A Statistical Analysis of The University of Oregon's Retention Rates for Minority Groups

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Presented to the Department of Economics, University of Oregon,
in partial fulfillment of requirements for honors in Economics.

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June 2006

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Abstract: We examine retention rates amongst students at the University of Oregon, and focus on five racial groups, Black, Hispanic, Asian, Native American, and White. We use census data and admissions data collected for ten years that was previously used in a study of retention rates by Professor Larry Singell at the University of Oregon. In regards to our findings, we discover many varying levels of responsiveness to the various explanatory variables between the different racial groups.

Approved: _____

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Introduction

Fostering diversity at institutes of higher education has long been the goal of many institutions and thus has been at the forefront of policy making decisions and research both past and present. Specifically, the University of Oregon (UO), the institute we will study in regards to this topic, has been discussing issues revolving around diversity quite a bit in the past years. In response, we investigate issues of student retention at the UO, similar to Professor Larry Singell studies conducted in 2002 and 2006, but with a focus on how retention rates differ for students of different racial groups.

We believe that by measuring the effects certain variables like need-based aid, scholarship, and city demographics (amongst many others) have on student retention, our findings may assist with policies that coincide with the University's efforts to encourage diversity on campus. In a recent study conducted by Professor Bill Harbaugh in efforts to investigate and encourage an efficient and clear plan for promoting diversity at the University of Oregon, he found the following: The current demographics of the state of Oregon are 83.52% White; 1.63% Black; 1.32% American Indian and Alaskan Native; 3.20% Asian, Native Hawaiian and other Pacific Islander; 7.29% More than one race, other, did not reply; and 5.00% Hispanic, Non-White. The current demographics of the University of Oregon's student body are 74.29% White; 1.64% Black; 1.17% American Indian and Alaskan Native; 5.83% Asian, Native Hawaiian and other Pacific Islander; 8.52% More than one race, other, did not reply; 3.12% Hispanic, Non-White; and 5.43% International Students. As can be seen, certain groups are underrepresented in the student body, while some are overrepresented when compared to state demographics. It is important to understand retention rate differences across these groups, if any.

In our study we hope to discover what attributes may be significant in encouraging retention amongst different groups of individuals at the University of Oregon. With this knowledge the University may be in a better position to address current student demographics where they see fit. As our foundation, we used 11 years of University Admissions and Census data that has been collected and sorted by Professor Larry Singell et al. This data includes a plethora of different academic achievement variables (both college and pre-college), community of origin traits, financial aid endowments, scholarship and grant awards, socioeconomic status indicators, and various other attributes that may affect levels of student retention.

Currently our study focuses on retention from the freshman to sophomore year at the University of Oregon. Our findings have been fairly straight forward in that we found expected obvious results across racial groups, such as freshman UO GPA being an important and positive indicator for retention. In addition we were able to measure the effectiveness of first year financial aid allotments as well as scholarship awards, more often than not having a positive and significant effect on retention rates for certain racial groups.

To be more specific, we find that Hispanic students are relatively responsive to factors that deal with the demographics of the hometown community. Black students are relatively more responsive to financial factors that deal with both social economic status and financial aid and scholarship awards; but are also significantly less responsive to GPA than the other racial groups. Asian students are relatively responsive to financial aid factors. We do not find a great deal of significance in the factors that affect Native American students due to a low number of observations. And White students are moderately responsive to nearly all factors.

We will begin by discussing previous literature concerning the topic of diversity and higher education as well as retention rates at various universities. After which we will discuss

what we expect to find in our study as well as briefly summarize our methodology. We will end with a discussion on our results in greater detail than was given in the previous paragraph.

Literature Review

Literature on this topic has been written since the persistence of the problems surrounding higher education retention and race has been evident. Although the topic has been defined, discussed and debated, and numerous solutions have been posed over many years of study, lower rates of retention and enrollment are still statistically observable to this day.

Evidence and theory for such trends comes, for example, from an article in The Journal of Higher Education by Loo and Rolison (1986), where they assert that much of these differences observed in retention and enrollment stem from disparities rooted in socioeconomic status and varying levels of pre-college preparedness for certain racial groups. In conjunction, Hurtado et al. (1998) argue that students of certain ethnic backgrounds are also less able to adapt to college life on primarily white campuses simply due to an overwhelming feeling of alienation from fellow students and faculty.

