EDUCATION MARKETS: FORWARD-LOOKING POLICY OPTIONS

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SUMMARY

Education is imperative for generating upward mobility and sustained economic growth. The consequences of the persistent inequality in educational attainment associated with where young people reside and their family circumstances are greater today than ever before; inequalities that start at young ages are often magnified through formal schooling, ultimately limiting mobility and cementing differences in opportunities. This is not a new phenomenon yet the consequences are greater than ever as labor market opportunities for those lacking broad-based skills have eroded. Failure to close achievement gaps will limit economic prosperity of those at the bottom and likely increase future burdens on taxpayers.

The case for *public* investment in education is strong. Benefits accrue not only to individuals, but to society. Money is necessary, but not sufficient. The decentralized and market-oriented nature of education production in the U.S. can be seen as a significant virtue. Yet, these markets are not without imperfections. The role for federal policy is to address inequality of opportunity generated by differences in resources, to foster innovation and to ensure a high return to public investment.

Although there are no easy solutions, there are modest—yet significant—changes in the allocation of federal resources and regulations that can yield efficiencies and improve outcomes in such areas such school accountability, teacher preparation, and undergraduate financial aid.

Increased federal emphasis on data-driven innovation and (at least some) decentralization in policy formation are needed. It is only natural to tie spending to outcomes-based assessment; how this is done matters enormously. An overarching conclusion of this paper is that the federal government must dramatically increase its investment in educational R&D.

We know a great deal more about what works and what doesn't in education than we did two decades ago. Existing evidence, while not definitive, identifies areas where further investment is likely to yield high returns, policies that are not working, and big unanswered questions. How federal policymakers address entrenched disparities in educational attainment will either pave a path to vibrant economic growth and innovation or produce stagnant growth and further erode the U.S. standing as a global leader in educational attainment.

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Education is an excellent investment—for individuals and for society. Indeed, it is imperative for generating upward mobility and sustained economic growth. The consequences of the persistent inequality in educational attainment associated with where young people reside and their family circumstances are greater today than ever before; inequalities that start at young ages are often magnified through formal schooling, ultimately limiting mobility and cementing differences in opportunities. This is not a new phenomenon. Yet the consequences of the current deficits in the performance of students and their schools are greater than ever in the skills-based economy. Labor market opportunities for those lacking broad-based skills have eroded. Failure to close achievement gaps will not only limit economic prosperity of those at the bottom but will likely increase the future long-term burden on tax-payers through entitlement programs.

The case for public investment in education is strong. The benefits accrue not only to individuals, but to society as a whole. Money matters in education; money is necessary, but not sufficient. Local, state and federal governments spent about $1.2 trillion on education at all levels in the 2013-14 school year, about 7 percent of Gross Domestic Product.[1] About one quarter of that comes the federal government, but the federal government is largely absent from the "production" of education. The federal role in education policy includes funding and regulation, while the actual provision of education is left to localities, states and private institutions. The vast majority of students in K-12 schools and in colleges attend public schools under the control of local or state governments. Educational institutions in both the private and public sectors generate decentralized and market-oriented provision of education in the U.S., which can be seen as a significant "virtue" (Goldin and Katz, 2008). Yet, these markets are not without imperfections and, as such, the natural role for federal policy is to not only address inequality of opportunity generated by differences in resources but to also ensure that there is a high return to the investment of public resources.

Yet calls for additional public investment in schools, colleges or financial aid are unlikely to be well-received (or effective) without substantial commitments to accountability and innovation. Although there are no quick or easy solutions to the most challenging issues in education[2]—particularly the persistence of substantial inequality—there are modest, yet significant, changes in federal regulations that can yield efficiencies and improve outcomes.

Increased federal emphasis on data-driven innovation and (at least some) decentralization in policy formation are needed. It is only natural to tie spending to outcomes-based assessment, but how this is done matters enormously for the return on investment, as further described below. One overarching conclusion of this paper is that the federal government must dramatically increase its investment in educational R&D. To make substantial progress on truly hard problems will require large-scale investment, with attention to basic research, development and implementation. At the same time, we do know a great deal about the relative returns to policies "already on the books" and this evidence should be employed actively in deciding where to invest.

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1 *Digest of Education Statistics* (2016), tables 106.40, 106.40, 401.10.

2 Inequality in educational attainment is a long-standing problem, with differences by race and family income extending to well before the start of the 20th century. Over the last 75 years there have been a number of major federal reports identifying the decisive inequality in educational outcomes associated with socio-economic status, as well as race. Two of the most prominent examples are Zook 1947 and Coleman 1966.

Three challenges headline the current educational landscape:

- Students' preparation for school differ markedly by family economic circumstances and race;
- Students' gains from attending elementary and secondary school are distributed unevenly by economic circumstances, geography, and race;
- Differences by family circumstances in students' educational outcomes—including college attendance, college choice, and college completion—widen after high school, even after taking into account differences in academic preparation.

These challenges are not just matters of social justice and inequity. They are demonstrations of economic inefficiency. There are young people capable of entering the workforce with strong skills who miss out on these opportunities through no fault of their own.

Claims about the future of education in the U.S. often begin with a narrative about "falling behind."[3] Such claims are not totally without merit; scores of U.S. students on international metrics of K-12 achievement or college completion rates have increased at a much slower rate than those in other countries. Yet, there has been good news over the last quarter century, including:

- The proportion of children participating in early childhood programs has increased between 1990-2014 from 44 percent to 54 percent;[4]
- Scores of elementary students on the NAEP test at age 9 have risen in both math and reading between 1990 and 2014 (although scores for older students have been stagnant);
- High school dropout rates (the percentage of 16- to 24-year-olds without a high school diploma or GED) have fallen from 12.1 percent to 6.5 percent between 1990 and 2014;[5]
- College enrollment rates have risen 31 percent since 2000, and they are projected to increase another 14 percent by 2025;[6]
- The share of 25-29 year olds with a BA degree has risen from 23.2 percent in 1990 to 29.1 percent in 2000 to 35.6 percent in 2015.[7]

These are not small accomplishments, particularly in an environment in which real earnings among below-median families have eroded while the percent of young people growing up in poverty and single parent homes has increased which would predict deterioration in aggregate educational outcomes.[8] Not only do

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3 See U.S. Department of Education, 1983. See also "The United States, Falling Behind," 2013.
4 Kena et al., 2016.
5 Kena et al. (2016), "Status Dropout Rates."
6 Kena et al., "Undergraduate Enrollment."
7 Much of this increase occurred between 2009, when the BA attainment rate was 30.6 percent, and 2015. See Table 104.20 in *Digest of Education Statistics* (2016).
8 Data assembled by Child Trends from federal statistics indicate that the share of children born to unwed mothers increased from 10.7 percent in 1970 to 40.2 percent in 2014, while the share of children growing up in poverty increased from 15.1 percent in 1970 to 20.7 percent in 1970 (though this measure varies with the business cycle).

aggregate data show signs of improvement, but there are visible examples of excellence in U.S. education at all levels.[9]

We know a great deal more about "what works" (and what doesn't) in education policy today than we did two decades ago. The introduction of the Institute for Education Sciences not quite 15 years ago (through the Education Science Reform Act of 2002) is just one visible indicator of the attempts that have been made to improve the evidentiary base to guide education policy.[10] To be sure, there have been genuine disagreements about models of behavior and the measurement of outcomes, but there has also emerged a consensus about evidentiary standards and the importance of evaluation in guiding resource allocation. While the evidence assembled does not provide a definitive road map for policy reform, it does serve to identify areas where further investment is likely to yield high returns, policies that are not working, and the big questions that need to be addressed. How policymakers address entrenched deficiencies in educational attainment will either pave a path to vibrant economic growth or, less optimistically, stall growth and innovation.

This analysis moves ahead by first setting forth the broad landscape of educational markets from K-12 to the collegiate level and the unique challenges for federal education policy, which is functionally intertwined with decentralized institutions and the policy decisions made at state and local levels. In sketching this landscape, we are left with the inescapable fact that, not only are the sluggishness of educational gains concerning, but the persistence of inequality in educational outcomes linked to family circumstances is the pressing challenge for education policy in all domains. The second section outlines the dimensions of this problem. The third and fourth sections turn to the consideration of the federal policy choices best positioned to address these challenges, first in the K-12 domain and then in the collegiate sector. The final section offers a basic message: while there are modest yet significant changes in regulations that can be expected to yield efficiencies and improve outcomes, there are no silver bullets or quick fixes in addressing the most challenging barriers in education today. To this end, a federal policymaking environment that emphasizes data-driven innovation and some decentralization in policy formation may be well-positioned make large gains on long-standing challenges in educational attainment.

I. INSTITUTIONAL CONTEXT AND FEDERAL POLICY TOOLS

All politics are local, most (but not all) education policy is local

Education in the U.S. is distinguished from many other countries by the extent to which production and funding is largely carried out by state and local agencies rather than a centralized federal government; the Establishment Clause (10th Amendment) delegated to the states matters not enumerated, like education. This highly decentralized system has, historically, provided many advantages—fostering competition

9 On a per capita basis, the U.S. leads the world in the supply of collegiate opportunities, and boasts 33 of the 50 most highly ranked universities in the world (Shanghai Rankings). Additionally, recent evidence identifies innovative elementary and secondary schools that have produced dramatic gains in measured achievement among some of the most traditionally disadvantaged students (Abdulkadiroglu et al. 2011; Dobbie and Fryer 2011).

10 Angrist (2004) notes that in 2000 only one of the 84 projects that were part of the Department of Education's annual plan involved a randomized trial.

between districts at the elementary and secondary levels, as well as among colleges and universities, and allowing individuals to select among different educational options.[11] Whether these historical "virtues" have become "vices" that stymie mobility and exacerbate inequality is an important question and, perhaps, a primary influence on recent federal involvement in in education policy (Goldin and Katz, 2008). In effect, does the relatively modest level of funding and oversight from the federal government limit educational attainment and foster inequality?

Of the $1.3 trillion spent by state, federal and local governments in the 2010-2011 school year, direct outlays for education among state and local governments were almost $870 billion, approximately 70 percent of which was for K-12 education. At the elementary and secondary level: In 1970, 52 percent of school revenues came from local sources, while only 40 percent came from the state, and about 8 percent came from the federal government. By 2010, state and local sources accounted for roughly equal shares of revenues, at 47 percent and 44 percent respectively, and federal contributions had grown slightly to almost 10 percent of total revenues.

While funding for education comes from all three levels of government in addition to private sources, the federal government is largely absent from the "production" of education.[12] 84.1 percent of students enrolled at the elementary and secondary levels attended public schools, operated by local governments and funded from taxes raised locally, as well as funds from state and federal governments. About 72 percent of students enrolled in higher education attend public colleges and universities under the control of state governments; another 19 percent were enrolled in schools that were private and nonprofit, and only 8 percent of students were enrolled in private, for-profit organizations.

There are (at least) two fundamental economic challenges that motivate a role for federal policy in education. The first concerns the long-standing notion of equality of opportunity. So long as educational attainment is either tied to where individuals live (and housing costs) or requires direct payment, an individual's family and economic circumstances—not individual ability—may limit where a student can attend school and what type of education he or she can pursue.[13] The federal government has a vested interest—and, in some cases, a legislated responsibility—in addressing these inequalities.[14] Moreover, because the benefits of an educated populace (or the costs of ignorance) spread across geographic areas there is a strong federal incentive to encourage educational attainment.[15]

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11 In their analysis of the spread of secondary schooling in the U.S., Claudia Goldin and Lawrence Katz (1999) emphasize the decentralized nature of the rise of high schools in the early 20th century. They argue that the combination of high labor market returns to a high school degree and inter-district competition driven by the large number of school districts in America at the time led to dramatic increases in secondary school attainment.

12 The military academies provide the obvious exception.

13 Beyond economic circumstances, race has also been a salient historical factor limiting educational access.

14 Indeed, the federal government has exerted a powerful influence in reducing inequality and increasing educational opportunity through judicial action (*Brown v. Board of Education* (1954), *United States v. Virginia* (1996), *Sweatt v. Painter* (1950), for example) and legislation (Civil Rights Act of 1964 (Public Law 88–352) and Americans with Disabilities Act of 1990 (Public Law 101–336), for example).

15 A number of researchers have demonstrated the strong link between the education level of the workforce and economic growth (see, for example, Delong et al., 2003). Greater levels of education also lead to more civic engagement (Dee, 2004).

