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Can't Get Here from There: The Decision to Apply to a Selective Institution

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Students from low-income families are greatly underrepresented at selective colleges and universities in the United States. In an attempt to increase applications from low-income students, some institutions have developed programs involving increased recruitment of and more attractive financial aid packages for students from low-income families. However, relatively little research has looked at the factors that are important in the college application decision-making process, and in particular how the importance of some factors may be different for low-income students. This paper uses data from the *National Education Longitudinal Study of 1988* and the *National Longitudinal Survey of Youth, 1997 cohort* to analyze the factors influencing students' college application decisions, with a focus on the decision to apply to a selective four-year institution. We analyze how the influence of distance from a student's home during high school to a selective college or university and average tuition levels at selective institutions located nearby vary with the a student's family income. Our results show that the further a student lives from a selective college, the less likely they are to apply to one, and this effect seems to be stronger than that of average tuition levels in the student's state. Although the effect of distance does not differ for low-income students, they are most heavily impacted due to the geographic mismatch of low-income students and selective institutions. Personal, family (in particular, parent's education) and high school characteristics also prove to be very influential when students are deciding whether or not to apply to a selective institution.

Keywords
higher education, income, selection, admissions, tuition

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Students from low-income families are greatly underrepresented at selective colleges and universities in the United States. In an attempt to increase applications from low-income students, some institutions have developed programs involving increased recruitment of and more attractive financial aid packages for students from low-income families. However, relatively little research has looked at the factors that are important in the college application decision-making process, and in particular how the importance of some factors may be different for low-income students. This paper uses data from the *National Education Longitudinal Study of 1988* and the *National Longitudinal Survey of Youth, 1997 cohort* to analyze the factors influencing students' college application decisions, with a focus on the decision to apply to a selective four-year institution. We analyze how the influence of distance from a student's home during high school to a selective college or university and average tuition levels at selective institutions located nearby vary with the a student's family income. Our results show that the further a student lives from a selective college, the less likely they are to apply to one, and this effect seems to be stronger than that of average tuition levels in the student's state. Although the effect of distance does not differ for low-income students, they are most heavily impacted due to the geographic mismatch of low-income students and selective institutions. Personal, family (in particular, parent's education) and high school characteristics also prove to be very influential when students are deciding whether or not to apply to a selective institution.

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1. Introduction

Although access to higher education has generally improved in the last few decades, low-income students are still greatly under-represented at our colleges and universities. The average proportion of Pell Grant recipients in the undergraduate student body, a rough proxy for the share of low-income students at our colleges and universities, is very low. For public universities, the average share is 19%, although it has been calculated to be as high as 27% (Heller, 2004; Ehrenberg, 2006). The situation is especially severe at private four-year institutions, with the average share of low-income students as low as 13% (Heller, 2004). An analysis of family income levels for students at the COFHE colleges and universities, a consortium of 28 selective private institutions, shows that only 10% of the total student bodies came from families in the bottom two quintiles of the family income distribution (Hill, Winston & Boyd, 2005).

This under-representation of low-income students has important implications for their future earnings. The college wage premium has remained fairly large, and for some groups has been growing over the last few decades. Most studies agree that there is a premium associated with receiving a degree from a more elite institution (Brewer, Eide & Ehrenberg, 1999; Long, 2006)[1]. In fact, the gains of graduating from a higher quality school may be higher for low-income students (Behrman, et al, 1996; Dale & Krueger, 2002). There are great gains to be realized from increased college attendance of low-income students, especially at more selective institutions.

[1] The exception being Dale & Krueger's 2002 paper finding that an increase in selectivity of college attended is not necessarily associated with a corresponding increase in wages. However, they do find that students attending higher expenditure per student institutions receive higher post college earnings.

In an effort to address this issue, a number of colleges and universities have introduced programs designed to target low-income students. These programs developed by both public and private elite institutions such as Harvard, Yale, Princeton, the University of Virginia and the University of North Carolina among others, are varied in their approach. However, most have at their core a promise to cover most or all of the school's tuition for students with family incomes below a certain cut-off, often $50,000. These selective institutions recognize the need to target low-income students at the early stages of the college choice decision making process. For many, the programs include attempts to increase awareness of the institution and the opportunities available for low-income students. It is the hope that an increase in awareness will lead to a larger applicant pool of low-income students at selective institutions and therefore higher representation in the matriculating classes. Preliminary results from Harvard suggest that while effects of their program are so far modest, it does seem to be succeeding[2].

To insure that these programs are able to successfully target low-income student populations, we have to examine why we currently see so few low-income students at the more elite institutions. According to a 2005 study by Winston and Hill, there is a sizeable pool of high-ability, low-income students in the United States (as measured by test scores and reported family incomes). But this says nothing about the geographic distribution of these students. Many of the more elite institutions in the U.S. are clustered in the Northeastern states, while it seems likely that many of the low-income students that could aspire to attend these colleges are located in geographically distant states. This population of students may be discouraged by distance from applying to or attending colleges, due to both financial and non-monetary costs. Therefore, it is important for us

[2] For an in-depth analysis of the effects of this program see Avery et al, 2006.

to understand the extent to which distance and location matters to low-income students when they are deciding whether or not to apply to a selective college or university. Once we have an estimate of this, we can better inform policies aimed at increasing representation of low-income students.

This paper adds to our understanding of the factors that are important during the college application process, and specifically how the influence of these factors can differ by income and over time. We employ two national longitudinal datasets that allow us to control for many background characteristics of the student and their parents. After controlling for personal, family and high school characteristics as well as characteristics of the zip code in which the student resided during high school, we are able to isolate the influence of distance to selective schools and local tuition levels of selective schools on the decision whether or not to apply to a selective college or university. We then examine whether these effects differ for low-income students.

We find that the further a student lives from a selective college or university, the less likely they are to apply to a school of this type. However, this effect is no longer significant in the more recent sample of data that we analyze, due possibly to its relatively small sample sizes. This effect does not seem to be any different for students from low-income backgrounds. In addition, students from regions with very few selective colleges are significantly less likely to apply to a selective institution. High local tuition levels at selective colleges and universities do not seem to discourage students from applying to selective institutions in the earlier sample. The more recent data shows that as average tuition levels at local selective institutions increases students are slightly less likely to apply to a selective college. We also show that median

neighborhood income, high school quality, and the educational attainment of parents are very important predictors of whether a student will apply to a selective institution.

