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Benchmarking Student Diversity at Public Universities in the United States: Accounting for State Population Composition

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Abstract

Regions rely at least partially on the internal production of a qualified workforce in order to maintain their economic competitiveness. Increasingly, at least from a university or corporate point of view, a qualified workforce is viewed as one that is racially and ethnically diverse. However, the conceptualization and measurement of ethnic and racial diversity in higher education appears to be often based on normative values rather than solid benchmarks, making any regional comparisons or goals difficult to specify. Ideally, at least as a starting point, public state universities would, while attempting to increase overall student diversity, benchmark their progress against the state population composition. This paper combines enrollment data from the National Center for Education Statistics (NCES) with U.S. Census Bureau population estimates data to provide a point of comparison for state universities. The paper has two goals: first a university-level comparison of diversity scores, as measured by the interaction index and, second, an analysis of how university student population composition compares to that of the population the university was originally intended to serve – the state population.

Keywords

population composition; diversity; interaction index; location quotients; higher education

I. Introduction

Empirical and theoretical research stands solidly behind the assertion that higher levels of educational attainment, or human capital more generally, are good for a region or nation's economic growth (e.g. Barro 1991; Barro and Lee 2001; Florida 2008; Glaeser et al. 1995). Improving access to higher education should benefit a region's economy by increasing the aggregate stock of human capital, while as a side effect potentially leading to a more diverse¹, educated workforce. Seen this way, a more diverse workforce is a natural extension of higher education access, not a goal in and of itself. Increasingly, though, diversity itself – independent of the education access issue – is seen to convey economic benefits (for an excellent review of the pros and cons of diversity vis à vis economic growth,

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¹Diversity can be understood as heterogeneity of the student/faculty bodies in a number of dimensions: class, race, ethnicity, and sexual identity. This paper defines diversity in terms of race and ethnicity.

For an example of a campus diversity plan, see the University of Maryland's, <http://www.president.umd.edu/EquCo/Conference/>.

see Alesina and La Ferrara 2005). That is, additional economic benefits accrue to the region from a diverse and educated population, above and beyond those benefits stemming from the actual stock of human capital; the *mix* or *diversity* of the workforce is important.

At the college and university level, diversity must be one of the most bandied-about terms in current higher education administration in the United States. Universities and colleges promulgate broadsweeping “diversity plans” that propose goals for student and faculty diversity, as well as retention plans for maintaining diversity among those groups. Faculty diversity is viewed as important from a perspective of offering students a richer instructor background, as well as providing minority students with model instructors. The minority faculty pipeline, in turn, is dependent on the diversity of the undergraduate student population, unless one accepts that all faculty diversity will come from foreign-educated minorities. Moreover, a diverse student body is seen as part of the higher education experience in the United States; students gain a university education not only in the classroom, but also by learning from the experiences of a wide spectrum of fellow students. Finally, providing access to higher education improves social mobility for students who may not have historically had access to careers and training available at higher education institutions (Hurtado 2007; Jayakumar 2008).

For all of the above reasons, evaluating student diversity at U.S. colleges and universities is important, timely, and socially relevant. Existing research has focused on the benefits of diversity in a university context, barriers to increased diversity, ways to increase and maintain diversity; and, more recently, the importance of ethnic and cultural diversity to regional economic growth and innovation. Little research has focused on quantitative measures of student diversity (for a light treatment of diversity measures in the context of student diversity, see Allen et al. 2006) or the relevance of a diverse student body to regional economic development and change. Moreover, in spite of the fact that variations in diversity are at least partially the result of spatial patterns of population composition, no research has explicitly addressed the spatial and demographic component of quantitative diversity measurement. Beyond arguing that diversity in higher education is worth quantifying, the goal of this paper is twofold: to suggest a diversity statistic that enables cross-comparison of higher education institutions in the United States and to argue for diversity “benchmarks” that compare student body composition to the composition of the institution’s catchment or service area. In other words, this paper begins to answer the following question: How do we define appropriate levels of student heterogeneity? Presumably, this appropriate level will vary spatially and will change over time, depending on the demographic composition of universities’ respective catchment areas.

The format of the paper is as follows. The next section seeks to place the topic of diversity in higher education in a suitable research context. Section III describes the data and diversity measures used for this analysis. Section IV offers a descriptive analysis of diversity at U.S. higher education institutions. Section V narrows the analysis to focus on public, four-year institutions, and Section VI offers a discussion of the results and avenues for future research on the topic.

