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The role of selective colleges and universities in shaping students' educational and socioeconomic outcomes is becoming increasingly apparent. These institutions are capacity-constrained and educate only a very small percentage of college enrollees, but they offer a rich range of academic and financial resources benefiting their students. Net of other factors, attending a selective institution has been associated empirically with higher future income, greater social status, increased pursuit of graduate degrees in selective programs, and increased civic engagement (Bowen & Bok, 1998; Bowen, Chingos, & McPherson, 2009; Brand & Halaby, 2006; Brewer, Eide, & Ehrenberg, 1999; Thomas & Zhang, 2005; Zhang, 2005). Although evidence of returns to attending a more selective institution is not uniformly positive (e.g., Liu, Thomas, & Zhang, 2010), there is ample support for Bowen, Kurzweil, and Tobin's (2005) observation: "The path to many positions of power and wealth in this country winds its way through these selective colleges and universities" (p. 95).

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The benefits of attending such schools appear to be especially strong for students of lower socioeconomic status (SES). Dale and Krueger (2002), for example, found that attending a selective college notably raised post-graduation earnings for lower-income students. Yet relatively few lower-SES students attend such schools (Bailey & Dynarski, 2011; Heller, 2004), and fewer still earn degrees from them (Bastedo & Jaquette, 2011). To the extent that attendance in the most selective institutions is disproportionately found among the most socioeconomically advantaged students, research and policy attention are warranted.

All selective institutions exhibit disproportionate enrollment from the middle and upper socioeconomic strata. In the public sector, institutions have coped with declining levels of state support by charging more to both out-of-state and in-state students (Hiltonsmith & Draut, 2014; Rizzo, 2006). The historic "tuition gap" between public and private institutions has narrowed, and preexisting stratified enrollment patterns in the selective public sector are likely being exacerbated by the dramatic surge in tuition charges there. Still, public colleges continue to enjoy substantial government subsidies, generally charge less than private colleges, and usually pose fewer financial challenges for lower-SES students and their families. What is more, public institutions work under stronger societal, legal, and organizational expectations for providing access to all socioeconomic classes. Like their public counterparts, private institutions offer need-based student aid to offset price barriers, but their greater market dependence compels them to base their pricing and aid awards on a variety of institutional goals beyond increasing access, e.g., buttressing academic quality, achieving financial sustainability, acquiring funds to subsidize other institutional activity, expanding diversity in areas other than SES, and attracting specialized talent.

As private college leaders have recently pointed out, albeit guardedly, egalitarian norms have played a substantially smaller role in shaping private institutions' legitimacy and role in society, compared to the influence of such norms on public institutions (Pérez-Peña, 2013b). Commitment to addressing educational, social, and economic inequalities is arguably more discretionary in private institutions. Given the centrality of those institutions in the nation's higher education system, enrolling more than one-third of all students and playing critical roles in meeting state and national priorities for research and economic development (Alexander, 2000; Geiger, 2004; U.S. Department of Education, 2011; Zumeta, 1996), private institutions must be considered critical actors in addressing socioeconomic barriers in enrollment. Lacking both an opportunity-oriented societal/governmental charter and substantial state subsidies to help reduce price barriers, a given private institution's distinctive organizational character and strategic choices profoundly shape the socioeconomic profile of its student body. It therefore

makes sense to focus attention directly on the role of selective private institutions in providing access to lower-SES students.

Not surprisingly, some private institutions have enrolled substantially more lower-SES students than others. Data for the federal government's Pell Grant program highlight these patterns. Pell is the nation's largest need-based student-aid program, and all major colleges and universities participate in the program. Institutional pricing in the elite private sector tends to be rather uniform, so institution-level Pell participation data can be useful for profiling. Data from the U.S. Department of Education and the Delta Cost Project reveal dramatic differences in lower-SES student enrollments among similarly priced, highly selective private institutions. In 2008, approximately one-fifth of full-time undergraduates at Mount Holyoke College and Tulane University received Pell Grants. Even more strikingly, one-fourth of the students at Smith College received the grants that year. In contrast, at three schools in our sample, well under a tenth of the students received Pell Grants that year.

With these disparities in mind, we focus our analysis on selective private institutions' socioeconomic diversity, which we define here as the extent of an institution's variation from the longstanding predominance of middle- and upper-SES students in that sector. A core premise, therefore, is that divergence from historical socioeconomic distributional patterns toward patterns more reflective of the national population reflects an institution's organizational commitment to more inclusive student bodies. This premise, in turn, points to our central research question for this paper: How do organizational factors shape socioeconomic diversity at selective private institutions?

Stratification of Postsecondary Enrollment Patterns

Analysts have studied the factors and processes distributing students among differing colleges and universities in varied ways. Case studies have offered enriched understandings of particular nexuses of students, families, and institutions (e.g., McDonough, 1997), large-scale, survey-based studies have brought quantitative rigor and generalizability (e.g., Long, 2004), and mixed methods have further enriched understanding (e.g., Lee & Kramer, 2013). Uniformly, such studies have highlighted the stratification endemic in U.S. postsecondary education.

Stratifying patterns limit certain students' entry *into* postsecondary institutions of any kind, but inequalities are also prominent *within* the postsecondary education system (Jencks et al., 1979; Winston, 2004). At the institutional level, large variations appear in the distribution of academic and financial resources across colleges and universities. At the same time, at the student level, there is enormous, systematic variation in enrollment destinations. Lower-income students are appreciably more likely than others

to delay entry after high school, attend college part-time, and fail to obtain a degree in timely fashion (Bailey & Dynarski, 2011; Cabrera, Burkum, & La Nasa, 2005). These patterns contribute to socioeconomically differentiated exposure to academic resources and, ultimately, to socioeconomically differentiated levels of educational attainment (Grodsky & Jackson, 2009; Mullen, 2010; Stevens, 2009).

These differences also extend to the institutions that college-going lower-SES students attend. While the late 20th-century shift toward mass higher education in the United States greatly expanded postsecondary access among all social classes, students' specific college choices have remained closely linked to socioeconomic background. Although low-SES students on average score lower on some indicators of academic qualifications (Walpole, 2003), many of them are qualified to attend selective institutions. Regardless, relatively few lower-SES students enroll in such schools (Carnevale & Rose, 2004; Hoxby & Avery, 2012; Winston & Hill, 2005). Even after statistically controlling for variations in academic ability, achievement, experiences, and expectations, students from lower-SES backgrounds are less likely than similar students from more privileged backgrounds to attend selective, well-resourced institutions (Astin & Oseguera, 2004; Engberg & Allen, 2011; Grodsky, 2007; Karabel & Astin, 1975; Hearn, 1988, 1991; Karen, 2002; Mortenson, 2005). In short, SES-differentiated college enrollment patterns are not simply artifacts of differing academic qualifications.

What else, then, might be at work? Numerous analysts have addressed this complex, multidimensional question from the *student* perspective, and we have learned much concerning the many sociocultural factors shaping students' and families' college-going decisions and behaviors (Beattie, 2002; Cabrera & La Nasa, 2000; Hossler, Schmit, & Vesper, 1999; Hurtado et al., 1997; McDonough, 1997; Turley, 2009). Meriting further investigation, however, is the *institutional* side of the equation. While similar in their academic selectivity, elite private institutions are far from homogenous in their SES diversity. Lower-income students comprise less than 5% of the enrollments in some of these schools but more than a quarter in others. In this article, we examine the organizational factors that may be suppressing or enhancing levels of socioeconomic diversity.

