Changes in the Process of College Choice among Men and Women:

The Role of Two-Year Colleges

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Abstract

Rising average levels of educational attainment, a shift from the predominance of men to the predominance of women among college students, and the growing importance of two-year colleges are important sources of change in the process of college attendance and graduation over the past 30 years. This paper extends Manski and Wise's model of college choice by (1) examining changes in selection into college on measured determinants of attendance and graduation over the high school classes of 1972, 1982, and 1992; (2) documenting how patterns and trends in selection into college differ between men and women; and (3) incorporating two-year college attendance and transfers between two and four year college into the model. It investigates the hypothesis that selection into college changed largely through changes in the prevalence of two-year colleges and other non-traditional routes to college completion. Investigating these alternative paths illuminates gender differences in the process of college choice.

Introduction

Among the many changes in socioeconomic inequality between men and women over the past 30 years, one of the most striking is the change in relative levels of educational attainment. Both absolutely and relative to men, women experienced huge increases in rates of college attendance and college completion over this period. By the 1990s the traditional dominance of men in higher education was substantially eliminated and, at the college level, women's attendance and completion rates surpassed men's. Women are now the majority of college attenders and college completers in the United States (see Table 1). These demographic changes suggest that the process of college choice changed during this period and that this process occurs differently among men and women. This paper describes these changes.

In their seminal analysis of college choice, Manski and Wise (1983) showed, for the high school graduating class of 1972, that college attendance in the United States is highly self-selective. Academic qualifications (test scores and class rank) play a key role in the process of college attendance and completion. While opportunities for college attendance are abundant, the students who attend college are those who have the best prospects of success and those who do not attend would have a poor chance of graduation were they to attend. This conclusion is based on both the measured characteristics of students who attend and fail to attend college as well as on correlations between the unmeasured determinants of attendance and graduation.

In view of the massive changes in attendance patterns over the past 30 years, it is useful to extend Manski and Wise's analysis in several ways. First, I examine whether the basic process of college selection has changed across cohorts attending college in the 1970s, 1980s, and 1990s. Second, I examine selection processes and their trends separately for men and women, to take account of the possibility that the relatively rapid growth of women's attendance has changed the ways in which colleges select on measured determinants of success. Third, whereas Manski and Wise focus only on attendance at and graduation from four-year colleges, I also examine two-year college attendance and transfers from two to four-year colleges, transitions that have become much more common in recent decades.

Estimating a series of probit models, I show that much of the increase in women's college attendance and completion can be attributed to the emergence of two-year colleges. Women who in the past did not attend college are now attending two-year colleges, and a much larger proportion of women attending two-year colleges are transferring successfully to four-year colleges compared to their male counterparts and women in earlier decades.

Background

There is a long history in sociology and economics of trying to understand educational attainment, who attends college, who completes college, how this process changed over time, what factors affect these outcomes. From this research comes an understanding of education as a process or series of decisions (Manski and Wise 1983; Mare 1981). Whether or not an individual finishes high school determines whether or not that individual can attend college, and whether an individual attends college determines whether an individual can complete college. Each educational decision is dependent on the previous decision. This means that a study of college completion must also study college attendance. Manski and Wise (1983) conceptualize this process as a series of smaller decisions. In order to complete college a student must apply to college, be admitted by the college to which he applies, and attend college.

In their analysis of the high school graduating class of 1972, Manski and Wise (1983) show that there is a significant amount of self-selection at each stage in this process of college choice. The individuals most likely to apply to college and attend college are also most likely to complete college. These individuals are selected on a number of characteristics, but most strongly on achievement characteristics. Students use their test scores and class rank as an indicator of potential college success. Students who do not excel in high school generally do not apply to or attend college, and if they were to attend, would not be successful. This research captured the process of college choice in the early 1970s.

While informative, the Manski and Wise model of college completion ignores the multiple paths to college completion. Manski and Wise study the standard path to college completion: four-year college attendance immediately following high school completion, and college completion in four or five years. College attendance and completion could diverge from this path in two ways: timing and type of college attended. A small portion of students take time off between high school graduation and college attendance or take time off during college, increasing the time between high school completion and college completion. Among the students studied by Manski and Wise, more than 20% of students who attend a four-year college attend the year after high school graduation or later. Many students also choose to attend a two-year college instead of a four-year college. Two-year college is an important alternative for many individuals, in particular for those who do not have the achievement record to be accepted into a four-year college, the economic resources to pay for four-year college, or the desire to leave home to attend college. While not everyone who attends a two-year college intends to transfer to a four-year college, approximately a third of the students who attend a two-year college in the sample of students studied by Manski and Wise, transfer to a four-year college. These students are not included in the Manski and Wise model of college completion.

The inclusion of these alternative paths of college completion is even more important when trying to capture changes in the process of college choice. In the last 30 years, the role of two-year colleges in the nation's post-secondary education system grew dramatically. Two-year colleges are increasingly enrolling more students in post secondary education and are enrolling populations of students who in the past would not have enrolled in college (Kane and Rouse 1999). Given the increased prevalence of two-year college attendance, the process of college choice may have changed dramatically. If two-year college attendance is more prevalent among women than men, then the rise in enrollment at two-year colleges may explain some of the changes in patterns of college attendance and completion among women.

This paper seeks to describe changes in the process of college choice among men and women in the last 30 years. A few studies have captured some of these changes, studying one part of the process of college choice. For example, Turley et al (2004) show that the effect of family background on college application increases slightly over time, while Ellwood and Kane (2000) show that the effect of family background increases with respect to college enrollment and type of college. While these two studies reflect important changes in this process, they fail to recognize the entire process of college choice and furthermore do not address the recent changes in patterns of attendance and completion among men and women. This paper describes changes in the full process of college attendance and completion, allowing for multiple paths to college completion. Through this analysis, I hope to not only describe changes in the process of college choice among men and women but also explain some of these changes by analyzing the complete process of college choice.

Data and Methods

I explore changes in post secondary educational processes using three data sets: the National Longitudinal Study of the Class of 1972 (U.S. Dept. of Education 1992), High School and Beyond 1980: Sophomore Cohort (U.S. Dept. of Education 1988), and the National Education Longitudinal Study 1988 (U.S. Dept. of Education 1989). Each dataset captures one birth cohort, 10 years apart. Given on time graduation from high school, they represent the high school graduating classes of 1972, 1982, and 1992 respectively. These surveys cover the 30 year period of observed changes in educational stratification among men and women and are particularly useful for looking at transitions from high school to post-secondary education and work because of their longitudinal natures. Table 2 presents key information for each dataset.

In addition to each survey, I also include state level data on economic conditions and college costs during the year most survey participants graduate from high school. Data on economic conditions, unemployment and average manufacturing wage, was gathered from the Bureau of Labor Statistics. Data on college costs are provided by the Higher Education Coordinating Board in the state of Washington (Raudenbush 2004).

In order to capture changes in the process of college choice across these three cohorts I estimate a series of binary probit models for each cohort using maximum likelihood estimation[1]. I focus on four outcomes that capture the multiple pathways available to complete college:

[1] By estimating each equation alone, I assume that the unmeasured characteristics that affect each outcome are uncorrelated across equations. This assumption may not be valid. For example, an individual's value of learning, not captured in measured variables in the model, may affect college attendance, type of college attended, and college completion. Manski and Wise (1983) show that for the NLS cohort the unmeasured characteristics that affect four-year college attendance are positively correlated with college completion. In other words, those most likely to attend a four-year college are also most likely to complete college, net of measured characteristics. Given evidence that there is a significant amount of selection in college attendance (and possibly college type and transfer), parameter estimates may be significantly biased (Fu, Winship and Mare 2004; Maddala 1983). If selection on unmeasured characteristics remains constant over time then while estimates of the effects of individual variables within years may be biased, the changes in effects and overall probabilities of attendance, type, transfer and completion, will not be affected. Previous work suggests that selection on unmeasured characteristics has changed (Flashman 2005). Over time, selection into four-year college on unmeasured characteristics declined. This result suggests that earlier estimates of college completion will be more biased than later estimates.