II. Background

Measuring how diverse is “diverse enough” depends greatly on the origin of universities’ students, or their “catchment” area. Because defining the boundaries of these catchment or service areas depends on the type of institution, this paper uses public four-year colleges and universities as a test case for the benchmark portion of the study, as their primary catchment area can be defined as the state. Private colleges and universities may draw their students locally, nationally, or internationally, depending on their reputation and reach. Public four-year colleges and universities often have a comparably extensive geographical reach; however, in their case, a minimum catchment area can be defined: the state. That is, even should a public state university or college have, in practice, a catchment area larger (or smaller) than the state, the institution exists to provide a state-level service: education of the state’s population. Because a similar argument cannot be made for private four-year institutions, public four-year universities offer the best test case and are used in this paper. In addition, since catchment areas for graduate or professional degrees operate by varied and specific rules, this paper focuses on the undergraduate student population.

Research on student diversity in higher education typically focuses on the processes and policies used to institute change in student diversity. For example, removal of affirmative action in admissions policies during a period of increased emphasis on test scores in the admissions decision-making process is seen to have had a negative effect on minority admissions and, by extension, resulting student body composition (Alon and Tienda 2007). Other research has addressed methods for narrowing the achievement gap between White, non-Hispanic students and minority students. Minority student recruitment and retention has received a particularly great deal of attention in the Science, Technology, Engineering, and Mathematics (STEM) disciplines, where low student diversity – both in terms of race/ethnicity and sex – has been a long-standing issue (briefly summarized in Bouville 2008). In addition, there is recognition of the impact changing demography has on diversity and college admissions: between 1970 and 2000, the percentage of the U.S. population that was non-white and college-aged increased from 16 to 35 (Alon and Tienda 2007). Understandably, in some states, the impact was even greater.

Although the literature is scant on quantitative diversity measures in higher education research, a rich resource for potential conceptualization of diversity benchmarks and statistics can be found in regional science, geography, and economics, where studies on population and economic composition have long made use of such measures. Plane and Rogerson (1994) provide coverage of these methods in a demographic context and Massey and Denton (1988) cover a large range of residential segregation measures – over 20 in all. Florida (2002), for example, uses location quotients to assess the geography of the Bohemian or creative class in the United States. An industrial application can be found in Marshall (1975), which investigates industrial diversification in Canada by city size and Dissart (2003) offers a broad evaluation of statistics to measure economic diversity.

Research on diversity and economic development, broadly, is also extensive. Alesina and La Ferrara (2005) provide an excellent survey of research on diversity and economic growth. Alesina et al (1999) and Easterly and Levine (1997) both use variations on the interaction

index in their evaluation of the relationships between diversity and provision of public goods. In contrast to what many would argue today, they find, in U.S. cities and in an international cross-comparison, that ethnic/language diversity inhibits growth and provision of public goods. Other recent research, however, suggests that increases in “cultural” diversity can deliver economic benefits (Niebuhr 2010; Ottaviano and Peri 2006) and these benefits come on top of the advantages that previous researchers have established vis à vis economic growth and aggregate national or regional human capital stocks (e.g. Lucas, 1988) or the links between regional development and the production (and retention of) human capital (e.g. Faggian and McCann, 2009a). Florida et al. (2008) differentiate between human capital as a stock and as a flow, arguing that flow offers a better conceptualization of human capital. Either way, human capital must be produced *somewhere*, an additional argument for an evaluation of demographic dynamics at the university level. Finally, the importance of university-produced human capital mobility is discussed in Faggian and McCann (2009b). It is not sufficient for a region to produce human capital in the form of educated residents; it must also retain those residents within the region and, preferably, attract them from other locations. The present research proposes the possibility that racially and ethnically homogenous regions can create an environment of educated diversity by attracting minority students to local universities from outside the region and who then remain in the region upon graduation.

III. Data and Measurements

A. Data

For this paper, race and ethnicity data for higher education institutions were paired with matching demographic data for U.S. states in 2007. The National Center for Education Statistics collects a variety of educational statistics for the United States. Data for this analysis are extracted from the Integrated Postsecondary Education Data System (IPEDS), which aggregates survey results for all post-secondary education institutions. Response to these surveys is mandatory for any institutions that receive or apply to receive federal assistance under Title IV of the Higher Education Act of 1965, and so these data provide the best and most thorough coverage of colleges and universities over time in the U.S.

Data were assembled for 2007 from IPEDS for undergraduate students at the following types of postsecondary institutions, which encompass the range of institutions offering an associate’s degree or above:

- Public, 4-year and above
- Private, Non-Profit, 4-year and above
- Private, For Profit, 4-year and above
- Public, 2-year
- Private, Non-Profit, 2-year
- Private, For Profit, 2-year

I exclude U.S. service schools and colleges/universities in outlying areas (e.g. Guam), as well as institutions that were less than two-year, did not offer at least an associate's degree, or offered only graduate or professional degrees. This left 4,098 observations with over 15 million enrolled undergraduate students. Of those enrolled students, about 37 percent were enrolled in public four-year schools, 16 percent at private non-profit four year schools, and 41 percent at public two year schools. Public four-year and private non-profit four-year colleges and universities are those recognized as traditional higher education institutions. In recent years, for-profit institutions have gained market share in response to their openness towards non-traditional and part-time students. Two-year public schools are junior or community colleges, which are increasingly seen as an alternate (and less expensive) path to an eventual degree at a traditional four-year school.