Of course, the great majority of students in all of the most selective and expensive schools come from relatively advantaged backgrounds. Numerous studies have found that those institutions lag far behind others in enrolling socioeconomically diverse student bodies (Heller, 2004; Karen, 2002; Mortenson, 2011; Steinberg, Piraino, & Haveman, 2009), and these troubling gaps are becoming more pronounced (e.g., Astin & Oseguera, 2004). Not surprisingly, the issue has attracted attention in the national media and in policy debates (e.g., Leonhardt, 2011). Some analysts refer to the patterns of enrollment described above as students "under-enrolling" in elite institu-

tions, relative to their capabilities. We are reluctant, however, to place the behavioral emphasis on students rather than institutions. Instead, we prefer to frame the issue at the institutional level. Important recent work by Hoxby and Avery (2012) affirms this perspective, suggesting that the dearth of applications to elite colleges by lower-SES students is in good part attributable to strategic choices of institutions regarding where those institutions focus their recruiting efforts. As Carnevale and Rose (2004) and Bowen, Kurzweil, and Tobin (2005) have argued, the most selective institutions do a better job of recruiting racially and ethnically diverse student bodies than they do in pursuing socioeconomically diverse student bodies.

Understanding these institutional variations comprises a significant policy and theoretical issue, given the earlier cited evidence that attending elite institutions produces distinctively important lifetime returns. Absent evidence of overt discrimination against lower-SES students, it is appropriate to examine how individual institutions' strategic choices and organizational characteristics may shape SES diversity. While the earlier cited studies of students' college-going decisions enhance understanding of the links between social background and long-term attainments, they provide limited insight into how these stratifying processes play out at the institutional level, and how some selective institutions come to be more complicit in these stratifying processes than others.

Conceptual Framework

Unquestionably, elite institutions serve both as "engines of opportunity" and "bastions of privilege," to use the phrasing of Bowen, Kurzweil, and Tobin (2005). On all evidence, the latter role is currently ascendant (Carnevale & Strohl, 2013). It is not surprising that higher education's role in the reproduction of social inequality is growing. As a society expands access to higher levels of education, status differentiation within and above that level grows, allowing the wealthiest in the society to maintain and potentially increase their advantage. In that scenario, current levels of inequality remain or grow. For example, over the course of the nation's history, college attendance has gone from largely being the province of the elite to an activity open to a majority of the population, and in concert we have moved from little attention being paid to which institution one attended (being a college graduate alone was a critical determinant and marker of status) to ranking institutions and assigning varying levels of prestige to them. As access and the supply of postsecondary institutions have grown, status differentials among them (and thus among graduates) have grown in concert. Thus, we have a prominent instance of trends in a society toward "maximally maintained inequality" (Raftery & Hout, 1993).

In biblical terms, current enrollment trends evince strong elements of a "Matthew effect" at work (Merton, 1968). That is, the adage that "the rich get richer" applies to the matching of students and institutions in the United States: Both parties in the matching benefit from higher starting positions, with students from the wealthiest families continuing to score highest on admissions criteria and with more prestigious institutions continuing to draw the most resources and the most accomplished students. The advantages of resource-rich institutions, relative to others, thus appear to increase over time (Geiger, 2009; Winston, 2000, 2004). A small number of elite institutions operate at the highest level of this hierarchy, with increased levels of financial and academic resources leading to even higher levels of these same resources, in a kind of "virtuous cycle" (Geiger, 2009).

These increasingly evident patterns of reproduction make the openness of elite institutions critical from a policy perspective. While previous studies have helped explain how personal characteristics and financial circumstances (e.g., aid offers) influence individual students' postsecondary enrollment, relatively little is known about these processes at the institutional level. This study builds on previous work by examining the organizational factors associated with larger or smaller proportions of lower-SES students at elite private institutions over a multi-decade time period. Which institutions in this distinctive sector have clearly committed to, and succeeded in, enrolling large proportions of such students? To address that question, we began with propositions along four lines: pricing policies, academic policies, organizational forms and contexts, and institutional resources.

Pricing Policies

The first and most obvious barrier to lower-SES students' enrollment in selective private institutions is pricing policies. Sticker prices, or institutions' published tuition and fee levels before financial aid is considered, are uniformly high in this sector relative to other private and public institutions. The dramatic tuition and fee increases of recent years in private institutions have unquestionably shaped enrollment patterns, as have declining government commitments to "portable" student aid (i.e., aid that can be used by all needy students to attend any institution). Simply put, selective private institutions may seem unaffordable for many lower-income families. Even within this rather homogenous sector, however, there are variations in pricing; and because this organizational feature can clearly adversely affect enrollment among low-SES students, it must necessarily be considered, at least as a control in theoretical and operational models. That is, by definition, higher-priced schools are less affordable for lower-SES students and require more institutional offsets, even after awarding federal aid (Heller, 1997; Leslie & Brinkman, 1987). For this reason, we consider tuition and fee levels, which we expect will be negatively related to SES diversity.

Sticker prices clearly do not tell the entire story: If they did, we would expect similarly depressed lower-SES enrollment patterns across the elite private sector, because tuition and fee levels are uniformly high in that sector. Although price is an important consideration in understanding enrollment patterns, institutions—and elite private institutions, in particular—direct substantial internal funds toward financial aid to shape student enrollment in the direction of institutional goals (McPherson & Schapiro, 1998). Institutions may direct financial aid to students on the basis of academic merit, financial need, or other factors. Merit-based aid is disproportionately awarded to more affluent students (who on average score higher on standardized test scores and other measures of academic achievement) while need-based aid is directed mainly toward lower-income students (Heller, 2002). In awarding their institutional aid funds, private universities have become increasingly responsive to academic characteristics of students (Doyle, 2010). Still, some institutions are stepping up their commitments to equalizing access through financial aid investments. In a national study, Steinberg, Piraino, and Haveman (2009) found that institutions' allocations of their own funds to student aid were positively associated with their rates of lower-income student enrollment.

Unfortunately, connecting such findings to specific kinds of institutional aid awards is difficult: The major existing institutional datasets do not distinguish between funds awarded based on academic merit and those awarded based on demonstrated financial need. As a result, we do not know institutions' respective compositions of institutional aid. What is more, the distinction between merit and need aid often is blurred because institutional aid may be awarded based on both financial and academic characteristics of students (McPherson & Schapiro, 2002). These data shortcomings make hypotheses regarding gross institutional aid effects problematic. Nonetheless, this variable is relevant to SES diversity because it counterbalances sticker price levels, indicating the average discounted cost of attendance for students at an institution.

A final pricing-related consideration is more straightforward. Financial aid programs that reduce or eliminate loans from low-income student financial aid awards are aimed toward increasing SES diversity. In the past few years, more than 70 institutions, many in the elite private sector, have adopted such programs (Kantrowitz, 2011). Recent analyses by Hillman (2013) and Waddell and Singell (2011) suggest that these programs can influence lower-SES student enrollment. Loan reduction and elimination efforts may well be an effective tool for elite private institutions seeking to bolster lower-SES student enrollment.

Academic Policies

A second category of organizational factors potentially influencing lower-SES enrollment involves academic policies. Selective institutions vary not only in the nature of the financial signals they send prospective lower-SES applicants but also in the nature of the academic signals they send. It is striking that, while academic credentials and preparation have steadily increased over recent years for all students, the attendance and attainment gains of lower-SES students have not kept pace with those of others (Bastedo & Jaquette, 2011). Selective schools' traditional approaches to admissions comprise a contextual factor at work in these patterns. Historically, highly selective schools have relied on grades and test scores as measures of academic ability in sorting students into colleges. When selective institutions formulaically emphasize certain academic criteria, such as test scores, they may be sorting in ways that disproportionately disadvantage some students (Alon, 2009; Posselt, Jaquette, Bielby, & Bastedo, 2012).

