Cascading in Higher Education:

Investigating the Impact of Institutional Stratification on Educational Opportunity in America

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Introduction

Among scholars of social stratification, the most important question about expanding postsecondary education is whether it reduces inequality by creating opportunities for disadvantaged students or whether it increases inequality by concentrating opportunities among those already privileged (Shavit, 2007). This discussion is important because of the personal benefits earned from attending postsecondary education, particularly from more prestigious colleges and universities. The positive effects of attending a prestigious university on employment, even after controlling for socioeconomic status and academic preparation, are well documented both in the United States and around the world (Hearn, 1991; Shavit, Mèuller, & Tame, 1998; Trow, 1984).

Our research uses the concept of "cascading" to examine whether the relationship between institutional prestige and student socioeconomic background has become stronger over time. "Cascading" refers to "the pattern of choices made by students who are refused entry to very highly selective institutions who are then admitted to somewhat less selective institutions" (Trow, 1999, p. 66). Social stratification theories argue that as access to postsecondary education increases so does competition for admission in elite universities, with lower socioeconomic status students relegated to less prestigious institutions (Raftery & Hout, 1993; Swirski & Swriski, 1997). Social theorists (Blau, 1994; Bourdieu, 1988; Frank & Cook, 1995; Trow, 1984) hypothesize that institutional stratification has increased in recent decades with selective institutions increasingly being composed of high socioeconomic status students. The cascading phenomena is particularly germane in the current public policy context due to recent reports of decreasing socioeconomic status diversity in flagship colleges and universities (Bowen, Kurzweil, Tobin, & Pichler, 2005; Carnevale & Rose, 2004; Gerald & Haycock, 2006; Kahlenberg, 2003). Unequal chances of attending selective institutions also leads to unequal labor market opportunities, because graduation from a selective institution has a disproportionate impact on labor market outcomes (Brewer, Eide, & Ehrenberg, 1999; Hoxby & Long, 1998; Monks, 2000).

This study aims to enhance our understanding of stratification in access to postsecondary education (hereby "institutional stratification"). We define institutional stratification as the extent to

which access to specific types of postsecondary education institutions (hereby "institutions") differs by socioeconomic status, gender, and ethnicity. Although prior empirical analyses have demonstrated that institutional destination differs by socioeconomic status (Hearn, 1991; Karen, 2002), these studies are based on individual cohorts, making it impossible to ascertain whether institutional stratification is a growing or diminishing problem. To address these shortcomings, we have constructed a single dataset that integrates multiple cohorts, applying the same variable definitions and sample constructions across cohorts. Using this dataset, we can track the impact of state policy and system design on institutional stratification across states. Moreover, in contrast to other studies examining access to postsecondary education, we reject dichotomous measures of access in favor of more nuanced measures of institutional type, ranging from technical and community colleges, to non-selective 4-year institutions, and to 4-year institutions from varying levels of selectivity.

Literature Review

The study proceeds in two stages: first, investigating changes over time in the relationship between socioeconomic status, pre-collegiate academic preparation, and postsecondary destination; and second, investigating the relationship between institutional stratification and *de facto* policy decisions to concentrate state enrollment growth in the community college sector. With respect to changes in institutional stratification over time, we review social theories arguing that the mechanisms of stratification have strengthened in recent decades. In addressing state policies, we review literature examining state policies that while seeking efficiency through institutional stratification may also be undermining the goal of increasing baccalaureate degree production.

One cause of institutional stratification is increased competition for fewer good jobs. Human capital theory posits that individuals invest in education to increase lifetime earnings, net of education costs, and governments can increase national prosperity by increasing access to education (Becker, 1964; Grubb & Lazerson, 2004). Yet a discussion of the returns to education must also consider employer

demand for skilled labor (Frank & Cook, 1995; Granovetter, 1981; Thurow, 1975); education only helps an individual's employment prospects if job vacancies exists (Sorensen, 1977).