Loo and Rolison (1986) report that lower rates of retention amongst certain racial backgrounds stems from a lack of social integration. Often these feelings of estrangement stem from neglectful treatment by fellow students and pressure from the greater community for social conformity to the dominant white culture. Loo and Rolison (1986) argue that an establishment of meaningful relationships can offset such feelings with both students and faculty to encourage social integration and a collapse of the barriers between the dominant and subculture. Loo and Rolison (1986) also reported that African American and Chicano students felt that most of their academic difficulties stemmed from insufficient high school education, requiring them to spend a

great deal of time simply 'catching up' to achieve the same level of preparedness as those with access to higher quality preparatory schools and programs.

Another major theme observed in the literature regarding race and retention is how to remediate disparities. Although most academics agree on the source of disparity, there are quite a few theories on what should be done. Many of the journals, including the RSED's Diversity Plan (2004), Hurtado et al. (1998), and Loo and Rolison (1986), that are offering suggestions on how to better the situation oftentimes do not include any econometric or non descriptive statistical data to support their suggested administrative policies. In fact, more often than not, many of them operate solely on theories and techniques that have existed since the early – mid 1980's.

In the RSED's (Rehabilitation and Special Education Department) Plan For Enhancing Diversity on a national level, important retention strategies that were outlined included (a) hiring faculty that represent marginalized minority students, (b) making financial aid more readily available, (c) increasing funding and quality of support services and opportunities based upon cultures, (d) 'remediating' programs and services, and (e) creating ethnic-specific opportunities. Such changes, they believe, will bring about a much more diverse and equal environment for students and faculty of color who are currently underrepresented in all aspects of rehabilitation and special education (RSED's Diversity Plan, 2004).

Though some initiatives, like the RSED's, may be turning up promising results, one must stop to ask whether or not they are efficient in their policy making and thus truly effective. Singell's investigation of retention at large public universities suggests that, although need-based financial aid has an effect on enrollment, overall it does not have a significant effect on graduation at these universities. Instead, it is merit-based aid that has a greater effect on

graduation rates at these universities. Levels of merit-based aid are determined by a student's pre-college academic indicators such as SAT scores and GPA. Thus merit based aid will tend to attract students that have certain observable advantages in ability, such as the ability to perform well on standardized tests like the SATs. Additionally SAT scores are correlated with financial income, which is one of the major indicators for socioeconomic status. And thus socioeconomic status is positively correlated with ability. Thus by using merit based aid, an institution may simply be changing the demographics of their student body by catering to the financially well to do (Singell, 2006).

Thus many initiatives focusing on the use of financial aid as an incentive for enrollment and retention at larger institutions, may find their policy making ineffective at increasing graduation rates amongst the students they seek to help. In essence their policies are an inefficient use of scarce resources and a closer look should be taken as to how to go about more efficiently increasing graduation rates amongst underrepresented groups. Such investigations are difficult to conduct.

Hurtado et al. (1998) explore the extent to which embedded benefits still exist for Caucasian students. They encourage campus leaders to explore possible areas where unfair advantages may still exist for the historically dominant races and classes. The authors warn that campuses with higher proportions of white students may provide fewer opportunities for interaction across race/ethnicity barriers and limit educational experiences for socially and culturally diverse groups. They also warn that attempts at increasing structural diversity in institutes of higher education will ultimately fail if they are not accompanied by more "student-centered" approaches in teaching and by increased communication across racial gaps.

The problem here is that it is very difficult to measure the effects that open dialogue and student centered teaching has on improving diversity on college campuses. Other limitations regarding studies conducted on retention and race are found simply in observable differences in college attributes. For example, a study conducted in 1990 by Amaury Nora in regards to the effects financial aid has on Hispanic student retention at a community college shows that it does have some positive effect on retention.

Nora (1990) in a study of race and retention estimates a statistical model where retention is the dependent variable.. Nora's explanatory variables included cumulative grade point average, different types of campus-based financial aid financial need, non-campus based grants and high school grades. This model also estimated a model where attainment of some form of credential while attending the Community College was the dependent variable. Nora's conclusion is that financial aid does play a part in Hispanic attrition at community colleges.

The implications here are that the behavior of Hispanic (and possibly other students) in regards to attrition will differ based upon the size of the institution and various other variables that are being controlled for. Thus in our own study, we hope to replicate a regression model similar to Professor Singell's retention model, and narrow our focus and examine whether the factors that affect retention vary by race at the University of Oregon.