This paper proceeds as follows: Section 2 provides a brief overview of previous research in this area, Section 3 discusses the data we employ and our methodology, as well as providing descriptive statistics. Section 4 discusses our results and how they may be helpful to colleges and universities interested in increasing their representation of low-income students, and in Section 5 we conclude.

2. Literature

There are several studies that have focused on the college application process and an extensive review of many of the earlier studies can be found in Hossler et al (1989). Although results are varied on how a student's socio-economic status can affect his or her application decision the most common finding is that students from low socioeconomic backgrounds are less likely to apply to high status schools. Both educational attainment of parents, as well as parental involvement and encouragement have been found to be positively correlated with the likelihood of application to more selective schools. As with the studies of where to attend college, many application studies also have found that institutional characteristics, such as location, size, distance from home and reputation are very important in a student's decision of whether to apply.

In his 2001 paper, Toutkoushian looks specifically at the application decisions of seniors at New Hampshire high schools. He constructs a choice set as the list of schools to which each student chose to send their SAT scores. The study focuses on a small

sample of schools in New Hampshire and surrounding states that many students apply to or attend. His results suggest that low levels of parental income and educational attainment do not discourage students from applying to the more selective schools in the sample. However, there were a small number of selective schools in the sample, with very little geographic variation.

Two recent studies looked at the factors influencing applicants to specific institutions. The work of Desjardins et al. looks at applicants to a large public university in the Midwest, using ACT scores of in-state residents as well as residents of surrounding states to estimate a logit model for the decision to apply (1999). Their results suggest that students from low and middle income families are more likely to apply to the institution, a high quality public university, than students from high income families. Characteristics of students' early educational experience, as well as those of the area they grew up in were important in influencing the college application decision. In a similar study, Weiler uses SAT data to look at students applying to a selective private institution in a suburban location (1994). He finds that both parental income and educational attainment are positively correlated with the probability of applying to the institution.

A more recent study by Turley uses NELS:88, a nationally representative dataset of high school seniors, one of the datasets we use in this paper, to examine how college proximity can influence the type of college to which students apply (2006). She finds that as the number of four-year colleges within a pre-determined radius of a student's home increases, the student is more likely to apply to a four-year college. Most interestingly, she finds that the influence of a nearby four-year college does not only increase the likelihood the student applies to this specific college, but also to any four-

year college at all. Turley suggests that these results show that distance is important not only for convenience reasons, but also perhaps in creating awareness of college opportunities and a college-going mentality.

A similar study looks at the importance of proximity of selective colleges in the college matriculation decision for low versus high income students, using data from the High School and Beyond Survey (Do, 2004). Low-income students are found to be more likely to attend a higher quality college if they live near a good public university, with mixed results for the impact of living near other types of elite institutions.

This study will address the question of what impact distance to colleges and universities has on the type of college a student will apply to, and also what personal and family characteristics play a significant role in this decision. Our work builds on Turley's 2006 study, by controlling for characteristics of the student's background, and focusing on the decision to apply to a selective college or university. We will investigate how important the distance a student lives from a selective college or university is when that student decides whether or not to apply to a selective institution. In particular, we will focus on how this effect may be different for students from low-income backgrounds.

There are a number of reasons that distance should be important for all students, and perhaps matter more for low-income students. Students may want to attend college (and therefore will apply to colleges) closer to home for convenience and travel cost reasons. Attending a school closer to home can allow students to live at home, or students may need to help out at home, maybe financially or perhaps by helping to care for another member of the family. Close family ties, or a desire not to leave their home

area and therefore comfort zone, may also influence students to apply to and attend colleges close to home. The financial reasons for attending a college closer to home may be more pressing for students from low-income families. There may also be a higher cost of assimilation to the environment of a selective institution for low-income students. For example, it may involve a new wardrobe, or decorations and necessary accessories for a shared dorm room. It is also possible that living in close proximity to a selective college could create an increased awareness of the opportunities available at this type of institution and therefore would increase the probability that students would apply to a selective college anywhere, not necessarily close to home. Either or both of these pathways may be playing a part in the college application decision-making process. By investigating what factors play a role, and how their importance differs by income, we can hopefully shed some light on what issues need to be addressed in order to increase representation of low-income students at elite colleges and universities.

3. Data & Methodology

We use two nationally representative data sets to investigate our question. The two datasets concern students that were applying to college about a decade apart, allowing us to look at how the influence of different factors in the college application process has changed over time. The first dataset we utilize is the *National Education Longitudinal Study of 1988 (NELS:88).* The National Center for Education Statistics developed this study to survey students in eighth grade in 1988 and then to follow them closely throughout their secondary and post-secondary educations. After the original

questionnaire administered while the students were eighth graders, follow-up surveys were given in tenth and twelfth grades as well as after completion of high school. For this study we have focused on respondents from the second follow-up, a sample of 16,120 students in the twelfth grade in 1991-1992. In addition to information on personal characteristics, the restricted-use data allows us to identify the names and unitids of the two colleges and universities students applied to during their senior year of high school that they think they are most likely to attend, if any. NELS:88 also includes several composite standardized tests that were administered to the students during the second follow-up. We have information on family income, structure and size and the highest level of education attained by either parent from surveys administered to a parent of each student during the second follow-up.

Data on high school characteristics was derived from surveys completed by a high school administrator as well as additional information from the QED (Quality Education Data) and the CCD (Common Core of Data). This includes the high school zip code which is used as a proxy for the student's residential zip code during their senior year[3]. The NELS:88 restricted-use data also includes information on racial composition and income distribution of the student's zip code derived from Census data.

The second dataset we use for our analyses is the National Longitudinal Survey of Youth 1997 (NLSY97). The NLSY97 consists of nearly 9000 youths who were born in the years 1980-1984. The youths were 12-17 when first interviewed in 1997, and have had annual in-person interviews ever since. In 2003 (round 7), the NLSY97 added a section on college choice for youths born in the years 1983 and 1984. In the college

[3] The actual residential zip codes are not easily obtained, and in her 2006 paper Turley found that estimations using high school zip code as a proxy for residential zip gave qualitatively similar results as when using actual residential zip code.

choice section, youths report on each college application cycle. The survey collects key information on the name of each college applied to, whether the youth was admitted, and any financial aid. The section was repeated for the same two birth years in 2004.