For each type of institution above, information was gathered about total fall enrollments², the race and ethnic composition of total enrollment, and other institution attributes.

Enrollment is disaggregated by:

- White, non-Hispanic
- Black, non-Hispanic
- Asian or Pacific Islander, non-Hispanic
- American Indian or Alaska Native, non-Hispanic
- Hispanic Other

Because non-resident alien students are counted in the enrollment data as a separate race/ethnicity category, these students were dropped from total enrollment numbers.

State population compositions change over time as a result of selective in and out-migration, as well as fertility rates that vary across race and ethnicity categories. To enable comparisons of college/university student diversity to state populations, I compiled state population composition data using the U.S. Census Bureau's vintage 2008 state estimates data by age, race, and ethnicity (US Census Bureau 2008). The U.S. Census Bureau allows race (Black, White, etc.) to overlap with ethnicity (Hispanic or non-Hispanic). Since the IPEDS data separate race only for non-Hispanic categories, I follow suit with the Census data. So a Hispanic student may be of any race, but any student listed as White or Black will also be non-Hispanic.

B. Diversity Measurements

For the purposes of this paper, diversity is conceptualized in two different ways. The first is as a measure of heterogeneity that describes the "diversity within and between social aggregates" (Lieberman 1969). These types of measures collapse population composition into one statistic that provides an overall measure of diversity, which can then be easily compared to other values for different locations or time periods. A few potentially suitable indices exist for comparing population heterogeneity across² institutions, including the entropy, exposure, or interaction indices (Plane and Rogerson 1994)³. This paper uses an

²As of October 15 of the current academic year.

interaction index – referred to as the Simpson index when applied to species diversity – to describe racial and ethnic diversity at U.S. colleges and universities as this has been the diversity measure commonly used in the economic development literature (e.g. Alesina et al. 1999; Easterly and Levine 1997; Niebuhr 2010; Ottaviano and Peri 2006). The index is computed as follows:

$$S = 1 - \sum_{k=1}^n (E_k/E)^2$$

where E_k is the institution's undergraduate enrollment of the k th racial or ethnic group and E is the total undergraduate enrollment. The index value is interpreted as the probability that any two students selected at random will belong to different race/ethnicity categories. So, a higher value is indicative of higher levels of diversity. Schools with no diversity – that is, comprising only one race or ethnic group – will have an interaction index of zero. The maximum value of the index in this case is 0.833, which occurs when all ethnic/racial groups are equally represented⁴. It is interesting to note that the interaction index appears to be similar to the diversity index computed by *U.S. News and World Report* in its college rankings (Allen et al. 2006; Meyer and McIntosh, 1992), although schools are not ranked alone by diversity score and the statistic is provided for descriptive purposes⁵.

The second statistic used in the analysis offers a different perspective than the interaction index by comparing the student body race/ethnicity composition to that of the school's service or catchment area – assumed here to be the state.

$$LQ_i = \frac{(Race_{college}/Enrollment_{college})}{(Race_{state}/Population_{state})}$$

where LQ_i is the location quotient for the i th college or institution, $Race_{college}$ and $Race_{state}$ represent the population of each racial or ethnic subgroup, and $Enrollment_{college}$ and $Enrollment_{state}$ are the total college and state populations of interest. Formulated in this manner, the location quotient is a ratio of race/ethnicity proportions, with values close to one suggesting that, for a given race or ethnicity, a school's proportion matches that of its state population. Values less than one indicate that a school's proportion of a race/ethnic category is less than that of the state, and greater than one the reverse.

Using a state's total population in each race/ethnicity category as the denominator may not fully capture the demographic composition of states with a more recent history of minority in-migration. In those states – especially ones experiencing high levels of Hispanic in-migration – the total population may appear relatively homogenous, but younger age groups will be more diverse, as the Hispanic population, especially, tends to be younger and have a higher fertility rate than the overall population. Additionally, the pool of potential undergraduate students at higher education institutions – especially traditional four-year

³A rich set of spatial measures of diversity exists, such as the index of dissimilarity. However, these measures compare population composition across a set of geographic sub-areas and are not appropriate for this analysis.

⁴The maximum value of the interaction index is determined by the number of sub-groups as follows: $1-1/n$.

public and private non-profit schools – tends to come disproportionately from younger age cohorts. For the above reasons, the location quotient uses the population under 21 in each race and ethnicity category for the calculation of the measure. The choice of this age cohort has the advantage of being both forward-looking and conservative by benchmarking undergraduate student composition to those who currently are and will be “at risk” of attending college in the future.