Research suggests that highly selective institutions increasingly rely on standardized test scores in the admissions process (Alon & Tienda, 2007; Posselt et al., 2012). The growing emphasis on test scores at selective institutions particularly threatens low-income students, who, on average, score lower on standardized tests than their wealthier peers (Blau, Moller, & Jones, 2004; Fischer, Hout, Jankowski, Lucas, Swidler, & Voss, 1996). Thus, admissions policies that focus on test scores may pose a barrier to socioeconomic diversity. For case histories of such policies, see Karabel (2005), Soares (2007), and Stevens (2007). Even within the selective schools of interest in this analysis, across-institution variation in average SAT scores may reflect varying openness to SES diversity. That is, the schools in this competitive sector with the SAT averages in the very highest ranges may face special challenges in enrolling lower-SES students (Heller, 2004). We hypothesize that institutions with higher SAT scores will have lower levels of SES diversity.

It is important to note, however, that concerns over growing emphases on test scores have contributed to increasing variation in admissions protocols in this sector (Hoxby, 2009). Indeed, several selective private institutions (including Bates, Bowdoin, and more recently Smith, Bryn Mawr, and Wake Forest, among others) have moved to deemphasize or eliminate standardized test scores as factors in admission decisions (FairTest, 2011). Based on previous findings that the adoption of such admissions policies favorably influences the admission and enrollment patterns of lower-SES students (Espenshade & Chung, 2011), we expect the share of lower-SES enrollment to increase at institutions that have adopted these programs.

Organizational Forms and Contexts

A third class of organizational factors connecting to SES diversity involves organizational forms and contexts. Notably, age may contribute to resistance

to change. Older schools may be highly institutionalized, with robust historic cultures, enduring governance infrastructures, intense alumni expectations, and other forces that may weigh against expanded strategic attention to access. Similarly, schools that strongly emphasize undergraduate education may be more resistant to changes not only because of their distinctively identified and legitimated niche as the quintessentially American college (Kraatz, Ventresca, & Deng, 2010) but also because of their strong market position. For those hoping to enroll in an academically elite baccalaureate institution, the well-established selective private liberal arts colleges can claim a form of hegemony, largely unchallenged by competition from the public sector. That marketplace dominance may contribute to institutional resistance to publicly held norms regarding educational opportunity.

Further, schools in geographic areas with few other private institutions may be more likely to seek to maintain distinctive marketplace niches independent of the expectations facing public higher education. For example, such schools may work to emphasize their academic selectivity (rather than their diversity) and thus to stress their clear distinction from the mass education offered by the locally dominant public institutions. Conversely, schools in areas with robust numbers of private colleges may be incentivized to compete more aggressively among themselves, expanding the competitive dimensions beyond academic considerations into diversity commitments as well as athletic programs, student facilities, and other factors.

Arguably, one could extend this ecological argument to encompass more politically conservative areas. The South and Southwest regions of the United States are distinctive nationally in both their proportionately low numbers of selective private liberal arts colleges and their proportionately high commitment to "red state" conservatism. Perhaps private colleges in these regions may, as a whole, be more distinctive in market terms and more contrasting in their approaches to socioeconomic openness, relative to the public institutions in those regions.

Institutional Resources

Finally, resources comprise a fourth area of potential organizational influences on socioeconomic diversity. We can hypothesize that institutions with more robust resources may have enough flexibility and organizational cushioning to make special efforts on behalf of disadvantaged students. Financial resources, all other factors being equal, may contribute to subsidizing tuition generally and providing special discounts for needy students in particular (Pérez-Peña, 2013a).

Findings by Ehrenberg and Smith (2001), for example, suggest that an institution's endowment value is a useful indicator of its financial well-being and, more specifically, its level of flexibility for offering financial aid to accommodate students with constrained family financial resources. Large

enrollments may also represent an important resource for enhancing SES diversity in that they can allow institutions to craft admissions pools sufficiently diverse to allow them to use full-paying students' tuition and fees to offset lower-SES students' affordability concerns, via need-based financial aid.

Research Design

To address the various propositions above regarding factors associated with selective private institutions' socioeconomic diversity over time, we examine a sample of elite private institutions from 1990 to 2008, a span of nearly two decades. Specifically, our sample includes 80 private institutions categorized by Barron's *Profile of American Colleges* (1988, 2001, 2009) as "most competitive" and "highly competitive." Barron's classifies institutions using several academic factors, including the percent of students admitted, average GPA, median SAT/ACT test score, and high school class rank. Institutions in the "most" and "highly" competitive categories generally are characterized by higher SAT/ACT test scores and by selective admissions criteria, admitting fewer than half of their applicants. All institutions in this sample have median combined verbal and math SAT scores over 1,140 in all years of analysis. Table 1 provides a list of the institutions included in our sample.

Institutional data for the sample were obtained from the U.S. Department of Education Office of Postsecondary Education; the Integrated Postsecondary Education Data System (IPEDS); the Delta Project on Postsecondary Costs, Productivity, and Accountability (the Delta Cost Project, as it is colloquially known, incorporates extensive IPEDS data); the College Board's *Annual Survey of Colleges* (2011); and the Commonfund Study of Endowments produced by the National Association of College and University Business Officers.

Variable Indicators

Table 2 provides descriptions and sources for all variables in our analysis. To indicate SES diversity, our outcome variable of interest, we use the share of total full-time undergraduate students receiving Pell Grants at institutions in our sample. The Pell program is the largest source of federal grant aid for students and is directed toward needy students (Mercer, 2008). Institutions, states, and the federal government consider the Pell Grant to be the foundational grant in need-based aid packages, and consideration of Pell eligibility comes with students completing the Free Application for Federal Student Aid, required by all institutions that participate in federal student aid programs.

Pell awards are formulaically tied to institutional costs. Thus, when studies encompass wide variations in institutional pricing, those variations can confound comparative institutional analyses of Pell participation. That variation does not pose a significant limitation in our sample, however, because

Table 1

"Most Competitive" and "Highly Competitive" Institutions, 1988, 2001, and 2009 (Barron's Magazine)

Amherst College, MA
Babson College, MA
Barnard College, NY
Bates College, ME
Boston College, MA
Boston University, MA
Bowdoin College, ME
Brandeis University, MA
Brown University, RI
Bryn Mawr College, PA
Bucknell University, PA
California Institute of Technology, CA
Carleton College, MN
Carnegie Mellon University, PA
Case Western Reserve University, OH
Claremont McKenna College, CA
Colby College, ME
Colgate University, NY
College of the Holy Cross, MA
Colorado College, CO
Columbia University in the City of New York, NY
Connecticut College, CT
Cooper Union for the Advancement of Science and Art, NY*
Cornell University, NY
Dartmouth College, NH
Davidson College, NC
Duke University, NC
Emory University, GA
Franklin and Marshall College, PA
Georgetown University, DC
Gettysburg College, PA
Grinnell College, IA
Hamilton College, NY
Harvard University, MA
Harvey Mudd College, CA
Haverford College, PA
Johns Hopkins University, MD
Kenyon College, OH
Kettering University, MI
Lafayette College, PA
Lawrence University, WI
Lehigh University, PA
Macalester College, MN
Massachusetts Institute of Technology, MA
Middlebury College, VT
Mount Holyoke College, MA
New York University, NY
Northwestern University, IL
Oberlin College, OH
Pomona College, CA
Princeton University, NJ
Reed College, OR
Rhodes College, TN
Rice University, TX
Rose-Hulman Institute of Technology, IN
Skidmore College, NY
Smith College, MA
St. Olaf College, MN
Stanford University, CA
Swarthmore College, PA
Trinity College, CT
Trinity University, TX
Tufts University, MA
Tulane University, LA
Union College, NY
University of Chicago, IL
University of Notre Dame, IN
University of Pennsylvania, PA
University of Richmond, VA
University of Rochester, NY
University of the South, TN
Vassar College, NY
Villanova University, PA
Wake Forest University, NC
Washington and Lee University, VA
Washington University in St Louis, MO
Webb Institute, NY*
Wellesley College, MA
Wesleyan University, CT
Williams College, MA
Worcester Polytechnic Institute, MA
Yale University, CT

*Note: We exclude these two institutions from our analysis because all enrolled students there receive full-tuition scholarships.

