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AFFORDING THE DREAM:
Student Debt and State Need-Based Grant Aid for Public University Students

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ABSTRACT

Public research universities are a key vehicle for educational mobility. Yet rising student debt for undergraduate students has created new risks, particularly for lower income students at lower ranked universities. We find that student loan default rates reached 35 percent for low-income students at public universities with low research rankings during the Great Recession. Given these troubling loan default rates, we find encouraging evidence that a few U.S. states have adopted robust need-based grant aid programs to make college more affordable for low-income students. Such grant programs can cover tuition, room, and board costs. California, Wyoming, and New Jersey now spend more than $4,000 per low-income student, more than the federal expenditure on Pell Grants for their state. More than 30 states, however, spend less than 25 percent of the federal Pell Grant expenditure. We find that generous state aid programs are associated with lower actual costs of attendance for low-income students.

Keywords: College Affordability, Student Debt, Financial Aid, Public Universities

Tested by funding cuts and rising enrollment demands since 1990, public research universities have remained a cornerstone of mass undergraduate education in America. Public research universities enrolled more than 3 million undergraduate students in 2012, more than all private undergraduate programs - in research and non-research universities - combined (Brady, Eaton, and Stiles 2014).[1] Public research universities are especially important because matriculating undergraduates can benefit both from learning directly from scholars engaged in cutting-edge research and from the prestige associated with research institutions (Brewer and Susan 2002; Hoxby and Turner 2013). Public universities, moreover, have been shown to offer the highest rates of income mobility for students from the bottom of the U.S. income spectrum (Chetty et al. 2017).

Declining per-student levels of state support, however, have undermined affordability at public research universities because student tuition has been raised to cover or partially cover lost state support. Many public university students have had to take out more loans to cover these increased costs of attendance. Rising student debt has, in turn, created new burdens and risks, particularly for lower income students at lower ranked universities. Using new College Scorecard data, we find that public universities may have limited increases in student debt for low-income students who saw lower increases in debt that higher income students. Still, the relative burdens of debt appear to have been highest for low income students, particularly during the Great Recession. In that period, student loan default rates reached 35 percent for low-income students at public universities with low research rankings.

In the wake of rising loan defaults, we find encouraging evidence that a handful of U.S. states have adopted robust need-based grant aid programs to affordably enroll more low-income students. Such grant programs can cover tuition, room, and board

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costs. But research on these state-based aid programs has been limited relative to their scope. States awarded approximately $7 billion of need-based grant aid in 2015 (National Association of State Student Grant & Aid Programs 2015). The scale of these programs is now beginning to approach the $30 billion in annual Pell Grants and $14 billion in veteran grants (The College Board 2012), but their impact varies substantially across the states. In 2014, California, Wyoming, and New Jersey spent more than $4,000 per low-income student, more than the federal expenditure per student on Pell Grants for their state. But more than 30 states have grant aid expenditures that are less than 25 percent of the federal Pell Grant expenditure for their state. Eight states lack any meaningful need-based grant aid program.

We also find that the actual public university cost of attendance for low income students tended to be substantially less in states with larger need-based grant aid programs. Because states differ in the average tuition they charge students,[2] it is important to look beyond the size of state grants to see how they relate to the cost of attending public universities in the state. Cost of attendance is an important measure of affordability because it is estimated by deducting tuition waivers, discounts, and financial aid from tuition and room and board. States' average annual cost of attendance for low income students across all of their public universities ranged from $6,818 to $15,873 in 2014. Cost of attendance also varies between states with state aid programs of similar size. A state with a low level of aid may, for example, be quite affordable to students because it has a very low tuition whereas a state with a higher level of aid may not be affordable because it has a high tuition.

Still, we find that costs of attendance for low income students tends to be about $1,000 lower for every 21 percent of tuition sticker price that was covered by state aid. This difference in actual cost of attendance could be highly consequential because students may use debt to cover such costs. This is concerning because of our previously mentioned finding that low income students had higher default rates despite seeing lower increases in overall debt that wealthier students. Even small increases in debt may increase the risk of default if a low-income student does not graduate and attain higher earnings.

We find few states with a truly "high tuition/high aid" model in their state need-based aid programs (Heller 1999). Only California, Washington State, and New Jersey had schools with an average instate tuition sticker price in the top quartile (above $10,700 per year) together with state need-based aid covering at least 30 percent of instate tuition before aid. More states control the cost of attendance by setting tuition near that of other states and offsetting that amount with need-based aid. Indiana, New York, North Carolina, Wyoming; Washington and California use this model for their less research-intensive universities. Under this formula, each of these states has costs of attendance for low-income students of $8,000 or less per year. In contrast, the median cost of attendance for low-income students across all state universities is 25 percent higher at $10,176 per year.

Reflecting the complexity of financial aid, we also identify a handful of high ranked research universities with low actual costs of attendance even in the absence of substantial state need-based aid programs. The University of Georgia and the University of Michigan (Ann Arbor campus) particularly stand out with an actual cost of attendance of just $6,000 per student. Georgia and Michigan achieve these low actual costs by using what is known as need-based institutional aid. Need-based institutional aid is funded with universities' own resources, including tuition from students who do not qualify for aid, endowment resources, and philanthropy. We find that few lower-ranked public research universities appear able to provide institutional aid. Unfortunately, the need is greatest at the lower-ranked research universities because they have great enrollment growth and more low-income students. Taxpayer funded need-based financial aid is probably the only sustainable model for controlling cost of attendance at these universities.

We detail the findings of the study as follows. Section 1 explains how undergraduate enrollment and diversity have increased across public universities from different strata of research activity. It also compares institutional resources and affordability. In section 2, we explain how we combine different sources of higher education data to provide key measures of student debt for low-income students, state need-based aid spending, and cost of attendance for low income students. Section 3 presents our results in three parts. First, we detail increases in student debt and student loan defaults for low and middle-income students. Second, we explain the large differences in the size and scope of state financial aid programs relative to the federal Pell Grant program. Third, we analyze the relationship between state grant aid programs and cost of attendance for low-income students. This analysis shows how state financial aid lowers cost of attendance across public universities with varied prestige and research intensiveness. In section 4, we conclude by discussing how even states with the most generous existing grant aid programs may need to rethink tuition and grant aid levels to protect low-income students from high debt and the risk of default.