Federal funds, federal rules

The federal government's role in education has historically been fairly modest due to the strong desire among many Americans to retain local control of public schools. Still, the federal role in education policy is by no means inconsequential in terms of funding or regulatory impact. In 2015, the federal government provided direct support to education of about $196 billion which was about evenly split between programs related to elementary-secondary education and programs related to higher education; in addition, another $101.5 billion of federal funds are reflected in indirect expenditures, principally in the form of the student lending program (*Digest of Education Statistics*, Table 401.10). The federal role in knowledge creation and skill-development is actually much larger when the full scope of research activities, which are complementary to student enrollment, are taken into consideration.

Two large omnibus acts of legislation, the Higher Education Act (HEA) of 1965 and the Elementary and Secondary Education Act (ESEA) of 1965, set forth a range of funding vehicles from Title I support for low-income schools to the Title IV financial aid programs. One might think of this legislation as foundational to the currently federal role in educational policy, though there are plainly other vehicles through which federal legislation affects schooling.

Looking ahead at legislative action in the course of the coming years, an important starting point is the reauthorization status of these major laws. In 2015, the federal government passed the Every Student Succeeds Act, which replaced the No Child Left Behind Act legislation and serves as a reauthorization of the Elementary and Secondary Education Act. Major overhaul of this legislation is unlikely to be on the immediate horizon, even as there a number of questions about how money should be spent and rulemaking decisions (particularly governing Title I) open for policy consideration. Where there is likely to be major legislative action in the near term concerns the re-authorization of the Higher Education Act, which has been due for an overhaul since 2013. The Higher Education Act includes the backbone of the federal government's funding and regulation of colleges and universities and includes the federal financial aid to students (Pell Grants, Stafford loans which are included in Title IV) and direct support of institutions.

While this paper and presentation focus explicitly on educational attainment and funding from K-12 to college, two ends of the skill development spectrum warrant recognition: i) early childhood and pre-K and ii) graduate education and basic science. The omission of these topics should not diminish their importance or the potential return to investment in these areas. Existing policy discussion of early childhood education is robust and thoughtful recent contributions include Bob Pianta's "Pre-K prerequisite" (2016) and the Brookings Institution (2016) piece "Early childhood investments are vital," by Diane Whitmore Schanzenbach, Ryan Nunn, and Lauren Bauer.

Arguably, academic and policy analysis of advanced graduate study, as well as basic science in research universities has been more limited. Innovation in the basic sciences is done largely at colleges and universities in the U.S. and federal funding in this area is absolutely essential in order to secure long-term economic growth. Yet, federal funding as a share of GDP for basic science has been declining over the last 3 decades. Writing in the Wall Street Journal (December 5, 2016), MIT President L. Rafael Reif notes:

> For 70 years, federal support for basic scientific research has been the invisible infrastructure paving the way to innovation and economic growth. …. Scientists are like entrepreneurs: They have an eye for spotting unrealized opportunities. It can be hard to predict where those leads will take them. But as we have seen over decades, basic science leads to the new knowledge that leads all of us to the future, along the way spinning off powerful new tools and educating a new generation of scientific pioneers.

While discussion of federal investments in university research infrastructure, as well as early childhood programs, merit a place at the table in the broader discussion of human capital development, this analysis focuses on the territory from kindergarten to college.

II. INEQUALITY IN INPUTS? INEQUALITY IN OUTCOMES

Two broad observations motivate concern that federal (as well as state and local) education policy is not meeting the needs of Americans:

- **Increases in spending, modest results:** Between 1984-85 and 2014-15, real spending on education more than doubled from $535 billion to $1.228 trillion (Digest of Education Statistics, Table 106.20), while gains in attainment across all levels have been modest. On a per capita basis, real spending on elementary and secondary education on a per pupil basis increased from $7,785 to $12,509. As discussed below, there are some indications that increases in spending have not been spread evenly among students.[16]
- **Pervasive inequality in educational attainment by family circumstances:** Differences among young people in educational attainment by family income and by race appear to be entrenched and impervious to existing policies. The consequences are magnified by increases in the returns to skills in the economy and dampen intergenerational mobility.

Differences in educational attainment by family income which start at young ages and widen over the educational pipeline motivate policy makers to ask whether educational institutions differ by family income and whether there is a potential for schools to serve a compensatory role in narrowing achievement gaps linked to family background. An important starting point is the observation that the underlying differences in family income between those at the top and those at the bottom is greater now than ever before; in 1947, the ratio of incomes in the 80th percentile relative to the 20th was 3.1; in 1987, it rose to 3.26; and expanded further to 4.07 in 2007 (Duncan and Murnane, 2011). In effect, resources at the top have increased a great deal in the last 30 years, while the resources of a family in the bottom quartile have moved up only slightly.[17]

16 See https://nces.ed.gov/programs/digest/d12/tables/dt12_213.asp

17 As Duncan and Murnane (2011) note, these differences in income lead to a dramatic widening between top quartile and bottom quartile families in expenditures on enrichment activities; by 2005, a family in the top quartile spent about $8,872 on educational enrichment relative to the $1,315 spent by a family in the bottom quartile.

K-12 inequality in outcomes

With large differences in home resources, it is perhaps unsurprising that differences in achievement emerge early in life. Even before students enter school, Elango et al (2016) show large developmental differences in early childhood. By the first years of elementary school, the difference between the top and bottom SES decile on mathematics achievement is more than 1.34 standard deviations, and this gap widens slightly into 5th grade (Figure 3.2, Duncan and Magnuson, 2011). These differences in measured academic achievement by family income are accompanied by differences in social behaviors, with the 0.26 gap in standard deviation units widening to 0.47 between 1st and 5th grades (Figure 3.4, Duncan and Magnuson, 2011).

The implications for educational attainment of growing up in a low-income family are likely compounded when a student grows up in a low-income community. In new work, Reardon (2016) examines average district-level standardized test scores (on state accountability tests) for more than 11,000 school districts (including charter schools) in relation to district-level economic and demographic characteristics. The gradient between test score levels, and to a lesser extent test score growth, and the level of affluence is unmistakable. To be sure, test scores are a reflection of other factors related to income including children's home resources, neighborhood characteristics, pre-school options, as well as K-12 schooling experiences. Yet, beyond the income-test score gradient there is also considerable variance across districts, particularly in test score growth, which suggests that differences in the effectiveness of schools have an important impact on student outcomes.

Even with recognition of the gaps in measured student achievement, family income continues to play a determining role in high school graduation. Belley and Lochner (2007) show that, conditional on test scores, those in the top income quartile were 6.76 percentage points more likely to graduate from high school than those in the bottom quartile for young people born between 1979 and 1982. Nonetheless, this gap is somewhat smaller than the gap of nearly 8.5 percentage points observed for those born about two decades earlier.[18]

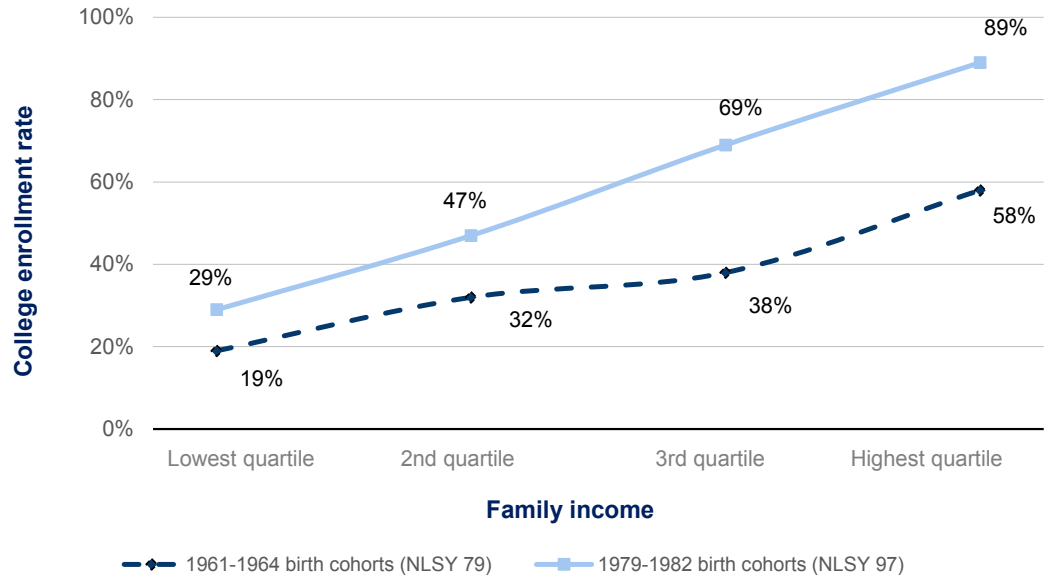
Post-secondary inequality in attainment

Even as there has been some narrowing in the pre-collegiate achievement gap by family income, the gaps in college enrollment and completion have actually widened over time. Starting with the unconditional difference, Figure 1 shows the raw difference in college enrollment and college completion by family income quartile. While gains in college enrollment for those born between 1961 and 1964 (starting college between 1979 and 1983) and those born between 1979 and 1982 (starting college between 1997 and 2000) have accrued across all family backgrounds, they have been much larger for those in higher income quartiles, rising more than 20 percentage points relative to a gain of 10 percentage points at the bottom. The second panel of this figure shows BA attainment for these cohorts, which similarly rose more in the top part of the income distribution than the bottom, as the gap in college completion increased from 31 percentage points to 45 percentage points. Taken together, enrollment and overall degree completion by family income underscore the observation that even when students from below median-family

18 It should also be noted that there is concern among many about the measurement of high school graduation. Heckman and LaFontaine (2010) argue that the true graduation rate is likely well below the statistics reported by the Department of Education.

incomes start college, they are much less likely to complete college compared to those from the top part of the income distribution.

Figure 1, panel a: College enrollment by family income



Source: Bailey & Dynarski (2011), tabulations from NLSY.

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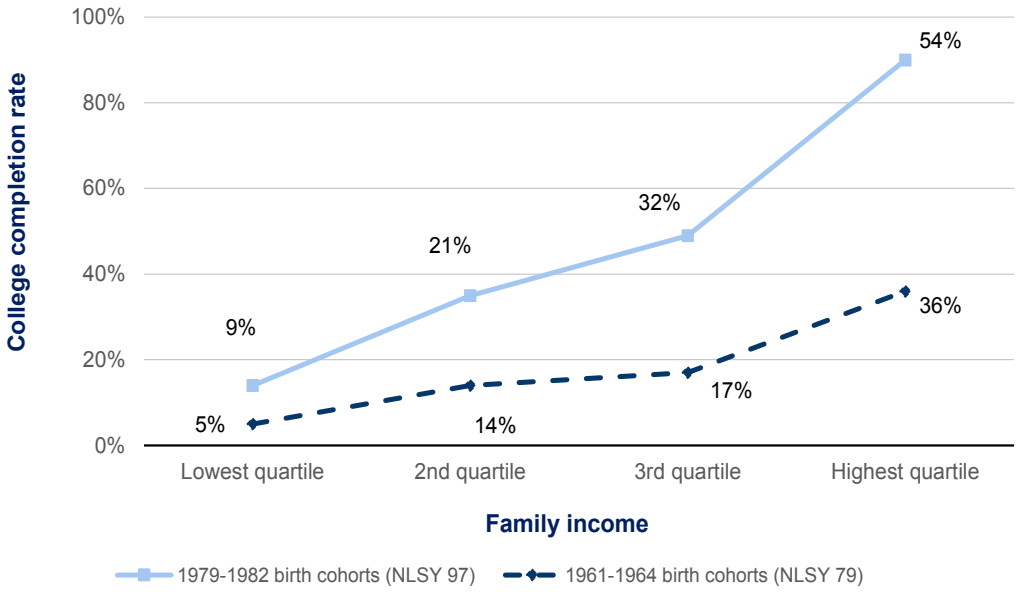
Figure 1, panel b: College completion by family income



Source: Bailey & Dynarski (2011), tabulations from NLSY.