Table 2
Variable Descriptions and Sources

Variable	*Description*	*Source*
Percent of Pell recipient enrollment	The number of Pell recipients enrolled as a percentage of total full-time undergraduates.	U.S. Department of Education Office of Postsecondary Education (http://www2.ed.gov/finaid/prof/resources/data/pell-institution.html) and the Delta Cost Project (www.deltacostproject.org)
Tuition and fees	Out-of-state tuition and fees for full-time undergraduates. We log this variable in our analysis to account for a skewed distribution.	Delta Cost Project
Institutional grant aid per FTE	Total funded and unfunded institutional grant aid divided by FTE. We log this variable in our analysis to account for a skewed distribution.	Delta Cost Project
Reduced- or no-loan financial aid policy	Dichotomous variable (yes=1; no=0) indicating whether an institution adopts a reduced- or no-loan financial aid policy.	Finaid.org (list of institutions) and institution websites (year of adoption, policy details)
SAT scores	Mean 25th and 75th percentile SAT scores for critical reading and math sections. For institutions at which more than 50% of students submitted ACT scores and for institutions at which SAT scores were not available, we used the mean 25th and 75th percentile ACT composite scores converted to equivalent SAT scores using formulae provided by the College Board and ACT. Because the SAT was recentered in April 1995, we convert institution SAT scores from 1995 and earlier to their recentered equivalents using the concordance recommended by Dorans et al. (1997). To facilitate interpretation, we divide SAT scores by 100.	College Board's Annual Survey of Colleges (2011)

Test-flexible admissions policy	Dichotomous variable (yes=1; no=0) indicating whether an institution adopts a test-flexible admissions policy. We include institutions that have adopted policies that are test-optional and test-flexible (require students to submit another test–SAT II subject tests, AP/IB exam scores, etc.– in place of SAT or ACT scores or have GPA or class rank requirements).	The National Center for Fair and Open Testing (list of institutions) and institution websites (year of adoption, policy details)
Year of founding	Dichotomous variable (yes=1; no=0) indicating whether an institution was founded before 1800.	IPEDS
Carnegie classification	Dichotomous variable (yes=1; no=0) indicating whether an institution is classified in the 2000 Carnegie classification as a baccalaureate institution, as opposed to a research/master's/ specialized institution.	Delta Cost Project
Geographic region	Geographic region code: New England; Mid-Atlantic; Great Lakes/Plains; Southeast/Southwest; Rocky Mountains/Far West.	Delta Cost Project
Market value of endowment per FTE	Market value of endowment at end of fiscal year divided by full-time enrollment. We log this variable in our analysis to account for a skewed distribution.	NACUBO Commonfund Study of Endowments
Full-time enrollment	Total fall full-time equivalent student enrollment. We log this variable in our analysis to account for a skewed distribution.	Delta Cost Project

the elite private institutions we examine have uniformly high tuition levels. Notably, in 2008, all institutions in the sample had tuition and fees levels over $26,000, with a mean of over $36,000 in inflation-adjusted 2009 dollars. The use of a tuition indicator as a control in the statistical model further ensures the utility of focusing on Pell in the analysis.

Clearly, the share of full-time undergraduate students receiving a Pell Grant is not a perfect proxy for SES diversity. An ideal dataset would have institutions' full undergraduate enrollments reliably and validly broken out by students' background socioeconomic characteristics, but no such dataset exists. Because no other source provides superior data for profiling the socioeconomic composition of student bodies, analysts most often use colleges' proportional enrollments of Pell Grant recipients as a proxy for institutions' commitment to lower-SES students. For example, Heller (2004) provides a strong defense of this approach to measuring institutions' socioeconomic diversity. Tebbs and Turner (2005), in the course of expressing concerns over the use of Pell data for studying institutional diversity more generally, note that such concerns diminish greatly when the sample is limited to elite schools:

> For universities such as Harvard and Yale that face a national—or international—market in recruitment of potential students, we would expect little variation in the socioeconomic characteristics of their pools of potential students. Thus, observed differences in the representation of low-income students at these universities might plausibly be attributed to institutional policies. (p. 39).

To generate this variable indicator, we divide the number of Pell recipients enrolled at each institution by the total full-time undergraduate enrollment at the institution and multiply by 100.[1]

Explanatory variables of interest in our model are measures of elite private colleges' pricing and admissions policies as well as institutional forms and resources. Several of these indicators are financial in nature, and all such indicators have been (a) converted for this analysis to inflation-adjusted 2009 dollars using the Consumer Price Index, and (b) logged to account for non-normal distributions.

To indicate an institution's prices, we include tuition and fees (that is, the "sticker price") as an indicator in our analysis. Also potentially influential in these patterns is institutional grant aid per full-time enrolled student, another

[1]Tebbs and Turner (2005) propose 12-month unduplicated undergraduate enrollment adjusted by the number of non-degree-seeking and non-resident alien students as a more accurate representation of the number of students enrolled who are eligible for the Pell Grant than full-time enrollment. However, data on 12-month unduplicated undergraduate enrollment are not available through IPEDS for all years in our sample, so we use Pell recipients as a percentage of full-time enrolled students as a reasonable measure of low-SES student enrollment.

indicator of the pricing policies of elite institutions. As a final indicator of pricing policies, we include a dichotomous variable in our model for whether an institution has in place for a given year a reduced- or no-loan financial aid policy that replaces some or all loans with grant aid for low-income students. During the time period observed in our analysis, 39 sample institutions—nearly 50%—adopted a reduced- or no-loan financial aid policy. While loan-reduction programs vary significantly across institutions (Lips, 2011), the variation within our sample of highly selective private universities is almost certainly less than it would be if we included all institutions that have adopted such policies. Of the 39 institutions in our study that adopt reduced- or no-loan financial aid policies, 15 programs eliminate all loans regardless of income (true "no-loan" programs), and many of the other programs have an income limit below which they eliminate loans and above which they cap loan amounts (Project on Student Debt, 2010). As such, reduced- and no-loan financial aid policies at institutions in this study reflect significant commitments to reducing the debt burdens of low-income students.

For admissions policies, we focus on an institution's supply of academically competitive students by including the mean of an institution's 25th and 75th percentile SAT verbal and math scores, hereafter referred to as SAT scores. For institutions at which more than 50% of students submitted ACT scores, we used the mean of an institution's 25th and 75th percentile ACT composite scores. We converted these scores to equivalent SAT scores using College Board and ACT concordance tables. The SAT was recentered in April 1995. We use recentered SAT scores from 1996 through 2005 and convert ACT scores to recentered SAT scores using the concordance recommended by Dorans, Lyu, Pommerich, and Houston (1997). We also used an updated concordance table provided by the College Board and ACT for scores from 2006 and after to account for the addition of a writing section in May 2005. To facilitate interpretation, we divide SAT scores by 100 points when presenting modeling results. We also include a dichotomous variable indicating whether an institution had adopted a test-flexible admissions policy in a given year. During the time period we observe, 13 institutions in our sample had policies that eliminated or reduced reliance on standardized test scores in the admissions process.