1. State Funding, Access, and Affordability in the Varied Terrain of U.S. Public Universities

The United States has a remarkably heterogeneous ecology of colleges and universities (Gerber and Cheung 2008; Stevens, Armstrong, and Arum 2008; Stevens and Gebre-Medhin 2016). Not only are institutions public or private, they also differ tremendously in research intensity, style of instruction, and endowment. Public universities themselves vary substantially in research intensiveness, resources, selectivity and other organizational characteristics. Existing research has shown that state

funding per student has declined and tuition revenue has increased in most states and across public universities as a whole (Ehrenberg 2000; Quinterno 2012; Weerts, Sanfordeah, and Reinert 2012). We build on a new line of research that shows widening inequalities in students' socio-economic backgrounds and universities' resources between the different strata of research universities (Eaton, Brady, and Stiles 2016). Understanding this unequal and varied institutional terrain provides important context for understanding trends in student debt and state need-based aid programs.

Table 1: Research University Categories

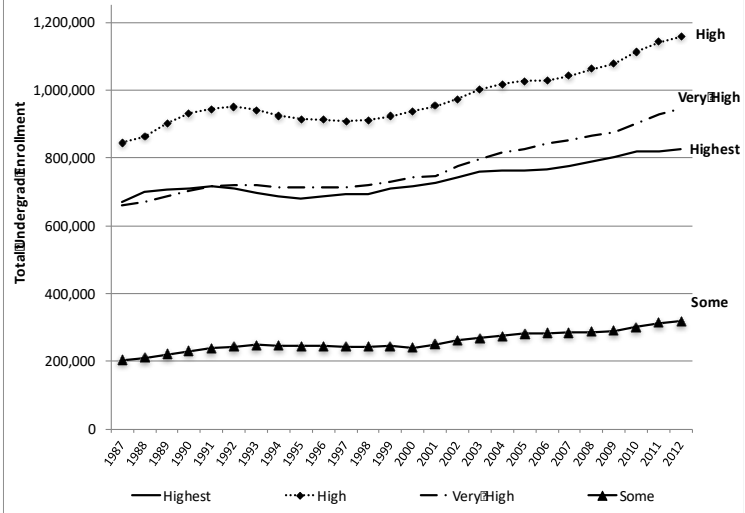
RESEARCH INTENSITY — Highest to Lowest				
"Very High" (73)		High	Some	None
Highest (AAU)	Very High (non-AAU)			
34	39	74	30	463

Source: The Carnegie Classification of Institutions of Higher Education. See http://carnegieclassifications.iu.edu/downloads/CCIHE-2015-Research_Activity_Index.xlsx

The Strata of Research Universities

Throughout our analysis, we will compare public research universities across four categories for their levels of research and prestige (see Table 1). These comparisons are useful because higher levels of research and prestige tend to garner greater state, tuition, and other public and private resources that can benefit students' chances at graduation and success after college (Bound and Turner 2007; Eaton, Brady, and Stiles 2016; Hoxby and Turner 2013; Webber and Ehrenberg 2010). Table 2 shows how our four categories modify the 2010 Carnegie Classification of research universities as "Very High", "High", and "Some". We add a category for "None" for public four-year schools that lack sufficient research to have a Carnegie research classification.

Figure 1: Undergrad Enrollment at Public Universities



Source: IPEDS.

The Carnegie categories divide doctoral granting research universities according to the amount of research spending per faculty. We also divide the "Very High" category between universities that are members of the prestigious Association of American Universities (AAU) as "Highest" and those that are not AAU members as simply "Very High". This accounts for greater levels of prestige and resources that are accorded to the very top public research universities.

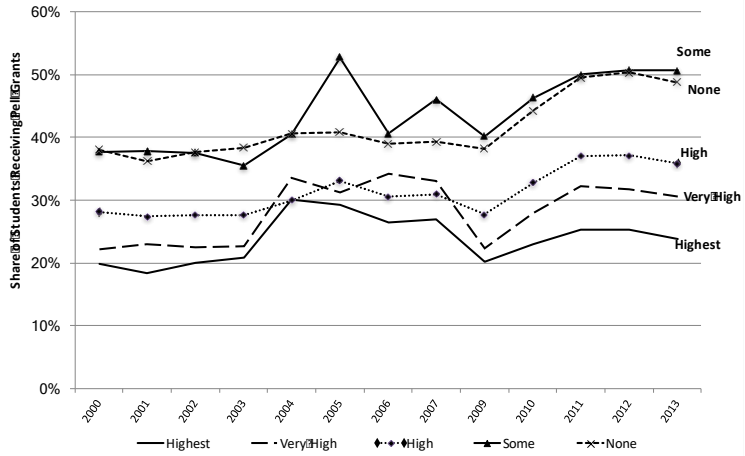
Expanding Enrollment Across All Strata

Public universities have provided the vast majority of 4-year undergraduate enrollment growth in the U.S. since 1990 (Eaton, Brady, and Stiles 2016). Combined enrollment at public research universities grew to over from 2.4 million in 1987 to 3.2 million in 2012. Figure 1 shows that enrollment growth extended across all types of public research universities including those with the highest research intensiveness and prestige. "Highest" research university enrollment grew from less than 700,000 to more than 800,000. Enrollment at "Non-AAU Very High Research" schools increased from under 700,000 to nearly 950,000. Enrollment at "High Research" universities increased from 850,000 to nearly 1.2 million. Public universities in the "Some Research" category had enrollment increases from 200,000 to over 300,000. Enrollment at "Non-Research" public universities grew at a comparable pace from 2 million to nearly 3.4 million but this is omitted from Figure 1 because of the substantially larger scale than enrollment growth in the other strata. Enrollment across all public universities thus grew from 4.5 million to 6.7 million. For comparison, enrollment across all private non-profit undergraduate 4-year institutions grew from 2.1 million to just 2.9 million.

Rising Enrollment of Low-Income Students, Especially at Less Research Intensive Universities

Public research universities also enrolled an increasing share of their students from low-income households (Bound, Lovenheim, and Turner 2009, 2012). Disparities in low-income enrollments, however, have widened slightly between better-resourced elite public research universities (which tend to take fewer low-income students) and more resource strapped public universities (which tend to take more low-income students) that engage in less research. Figure 2 shows disparities by charting the share of full time first year students receiving Pell Grants, an indicator for low-income status. We use the first-year student Pell Grant measure because it provides data going back to 2000 while other IPEDS measures for all undergrads and for low-income students are only available from 2010 onward.