The importance of baccalaureate attainment has increased with changes in the economy. Social mobility increased in the mid-twentieth century because of technological innovations that reduced the number of low-skill agricultural jobs while increasing the number of high-skill blue-collar and white-collar jobs (Blau & Duncan, 1967). Over the past thirty years, the composition of the American workforce has shifted further to high-skill knowledge jobs; since the 1970s, the proportion of high-skill blue-collar jobs has decreased (Blau, 1994) while the proportion of college-educated workers has increased (National Center for Educational Statistics, 2008).

Educational credentials such as baccalaureate attainment are also valuable because they distinguish those possessing a credential from potential competitors. Signaling theory (Arrow, 1973; Spence, 1973; Stiglitz, 1975) argues that employers envision educational credentials as a "signal" of productivity: individuals who successfully attain educational credentials are likely to be more productive than those who do not. An overlooked implicit assumption in signaling theory is that the power of a signal is inversely related to the proportion of job applicants possessing a given credential. Research reporting that college graduates earn higher incomes than high school graduates (Grogger & Eide, 1995), therefore, use an inappropriate benchmark because the signaling power of the high school diploma has declined in proportion to its ubiquity (Collins, 1979).

We extend these ideas to argue that as the proportion of individuals possessing baccalaureate degrees increases and the proportion of high-skill jobs decrease, the prestige of a baccalaureate credential becomes more important in determining the allocation of scarce positions. We hypothesize that (**H1**) the competition for admission into selective institutions has increased in recent decades due to a corresponding increase in value of prestigious credentials relative to non-prestigious credentials. Credentials from selective institutions, by definition, are always in short supply and they retain their value even as the total number of credentials increases. High-paying employers, for example, increasingly

recruit only from selective colleges and universities while prestigious graduate programs strongly prefer applicants possessing selective undergraduate credentials (Frank & Cook, 1995).

We also hypothesize (**H2**) that the strength of the relationship between socioeconomic background and pre-collegiate academic preparation has increased over time. In general, students are admitted to college because of their academic accomplishments – grades, evidence of rigorous course work, test scores – and their extracurricular activities (Kingston & Lewis, 1990; Stevens, 2007). Students from affluent households may possess an advantage in admissions processes not only because of the educational attainment of their parents, but also because they have access to important resources in the competition for prestigious institutions such as better primary/secondary schools and tutoring and extracurricular activities. From these observations, we also hypothesize (**H3**) an increase over time in the strength of the relationship between socioeconomic background and institutional selectivity.

We also note that state policies establishing hierarchically differentiated postsecondary education systems can increase institutional stratification. The influential *California Master Plan*, for example, limited admission into University of California to the top 12.5 percent of high school graduates and into state colleges to the top third of high school graduates, with all other students directed to the community college (California State Department of Education, 1960). These different types of institutions have different functions, different costs, and different effects on students. Although the California system is an example of conscious planning, fiscal crises precipitate incremental system differentiation in many states. States have struggled offering all students a flagship university education due to rising costs for "mandatory" programs – K-12 education, Medicaid, and corrections – and rising postsecondary education enrollments (Kane & Orszag, 2003). In addition to other budgetary priorities, recent "tax revolts" have further compelled states to decrease public funding for postsecondary education and to isolate enrollment growth in community college and comprehensive institutions, which have lower public funding per student than flagship state universities (Winston, 2004; Richardson, Bracco, Callan, & Finney, 1999).

Despite the fiscal attractiveness of this approach, expanding enrollment capacity through the community college system obscures potential outcomes on student access. State policy goals aimed at

maximizing the efficiency of public funding increase social stratification (Bastedo & Gumport, 2003; Gumport & Bastedo, 2001). Whereas non-elite institutions have generally raised tuition only to the extent necessary to offset declines in public funding, flagship institutions have used tuition increases to increase spending per student. Trow (1984) argues that a "Matthew effect" exists in higher education whereby already advantaged institutions are likely to receive a disproportionate amount of resources in the future.