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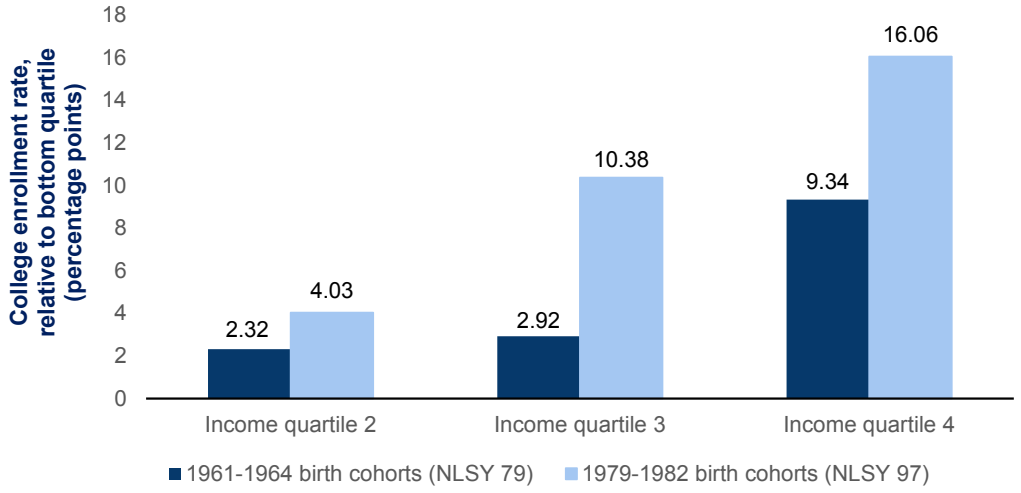
These differences, as presented, are unadjusted and do not answer the question of whether differences in college enrollment, and the widening gap by college completion, reflect pre-collegiate academic preparation tied to family income, direct effects of income on enrollment and attainment, or differences in the quality of colleges and universities selected by family income. One approach to this issue is to condition

on a whole set of demographic and achievement covariates and examine the independent effects of family income. When Belley and Lochner (2007) do this for both the early and late cohort, the gaps between income groups narrow but remain substantial and larger in the more recent cohort than in the earlier cohort. Figure 2 shows the college enrollment and attainment advantages associated with income quartile net of measured achievement differences. The top quartile is 16 percentage points more likely to enroll than the bottom quartile, 10 percentage points more likely to complete a 4-year degree, and 15 percentage points more likely to complete two years of colleges. Strikingly, the second quartile also lags markedly: 12 percentage points less likely to enroll, 11 percentage points less likely to complete 4-years, and 10 percentage points less likely to complete two-years.

Figure 2, panel a: College enrollment conditional on achievement, relative to bottom quartile



Source: Belley & Lochner (2007).

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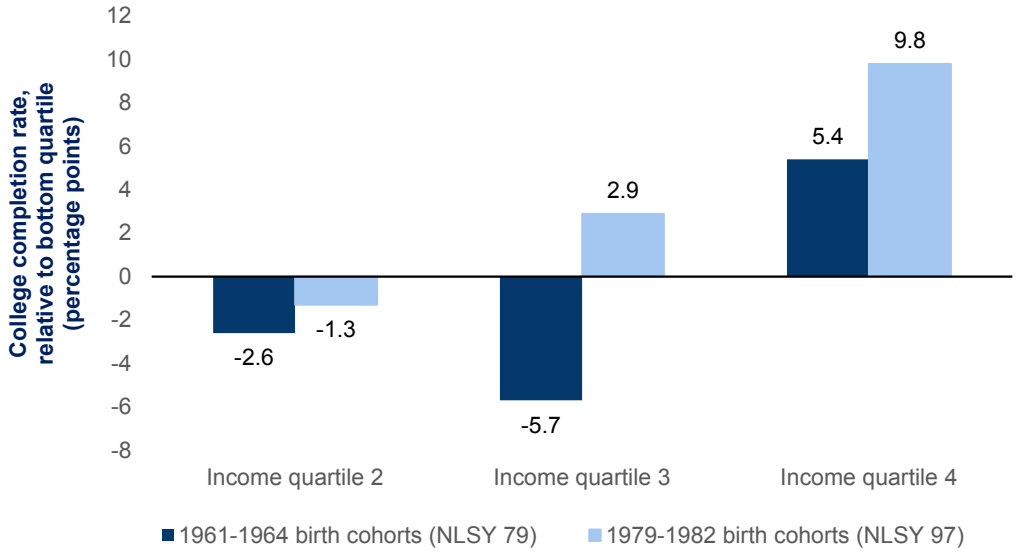
Figure 2, panel b: College completion conditional on achievement, relative to bottom quartile



Source: Belley & Lochner (2007).

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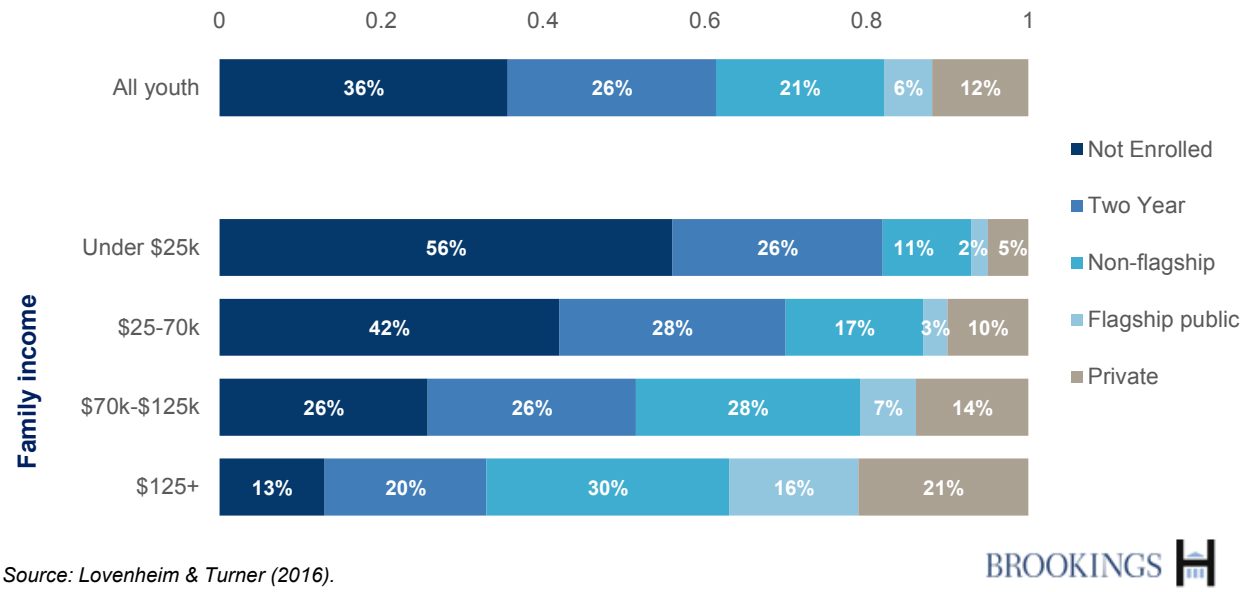
The sharp takeaway from this evidence is that inequality in educational attainment by family income widens at the post-secondary level and actually appears to have gotten worse in recent decades. Of course, the consequence of these differences is yet greater given the rising earnings premium associated with college attainment.

Differences by family circumstances in where students choose to attend college and the options available to them given stratification and greater selectivity at the most resource intensive institutions represent an important part of this equation. Figure 3 shows the distribution of students by type of institution and family income: low-income students are concentrated disproportionately at community colleges and open access 4-year institutions, while students from more affluent families are likely concentrated at flagship public institutions and resource-intensive private colleges and universities. Not only are collegiate resources strongly linked to degree attainment and time to degree (Bound, Lovenheim, and Turner, 2010 and 2012), but they also impact later life earnings outcomes (for example, Black, Daniel, and Smith, 2005; Hoekstra, 2009; Dillon and Smith, 2016).

Figure 3: Enrollment by type of institution and family income



Source: Lovenheim & Turner (2016).

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Research in the last decade has addressed the question of the "academic match" of collegiate choice, considering the extent to which students' academic characteristics represent the same level of competitiveness as the institutions to which they apply and attend. Low-income students are systematically less likely than their more affluent peers to attend selective colleges and universities; in turn, they are likely to attend community colleges and less selective public institutions. This "undermatching" is linked to lower college graduation rates (Bowen, Chingos, and McPherson, 2009) and, as Hoxby and Avery (2013) show using more recent data, there are few differences in persistence between high-income and low-income students conditional on type of institution. For this reason, understanding which students are likely to "underapply" and the factors affecting these students' decisions takes on particular policy importance. Notably, researchers examining these issues have found that it is at the college application stage—not

in college admissions nor matriculation decisions—where the behavior of low-income, high-achieving students most clearly diverges from that of their higher-income counterparts (Dillon and Smith, 2016; Avery and Turner, 2009; Hoxby and Avery, 2013).

One detailed analysis of "undermatch" comes from the Hoxby and Avery (2013) review of application patterns for very high achieving students (top decile) derived from individual level testing data; they find that the majority of low-income students in the top decile of achievement apply to no selective college, much less the highly selective schools at which they are likely to receive admission, even as these institutions tend to offer very generous financial aid. Examining data from North Carolina on students from a broad achievement range, Bowen Chingos and McPherson (2009) show that 40 percent of students who were well-qualified to attend a selective college in 1999 did not enroll in one, with this finding appreciably more pronounced among students in the bottom quartile of family income (59 percent of SAT-taking students) than among students from the top quartile (27 percent).

While the question of college choice has been at the forefront of a number of research agendas (including mine) in recent years, the degree to which students have high quality choices available is limited by individual circumstances and geography. For a college-ready student who is unlikely to be admitted to a selective institution, public options which come with a substantial price advantage for in-state students vary substantially in productivity and funding across states and even within states (Blagg and Chingos, 2016). Unlike the most selective institutions which are able to meet full need (often with grants), colleges and universities available to students from outside the top of the achievement distribution are likely to be unaffordable to many low-income students. Declines in state appropriations for higher education have had the most deleterious effects on the resources per student available at open access institutions.

With widening gaps in educational attainment by family income as students move from kindergarten to college, can federal education policy, layered on state and local policies, address these gaps and deliver on the promise of education as a means to economic growth and upward mobility?

Given the pervasive nature of educational inequality at all levels, the questions for federal policy (as well as those at state and local levels) should not be framed as a choice between investing in early childhood, K-12, or post-secondary attainment. Instead, we need to examine the basic components of the educational infrastructure asking what is working, what is not working, and where do we need more evidence. In turn, it is imperative to fund generously initiatives with high returns while reallocating funds from those with limited demonstrated effectiveness.

III. FEDERAL POLICY ACTION IN THE K-12 DOMAIN

The combination of major federal policy changes including NCLB, purposeful large scale experiments and careful analysis of administrative data have fundamentally altered knowledge of educational practice over the course of the last quarter century. Few of these innovations at the state and local levels have been in place long enough to present evidence convincing enough for a federal policy mandate. Consider, for example, that the first full cohort to experience accountability mandates under NCLB is only now nearing the age of college graduation.

There is little dispute that the federal role in K-12 education policy increased fundamentally with the passage of the NCLB legislation. Federal funding did increase while the government linked resources to regulatory and reporting requirements to a greater degree. Yet, the fundamental decentralization remains: most allocation decisions are made at the state and local levels. The prior section emphasized the fundamental challenge of inequality in education tied to family circumstances, with the question of how or whether federal policy could address these gaps.

Where federal policy has an extraordinary advantage is in facilitating research-based policy innovation and encouraging the development of an evidentiary base that allows states and localities to design policies adapted to local circumstances. Three domains in the policy landscape have changed markedly over the last quarter century include: school accountability, teacher performance evaluation, and public schools of choice (charters schools and intra-district choice).

School accountability

Research evidence

While students have taken standardized tests such as the Iowa Test of Basic Skills since the 1930s, state-wide requirements for testing are a relatively recent policy. The Texas Assessment of Academic Skills (TAAS) program was introduced in 1990 and mandates annual tests of students in grades three to eight, along with a high school graduation exam. In 1994, consequential accountability requirements required minimum pass rates if schools were to avoid sanctions from the state. States that soon followed the Texas lead included North Carolina, South Carolina, Florida and a number of others. By the start of the twenty-first century, more than 40 states had some accountability measures in place and the policy outline rose to the national level in 2002 with the passage of the No Child Left Behind (NCLB) Act which required all states to introduce standards of accountability and to assess student performance.