IV. Diversity in Higher Education

Although different types of educational institutions tend to serve distinct demographics, they have in common a goal of increased and maintained student diversity. Four-year public and private, non-profit schools, traditional providers of higher education in the U.S., are particularly conscious of levels of diversity as degrees from these institutions, which tend to be more selective in their admission of students, may bring higher returns to the holder. Table 1 compares the mean value of the interaction index for all types of higher education institutions. The most diverse types of institutions are two-and four-year for-profit schools (interaction index values of 0.4600 and 0.5370, respectively), which, as discussed above, typically accept a broader range of the population and include more non-traditional and mid-career students. These types of schools are more available to minority students. Public, two-year schools, which often function as an intermediary stage for minority students who intend to transfer to a four-year college or university, are also relatively diverse (0.4257). Least diverse (leaving out the small group of private, non-profit two-year schools) are the four-year public and private, non-profit institutions, with the public schools showing slightly more diversity than the private.

Another descriptive way of thinking about diversity across institution types is to compare the U.S. population composition to that of the various institution categories. Table 2 provides the racial/ethnic breakdown of the six types of higher education institutions and compares these to the composition of the total U.S. population, as well as the U.S. population under 21 years old. It may be noted, first off, that racial and ethnic minorities, Asians aside, represent larger proportions of the under 21 population than of the population as a whole. This provides additional ammunition for diversity measures that accurately reflect the underlying “at risk” population of college students. The shares of White, non-Hispanics at four year public and private non-profit schools are comparable to their shares in the total population, but overrepresented compared to their share of the under 21 population. Asians and Pacific Islanders, only 4.1 percent of the under 21 population, are 6.9 percent of the undergraduate student body at public four-year schools and, in fact, are over-represented in all public and non-profit institutional categories. In contrast, Blacks are over-represented among for-profit institutions, but under-represented in the mainstream four-year categories. Given their share of the under-21 population, Hispanics are highly under-represented at all institution types, four-year schools in particular. In fact, the only two institutional categories in which their population proportion is matched (when compared to the total U.S. population) is in the two-year public and private, for-profit categories.

Tables 1 and 2 provide ample evidence that diversity – as measured by the interaction index – varies considerably across institution type. Presumably, other factors such as location and

size of school also help explain variation in diversity scores. Table 3 provides results for descriptive regression models that estimate the contribution different institution characteristics make to the value of the interaction index. Models 1 and 2 are identical, except that the second model controls for the percent of applicants who were admitted to the school. Including this control for school selectivity cuts the number of observations in half and so although this variable is important, models results should be judged with caution.

Although model fit is modest, some interesting conclusions can be drawn from the analysis. Results suggest that diversity is negatively impacted by rural location, as well as by location in regions other than the Far West or New England, and this is after holding state population composition constant. Holding other factors constant, institutional category has a positive effect on diversity levels, compared to the omitted category, which is public, four-year institutions. Larger schools, as measured by enrollment, are associated with higher interaction index values, and increases in the percent of applicants admitted are associated with decreases in the interaction index, which is in line with the argument that more selective schools may be more proactive in increasing levels of student diversity on campus. As might be expected, historically-Black and tribal colleges and universities tend to be less diverse than their nonrace/ ethnicity-dedicated peers.

V. Diversity at Public, Four-Year Universities

A. Interaction Index Scores

Along with private, non-profit four-year schools, public four-year colleges and universities are the traditional, mainstream providers of higher education in the U.S. Their student body diversity varies greatly, however, as can be seen in Tables 4 and 5. Table 4 ranks public, four-year institutions by interaction index value and lists the top and bottom 15 schools. Location – and, most likely, by extension, the population composition of that location – plays a large role in student body diversity outcomes. For example, of the top 15 most diverse public schools, eight are in California, one of the most racially and ethnically diverse states in the country. Of the 15 *least* diverse public schools, almost one third are located in Maine and six are in Ohio or Pennsylvania.

The least and most diverse public colleges and universities are different not only in terms of their geography, but also in terms of their size: on average the most diverse schools have an enrollment of 17,392 undergraduate students, while the least diverse are much smaller with an average enrollment of 3,240. Table 5 attempts to render the comparison groups more comparable, by ranking the largest state universities by their interaction index score. Here again, the most diverse schools are in California (11 out of 15) and an additional two are in Nevada, which surely benefits from student spillovers from neighboring California. The least diverse large state schools are in the Midwest or other geographically internal locations, which may not be surprising, given their historically homogenous populations.