Through the use of the NLSY97 geocode CD and confidential data available to researchers who come to the Bureau of Labor Statistics, we have access to college unitids, residential zip code, state, and county for each survey year, and high school id codes. We use parent reports of household income from the round 1 NLSY97 parent questionnaire. Family structure, household size, and biological mother's education are also from round 1. Race and ethnicity are defined as three mutually exclusive groups: non-black and non-Hispanic, black and non-Hispanic, and Hispanic. The latter two groups are oversampled in the NLSY97. ASVAB test scores are available for about 80 percent of the NLSY97 sample. From the summer of 1997 through the spring of 1998, the computer-adaptive version of the ASVAB was given to NLSY97 youths. A composite measure of math and verbal aptitude was formed from four of the subtests. This aptitude measure is similar to the Department of Defense's Armed Forces Qualification Test (AFQT) score available in the NLSY79. NLSY97 survey personnel internally normed these tests and created the composite math and verbal aptitude percentile score (0 (lowest) to 99) provided in the NLSY97 data set. High school characteristics are obtained from the QED (Quality Education Data). In addition, we merge in characteristics of the respondent's high school county of residence from the County and City Data Book.

We use the college unitid to merge in information from IPEDs and the College Board's Annual Survey of Colleges about selectivity and other characteristics of the

colleges to which respondents apply. Zip code for each respondent's senior year of high school is used to merge in variables that describe distance to nearest two-year, four-year non-selective and four-year selective colleges and average tuition levels within the state for each type of school. Four-year college selectivity is defined using data on median combined SAT scores for the incoming freshman classes of 1990 and 2000 for NELS:88 and NLSY97 respectively[4]. Four-year colleges or universities with median combined SAT scores of 1200 or greater are considered to be selective.

3.1 Descriptive Statistics

Descriptive statistics for the NELS:88 sample are shown in Table 1, with the sample separated by type of school applied to: two-year, four-year non-selective or four-year selective. Table 2 contains a similar display of statistics for the NLSY97 sample. For both samples we see that both Black and Hispanic students make up a much smaller percentage of the group who applied to a selective school than they do of the entire sample. Instead, they seem to make up a much larger share of the sample that applied to a two-year school or none at all. In the NELS:88 sample which contains an Asian category for race, we see that Asian students are disproportionately represented in the sample of students applying to selective schools (in terms of their representations in the overall sample).

There is a clear pattern regarding parents' educational attainment and the type of college to which their child applies. The group of students applying to two-year schools or less mostly consists of students whose parents have only some college or less, whereas

[4] SAT scores from 1990 were converted to the recentered scale using the crosswalk provided by the College Board at http://www.collegeboard.com/about/news_info/cbsenior/equiv/rt027027.html

the students applying to four-year colleges, both selective and non-selective, have parents with college degrees or higher. In particular, 26 percent of the students who applied to a selective college have at least one parent with a PhD, compared to only 6% of the entire sample. The students applying to selective schools are more likely to come from a home with both biological parents and smaller families than the other groups. These numbers illustrate just how important a student's family background is when they are deciding to what type of college to apply.

Both Tables 1 and 2 clearly show the under-representation of students from low-income families in the selective college applicant pool. We define a family as low-income if they reported total incomes of less than $35,000 for the NELS:88 sample and less than $40,000 for the NLSY97 sample[5]. In the NELS:88 sample, although almost 51% of the students come from low income families, only 26% of students who applied to a selective college were from a low income background. Data from the NLSY97 looks very similar, with 47% in the entire sample and 22% of the students applying to selective schools from low income families. Students from low income families have fewer resources available for their education, and therefore are often not as well prepared as a similar student from a high income family and this could be driving the numbers that we see here. A more rigorous analysis is required to determine whether students from low-income families systematically differ in their decision of whether to apply to a selective college.

[5] Our low-income cut-offs are intended to mimic those created by selective institutions in their programs to increase access for low-income students. The NELS:88 data does not include a continuous measure of income, while the NLSY97 data does. Accounting for inflation, the low-income cut-offs are approximately equal for the two samples.

Students from the NELS:88 sample who applied to a selective college attended high school in states with higher average tuition at all three types of institutions. Similarly, the students in the NLSY97 sample who applied to a selective college are from states with higher average tuition at two-year and four-year non-selective colleges. However, in the NLSY97, this group consists of students from states with lower average four-year selective tuition. Students that applied to a selective college live closer on average to all three types of schools than do students who applied to another type of school. It is important to note that although students live on average less than 25 miles from a two-year or four-year non-selective college, students live on average at least twice this distance from a selective college. This reflects the relative scarcity of selective colleges and universities in the U.S. and their geographic location. Within the sample of 127 selective colleges during the time period that the students of the NELS:88 dataset were applying to college, 50% are located in the Northeast[6], and if we include California, this percentage increases to 60%. The numbers look very similar for the NLSY97 sample. There are slightly more selective colleges available to these students (162), 43% of which are in the Northeast and 50% of which are in the Northeast or California.

Even more marked is the difference in average distance to a selective college by income level. In the NLSY97 sample, students live on average 79 miles from a selective college and low-income students live on average 86 miles from a selective college. In the NELS:88 sample, of the students from low-income backgrounds, only 15% attended high school in the Northeast (26% if we count California). This leaves roughly 75% of the nation's low-income students in states in the middle of the country where less than 40%

[6] Northeast is defined as the following states: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.

of the selective colleges were located. To show further evidence that distance is an important factor for low-income students in their choice to apply to a selective college, consider the following statistics. Of the students in the NELS:88 sample from low-income families and that ultimately applied to a selective college, 36% are from the Northeast, and 50% from the Northeast plus California. As a reference, 28% of students from families with reported incomes of $100,000 or greater attended high school in the Northeast, while 39% of students who applied to a selective university and had family incomes greater than $100,000 attended high school in the Northeast. These numbers suggest that distance may be important for all students. However, the difference in applications to selective institutions by region is most apparent for low-income students. Although only a small percentage of low-income students live in the Northeast, a region rife with selective colleges, they disproportionately represent the low-income students applying to selective colleges.

3.1 Empirical Model

We estimate a multinomial logit model with four possible outcomes. The category of students who applied to no college, or applied to a less than two-year college is considered the base case. The other three mutually exclusive categories are groups of students who applied to at least one selective college, students who did not apply to a selective college but did apply to a four-year college, and lastly, students who did not apply to a four-year college but did apply to a two-year college.[7]

[7] The NELS:88 questionnaire only solicited the names of the two colleges a student applied to that they felt they were most likely to attend if accepted. This may introduce a systematic measurement error into the dependent variable if some students who applied to a selective college did not list it, either because they felt it likely they would not be accepted, or they would not attend even if they were accepted (possibly for

The type of college *j* that each student *i* applies to is a function of student *i*'s characteristics. The explanatory variables can be broken into four categories: personal characteristics, family characteristics, high school characteristics and characteristics of the residential zip code (or county for the NLSY97). The first category contains information on the student's gender, race and test scores. The second contains variables regarding family income, parental educational attainment and family structure and size. High school characteristics include type of institution (private, catholic or public), racial composition of the twelfth grade class (or high school for the NLSY97) and percent of the school receiving free or reduced price lunch. This last variable is used as a rough measure of the income distribution at the student's high school.