We included several time-invariant factors in the analysis to address the organizational concepts introduced earlier. To examine the potential effect of institutional age on share of Pell Grant recipient enrollment, we created a dichotomous variable for the year of founding that indicates whether an institution was founded before 1800. Although dichotomizing this variable results in loss of variation in age of institution, we found in early analyses a clear distinction in Pell-recipient enrollment for institutions founded before and after this date. We also estimated a model with age of institution as a

continuous variable, with similar results to those we present below. Because the distinctive institutional missions of baccalaureate institutions may affect low-SES student enrollment, we use the 2000 Carnegie classification to separate baccalaureate institutions dichotomously from research, master's, and specialized institutions.

We also include a categorical variable for geographic region because institutional approaches may be influenced by the socioeconomic and demographic characteristics, as well as educational offerings, of the regions in which colleges are located. Because these highly selective private institutions draw from national (and international) applicant pools, enrollment at these institutions is less likely to be influenced by state financial aid policies. We included an indicator variable for the region in which an institution is located rather than state indicators to capture the broader geographic market in which these institutions are located. In the last year of our panel, for example, many of the institutions we studied enrolled more than 90% of their students from out of state. Still, state spending on need and merit aid may shape enrollment patterns at some institutions. To examine this possibility, we estimated a model using state dummy variables in place of region. The results were similar to those presented in this article and indicated no substantial state-level effects. These additional analyses are available on request from the authors.

To address the importance of an institution's resources, we use two indicators. The market value of endowment at the end of one fiscal year per full-time equivalent (FTE) enrollment is hypothesized to relate to the share of Pell recipient enrollment in the academic year beginning in the fall of the following fiscal year. For example, the market value of the endowment in the fiscal year ending June 30, 1990, is expected to relate to the share of Pell recipients who enroll at each institution in the fall of 1990. Also, we include an indicator of FTE enrollment to capture the potential benefits of size in implementing strategic enrollment policies. The indicator is logged to account for a non-normal distribution in our sample.

Analytic Technique

The use of panel data allows us to observe factors that our conceptual framework suggests influence SES diversity both between and within institutions over time. We estimate fixed- and random-effects models to examine the relationship between organizational characteristics and the share of Pell recipient enrollment at elite private institutions. Our choice to present results derived from these two forms of modeling is based on the relative benefits and limitations of each.

Fixed-effects modeling allows unobserved time-invariant institutional heterogeneity to be correlated with the explanatory variables in the model (Zhang, 2010). As a result, fixed-effects modeling limits the bias that results

from omitted variables by removing the effect of unobserved time-invariant institutional characteristics (such as institutional prestige) on SES diversity from the estimates. By controlling for possible unobservable and non-varying institutional characteristics that may confound the relationship between SES diversity and our explanatory variables, fixed effects can produce unbiased estimates. In removing institutional heterogeneity from the estimates, however, the effects of any time-invariant institutional characteristics are absorbed by the fixed effect.

Because we are particularly interested in several time-invariant factors in this study (including categorical indicators for founding date of an institution, Carnegie classification, and geographic region), we also estimated a random-effects model. Random-effects modeling assumes that unobserved institutional factors are uncorrelated with the explanatory variables, a bold assumption that may lead to biased estimates. At the same time, however, the random-effects approach provides potentially useful information about how time-invariant variables may be associated with SES diversity, which would be unknown if we estimated only a fixed-effects model. As we note below, the coefficients obtained from the two approaches for this paper were similar.

The random-effects model may be expressed:

$$Y_{it} = \alpha + \beta_1 Z_{it} + \beta_2 T_t + (u_i + v_{it})$$

where Y_{it} denotes the share of Pell recipient enrollment of institution i in year t; α is the intercept; Z_{it} is a vector of institutional variables of interest with their corresponding coefficients represented by β_1; T_1 are year dummy variables; and $(u_1 + v_{it})$ is the composite error term consisting of the random effect (u_i) and the stochastic error (v_{it}). We used cluster-robust standard errors to account for heteroskedasticity and autocorrelation occurring within institutions (Wooldridge, 2002).

Missing data posed an issue in the analysis, as in all longitudinal analyses using IPEDS and other large-scale institutional data. We noted missing data on our outcome variable—the percent of Pell recipient enrollment. Four observations out of 1,520 were incomputable because of absent data for total full-time undergraduate enrollment. To account for these missing data, we estimated additional models using the mean of total full-time undergraduate enrollment from the year preceding and year following the missing data with results similar to those presented below. Data were also missing for several independent variables of interest: tuition and fees (25 observations out of 1,520 were missing), institutional grant aid per student (missing 10 values), SAT scores (missing 22 observations), and endowment value per student (missing 24 observations).

To determine if data were missing at random for these independent variables, we examined whether the means of the missing and non-missing

values were statistically similar for the dependent variable, percent of Pell grant recipient enrollment. Missing values for SAT scores and institutional grant aid per student appeared to be missing at random, suggesting that there was no systematic relationship between the share of Pell recipient enrollment at an institution and the non-reporting of SAT scores and institutional aid per student. The mean value for share of Pell recipient enrollment, however, was statistically different for missing and non-missing data on endowment value per student and tuition and fees.

With these limitations in mind, when at least one value for an institution/year was missing (i.e., one or more independent variable and/or dependent variable), we excluded that institution/year from the analysis. No institutions were excluded entirely from our analysis because of missing data, however. Taking this approach, we excluded 5.3% of observations from the analysis because of missing data. For any given year, the number of institutions with complete data in our sample ranged from 68 to 80.

FINDINGS

Descriptive Analysis

Table 3 provides descriptive statistics for variables of interest for the first year of our sample, 1990, and the last year, 2008. Notably, the overall share of Pell Grant recipients was relatively similar in the first and last years of our sample, ranging from 11.97% in 1990 to 12.43% in 2008. Figure 1 shows the percent of Pell recipient enrollment from 1991 to 2008 at the institutions in our sample, at all private four-year institutions, at all public four-year institutions, and among all institutions. As evidenced in the figure, sample institutions, on average, are characterized by much lower shares of Pell recipient enrollment than the other institutional groupings (all private four-year, all public four-year, and all institutions). Over time, the share of Pell recipients remained relatively constant at the selective private institutions included in our sample, while it generally increased (albeit unevenly) at private four-year institutions, at public four-year institutions, and among all institutions.

Although the overall share of Pell recipient enrollment remained relatively constant at sample institutions throughout our observation, the sample institutions displayed the extraordinary variation in SES diversity that we noted earlier in the paper. In 2008, the percent of Pell recipient enrollment at the institutional level ranged from just 4.46% to nearly 25%. Thus, these elite private institutions provide an interesting sample for exploring the organizational factors associated with limited or expanded levels of SES diversity.