Figure 2: Share of Full Time First-Year Students Receiving Pell Grants



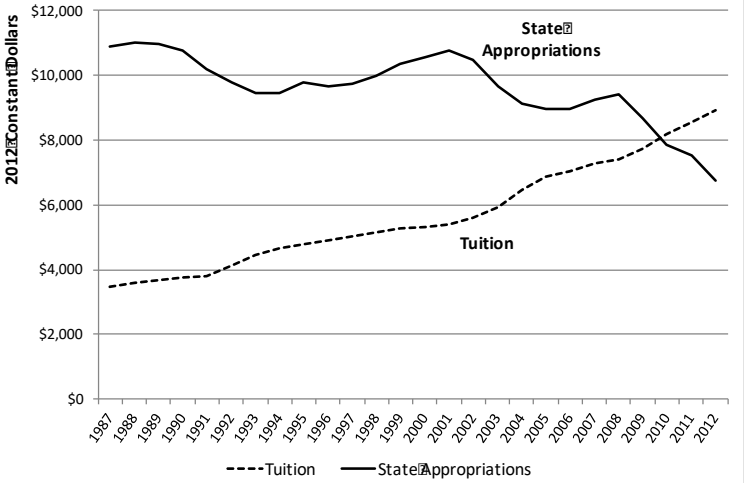
Source: IPEDS

For all research strata, the average share of first-year students receiving Pell Grants is consistently similar to the share of all undergrads receiving Pell Grants and the share of students from households with annual income below $30,000 in the years for which full data are available. Tracing the ups and downs of business cycles, Pell Grant recipients mostly fluctuated at between 20 and 25 percent of full time first-year students at universities in the "Highest" research category between 2000 and 2012. At the other end of the spectrum, enrollment of Pell Grant recipients has steadily increased from just under 35 percent to over 45 percent at public universities in both the "Some" and "None" research categories.

Rising Tuition to Offset State Funding Cuts Per-Student

Low income students require greater resource expenditures by universities in order to ensure their success because of absent household resources and lagging postsecondary education quality in low-income communities (Bound, Lovenheim, and Turner 2009, 2012; Bound and Turner 2007). Public universities, however, have received less state funding per student even as their enrollment of low-income students has increased. To address these resource shortfalls, public universities have increased revenue per student from tuition. This tradeoff has been particularly acute since 2000. Figure 3 shows that the tradeoff between state funding cuts and tuition has been approximately 1-to-1 between 2000 and 2012. We show elsewhere how this trend extends across all research levels of public universities (Eaton, Brady, and Stiles 2016).

Figure 3: Public University Revenue Per FTE Student by Source



Source: IPEDS

A Murky Picture of Student Debt

Researchers still have a remarkably murky picture of student debt across the different strata of research universities. Across all public universities, we know that average debt per student (including non-borrowers) at graduation increased by 38 percent from $10,831 in 2004 to $14,908 in 2013 in 2013 constant dollars (The Institute for College Access & Success 2016a). Average debt per borrower at graduation increased at a slower rate of 24 percent but from a higher baseline of $20,208 to $25,049. We also know that comparable increases were widespread but not universal across all U.S. states (The Institute for College Access & Success 2015). But we know little about how the increase in student debt differs across the strata of public universities. Nor do we have a clear picture of trends in student debt among particular socio-economic groups at these different types of research universities.

We know even less about the ability of former students at research universities to repay their loans after college. But it seems sensible to believe that we should be particularly worried about the ability of low-income students and students at lower ranked

research universities to repay their loans. Some prominent economists have argued that students rarely borrow too much because on average the earnings gains from college are much higher than the costs of repaying student debt (Akers and Chingos 2016; Avery and Turner 2012). New research suggests, however, that large numbers of low-income students and students at lower-prestige schools are in fact unable to repay their loans (Looney and Yannelis 2015). Student loan default rates approached 30 percent in 2011 for for-profit and community colleges where low-income students are predominant (Looney and Yannelis 2015, 59). The high default rates at community colleges indicate that low-income borrowers have high rates of default even when they borrow comparatively smaller amounts because of low-income gains from community college.

High student loan default rates at community colleges suggest that student loan default rates might also be particularly high among low income students who have lower odds of graduating – and thus are less likely to secure income gains – even at four-year colleges. Low and middle-income students may also be particularly at risk at lower tier public research universities where graduation rates are often below 50%. Indeed, overall student loan default rates approached 20% in 2011 at less selective four year schools (Looney and Yannelis 2015, 59). With approximately 1 million students leaving public research universities every year, mostly from less selective schools, this raises the possibility that nearly 200,000 of them will default on student loans in the next 3 years. Low income students are the most likely to be those who default.

An Even Murkier Picture of State Need-Based Grant Aid

Research is extremely limited regarding the scope of state need-based student grant aid programs and how they differ across states (Carlson and Zaback 2014). Need-based grant aid probably encourages college attendance among low-income students (S. Dynarski 2000, 2002; S. M. Dynarski 1999; The Institute for College Access & Success 2016b). Need-based grant aid also probably improves college persistence and completion (Carlson and Zaback 2014; Chingos 2012; Goldrick-Rab et al. 2012; Titus 2006). Yet Pell Grants, the primary federal need-based grant aid program cover a substantially smaller share of college costs today than in the 1980s (The College Board 2013). Consequently, need-based state student grant aid programs could provide a critical policy tool for reducing the high rates of student loan defaults at public research universities.

State need-based grants could potentially fill the gap left by Pell Grant awards. Despite large increases in college costs, the average Pell Grant award has increased just $374 since 1975 in inflation adjusted dollars from $3,350 to $3,724. The maximum Pell Grant award has actually declined in inflation adjusted dollars from $6,164 to $5,775. Like Pell Grants, state need-based grant aid consists of grants awarded primarily on the basis of economic need to students. In contrast to institutional aid, the grants are funded by tax and other revenue by states rather than by public universities themselves. These grants can be used to cover tuition, room, or board costs, thus offsetting the need to borrow using student loans. Total spending on need-based grants across all states increased 37% from $5.7 billion in 2005 to $7.8 billion in 2015 (National Association of State Student Grant & Aid Programs 2015). The scale of these programs is now beginning to approach the $30 billion in annual Pell grants and $14 billion in veteran grants (The College Board 2012). But we have scant analysis of how state grant aid programs differ across different states. Nor do we know how these grant aid programs might contribute to varying levels of affordability for low-income students across the different strata of research universities.