In addition, in the NELS:88 estimation we include a variable reported by the high school administrator giving the percentage of graduates in the past sampling period (when the students were in 10^{th} grade) who attended a four-year college. This variable is intended to measure a type of peer effect, and to allow us to examine the importance of a college-going atmosphere at the high school level. Finally, zip code or county specific characteristics provide information on area racial composition and income distribution, as well as a description of the urbanicity of the environment. In addition, this category contains fixed effects for region of the country and the distance and tuition variables of particular interest in this study. In order to investigate the relationship between income group and the influence of distance and tuition variables, we allow the influence of the

financial reasons). The latter case is of more concern to us because it may be more likely to occur for low-income students. However, in the NLSY97 sample, which had more complete data on college applications, students that applied to selective institutions on average applied to about 3 colleges in total. This is a fairly small number, and suggests that we are likely capturing the choice set for the NELS:88 respondents fairly well.

distance to each type of school and average within-state tuition levels of each type to differ by income group.

4. Results

The partial probabilities from a multinomial logit estimation for the NELS:88 sample are shown in Table 3 and results for a similar estimation for the NLSY97 dataset are shown in Table 4[8]. The parameter estimates used to calculate the partial probabilities can be found in the Appendix. Many of the results for the estimation using the NLSY97 sample look very similar to those of the NELS:88 estimation, but the coefficients and marginal effects are less likely to be statistically significant; this is probably due to the much smaller size of the NLSY97 sample. In particular, only 223 students in the NLSY97 sample of 2,668 applied to a selective school. Overall, with only a couple of exceptions that we will discuss below, the results from the two datasets are qualitatively very similar despite the lack of statistical significance of the NLSY97 estimates.

It is immediately obvious that personal and family characteristics have a very significant influence on a student's decision to which type of college to apply. Both gender and race are important. Female students are more likely to apply to a two-year or four-year selective college than males are, but are less likely to apply to a non-selective four-year school in the NELS:88 sample. However, in the NLSY97 results we see that female students are now more likely to apply to a non-selective four-year school than

[8] Partial Probabilities for the NELS:88 sample were calculated by calculating the effect for each observation and taking the average for the sample. Marginal Effects for the NLSY97 sample reported here were calculated by evaluating at the means of the independent variables. Future drafts will include partial probabilities for the NLSY97 data calculated as they were for NELS:88, and the NLSY97 results shown in Table 4 should be compared to the NELS:88 results with caution.

males, and there is no effect of gender on application to two-year colleges or selective institutions. In the NELS:88 results, Asian and Black students are more likely than white students to apply to four-year schools, dramatically so for Asian students. Both Asian and Black students are less likely to apply to a two-year school. Hispanic students are less likely to apply to a two-year college or a non-selective four-year institution and slightly more likely to apply to a selective college than a white student. However, the magnitude of this effect (3.62 percentage points) is much smaller than that for Asian students (10.14 percentage points) or Black students (5.31 percentage points). In contrast, in the NLSY97 Hispanic students are slightly less likely to apply to selective colleges, and the effect is much smaller (0.8 percentage points).

Looking at both sets of results, students that come from families defined as low-income are not any less likely to apply to any type of college. All else equal, low income students are no less likely than high income students to apply to selective colleges in either sample. This finding suggests that although we see very few low-income students at selective colleges, they are not discouraged from applying due strictly to their family income. Instead, it seems that there are other factors that are highly correlated with income that are generating the under-representation. Students from low-income families are often less well prepared educationally, and you can see that students with lower test scores or high school grade point averages are significantly less likely to apply to selective institutions. Low-income students are also more likely to come from families with lower levels of educational attainment, another factor that plays an important role in the decision to apply to a selective college.

Perhaps the most striking result is the impact of an increase in parent's education level. In the NELS:88 dataset we see that an increase from a high school degree or less to a Bachelor's degree increases the probability a student will apply to a selective institution by 6.5 percentage points. An increase for a parent from a high school degree or less to a Doctorate or the equivalent leads to a 12 percentage point increase in the probability that the student will apply to a selective college. In the NLSY97 sample we see that an increase of mother's education by one year leads to a 0.25 percentage point increase in probability that a student applies to a selective college. These are all very large effects and they underscore the importance of family characteristics in the college application decision. In addition, in the NELS:88 sample, as parent education increases, it seems to increase the substitution away from non-selective four-year colleges into selective colleges. Families are a very important source of information for students on colleges and to which type a student should be applying.

Another valuable source of college information is the student's high school. Students from private and Catholic high schools are far more likely to apply to a selective institution. This suggests that in addition to perhaps doing a better job of preparing students for a selective college academically, these high schools are providing the needed information about these institutions. This may also be an important factor in the under-representation of low-income students at selective institutions. Low-income students are far less likely to attend a private or Catholic school. In the NELS:88 sample, 3% of students from low-income families attended a private high school while 42% of students from families reporting incomes greater then $100,000 graduated from private high schools. Our results show that private high schools are an important source of

information about selective institutions for students choosing a college, one that is not available to the vast majority of low-income students. In addition, students that attended high schools with larger percentages of past students attending four-year institutions were also more likely to apply to selective institutions indicating the importance of a college-going atmosphere during the student's high school experience.

The community a student groups up in also has a strong influence on their college application choice. Students from zip codes with higher median incomes are far more likely to apply to a selective institution. Education and income levels are highly correlated, suggesting that selective institutions that want to increase their representation of low-income students should focus on communities with low average parental education, as well as low family incomes. On average, the students from this type of background don't seem to be getting enough information on selective institutions from their high school or their parents, and would benefit from increased attention from the institutions themselves.