Simultaneous equation modeling, which estimates the correlation between unmeasured characteristics and can adjust for selection bias introduced by choice, is not a simple solution to this problem. This form of estimation assumes a multivariate normal distribution of the error term and the correlations between error terms are often difficult if not impossible to identify, especially as equations and error terms are added to the estimation.

I tried to estimate this model using simultaneous equation modeling. The model was too complicated to estimate. The identification of the correlations between the four binary equations' error terms was unsuccessful.

1) college attendance
2) four-year college attendance (versus two-year college attendance)
3) transfer to a four-year college
4) college completion

The latent indicator of college attendance (A_i) is dependent on a number of individual background and achievement characteristics (X_{1i}) and a random term (ε_{1i}) or:

$$A_i = X_{1i}\beta_1 + \varepsilon_{1i} \quad (1)$$

The latent indicator of four-year college attendance (F_i) is dependent on individual characteristics (X_{2i}) and a random term (ε_{2i}) or

$$F_i = X_{2i}\beta_2 + \varepsilon_{2i} \quad (2)$$

The latent indicator of transfer (T_i) is dependent on individual characteristics (X_{3i}) and a random term (ε_{3i}) or

$$T_i = X_{3i}\beta_3 + \varepsilon_{3i} \quad (3)$$

Finally, the latent indicator of college completion (C_i) is dependent on individual characteristics (X_{4i}) and a random term (ε_{4i}) or

$$C_i = X_{4i}\beta_4 + \varepsilon_{4i} \quad (4)$$

An individual attends college if $A_i > 0$. An individual attends a two-year college if $F_i < 0$ and $A_i > 0$, and attends a four-year college if $F_i > 0$ and $A_i > 0$. An individual transfers from two-year college to four-year college if $T_i > 0$ and $F_i < 0$. An individual completes college if $C_i > 0$ and $F_i > 0$ or $T_i > 0$. The probability that individual *i* attends college is:

$$\Pr[A_i = X_{1i} + \varepsilon_{1i} > 0] \quad (5)$$

While theoretically this model should be estimable, I concluded that the model was inestimable using these methods. Even in a simpler form the model would not converge.

The probability that an individual *i* attends a two-year college is:

$$\Pr[F_i = X_{2i} + \varepsilon_{2i} < 0] \mid A_i > 0 \tag{6}$$

The probability that an individual *i* attends a four-year college is:

$$\Pr[F_i = X_{2i} + \varepsilon_{2i} > 0] \mid A_i > 0 \tag{7}$$

The probability that an individual *i* transfers to a four-year college is:

$$\Pr[T_i = X_{3i} + \varepsilon_{3i} > 0] \mid F_i < 0 \tag{8}$$

And finally, the probability that an individual *i* completes college is:

$$\Pr[C_i = X_{4i} + \varepsilon_{4i} > 0] \mid (F_i > 0) \vee (T_i > 0) \tag{9}$$

Each of these decisions is conditional on previous decisions. In this analysis I am interested in the conditional probabilities as well as the unconditional probabilities, which capture changes in numbers rather than changes in rates. The unconditional probabilities of each outcome can be derived from the conditional probabilities. The unconditional probability of two-year college attendance is:

$$(\Pr[A_i = X_{1i} + \varepsilon_{1i} > 0]) \cdot (\Pr[F_i = X_{2i} + \varepsilon_{2i} < 0]) \tag{10}$$

The unconditional probability of four-year college attendance is:

$$(\Pr[A_i = X_{1i} + \varepsilon_{1i} > 0]) \cdot (\Pr[F_i = X_{2i} + \varepsilon_{2i} > 0]) \tag{11}$$

The unconditional probability of transferring to a four-year college is:

$$(\Pr[A_i = X_{1i} + \varepsilon_{1i} > 0]) \cdot (\Pr[F_i = X_{2i} + \varepsilon_{2i} < 0]) \cdot (\Pr[T_i = X_{3i} + \varepsilon_{3i} > 0]) \tag{12}$$

The unconditional probability of ever attending a four-year college, either through initial attendance or transfer is:

$$\begin{gathered}(\Pr[A_i = X_{1i} + \varepsilon_{1i} > 0]) \cdot (\Pr[F_i = X_{2i} + \varepsilon_{2i} > 0]) + \\ (\Pr[A_i = X_{1i} + \varepsilon_{1i} > 0]) \cdot (\Pr[F_i = X_{2i} + \varepsilon_{2i} < 0]) \cdot (\Pr[T_i = X_{3i} + \varepsilon_{3i} > 0])\end{gathered} \tag{13}$$

Finally, the unconditional probability of completing college is:

$$\begin{bmatrix} (\Pr[A_i = X_{1i} + \varepsilon_{1i} > 0]) \cdot (\Pr[F_i = X_{2i} + \varepsilon_{2i} > 0]) + \\ (\Pr[A_i = X_{1i} + \varepsilon_{1i} > 0]) \cdot (\Pr[F_i = X_{2i} + \varepsilon_{2i} < 0]) \cdot (\Pr[T_i = X_{3i} + \varepsilon_{3i} > 0]) \end{bmatrix} \cdot \Pr[C_i = X_{4i} + \varepsilon_{4i} > 0] \quad (14)$$

In this paper I estimate the conditional probabilities of college attendance, four-year college attendance, transfer, and college completion. Using equations 10-14 I manipulate these estimates into the unconditional probabilities of two-year college attendance, four-year college attendance, transfer, four-year college ever, and college completion.

Dependent Variables

This analysis focuses on four outcomes: attendance at any college or university, the type of college attended (two-year college or four-year college), transfer to a four-year college, and college completion.

An individual is classified as attending college if she was enrolled full time at a two or four-year college or university at any point during the first eight years after expected high school completion[2]. For the NLS sample this includes anyone attending full time between 1972 and 1980. For the HS&B sample this includes anyone attending full time between 1982 and 1990. For NELS this includes anyone attending full time between 1992 and 2000.

Type of college attended represents the type of college *first* attended by the respondent after completing high school[3]. There are two types of academic post-secondary institutions, two-year/junior/community colleges, and four-year colleges or universities. While there are other forms of post-secondary education, for example vocational schools, these institutions do not lead

[2] Each survey covers a different number of years. NLS respondents are observed for 14 years while HS&B respondents are observed for 10 years and NELS respondents are observed for 8 years. This difference allows respondents from the earlier cohorts to attend and complete college later and be classified as attending college or completing college whereas in later cohorts they would be censored and could not be considered attenders or completers. I therefore limit responses to those referring to events occurring within the first 8 years after expected high school completion.

[3] A number of respondents (particularly in later cohorts) take a college level course while attending high school. I do not count this attendance as college attendance.

to four-year college degrees. For the purposes of this analysis, attendance at these institutions is ignored.

Transfer to a four-year college is observed only for those who attend two-year college. If an individual attends a two-year college initially, and during the period following, attends a four-year college, she is classified as transferring.

Lastly, college completion is only observed for those at risk for college completion (those who initially attended a four-year college, or those who transferred to a four-year college). Those who report holding a BA or BS, MA, or PhD, are all treated as completing college. A small number of respondents are enrolled in college during the last observation point but have not completed college. These respondents are classified as non-completers, regardless of their year in college.

This analysis is limited to respondents who completed high school, though I allow respondents to complete high school earlier or later than expected. Regardless of year of high school graduation, if the respondent graduated from high school he is included in the analysis. In NLS virtually the entire sample graduated from high school; in the HS&B sample, 10% did not complete high school; approximately 6% of the NELS sample did not graduate from high school.