In the following pages, we take important first steps towards understanding both the ability of low-income students to repay their debts and the availability of grant aid as an alternative to debt. First, however, a word is in order about the unique data we use for this enterprise.

2. Data

We assembled a new dataset that combines college-level data from multiple sources. First, we use the College Scorecard data on student loan borrowing and student loan repayment at the college level. Second, we combine the National Association of State Student Grant Aid Programs (NASSGAP) database with college cost data from the Integrated Postsecondary Education Data System (IPEDS). The NASSGAP data are reported on a state-by-state basis and the IPEDS data is reported for each university or college. We link the two at the state level since we know the location of each institution in the IPEDS data. This enables us to analyze the extent of state need-based aid – and its relationship to college costs. Specifically, we link state-level NASSGAP data for 2014 to IPEDS data on federal student aid, student household income, and college costs. Using these data, we can make meaningful estimates and comparisons across states in the state-level size and generosity of state need-based aid per student. We can also examine how these state-level measures of grant aid programs relate to net college costs by income group in our different research university categories.

We specifically use NASSGAP data on need-based state undergraduate student grant aid awards to students at 4-year state universities. We turn to the NASSGAP data because no other dataset provides comprehensive data on state need-based aid at the state level, let alone at the college level. NASSGAP publishes an incredibly detailed longitudinal database of all state student aid programs at the state program level. The database includes state-level student loan, merit scholarship aid, and tuition waiver programs in addition to data on need-based grant aid. We only use the data on need-based grant aid in accordance with our

thesis that the targeting of such programs will be particularly effective in limiting college costs for lower-income students. Similarly, we only use data on expenditures to support students at public universities because of our particular interest in affordability at public universities for which state grant aid programs may differ from their support of community college or private college students.[3] Our estimates use expenditure data only from state aid programs, which report using a measure of economic need for program eligibility although they may use other measures as well. Programs sometimes include a merit component such as a minimum GPA. We include such programs in our estimates because selecting on merit lowers per student expenditures so we are not exaggerating aid in states that select on merit.

We then turn to IPEDS data, first, to standardize state grant aid measures according to the number of low-income students in public universities in each state. To accomplish this, we simply divide the total state expenditure on need-based grant aid for students at public 4-year schools by the total number of Pell Grant recipients at public 4-year schools in the state. We use the count of Pell Grant recipients at public 4-year schools because it is the most consistent measure of the number of low-income undergraduate students across universities – much more consistent than the counts of undergraduate students by income bracket. Nearly all students receiving Pell Grants are from households with $50,000 or less in total annual income. This measure of state grant aid per Pell recipient at the state level is necessarily crude because the reader may recall that data for such aid expenditures are only available at the state level. Unfortunately, the estimate of state grant aid generosity per Pell recipient does not account for differences in state aid program awards within states between public universities. Such differences in aid program awards tend to occur in states such as California where in-state tuition rates differ substantially across the state's universities.

Second, we also standardize the relative generosity of state grant aid by using IPEDS data on in-state tuition sticker price. For this we simply divide the state-level measure of grant aid per Pell recipient by the college level measure of sticker price. We do so in order to account in some of our analyses for differences in the relative purchasing power of state grant aid relative to tuition. The estimate is again necessarily crude because the count of Pell Grant recipients in IPEDS includes out-of-state students. This means that the Pell Grant recipient count may include out-of-state Pell Grant recipients who are not eligible for state need-based aid. We expect the difference to be small, however, because most states enroll only higher income out-of-state students who are able to pay higher out-of-state tuition rates.

The estimate of state grant aid per Pell recipient is also crude because it does not account for how need-based grant aid generosity can vary between public universities with different tuition levels within a state. For example, California provides Cal Grants up to a maximum that is approximately equivalent to the in-state tuition sticker price for each of its public universities. This means that the maximum CalGrant for students is approximately $13,000 for students at campuses of the University of California system where tuition is higher. The maximum CalGrant is approximately $6,000 for students at campuses of the California State University system for which tuition is lower. In such cases, our estimates may sometimes underestimate the portion of sticker price that is covered by need-based grant aid at higher tuition universities. Likewise, our estimates may overestimate the share of sticker price covered at lower-tuition universities in a state. We try to adjust for this when estimating grant aid per Pell recipient as a share of average sticker price for a state and for a state research category by weighting university-level sticker prices used for the averaging by the total number of Pell recipients at each university.

Third, we use IPEDS data on the percent of all undergrads that are Pell Grant recipients to estimate the level of financial need for undergraduate students. Larger state grant aid programs may particularly be needed for universities with more low-income students. An alternative approach would use the percentage of 18-24 year olds in a state who are from low-income households. This could also reflect potential need among young people who do not currently attend universities but might attend if more generous grant aid were available. On the other hand, many factors go into whether low-income people enroll at universities aside from cost considerations. For illustrative purposes, we therefore find it appropriate to use the share of undergraduates that are Pell recipients as a rough measure for student financial need.

Finally, we use IPEDS data on college-level in-state net price by income group to estimate the relationship between state grant aid and college affordability. We are able to do this because IPEDS includes a college level variable for net price income brackets. There are drawbacks to this approach as well, but we believe it is the best option for assessing the relationship between state aid and affordability with comprehensive administrative data across public universities. From IPEDS, we use the in-state net price data for students from households in the $0-$30,000 income bracket. The net price data differs from the in-state sticker in that a) it includes room and board costs and not just tuition and b) it reflects the actual full cost paid by students after all state, federal, and grant aid are accounted for. We use these data to estimate the relationship between state-level state-aid program expenditures and net-price at both the state-level for all universities in the state and for universities in each state by research category. This enables us to see if state grant aid may cover more costs in certain categories of research universities in some states. Similarly, it will provide a sign if some universities are substantially reducing net-price for lower and lower-middle