Singell (2006) ran a study of retention at 3 major flagship institutions, he found that need based financial aid yielded a 3.00% increase in likelihood for a student to graduate for every $1000 awarded. However, this scenario was only true when his model does not control for enrollment selection. The effect disappears when his model controls for enrollment selections. His findings suggest that need-based aid increases the accessibility of colleges that better fit a

needy student's desires socially and academically. Essentially it allows for higher quality institution-student matches, which increase graduation rates.

In addition Singell (2006) found that merit based aid, when SAT scores were not controlled for but selection controls were, yield an additional 6.00% greater likelihood of graduation for each additional $1000 awarded to a student per year. However, when SAT scores were controlled for, the effect of merit based aid graduation rates disappeared. Singell (2006) concludes that this is due to a correlation between merit based aid and observed ability in the students receiving it; ability which is not explained by college GPA, such as raw intelligence and test-taking ability. Using merit aid, however, is likely to enhance the opportunities of those financially well to do, as there is a strong correlation between income and performance on standardized tests, according to Singell.

Hypothesis

In this section we discuss the relationships we expect between various factors of retention rates for different racial groups at the University of Oregon. The three general class of factors we discuss in full are 1) Financial, 2) Academic/Judicial, 3) Social/Adaptation. We can essentially assume that any major trends seen throughout specific student groups will likely be able to be prescribed to one of these three major classes of factors which include within them a number of different variables. For example, we can measure financial effects using variables pertaining to financial aid allotments, family income, work study hours, financial aid eligibility and others. For academic and judicial factors, we have access to students GPA (both college and pre-college), SAT scores, whether or not they were special admit students, their SAT scores relative to their peers, and various other variables that may prove to be significant. For social

and campus adaptation variables we use a number of different factors, many of which are key demographics taken from the students' community of origin. More specifically we have the demographics separated by race and by the percentage of bachelor's degrees held by community members. In addition we also have other socially oriented variables such as the type of high school they attended, the size and type of their city of origin, and the size of their school.

We expect that the results of our regression analysis will shed light on the effectiveness of aid allocation that may be used in conjunction with the University of Oregon's diversity building efforts. We expect that first year experiences, such as on-campus living, participation in campus clubs, availability of tutoring and student leadership demographics are relevant in order to predict sophomore year retention and graduation rates. We hypothesize that our study will find similar results to Singell (2006), in that he found merit based financial aid was significant in determining retention and graduation rates. Singell attributed this to the underlying traits that merit-based aid receiving students have. Singell (2006) also found that need based financial aid was significant in determining retention rates in that it helped to create a better fits for students and institutions, allowing students to attend the university that best catered to their academic and social needs. Our hypothesis is that different racial groups will respond differently to certain categories of aid. We also expect that the attributes of their cities, high schools, and other pre-college characteristics will be instrumental in determining whether or not students are retained indicating a level of adaptation to the University of Oregon's social and academic climate. We also examine if other variables, such as the age when the University and the student first had contact,, are significant in retention.

The decision to dropout presumably takes place because the opportunity cost of college has become larger than the individual's current valuation of the future benefit from attaining a

bachelor's degree. Essentially what we are attempting to do is evaluate the potential reasons why a student's opportunity cost of college has become too high. From the data gathered, the data offered in previous readings, and our own speculations as to what reasons may cause an individual to discontinue their pursuit of higher education at UO, we can assume one or more of the following must be true: (A) They cannot financially continue to afford to attend UO (B) They are no longer eligible to attend (due to poor academics, behavioral sanctions, etc.) (C) They have not fully integrated into the UO community and thus are alienated from continued attendance. Thus our regressions will focus on variables that we believe may help determine methods to increase the value or alleviate the cost of pursuing a degree at the University of Oregon.

Methodology

For our study, we have a vast assortment of census and university data that has been collected over the past eleven years for Professor Larry Singell to be used in his study of retention at the U of O. We use the available variables in the data set to explain the statistical differences observed between different racial groups. To begin our project we re-create Professor Singell's model, then we create five separate samples that separate the original group into five different racial groups: Hispanic, Asian, African Americans, Native Americans, and White-Caucasian.