Descriptive data for our explanatory variables also are of interest. Mean tuition and fees in constant dollars rose from $22,466 a year to nearly $37,000, a 63% increase. Tuition and fees in 2008 for institutions in our sample ranged

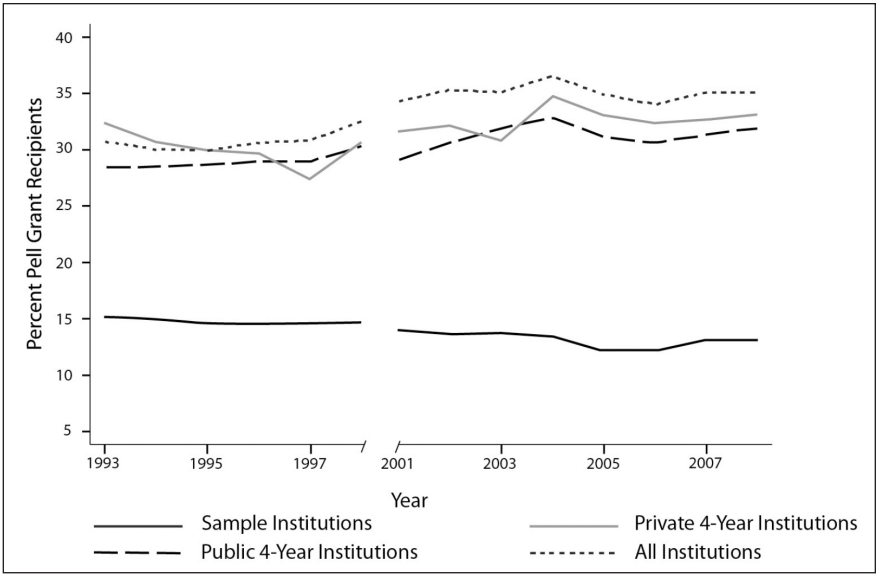

Figure 1. Pell Grant Recipients' Percent of Enrollment by Institution Type.

Notes: Data for sample institutions are from the U.S. Department of Education Office of Postsecondary Education and the National Center for Education Statistics' IPEDS database. Data reflect Pell Grant recipients as percentages of fall, undergraduate, degree-seeking, resident non-alien headcount enrollments at private four-year institutions, public four-year institutions, and overall. Data for public four-year institutions, private four-year institutions, and all institutions are provided by Postsecondary Education Opportunity (2011). Data for 1999 and 2000 were not available. Because of limitations in data availability, the denominator in this figure (fall, undergraduate, degree-seeking, resident non-alien enrollment) is different from the one used in our analysis (full-time undergraduate enrollment). All percentages in this figure use the same denominator, including percentages for our sample institutions, allowing comparison of Pell recipient enrollment in different types of institutions over time.

from $26,834 to more than $40,000. In the nearly two decades we examined, institutional aid per student increased from just over $5,000 to more than $13,000 in constant dollars, a 139% increase. We saw a large variation in the amount of institutional aid awarded per student at institutions in our sample—in 2008, institutional aid per student ranged from $7,095 to almost $24,000. The most dramatic change in institutional financial aid policies we observed involved the adoption of policies that reduce or eliminate loans from financial aid packages for low-income students. At the beginning of our analysis, in 1990, none of the institutions in our sample had such a program

TABLE 3

DESCRIPTIVE STATISTICS FOR VARIABLES OF INTEREST, 1990 AND 2008

Variables	*Mean*	*Standard Deviation*	*Minimum*	*Maximum*
Percent of Pell recipient enrollment (1990)	11.97%	4.71%	4.07%	28.24%
Percent of Pell recipient enrollment (2008)	12.43%	3.50%	4.46%	24.92%
Tuition and fees (1990)	$22,466	$2,855	$11,089	$25,933
Tuition and fees (2008)	$36,690	$2,487	$26,834	$40,240
Institutional grant aid per FTE (1990)	$5,523	$1,608	$2,011	$8,925
Institutional grant aid per FTE (2008)	$13,212	$3,430	$7,095	$23,669
Reduced or no-loan financial aid policy (1990)	0	0	0	0
Reduced or no-loan financial aid policy (2008)	0.49	0.50	0	1
SAT score (1990)	1,304	67	1,140	1,480
SAT score (2008)	1,366	71	1,210	1,515
Test-flexible admissions policy (1990)	.01	.12	0	1
Test-flexible admissions policy (2008)	0.12	0.33	0	1
Market value of endowment per FTE (1990)	$150,116	$122,492	$12,150	$632,915
Market value of endowment per FTE (2008)	$419,473	$436,017	$27,402	$2,262,379
Full-time enrollment (1990)	5,696	5,696	578	25,031
Full-time enrollment (2008)	6,754	7,166	737	36,056

Notes: This table presents descriptive statistics for institutional observations included in our analysis (n = 69 observations in 1990; n = 75 observations in 2008). Some indicators are scaled or logged in our regression analysis to ease interpretation and account for skewed distributions; t This table presents data in raw form, however, to provide a more straightforward comparison among variables. Financial indicators are inflation-adjusted to 2009 dollars using the Consumer Price Index.

in place. By 2008, however, nearly half of the institutions in our sample had established reduced- or no-loan programs.

Over the years included in our panel, SAT scores increased from 1,304 to 1,366, with a range of 1,210 to 1,515 in the most recent year of our sample. Several institutions in our sample, however, began to rely less on test scores in the admissions process during the period we observe. In 1990, four sample institutions had a formal policy that deemphasized or eliminated standardized tests from admissions consideration. Nineteen years later, 13 institutions in our sample had such policies.

Between 1990 and 2008, the mean market value of the endowment per student in constant dollars increased 179%, from $150,116 to more than $400,000. That value ranged in the last year of our sample from $27,402 to more than $2 million. This large variance in financial resources, even among a relatively elite group of private institutions, clearly may influence institutional largesse directed toward achieving diversity. Similar diversity was apparent in enrollment: In 2008, institutions' FTE enrollments ranged from just over 700 to more than 36,000. Sample institutions expanded enrollment by just over 1,000 students on average during the time period we observed, growing from nearly 5,700 to just over 6,700 students.

Table 4 provides descriptive statistics for time-invariant indicators in the analysis. As a group, 16% of the sample institutions were founded before 1800. This selective, private-college pool is somewhat older than institutions in other sectors of U.S. higher education. Sample institutions were almost evenly divided between baccalaureate (n = 43) and research, master's, and specialized (n = 37) institutions. Finally, the sample institutions were disproportionately located in New England and the Mid-Atlantic region, relative to other geographic regions.

Regression Analyses

To examine how these factors may be associated with evolving levels of SES diversity, we turn now to our regression analyses. Table 5 presents random- and fixed-effects regression results. Because of our strong interest in time-invariant institutional characteristics, we focus our discussion on the random-effects regression results here, but the fixed-effects results presented in the table for the time-varying factors are similar in direction, magnitude, and significance.[2]

[2]Our outcome variable, percent of Pell recipient enrollment, is not normally distributed, which can lead to out-of-bounds predictions (e.g., below 0 or above 100). To determine whether this was a concern, we generated predicted values of percent of Pell recipients from our final model. We found predictions of percent of Pell recipient enrollment ranging from 3.24 to 20.68, which approximates the range of our observed values.

TABLE 4

DESCRIPTIVE STATISTICS FOR TIME-INVARIANT VARIABLES

Variables	*Number of Institutions*	*Percent of Sample*
Founded before 1800	13	16%
Founded after 1800	67	84%
Baccalaureate institutions	43	54%
Research/master's/specialized institutions	37	46%
New England (CT, ME, MA, NH, RI, VT)	24	30%
Mid-Atlantic (DE, DC, MD, NJ, NY, PA)	24	30%
Great Lake/Plains (IL, IN, MI, OH, WI, IA, KS, MN, MO, NE, ND, SD)	14	18%
Southeast/Southwest (AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, WV, AZ, NM, OK, TX)	11	14%
Rocky Mountains/Far West (CO, ID, MT, UT, WY, AK, CA, HI, NV, OR, WA)	7	9%

Notes: This table presents descriptive statistics for categorical variables in our analysis (n = 80 observations). Some percentages do not sum to 100 because of rounding.