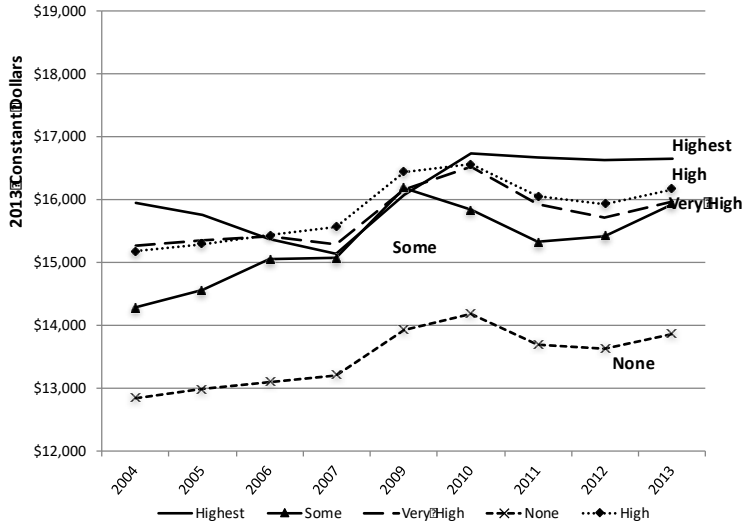
income students through alternative means such as lower tuition rates or institutional financial aid financed from other sources such as tuition paid by out-of-state or high income students.

3. Results

Student Loans at Public Research Universities

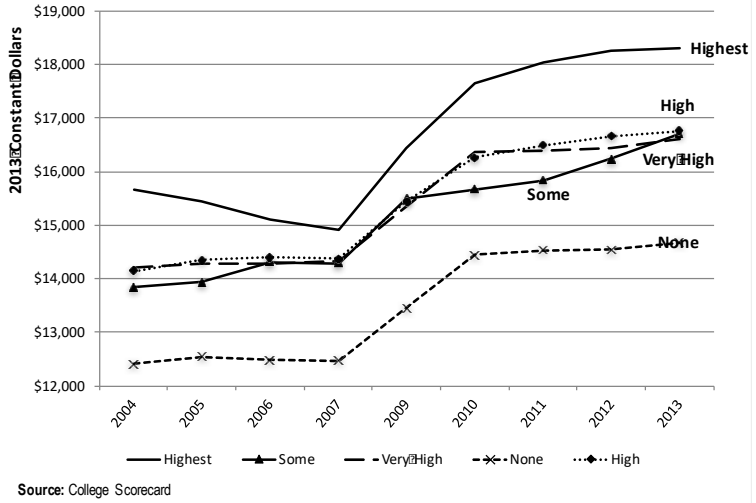
We find relatively uniform increases in student loan borrowing across all strata of research universities for both low and middle-income borrowers. Unfortunately, college level data are not available on the number of students who left school with zero debt. Our analysis therefore examines only average debt per borrower among borrowers who left school with at least some debt. This average debt per borrower measure is consistently 45 percent lower than debt per student when students with no borrowing are included. Figure 4A shows that higher research universities started with higher baseline student debt levels but also were able to shield low-income borrowers from larger increases over the period. Student debt increased around 7 percent from about $15,000 in 2004 to about $16,000 in 2013 for "Very High" research universities, "High" research universities, and "Some" research schools (2013 constant dollars). Similarly, public universities in the "None" category saw student debt rise 8 percent from $13,000 to $14,000. Research universities in the "Highest" category had just a 4 percent increase in debt from $15,941 to $16,635.

Figure 4A: Low-Income Student Debt By Public University Research Category



Public universities also appear to have shielded low-income borrowers from debt increases to a greater extent than we see among middle income borrowers. Figure 4B shows that debt for departing middle income borrowers rose by 21 percent from about $14,000 in 2004 to about $17,000 in 2013 for universities in the "Very High", "High", and "Some" research categories. For middle income borrowers at schools in the "Highest" research category, debt was consistently more than $1,000 higher than at schools in these lower research categories, rising 12 percent from just under $16,000 in 2004 to over $18,000 in 2013.

Figure 4B: Middle-Income Student Debt By Public University Research Category



Source: College Scorecard

Note that the survey cited earlier found higher levels of baseline debt at graduation for all income groups, increasing 24 percent from $20,208 to $25,049. (The Institute for College Access & Success 2016a). These figures are different from what we find for all exiting borrowers across all income groups. This discrepancy is primarily because our data are for all borrowers in an exiting cohort, including non-graduates who may leave with less debt because they exit school early. In our dataset, debt at graduation is not as high, but still consistently higher, increasing by 16 percent from $17,576 to $20,977 during the period. Unfortunately, however, we cannot disaggregate college-level data for debt at graduation by borrowers' income groups.

Student Loan Defaults by Public University Students

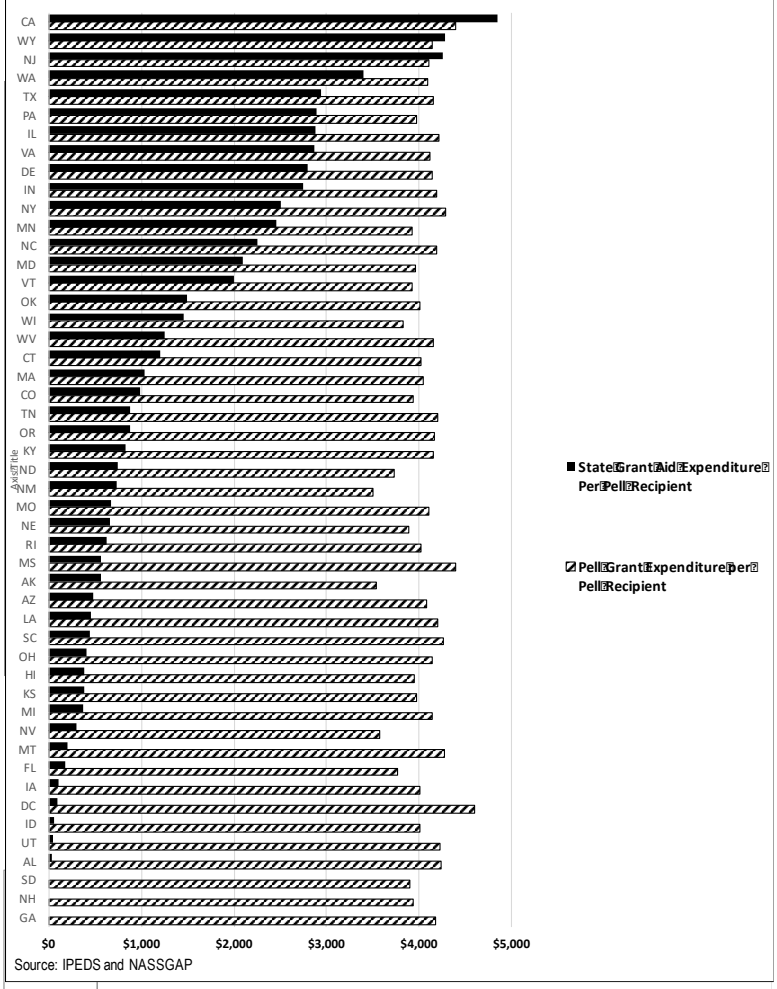
We saw that public universities managed to check student loan increases for low income borrowers, presumably by providing them with grant aid. Nevertheless, we find that low income students were particularly vulnerable to default. With lower graduation