We find mixed results for the effect of within state average tuition levels for each type of school in the NELS:88 data. Students that live in states with higher average two-year tuition are more likely to apply to four-year schools and less likely to apply to two-year schools. In a similar fashion, students living in states with higher average tuition at non-selective four-year schools are more likely to apply to two-year or selective four-year colleges and less likely to apply to a non-selective four-year institution. However, there seems to be very little effect of state average tuition levels at selective schools on the probability of applying to any type of college. None of these effects of average tuition levels are different for low-income students, indicating students from all income

background respond in the same way to their local tuition environment. Although we see very little effect of tuition levels in the NELS:88 sample, the effect of local selective tuition levels is significant in the NLSY97 sample. As the average selective tuition level increases, students are less likely to apply to a selective institution. It is important to remember that we have not measured the effect of tuition levels at the actual selective schools the students have applied to, or the actual tuition they would pay if they attended the institution, but rather the effect of local tuition levels. In particular, these measures do not account for any financial aid that students may receive if they attend a particular institution. This should indicate a measure of the tuition environment the student is surrounded by at the time she is deciding to which type of school to apply. Our results suggest that the importance of the selective tuition environment a student is in during high school may be increasing slightly in recent years, as shown by the significant effect in the NLSY97 data. However, this effect is still relatively small, with an increase of $1,000 in average selective tuition levels associated with a 0.22 percentage points decrease in probability of applying to a selective institution.

A quick look at Tables 3 and 4 reveals that the distance to each type of college has a significant influence on to which type of school a student applies. As the distance to the nearest two-year school increases, or put another way, the further a student lives from a two-year institution, the less likely that student is to apply to a two-year school. If a student lives 10 miles closer to a two-year college, they are 0.6 percentage points more likely to apply to a two-year college, or 0.2 percentage points for the NLSY97 sample. For the other two distance measures, the effects are allowed to differ for low-income students. For all students, living further away from any non-selective four-year school

increases the probability of applying to a two-year school, but this effect is slightly less for low-income students in the NELS:88 sample. The substitution between colleges as distance increases appears to mostly be occurring between two-year colleges and non-selective four-year colleges.

Students that live farther away from a selective school are less likely to apply to this type of school. We see the same pattern in the NLSY97 results although the effect is not significant. However, the sample size for the NLSY97 is very small, and there is likely very little geographic variation from which to draw our results. Therefore, it is uncertain whether the effect of distance to a selective institution is actually not different from zero, or if the sample size is just too small. From the NELS:88 sample we see that low-income student are not any more or less sensitive to distance to selective institutions. A student that lives 100 miles closer to a selective institution is 1 percentage point more likely to apply to a selective school. These effects are small in comparison to the effects of high school type and parent education, but they are significant findings.

Students may be sensitive to distance for both convenience and cost reasons. They may want to attend a college closer to home in order to help out at home, perhaps with younger siblings or elderly relatives, or possibly just to avoid high travel costs. Going away to college is the first big step most students make, and they may just want to remain near their families and support systems during such a big change. This story suggests that students living closer to a selective college are influenced to apply to that nearby college. A second story suggests that living near a selective college expands the student's knowledge of opportunities available at colleges in general and selective colleges in particular. It could be argued that selective colleges are more visible than

non-selective colleges in areas where they are located, and therefore, perhaps more effectively, may increase awareness of the opportunities available at selective colleges. Students living closer to selective colleges would then be influenced to apply to a college anywhere, not necessarily to the nearby college. It is difficult however to tease apart the effects of distance into these two pathways. Instead it seems likely that both play a role. Programs sponsored by selective colleges increasing awareness of college opportunities could have a positive effect on applications from low-income students to all selective institutions, not just the colleges responsible for the programs.

Although obviously the region fixed effects are picking up many different region-specific trends in college application behavior, they also help to illustrate how important location is. Students from the Midwest, West and South are significantly less likely than those from the Northeast to apply to a selective institution. These are the three regions of the country that have very few selective colleges and relatively large percentages of low-income students. However, these effects seem to be much smaller in the NLSY97, suggesting that the regional differences in selective institution application behavior have decreased over time. In addition to the other factors that we have found to be highly important, the region of the country in which a student attends high school has a significant influence on the college application decision.

5. Conclusions

In this paper we investigate what factors are important when a student is deciding what type of college to apply to, and specifically whether or not to apply to a selective

college. We examine the influence of distance to and average tuition levels at selective colleges and universities on students' decision whether or not to apply for admission, and how the importance of these factors may differ for low-income students. We use two nationally representative datasets, NELS:88 and the NLSY97 to estimate a multinomial logit model. We model four possible application outcomes, apply to no school, apply to a two year, apply to a four-year non-selective college, or apply to a four-year selective college, as a function of a student's personal, family, high school and zip code characteristics.

Distance to a selective college has a significant impact on whether a student will apply to a selective school. As the distance to the closest selective college increases, students are less likely to apply to this type of school, all else equal, although the effect is insignificant in the NLSY97 sample. Low-income students do not seem to be any more sensitive to distance in either sample. Parent's education level however, is a very important predictor of whether a student will apply to a selective institution. Students from families with low levels of education are significantly less likely to apply to a selective institution.

Our results show that distance plays a very important role in any student's application decision. This has the largest effect on low-income students because on average they live farther away from selective colleges and universities. Low-income students make up very large percentages of the Midwest, West and South, regions for which we have identified as having students with significantly lower probabilities of applying to selective institutions. This is a particularly significant finding, as the majority of selective institutions are found in the Northeast, a region with relatively few

low-income students. The importance of distance in the college application decision and the geographic mismatch of low-income students and selective institutions is likely a leading factor in why we see significant under-representation of low-income students at selective institutions.

There is a wage premium associated with attending a selective college or university, and evidence suggests that this premium is larger for students from low-income backgrounds. It is important that well qualified students who would do well at a selective college apply to this type of school in order to take advantage of the opportunities available to them. Programs that have been developed recently by selective institutions are having some success at increasing representation of low-income students at some of our nation's selective colleges. The findings in this paper suggest that the financial aspect of college may not be the only hurdle for low-income students that should be addressed. The further a student lives from a selective school, the less likely they are to apply to one. Students in regions outside of the Northeast are particularly less likely to apply to a selective institution. These results underscore the importance of focusing on making it more convenient and inexpensive for low-income students to travel further distances for school. In addition, programs will have more success if they include aspects that focus on increasing awareness of the opportunities available at selective colleges for students in traditionally low-income, low parental educational attainment areas, and those that do not have a nearby selective college.

Table 1: Descriptive statistics for NELS:88 for entire sample and by type of college applied to.