Building on this proposition, Hearn (1991) hypothesizes that the Matthew effect exists not only for institutions, but for students who attend postsecondary education institutions. Using nationally representative longitudinal data from a cohort of 1980 high school graduates, Hearn (1991) finds that minority students and students from disadvantaged socioeconomic backgrounds attend less selective postsecondary education institutions after controlling for academic preparation variables. Karen (2002), finds similar results for the 1992 high school senior class. Similarly, Gerald and Haycock (2006) illustrate that in 2005 only 22 percent of students at flagship state universities received Pell grants in comparison to 35 percent of those at all colleges and universities; and only 12 percent of students at flagship state universities are of Black, Latino, or Native American origin compared to 24 percent of students at all colleges and universities. Perna (2005), using data from Maryland, argues that the increased gap in participation rates between White and Black students in public four-year non-HBCUs is due to lower growth of state appropriations coupled with higher tuition increases relative to other types of institutions.

State policies designed to create a hierarchically organized statewide system, as opposed to a set of autonomous institutions, also increase social stratification as students are "matched" to institutions consonant with their academic preparation. Bastedo (2003), using data from Massachusetts, highlights that the creation of statewide admissions standards diverts poor and minority students away from research universities and into community colleges. Existing research suggests that more differentiated state systems of higher education are likely to observe higher levels of institutional stratification, with low-income students disproportionately represented in state colleges and community colleges.

We argue that state policies creating a more differentiated postsecondary education system cause low-income students to be disproportionately represented in the community college sector. We envision this being the case for two reasons: low-income students are less likely to be successful in the competition for selective admissions (hypotheses H1, H2, and H3); and low-income students are less able to afford the higher tuitions at state colleges and flagship universities. Several specific hypotheses will be tested. We hypothesize (**H4**) that de facto state policy decisions to increase enrollment through community colleges rather than through 4-year institutions increase the probability that low socioeconomic status students will be concentrated in community colleges as opposed to not attending postsecondary education or attending a 4-year institution. We hypothesize (**H5**) that living closer to a community college than a public 4-year college increases the probability that a student will attend a community college (Card, 1993; Do, 2004; Frenette, 2004; Spiess & Wrohlich, 2008). Finally, we hypothesize (**H6**) that high in-state tuition at 4-year state colleges relative to community colleges cause low socioeconomic status students to be disproportionately concentrated within community colleges.

Data and Methods

We examine four nationally representative NCES longitudinal surveys – the National Longitudinal Survey of 1972 (NLS), the sophomore cohort of the High School and Beyond Survey of 1980 (HS&B), the National Educational Longitudinal Survey of 1988 (NELS), and the Educational Longitudinal Survey of 2002 (ELS) – to analyze changes over time in institutional stratification. Using these sources, we created a dataset that consists of a nationally representative sample of high school completers from the 1972, 1982, 1992, and 2004 high school senior classes. To be consistent with the NLS, which begins with 12th graders in 1972, we exclude students who are not in 12th grade when the majority of their cohort begins 12th grade. Second, we only include students who complete high school within 1.5 years of their high school graduating class, because the most recent wave of the ELS survey begins interviewing students 1.5 years after the high school graduating class of (June) 2004. We also apply appropriate NCES analytic weights in order to make inferences about the general population.

Our dependent variable of postsecondary access is a categorical measure of the selectivity of the first "true" postsecondary education institution (PSEI) attended after completing high school. It has the following categories: 1) did not attend PSE; 2) attended 2-year or less than 2-year PSEI; 3) attended non-selective 4-year PSEI; 4) attended a "competitive" 4-year PSEI; 5) attended a "very competitive" 4-year PSEI; 6) attended a "highly competitive" 4-year PSEI; 7) attended a "most competitive" 4-year PSEI. We garner attendance data for NLS, HS&B, and NELS from survey responses and the postsecondary education transcript study (PETS), but survey response is the only source of attendance data for ELS. When available, PETS data are preferable to survey responses (Adelman, 1999, 2005), but PETS data does not include all requested transcripts and the proportion of missing transcripts differs among surveys.