Two types of research initiatives related to accountability policies merit note: first, did these policies meaningfully impact student learning and, second, to what extent did testing produce distortions and unintended consequences. A growing body of evidence does point to sustained learning gains from test-based accountability.

- Hanushek and Raymond (2005) show that states adopting consequential accountability policies had about 3.2 points more growth in math and reading NAEP scores than states that did not pass these laws in the years before NCLB;
- Dee and Jacob (2011) compare states that already had a consequential accountability system in place in 2002 (such as Texas), with those forced to change policies with NCLB; they find NCLB is associated with an increase in fourth-grade math achievement of about 8.2 points (0.26 standard deviation) and an effect on eighth grade math of 5.3 points (0.14 standard deviation), with generally insignificant effects on reading.
- More recent work, including Deming et al. (2016) suggests that when schools face accountability pressures (including the risk of being labeled low-performing) students, particularly from low

performing schools, benefit in terms of improved learning and earning outcomes.

While researchers have cataloged behaviors that include focus on students at the proficiency margin to the detriment of other students, narrowing the curriculum, cheating, systematic exclusion of low-performing subpopulations, and the threat of outcome variation generated by measurement error (Figlio and Loeb, 2011), many of these problems have been mitigated with improved policy design, even as some educators retain concern over the burden of testing.

Policy action

The tension associated with federal accountability policies concerns the extent to which the target curriculum on which testing would be based would be a common federal standard or reflect state-specific autonomy.[19] The Every Student Succeeds Act (2015), which replaced No Child Left Behind as the reauthorization of the Elementary and Secondary Education Act, reached a bi-partisan compromise to allow states flexibility in the design of curriculum and standards while maintaining the federal mandate for testing in grades 3 to 8.[20]

Looking ahead over the course of the next several years, the major question is one of state behavior: does the flexibility afforded by the new ESSA provisions improve student outcomes by allowing states to tailor standards and testing (and other observational measures, like attendance) to local contexts? Alternatively, does the more limited role of the federal government in the establishment of accountability standards produce a dilution in requirements and an erosion in performance?[21] The primary "policy actions" in the accountability domain include:

- **Stay the course:** Test-based accountability serves diagnostic and informational functions as well as providing incentives for improvement; still, how such programs are designed is critical to avoid unintended consequences.[22]
- **Invest in high-quality assessments:** Federal funding could support the independent development and testing of high-quality assessments linked to specific curricular objectives; the structure of funding should encourage groups of states to collaborate to benefit from economies of scale in development.
- **Understand limits:** Fundamentally, we are not going to test our way to eliminating the achievement gap, so accountability policies are necessary but not sufficient policies to close achievement gaps.

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19 With the federal stimulus funds from ARRA, the Department of Education created a large-scale competitive grants program known as Race to the Top. The near requirement that states had to adopt the Common Core curricular standards generated considerable dissatisfaction and was viewed by some as "overreach" by the federal government. .

20 In addition to the "accountability" benefits of mandated testing, these instruments provide rich information at a very detailed level for the entire population of public school students. Reardon (2016) and colleagues provide an important first step in demonstrating the power of these data in helping researchers and policymakers to document variation in performance levels and growth.

21 Peterson and Lastra-Anadon (2010) note: "States have strong incentives not to set world-class standards. If they do, more of their schools will be identified as failing under NCLB rules, and states will then be required to take corrective actions to bring students' performance up to the higher standard."

22 Federal efforts have the capacity to complement state and local efforts by using uniquely federal data from the FSA to report FAFSA filing and financial aid utilization at the level of the high school.

School choice

Research evidence

Even as discussion of "school choice" in the form of vouchers dates at least to Milton Friedman's writings in the 1950s, the establishment of alternatives to traditional public schools has expanded markedly in the last two decades with the innovation of "charter schools" and the mandate for alternatives to public schools when local public schools were deemed to be failing in state accountability settings.[23] The promise of school choice for improving educational outcomes is twofold: first, the competitive effects of students leaving one school and attending another may lead to systemic pressure for improvement when public school revenues are tied to student flows; second, schools of choice (particularly charter schools) may serve as "laboratories" for considering how alternative organization and staffing of the schooling experience affect student outcomes.

The substantial expansion of charter schools in the last two decades has been accompanied by rich research literature on efficacy, reflecting both near term changes in test scores and longer-term outcomes (earnings, college and behavior). The results are "mixed"—largely reflecting differences in student, school and market characteristics. In short:

- Some urban charter schools—particularly those that implement some version of the "No Excuses"[24] approach—show strong and persistent effects on test scores, as well as further outcomes like collegiate attainment (Abdulkadiroglu et al. 2011, Dobbie and Fryer 2011, Angrist, Pathak, and Walters 2013; Angrist et al. 2016; Tuttle et al. 2013; Dobbie and Fryer 2015). Results from the charter schools in Boston and the Promise Academy in New York have been particularly striking in this regard. Many of these substantial effects come from studies in urban areas which take advantage of oversubscription to generate quasi-random assignment in lotteries.[25]
- Many of the other analyses of charter school effects on achievement based on observational studies find on average no achievement effects. The 2013 CREDO study based on 27 states found essentially no effect in math and a very slight positive effect in reading, with 29 percent of charter school students outperforming their traditional public school (TPS) peers, while 19 percent performed worse than TPS peers. Studies that are able to use both observational and lottery approaches broadly conclude that it is differences in schools not differences in methodologies that produces these results (Abdulkadiroglu, et al., 2011; Furgeson, et al., 2012; Tuttle, et al. 2013).
- There is some evidence that the charter sector as a whole is improving over time (CREDO, 2013)

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23 This discussion focuses on charter schools in the interest of focus. Two other prominent mechanism of school choice include intradistrict choice (or "open enrollment") and private school options facilitated by vouchers. Most broadly, school choice policies serve to policies serve to decouple the link between where students live and the public schools they can attend. Many large school districts including Chicago, Los Angeles, New York City and Charlotte-Mecklenburg have open enrollment policies. Voucher programs targeted to low-income students have tended to be quite modest in scale and limited programs have existed Milwaukee, Cleveland, New York, and Washington, D.C.

24 Schools in this mode tend to have longer school days and terms, higher behavioral expectations, stricter disciplinary codes, uniform requirements, and so forth.

25 As Epple et al (2015) note, these lottery-based studies have internal validity that is well-established, but their external validity and applicability to a wider set of environments is likely limited. Moreover, oversubscription is a condition for lottery analysis and it is natural to expect that schools with wait lists may be among the best schools of charters, providing little information about charters that are not oversubscribed.

while individual charter schools also seem to get better as they mature (Epple et al, 2015). The closure of underperforming schools is, in turn, an important mechanism for overall improvements in quality and, as Epple et al note: “This research points to the important role that charter authorizers can play in weeding out ineffective charter schools, a role that many charter authorizers have yet to embrace.”

- Yet, even for the highly-acclaimed “No Excuses” schools there is no evidence that these schools impact labor market outcomes for students in their 20s, based on the Dobbie and Fryer (2016) study of outcomes in Texas. What is more, these authors find that the remainder of “regular” charter schools have negative effects on test scores, four-year college enrollment, and earnings relative to the standard public school alternative.

While the available evidence on charter schools is moderately encouraging even as outcomes are not unambiguously positive, evidence on the impact of voucher programs on student achievement is disappointing. Research evidence based on publicly funded voucher programs serving students in low-performing schools in Ohio (EdChoice Scholarship Program) and Louisiana (Louisiana Scholarship Program) finds negative effects on student achievement among those making use of the vouchers to attend a private school (Figlio and Karbownik, 2016; Abdulkadiroglu, Pathak and Walters, 2015). If there is a silver lining to these results, it is that voucher programs available to students in low-performing schools do appear to generate positive “competitive effects,” improving outcomes at voucher eligible public schools (Figlio and Karbownik, 2016).

Policy action

The evidence on charter schooling, and school choice more generally, is unquestionably thought-provoking, but genuinely mixed. The quite dramatic results from the “No Excuses” model for a population for which any achievement gains have traditionally been seen as elusive must surely register as an advance and, more generally, the capacity of charter schools to provide laboratories for educational innovations is a channel through which charter schools may positively impact traditional public schools. The federal policy role with respect to charter schools is one of generating evidence and disseminating best practices. While independent researchers have done an able job of gathering and disseminating evidence about achievement effects in particular districts and geographies, at least three research questions would benefit from a coordinated federal effort to collect and assess evidence:

- **Choice:** How do parents (and students) choose to make applications to charter schools? How do parents’ perception of school quality (including comparisons among traditional public schools and charter schools) and match quality align with objective measures? Are there design interventions that can facilitate better matching of students when charter schools and intradistrict choice are options?
- **School-level evaluation:** What are the multiple metrics that districts, states and other authorizing agencies have to identify successful / failing schools of choice? At what point is there sufficient information to deem a school “failing”? How can authorizing agencies best provide developmental

feedback to school about performance?

- **Long-term outcomes:** As charter schools approach about the quarter century market as a policy option (though many are far younger), what are the long-term economic and behavioral outcomes of these alternative environments and how do they differ with student characteristics?

As the evidentiary base on schools of choice grows, it should be possible to add more direction to federal guidance, funding and regulation in this area. Yet, heterogeneity in student characteristics and market conditions caution against explicit endorsement of particular "models" of schools of choice on an "across the board" basis.

Even as decentralization in this domain is surely warranted, the high long-term costs for students of continuation of institutions with exceedingly poor performance does caution against full deregulation[26] and the consideration of minimum standards of proficiency required for continued operation. Indeed, no stronger proponent of the injection of private market forces than Milton Friedman reminds of the importance of government regulation in ensuring schools met certain "minimum standards" no less than three times in his essay "The Role of Government in Education" (1955); for example, Friedman identifies the role of government in "assuring that the schools met certain minimum standards such as the inclusion of a minimum common content in their programs, much as it now inspects restaurants to assure that they maintain minimum sanitary standards." Consistent oversight does appear to yield stronger outcomes among alternative public school arrangements: strong student outcomes in charter schools in New Orleans can be reconciled with weak outcomes among students utilizing vouchers in this same environment by recognizing the differences in regulatory environments. Quoted in the New York Times (Leonhardt, 2016), one researcher who studying these outcomes notes: "The larger theme is that not all school reform is created equal. The charter system here has significant accountability: Low-performing schools are closed."

The federal government does maintain the regulatory and funding authority to prevent poor-performing charter schools from receiving federal support, either directly or indirectly. An analogy is important: the FDA requires the cancelation of clinical pharmaceutical trials[27] whenever there is a reasonable doubt of patient safety; the government should suspend experimental charters when there is evidence indicating that a student's persistence in a charter is causing harm relative to the existing public school option.[28]

With mixed evidence on the impact of charter schools and voucher programs on student learning and outcomes in the public sector, forward-looking policy proposal must emphasize **regulation and oversight**, particularly:

1. Federal guidelines for the agents authorizing charter schools and those approving schools to receive vouchers that are tied to federal funding;
2. Federal guidelines for identifying and closing failing schools, as well as potentially rewarding those that demonstrate sustained excellence.

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26 Some evidence would indicate that "online charters" may have particularly suspect achievement outcomes.
27 21 C.F.R. 312.44 (2016).
28 To be sure, this is tricky: the relevant counterfactual is the alternative traditional public school and not some arbitrary benchmark.

Teacher performance and teacher compensation

Research evidence

Large-scale administrative data, randomized control trials and innovative policy approaches have produced quite convincing evidence of the powerful effect that teachers have on students. Indeed, through value-added assessments and improved observational assessments, administrators and researchers are able to demonstrate powerfully the distinction between strong teachers and weak teachers in their effects on a variety of short-term and long-term student outcomes. Much of this work has been facilitated by researcher access to panel data of individual student records with standardized test achievement and non-test outcomes and, in some cases (particularly the papers by Chetty and coauthors), links to long-run outcomes. Among the key findings:

- Value-added measures of teacher performance are strong predictors of how teachers differentially affect students. Such measures are far more predictive of student performance than observed characteristics like experience or advanced degree attainment, even as there is important methodological critique to acknowledge.
- In addition to predicting students' achievement on standardized tests, value added indicators of teacher performance are meaningful predictors of long-term student outcomes. For example, based on work by Chetty et al (2014), a one standard deviation in a teacher's value added score increases expected student income at age 28 by $286 per year. This is a strong indicator that the impact of highly effective teachers is likely to be long-lasting.
- Early career indicators of teacher performance in the first three years of teaching are meaningful predictors of a teacher's long-run performance in the classroom (Kane and Staiger, 2005; Gordon, Kane and Staiger, 2006). In other words, after just three years in the classroom, it is clear who will be a good teacher and who will not be, though existing measures at this early career stage are much stronger in identifying teachers in the tails than differentiating among those in the middle of the distribution.