Independent Variables

This analysis controls for three groups of explanatory variables. First, I control for variables that describe a student's position in high school, specifically SAT score, high school class rank, whether the students is a leader in student government, and whether the student is a leader in varsity sports. Second, I control for socioeconomic and demographic background variables, including mother's education, father's education, parents' income, number of siblings, race, region, gender, and high school urbanicity. Lastly, I control for state level unemployment, average manufacturing wage, and the cost of the lowest tier state four-year college. These variables are meant to capture the main determinants of college attendance, type, transfer, and completion. In this analysis I am primarily concerned with changes in overall trends in the process of college choice among men and women, rather than changes in the effects of particular variables. Manski and Wise (1983) show that academic achievement is the key selection factor in four-year college attendance and completion. My discussion of the effect of individual variables is therefore limited to the effect of high school academic success on each outcome. I describe these variables below. Table 3 describes all variables included in each model in more detail.

I use two variables to measure an individual's academic success in high school. Scholastic Aptitude Test (SAT) score likely has a large effect on an individual's propensity to attend and complete college if it is interpreted as a measure of ability. It may also play a key role in determining the type of college attended. In NLS, HS&B and NELS SAT scores are only available for a subset of the students. Many students took the ACT or took no college entrance exam. All students took ETS ability tests as part of the survey. I use these tests to estimate a predicted SAT score for students who did not take the SATs. The prediction equations for SAT scores are listed in the appendix.

Class rank is also used as a proxy for academic ability and potential success in college. I expect that individuals ranked in the top of their class are more likely to attend college, more likely to attend a four-year college, more likely to transfer to a four-year college if they attend a two-year college, and more likely to complete in college.

Missing Data

A number of independent variables contain missing data. Eliminating respondents missing data on one or more variables would substantially bias my estimates. I deal with missing data in two ways. For continuous variables with missing data, those missing are assigned the population mean. I included a dummy variable in the analysis to flag those individuals who were given the mean from those with observed values. For categorical variables, missing is included as a new category of the variable.

Means and standard deviations of all independent variables for all students in each survey are available in table 4. Means and standard deviations by gender are available in table 5.

Results

The following section presents the results of my analysis. First, I discuss the unadjusted population changes in college attendance, two-year college attendance, four-year college attendance, transfer, and college completion among men and women. This discussion is followed by a discussion of the predicted probabilities of each outcome, controlling for the independent variables discussed earlier in the paper. In these two sub-sections I discuss the unconditional proportions and probabilities of each outcome as well as the conditional rates and probabilities. To highlight the key components of the change in college completion I run a number of simulations combining 1992 probabilities with earlier probabilities. This exercise allows me to make the following counterfactual for example: if women in 1992 experienced women's 1972 probability of college attendance but all other probabilities remained at their 1992 levels, how is women's unconditional probability of college completion affected? Finally, I disaggregate results by achievement level to demonstrate that changes in attendance and completion, and the role of two-year colleges in this process, differ depending on achievement level.

Trends

Table 6 presents the unconditional unadjusted trends of college choice among the high school graduating classes of 1972, 1982, and 1992 by gender. College attendance increases across cohorts; 57% of the class of 1972 attends college compared to 74% of the class of 1992. While both men and women's attendance increases, women make greater gains in attendance, increasing their attendance 20 percentage points. As a consequence, the unconditional proportions of students attending both two and four-year colleges increase. Among both men and women, much of the increase in attendance is explained by two-year college attendance. As the proportion of students enrolling in two-year college increases, the proportion of students transferring from two-year college to four-year college also increases. The combination of increased college attendance and transfers leads to an increase in the number of students ever attending four-year college. While the unconditional proportion of women completing college increases 10 percentage points across cohorts, men's college completion remains relatively constant.

Table 7 presents the conditional rates of college attendance, two-year college attendance, transfer, and college completion. This table highlights the components of the process of college choice driving college completion trends. College attendance among men and women increases. This leads to increasing numbers of people attending college. While there is some shift in type of college attended increasing two-year college attendance, transfer rates remain constant. This leads to increases in the number of students transferring from two-year college to four-year college. Given four-year college attendance, rates of college completion increase among women but decline among men. The decline in rates of completion among men is balanced by increases in college attendance, leading to a constant proportion of men completing college over time. Among women, increased attendance, along with constant rates of transfer and increased rates of completion lead to increases in the unconditional proportion of women completing college.

Because college attendance increases, a significant portion of that increase is caused by two-year college attendance, and rates of transfer remain constant, more students are going through the two-year college system to complete college, especially among women.

Trends in college attendance and completion are affected by population changes in school achievement, socioeconomic status, and economic conditions. These variables may also affect men and women's attendance and completion decisions differently. Tables 6 and 7 do not account for the effects of these exogenous changes. It is therefore necessary to estimate the probability of college attendance, two-year college attendance, four-year college attendance, transferring, and college completion, net of exogenous variables that may also affect trends in college choice.

Multivariate Analysis

Table 8 presents the unconditional predicted probabilities of college attendance, two-year college attendance, four-year college attendance, transfer, and college completion among men and women[4] with all measured variables held constant at 1972 population means (displayed in

[4] All models were estimated for the whole population as well as by gender. Because I am primarily interested in gender differences in college decision processes I do not present the pooled estimates. Pooled estimates are available from the author upon request.

the table 4). These values are derived from the parameter estimates presented in tables A.1 and A.2 in the appendix.

The unconditional predicted probability increases across cohorts. This increase is especially dramatic among women. Women's probability of college attendance increases more than 20 percentage points between 1972 and 1992. Much of this increase is explained by increasing probabilities of two-year college attendance. Two-year college attendance explains 62% of the increase in the probability of college attendance. While men experienced similar gains in both general attendance and two-year college attendance, changes are less dramatic and two-year colleges and four-year colleges contribute equally to increases in the probability of college attendance.

Women also experience increases in the unconditional probabilities of transferring to a four-year college, ever attending a four-year college, and completing college. Women's unconditional probability of college completion increases from .19 to .26. By contrast, men's unconditional probabilities of transferring, ever attending a four-year college, and college completion remain constant across cohorts.

Which part of this process is driving women's increased college completion? Table 9 presents the conditional predicted probabilities of college attendance, two-year college attendance, four-year college attendance, transfer, and college completion. As noted above, the probability of college attendance increases dramatically. While the conditional probability of transferring to a four-year college increases among women, the conditional probabilities of attending two-year college, four-year college, and completing college remain relatively constant across cohorts. Men experience increasing but lower probabilities of attendance compared to women, and constant conditional probabilities of all other outcomes.

Increases in the probability of attending college among women drive increases in their unconditional probability of completion. More women attend college over time. Because conditional probabilities remain constant, more women are pushed through the system and thus complete college. Increased transfer from two-year colleges also plays an important, though somewhat lesser role, in women's increasing unconditional probability of completion. Women in later cohorts who attend two-year college are more likely to transfer to four-year college. Because women are more likely to attend college, more women are attending two-year college and a larger proportion of those women are successful in transferring to four-year college. This process puts more women at risk for college completion. Men do not experience the same gains in unconditional completion because 1) their probability of attendance does not increase as much as women's and 2) their conditional probability of transfer does not increase.

Simulated Probabilities

These results suggest that increases in the probability of college attendance drive increases in the unconditional probability of college completion among women. Because a large part of the increase in college attendance is due to increases in two-year college attendance, two-year colleges have increasingly become more important to women's success in post-secondary education. Table 10 further clarifies these trends by simulating the unconditional probability of completion for 1992 men and women under different conditions.