Our first hypotheses focused on institutions' pricing policy choices regarding attracting students from less advantaged backgrounds. As we expected, strategic pricing efforts were associated with differences in levels of Pell recipient enrollment. We found a small but significant negative relationship between socioeconomic diversity and price, in the context of the other factors in the model. A 1% increase in tuition and fees was associated with a .04 percentage point decrease in Pell recipient enrollment. Institutional grant aid per student, another strategy that institutions adopt to enroll a class that meets revenue, quality, and access goals, was also positively and significantly associated with low-SES student enrollment. As with the first effect, this relationship was small: A 1% increase in institutional grant aid per student was associated with a .03 percentage point increase in Pell recipient enrollment. Further, we found that the presence of a reduced- or no-loan policy, which nearly half of sample institutions had adopted by 2008, was associated significantly with a .97 percentage point increase in Pell recipient enrollment. This is an especially interesting finding given that few institutions in our sample adopted such a program prior to 2006 and 2007.

Admissions policies at selective private institutions also related to differences in levels of SES diversity. Specifically, over the period of the analysis, we found that a 100-point increase in institutional SAT scores was associated with a 1.5 percentage point decrease in Pell recipient enrollment. In concert, we found that institutional admissions policies that reduced or eliminated

Table 5

Regression Results for Percent of Pell Grant Recipient Enrollment at Selective Private Institutions, 1990–2008

Variables	*Random Effects*	*Fixed Effects*
Tuition and fees (logged)	-3.868*	-3.794*
	(1.642)	(1.668)
Institutional grant aid per FTE (logged)	2.919**	2.458**
	(0.746)	(0.663)
Reduced- or no-loan financial aid policy	0.966*	1.018*
	(0.468)	(0.450)
SAT score (in hundreds)	-1.511**	-1.414**
	(0.506)	(0.505)
Test-flexible admissions policy	1.253**	1.308**
	(0.466)	(0.462)
Founded before 1800	-2.541*	
	(1.291)	
Baccalaureate institution	-5.830*	
	(2.756)	
Mid-Atlantic region	1.668	
	(1.499)	
Great Lakes/Plains region	-0.132	
	(1.274)	
Southeast/Southwest region	-3.643*	
	(1.586)	
Rocky Mountains/Far West region	0.252	
	(1.363)	
Market value of endowment per FTE (logged)	0.929*	0.790*
	(0.447)	(0.371)
Full-time enrollment (logged)	-2.357	-8.801*
	(1.537)	(3.989)
Constant	57.415**	110.104**
	(19.943)	(38.347)
Observations	1440	1440
R-squared	0.350	0.368

+ $p < 0.10$ *$p < 0.05$ **$p < 0.01$
Cluster-robust standard errors in parentheses.

Notes: Analysis includes data from 80 institutions over 19 years. The reference group for the founding indicator in the model is founding after 1800. The reference group for the Carnegie classification indicator is research, master's, and specialized institutions. The reference group for the region indicator is New England.

consideration of standardized test scores or provided students with multiple test options may have facilitated increased levels of Pell recipient enrollment. The adoption of a test-flexible admissions policy was significantly associated with a 1.25 percentage point increase in Pell recipient enrollment.

Two institutions in our sample were test-optional but required standardized subject tests in place of the SAT/ACT and one institution was test-optional for students above a 3.6 grade point average or in the top 10% of their high school class. We estimated a model excluding these institutions from the test-flexible classification because they require some form of standardized test for all or some applicants. In this model, elimination of test scores from the admissions process was not significantly associated with Pell recipient enrollment, so we interpret the relationship between test-flexible admissions policies and Pell recipient enrollment levels with caution.

Several of the categorical indicators of organizational forms and contexts showed significant effects. We found evidence to support the hypothesis that the oldest institutions in the sample were associated with lower levels of socioeconomic diversity in their student bodies. All other factors being equal, institutions founded before 1800 were associated with a downward shift in SES diversity of 2.5 percentage points. Similarly, as we hypothesized, findings indicate that selective baccalaureate-level institutions enrolled a smaller share of Pell recipients than other selective institutions. Baccalaureate institutions were associated with a 5.8 percentage point decrease in Pell recipient enrollment relative to research, master's, and specialized institutions.

Geographic region was also associated with low-SES student enrollment. Institutions in the Southeast and Southwest, compared to the model's reference institutions in New England, enrolled a smaller share of Pell recipients. Given that the two southern regions have generally lower SES levels and larger numbers of Pell-eligible high school graduates per capita, this finding suggests that those students may find the most welcoming selective colleges and universities either in public institutions or in private institutions at some distance removed from their home states. Some of the regional differences in Pell recipient enrollment shares may also have come from individual institutions' choices to use only standardized test scores to identify specific recruiting areas or to recruit in regions that have smaller shares of low-income, high-ability students (Hill & Winston, 2010).

The market value of endowment per student, one indicator of an institution's financial resources and well-being, was positively and significantly associated with Pell recipient enrollment, as hypothesized. Our analysis suggests that a 1% increase in the market value of the endowment was associated with a .01 percentage point increase in Pell recipients. The practical significance of this result may seem small, but this relationship becomes more interesting when considering that the market value of endowments in our sample grew (or shrank) by as much as 25% between some years and at some institutions in our sample. We found no effect of institutional size on Pell shares in the random-effects analysis, but the fixed-effects analysis suggested that a 1% increase in full-time enrollment was associated with a .09 percentage point decrease in Pell recipient enrollment.

Implications

The United States is well into its fifth decade of substantial governmental and institutional commitment to improving postsecondary access and choice, but dramatic socioeconomic stratification persists in enrollments at the most selective schools in U.S. higher education. Several conclusions emerge from this examination of that pattern.

First, institutional pricing and aid policies matter. Not surprisingly, we find that tuition and fee levels are negatively associated with low-SES student enrollment while institutional aid per student is associated with increased levels of SES diversity. Similarly, and interestingly, because it represents so recent a phenomenon at institutions in our sample, we found indications that the adoption of no- or greatly reduced-loan policies for low-SES students were associated with an increase in Pell recipient enrollment. This trend is a particularly important finding given that many institutions, most recently Massachusetts Institute of Technology, have recently eliminated or reduced the size and scope of their aid programs, citing financial constraints (Jaschik, 2012; Kiley, 2012).

Second, academic factors and admissions policies matter. High selectivity levels, measured by institutions' overall SAT profiles, evince a strong negative association with levels of low-SES student enrollment in our model. That this pattern holds even in our academically relatively homogenous sample of highly selective schools is striking. Hints in our findings suggest that institutional policies that decrease reliance on standardized test scores or allow students to choose among multiple standardized test options are associated with increased levels of SES diversity. Thus, to the extent that schools in this rarified stratum bend in their reliance on these scores, a payoff may come in greater SES heterogeneity.

Third, several organizational factors appear to connect meaningfully to socioeconomic diversity levels. Offering doctoral or master's degrees and having a larger per-FTE endowment may be associated with higher shares of enrolled Pell recipients, suggesting that wider academic offerings and greater financial resources can propel and support commitments to diversity. On the other hand, enrollment size was related to lower levels of diversity, at least in the fixed-effects modeling. Another institutional resource, in both senses of "institutional," also had a negative relationship with low-SES enrollment: the age of an institution. Age is associated with institutional prestige and reputation but also with greater socioeconomic homogeneity. Compared to institutions dating from the 18th century, younger elite institutions enroll higher shares of Pell recipients. From the perspective of institutional theory, this pattern among institutions historically embedded in elite status seems to reflect enduring influences of the socioeconomically homogenous beginnings of higher education in this country.