Looking back only two decades, important empirical and methodological advances in assessing teaching performance are evident. One takeaway from the Measures of Effective Teaching (MET) project evaluations is that using multiple measures of performance will provide a more comprehensive assessment than just value-added measures and will be less subject to distortions like "teaching to the test" at the expense of broad based and engaging instruction.

Yet, the connection between this growing body of evidence and solid policy recommendations for teacher recruitment and performance-based compensation remains weak. Theoretical arguments for moving away from a compensation mechanism based on experience and education are well-placed; however, there are compelling concerns that performance-based incentives may have deleterious unintended consequences or may simply be ineffective. For example, the large-scale experiment in New York City exploring how monetary incentives for teachers tied to student achievement affected student performance identified little

change in teacher behavior or student outcomes (Fryer, 2013). Yet, in other settings, incentives such as a strong dismissal threat had a significant effect on retention and teacher performance when linked to evaluations that also included a substantial feedback component (Dee and Wyckoff, 2015).

Policy action

Recruiting and retaining better teachers, providing meaningful professional development, and compensating teachers in a manner consistent with performance reflect the policy objectives with the potential to have the most transformational effect on student achievement of any intervention on the horizon. We know a great deal more about these mechanisms than we did a decade ago, but the state of knowledge is not sufficient to set guidelines for a national "teacher policy." Where federal policy can be most effective is in providing the resources to pursue an integrated and comprehensive research strategy which would include both data collection and large scale trials. Such a strategy would invest in:

- Teacher training and recruitment
- Professional development
- Comprehensive evaluation and performance incentives

There is a large accumulation of evidence about the broad ineffectiveness of many activities in both teacher training programs and professional development. An extraordinary level of resources (time and money) is currently invested in such initiatives by districts across the country, with little impact on student outcomes (Weisberg, 2009). Moreover, it is naïve to suggest that large gains in teacher performance will follow from a computer program or a new fad in teaching or counseling procedures.

High-functioning systems of professional accountability are expensive and time-intensive to develop. As such, there are large fixed costs that likely prohibit small- and medium-sized districts from undertaking these initiatives at a high level. Given the economies of scale associated with any well-designed evaluation program, there is likely some benefit to provide seed money for larger collectives to undertake these tasks, serving multiple districts or even multiple states.

A key piece of any coordinated research strategy is to recognize the importance of geographic heterogeneity and student heterogeneity. While the current research base includes major studies of large metropolitan labor markets (New York, DC, Los Angeles), research knowledge about teacher labor markets and, in turn, response to performance incentives is far more limited in non-urban markets where behavioral responses may well-be quite different as suggested by Rothstein (2012). The fundamental variation in labor market conditions and student needs pushes against any "one-size-fits all" set of policies for teachers; at the same time, there are enough similarities among communities within and between states to believe that innovative strategies with demonstrated efficacy could benefit a large number of teachers, schools and students.

Federal investments aimed at improving the skills of teachers as they enter the workforce, developing skills in the classroom and rewarding strong performance hold strong promise. While recognition of differences in

local labor markets and student needs, cautions against any expectation of a "federal teacher policy," there is every reason to believe that innovative models with proven efficacy could be disseminated across states and districts, thereby generating a collective return on the federal investment. Potential policy innovations include:

- Fund the development of a state-level database of teachers that records assessments in teacher education programs and classroom outcomes with the capacity to link to districts' and states HR systems.
- Invest in scalable and data-driven teacher assessment and professional development programs; note that the innovation includes both personalized information / guidance provided to teachers and the development of "system architecture" that takes advantage of scale economies in development (every mid-size district need not re-invent the wheel).
- Continue to monitor and test incentive pay, while also consider experiments that assess whether increased compensation in hard-to-staff schools or subjects impacts student outcomes and the retention of strong teachers.

IV. HIGHER EDUCATION

Poor outcomes in the market for higher education including unacceptably low-measures of collegiate attainment and borrowers struggling with loan repayment start with problems of college choice and academic preparation. How students choose colleges, the resources available to them at collegiate institutions, and how they pay for college are the fundamental determinants of attainment and, it is at this point that gaps by family circumstances widen. In recent years, press coverage of higher education tends to focus exclusively on the visible result of these issues in terms of a loan repayment problem. While the latter may be salient, it is a symptom of the problem not the cause.

Choice, information and shared responsibility for funding are the foundations of any discussion of collegiate attainment in a market environment. What is the federal role in such a system?

Federal aid: Improving how students and families pay for college

College is an investment that can be expected to provide long-term dividends in the form of higher earnings. Thus, many of the returns to successful collegiate attainment are private. Yet there are also public benefits to successful completion as well as costs to failed experiences. It only makes sense that all students who can benefit from college should have the opportunity to invest, paying through a combination of own resources, loans and government subsidies, thereby making college "affordable." But, "affordability" is dangerously misunderstood in the public dialogue—affordable does not mean free.[29]

29 "Free tuition" is unrealistic given that it would further erode resources per student, poorly targeted, and misses the point that many of the returns are private. Moreover, "free" is also a terribly regressive form of subsidy. Bowen and McPherson (2016) note that "costless" programs of study often generate other unintended consequences such as extended time to degree, a situation which was quite evident under 0 tuition regimes in Europe.

The research evidence on financial aid does not provide a convincing rationale for the system as currently designed. It has been well-established that transparent, portable grant aid can impact enrollment and attainment. However, little research evidence supports the efficacy of the current structure of the two flagship federal programs, Pell Grants and tuition tax credits,[30] in promoting collegiate attainment. The scale of these two programs on the federal ledger merits particular comment: the programs peaked at $39 billion in spending on Pell Grants, and $21 billion in tax credit expenditures in 2010-11; recent levels have been about $30.6 billion for Pell Grants, and $18.25 billion for the trio of tax credits. In comparison, for FY 2015, Title I of the Workforce Innovation and Opportunity Act (the successor to WIA) which covers employment and training services received only about $2.6 billion, while for workforce development in all parts of WIA plus programs dispersed in other agencies totaled $12 billion in 2009-10 (Congressional Research Service, 2013).

Federal spending on financial aid, in billions

	1999-2000	2004-2005	2010-2011	2014-2015
Pell Grants	$10.32	$16.57	$39.1	$30.68
Education Tax Benefits	$5.94	$7.72	$21.69	$18.23

BROOKINGS

The scope of the Pell Grant program in serving both students engaged in college enrollment following high school graduation and those who are returning to college after some labor force experience merits emphasis. Indeed, since 1985-86, the majority of Pell Grant recipients have been "independent" students (effectively 24 or older or with independent households) and the proportion of Pell Grant recipients who are in the independent category varies with labor market conditions. Not surprisingly, in response to the Great Recession this share rose to a peak of 60.5 percent in 2009-10 before falling back to 54.9 percent in academic year 2014-15 (*Trends in Student Aid*, Table 8). The role of federal financial aid in providing access to training for older workers and the intersection with other active labor market policies, including unemployment insurance, is understudied (Barr and Turner, 2015a).

Early work by Hansen (1983) and Kane (1994) found little evidence that the introduction of the Pell Grant program in the early 1970s appreciably altered college enrollment of young adults from disadvantaged

30 The reference to "tax credits" in a general sense captures three related federal programs. First, the Hope Tax Credit and the Lifetime Learning Credit were introduced in 1997. The Hope Tax Credit, which is available for the first two years of post-secondary study, provides 100 percent of the first $1200 of tuition expenses and 50 percent of the second $1200 in tuition expenditures provided that tuition expenditures exceeded $2400. The original phase-out range was between $48,000 and $58,000 modified AGI for single tax filers (and $96,000 to $116,000 for married joint filers). The Lifetime Learning Credit, which accrues per taxpayer not per student, was initially a non-refundable credit equal to 20 percent of the first $5,000 of expenditures on qualifying tuition and fees; the qualifying amount was subsequently raised to $10,000 leading to a maximum of $2,000, while the phase-out ranges are identical to the Hope Tax Credit. The American Opportunity Tax Credit (AOTC) was enacted as part of the American Recovery and Reinvestment Act in 2009 and provides for 100 percent of the first $2,000 of qualifying tuition and fees plus 25 percent of the next $2000 for a maximum credit of $2,500. The AOTC applies for four collegiate years of post-secondary education and is partially refundable (up to 40 percent). In addition, the phase-out ranges for the AOTC are higher at between $80,000 and $90,000 for a single tax filer and between $160,000 and $180,000 for joint filers.

backgrounds.[31] Recent research evidence on the effect of the tuition tax credits from Hoxby and Bulman (2015) points to essentially no impact on outcomes regarding postsecondary attendance or type of college attended and the increase in the generosity of this large program.

But the news on the impact of portable grant aid is not all discouraging: Other evidence on federal grant aid, including the Dynarski (2003) analysis of the elimination of Social Security Student Benefits (SSSB), and the Bound and Turner (2002) research on the GI Bill show quite large enrollment and attainment effects for portable grant aid. One explanation for the differing results is that transparency and communication may make a big difference: Pell Grant eligibility and generosity may not be evident at the time an individual applies to college because of the complexity and difficulty of federal aid programs that work through the FAFSA application process. In contrast, programs like the SSSB and the GI Bill provided clear notification of benefit eligibility and the amount of aid a student could expect to receive. The greater transparency of these programs and ease of benefit determination, combined with fixed duration support that cover a substantial share of college costs, are among the likely reasons why these programs have larger impacts and, in turn, provides some guidance on how best to structure financial aid programs.

Policy action

Recognizing the salience of potential credit constraints which limit individuals' capacity to pay for college, a federal financial aid system which combines portable grants, effectively vouchers, and loans to assist individuals in paying for college would seem to have much in its favor. In principle, this system is intended to be progressive in generosity—offering more aid to those least able to pay—and limited in its distortions.

Yet, in practice, the current system falls short in two dimensions:

1. **Transparency:** Students (and their families) struggle in the FAFSA application process and are often unaware of the full availability of aid and, in turn, net price of different collegiate options until late in the college application process or even after key decisions must be made.
2. **Needs assessment and targeting:** the combination of the FAFSA form and the allocation of tax credits effectively generates a dual system of needs analysis. The current system for needs analysis is also ill-suited to nearly all students who are attempting to avail themselves of collegiate opportunities well after high school completion as it focuses on "backward looking" family financial circumstances; for older students, capacity to pay is likely determined by very recent circumstances (such as job loss), rather than taxable income from more than one year ago.

While reasonable people can discuss whether the returns to collegiate attainment are so high as to merit additional investments in federal financial aid, there are substantial opportunities for restructuring existing federal investments in aid in order to close gaps in collegiate attainment by family circumstances and

31 Given that the Pell Grant is now embedded in U.S. higher education policy, it does not follow that elimination of the Pell Grant today would be expected to leave enrollment outcomes unchanged. Unlike the early evidence for low-income youth, the effects on college participation for nontraditional students have been sizable. Research by Seftor and Turner (2002) finds that the introduction of the Pell Grant program, as well as changes in program eligibility, have a positive and significant effect on the college enrollment decisions of older students.

raise attainment overall. (Some of the core recommendations of this section follow from the panel report "Rethinking Pell Grants").