These values are derived from the values presented in tables 8 and 9 using equation 14. The second cell of the first row of table 10 shows the unconditional probability of college completion among 1992 women if these women experienced women's 1972 probability of attending college and women's 1992 conditional probabilities of four-year college attendance, transfer, and college completion. Under these conditions, the unconditional probability of completing college would decline by .07 (see cell 2 in row 1) to the 1972 unconditional probability of college completion (see table 8). In other words, the difference between women's 1972 unconditional probability of college completion and women's 1992 unconditional probability of college completion is created entirely by differences in their probabilities of attendance.

The probability of college attendance can be disaggregated into the unconditional probability of two-year college attendance (equation 10) (multiplied by the conditional probability of transferring) and the unconditional probability of four-year college attendance (equation 11). In essence, we can know how much of the .07 change is explained by increases in the unconditional probability of two-year college attendance, and how much is explained by increases in the unconditional probability of four-year college attendance.

Rows two and three of table 10 show these effects. If 1992 women experienced the 1972 unconditional probability of two-year college attendance but the 1992 unconditional probability of four-year college attendance, the 1992 conditional probability of transfer, and the 1992 conditional probability of college completion, their unconditional probability of college completion would be .03 lower than the actual 1992 unconditional probability of college completion. If 1992 women experienced the 1972 unconditional probability of four-year college attendance, their unconditional probability of college completion would be .04 lower than their actual unconditional probability of college completion. Changes in the unconditional probabilities of two and four-year college attendance contribute relatively equally to the changes women experience in unconditional college completion. In other words, increases in college attendance—at *both* two and four-year colleges—are driving changes in the unconditional probability of college completion among women.

Changes in the conditional probability of transferring explain a smaller portion of women's unconditional probability of college completion. Given women's 1972 conditional probability of transferring to a four-year college, the unconditional probability of college completion among 1992 women would fall by .02. The conditional probabilities of four-year college attendance and college completion on the other hand have no effect on the increase in the unconditional probability of college completion among women. In fact, if 1992 women's conditional probability of completion were at the 1972 level, they would *increase* their unconditional probability of attendance by .02.

This table clarifies previous results. Increases in the probability of college attendance are driving women's increased unconditional probability of college completion. And two-year colleges are playing a significant role in this increase.

Effects of Achievement

The previous results show that men and women's college attendance and completion probabilities diverged over time. Women increased their probability of college attendance, increasing their unconditional probabilities of both two and four-year college attendance. This increase drove up their unconditional probability of college completion by essentially funneling more people through the system.

Manski and Wise show that achievement in high school is a key selection factor in four-year college attendance and completion. The highest achieving students are most likely to attend four-year college and are most likely to complete college. Is the observed pattern—increasing unconditional probability of completion driven largely by increases in probabilities of college attendance among women—consistent across achievement groups?

I define three achievement groups: high achievers who score 1100 on the SAT and rank in the 75th percentile of their high school class, middle achievers who score 900 on the SAT and rank in the 50th percentile of their high school class, and low achievers who score 700 on the SAT and rank in the 25th percentile of their high school class. Table 11 shows the simulated unconditional predicted probabilities of college completion under 1972 and 1982 college attendance probabilities by achievement group.

Two-year college attendance plays *no* role in the increase in the unconditional probability of college completion (from .52 to .65) among the highest achievers. Increases in the unconditional probability of four-year college attendance explain 77% of the change in the unconditional probability of college completion among the highest achieving women. Two-year college attendance also has little effect on the unconditional probability of college completion among the lowest achievers. While the unconditional probability of 2-year college attendance is responsible for much of the increase in the probability of college attendance within this population (from .4 to .6) their increased attendance does not lead to increased probabilities of college completion. It is among the middle achievers that two-year colleges are affecting the probability of college attendance *and* the unconditional probability of college completion.

The increased prevalence of two-year colleges as an option for college attendance and completion affects populations differently. High achievers are unaffected by two-year colleges. These students attend four-year college and rarely consider the two-year college in their college choices. Two-year college opened up opportunities for higher education for low achieving students. While their probability of four-year college attendance is low and constant across cohorts, their unconditional probability of two-year college attendance increases dramatically. These students did not attend college in the past, and are now attending two-year colleges. While increasing attendance, these students do not experience greater unconditional probabilities of completion. It is the middle achieving students who are most affected by two-year colleges, and it is these students who are captured in earlier results. These students' increased their probability of two-year college attendance, increased their unconditional probability of transferring to a four-year college, and consequently increased their unconditional probability of completing college.

Discussion

Through a simple probit analysis of the process of college choice, I describe the change in college choice among men and women in the last 30 years. Net of demographic, achievement, and state economic characteristics, women experience substantial gains in probabilities of college attendance and completion compared to men. A large part of this change is explained by the emergence of two-year colleges. Women in later cohorts are more likely to attend college because they are more likely to attend a two-year college. These are women who in the past would not have gone to college. In other words, college attendance increased among women largely because a new population of women chose to attend two-year college.

Increased college attendance, particularly attendance at two-year colleges, does not necessarily lead to increased college completion. Women's probability of college completion increased in part because their probability of transferring to four-year college increased. An increased probability of transfer along with a constant probability of four-year college attendance put more women at risk for completing college and thus increased the overall probability of completion.

Simply put, the emergence of the two-year college is responsible for a large portion of the observed increase of college attendance and completion among women. The two-year college has not served the same role for men. Over time, though the two-year college increased in prevalence, men have not significantly increased their attendance or their probability of transfer. These results capture the effects of the two-year college for middle achieving students. Among high achieving students, two-year colleges played no role in increasing college attendance or completion. Among low achieving students two-year colleges increased overall college attendance, but did not affect college completion.

Future Research

This paper decomposes demographic trends in college going among men and women. Ignored in this analysis is the role of selection on unmeasured characteristics in determining college attendance (and perhaps type of college attended as well as transfer). Manski and Wise (1983) show that there is a significant amount of selection into four-year college on unmeasured characteristics. Furthermore, Flashman (2005) shows that selection into four-year college declined during this period. Both of these results suggest that selection on unmeasured characteristics is an important aspect in this process. I am currently working on a model that will account for self-selection into college on unmeasured characteristics as well as measured characteristics. Using this model I can generalize results beyond the population at risk and capture changes in the effects of both measured *and* unmeasured characteristics.

Change in the process of college choice is not limited to men and women. Racial and ethnic groups, in particular African Americans and Latinos, experienced considerable changes in college attendance and completion during this period, and two-year colleges likely played a key role in this change. I plan to extend this research to also consider changes in patterns of attendance and completion among African Americans and Latinos during this period.

This paper describes changes in the process of college choice over the last 30 years. It successfully shows that the emergence of two-year colleges is responsible for much of the change in women's attendance and completion patterns, net of other characteristics. Why are women increasing their enrollment while men are not? Why are these women attending two-year colleges rather than four-year colleges? Why are women now more likely to transfer to a four-year college after attending a two-year college? These are important questions that this research does not address. Now that we understand the trends in the process of college choice and the emerging role of two-year colleges we can begin to address these questions.

References

Curtin, T.R., S.J. Ingels, S. Wu, and R. Heuer. 2002. *National Education Longitudinal Study of 1988: Base-Year to Fourth Follow-up Data File User's Manual (NCES 2002-323)*. Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Ellwood, David, and Thomas Kane. 2000. "Who Is Getting a College Education? Family Background and the Growing Gaps in Enrollment." in *Securing the Future: Investing in Children from Birth to College*, edited by Sheldon Danziger and Jane Waldfogel. New York: Russell Sage Foundation.

Flashman, Jennifer. 2005. "Delayed Selection: Changes in the Process of College Choice among Men and Women." in *Department of Sociology*. Los Angeles: University of California-Los Angeles.

Fu, Vincent Kang, Christopher Winship, and Robert Mare. 2004. "Sample Selection Bias Models." in *Handbook of Data Analysis*, edited by Melissa Hardy and Alan Bryman. London: SAGE.