The rankings in Tables 4 and 5 highlight a shortcoming of the interaction index: it provides no means of identifying schools that are not as diverse as they should be, based on their location or on the composition of the population from which they draw their students. As discussed in the introduction, establishing what this underlying population should be for

private, non-profit schools is potentially complex. Public four-year institutions, though, have, as a minimum the role of higher-education provider for their state's population. This suggests a basic benchmark that is that of matching their state's population composition. Naturally, this role has evolved over time, with some state institutions more selective than many private colleges or universities would be. Nonetheless, state population composition can serve as a suitable benchmark for measuring the diversity of public, four-year schools, which is accomplished in the following section.

B. Using Location Quotients to Benchmark Appropriate Levels of Student Diversity

If public, four-year institutions have a duty, first and foremost, to ensure their future economic development by educating their state's residents, then states with a more homogenous population may be justified in having a less diverse student body. Put another way, many of the public universities scoring lowest in Tables 4 and 5 may be as diverse as they should be, given the racial/ethnic composition of their state population. Location quotients, as discussed in Section II of the paper, provide a simple means for comparing undergraduate student body racial and ethnic composition to that of the area from which students are drawn (in this case, the state). Location quotients discussed below relate institutional enrollments to state populations under 21 years old, disaggregated by the race and ethnicity categories used by the IPEDS data.

Location quotients at or above one indicate that that race or ethnic group is either perfectly or overrepresented at a particular institution, compared to a state's aged zero to twenty population in that category. White, non-Hispanics are over-represented at 77 percent of all institutions, and Asians at just over 50 percent of all institutions (Table 6). In contrast, only six percent of institutions show a location quotient for Hispanics of at least one. Blacks are under-represented at 74 percent of all public, four-year institutions. These figures suggest that, overwhelmingly, if state universities should seek to at least match their state's population composition, they fail when it comes to the Blacks and Hispanic populations. In fact, for the most diverse large state schools listed in Table 5, location quotients for Whites and Asians are mainly at least one and, often, much higher for Asians. In contrast, none of these schools has a location quotient for Hispanics above 0.6. The location quotients for this group of schools tend to be higher for Blacks, although for the selective University of California schools, no location quotient for Blacks exceeds 0.6. A similar pattern is seen with the least diverse large state schools, as well, with good representation of Whites and Asians and relatively poor representation of Blacks and Hispanics – although the location quotient for Hispanics at West Virginia University is 1.1. Perhaps not surprisingly, the highest location quotients for Hispanics at large state institutions are found in Florida and Texas.

A disadvantage of location quotients is that there is no straightforward way to gauge, with one measure, how well a school matches its overall catchment area population composition. Table 7 lists the few schools for which the location quotient for all minority race/ethnicity groups is over 0.90. These are the institutions that most closely represent the underlying minority populations of their states, as captured by location quotients for the four main race/

ethnicity categories. This list of schools tends to score much higher in terms of the interaction index and includes a mix of coastal and interior state locations.

Figure 1 compares interaction index values with the four computed location quotients, noting in particular which colleges and universities fall above the mean interaction index score of 0.3851 and a location quotient value above or below one. There are a few institutions with low levels of diversity and underrepresentation of the White, non-Hispanic population, but as shown above in Table 6 Whites are well- or over-represented at most colleges and universities in the United States. Black non-Hispanics, however, there are many colleges and universities at which Blacks are well represented (location quotient greater or equal to one) and the student body is more diverse than average. Those schools with high Black location quotients and low interaction index scores are likely historically Black colleges and universities. If Hispanics are well-represented in a school's student body, that school is less likely to have a below average interaction index score – although bears reiterating that Hispanics are under-represented at most colleges and universities.

The regression lines and correlation coefficients shown in Figure 1 provide a visual sense of the relationship between undergraduate diversity and the respective location quotients. There is very little apparent linear relationship between school diversity and the location quotients for White or Black non- Hispanics, indicating that schools that draw more than their fair (i.e. state) share of these populations do not tend to be more diverse. This is not the case for either Hispanics or Asians, however, where the strength of the correlation coefficient suggests that less diverse schools also tend to be under-representative of their state populations for those groups, and vice versa. This is an interesting observation and, although outside the immediate scope of this paper, merits further reflection. It may very well be that the most diverse schools achieve that diversity by “importing” Hispanic and Asian students from out of state.

Of course, if diversity itself is seen as engine of regional economic growth, as opposed simply to access to higher education for all demographic groups in a state's population, the interaction index is a better measure than the location quotient. That is, even though states with relatively racial and ethnically homogenous populations may be justified in having lower interaction index scores, they miss out on the economic benefits of a diverse workforce and so may turn to importing minority students from outside their states.