Like Singell, we also extend this model to take into account graduation levels given the choice to enroll. By running this bivariate probit model we will begin to measure the effects the various variables provided to us may have on retention and graduation. Our empirical model for estimating retention probabilities is the following:

Retention= C +B_1Gender +B_2Resident+B_3Contact Age +B_4HSType+ B_5CityType +B_6Net High School GPA+ B_7Net Cumulative SAT+ B_8First Year GPA+ B_9Average Family Income +B_{10}FAFSA Completion +B_{11}Aid Eligibility +B_{12}Financial Aid + B_{13}Scholarships + Random Error Term

To briefly define the above variables: Gender is a dummy variable used for indicating a student's identification as either male (0) or female (1). Resident is also a dummy variable used for indicating whether a student is a non-resident (0) or a resident (1). First year GPA is a numerical value measuring the cumulative GPA of the student during their freshman year at UO. Average Family income is the average income of families from the students zip code. FAFSA completion is a dummy variable stating whether or not the student did not fill out their FAFSA (0) or whether they did (1) for reenrollment to their sophomore year. Aid Eligibility is a numerical measurement of how much financial aid a student is eligible for going into their sophomore year at UO. Financial Aid is the amount of financial aid a student has been awarded for their sophomore year at UO. Scholarship is the amount of money the student earned in scholarships for their sophomore year at UO. The Random Error term helps us to control for random errors.

Descriptive Statistics

In order to fully understand our results we've included this section with descriptive statistics. As discussed earlier, our variables are divisible into four broad categories: academic, family back ground, hometown community characteristics and financial aid, scholarships and grants.

+Academic Statistics

GPA is an important indicator of success in an academic environment, and the average GPA varies quite a bit across races. For example average first year GPA is 2.92 for white students, 2.85 for Asian students, 2.76 for Native American students and 2.71 for Hispanic students. The lowest average first year GPA by a large margin is 2.41 for African American students. Average GPA for white students continues to increase each year, with a fourth year average GPA of 3.11. Meanwhile Asian and Hispanic students' average GPA increases until their third year then slightly decreases their fourth year. Native American and African American students have similar decreases in their average GPA their third year with rebounds their fourth year.

+Family Background and Hometown Community Statistics

Average family income and median household income of a student's hometown are important proxies for a student's financial background. The average family income for Asian student's hometown is $57,973, while for African American students it is $50,583, for Hispanic students it is $56,253, for Native American students it is $53,777 and for white students it is $59,172. For Asian students the average hometown median household income is $35,461, for African American students the average is much lower at $31,410, similarly the average median household income for Native American students is $31,473. For Hispanic students the average median household income is $32,152, and for white students the average is $34,509.

Of the students who enrolled their freshman year 73% of both Hispanic and white students were residents, 70% of Asian students were residents, 64% of black students were residents and 69% of Native Americans were residents.

White students came from hometowns where on average 30% of the adult population had their Bachelor's degree, while only 27.7% of the adults in the hometowns of Asians held their Bachelor's degree, 24.4% for African American students' hometowns, 26% for Hispanic students' hometowns and 23.4% for Native American students' hometowns.

+Financial Aid, Scholarship, and Grant Statistics

Average financial aid varied quite a bit between races. For example four year average grants were $896 for Asians, $1311 for African Americans, $1067 for Hispanics, $813 for Native Americans and $417 for white students. Four year average total scholarships were less varied than grants but whites maintained the lowest average at $579, for Asians it was $816, for African Americans it was $916, for Hispanics it was $978, for Native Americans the average was highest at $1001.

In examining loan offers to groups we see small changes in group averages. For example the average yearly subsidized loan offer is $1,586 for Asians, $1,728 for African Americans, $1,673 for Hispanics, $1,650 for Native Americans and $1,126 for whites. Average yearly unsubsidized loan offers were also similar between groups, with $2,082 being the lowest for white students, $2,476 for Asians, $2,699 for African Americans, $2,602 for Hispanics, $2,849 for Native Americans.

Results

Retention: Freshman to Sophomore Year

Overall we ran two sets of five univariate probit regressions and one overall bivariate probit regression to measure marginal effects. We separated each univariate set by racial groups, and within each set we used the same model for each race. The first set of regressions differed

from the second in that it did not include such variables as the percentage of white people observed in the student's community of origin, whether or not the student was a special admittance student, the student's high school size, the amount of academic credits the student had their senior year of high school, and the percentage of bachelor degrees held by community members in the student's city of origin.