rates, lower strata public universities saw particularly bad student loan default rates for low-income borrowers in exiting cohorts from 2006 to 2010. Figure 5A shows that defaults by low income borrowers topped 36 percent in the "Some" research category and exceeded 27 percent in the "High" category. Even at "Very High" research universities, however, more than 1 in 5 low-income borrowers in the 2010 exiting cohort went on to default on loans in their first 3 years of repayment. The default rate for that cohort was 15 percent at universities in the "Highest" research category.

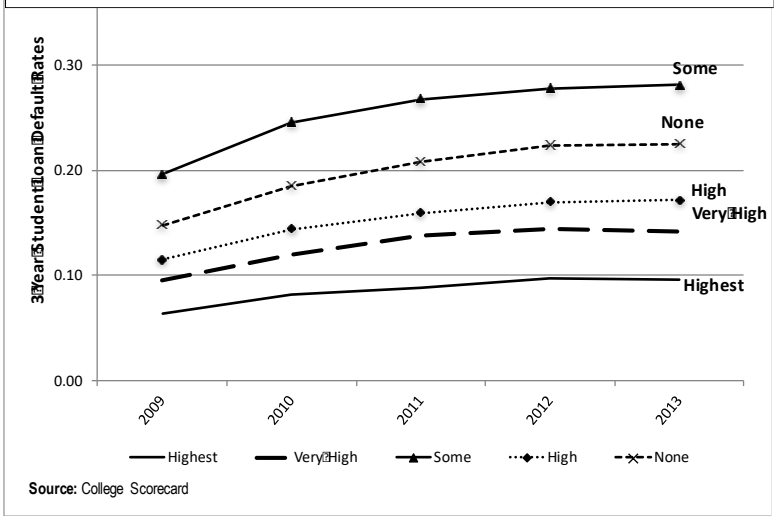
Student loan default rates also raise concerns about rising student loan debt for middle-income students. Figure 5B shows that default rates were lower between 2006 and 2010 for middle-income than for low-income students. Still, default rates neared 30 percent for exiting cohorts between 2008 and 2010 at universities in the "Some" research category. Middle-income default rates also reached 15 percent or more in the "High" and "Very High" research categories.

These high default rates underscore the perils of even moderate levels of student loan borrowing at lower strata research universities and among lower income students. Absent new federal policy alternatives, state need-based grant aid might provide an option for keeping student loan borrowing in check. We turn now to our analysis of such state based programs and their relationship with college costs.

Figure 6: State Aid Expenditure Per Pell Recipient Versus Pell Grant Expenditures



Source: IPEDS and NASSGAP



Source: College Scorecard

The Varied Size and Scope of State Need-Based Grant Aid

State need-based grant aid programs vary dramatically in both the share of students receiving aid and in the size of overall expenditures on aid. The variation in state need-based grant aid has been noted in NASSGAP reports for the last ten years (National Association of State Student Grant & Aid Programs 2015). But there has been limited analysis of how aid programs vary across states after accounting for factors like differences across states in their demographic composition, college-going rates, and student economic need levels. Our findings begin to fill this gap by showing that only five states provide need-based grant aid to a larger number of students than the federal Pell Grant program for their state. We also find that three states significantly outpaced other states by spending more on need-based grants than the federal Pell Grant expenditure for their state.

Our findings indicate that while a few states are investing heavily in need-based aid, most states spend little relative to federal programs. We illustrate this by comparing total state aid expenditures relative to Pell Grant expenditures by state. This is shown

in Figure 6, which charts state need-based grant aid spending per Pell Grant recipient (in black) against Pell Grant spending per Pell Grant recipient for the state (in stripes).

We compare spending on a per Pell recipient basis because the number of Pell Grant recipients approximates the number of low-income students in the state with earnings around or below $50,000 per year. We can see that three states, California, Wyoming, and New Jersey, spend more than $4,000 per Pell recipient on state aid, higher than the federal Pell Grant expenditure for their state. After a large drop, these leading states are followed by 11 states that spend between $2,000 and $3,000 per Pell recipient and 50 percent to 75 percent of the federal Pell expenditure for their state. Six states and the District of Columbia spend less than $100 per Pell recipient on state aid.

Spending per low-income student is a function of both the amount of aid per recipient and the share of low-income students who receive aid. We find that states which spend more per recipient also tend to cover more low income students. This is depicted in Figure 7 which plots states according to their average grant award per recipient on the Y axis and the difference in the percent of students receiving state grants minus the percent of students receiving Pell Grants on the X axis. By plotting states according to the percent of students receiving state grants minus the percent receiving Pell Grants, we can see which states are offering state grants to more students relative the number of students with sufficient financial need to qualify for Pell Grants. Again, we take this approach because the percent of students receiving Pell Grants is the most consistent indicator for the percent of students who are from low-income households. The plot reveals that states with more generous grants per student also tended to provide grants to higher shares of needy students. The upward sloping dashed line is a fitted regression estimate for this relationship.

At a more granular level, Figure 7 shows the large disparities across states in the size of need based grant awards and coverage of Pell Grant recipients. We can see that California and Washington ($8,000 and $7,000 respectively) have generous state grant awards per recipient but that more than 15 percent of their undergraduates receive Pell Grants but no state aid. In contrast, most states, however, provided average grants of less than $2,000. In addition, more than 15 percent of their undergraduates receive Pell Grants but no state aid. Alternatively, Vermont and Massachusetts stand out on the far right of the X axis for covering more students than Pell Grants but offering low aid per recipient. Like most states, they offer below $2,000 and below $1,000 per recipient respectively even though Vermont has the second highest average in-state tuition sticker price of $14,366 and Massachusetts has the 10th highest in-state tuition sticker price of $10,874.