VI. Discussion and Conclusions

The production of educated state residents is a driver of regional economic growth and increasingly the production of an educated *and* diverse workforce is seen as an important component of growth. For this reason, among others, colleges and universities seek to increase the racial and ethnic diversity of their student bodies. Although stated desires for increased diversity in higher education are now seemingly ubiquitous, concrete measures of diversity in higher education have lagged. This paper has presented two different means for evaluating student diversity at U.S. colleges and universities. The first, an interaction index, provides a succinct measure of the heterogeneity of an institution's student body. This index captures the probability that two students drawn at random will belong to different race/

ethnicity categories and the resulting statistics provide a basic means for comparing diversity across broad types of institutions as well as institutions at the individual level. Colleges and universities could use this measure to track diversity over time, as well as to compare their student diversity to that of peer institutions. The growing body of research linking demographic diversity (whether cultural, creative, or ethnic) suggests that regions with higher index scores will fare better in terms of economic growth.

The interaction index fails to show, however, whether a gap exists between the diversity of the student body and the population from which an institution draws (or aspires to draw) its students. For this, the location quotient is better, although the ideal would be a one-number summarization of the extent to which student bodies match their catchment areas and location quotient results are entirely dependent on the reference geography chosen. For added accuracy, location quotients in this paper compared school enrollments to a baseline state population that was limited to those under 21, since this group represents the lion's share of students attending these schools. Because determining the catchment area for a private, four-year school is complex in-and-of-itself, this paper applied location quotients only to the case of public, four-year institutions since, at a minimum, they are generally charged with providing access to higher education for their state's populace. Results of the analysis indicate that in more than half of public, four-year schools the White, non-Hispanic population is at least well-represented (location quotients greater than or equal to 1). The same cannot be said for Black or Hispanic groups and, indeed, using location quotients, the Hispanic population appears to be grossly under-represented in public, four-year higher education in the United States.

It is interesting to speculate about the long-term impacts of the economic recession, which may affect student diversity in at least two ways. First, higher tuition rates make a four-year college education more unaffordable for many minority students. Moreover, the high cost of a private university education increases the competition for places in cheaper, public universities (Fain 2009). The potential end result is decreased student diversity at both public and private colleges and universities in the U.S. Second, to fill budget gaps, many state universities are contemplating increasing the proportion of the student body that comes from outside the state, as out-of-state students typically pay higher tuition rates (Fain 2009; Keller 2009). The impact of this policy change is less straightforward: public universities in states with homogenous populations may well see their student diversity increase if they are permitted to admit more out-of-state students. Institutions with diverse state populations, such as California, may see their overall student body diversity decrease, however (Keller 2009).

Ideally the interaction index should be compared to other diversity measures in order to determine how robust the present findings are and which measures provide more insight into the issue of student diversity. Although the location quotient provides a better measure of how representative schools are of their service areas – thereby providing a basic “benchmark” that can be used to measure how close a school comes to its ideal diversity level – it still requires a separate location quotient for each race/ethnicity category, which limits its usefulness; if benchmarking is the goal, a one-number measure or means of representing the location quotient results must be developed.

In conclusion, if racial and ethnic diversity contribute to regional economic growth, it behooves us to understand the regional variations in student diversity. This paper offers a first attempt to quantify student diversity and suggests a way in which university student diversity can be benchmarked, assessed, and measured for progress over time. It also provides evidence that, given their increasing share of the population in many regions of the U.S., Hispanics are under-represented in public four-year universities. Although community colleges and for-profit educational institutions will surely absorb some share of the Hispanic population, for long-term regional economic growth, it will be important to consider policy development that rectifies this current shortcoming. Finally, this paper offers an initial effort at increasing our understanding of how student diversity can be measured and how it varies across the United States.

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Figure 1.
Interaction Index Scores by Location Quotient

Table 1

Undergraduate Diversity by Type of Educational Institution

Type of Institution	n	Mean Diversity	Standard Deviation
Public, 4-year and above	631	0.3851	0.1826
Private, Non-Profit, 4-year and above	1,327	0.3699	0.2033
Private For Profit, 4-year and above	468	0.5370	0.1679
Public, 2-year	1,031	0.4257	0.1820
Private, Non-Profit, 2-year	93	0.3754	0.2012
Private, For Profit, 2-year	548	0.4600	0.2043

Diversity is measured by the interaction index, similar to the Simpson index for species diversity. It can be interpreted as the probability that any two randomly selected members of the group will belong to different sub-populations. Its minimum value is zero (when everyone in the population belongs to the same subgroup) and, in this case, its maximum value is .833 (when all groups are equally represented).