But might something else be involved in this effect? An earlier reader of the paper speculated that the age effect we observed may be confounded by a "mission" effect. Notably, five of our sample institutions founded after 1800 are women's colleges (e.g., Mount Holyoke and Smith). With this possibility in mind, we estimated the same model with the addition of a dummy variable for women's colleges. Intriguingly, the effect of institutional age on Pell recipient enrollment disappeared in this new model, while the new women's college indicator showed a positive effect. Whether this "mission" effect is distinguishable from the age effect we originally inferred cannot be easily resolved. Women's colleges may represent simply one among many possible organizational manifestations of schools breaking away from the hegemonic forms institutionalized earlier in the nation's history. Further examination of these connections could be fruitful.

LIMITATIONS

Inevitably, there are limitations to this analysis. First, in purely institutional data such as those studied here, enrollments are a fait accompli: there is no way to cleanly untangle institutional decision-making from students' attitudes and application behaviors in producing those enrollments. Because institutions' SES diversity levels are a joint product of institutional choices and student demand, it would be reductionist to interpret the present results entirely from an organizational point of view. Relatedly, many factors are closely associated in institutional data of the kind used here, so sorting through interrelationships and establishing even tentative causal inferences is daunting.

Our aid-related variable indicators are also not ideal. Although the population served by the Pell Grant program has remained rather stable and clearly in the lower-income ranges since the program's inception, the specifics of eligibility standards and award levels have shifted somewhat over the decades we cover here. Also, while our indicator of institutional grant aid is of interest because it suggests the average discounted cost of attendance for students at each institution, the indicator does not allow us to distinguish between institutional grant aid awarded based on need and institutional grant aid based on other factors, such as academic merit. Unlike need-based aid, merit-based aid disproportionately is awarded to more affluent students (Heller, 2002), an observation that dilutes the power of the inferences here.

Further, as noted above, the use of random-effects modeling opens the analysis to the possibility that various other factors may surreptitiously contribute to the influences of time-invariant factors suggested here. While the concordance between our random-effects and fixed-effects results suggests that the random-effects model is well specified, the results must be interpreted as associations between variables rather than causal relationships. As

always in non-experimental studies, findings may be influenced by unobserved factors. For example, as one reviewer has noted, institutional outreach programs such as information campaigns or alumni appeals may affect SES diversity, but such programs typically lie outside the scope of IPEDS and other large-scale annual surveys of institutions, so assessing their potential influences is difficult.

The most noteworthy caution regarding causal inferences here involves the observed findings for test-flexible and no-loan policies. The factors prompting institutions to adopt such policies may overlap with underlying commitments to openness and diversity, and our models cannot tap into such commitments. It would be inappropriate, therefore, to consider the associations uncovered here for those two indicators to be causal. This study provides insight into how and to what extent various factors relate to patterns of low-SES student enrollment in colleges and universities, but it is far from definitive regarding specific influences.

Further Research

Nonetheless, the study hints at several new directions for study. Socioeconomic diversity has remained relatively stable over time at highly selective private institutions, despite growth in socioeconomic diversity in four-year institutions as a whole. (See Figure 1.) It thus appears that elite private higher education continues to play an important role in reproducing societal inequality. But our analysis suggests that, in recent years, some institutions in that sector have begun making strategic choices that may help shift those patterns.

Specifically, several institutional choices appear to be associated with larger shares of low-SES student enrollment, demonstrating that well-resourced elite institutions have the potential to leverage their wealth to become instruments of social mobility for those who are academically qualified but otherwise unable to attend. Reducing reliance on loans, increasing flexibility in the use of admissions test scores, and offering generous student aid each appears to limit the socioeconomic stratification of institutional enrollments.

These findings encourage more refined analysis. Two directions strike us as particularly important. First, while reduced- and no-loan programs appear promising choices for reducing SES homogeneity, the nature of those effects requires more attention. There is substantial variation in these programs (Lips, 2011). Our analysis assays these programs together, but it is possible that differences in individual institutions' eligibility requirements and in the specifics of their loan reduction approaches shape SES diversity in different ways.

Second, the finding here that SES diversity appears more closely related to tuition than to aid merits deeper investigation. Classic economic reason-

ing, and continuing federal and institutional policies, encourage students and families to focus on net prices, assuming that the difference in sticker price and student aid is the dollar figure that matters. Such reasoning drives the commitment to "high-tuition/high-aid" approaches by governments, private institutions, and some state systems. But a model that couples high tuition levels with targeted aid may be limited in improving institutional diversity if tuition levels alone have a restraining effect on lower-income student enrollments.

Might a low-tuition model be more attractive to lower-SES students? On this question, our research can only hint at answers. We do not address student-level data, and our institutional data do not reveal how schools allocate aid between merit and need, so we cannot adequately assess how specific pricing and aid practices influence SES diversity. Recently, Franklin and Marshall College, one of the institutions in this study, shifted its institutional aid allocations from merit-based to need-based. This shift, along with changes in recruiting and admissions practices and on-campus support services, was followed by an increase in the number of low-income students enrolled (Tyer, 2014). Such anecdotal evidence helps emphasize the need for better understanding of the roles of institutional pricing and aid strategies in shaping opportunity in the selective sector.

Policy Considerations

To the extent that selective-sector diversity continues to be static or declines (as profiled in Figure 1), and to the extent that this trend is viewed as problematic, there are policy options for government action. Might federal financial aid policy be used to incentivize selective private institutions to increase access for lower-SES students? For example, might campus-based federal aid allotments be awarded based on institutions' levels of Pell recipient enrollment, such that institutions with lower rates of Pell recipient enrollment would risk losing or facing a significant reduction in federal aid, including aid that supports enrollment for students from other SES backgrounds?

Direct intervention to differentially favor some institutions over others in federal aid awards might be controversial, in that such a policy might work against the increasingly popular notion of higher education as a "private good" and against the economic-development goals increasingly being incorporated into the enterprise. What is more, such a policy might insufficiently acknowledge the many constraints facing students and institutions in changing their enrollment patterns. Nevertheless, such activist policymaking aimed toward rewarding certain favored behaviors could stimulate action toward a national priority. In a 2012 letter to the editor of the *New York Times,* the president of Vassar College argued for just such a policy (Hill, 2012). More recently, the New America Foundation advanced

a similar, highly detailed policy proposal (Burd, Carey, Delisle, et al., 2013). At a minimum, such an approach seems preferable to well-intended federal policy initiatives that may actually discourage attendance by lower-income students in higher-cost institutions. (See Goldrick-Rab & Kelchen, 2012, for a discussion of a recent example.)

At stake in such patterns is an important aspect of the nation's commitment to distributing higher-education resources to the least advantaged. How the nation's elite private institutions allocate their academic and financial resources and make choices in those arenas has implications for how opportunity and inequality are rationed in the society. On what basis are allocative decisions at the elite reaches of the higher education system to be made? Are we moving toward matching students and institutional resources in increasingly mechanistic ways, attending less to the ultimate effects of such approaches on socioeconomic inequality? Or can such novel approaches as reduced and no-loan financial aid policies fundamentally alter the role of higher education in societal stratification?

Rawls (2001) argued that a society's priorities and policies should work to allow those with comparable talents and motivation to experience roughly similar life chances, regardless of their social origins. In the issue at hand, Hausman and McPherson (2002) suggested that how a society rewards talent and compensates brute luck reflects its core values. Ensuring that high performers from lower-SES backgrounds are afforded the means to join their high-performing peers from more advantaged backgrounds in selective institutions with important lifetime impacts is a legitimate equity concern. The topic merits continuing research and policy attention.

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