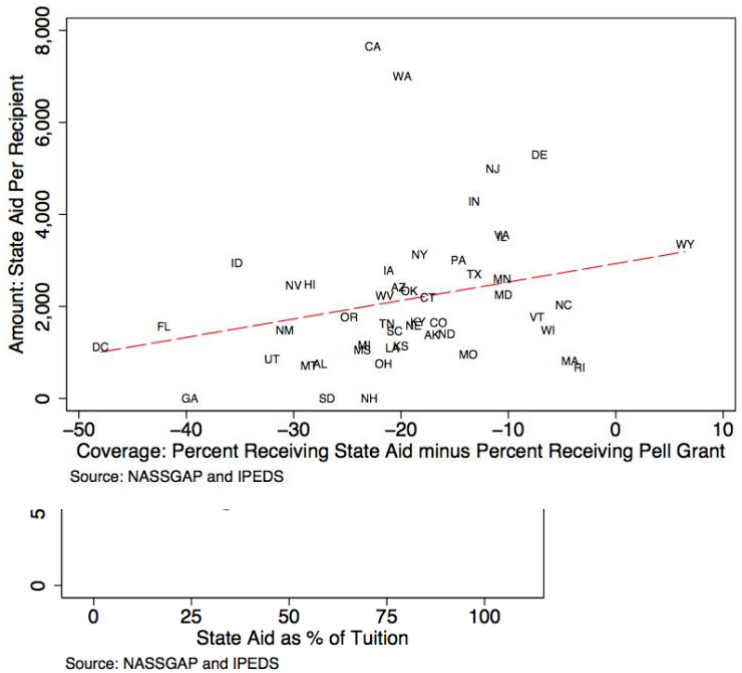
Georgia, South Dakota, and New Hampshire are shown to not provide any state need based grant aid despite significant shares of students who qualify for Pell Grants.[4] The case of Georgia highlights that these estimates reflect only state's need based grant aid programs. Georgia offers a generous state grant known as the Georgia Hope Scholarship. Unlike need based aid, the Georgia Hope Scholarship is awarded on the basis of a merit GPA qualification and is provided to students of all income levels. As a result, substantial funds go to high income students under non-need based aid programs like the Georgia Hope Scholarship.

Net Price for Low Income Students and State Aid

As expected, we also find that actual college net-prices for low income students – tuition, room, and board costs after all aid is factored in – are consistently lower in states with high state spending on aid. This finding holds across research university categories. At the same time, we identify a small number of very high research universities that have low net prices for low income students despite having high sticker prices and low state need-based aid programs. This underscores how public universities can achieve low net price in several ways, including internally financed institutional student aid. Although there are many such paths to lower net prices, all of them may not be equally achievable for the different strata of research universities.

States particularly tend to have lower net prices across all research university strata when state grant aid is higher relative to the in-state tuition sticker price. We illustrate this in Figure 8. Each circle in the scatter plot represents one of four research categories for

Figure 7: State Aid Per Recipient State Aid Coverage of Pell Grant Recipients



an individual state. A single state may thus have as many as four circles of different shading. The circles go from darker shading for higher research strata to lighter shading for lower research strata. We group the "Some" and "None" research university strata together in one category because there are no meaningful differences in estimates between the two groups and few states have schools in the "Some" research category.

Figure 8 plots the research category for each state on the Y axis according to the average actual net price for low income students. Recall that this actual net price or "cost of attendance" includes tuition, room, and board costs to students after accounting for discounts and grant aid. The research category for each state is plotted on the X axis according to the state expenditure on need-based aid per student as a share of the average net price for the research category.[5] One note of caution: states are still plotted in these graphs on the X-axis by the average aid spending on tuition as a share of sticker price for *all* public universities in the state. This is primarily because state aid spending cannot be broken out by research category. In addition, actual state aid spending on a given student typically reflects a formula that awards higher aid for students at schools with higher sticker prices. So the average of state spending per student in a state would not accurately reflect the actual spending in a given research category if that state's tuition rates were substantially higher in one research category than another. As noted earlier, this is the case with for the CalGrant aid program and California's higher ranked University of California (UC) campuses and the state's lower ranked California State University campuses (UC).

The dashed line reflects the linear fit of the relationship between actual net price for low income students and state aid as a percent of tuition. This estimates that net price for low income students tends to be about $1,000 lower for every 21 percent of tuition sticker price that was covered by state aid. This relationship holds across all research university categories. While it is difficult to discern in the scatter plot, we can also see that states have particularly kept net prices for low income students down at schools in the "Highest" research category. Of the 23 states with schools in the "Highest" research category, 15 states or 65 percent kept the average net price below the median average net price across all research categories of $10,176. Of the 48 states with schools in the "Some/None" combined category, 28 states or 58 percent also kept the average net price below this median net price. In the "Very High" and "High" research categories, however, just 40 and 36 percent of states kept the average net price below the median net price.[6]

Our findings also suggest that some alternative paths to low net price, may not be as achievable or sustainable for all schools as state-grant aid programs. For example, it appears that higher ranked public universities are most able to have low net prices for low-income students despite high tuition and low state aid. University of Georgia and University of Michigan both stand out as two such universities. Both are in the bottom left of the scatter plot as schools in states with aid spending below 10% of sticker but low-income actual costs of attendance of just $6,000. Both schools are also in the top quartile for average state level sticker prices (above $10,700 per year). A potential explanation for low net prices in these states is the use of "institutional aid" funded by endowments or "tuition return to aid" from wealthier students at the university level rather than from state tax revenue. Higher ranked research universities are more likely to have endowments and be able enroll higher numbers of out-of-state students at higher tuition rates (Eaton et al. 2016; Eaton, Brady, and Stiles 2016; Jaquette and Curs 2015). These higher ranked research universities in turn are most likely to have revenue to support institutional aid for low-income students.

4. Conclusions

To sum up, we find that rising student debt particularly poses a problem for low-income students at lower-ranked research universities. Parallel with findings on community college student debt, low income students at lower ranked universities tend to have higher default rates even though they have lower levels of borrowing. During years overlapping with the Great Recession, student loan default rates reached 35 percent for low-income students at public universities with low research rankings.