We, therefore, created three versions of the access variable: the first variable is based solely on PETS data (except for ELS); the second variable is based solely on survey response data; and the third variable is based on PETS data unless the student is 1) identified as not attending PSE according to the PETS data and 2) the student has at least one missing transcript, in which case we use the survey data. After determining first PSEI attendance, we identify whether the student attended a 2-year or 4-year college using HEGIS/IPEDS data, as well as determine the selectivity level of 4-year PSEI by merging data from the 1972, 1982, 1992, and 2004 editions of Barron's Profiles of American Colleges (1972, 1982, 1992, 2002) to the appropriate student cohort.

To deepen our understanding of potential changes over time in institutional stratification, we include numerous covariates from NLS, HS&B, NELS, and ELS into our analyses. First, we analyze socioeconomic variables such as race/ethnicity, gender, parental education, and parental income. We also examine academic preparation variables – including SAT score, high school GPA, math and science course taking patterns, and extracurricular activities – to investigate the extent to which changes in social stratification can be explained by changes in academic preparation.

We will employ a variety of analytical methods to examine our hypotheses. To test Hypothesis #2 (the strength of the relationship between socioeconomic background and pre-collegiate academic preparation has increased over time), we will create a single factor analysis variable (Black & Smith,

2006; Harman, 1976) consisting of the variables that cumulatively determine college applicant competitiveness (Karen, 2002); and then we will regress the factor variable on a vector of demographic characteristics and a vector of socioeconomic characteristics. To examine Hypothesis #3 (the relationship between socioeconomic background and institutional selectivity has increased over time), we will test the categorical selectivity variable using multinomial logistic regression. Hypothesis #1 (the competition for places in prestigious institutions has increased) will be tested using regressions results from Hypothesis #3 by predicting selectivity probabilities associated with particular covariate values (a given SAT score and HS GPA, for example) and analyzing how those predicted probabilities change across cohorts for the same covariate values.

We employ some of these methods to investigate the other hypotheses. We consider two sets of measures when examining Hypothesis #4 (de facto state policy decisions to grow enrollments through community colleges rather than through 4-year institutions increase the probability that low socioeconomic status students will be concentrated in community colleges): first, a measure of total community college enrollment within the state and a measure of total public 4-year college enrollment in the state; and second, a ratio of these two enrollment figures. For this analysis, we will specify a multinomial regression model using a dependent variable with three outcome categories: did not attend postsecondary education; attended 2-year/vocational institution; and attended 4-year institution. We will use state fixed-effects to control for unobserved variation between states; and to assess how the effect differs by socioeconomic status, we will run analyses separately for different socioeconomic status groups and create interactions between socioeconomic status decile and enrollment.

High transportation costs – including moving away from home – may prohibit some students from attending institutions far away from home. Although empirical analyses have estimated the effect of "distance from a university" on access (Card, 1993; Do, 2004), the analyses have not tested whether living closer to a community college than a public 4-year college increases the probability that a student will attend a community college (Hypothesis #5). We will create a dichotomous variable (living closest to community college or living closest to a public 4-year institution) by measuring the distance from the

student's home (defined as high school zip-code) to the closest community college and the closest public 4-year college. As with earlier analyses, we will use state fixed-effects to control for unobserved variation between states and to assess how the effect differs by socioeconomic status. Finally, we consider two sets of measures to test Hypothesis #6 (high in-state tuition at 4-year state colleges relative to community colleges causes low socioeconomic status students to be disproportionately concentrated within community colleges): first, a measure of in-state tuition at the closest community college and a measure of in-state tuition at the closest public 4-year college; and second, (Tuition2) a ratio of these two measures.

Preliminary Results

We observe that a greater proportion of the 2004 cohort attended some version of postsecondary education than the 1982 cohort. In 1982, 41 percent of students did not attend postsecondary education while 22 percent of students attended some college in 2004 (reference Exhibit 1 in Appendix). Moreover, we find higher percentages of participation in all of the college-going outcome categories apart from the most selective institutional category. With respect to the relationship between postsecondary education participation and socioeconomic status, we observe that a greater proportion of the 2004 cohort attended some version postsecondary education than the 1982 cohort for all socioeconomic quartiles (reference Exhibits 2-5 in Appendix). Among students in the lowest quartile, for example, 65 percent of students did not attend any college in 1982, but only 39 percent of students did not attend postsecondary education in 2004 (reference Exhibit 2 in Appendix).