	All	Did Not Apply	Two-Year College	Non-Selective Four-Year College	Selective Four-Year College
Personal Characteristics					
Female	0.501	0.457	0.573	0.543	0.500
Asian	0.074	0.048	0.053	0.076	0.161
Black	0.093	0.107	0.064	0.100	0.050
Hispanic/Other	0.129	0.187	0.150	0.093	0.058
Std. Test Score	51.927	46.989	47.769	54.903	62.479
Family Characteristics					
Low Income	0.509	0.636	0.601	0.431	0.265
Some College.	0.348	0.393	0.395	0.358	0.157
College	0.156	0.094	0.107	0.203	0.241
Masters	0.100	0.039	0.047	0.132	0.234
PhD	0.065	0.014	0.018	0.064	0.258
Family Size	4.261	4.276	4.219	4.274	4.189
Both Bio Parents	0.576	0.480	0.557	0.628	0.719
Bio Mom only	0.219	0.257	0.221	0.203	0.156
Bio Dad Only	0.041	0.050	0.038	0.037	0.034
High School Characteristics					
Private	0.088	0.021	0.016	0.081	0.377
Catholic	0.056	0.029	0.041	0.083	0.073
% Asian Grade 12	3.926	3.540	3.379	3.683	6.037
% Black Grade 12	10.858	11.653	8.715	11.438	8.238
% Hisp/Other Grade 12	11.322	14.351	12.613	9.767	7.266
% '89 Grads at 4-yr Coll.	48.044	38.214	38.815	51.105	72.997
% Reduced Price Lunch	20.022	24.186	22.492	18.799	9.193
Zip Code Characteristics					
Urban	0.289	0.256	0.211	0.300	0.434
Suburban	0.405	0.399	0.409	0.402	0.444
% Asian Zip	2.713	2.524	2.420	2.621	3.556
% Black Zip	8.940	8.669	6.410	9.791	8.927
% Hisp/Other Zip	4.341	5.580	4.782	3.555	3.010
Ln(Median Income)	10.313	10.239	10.263	10.317	10.567
Location & Tuition Variables					
Avg. Two-Year Tuition	1.977	1.768	1.989	2.037	2.345
Avg. Non-Selective Tuition	5.197	4.951	5.402	5.187	5.746
Avg. Selective Tuition	8.642	8.060	8.870	8.630	10.041
Dist Two-Year	13.990	15.157	13.903	14.556	7.937
Dist Non-Selective	13.956	15.885	17.318	13.288	6.820
Dist. Selective	114.121	132.592	117.091	114.114	55.092
Midwest	0.265	0.252	0.275	0.286	0.206
West	0.207	0.262	0.224	0.170	0.156
South	0.336	0.373	0.283	0.340	0.257
N	15091	5128	1654	6446	1863

Note: All tuition variables are in thousands of dollars. Means of background variables exclude any missing observations. In regression analyses that follow, a missing variable dummy variable is set to one, and the missing values are set to zero. Low Income refers to a family income of less than $35,000. Selective is defined as having median combined SATs of 1200 or greater.

Table 2: Descriptive Statistics for NLSY97 for entire sample and by type of college applied to.

	All	Did Not Apply	Two-Year College	Non-Selective Four-Year College	Selective Four-year College
Personal Characteristics					
Female	0.502	0.441	0.508	0.544	0.552
Black	0.241	0.247	0.252	0.254	0.135
Hispanic/Other	0.198	0.252	0.252	0.139	0.090
Math/Verbal percentile Score	50.242	36.333	40.861	60.534	79.713
High School GPA	2.959	2.633	2.794	3.209	3.586
Family Characteristics					
Low Income	0.474	0.598	0.541	0.376	0.215
Biological Mother's years of education	12.841	11.838	12.208	13.694	14.732
Family Size	4.566	4.701	4.612	4.452	4.395
Both Bio. Parents	0.558	0.472	0.520	0.612	0.776
Bio Mom only	0.248	0.286	0.267	0.229	0.121
Bio Dad Only	0.028	0.035	0.027	0.026	0.009
Bio Parent plus step-parent	0.132	0.161	0.150	0.106	0.085
High School Characteristics					
Private	0.022	0.019	0.011	0.021	0.063
Catholic	0.042	0.009	0.030	0.060	0.126
log(school size)	7.029	6.990	6.992	7.058	7.186
Student/Teacher Ratio	17.112	17.226	17.384	16.775	17.396
% Black	20.724	20.588	20.069	21.914	17.512
% Hispanic	14.361	17.165	16.661	11.008	10.649
% Chapter I	23.898	25.323	25.674	23.019	16.071
Zip Code/County Characteristics					
Urban	0.765	0.760	0.768	0.748	0.851
Ln(Median Income)	10.532	10.512	10.514	10.529	10.669
Location & Tuition Variables					
Avg. Two-yr Tuition	3.254	3.250	2.984	3.309	3.744
Avg. Non-Sel Tuition	8.339	8.295	8.304	8.201	9.202
Avg. Sel. Tuition	16.756	16.826	16.926	16.784	15.986
Dist Two-Yr	11.910	11.929	10.644	13.474	8.402
Dist Non-Sel	11.706	11.679	12.606	11.838	8.870
Dist Sel.	79.331	86.449	75.966	84.045	39.281
Midwest	0.232	0.224	0.198	0.252	0.264
West	0.235	0.262	0.307	0.178	0.188
South	0.360	0.358	0.348	0.389	0.274
N	2668	894	587	964	223

Note: All tuition variables are in thousands of dollars. Means of background variables exclude any missing observations. In regression analyses that follow, a missing variable dummy variable is set to one, and the missing values are set to zero. Low Income refers to family incomes of $40,000 or less. Household income is from the round 1 (1997) parent interview. Selective is defined as Median combined SATs of 1200 or greater.

Table 3: Partial Probabilities of applying to a Two-Year, Non-Selective or Selective Four-Year college using NELS:88 sample.