Restructure portable grant aid (the "Pell Grant")

Economic theory and empirical evidence provide a compelling case for transparent and portable means-tested grant aid for college students. Yet, the approximately $50 billion in annual expenditures in combined expenditures for Pell Grants and tax credits are not meeting the needs of first-time college students or adults returning for college. Key steps for reformulation include:

1. **Eliminate tuition-tax credits** and combine these resources in a Pell Grant program that provides portable benefits to include low-income students as well as moderate income students. In effect, coverage to the moderate income families who receive tax credits but are not eligible for Pell Grants would be continued; this would have the benefit of some "targeting within universality" without the discontinuities generated by differential program eligibility requirements and thresholds where modest changes in circumstances lead to large changes in financial aid. Note that in the current system with financial aid eligibility determined through both the FAFSA and the tax code, there are effectively two incongruent systems of needs assessment.[32]
2. **Restructure the Pell Grant program** to recognize the different needs of first-time college students and older adults returning to school. Both groups could be better served, while presenting a more efficient use of public resources. A good starting point for such an approach would be the recommendations of the Rethinking Pell Grants panel, which suggested the division of the Pell Grant into two different aid vehicles: Pell Y, serving young people through the age of 24, and Pell A, serving older adults returning to school.[33]
3. **Redesign needs-analysis** in a way that provides students and their families with clear and accurate information at the point of program choice (not after enrollment commitment) of benefit generosity and avoids burdensome filing requirements. The adage of "simple but not too simple" should apply as single indicator eligibility criteria are likely inefficient and distortionary, particularly beyond the most obvious cases;[34] with both an increasing monetary level of the grant and inclusion of moderate-income families, substantial targeting would be lost by failure to collect a detailed profile of income and assets from different sources. Using the full "pre-population" of tax data from

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32 For students who apply to many selective private colleges and universities, there is yet another assessment in the form of the CSS Profile.

33 This recommendation follows directly from Baum et al. (2013). Quoting from the report: "To best serve all recipients, from young high school graduates enrolling in bachelor's degree programs to older adults seeking short-term labor market preparation, the Pell Grant program should be restructured to eliminate the constraints of a one-size-fits-all program. The program should be divided into two components: Pell Y, serving young people through the age of 24, and Pell A, serving older adults returning to school." In short, the Pell Y would provide students access to the program for the attainment of 150 credit hours, effectively 125 percent of the credits required for BA degree attainment. Pell A would provide students with limited funds to cover tuition and fees for 125 percent of the duration of the chosen program at a level of generosity consistent with tuition at a community college. Eligibility for Pell A Grants would include both long-term disadvantaged adults and those who experiencing spells of unemployment.

34 Baum et al. recommends granting maximum eligibility without limited additional assessment to those receiving Temporary Assistance for Needy Families (TANF), Medicaid, Section 8 public housing benefits, or Supplemental Security Income (SSI), along with orphans and wards of the court.

the IRS should eliminate burdensome computations.[35] In addition, while colleges and universities can maintain the latitude to use data differently than the federal government in determining capacity to pay, every effort should be made to eliminate redundancies between the CSS Profile and the FAFSA, as such administrative hurdles likely place the greatest burden on relatively disadvantaged students.

Student loans: Access and repayment

Given the attention granted to student loans in the public discourse, it is important to distinguish some of the most egregious problems of the last decade (some of which include downright fraud), from optimal student loan program design.[36] The federal government maintains an important role in ensuring access to capital for student borrowers, particularly those in programs where high financial returns are not assured even as they might be expected in aggregate.[37] Two steps to improve the function of federal student loans include:

1. **"Degree-scoring:"** Beyond a baseline, access to federal loans can be tied to expected earnings outcomes, such that student access to loans would be pro-rated to correspond to expected enrollment terms with reduced loan eligibility for part-time students and sub-baccalaureate degrees.[38]
2. **"Limits to income-contingent repayment:"** Lower-limits on forgiveness, with particular constraints for graduate borrowing, are imperative to prevent the worst abuses while extended terms of repayment and required minimum repayments will serve to limit abuses while retaining the important "insurance" dimension of the program.[39]

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35 Indeed, it should be possible to provide early "pre-notification" of expected benefit eligibility for dependent students and their families (much like the government currently provides notice of expected Social Security benefits) which would allow for greater transparency and accurate consideration of expected net college costs. In a recent policy change beginning in 2016 for the 2017-18 academic year, the FAFSA was a made available for completion in October rather than January and applicants and institutions could two years prior (e.g., tax year 2015) to the academic year instead of the previous year. The shift to "prior-prior year" needs analysis is an exceedingly sensible policy shift for students (and their families) applying to college in the senior year of college which would students of expected financial aid at a range of institutions much earlier in the college choice process. Yet, this umbrella policy also highlights the extent to which the "umbrella" needs-assessment is poorly suited to a constituency of students returning to post-secondary education in response to recent labor market experiences.

36 Headlines like "A Generation Hobbled by the Soaring Cost of College" (New York Times, 2012) which profile students who are more than $100,000 in debt are quite common even as data from the New York Federal Reserve show that fewer than 1 in 30 students have debt loads above $100,000.

37 As discussed in the "college choice" section below, when students use loans to invest in programs that do not have a positive expected net return ex ante, this is a policy issue of college choice not a policy problem to be addressed in the repayment system.

38 A related policy in Chile was studied by Beyer, Hastings, Neilson, and Zimmerman (2015). One might think of such policies as a circuit-breaker to keep students from borrowing more than they could reasonably afford to repay, while also recognizing that some worthwhile investments have substantial out-of-pocket costs.

39 Whether income-based repayments are an improvement over conventional loans (including those with graduated or extended repayments) in terms of improving the allocation of scarce financial aid subsidies and improving students' educational investments remains an open question. Income-based repayment has an attractive feature in insuring borrowers from ex poste risks that could not be anticipated at the point of enrollment. However, there may be substantial unintended consequences of income-based repayment including moral hazard and adverse selection problems. Students who expect to have high balances forgiven are the most likely to participate, while students who will likely repay in full are the least likely to participate, particularly if there are other sources of financing. The result is growth in the government's liability well-beyond the level expected without behavioral adjustments. There is some evidence that this is occurring: In the face of the expansion of the current federal liability on Income-Driven Repayment to $74 billion, the GAO called out the Department of Education for its failure to model appropriately IDR liabilities (GAO, 2016).

Advocates of nearly universal income-based repayment are encouraged to recognize the distributional and incentive consequences of the current system, which appear to disproportionately benefit graduate school borrowers,[40] and those who attend high-priced, low-quality institutions rather than students struggling to repay modest amounts of debt. With considerable federal promotion, there has been a notable increase in the use of income-based repayment, rising from 11 percent of borrowers in 2013 to 20 percent of borrowers in 2015. The percent of loan dollars in income based repayment has risen more over this interval, from 23 percent to 37 percent (Figure 11B, Trends in Student Aid), which implies that students with higher debt levels are increasingly more likely to use this repayment method. The opportunity cost of these expenditures in terms of funds that could be targeted more directly to low-income students merits thoughtful consideration.

College choice: Improving how students and families select colleges

Individual choice in the U.S. market for higher education is both a blessing and a curse. Overall, it gives students extraordinary agency—unparalleled in other countries with more centralized systems of higher education—to match with a post-secondary institution best-suited to individual circumstances and needs. Two factors limit the students' capacity to make optimal choices, thus exacerbating inequality in student outcomes:

1. **Market options:** The resources and opportunities in a student's market which may be local, regional or national;
2. **Market information:** Full information about different collegiate options and their likely "match quality" with a student's academic characteristics and preferences.

First, market options differ with student geography and achievement. The colleges where a student will be afforded the benefit of in-state tuition differ markedly by geography: a student from Michigan has different choices than a student from Ohio. Within states, students differ in their proximate options, as a student from Traverse City, MI has a much different local choice set than a student from Ypsilanti, MI. Students in urban markets such as New York City or Chicago tend to have the benefit of much "thicker" markets for collegiate choice.[41] Student achievement also affects market options as very high-achieving students (such as those studied by Hoxby and Turner in the *Expanding College Opportunities* project) are likely to have admissions options at some of the most resource-intensive colleges including highly selective public universities and private liberal arts colleges and universities, which are likely to offer very generous student aid.[42] Can federal policy play an affirmative role in increasing collegiate options? While this issue receives more attention in the next section on the supply side, an open question is why young people are not more

40 Even in a well-regarded program like Georgetown Law School, administrators counseled students on ways to allocate income so that they would reduce loan payments and increase the amount of debt likely to be forgiven. This example, along with a number of others, are available in reports like Delisle (2013).

41 Blagg and Chingos (2016) discuss what they describe as "choice deserts" in the sense of geographic areas in which 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.

42 Hoxby (2009) notes the increased integration of this national market and the extraordinary competition among these schools for students and faculty.

geographically mobile in their college choices. Structuring state and federal aid in a way that encourages geographic mobility would naturally expand market options.[43]

The role that *market information*—what students and their families know about college choices (and how to pay for them) has been widely cited as a key factor in enabling students to make better investments in their own futures through college going. Beyond financial aid, there are good reasons to believe that students from low-income and first generation families find the challenge of identifying an application set and applying to a portfolio of schools to be particularly onerous given the implicit need to both gather substantial information and derive conditional expectations of outcomes under different scenarios. It is critically important to recognize the importance of customization in giving students (and parents) tools to evaluate different collegiate options. Students should examine different "bands" of institutional selectivity based on their achievement. The guidance challenge should not be oversimplified—choosing a well-matched college requires student (and parental) investment in decision making. While well-designed, low-cost guidance can have a very high return it would be overly facile to suggest that the same sorts of "nudge" techniques that may be effective in encouraging people to turn off the lights or take medication will meaningfully address the challenges of college choice and may well do more harm than good, to the extent that information students receive cannot be generalized.

There are two pieces to the challenge of improving market information available to students: the first is improving the "raw metrics" that are available in the public domain that record student outcomes. Given that so much of the relevant data are effectively in federal control, the organization and release of these data require federal policy action. These needs are outlined by Hoxby and Turner (2013) and include both institution-level metrics of outcomes and program progress as well as student-level inputs.[44]

The second piece of the challenge is to enable students, their families, trusted adults and college counselors to analyze the data in terms of benefits and costs of different college choices. Because students' needs are likely to differ markedly with their environments, family circumstances, and level of achievement and objectives, it seems highly unlikely that the federal government is well-positioned to develop a single application that meets such a broad range of needs. Rather, this is an arena where a decentralized, yet competitive development process is likely to benefit both students and the collegiate market.[45]

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43 The advent of well-designed distance education programs may reduce some of these geographical differences; for example, Goodman et al. (2016) find that an on-line MA program in computer science that is designed to be equivalent to the in-person program can draw new students from geographically diverse areas at a fraction of the cost. It is also plausible that shifting the structure of state support for institutions to individual vouchers might allow students to cross-state lines at a moderate cost (Knight and Schiff, 2016).

44 Full data from the FAFSA that distinguish student circumstances, their utilization of federal aid, and college outcomes at the census block or block group level provide a critical mapping of the distribution of college students, particularly those with financial need. Access to such data would allow researchers to customize interventions on dimensions such as financial literacy, use of debt, take-up of aid programs, and colleges that are most popular locally. The established procedures for restricted-use licenses for the major National Center for Educational Statistics (NCES) data sets serve as a model for the administration and management of these data.

45 It is imperative to distinguish "competitive" from "commercial" in this discussion of a policy need. This is a sphere in which some consumer protections are imperative, so initiatives that are developed with a commercial intent to derive revenue either by "selling" ancillary services (such as student loans) or promoting particular sets of institutions are antithetical to policy goals. The objective of decentralized research and testing should be to develop applications that could be adopted at scale by governments and/or secondary schools.

Policy action

There is ample room for innovation to improve how students match with colleges which should receive support for development and efficacy testing from federal research funds, including IES. The efficacy and return on investment of the federal government's TRIO programs, which accounted for federal government spending of about $1.2 billion in 2012, is mixed.[46]

In the last decade, there have been a number of innovations intended to improve the tools and skills that students have to consider collegiate transitions, which vary in the intensity of treatments and the modes of delivery. Examples include the Expanding College Opportunities project (Hoxby and Turner, 2013),

the Chicago Schools Project (Roderick, 2009), and the College Advising Corps (Horng et al. 2013). Each of these independent interventions has emphasized the importance of demonstrated efficacy while also adding to the knowledge base informing the study of college transitions.

Among the margins where there are opportunities for innovation include:

- Increasing students access to (and take up of) the tools that permit college planning including college placement tests;
- Improving the engagement of parents in the college planning process;
- Providing and developing better tools to help high school counselors efficiently convey information and options to students;
- Investing in understanding the barriers to student mobility and developing experiments to assess how alternative aid structures (including greater cross-state reciprocity or housing assistance) impact enrollment and attainment outcomes.