Despite a greater proportion of students from all of the socioeconomic statuses attending some postsecondary education, we observe differences in where students from different socioeconomic statuses attend college. Among students in the lowest (or first) socioeconomic quartile, we find a higher percentage of students attending two-year and "not competitive" and "competitive" four-year institutions in 2004 than in 1982 (reference Exhibit 2 in Appendix). In this socioeconomic category, for example, 35 percent of students attended two-year institutions in 2004 while only 21 percent did so in 1982; and 11

percent and 10 percent respectively attended "not competitive" and "competitive" institutions in 2004 as compared to 6 percent and 5 percent in 1982 (reference Exhibit 2 in Appendix). Yet we find higher percentages of students in higher socioeconomic statuses attending more prestigious institutions. Among students in the second socioeconomic quartile, we find a higher percentage of students attending institutions in all of the college-going outcome categories apart from the most selective institutional category (reference Exhibit 3 in Appendix). In 2004, 36 percent of students attended two-year institutions in while only 27 percent did so in 1982; and 13 percent and 15 percent respectively attended "not competitive" and "competitive" institutions in 2004 as compared to 7 percent and 11 percent in 1982 (reference Exhibit 3 in Appendix). In other words, although a greater proportion of students in the lowest socioeconomic category are attending some postsecondary education, they are attending more prestigious institutions at lower rates than their peers in the next highest (or second) socioeconomic category.

The differences are more pronounced when comparing students from the lowest socioeconomic quartile to those in the third and the highest quartile. Among students in the third socioeconomic quartile, we find a higher percentage of students attending institutions in all of the college-going outcome categories apart from the two most selective institutional categories. Among students in this quartile, 34 percent of students did not attend any college in 1982, but in 2004, only 16 percent of students did not attend postsecondary education (reference Exhibit 4 in Appendix). In 2004, 32 percent of students attended two-year institutions in while 30 percent did so in 1982; and 15 percent, 22 percent, and 10 percent respectively attended "not competitive," "competitive," and "very competitive" institutions in 2004 as compared to 9 percent, 16 percent, and 7 percent in 1982 (reference Exhibit 4 in Appendix). Among students in the highest (or fourth) socioeconomic quartile, we find a lower percentage of students not attending any postsecondary education and attending a two-year institution, while observing a higher percentage of students attending institutions in all of the other college-going outcome categories. In 2004, 12 percent of students attended "not competitive" institutions while 10 percent did so in 1982; and 26 percent, 19 percent, and 10 percent respectively attended "competitive," "very competitive," and "highly competitive" institutions in 2004 as compared to 21 percent, 16 percent, and 7 percent in 1982

(reference Exhibit 5 in Appendix). Although we will test our formal hypotheses using multinomial regression, our descriptive statistics suggest that institutional stratification may exist.

Implications

Institutional stratification has negative effects for both students and states, as widely acknowledged by policymakers (Bastedo, 2009; Bastedo & Gumport, 2003). First, poor students are increasingly concentrated in community colleges, which may undermine efforts by states to increase baccalaureate attainment (Long & Kurlaender, 2008). One of the causes may be that as a nation, in recent years we have grown almost exclusively in the community college sector, when it is well established that students are 13 percent less likely to graduate with a bachelor's degree with the same personal characteristics and academic credentials (Whitaker & Pascarella, 1994). Students who successfully complete an associate's degree and transfer to a community college are just as likely to attain the bachelor's degree as native students (Whitaker & Pascarella, 1994); thus impediments in student flow among the stratified sectors must play a substantial role in producing this effect.