Table 2

Race/Ethnicity by Type of Educational Institution

Race/Ethnicity	Percent of Total U.S. Population	Percent of Total U.S. Population Under 21	Public, 4-year and above	Private, Non-Profit, 4-year and above	Private For Profit, 4- year and above	Public, 2 -year	Private, Non-Profit, 2-year	Private, For Profit, 2-year
White, Non-Hispanic	66.265	57.54	65.560	67.088	40.893	57.545	60.235	45.039
Black, Non-Hispanic	12.158	14.359	11.436	11.350	19.226	13.193	18.684	24.609
Asian or Pacific Islander, N-H	4.414	4.077	6.855	5.263	3.030	6.565	4.047	3.670
American Indian or Alaskan Native, N-H	0.682	0.916	1.058	0.662	0.857	1.166	5.463	0.975
Hispanic	14.734	20.527	9.813	6.367	9.970	15.231	7.337	16.266
Other Race/Ethnicity	1.747	2.581	5.279	9.270	26.025	6.299	4.234	9.441
Number of observations			631	1,327	468	1,031	93	548

Cells contain the percent of the undergraduate student body for each institution type that is represented by that particular race/ethnicity. Data come from the 2008 vintage population estimates from the U.S. Census Bureau and from the 2007 American Community Survey.

Table 3**Explaining Undergraduate Student Diversity**

	Model 1	Model 2
Historically Black College/University	-0.235 ^{***} (0.0160)	-0.261 ^{***} (0.0199)
Tribal College	-0.118 ^{***} (0.0421)	-0.334 ^{**} (0.141)
Private, Non-Profit, 4-year and above	0.0367 ^{***} (0.00790)	0.0282 ^{***} (0.00967)
Private For Profit, 4-year and above	0.161 ^{***} (0.0110)	0.131 ^{***} (0.0149)
Public, 2-year	0.0336 ^{***} (0.00763)	0.0304 (0.0244)
Private, Non-Profit, 2-year	0.0973 ^{***} (0.0309)	0.0523 (0.0418)
Private, For Profit, 2-year	0.135 ^{***} (0.0125)	0.144 ^{***} (0.0181)
New England	0.0310 [*] (0.0164)	0.0596 ^{***} (0.0221)
Mideast/Mid-Atlantic	-0.0534 ^{***} (0.0143)	-0.00186 (0.0197)
Great Lakes	-0.0977 ^{***} (0.0152)	-0.0215 (0.0216)
Plains	-0.0913 ^{***} (0.0156)	-0.0312 (0.0219)
Southeast	-0.0830 ^{***} (0.0165)	-0.0229 (0.0231)
Southwest	-0.0758 ^{***} (0.0117)	-0.0534 ^{***} (0.0180)
Rocky Mountains	-0.0628 ^{***} (0.0174)	-0.0277 (0.0247)
Rural	-0.0423 ^{***} (0.00745)	-0.0374 ^{***} (0.0119)
State Youth Proportion White, Non-Hispanic	-0.262 ^{***} (0.0619)	-0.489 ^{***} (0.0918)
State Youth Proportion Black, Non-Hispanic	0.253 ^{***} (0.0726)	-0.0407 (0.105)
State Youth Proportion Hispanic	0.244 ^{***} (0.0650)	0.0922 (0.0978)
Total Undergraduate Enrollment	3.49e-06 ^{***} (4.20e-07)	3.34e-06 ^{***} (7.04e-07)
Percent Admitted		-0.00112 ^{***} (0.000194)
Constant	0.523 ^{***} (0.0524)	0.762 ^{***} (0.0801)
Observations	3,130	1,697
R-squared	0.420	0.422

Note: Dependent variable for all models is the Interaction Index, defined above. Models only include institutions with enrollments of at least 500 undergraduate students. Standard errors in parentheses.

α=0.01,

**
α=0.05,

*
α=0.1.

Institutions are classified into eight regions: New England - CT, ME, MA, NH, RI, VT; Mid-East - DE, DC, MD, NJ, NY, PA; Great Lakes - IL, IN, MI, OH, WI; Plains - IA, KS, MN, MO, NE, ND, SD; Southeast - AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, WV; Southwest - AZ, NM, OK, TX; Rocky Mountains - CO, ID, MT, UT, WY; Far West - AK, CA, HI, NV, OR, WA (omitted category). The omitted category for institution type is public, four-year. Rural is a dummy variable whose value equals one when a school is located in a rural area, zero otherwise. Historically Black College/University is a dummy variable, 1 if HBCU institution. Tribal College is a dummy variable that indicates whether an institution is a tribal college (1). The five institution type variables are indicator variables that control for type of institution as seen in Table 1.