Most of the policy action and research literature has focused on the choices of recent high school graduates, yet it is with the population of older students (including the many independent students receiving Pell Grants) where guidance is likely most lacking. Barr and Turner (2015b) note that adults with limited college education and several years of full-time labor force participation may lack the resources, such as high school guidance counselors and a large group of peers making similar decisions, available to those at the transition from high school to college. In making its recommendations for older students, the Rethinking Pell Grants (2013) panel recognized the need for stronger advising (both pre-enrollment and academic support) for these students) and made the following explicit recommendations (recommendations 2-4, pp. 33-34):

- Schools enrolling Pell Grant A recipients should be required to provide them with information about completion rates, average loan indebtedness, loan default rates, and labor market outcomes for

46 TRIO programs include the well-known Upward Bound, Talent Search, and Student Support Services initiatives, as well as other more modest initiatives like the Ronald E. McNair Postbaccalaureate Achievement program which focuses on increasing access to doctorate programs for students from disadvantaged backgrounds. A large scale evaluation of the Talent Search program (Constantine et al., 2006) does find significant effects on high school graduation, financial aid application and college enrollment.

similar students in the relevant programs.

- Students receiving Pell A Grants should be required to avail themselves of the services of One-Stop Career Centers (or their successors) before enrolling. These services should be designed to help students formulate their goals and make informed choices about programs most likely to lead them to those goals.
- Students receiving Pell Grant A awards and the institutions in which they are enrolled should be required to participate in academic and career guidance programs to ensure that students are progressing toward credentials that will be of value in their local labor markets.

Important to these recommendations is the recognition that they should not be implemented as "regulations" immediately, but rather developed as a set of pilot programs with associated efficacy testing before adoption. A large scale research investment in this domain is certainly warranted.

While affirmative policies and programs that facilitate well-informed student choices should be the primary tool to improve collegiate matching, the cost to students and society of the most poorly-performing programs is so high as to merit a regulatory role to close or sanction poorly performing institutions. Whether the examples are outright fraud (such as the widely reported case of Corinthian Colleges) or simply poor performance, it is often the most vulnerable students who are engaged by these programs.[47]

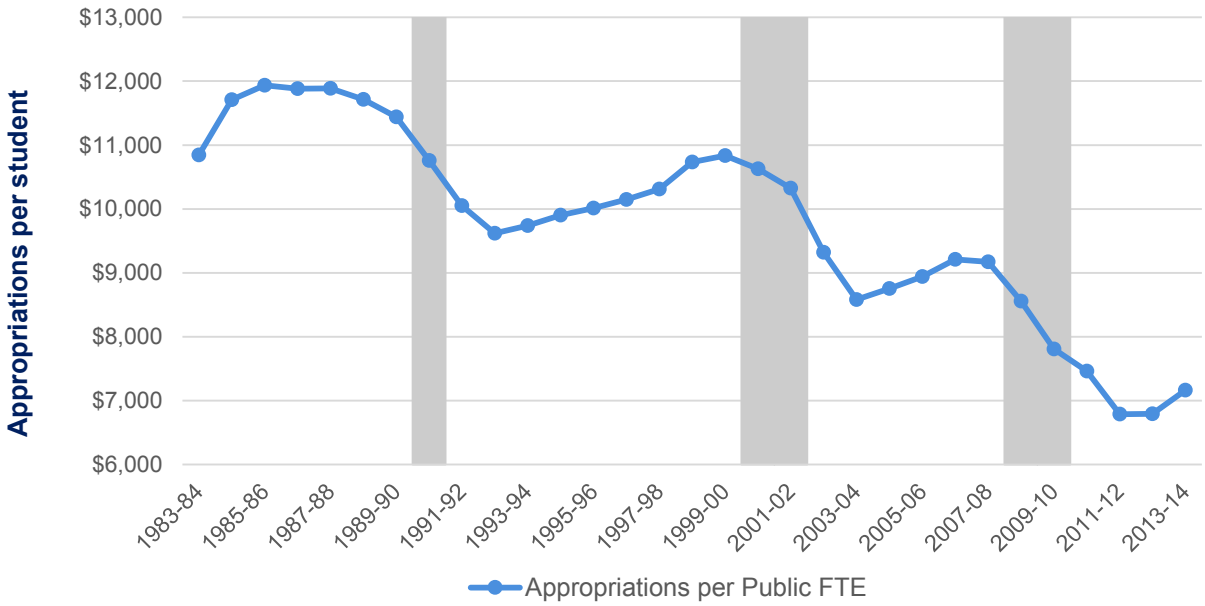
Collegiate resources and "supply-side" policies

The decline in resources per student from state sources is unmistakable over the course of the last two decades. Between academic year 2000-01 and academic year 2014-15, constant dollar appropriations to higher education held constant at about $77 billion while enrollment increased from 8.7 million to 11.1 million students resulting in a drop in appropriations per student from $8,886 to $6,966 (Figure 4, reproduced from Figure 14B, *Trends in College Pricing*). Even with for-profit and private providers in the collegiate market, the importance of public providers that continue to account for 72 percent of undergraduate enrollment is unquestioned. Some of the appropriations losses have been offset with increases in tuition levels, effectively shifting the burden of who pays for college; the share of public universities' total educational revenues covered by net tuition revenue, rose from 29.4 percent in 2001 to 43.3 percent in 2011 (Bowen, 2012). States with the most severe economic downturns in the 2008 recession were among those in which public institutions raised tuition the most (Barr and Turner, 2013), but on net many institutions faced declines in total resources per student, with these declines most apparent outside the most selective public research universities. There is evidence that such erosion in resources

47 Critics of the "Gainful Employment" regulations often note that they are aimed principally at for-profit institutions. It is important to note that no sector has a full monopoly on poor performance, as low completion and high default institutions also persist in the public and private, non-profit sectors. While the institutions of bankruptcy and closure do force poorly performing for-profit institutions out of the market, non-profits and public institutions may be much slower to exit. To give an example of the diversity of institutions with what would appear to be poor performance, the CollegeScorecard records the following institutions with graduation rates of 12 percent: Jarvis Christian College, Hawkins, TX (private non-profit, 32 percent of students in repayment, 94 percent receive loans, $24,600 is salary 10 years after attendance), Central Alabama Community College Alexander City, AL (public, 43 percent of borrowers in repayment, 40 percent receive loans, $27,500 is average salary 10 years after attendance) and South University-West Palm Beach Royal Palm Beach, FL (for-profit, 37 percent of borrowers in repayment, 80 percent receive loans, $28,800 is average salary 10 years after attendance).

likely has real consequences for student attainment in completion rates and time to degree (Bound, Lovenheim and Turner; 2012).

Figure 4: Appropriations per full-time equivalent student over time, 1983-2014



Source: Trends in College Pricing and Digest of Education Statistics, various years. Grey bars show US recessions as enumerated by NBER. All figures are deflated by the Higher Education Price Index (HEPI).

BROOKINGS

One cause of the secular decline in state funding for higher education is that higher education funding is often determined as the residual, after entitlement commitments and other non-discretionary spending. Indeed, cyclical pressures on higher education are often magnified by federal programs like Medicaid with state-level matching features (Kane, Orszag and Apostolov, 2005). Imploring states to "spend more" on higher education, particularly with competing demands for K-12 and infrastructure strategy, is unlikely to be a successful strategy to increase institutional funding. However, state legislators and governors do respond to incentives and matching support for high performing public institutions is one way to increase states' spending on higher education.

There should be little question that—broadly speaking—"resources matter" in higher education. But, before making substantial new commitments from the public purse it is only natural to ask whether existing resources are being used to maximal impact; in other words, are colleges and universities efficient in production? The answer appears to be "it depends": recent evidence provided by Caroline Hoxby (2016) points to both a positive relationship between resources and student outcomes, but also substantial differences in the "productivity" of colleges and universities measured as students' earning outcomes relative to resource inputs along with indicators of civic participation. There are a whole set of reasons why individual institutions may not be getting the most for their resources, but two merit particular comments: 1) colleges may be operating below the minimum scale that makes sense to keep the doors open and 2) within institutions, it may be politically difficult to close or merge programs that are too small or that have

outlived their usefulness.[48]

In commercial markets, when a firm cannot cover its costs, it closes. The process of closure or merger to repurpose assets, is much less direct with colleges and universities. There is a tendency to "hang on" well-beyond the years of economic viability among both non-profit and public colleges because there is no orderly process of reallocation of assets (both physical and staff). Private colleges will whittle down limited endowment resource while also likely deteriorating in quality, while public colleges may persist with urgent pleas for public subventions. The opportunity cost of this process is potentially substantial.

While one hopes that "market forces" would eliminate poor performing colleges and universities, the evidence points to a small, but non-trivial group of poorly performing colleges and universities that may actually "do harm" to students. When colleges have default rates greater than completion rates or when students graduate with wage expectations no greater than the poverty line, it is necessary to engage in some market intervention. For example, using data from the College Scorecard, it is notable that about 870,000 students (about 5 percent of total enrollment) attended institutions where the three-year repayment rate on student loans was less than 40 percent. While the majority of poor performing institutions are in the for-profit sector (705 programs), the poor performing institutions serving the greatest numbers of students are in the public sector.

Policy action

Federal policy has the potential to serve a constructive role in stimulating increased investment by the states in higher education (through matching funds) and encouraging states to undertake productivity-enhancing reforms among their higher education institutions, both public and private. The institutional configuration of higher education (including the location and number of public institutions) has often been the result of historical accident, and there are reasons to believe that there are opportunities to take advantage of economies of scale across campuses and technological innovation. Three spheres for policy action:

1. **Fostering mergers, consolidations and closure:** Taking advantage of economies of scale and providing the benefit of new educational innovations and high-resource collegiate experiences to the greatest number of students holds a promise of increasing productivity and reducing costs. Yet, it is difficult to affect such consolidation in a market dominated by public and non-profit providers where the absence of residual shareholders and the entrenchment of local interests makes any college merger or closure politically treacherous.[49] While the federal role in this arena is limited, two

48 Other explanations include basic managerial incompetence, a shift to providing "amenities" that do not enhance student learning, and institutional bloat and administrative rent-seeking leading to inflated costs (Campos, 2015). Evidence to support this latter explanation as a principle driver increased costs appears weak: Bowen and McPherson (2016) argue that administrative expense expansions that are evident in the data are likely to be productivity-enhancing; the rise in administrative positions accompanied an overall increase in enrollment, and there is some evidence that low-skilled jobs like filing and typing have been replace by positions that require greater skill, such as computer support, resulting in a shift from nonprofessional staff to professional staff.

49 There are several notable examples of the political hurdles to closing colleges and universities in the private and public sectors. Bacow and Bowen (2015) discuss the barriers to closure of Sweet Briar and Cooper Union, where in both cases the opportunity cost may be the expenditure of endowment which could have been redeployed. In 2012, the Georgia system started the process of consolidating 8 institutions, which produced intense public outcry. (Fain 2012).

productive investments include, first, clarifying rules and guidance and, secondly, providing some competitive "seed capital" to facilitate institutional reconfiguration.

2. **Limiting "bad outcomes":** While one hopes that "market forces" generated by students making well-informed choices would force out of the market underperforming institutions, the simple truth is that some of the worst outcomes follow from a modest number of institutions and disproportionately affect low-income students already at a disadvantage.[50] Whether these institutions are "under-resourced" (perhaps owing to limited state funding), or simply mismanaged is not relevant from the perspective of students who find themselves "worse off" as a result of enrollment.

   There is much to be said for a simple accountability system focused on low-performing institutions.[51] It should be plainly evident that the current accreditation mechanism imposes high compliance costs but provides little meaningful "accountability."

   Access to Title IV aid—that is whether students are eligible for Pell grants and government loans —is a powerful policy tool held by the federal government. Given the enormous cost burden on the lives of students of attending an institution unlikely to produce a pathway to improved labor market outcomes, federal policy needs to be swift in requiring demonstrated change (or closure) among those institutions with poor performance.

3. **Technological innovation ("Bending the Cost Curve"):** For nearly the last century, technological change has provided labor-saving advances in many industries – higher education has not realized transformations in its instructional capacity and faces the magnified cost challenge of employing a disproportionate share of the very highly educated. The challenge, of course, is that in the absence of changes in the organization of teaching (the production technology) universities will find costs rising faster than in industries where there have been innovations that allow for the substitution of new technology or capital for labor (Baumol and Bowen, 1966). Will higher education find a disruptive technology or innovation to break this cycle? While the federal government is not positioned to impose technological change or even "pick winners", it can be an important force in funding research and development of new approaches to teaching and learning, as well as administrative functions in higher education.