The proposed research is nationally important because it will provide a sound base of evidence to inform state and federal tertiary education policy. Policymakers care about efficiency and equity (DesJardins, 2002; Stone, 2002), among other concerns. From an efficiency perspective, policymakers want to maximize the productivity of the limited public resources and envision institutional stratification as an important mechanism to accomplish this objective (Bastedo & Gumport, 2003). Yet policymakers also care about equality of opportunity (Coleman, 1966); and a tightening relationship between social origin and educational achievement undermines equality of opportunity. Furthermore, an important national goal is to improve baccalaureate attainment rates. These rates are largely stagnant, and have been falling substantially compared to other industrialized nations (Wagner, 2006).

APPENDIX
Distribution of Postsecondary Education Participation (figures in percentages)

Exhibit 1: All Students – By Institutional Selectivity & Cohort

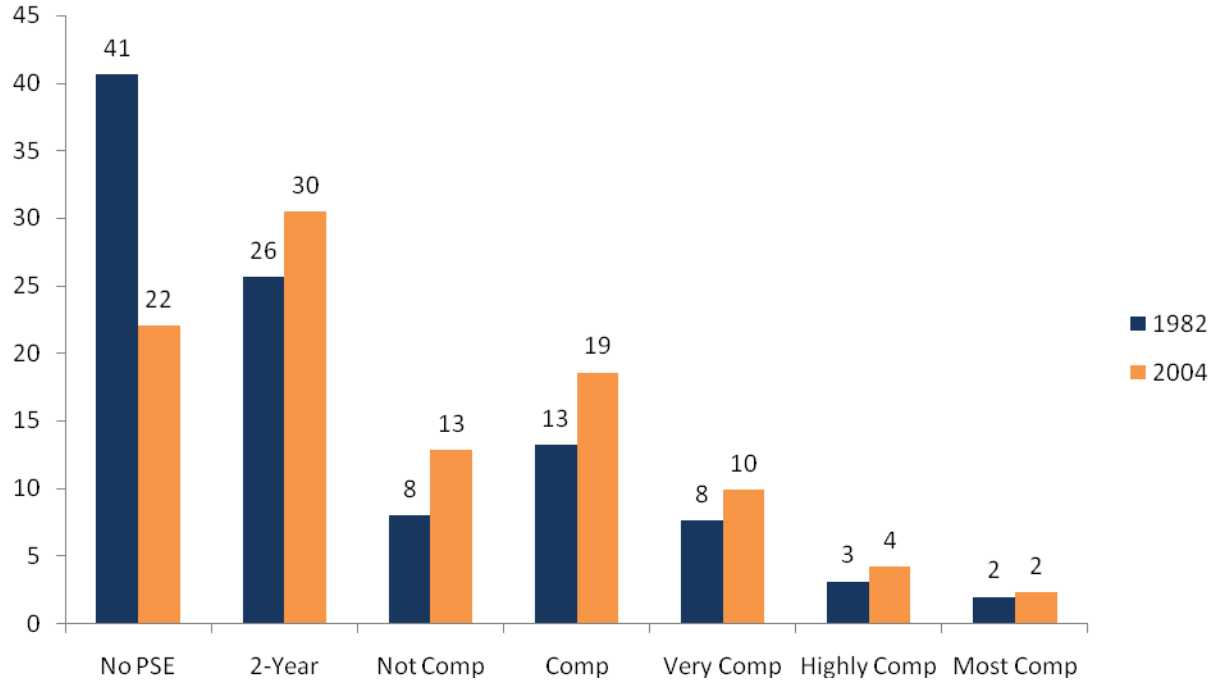

Exhibit 2: Students in First SES Quartile – By Institutional Selectivity & Cohort