Kane, Thomas, and Cecilia Elena Rouse. 1999. "The Community College: Educating Students at the Margin Between College and Work." *The Journal of Economic Perspectives* 13:63-84.

Maddala, G. 1983. *Limited-Dependent and Qualitative Variables in Econometrics*. New York: Cambridge University Press.

Manski, Charles, and David Wise. 1983. *College Choice in America*. Cambridge, MA: Harvard University Press.

Mare, Robert. 1981. "Change and Stability in Educational Stratification." *American Sociological Review* 46:72-87.

—. 1995. "Changes in Educational Attainment and School Enrollment." Pp. 155-213 in *State of the Union: America in the 1990s*, edited by Reynolds Farley. New York: Russell Sage Foundation.

Raudenbush, Kathy. 2004. "Tuition and Fee Rates: A National Comparison." State of Washington, Higher Education Coordinating Board.

Riccobono, John, Louise Henderson, Graham Burkheimer, Carol Place, and Jay Levinsohn. 1981. "National Longitudinal Study: Base Year (1972) through Fourth Follow-Up (1979) Data File Users Manual." Research Triangle Park, N.C.: Center for Educational Research and Evaluation, Research Triangle Institute.

Turley, Ruth Lopez, Martin Santos, and Cecilia Ceja. 2004. "Toward Equal Opportunity? Social Origin and Educational Opportunity and Attainment in the US (1972-1992)."

U.S. Dept. of Education, Center for Education Statistics. 1992. "National Longitudinal Study of the Class of 1972 [computer file]." Chicago, IL: National Opinion Research Center [producer].

U.S. Dept. of Education, National Center for Education Statistics. 1988. "High School and Beyond 1980: Sophomore Cohort [computer file]." Chicago, IL: National Opinion Research Center [producer].

—. 1989. "National Education Longitudinal Study, 1988 [Computer file]." Chicago, IL: National Opinion Research Center [producer].

Appendix

The following provides the equations used for predicting SAT scores for respondents whose SAT scores were not recorded or who did not take the SAT:

Class of 1972
If the student took the ACT but not the SAT, SAT score was predicted using reported ACT total score (srfq2i).

$$SAT = 32.42 \cdot (srfq2i) + 250.5056$$

$$r^2 = .72$$

If the student is missing both SAT and ACT score, SAT score was predicted using a combination of test scores from the battery test given to all survey participants. SAT score is predicted using the scaled vocabulary score (scvocsc), scaled picture identification number (scpict), scaled reading score (scrdsc), scaled letter groups score (sclgsc), scaled math score (scmatsc), and scaled mosaic score.

$$SAT = 7.533 \cdot (scvocsc) + .452 \cdot (scpict) + 5.649 \cdot (scrdsc) + 1.839 \cdot (sclgsc) + 10.024 \cdot (scmatsc) + .806 \cdot (scmscmt) - 538.348$$

$$r^2 = .73$$

Class of 1982
If the student took the ACT but not the SAT, SAT score was predicted using reported ACT total score (actcomp).

$$SAT = 36.326 \cdot (actcomp) + 106.793$$

$$r^2 = .82$$

If the student is missing on both SAT and ACT, SAT score was predicted using PSAT verbal (psatv) and math (psatm) scores.

$$SAT = 10.149 \cdot (psatm) + 8.528 \cdot (psatv) + 94.212$$

$$r^2 = .82$$

If the student is missing on SAT, ACT, and PSAT, the first follow-up test battery (futest), given to all first follow-up survey participants, was used to predict SAT score.

$$SAT = 23.177 \cdot (futest) - 434.195$$

$$r^2 = .71$$

Class of 1992
If the student took the ACT but not the SAT, SAT score was predicted using reported ACT subject test scores: English (f2racte), math (f2ractm), reading (f2ractr), and science (f2racts).

$$SAT = 9.247 \cdot (f2racte) + 17.015 \cdot (f2ractm) + 6.580 \cdot (f2ractr) + 8.147 \cdot (f2racts) + 32.219$$

$$r^2 = .82$$

If the student is missing on both SAT and ACT, SAT score is predicted using PSAT verbal (f2rpsatv) and math (f2rpsatm) scores.

$$SAT = 9.682 \cdot f2rpsatm + 9.383 \cdot f2rpsatv + 102.970$$

$$r^2 = .84$$

If the student is missing on SAT, ACT, and PSAT, SAT score was predicted using a combination of test scores from the aptitude tests given to all survey participants. Tests include reading (f2xrstd), the math (f2xmstd), history (f2xhstd), and science (f2xsstd). If the student's score are not available in the second follow-up, first follow-up tests are used.

$$SAT = 4.291 \cdot f22xhstd + 2.262 \cdot f22xsstd + 15.193 \cdot f22xmstd + 3.454 \cdot f22xrstd - 485.8232$$
$$r^2 = .74$$
$$SAT = 3.962 \cdot f12xhstd + 3.647 \cdot f12xsstd + 13.108 \cdot f12xmstd + 3.538 \cdot f12xrstd - 426.306$$
$$r^2 = .76$$

Table 1 Percent distribution of educational attainment by 5-year birth cohort, March CPS 2003, 1993, and 1983

Birth Cohort	High school graduate	Some College	College graduate	Ratio of college attenders to high school graduates	Ratio of college graduates to college attenders
All students					
1950-1954	86.0%	43.5%	22.5%	0.51	0.52
1960-1964	86.7	48.1	23.7	0.55	0.49
1970-1974	86.5	57.4	28.4	0.66	0.49
Men					
1950-1954	86.0%	44.8%	23.9%	0.52	0.53
1960-1964	86.0	49.5	23.4	0.58	0.47
1970-1974	84.9	53.8	26.0	0.63	0.48
Women					
1950-1954	86.0%	42.2%	21.1%	0.49	0.50
1960-1964	87.4	52.5	23.9	0.60	0.46
1970-1974	88.2	61.1	30.9	0.69	0.51

Table 2 Survey Details

	NLS Class of 1972	HS&B Class of 1982	NELS Class of 1992
Base year and follow-ups	1972, 1973, 1974, 1976, 1979, 1986	1980, 1982, 1984, 1986,1992	1988, 1990, 1992, 1994, 2000
Sampling	Nationally representative survey of almost 23,000 students in more than 1,300 schools. Fifth follow-up includes a subsample of 14,489 respondents from the original sample	Nationally representative probability sample of over 30,000 sophomores in 1,015 schools. The second follow-up is a probability subsample of the 1980 sophomore respondents resulting in a sample of 14,825 respondents.	Nationally representative probability sample of 1,052 schools and almost 25,000 eighth grade students. The third follow-up is a probability subsample of the third follow-up respondents, resulting in a sample of 15,237 respondents.
Response rates	base-year 71%, first follow-up 92%, second follow-up 89%, third follow-up 86%, fourth follow-up 80%, fifth follow-up 89%	base-year 98%, first follow-up 98%, second follow-up 92%, third follow-up 90%, fourth follow-up 85%,	base-year 93%, first follow-up 91%, second follow-up 91%, third follow-up 91%, fourth follow-up 83%
Final N	22,267	14,638	11,682

Table 3 Description of independent variables

Independent variables
Achievement
Combined SAT score
High school class rank
Proportion of high school class attending a 2 or 4-year college
High school student leader
High school athlete
Background
Parents' income in 1972 dollars (in 10,000's dollars)
Education of mother less than high school
Education of mother college degree or more
Education of father less than high school
Education of father college degree or more
Number of siblings
Race
White
African American
Other race
Region of high school
West
North central
South
Northeast
Urbanicity of high school
Urban or suburban
Rural
State-level characteristics
Average wage rate for manufacturing jobs in 1972 dollars
State level unemployment rate
Average lower tier four-year state college tuition in 1972 dollars (1000's of dollars)
College history
Transfer student

Table 4 Means and standard deviations all students NLS 1972, HS&B 1982,and NELS 1992