We found that the most important factors for Hispanic students appeared to be centered on hometown community demographics. The regressions showed that the most significant impacts on Hispanic student retention came from things such as the percentage Bachelors degrees held by community members in their community of origin as well as the racial demographics of their hometown community.

For Black students, our data seems to show that they are most responsive to financial factors such as scholarship award, financial aid, and family income. Black students also seemed to be less responsive to academic indicators like GPA than other racial groups.

For Asian students, it seems to be that they are fairly responsive to both academic factors as well as financial aid and scholarship variables.

Due to the small number of observations, it was hard to tell what variables were best at determining Native American retention rates. However, we did find that, like the other racial groups, Native Americans were fairly responsive to academic indicators like GPA when considering retention.

White students seem to be moderately responsive to all factors, hometown community, academic, financial, and other. Though they are typically less responsive than the other racial groups, oftentimes dramatically so as seen in the case of average family income where Black students are nearly ten times as responsive when considering sophomore year retention.

For the first set of probit regressions our pseudo R^2 measures were 0.10 for Hispanic students, 0.10 for Asian students, 0.18 for Black students, 0.15 for Native American students, and 0.05 for White students. For all five of our models Chi^2 test rejects the null hypothesis that our coefficients are jointly insignificant from zero.

In our second set controlling for a greater number of variables our pseudo R^2 measures go up to 0.13 of the variation for Hispanic students, 0.13 for Asian students, 0.21 for Black students, 0.17 for Native American students, and 0.06 for White students.

First Set of Univariate Sophomore Year Regression Results

In this section we explain our statistical results for various determinants of retention probabilities. For a full listing of results see tables.

+ Academic Effects

Freshman GPA seems to be fairly important for retention to the sophomore year, and not surprisingly so. We found that for every one unit increase in Freshman UO GPA Hispanic students are 10.88% more likely to return for their sophomore year. The effects for other groups are, given a one unit increase in Freshman UO GPA, an 11.32% increase in the probability of retention for Asian students, 6.32% for Black students, 13.40% for Native American students, and 9.25% for White students.

+ Family Background Effects

Finances have a significant effect on retention at the University of Oregon. But it does not simply stop with outside sources of funding. The financial backgrounds of the students' families also play a significant role in their choice to attend the University of Oregon. For Hispanic students, every $1,000 increase in household income yields a 0.4% greater likelihood for sophomore retention. Meaning, based upon our univariate regression model, a Hispanic

student coming from a community with its median household earning $40,000 a year, would have a 16% less likelihood of retention than one coming from a community whose median household earns on average $80,000 a year. The effects are even greater for African American students. For every $1,000 in average family income, African American students are 1.11% more likely to be retained. Given the same scenario, an African American student coming from a community with an average family earning $40,000 a year, would have a 44.4% less likelihood of retention than one coming from a community whose families earn $80,000 a year on average. For White students, there is also a measurable effect. For every $1,000 increase in average family income, White students from those communities are 0.12% more likely to be retained. Given that same scenario, a White student coming from a community with an average family earning a total of $40,000 a year, would have a 4.8% less likelihood of retention than one coming from a community that earns $80,000 a year per family on average.

+ Additional Individual Traits

In the first set of regressions, gender was actually fairly important for certain groups in determining first year retention rates. We found that White women, ceterus parabus, are 3.37% less likely to be retained to their sophomore year at UO than White men. Hispanic women, all else equal, are 8.36% less likely to continue on to their sophomore year than Hispanic men. Conversely, Asian women are 4.54% more likely to be retained to their sophomore year than Asian men, all else equal.

+ Financial Aid, Scholarship, and Grant Effects

The financial effects on retention can best be illustrated in our own findings by the effects measured from the benefits of financial aid. Financial aid seems to be fairly important in indicating future enrollment. Asian students with $1,000 of financial aid eligibility are 0.90%

more likely to reenroll for their sophomore year than those with $0 of financial aid eligibility. Additionally African American students have a 2.29% greater probability of reenrollment for each additional $1,000 of financial aid eligibility. However, Native American students, for each additional $1,000 of aid eligibility, have a 3.24% less chance of being retained. Singell found that with a $1,000 decrease in eligibility below zero there was a 0.14% increase in retention amongst the entire student body. Negative financial eligibility is observed for student's coming from financially well to do families and the correlation Singell observed points to the importance of financial background in the decision to reenroll.