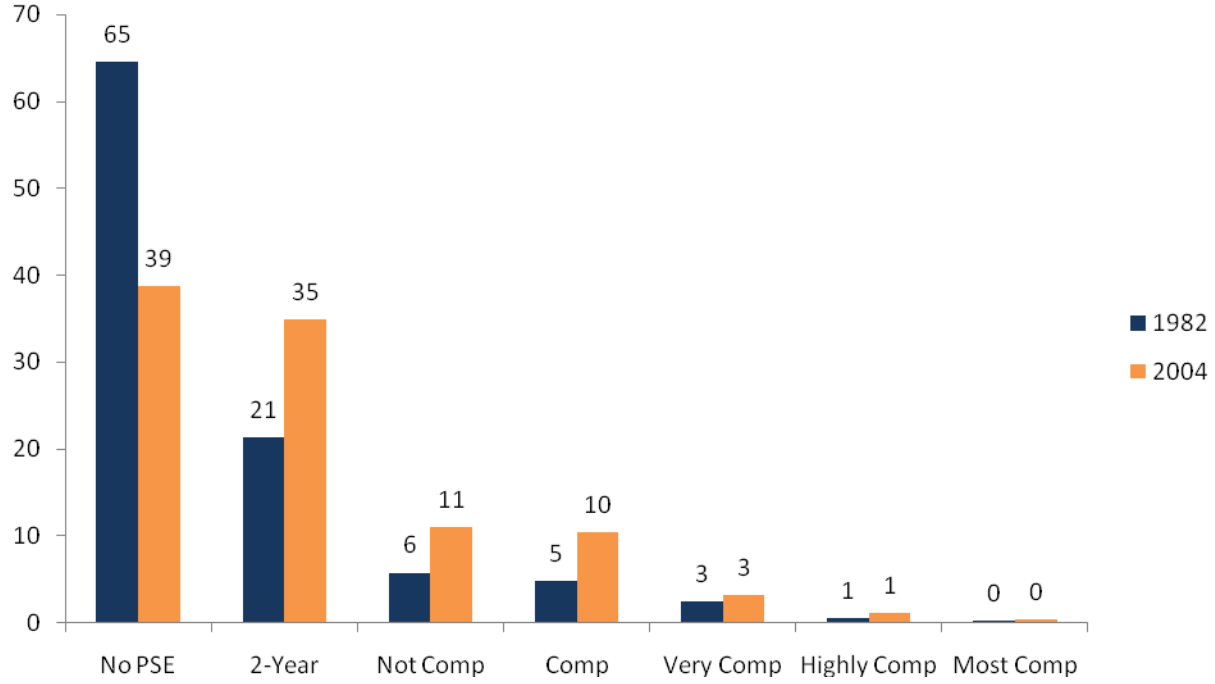

Exhibit 3: Students in Second SES Quartile – By Institutional Selectivity & Cohort