	Class of 1972		Class of 1982		Class of 1992	
Independent Variables	**Mean**	**S. D.**	**Mean**	**S. D.**	**Mean**	**S. D.**
Combined SAT score	0.807	0.204	0.740	0.204	0.784	0.222
High school class rank	0.557	0.226	0.523	0.227	0.543	0.229
Proportion of high school class attending a 2 or 4-year college	0.488	0.193	0.482	0.191	0.439	0.186
High school student leader	0.058	0.233	0.053	0.224	0.060	0.238
High school athlete	0.086	0.280	0.110	0.313	0.114	0.318
Parents' income	1.121	0.466	1.187	0.595	1.348	0.987
Education of mother less than high school	0.165	0.371	0.182	0.386	0.135	0.342
Education of mother college degree or more	0.078	0.269	0.116	0.320	0.201	0.401
Education of father less than high school	0.192	0.394	0.208	0.406	0.146	0.353
Education of father college degree or more	0.129	0.335	0.173	0.378	0.246	0.431
Number of siblings	2.062	1.457	1.156	1.171	1.178	1.273
White	0.764	0.424	0.754	0.431	0.707	0.455
African American	0.091	0.287	0.134	0.340	0.127	0.333
Other race	0.076	0.265	0.112	0.316	0.163	0.370
West	0.172	0.378	0.171	0.377	0.196	0.397
North central	0.286	0.452	0.281	0.450	0.250	0.433
South	0.285	0.451	0.325	0.468	0.362	0.481
Northeast	0.257	0.437	0.223	0.416	0.193	0.394
Rural	0.452	0.498	0.308	0.462	0.309	0.462
Wage rate	3.957	1.554	3.437	0.655	5.225	0.824
Unemployment rate	4.363	1.180	9.555	2.687	6.425	1.124
State college tuition	0.611	0.166	0.588	0.203	0.794	0.294
Male	0.493	0.500	0.494	0.500	0.504	0.500
Transfer student	0.072	0.259	0.083	0.277	0.107	0.309
N	22,267		13,389		11,529	

Table 5 Means and standard deviations by gender NLS 1972, HS&B 1982,and NELS 1992

	Class of 1972				Class of 1982				Class of 1992			
	Men		Women		Men		Women		Men		Women	
Independent Variables	**Mean**	**S. D.**	**Mean**	**S. D.**	**Mean**	**S. D.**	**Mean**	**S. D.**	**Mean**	**S. D.**	**Mean**	**S. D.**
Combined SAT score	0.817	0.212	0.797	0.197	0.745	0.209	0.734	0.198	0.798	0.224	0.770	0.219
High school class rank	0.522	0.227	0.593	0.221	0.488	0.225	0.557	0.223	0.512	0.232	0.574	0.221
Proportion of high school class attending a 2 or 4-year college	0.493	0.193	0.484	0.191	0.483	0.194	0.482	0.189	0.436	0.188	0.442	0.184
High school student leader	0.059	0.236	0.057	0.231	0.041	0.199	0.064	0.245	0.050	0.218	0.071	0.256
High school athlete	0.126	0.332	0.048	0.213	0.147	0.354	0.074	0.262	0.155	0.362	0.073	0.259
Parents' income	1.156	0.476	1.085	0.455	1.209	0.604	1.166	0.586	1.388	1.006	1.306	0.966
Education of mother less than high school	0.148	0.355	0.186	0.389	0.163	0.370	0.200	0.400	0.107	0.309	0.164	0.370
Education of mother college degree or more	0.086	0.280	0.074	0.261	0.123	0.328	0.108	0.311	0.220	0.414	0.181	0.385
Education of father less than high school	0.188	0.390	0.203	0.402	0.198	0.398	0.218	0.413	0.144	0.351	0.148	0.355
Education of father college degree or more	0.136	0.343	0.126	0.332	0.178	0.383	0.169	0.374	0.267	0.443	0.225	0.417
Number of siblings	2.020	1.468	2.102	1.467	1.143	1.169	1.169	1.174	1.120	1.183	1.237	1.356
White	0.775	0.417	0.754	0.431	0.751	0.432	0.757	0.429	0.710	0.454	0.704	0.456
African American	0.079	0.270	0.101	0.302	0.128	0.334	0.139	0.346	0.123	0.328	0.130	0.337
Other race	0.077	0.267	0.076	0.265	0.121	0.326	0.104	0.305	0.164	0.370	0.163	0.370
West	0.179	0.384	0.165	0.371	0.178	0.383	0.164	0.370	0.202	0.402	0.189	0.392
North central	0.292	0.455	0.280	0.449	0.279	0.449	0.283	0.451	0.240	0.427	0.260	0.438
South	0.281	0.449	0.288	0.453	0.315	0.465	0.334	0.472	0.369	0.483	0.355	0.479
Northeast	0.247	0.432	0.266	0.442	0.227	0.419	0.219	0.414	0.189	0.391	0.196	0.397
Rural	0.457	0.498	0.449	0.497	0.317	0.465	0.298	0.458	0.305	0.461	0.312	0.464
Wage rate	3.945	1.567	3.974	1.537	3.439	0.653	3.434	0.657	5.251	0.842	5.197	0.804
Unemployment rate	4.364	1.187	4.359	1.176	9.561	2.668	9.550	2.706	6.418	1.108	6.432	1.141
State college tuition	0.611	0.164	0.610	0.167	0.588	0.202	0.589	0.204	0.795	0.298	0.793	0.289
Transfer student	0.081	0.273	0.063	0.243	0.080	0.271	0.088	0.283	0.115	0.319	0.099	0.299
N	10,848		11,419		6,473		6,916		5,472		6,057	

Table 6 Unadjusted unconditional distribution of college choices, by gender NLS 1972, HS&B 1982,and NELS 1992

	College attendance	2-year college attendance	4-year college attendance	Transfer	4-year college ever	B.A. completion
Class of 1972						
Men	0.60	0.23	0.37	0.08	0.45	0.27
Women	0.55	0.22	0.33	0.06	0.39	0.23
Class of 1982						
Men	0.60	0.25	0.35	0.07	0.42	0.24
Women	0.67	0.30	0.37	0.08	0.44	0.25
Class of 1992						
Men	0.73	0.35	0.38	0.12	0.50	0.27
Women	0.75	0.34	0.41	0.10	0.51	0.33

Table 7 Unadjusted distribution of college choices conditional on previous choices, by gender, NLS 1972, HS&B 1982,and NELS 1992

	College attendance	2-year college attendance	4-year college attendance	Transfer	4-year college ever	B.A. completion
Class of 1972						
Men	0.60	0.39	0.61	0.35	0.75	0.60
Women	0.55	0.40	0.60	0.29	0.72	0.59
Class of 1982						
Men	0.60	0.41	0.59	0.27	0.70	0.58
Women	0.67	0.45	0.55	0.25	0.66	0.57
Class of 1992						
Men	0.73	0.48	0.52	0.33	0.68	0.54
Women	0.75	0.45	0.55	0.29	0.68	0.64

Table 8 Unconditional predicted probabilities of dependent variables with covariates held at NLS population means, by gender, NLS 1972, HS&B 1980, and NELS 1988

	College attendance	2-year college attendance	4-year college attendance	Transfer	4-year college ever	B.A. completion
Class of 1972						
Men	0.63	0.28	0.35	0.10	0.45	0.21
Women	0.59	0.28	0.31	0.08	0.38	0.19
Class of 1982						
Men	0.72	0.33	0.39	0.12	0.51	0.24
Women	0.68	0.32	0.36	0.10	0.46	0.24
Class of 1992						
Men	0.70	0.33	0.37	0.11	0.48	0.23
Women	0.80	0.41	0.39	0.15	0.54	0.26