	Two-Year College	Non-Selective Four-Year College	Selective Four-Year College
Personal Characteristics			
Female	2.92***	-5.52***	1.44***
Asian	-7.84***	22.01***	10.14***
Black	-8.81***	0.58	5.31***
Hispanic/Other	-4.14***	-9.88***	3.62***
Std. Test Score	-1.13***	-3.22***	1.45***
Family Characteristics			
Low Income	2.05	-9.46	1.36
Par. Some College	-1.71*	1.61	0.93*
Parents College	-6.38***	-8.10**	6.45***
Parents Masters	-8.83***	-11.96***	10.26***
Parents PhD	-11.75***	-10.34**	12.13***
Family Size	-0.15	2.01**	-0.45*
Bio. Parents	2.94	-4.46	0.82
Bio. Mom only	1.86	2.17	-1.21
Bio Dad Only	1.91	7.88	-2.68
High School Characteristics			
Private	-9.97***	-22.54***	10.59***
Catholic	-0.57	-5.33	3.27**
% Asian Grade 12	-0.18**	-0.54**	0.19***
% Black Grade 12	-0.01	-0.09	0.03
% Hisp/Other Grade 12	0.03	0.02	0.03
% '89 Grads in 4-Yr Coll.	-0.04***	-0.09**	0.05***
% Reduced Price Lunch	0.01	0.06	0.002
Zip Code Characteristics			
Urban	-3.46***	-1.15	1.10
Suburban	-0.72	3.66	-1.16
% Asian Zip	0.13	0.77**	-0.19**
% Black Zip	-0.06	0.04	0.04
% Hisp/Other Zip	-0.05	-0.27	0.06
ln(median income Zip)	-5.61**	-15.88***	6.36***
Geography & Tuition Variables			
Avg. Two-Yr Tuition	-1.78***	4.22***	-0.05
Avg Non-Sel Tuit	1.59***	-6.99***	0.91**
LowIncome*Non-Sel Tuit	-0.50	1.28	-0.10
Avg. Sel. Tuit	-0.19	0.24	0.02
LowIncome*Sel. Tuit	0.11	-0.20	-0.07
Dist. Two-Yr	-0.06**	0.11	0.01
Avg. Dist Non-Sel	0.07**	-0.15	-0.003
LowIncome*Dist Non-Sel	-0.05*	-0.02	0.02
Avg. Dist Sel.	0.006	0.03**	-0.01**
Lowincome*Dist Sel.	0.006	-0.01	-0.0004
Midwest	-2.19*	25.08***	-5.60***
West	-1.34	35.89***	-10.32***
South	-4.13**	26.19***	-5.90***

Note: Selective is defined as median combined SATs that are greater than or equal to 1200. Low-income refers to family incomes of less than $35,000 from 1992 parent survey. All tuition variables are in thousands of dollars. Standard errors are clustered by high school.*,**,*** indicate significance at the 10%, 5% and 1% level.

Table 4: Marginal Effects (x100) of probability of applying to a Two-Year, Non-Selective or Selective Four-year college using the NLSY97 sample.

	Two-Year College	**Non-Selective Four-Year College**	**Selective Four-Year College**
Personal Characteristics			
Female	1.272	4.620**	0.124
Black	-3.127	16.363***	0.115
Hispanic/Other	0.548	3.687	-0.803*
AFQT Score	-0.224***	0.596***	0.082***
High School GPA	-6.200***	20.402***	3.083***
Family Characteristics			
Low Income	0.666	-4.835	-0.088
Mom's Education	-1.069***	3.533***	0.247***
Family Size	-0.034	-0.849	-0.186
Bio Parent/Step Parent	2.570	-12.173***	-0.457
Bio. Mom only	0.259	-4.857	-0.959**
Bio Dad Only	-2.323	-6.997	-1.477***
Other Family Comp.	-0.775	-8.465	-0.803
High School Characteristics			
Private	-11.730*	8.664	6.582*
Catholic	-5.975	27.549***	3.971**
Ln(school size)	-2.066	4.546**	0.177
Student/Teacher Ratio	-0.062	0.000	0.023
% Black	-0.079	0.040	0.036***
% Hispanic	-0.019	-0.094	0.027*
% Chapter I	-0.029	0.242***	-0.016
Zip Code/County Characteristics			
Urban	-0.049	-1.077	0.685*
ln(median income County)	-5.460	6.288	2.649***
Location & Tuition Variables			
Avg. Two-Yr Tuition	-1.730**	-0.083	-0.053
Avg Non-Sel Tuit	-.202	-0.304	0.499***
LowIncome*Non-Sel Tuit	0.013	-0.275	-0.124
Avg. Sel. Tuit	-0.056	0.198	-0.221***
LowIncome*Sel. Tuit	0.110	-0.137	0.062
Dist. Two-Yr	-0.236***	0.185**	-0.004
Avg. Dist Non-Sel	0.169*	-0.250**	0.025
LowIncome*Dist Non-Sel	-0.074	0.225	0.027
Avg. Dist Sel.	-0.010	0.016	-0.007
Lowincome*Dist Sel.	-0.007	-0.012	0.001
Midwest	-2.922	-2.929	-1.00***
West	4.750	-15.152***	-1.13**
South	-3.841	-2.908	-1.378**

Note: Selective is defined as median combined SATs that are greater than or equal to 1200. Low Income refers to family incomes of less than $40,000. All tuition variables are in thousands of dollars. *,**.*** denotes significance at 10%, 5% and 1% levels. Please note that marginal effects in this table are evaluated at the mean, and should be interpreted with caution.

Appendix

Table A1: Multinomial Logit Parameter Estimates for estimation of probability of applying to a TwoYear, Non-Selective or Selective Four-Year college using NELS:88 sample.

	Two-Year College	Non-Selective Four-Year College	Selective Four-Year College
Personal Characteristics			
Female	0.556***	0.429***	0.351***
Asian	0.035	0.725***	1.648***
Black	-0.491***	0.529***	0.787***
Hispanic/Other	-0.216	-0.031	0.529***
Std. Test Score	0.003	0.099***	0.235***
Family Characteristics			
Low Income	0.352	0.045	0.276
Par. Some College	0.052	0.379***	0.300**
Parents College	0.119	0.957***	1.325***
Parents Masters	0.188	1.243***	1.981***
Parents PhD	0.223	1.578***	2.595***
Family Size	-0.058*	-0.025	-0.083**
Bio. Parents	0.481**	0.311*	0.233
Bio. Mom only	0.123	-0.006	0.169
Bio Dad Only	-0.0001	-0.078	0.426
High School Characteristics			
Private	-0.217	0.573***	1.664***
Catholic	0.327	0.583***	0.611***
% Asian Grade 12	-0.007	0.001	0.028**
% Black Grade 12	-0.0003	0.0001	0.004
% Hisp/Other Grade 12	0.0004	0.005**	0.006
% '89 Grads at 4-year Coll.	0.0001	0.005***	0.009***
% Reduced Price Lunch	0.002	0.005**	0.001
Zip Code Characteristics			
Urban	-0.357***	-0.152	0.101
Suburban	-0.220*	-0.200**	-0.233
% Asian Zip	0.003	0.009	-0.028*
% Black Zip	-0.001	0.009**	0.007
% Hisp/Other Zip	-0.009	-0.003	0.010
ln(median income Zip)	-0.112	0.239*	0.996***
Location & Tuition Variables			
Avg. Two-Yr Tuition	-0.200***	0.045	-0.039
Avg Non-Sel Tuit	0.257***	0.014	0.187***
LowIncome*Non-Sel Tuit	-0.067	-0.007	-0.027
Avg. Sel. Tuit	-0.020	-0.0004	-0.005
LowIncome*Sel. Tuit	0.002	-0.020	-0.011
Dist. Two-Yr	-0.006**	0.002	0.0004
Avg. Dist Non-Sel	0.007***	-0.002	0.001
LowIncome*Dist Non-Sel	-0.004*	-0.00005	0.003
Avg. Dist Sel.	-0.0003	-0.0004**	-0.002**
Lowincome*Dist Sel.	0.0007*	0.00004	0.0001
Midwest	-0.761***	-0.339***	-1.032***
West	-1.178***	-0.974***	-1.888***
South	-1.073***	-0.590***	-1.149***
Constant	-0.379	-7.985***	-26.183***