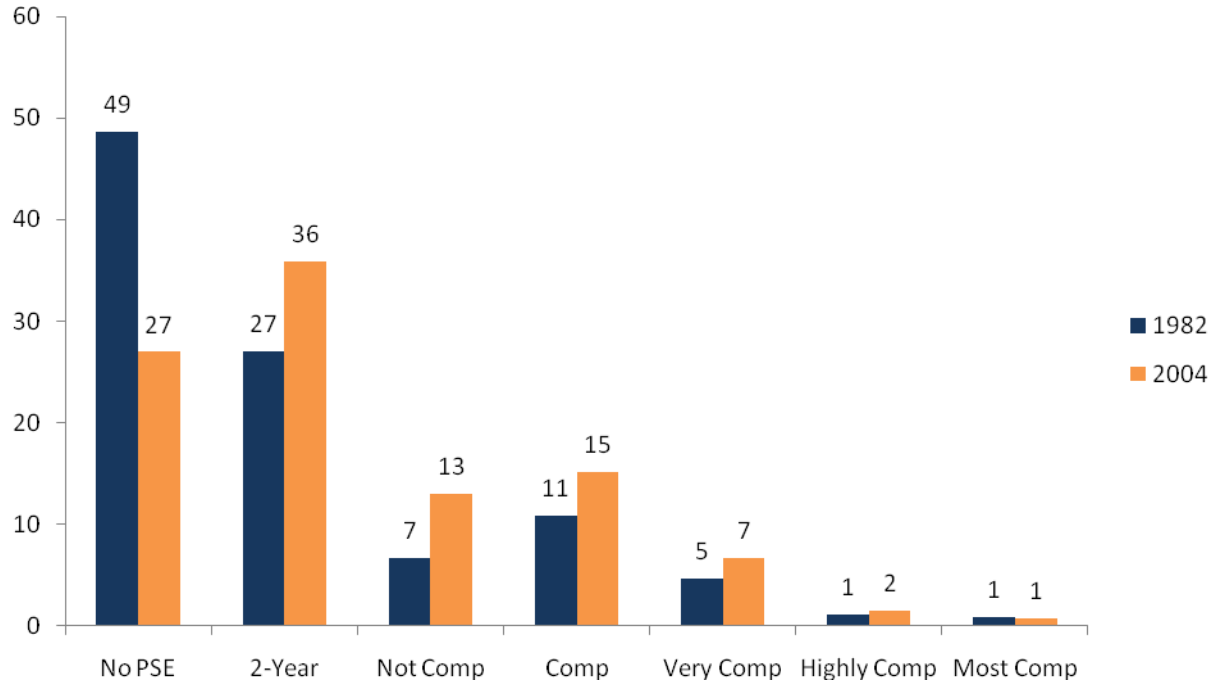

Exhibit 4: Students in Third SES Quartile – By Institutional Selectivity & Cohort

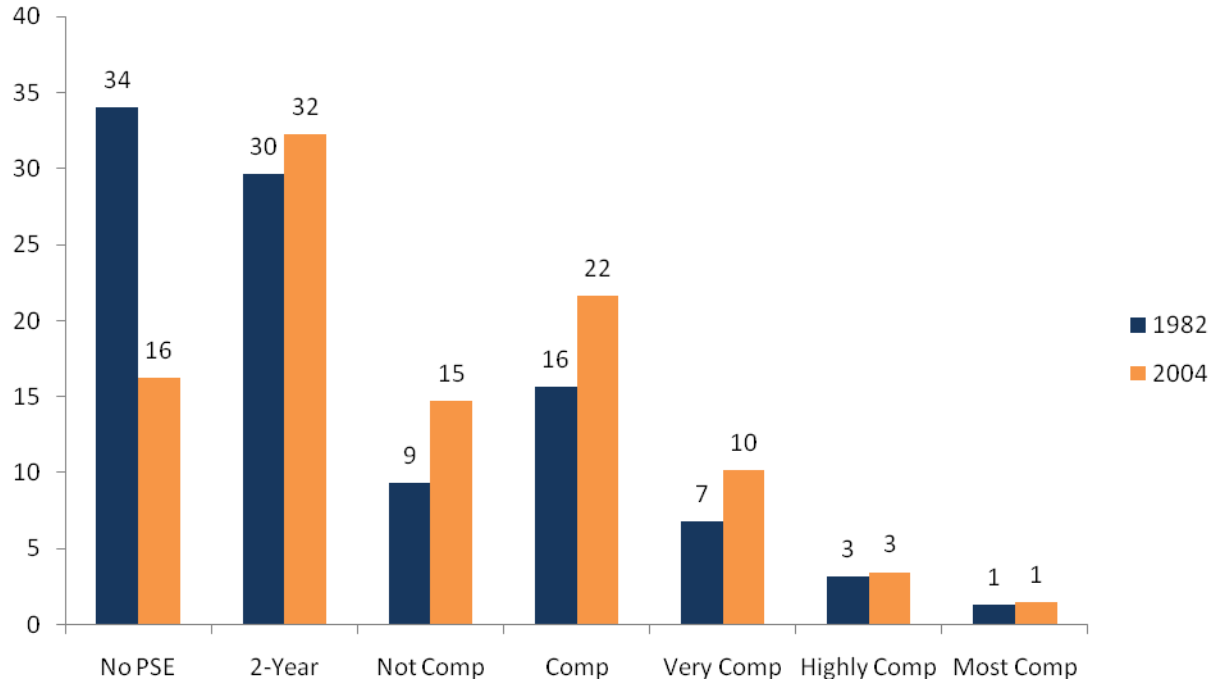

Exhibit 5: Students in Fourth SES Quartile – By Institutional Selectivity & Cohort