More encouragingly, we find a number of states with substantial state aid programs that improve affordability for low-income students. Texas, North Carolina, Massachusetts, Wyoming, and Vermont all provide state need-based aid to a greater number of public university undergraduates than the federal Pell Grant program. California and Washington state are leaders in providing an average of $8,000 and $7,000 of aid per recipient respectively – far more than the average Pell Grant per recipient of $4,000. By combining broad grant aid eligibility with generous grant levels, California, Wyoming, and New Jersey spend more on aid than the federal Pell Grant expenditure for their states.

We have also shown lower net prices for low-income students in states with strong state aid programs. This suggests that state aid might provide an alternative to the risks of student debt for low-income students. California, North Carolina, Washington, and Wyoming all stand out with aid spending per student equivalent to 40% of sticker price and actual average costs of attendance for low income students below $8,000. In contrast, New Hampshire, South Carolina and Washington DC stand out for high tuition, near-zero aid, and high actual costs of attendance for low income students of more than $13,000 annually.

The Need for Better Data

The poor quality of college and student-level student debt and aid data forces us to rely in this study on much cruder estimates that we would like. On the one hand, national surveys of students like the National Postsecondary Aid Study (NPSAS) do not include large enough samples to learn how much state grant aid is provided state-by-state. On the other hand, IPEDS college-level surveys do not break out either state grant aid or institutional aid by whether it is need or merit based. Even the new College Scorecard data are limited because it needlessly opts not to break out breakdowns for student loan repayment among low-income students by whether they graduated. Better student-level data would advance our analysis a great deal. Medium-term improvements in college-level data might be more plausible. We argue that an existing or new survey should gather additional college level data including:

- Total number of students in exiting cohorts that have zero federal student loan debt.
- Total number of student loan borrowers in repayment by income level *and* completion status.
- Total number of students receiving need-based *state* grant aid by students' income level.
- Total dollar awards to students receiving need-based *state* grant aid by students' income level.
- Total number of students receiving need-based *institutional* grant aid by students' income level.
- Total dollar awards to students receiving need-based *institutional* grant aid by students' income level.

These improvements to big organization-level datasets would be a valuable complement to recent advances in harnessing large administrative data sets with individual-level panel data. For example, Chetty et al have used deidentified individual-level IRS tax data to track generational mobility rates for different income groups by university (2017). Without college-level metrics of the type we call for here, it will be challenging to gain a full picture of student body characteristics that cannot be ascertained through individual level administrative data because of limited access or nonexistence. Even with individual-level data, for example, Chetty et al relied on IPEDS for measures of student body characteristics in the aggregate and other institutional characteristics that could influence student outcomes.

Different Paths Forward for Different States and Strata of Public Universities

Even without improved data, we can safely conclude that there are different paths for improving affordability in different states according to 1) the strata of their universities in terms of research intensiveness, 2) their historical tuition levels, and 3) the current scope of their need-based aid programs. For example, California offers high aid per recipient to cover most tuition costs. But we saw that California provided state grant aid to only 63% as many public university students as Pell Grants in 2014. This is because California limits the age eligibility for CalGrants much more restrictively than the federal Pell Grant program. Loosening age restrictions in California seems like a sensible next step, particularly as more adults seek postsecondary training and credentials amid declining blue collar career options. States like Massachusetts and Vermont with broad coverage but low aid per recipient could prioritize increases to grant awards.

Tax financed state grant aid is especially important for lower ranked research universities that have less ability to raise institutional funds for financial aid. Lower ranked public universities may have less market power to fund return to aid by charging higher tuition from wealthier students and out-of-state students. They may also struggle to garner sufficient philanthropic donations to fund aid relative to higher ranked schools. Increased state grant aid can also help to further expand affordability at higher ranked research universities. State funded grant aid can free up more funds for these higher ranked schools like University of Michigan to offer additional grant aid to students who need it the most.

States with strong existing grant aid programs could further prioritize expanding grant aid to reduce student loan borrowing for low-income students to zero or near zero. This is a worthy goal because we find high student loan default rates for low-income students despite their low average levels of student loan borrowing. Lower graduation rates for low-income students likely contribute to these high risks of default. By taking these risks off the table, offering debt free financial aid packages could encourage more promising low-income students to go to public universities.

In recent years, political leaders across the ideological spectrum have tapped into deep anxieties among Americans about such student debt risks and economic insecurity more broadly. Expanded college aid could most benefit communities where these economic anxieties are particularly intense. Aid must come from state government or higher education institutions themselves. State governments are better positioned to provide the aid to students in need. The variety of existing state aid programs coupled with the varieties of public universities provide important opportunities for experimentation and research into the most effective use of student aid. We already have strong examples from North Carolina and New York to Wyoming and Washington where state need-based grant aid improves affordability and lowers student debt. We hope our findings will spur further research and experimentation by explaining these state successes and identifying other states where similar programs are needed.

ENDNOTES

[1] We use the Carnegie Classification ranking of research universities according to the number of doctoral degrees they grant and amount of funded research they conduct.

[2] The average annual tuition sticker price for a public university across states ranged from $3,698 to $14,380 in 2014. In addition, there are often variations within a state in the tuition sticker price from one public institution to another.

[3] Note that Arkansas and Maine do not report the share of their expenditures that go to students at state versus private institutions. We therefor exclude these states from our analysis.

[4] Maine and Arkansas are omitted from Figure 6 and all subsequent figures because they do not break out data for their small state need based grant aid programs for public universities versus other private and two year institutions.

[5] For average in-state sticker price, we use IPEDS' college level data on sticker price to estimate the mean sticker price for universities within each research strata in the state weighted by number of Pell Grant students enrolled at each university. This makes the in-state sticker average more reflective of the sticker prices used at the universities which enroll more Pell Grant students within the research category in the state. It approximates the average sticker price that low-income students would pay without any gift and grant aid from any source.

[6] The careful reader might wonder about two outliers in the plot. At the very top of the plot is Penn State which has such a high in-state sticker price of $17,588 that its low income net price does not appear to be mitigated by Pennsylvania's moderate need-based grant aid program. On the far right, we can see Wyoming State University where state-grant aid awards per low income student amount to 108 percent of the school's $3,968 in-state sticker price.

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