Note: Selective is defined as median combined SATs that are greater than or equal to 1200. Low Income refers to family incomes of less than or equal to $35,000. *,**,*** indicates significance at 10%, 5%, and 1% levels. Standard errors are clustered by high school.

Table A2: Multinomial Logit Parameter Estimates of probability of applying to a Two-Year, Non-Selective or Selective Four-year college using the NLSY97 sample.

	Two-Year College	**Non-Selective Four-Year College**	**Selective Four-Year College**
Personal Characteristics			
Female	0.232**	0.300***	0.250
Black	0.330*	0.835***	0.520
Hispanic/Other	0.129	0.198	-0.396
AFQT Score	0.005*	0.029***	0.069***
High School GPA	0.283***	1.040***	2.202***
Family Characteristics			
Low Income	-0.101	-0.251	-0.175
Mom's Education	0.041	0.171***	0.216***
Family Size	-0.034	-0.054	-0.134*
Bio Parent/Step Parent	-0.179	-0.625***	-0.551*
Bio. Mom only	-0.152	-0.289*	-0.761***
Bio Dad Only	-0.381	-0.479	-1.765**
Other Family Comp.	-0.299	-0.507*	-0.829
High School Characteristics			
Private	-0.491	0.312	1.660***
Catholic	1.097**	1.904***	2.553***
Ln(school size)	0.000	0.195**	0.177
Student/Teacher Ratio	-0.004	-0.001	0.012
% Black	-0.003	0.001	0.019***
% Hispanic	-0.003	-0.005	0.012
% Chapter I	0.005	0.013***	-0.003
Zip Code/County Characteristics			
Urban	-0.15	-0.040	0.398
ln(median income County)	-0.108	0.264	1.547***
Distance and Tuition Variables			
Avg. Two-Yr Tuition	-0.124***	-0.059	-0.085
Avg Non-Sel Tuit	0.038	0.038	0.302***
LowIncome*Non-Sel Tuit	-0.011	-0.019	-0.054
Avg. Sel. Tuit	-0.005	0.003	-0.123***
LowIncome*Sel. Tuit	-0.005	-0.002	0.035
Dist. Two-Yr	-0.011**	0.003	-0.004
Avg. Dist Non-Sel	0.005	-0.008	0.012
LowIncome*Dist Non-Sel	0.002	0.011	0.020
Avg. Dist Sel.	-0.0004	0.0004	-0.004
Lowincome*Dist Sel.	-0.001	-0.001	0.0001
Midwest	-0.315	-0.273	-0.835***
West	-0.145	-0.754***	-1.061***
South	-0.393	-0.314	-1.061***
Constant	-0.029	-10.483***	-32.174***

Note: Selective is defined as median combined SATs that are greater than or equal to 1200. Low Income refers to family incomes of less than or equal to $40,000. *, **, *** indicate significance at 10%, 5% and 1% levels.

6. References

Avery, Christopher, Caroline Hoxby, Clement Jackson, Kaitlin Burek, Glenn Poppe, and Mridula Raman (2006). "Cost Should be No Barrier: An Evaluation of the First Year of Harvard's Financial Aid Initiative." NBER Working Paper 12029.

Behrman, Jere, Jill Constantine, Lori Kletzer, Michael McPherson, and Morton Schapiro (1996). "The Impact of College Quality on Wages: Are There Differences Among Demographic Groups?" Williams Project on the Economics of Higher Education, Discussion Paper No. 38.

Brewer, Dominic J., Eric Eide, and Ronald G. Ehrenberg (1999). "Does it Pay to Attend an Elite Private College? Cross Cohort Evidence on the Effects of College Quality on Earnings." *Journal of Human Resources*, 34(1), 104-123.

College Board (various years). *Annual survey of the colleges of the College Board and data base*, 1990-1991 and 2000-2001.

Dale, Stacey Berg, and Alan B. Krueger (2002). "Estimating the Payoff to Attending a More Selective College: An Application of Selection on Observables and Unobservables." *The Quarterly Journal of Economics*, 117(4), 1491-1527.

Desjardins, Steven L., Halil Dundar, and Darwin D. Hendel (1999). "Modeling the College Application Decision Process in a Land-Grant University." *Economics of Education Review*, 18(1), 117-132.

Do, Chau (2004). "The Effects of Local Colleges on the Quality of College Attended." *Economics of Education Review*, 23(3), 249-257.

Ehrenberg, Ronald G (2006). "The Perfect Storm and the Privatization of Public Higher Education." *Change*, 38(1), 46-53.

Heller, Donald. "Pell Grant Recipients in Selected Colleges and Universities" in Richard Kahlenberg ed. *America's Untapped Resources: Low-Income Students in Higher Education* (New York: Century Foundation Press, 2004): 157-166.

Hill, Catherine, Gordon Winston and Stephanie Boyd (2005). "Affordability: Family Incomes and Net Prices at Highly Selective Private Colleges and Universities." *Journal of Human Resources*, 40(4), 769-790.

Hossler, D., Braxton, J., and Coppersmith, G. (1989). "Understanding Student College Choice." In *Higher Education: Theory and Research, vol. 5.* (New York, Agathon Press): 231-288.

Long, Mark C. (2006). "College Quality and Early Adult Outcomes." Daniel J. Evans School of Public Policy Working Paper # 2006-07.

Toutkoushian, Robert K. (2001) "Do Parental Income and Educational Attainment Affect the Initial Choices of New Hampshire's College-Bound Students?" *Economics of Education Review*, 20(3), 245-262.

Turley, Ruth N. Lopez (2006). "College Proximity: Mapping Access to Opportunity." Working Paper.

Weiler, William (1994). "Transition from Consideration of a College to the Decision to Apply." *Research in Higher Education*, 35(6), 631-646.