Financial Aid importance is also illustrated by the negative effects such things as private loans (loans obtained from banks that are not subsidized by the federal government) can have on the chance of students reenrolling for their sophomore year at UO. For every $1,000 increase in private loans for an Asian student, we observe a 1.70% decrease in likelihood of retention for the sophomore year. For African Americans, this rose to a 2.07% less likelihood of retention. For White students, this effect was a 1.06% less likelihood of retention to the second year of college; whereas the effects from loans on the Hispanic or Native American student populace were statistically insignificant. In contrast, Professor Singell found no significant impact from a student receiving an unsubsidized loan.

We can further emphasize the effects of finances on student retention behavior by comparing the findings from private loans with those of government subsidized loans. Again, the significance of subsidized loans is statistically insignificant for the Hispanic and Native American student body, as well as the African American student body that reacted negatively to private loans. However, for both the Asian and White students, we find that the effects of subsidized loans are positive and significant. For Asian students every $1,000 of government

subsidized loans yields a 2.70% greater chance of retention; whereas for white students, a $1,000 increase of government subsidized loans there is a 1.42% increase in the probability of retention.

This illustrates that finances are very important in the decision to reenroll, so much so that an unregulated and higher interest rate gained from taking on private loans from places such as banks, can discourage students from continuing at the University of Oregon. For certain financially struggling groups, having government subsidized loans with a much lower and controlled rate of interest, appeared to encourage future attendance.

For scholarships, we see similar positive effects. For every $1,000 in diversity scholarships, Asian students are 2.97% more likely to be retained; additionally, every $1,000 in other scholarships yields a 6.1% greater likelihood of retention. Diversity scholarships are those attained for having certain attributes increase diversity on campus; whereas other scholarships can be gained for various other reasons academic, social, service, etc. For every $1,000 in diversity scholarships, African American students are 4.96% more likely to be retained. In addition we found significant effects from other scholarships as well. For every $1,000 in Dean Scholarships, Native American students are 16.3% more likely to be retained. For every $1,000 in other scholarships, white students are 2.64% more likely to be retained. In a similar univariate study, Singell found that a $1,000 increase total scholarships lead to a 46.5% increase in retention for the entire student body.

The effects of grants vary by race as well. For every $1,000 in grants, Asian students are 5.8% less likely to be retained, while African American students are 4.68% less likely to be retained and White students are 0.97% less likely to be retained. Singell found similar results while examining the entire student body. Grants do not seem to be significant in measuring the

behavior of Hispanic and Native American students in accordance to retention for the sophomore year.

Second Set of Univariate Sophomore Year Retention Regression Results

In the second set of univariate regressions we included controls for hometown community characteristics that may be significant in explaining variations in retention between racial groups. These are additional controls that may be important for explaining varying behavior between racial groups that weren't significant in the previous Singell study. The most significant of these characteristics appears to be the percentage share of white people in the student's community of origin and the percentage of bachelors degrees held by members of their community of origin.

However, given the new set of regressions some variables from the previous regression have lost significance for certain groups and some that were previously insignificant have gained significance. In addition, given the addition of these new variables, the size of the coefficients on all variables has changed.

+ Effects of Hometown Community Characteristics

Other contributing factors to community integration that we can observe come from traits of a student's community of origin. Specifically, we find that the demographics of the community of origin for Hispanic students are statistically significant in affecting retention for Hispanic students at the University of Oregon. For every percentage point increase in the number of white people in the Hispanic student's community of origin, a Hispanic student is 0.37% more likely to be retained to their sophomore year at UO. Whereas white students, for every percentage point increase in the share of white people in the community of origin, the student is 0.16% less likely to be retained to their sophomore year. Thus given a community of

origin whose demographics are such that 90% of those residing there are white, in contrast to a community where 80% residing there are white; a Hispanic student coming from the 90% white community has a 3.7% greater likelihood for retention than one coming from an 80% white community; and a white student given the same community demographics has a 1.6% less likelihood for retention coming from a 90% white community than one coming from the 80% white community.

Another interesting thing to note is the effect to which a more educated community of origin has on an incoming group of freshmen at the UO. For example for every percentage point of the community members (from the community of origin) that have earned Bachelor's degrees, a white student has a 0.16% increase in likelihood to be retained to the sophomore year. The effect is even larger for Asian students, measuring at a 0.28% increase in likelihood for retention to the sophomore year. And it is even greater for Hispanic students, measuring at a 0.76% increase in likelihood for retention. Thus a more educated community is more likely to produce students with a greater likelihood of retention to the sophomore year.