Table 9 Conditional predicted probabilities of dependent variables with covariates held at NLS population means, by gender, NLS 1972, HS&B 1980, and NELS 1988

	College attendance	2-year college attendance	4-year college attendance	Transfer	4-year college ever	B.A. completion
Class of 1972						
Men	0.63	0.44	0.56	0.34	0.71	0.46
Women	0.59	0.48	0.52	0.28	0.66	0.48
Class of 1982						
Men	0.72	0.46	0.54	0.35	0.70	0.48
Women	0.68	0.47	0.53	0.30	0.67	0.52
Class of 1992						
Men	0.70	0.47	0.53	0.34	0.68	0.47
Women	0.80	0.51	0.49	0.37	0.68	0.48

Table 10 Simulated probability of college completion among high school class of 1992 using probabilities from different years, by gender, NLS 1972, HS&B 1980, NELS 1988

	Completion			
	Women		Men	
	Simulated probability of college completion	Difference actual minus simulated	Simulated probability of college completion	Difference actual minus simulated
1972 conditional probability of attendance	0.19	0.07	0.20	0.03
unconditional 2-year college attendance	0.23	0.03	0.22	0.01
unconditional 4-year college attendance	0.22	0.04	0.22	0.01
1982 probability of attendance	0.22	0.04	0.23	0.00
unconditional 2-year college attendance	0.24	0.02	0.23	0.00
unconditional 4-year college attendance	0.24	0.02	0.24	-0.01
1972 probability of 4-year college	0.27	-0.01	0.23	0.00
1982 probability of 4-year college	0.27	-0.01	0.23	0.00
1972 probability of transfer	0.24	0.02	0.23	0.00
1982 probability of transfer	0.24	0.02	0.23	0.00
1972 probability of completion	0.26	0.00	0.22	0.01
1982 probability of completion	0.28	-0.02	0.23	0.00

Note: Each probability is calculated using the high school class of 1992 probabilities except for the probability listed in the left column. The first row shows the unconditional probability of completing college given the 1972 probability of attending college and the 1992 probabilities of attending a four-year college, transfering, and completing college.

Table 11 Simulated probability of college completion among high school class of 1992 using probabilities from different years, by gender, NLS 1972, HS&B 1980, NELS 1988

	Completion			
	Women		Men	
	Simulated probability of college completion	Difference actual minus simulated	Simulated probability of college completion	Difference actual minus simulated
High Achievers				
1972 conditional probability of attendance	0.57	0.08	0.57	0.01
unconditional 2-year college attendance	0.65	0.00	0.58	0.00
unconditional 4-year college attendance	0.55	0.10	0.58	0.00
1982 probability of attendance	0.61	0.04	0.59	-0.01
unconditional 2-year college attendance	0.65	0.00	0.62	-0.04
unconditional 4-year college attendance	0.60	0.05	0.58	0.00
Middle Achievers				
1972 conditional probability of attendance	0.22	0.07	0.25	0.02
unconditional 2-year college attendance	0.27	0.02	0.26	0.01
unconditional 4-year college attendance	0.25	0.04	0.27	0.00
1982 probability of attendance	0.25	0.04	0.27	0.00
unconditional 2-year college attendance	0.28	0.01	0.27	0.00
unconditional 4-year college attendance	0.28	0.01	0.27	0.00
Low Achievers				
1972 conditional probability of attendance	0.04	0.02	0.05	0.02
unconditional 2-year college attendance	0.05	0.01	0.06	0.01
unconditional 4-year college attendance	0.05	0.01	0.07	0.00
1982 probability of attendance	0.05	0.01	0.06	0.01
unconditional 2-year college attendance	0.05	0.01	0.06	0.01
unconditional 4-year college attendance	0.06	0.00	0.07	0.00

Note: Each probability is calculated using the high school class of 1992 probabilities except for the probability listed in the left column. The first row shows the unconditional probability of completing college given the 1972 probability of attending college and the 1992 probabilities of attending a four-year college, transfering, and completing college.

Table A.1 Male parameter estimates of probit models predicting college attendance, four-year college attendance, transfer, and completion, NLS 1972, HS&B 1980, and NELS 1988

	NLS				HSB				NELS			
	Attendance	4-year college	Transfer	Completion	Attendance	4-year college	Transfer	Completion	Attendance	4-year college	Transfer	Completion
Constant	-3.019	-2.039	-2.073	-2.427	-2.138	-2.099	-2.011	-1.888	-1.924	-2.687	-1.890	-2.142
	-0.176	-0.129	-0.204	-0.150	-0.190	-0.141	-0.228	-0.166	-0.294	-0.141	-0.202	-0.166
SAT score	2.554	1.880	1.509	1.292	2.241	1.578	1.382	1.286	1.892	1.821	1.179	1.266
	-0.093	-0.113	-0.182	-0.130	-0.123	-0.134	-0.214	-0.157	-0.136	-0.133	-0.198	-0.156
High school class rank	0.674	1.032	0.662	1.534	0.960	1.078	0.615	1.096	0.996	1.314	0.843	1.243
	-0.071	-0.092	-0.138	-0.109	-0.097	-0.102	-0.158	-0.120	-0.120	-0.111	-0.161	-0.127
Proportion of high school class going to college	1.022	0.242	0.380	0.690	0.912	0.715	0.445	0.448	0.614	1.073	0.491	0.765
	-0.081	-0.098	-0.162	-0.113	-0.096	-0.105	-0.169	-0.120	-0.130	-0.115	-0.186	-0.126
High school student leader	0.512	0.213	0.252	0.163	0.463	0.409	0.149	0.148	0.309	0.135	0.245	0.234
	-0.073	-0.068	-0.118	-0.070	-0.123	-0.090	-0.164	-0.090	-0.143	-0.099	-0.174	-0.098
High school athlete	0.514	0.258	0.222	0.162	0.348	0.299	0.210	0.185	0.424	0.309	0.292	0.138
	-0.046	-0.049	-0.083	-0.054	-0.057	-0.055	-0.093	-0.059	-0.074	-0.057	-0.092	-0.062
Parents' income	0.188	0.020	0.004	0.157	0.065	0.069	0.166	0.117	0.185	0.115	0.126	0.098
	-0.033	-0.040	-0.064	-0.046	-0.034	-0.036	-0.058	-0.040	-0.035	-0.024	-0.044	-0.026
Education of mother less than high school	-0.127	0.118	-0.110	-0.149	-0.133	-0.044	-0.078	0.080	-0.165	-0.214	0.028	-0.167
	-0.044	-0.061	-0.090	-0.073	-0.050	-0.068	-0.099	-0.083	-0.069	-0.089	-0.112	-0.112
Education of mother college degree or more	0.211	0.134	0.036	0.097	0.318	0.245	0.221	0.140	0.261	0.120	0.020	0.088
	-0.069	-0.065	-0.110	-0.068	-0.073	-0.064	-0.106	-0.067	-0.077	-0.062	-0.102	-0.067
Education of father less than high school	-0.205	-0.065	-0.139	-0.116	-0.187	-0.005	-0.094	-0.046	-0.333	0.011	-0.144	-0.135
	-0.041	-0.057	-0.085	-0.068	-0.049	-0.065	-0.096	-0.079	-0.065	-0.083	-0.111	-0.108
Education of father college degree or more	0.223	0.303	0.299	0.115	0.409	0.241	0.303	0.289	0.276	0.226	0.502	0.252
	-0.059	-0.058	-0.097	-0.061	-0.063	-0.059	-0.093	-0.063	-0.078	-0.061	-0.096	-0.067
Siblings	-0.010	-0.012	0.008	-0.038	-0.028	-0.032	-0.013	-0.050	-0.063	-0.007	-0.056	-0.086
	-0.010	-0.012	-0.019	-0.014	-0.015	-0.019	-0.027	-0.021	-0.019	-0.019	-0.027	-0.024
Black	0.317	0.376	-0.046	0.074	0.157	0.359	0.134	-0.206	0.170	0.572	0.046	-0.085
	-0.049	-0.066	-0.105	-0.078	-0.053	-0.066	-0.102	-0.075	-0.076	-0.086	-0.136	-0.102
Other race	0.207	0.029	0.127	0.020	0.153	0.108	0.076	-0.162	0.306	0.168	-0.013	-0.040
	-0.051	-0.068	-0.091	-0.081	-0.048	-0.057	-0.085	-0.066	-0.062	-0.062	-0.086	-0.071
West	0.171	-0.846	-0.260	-0.437	0.255	-0.572	-0.194	-0.305	0.112	-0.585	-0.140	-0.106
	-0.061	-0.054	-0.083	-0.065	-0.066	-0.064	-0.097	-0.077	-0.089	-0.073	-0.111	-0.083
North central	0.032	-0.032	-0.033	-0.075	0.133	-0.155	-0.273	-0.134	-0.167	-0.082	-0.259	-0.061