The ultimate challenge for both public and private higher education is to push the frontier of technological innovation by developing ways to improve student engagement and learning while reducing costs. The "technology" of collegiate instruction has hardly changed in over a century and remains dominated by "direct instruction," and by highly-educated professors in an on-campus classroom setting. Figlio (2016) presents an overview of the evidence (which has grown dramatically in recent years) of solid tests comparing student learning in online, traditional and hybrid modes of instruction and notes that most of the outcomes do not favor online instruction, suggesting an overall "modestly pessimistic picture of the likely outcomes of students enrolled in online-only instruction." Even if the direct effects of online instruction

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50 In an often repeated quote, "The US, with 4,000 institutions of higher education, probably has 50 of the best universities in the world and undoubtedly 500 of the worst." (Robert Stevens as repeated in Bowen et al., 2005, p. 66).

51 Deming and Figlio (2016) note that regulatory efforts in higher education are most needed among those institutions that rely largely on taxpayer funds, through federal financial aid and state appropriations.

are inferior to in-person instruction, Figlio notes that there are nonetheless potential benefits in terms of gains to students who would have no other access to higher education and potential competition leading to improved service delivery among existing colleges and universities. Whether there are transformational gains to follow from adaptive learning techniques and modes of instruction that afford greater economies of scale, is not yet known, but the potential certainly exists.[52]

It is worth emphasizing that it is quite possible to identify efficiency enhancing innovations in higher education that impact academic support services, including library functions,[53] course scheduling and advising. While "competition" among colleges for students and faculty, as well as on the playing field, is largely all to the good, collaborative efforts that take advantage of economies of scale in development should be encouraged in these support domains. Prudent federal investments to facilitate such collaboration and innovation will likely yield substantial cost savings.

For colleges and universities to garner additional support from federal (as well as state) policymakers, they will need to stand up and take responsibility for a bit of "house cleaning." A renewed federal commitment to strengthening institutions on the supply side must be accompanied by strong institutional leadership and some willingness to do some "house cleaning."

V. MAIN TAKEAWAYS

Available research evidence provides four main takeaways for public policy.

First, given the many other uses of resources and the economic distortion created any tax system, federal spending must be well targeted. This may require means testing federal aid or further targeting Title I funds to students or districts in poverty.

Second, challenges in education policy occur at all levels of education, and it is not helpful to focus narrowly on one stage in the pipeline (e.g., Pre-K or college access) or a single policy tool (e.g., class-size reduction). "Single issue" campaigns are counterproductive because they miss the presence of high return spending opportunities across the spectrum while often ignoring the presence of existing programs that may be ineffective.

Third, while accountability and evaluation are necessary correlates to any resource investment, policy design and implementation matter enormously. Incentives matter, and there is ample evidence that schools and students respond. As a result, too much emphasis on any one outcome (e.g., test scores, graduation rates, etc.) will likely undercut intended outcomes and distort behavior (teaching to the test, producing diploma mills).[54]

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52 In correspondence, Mike McPherson makes the important point that efficiency-enhancing gains need not be limited to the instructional function. Drawing on the example of health care, he notes that technology has afforded some savings through managerial innovation and streamlined administrative functions.

53 The most successful innovation in this spirit is JSTOR.

54 A corollary is that it is also important to focus on outcomes across the distribution (not just a "pass rate) and there is a responsibility to pay particular attention to outcomes in the bottom part of the distribution (e.g. bad colleges "hurting" intended beneficiaries or severely underperforming schools).

Finally, the federal government needs to dramatically increase the resources allocated to research and development in education. Education is a tough business and differences in outcomes tied to where students live and the resources of their parents are neither new nor straightforward to address. We can produce a set of blueprints for a high-speed train or a new airport, but there is no such easy mapping in education policy. That said, the knowledge base around "producing education" has expanded dramatically in the last several decades along with the commitment to systematically identifying practices that work and those that don't. To make substantial progress on hard problem will require large-scale investment, with attention to basic research, development and implementation. What should the federal role be in educational R&D?

- Provide funding to implement and evaluate well-designed policy innovations and experiments with the potential for replication in domains like teacher compensation and federal student aid delivery; at the same time, recognize that there are many interesting questions about how markets work or long-term outcomes that are not well-suited to randomized control trials and afford federally-sponsored study of these questions.
- Make investments in "collective goods" and new uses of technology in both the back-office / infrastructure capacity and in the development of technology enhanced learning strategies across educational levels.
- Ensure the collection of data on resource allocation and student outcomes in both K-12 and higher education, recognize that there are costs to data collection and analysis, provide assistance to states so that they do not become the juggernauts; and make every effort to release allowable federal administrative data for appropriate research purposes.

The importance of federal funding for research on education should not be understated. Transformational change in educational outcomes will require an increase in funding for both basic research and applied policy research. Research in the education sphere is most appropriately funded by the federal government —returns to successful innovation in this sphere have the potential to spread across localities and among states. As Rick Hess (2016) notes: "This is a case of a classic public good, but one where the U.S. has historically underinvested—with Washington spending on education research barely 1 percent of what the nation spends on medical research." Current levels of support are simply too small: A report by the AAAS identified federal R&D spending on education research in the 2016 budget proposal at $279 million which represented a decline of 54 million from the previous year.

There are no "magic bullets" for improving educational outcomes and narrowing the substantial gaps in attainment by family circumstances in the U.S. The market based system—with more than 15,000 school districts and 4,000 colleges and universities—has real flaws, but it is also the engine which has produced dramatic innovation and economic growth in the last century. Investing wisely in students and institutions holds the promise of generating the skills that will produce sustained growth in the 21st century and beyond.

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Table A1: Low-performing institutions and student representation, default rates

Dependent students by institution type where institution has greater than 25% 3-year cohort default rate from 2014-15 Scorecard data

	# institutions	*# dependent students*	*share*
2-year public	224	357177	0.74
4-year public	25	36103	0.08
non-profit	248	24462	0.05
for-profit	705	39378	0.08
other institution	198	22335	0.05

Top 10 institutions (by number of dependent students)

Institution name	*# student total*	*# dependent students*
South Texas College	17710	13069
Palomar College	22589	12974
Fresno City College	19770	12647
American River College	26803	12413
Central New Mexico Community College	22767	10484
Modesto Junior College	16253	8987
Des Moines Area Community College	14356	8074
San Diego City College	13920	7360
Butte College	11164	6353
Owens Community College	11363	6229

Independent students by institution type where institution has greater than 25% 3-year cohort default rate from 2014-15 Scorecard data

	# institutions	*# independent students*	*share*
2-year public	224	364853	0.67
4-year public	25	25575	0.05
non-profit	248	23617	0.04
for-profit	705	82795	0.15
other institution	198	45000	0.08

Top 10 institutions (by number of independent students)

Institution name	*# student total*	*# independent students*
American River College	26803	14390
Central New Mexico Community College	22767	12283
Palomar College	22589	9615
Los Angeles Trade Technical College	12769	7481
Modesto Junior College	16253	7266
Fresno City College	19770	7123
Rio Salado College	8366	6989
Antelope Valley College	12367	6838
Stark State College	11319	6798
Jefferson Community and Technical College	11665	6718

Note: University of Phoenix has 3-year cohort default rate of 0.135, so not eligible here.

APPENDIX

BROOKINGS

Table A2: Low-performing institutions and student representation, on time completion

Dependent students by institution type where institution has less than 20% on-time completion rate from 2014-15 Scorecard data

	# institutions	*# dependent students*	*share*
2-year public	443	1555562	0.89
4-year public	51	125841	0.07
non-profit	100	25817	0.01
for-profit	128	37138	0.02
other institution	6	1226	0.00

Top 10 institutions (by number of dependent students)

Institution name	*# student total*	*# dependent students*
Ivy Tech Community College	77657	32018
Lone Star College System	59920	27784
Houston Community College	58084	26403
Tarrant County College District	42189	19809
CUNY Borough of Manhattan Community College	25849	18676
El Paso Community College	27478	17793
Suffolk County Community College	22222	17269
Austin Community College District	32581	16978
Blinn College	17095	14140
College of DuPage	20964	13742

Independent students by institution type where institution has less than 20% on-time completion rate from 2014-15 Scorecard data

	# institutions	*# independent students*	*share*
2-year public	443	1555562	0.89
4-year public	51	125841	0.07
non-profit	100	25817	0.01
for-profit	128	37138	0.02
other institution	6	1226	0.00

Top 10 institutions (by number of independent students)

Institution name	*# student total*	*# independent students*
University of Phoenix-Arizona	151558	138306
Ivy Tech Community College	77657	45639
Ashford University	44744	43151
Western Governors University	44499	42158
Lone Star College System	59920	32136
Houston Community College	58084	31681
University of Maryland-University College	33892	30802
Tarrant County College District	42189	22380
Portland Community College	28549	18435
College of Southern Nevada	31149	18312

Table A3: Low-performing institutions and student representation, repayment B

Dependent students by institution type where institution has lower than 40% 3-year repayment rate from 2014-15 Scorecard data

	# institutions	*# dependent students*	*share*
2-year public	61	196700	0.58
4-year public	13	29579	0.09
non-profit	87	29871	0.09
for-profit	776	83808	0.25
other institution	2	215	0.00

Top 10 institutions (by number of dependent students)

Institution name	*# student total*	*# dependent students*
Long Beach City College	22768	13939
Fresno City College	19770	12647
American River College	26803	12413
Bakersfield College	16982	10139
Central Piedmont Community College	18596	9683
San Joaquin Delta College	15887	9340
Henry Ford College	12333	7036
Mt San Jacinto Community College District	13695	6942
Hartnell College	9161	6453
Hinds Community College	10447	6427

Independent students by institution type where institution has lower than 40% 3-year repayment rate from 2014-15 Scorecard data

	# institutions	*# independent students*	*share*
2-year public	61	198248	0.37
4-year public	13	8809	0.02
non-profit	87	22596	0.04
for-profit	776	300605	0.57
other institution	2	536	0.00

Top 10 institutions (by number of independent students)

Institution name	*# student total*	*# independent students*
American Public University System	44924	42404
Everest University-South Orlando	22340	19662
American River College	26803	14390
Ultimate Medical Academy-Tampa	12516	11169
Grantham University	10793	10037
American InterContinental University-Online	10542	9605
Central Piedmont Community College	18596	8913
Long Beach City College	22768	8829
Wayne County Community College District	12990	8369
Fayetteville Technical Community College	10598	7522

Note: University of Phoenix has 3-year repay rate of 0.45, so not eligible here.

Table A4: Low-performing institutions and student representation, earnings

Dependent students by institution type where institution has lower than $30k mean earnings at 10 years (if working; all entrants, not necessarily grads)

from 2012-13 Scorecard data; 12-13 is the most recent year for which earnings are available

	# institutions	*# dependent students*	*share*
2-year public	222	280783	0.47
4-year public	21	20606	0.03
non-profit	202	116528	0.20
for-profit	1583	156327	0.26
other institution	130	16990	0.03

Top 10 institutions (by number of dependent students)

Institution name	*# student total*	*# dependent students*
Instituto de Banca y Comercio Inc	19470	10302
Universidad Del Turabo	14333	8596
Reedley College	12278	8533
Universidad Del Este	12489	7766
Universidad Metropolitana	11293	6734
Hinds Community College	10832	5936
Merced College	8964	5686
Inter American University of Puerto Rico-Metro	7403	5542
Southwest Tennessee Community College	11567	5436
Wayne County Community College District	14687	5259

Independent students by institution type where institution has lower than $30k mean earnings at 10 years (if working; all entrants, not necessarily grads)

from 2012-13 Scorecard data; 12-13 is the most recent year for which earnings are available

	# institutions	*# independent students*	*share*
2-year public	222	340159	0.41
4-year public	21	14787	0.02
non-profit	202	69743	0.08
for-profit	1583	364477	0.44
other institution	130	41953	0.05

Top 10 institutions (by number of independent students)

Institution name	*# student total*	*# independent students*
Everest University-South Orlando	33635	30447
Ultimate Medical Academy-Tampa	12386	11108
Wayne County Community College District	14687	9428
Instituto de Banca y Comercio Inc	19470	9168
Jefferson Community and Technical College	12357	7825
Everest University-Brandon	8182	7216
Bluegrass Community and Technical College	11596	6853
Southwest Tennessee Community College	11567	6131
Universidad Del Turabo	14333	5737
Southwestern Illinois College	10402	5516