+ Newly Significant Variables

Contact age becomes significant in the second set of regressions for several racial groups, but was previously insignificant without controls for the various community characteristic variables.

Additionally, work study (the level of financial aid assistance the student is eligible to work for) has become significant for Hispanic students. The new regression suggests that for every $1000 in work study eligibility, Hispanic students are 6.76% less likely to be retained for their Sophomore year. This is likely due to the fact that eligibility for work study is determined as well by financial need.

+ Variables That Lost Their Significance

Median household income for the community of origin of Hispanic students loses its significance in the second set of regressions. This is likely due to the inclusion of the community characteristics mentioned above, median household income is itself a community characteristic and is likely correlated with the new indicators.

For the second set of regressions, the significant impact from all variables on Native American sophomore year retention disappears. UO Freshman GPA is significant at the 90% confidence level; however financial aid eligibility, as well as the Dean scholarship are no longer important in determining second year retention for Native American students. This is likely due to the small number of observations that we have for this student group.

Bivariate Sophomore Year Retention Regression Results

We ran one bivariate probit regression to measure marginal effects on sophomore year retention. Overall our Chi^2 test shows that the variables in our bivariate probit model are jointly significant from zero.

+ Academic Effects

The bivariate results show that freshman UO GPA is again significant and important in predicting retention for the sophomore year. Overall freshman GPA at the UO has the marginal effect of increasing the probability of enrollment by 5.15% for a one percentage point increase in GPA.

+ Race and Gender Effects

According to our bivariate regression results, both race and gender are significant in explaining UO sophomore retention rates. A female student, regardless of race, has the marginal effect of being 2.28% less likely to graduate than a male student.

When considering race we use dummy variables to indicate a student's racial group, leaving White out to give us a marginal effect for how other racial groups relate to their White counterparts. Asian students on the margin are 2.98% less likely to be retained to their sophomore year than their White counterparts. Black students are 5.54% less likely to be retained on the margin than their White counterparts. Hispanic students are 7.00% less likely to be retained on the margin than their White counterparts. And Native American students are 6.09% less likely to be retained on the margin than their White counterparts.

+ Financial Aid, Scholarship, and Grant Effects

Our bivariate model shows little significance from the various financial aid levels, in contrast to our univariate model. Essentially the only large effect we see of financial aid in the bivariate model comes from scholarships and grants. On the margin, a one percentage point increase in scholarship awards has a 1.8% increase in the probability of sophomore year retention. Whereas for every one percentage point increase in Grants, on the margin, there is a 0.49% decrease in the probability of retention to the sophomore year.

+ Additional Individual Traits

There were some additional traits in the bivariate regression that seemed to be fairly significant in explaining sophomore year retention rates. The three traits are whether or not the student is a resident, whether or not the student came from a private secular high school, and whether or not the student came from a private religious high school.

We observed that Oregon residents have a 20.07% greater probability of retention on the margin than non residents. We also observed that students coming from a private secular high school are 6.42% less likely to be retained on the margin than those coming from a public high school, and students coming from a private religious high school are 1.95% less likely to be retained on the margin than students coming from a public high school.

Retention: Four Year Retention

In addition to our look at freshman to sophomore year retention rates, we also took a look at four year retention rates. To do this we ran both a univariate regression using interaction variables to measure variations by race, and a bivariate regression to help us get a better look at the marginal effects.

For the univariate regression that we ran, we received a pseudo R^2 was .07. Although many of our variables in the univariate model did not seem to be important in explaining four year retention at UO, we still found some significance amongst some of the various interaction variables.

Univariate Four Year Retention Regression Results

+ Gender and Race Effects

We found, using interaction variables to measure the difference between groups, that gender was only important for Asian students in terms of four year retention. According to our regression model, Asian women are 8.38% more likely to be retained for their fourth year than Asian men.

Additionally, race as a non interactive variable was fairly significant for Black students. According to our results, Black students, all else equal as controlled for in our model, are 68.42% less likely to be retained for their fourth year at UO than White students.

+ Academic Effects

For the most part, the academic variables did not prove to be as significant in determining four year retention across racial groups as they were in determining sophomore year retention.