Table 4

Public, Four Year Schools, Undergraduates

Most Diverse			Least Diverse		
Rank	School	Score	Rank	School	Score
1	California State University-East Bay	0.784	1	Pennsylvania State University-Penn State Dubois	0.042
2	Rutgers University-Newark (New Jersey)	0.780	2	Ohio University-Eastern Campus	0.055
3	SUNY College at Old Westbury	0.762	3	University of Maine at Farmington	0.059
4	California State University-Northridge	0.759	4	West Virginia University at Parkersburg	0.065
5	New Jersey Institute of Technology	0.758	5	Ohio University-Southern Campus	0.070
6	San Francisco State University	0.749	6	Texas A & M International University	0.079
7	Benjamin Franklin Institute of Technology (Mass)	0.749	7	Maine Maritime Academy	0.082
8	New Jersey City University	0.748	8	Ohio University-Chillicothe Campus	0.084
9	Stony Brook University (New York)	0.747	9	University of Wisconsin-Platteville	0.086
10	California State University-Long Beach	0.746	10	University of Maine	0.089
11	San Jose State University	0.742	11	Pennsylvania State University-New Kensington	0.094
12	California State University-Sacramento	0.741	12	Morehead State University (Kentucky)	0.096
13	California State Polytechnic University-Pomona	0.739	13	Massachusetts Maritime Academy	0.096
14	California State University-Fullerton	0.739	14	Ohio University-Zanesville Campus	0.096
15	University of Houston (Texas)	0.735	15	University of Maine at Augusta	0.099

Note: Rankings do not include tribal or historically Black colleges and universities. Mean undergraduate enrollment for least diverse schools is 3,240; for the most diverse schools it is 17,392.

Table 5

Public, Four Year Schools with at Least 20,000 Undergraduate Students

Most Diverse			Least Diverse		
Rank	School	Score	Rank	School	Score
1	California State University-Northridge	0.759	1	West Virginia University	0.163
2	San Francisco State University (California)	0.749	2	Indiana University-Bloomington	0.237
3	California State University-Long Beach	0.746	3	University of Wisconsin-Madison	0.240
4	San Jose State University (California)	0.742	4	University of Iowa	0.240
5	California State University-Sacramento	0.741	5	Purdue University (Indiana)	0.240
6	California State University-Fullerton	0.739	6	Iowa State University	0.241
7	University of Houston (Texas)	0.735	7	Utah Valley University	0.242
8	College of Southern Nevada	0.714	8	Pennsylvania State University-Main Campus	0.244
9	University of Maryland-University College	0.697	9	The University of Tennessee	0.259
10	San Diego State University (California)	0.696	10	University of Missouri-Columbia	0.260
11	University of Nevada-Las Vegas	0.693	11	The University of Alabama	0.261
12	University of California-Berkeley	0.686	12	Colorado State University	0.284
13	University of California-Los Angeles	0.685	13	University of Wisconsin-Milwaukee	0.287
14	University of California-Davis	0.680	14	University of Kansas	0.291
15	University of California-San Diego	0.663	15	Central Michigan University	0.298

Table 6

Location Quotients for Public Four-Year Schools by Race/Ethnicity

	White, Non- Hispanic	Black, Non- Hispanic	Asian/Pacific Islander, Non- Hispanic	Hispanic
Less than 1	142	466	313	595
Exactly 1	91	24	25	10
Greater than 1	398	141	293	26
Range	0.0–2.3	0.0–8.7	0.0–11.9	0.0–2.8

n=631; LQ values rounded to one decimal. The highest location quotients for Black, Non-Hispanics are found, not surprisingly, at traditionally Black colleges and universities. High end of range for Asians drops to 7.6 if the first observation is excluded.

Table 7

Public Institutions Matching State Minority Population Composition

	Location Quotient White	Location Quotient Black	Location Quotient Hispanic	Location Quotient Asian	Interaction Index
Benjamin Franklin Institute of Technology	0.244	2.684	0.905	2.381	0.749
California State University-Los Angeles	0.345	1.393	1.005	2.027	0.694
CUNY City College	0.346	1.580	1.759	2.919	0.731
CUNY John Jay College Criminal Justice	0.492	1.422	2.045	1.187	0.693
CUNY New York City College of Technology	0.275	2.543	1.338	2.314	0.697
CUNY York College	0.144	3.386	0.987	2.270	0.604
Indiana University-Northwest	0.781	1.983	1.636	1.462	0.566
New Jersey City University	0.487	1.248	1.783	0.931	0.748
New Mexico Highlands University	0.721	2.258	1.121	1.749	0.583
Purdue University-Calumet Campus (IN)	0.832	1.706	2.031	0.918	0.521
Rutgers University-Newark (New Jersey)	0.512	1.294	0.947	3.288	0.780
Shepherd University (West Virginia)	0.980	1.133	1.734	1.892	0.202
SUNY College at Old Westbury	0.539	1.782	0.902	0.991	0.762
University of Wisconsin-Parkside	1.006	1.285	0.959	1.082	0.372

A match with state minority population composition is defined as a location quotient for all race/ethnicity categories except White, Non-Hispanic greater than 0.9.