Overall, it appears that net high school GPA was significant for the student body as a whole. Net high school GPA being the difference between the individual student's GPA and the average GPA of their peer group at their high school. The effect was a 5.69% greater likelihood for every one unit increase in net high school GPA. This obviously shows that high school GPA is a good indicator of overall academic success at UO.

+ Financial Aid, Scholarship, and Grant Effects

Financial aid eligibility also appears to be fairly important in our univariate regression. Financial aid eligibility for the second and third year has a negative impact on the probability of fourth year enrollment. For the sophomore year every $1000 of financial aid eligibility has the effect of decreasing the probability of fourth year enrollment by 0.74% whereas every $1000 of eligibility junior year has the effect of decreasing the probability of fourth year enrollment by 0.39%. Senior year financial aid eligibility has the effect of increasing the probability of fourth year enrollment by 0.87%.

Bivariate Four Year Retention Regression Results

We ran one bivariate probit regression to measure marginal effects on senior year retention. Overall our Chi^2 test shows that the variables in our bivariate probit model are jointly significant from zero.

+ Academic Effects

We found two separate significant effects from UO GPA, the first coming from the freshman year and the second coming from the junior year. For freshman year UO GPA, we actually saw a negative marginal effect. On the margin a one percentage point increase in freshman UO GPA has the effect of lowering the probability of four year retention by 2.13%. This is likely due to the loss of higher achieving students transferring to institutions that better fit their needs. The effect from junior UO GPA is positive, which is to be expected. On the margin a one percentage point increase in junior UO GPA renders a 3.56% increase in the probability of retention to the fourth year.

Net high school GPA is also significant in determining four year retention rates amongst UO students. As the marginal effect of net high school GPA, for a one percentage point increase, renders a 3.81% increase in the probability of retention to the fourth year at UO.

+ Race and Gender Effects

Neither race nor gender proved to be significant in predicting four year retention rates amongst UO students in our bivariate regression model.

+ Financial Aid, Scholarship, and Grant Effects

Financial aid proves to be important in four year retention rates according to our bivariate regression model, in that positive financial aid eligibility, as well as loans and work study seem to significantly impact retention rates.

For a one percentage point increase in financial aid eligibility for the sophomore year there is a marginal effect of decreasing the probability of four year retention by 0.50%; whereas for the junior year aid eligibility tends to decrease enrollment probability by 0.27% on the margin. However, financial aid eligibility for the fourth year has a marginal effect of increasing fourth year retention by 0.53%.

For loans, we took the average amount given over the four years of enrollment. A one percentage point increase in average subsidized loans has the marginal effect of increasing the probability of fourth year enrollment by 1.98%. A one percentage point increase of average unsubsidized loans has the marginal effect of decreasing the probability of fourth year enrollment by 1.04%.

Work study also proves to be significant in determining fourth year enrollment in our bivariate probit model. We also took the average of work study awarded to the student over the four years observed. On the margin, for a one percentage point increase of work study awarded there was an effective decrease of 3.99% in the probability of fourth year retention.

+ Additional Individual Traits

Whether or not the student is a resident of Oregon is significant in determining retention rates. We found that the marginal effects of a student being a resident rendered a 7.31% increase in the probability of fourth year retention.

Conclusion

In conclusion we did indeed find varying effects from various factors on retention rates for different racial groups. As expected, it appears that academics are fairly important in determining retention rates for all students, though the scale to which they affect different racial

groups differs. Hometown demographics seem to be more important for Hispanic students, whereas for Black students, financial factors are greater indicators. Asian students also seem to be fairly responsive to financial indicators. And White students respond to nearly every variable, though often to a lesser degree.

What does this all suggest? Perhaps it suggests that certain policies should be taken to encourage some racial groups when it might not be effective for another. Really our goal with this investigation has been achieved, as we sought to find and document the various differences and similarities observed between racial groups in regards to retention rates at UO.

The main problem with our study is simple and straight forward: we are missing a great deal of the variables that likely have some significant effect on retention. For example, whether or not the student lived in campus housing their first year, social groups and organizations the student was a part of, the amount a student worked (though we have work study award it is not as accurate), and various other factors that likely influence a student's choice to reenroll.

Despite lacking some potentially significant factors, we have found a great deal of significance in many of our explanatory variables, and hopefully have helped, in part with Singell's greater studies of retention, to explain variations in retention levels by race at the University of Oregon.

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