	-0.044	-0.053	-0.089	-0.058	-0.062	-0.061	-0.097	-0.067	-0.078	-0.067	-0.110	-0.075
South	0.143	-0.145	-0.034	-0.091	0.225	-0.159	-0.052	-0.151	-0.090	-0.223	-0.073	-0.132
	-0.057	-0.050	-0.084	-0.055	-0.070	-0.060	-0.096	-0.067	-0.092	-0.064	-0.105	-0.070
Rural high school	-0.175	0.042	-0.133	0.096	-0.128	0.135	-0.081	0.084	-0.235	0.042	-0.147	-0.013
	-0.034	-0.039	-0.059	-0.044	-0.041	-0.053	-0.080	-0.061	-0.049	-0.052	-0.073	-0.061
Local wage	-0.014				-0.032				0.139			
	-0.011				-0.033				-0.041			
Local unemployment rate	0.043				-0.004				0.045			
	-0.015				-0.008				-0.020			
Tuition	0.200				0.136				-0.459			
	-0.126				-0.135				-0.114			
Transfer				0.226				-0.190				-0.082
				-0.052				-0.062				-0.065
N	10848	6418	2527	4754	7216	4490	1835	3276	5568	4245	1815	3038
Log Likelihood	-5568	-3575	-1490	-2795	-3403	-2509	-1060	-1915	-2109	-2155	-1017	-1672

Table A.2 Female parameter estimates of probit models predicting college attendance, four-year college attendance, transfer, and completion, NLS 1972, HS&B 1980, and NELS 1988

	NLS				HSB				NELS			
	Attendance	4-year college	Transfer	Completion	Attendance	4-year college	Transfer	Completion	Attendance	4-year college	Transfer	Completion
Constant	-2.538	-2.004	-2.445	-2.230	-1.904	-2.341	-2.041	-2.089	-2.528	-3.022	-2.466	-2.196
	-0.167	-0.134	-0.221	-0.162	-0.179	-0.132	-0.207	-0.166	-0.304	-0.137	-0.204	-0.171
SAT score	2.218	1.579	1.300	1.283	2.250	1.886	1.320	1.626	2.479	2.164	1.544	1.055
	-0.095	-0.119	-0.201	-0.137	-0.128	-0.134	-0.208	-0.163	-0.157	-0.136	-0.207	-0.162
High school class rank	0.788	0.901	0.545	1.080	0.820	0.935	0.593	0.977	1.028	1.264	1.084	1.806
	-0.071	-0.098	-0.150	-0.124	-0.096	-0.100	-0.146	-0.125	-0.114	-0.111	-0.154	-0.135
Proportion of high school class going to college	0.911	0.283	0.515	0.656	0.956	0.351	0.605	0.505	0.414	1.343	0.697	0.742
	-0.079	-0.103	-0.169	-0.119	-0.097	-0.100	-0.158	-0.119	-0.136	-0.118	-0.185	-0.132
High school student leader	0.521	0.289	0.296	0.184	0.551	0.235	0.166	0.139	0.345	0.162	0.362	0.097
	-0.067	-0.065	-0.117	-0.068	-0.099	-0.069	-0.120	-0.076	-0.126	-0.078	-0.132	-0.081
High school athlete	0.250	0.060	0.250	0.159	0.117	0.334	0.268	0.100	0.423	0.278	0.291	0.299
	-0.066	-0.075	-0.122	-0.082	-0.083	-0.073	-0.122	-0.076	-0.123	-0.075	-0.125	-0.081
Parents' income	0.237	0.126	0.109	0.195	0.177	0.124	0.068	0.129	0.185	0.101	0.167	0.109
	-0.033	-0.042	-0.068	-0.048	-0.037	-0.034	-0.054	-0.040	-0.041	-0.023	-0.041	-0.026
Education of mother less than high school	-0.169	-0.110	-0.002	-0.186	-0.251	-0.091	-0.125	-0.071	-0.222	-0.138	-0.166	-0.169
	-0.039	-0.055	-0.084	-0.069	-0.047	-0.058	-0.082	-0.074	-0.061	-0.073	-0.095	-0.098
Education of mother college degree or more	0.337	0.168	0.366	0.173	0.190	0.278	0.007	0.209	0.153	0.297	0.105	0.160
	-0.069	-0.068	-0.119	-0.070	-0.079	-0.063	-0.110	-0.068	-0.085	-0.061	-0.104	-0.068
Education of father less than high school	-0.163	-0.121	-0.115	-0.094	-0.141	-0.031	-0.124	-0.136	-0.194	0.026	-0.202	-0.140
	-0.038	-0.054	-0.083	-0.066	-0.047	-0.056	-0.081	-0.072	-0.064	-0.075	-0.101	-0.099
Education of father college degree or more	0.304	0.305	0.148	0.075	0.435	0.324	0.342	0.234	0.370	0.211	0.264	0.218
	-0.055	-0.059	-0.104	-0.063	-0.069	-0.056	-0.091	-0.062	-0.086	-0.060	-0.097	-0.066
Siblings	-0.010	0.005	-0.003	-0.031	-0.026	0.002	-0.021	-0.034	-0.071	-0.021	-0.012	-0.044
	-0.009	-0.012	-0.019	-0.014	-0.015	-0.017	-0.025	-0.021	-0.016	-0.017	-0.024	-0.020
Black	0.622	0.542	0.229	0.113	0.478	0.511	0.189	-0.143	0.374	0.468	0.014	0.036
	-0.043	-0.058	-0.099	-0.070	-0.052	-0.061	-0.096	-0.070	-0.077	-0.076	-0.121	-0.089
Other race	0.237	0.182	0.183	-0.044	0.310	0.243	0.239	-0.021	0.189	0.213	0.129	-0.028
	-0.052	-0.070	-0.104	-0.085	-0.050	-0.053	-0.078	-0.063	-0.062	-0.060	-0.081	-0.069
West	0.236	-0.627	-0.118	-0.188	0.177	-0.510	-0.092	-0.239	0.092	-0.567	-0.139	0.052
	-0.057	-0.054	-0.084	-0.067	-0.070	-0.061	-0.090	-0.075	-0.088	-0.070	-0.105	-0.083
North central	0.018	0.057	-0.128	-0.091	0.116	-0.051	-0.112	-0.142	-0.001	-0.233	-0.262	-0.123

	-0.041	-0.052	-0.092	-0.059	-0.062	-0.055	-0.086	-0.063	-0.078	-0.063	-0.101	-0.070
South	0.002	-0.048	0.099	-0.004	0.031	-0.118	-0.100	-0.096	-0.017	-0.208	-0.131	-0.057
	-0.054	-0.049	-0.083	-0.056	-0.070	-0.055	-0.086	-0.064	-0.093	-0.062	-0.099	-0.068
Rural high school	-0.113	0.036	0.126	0.097	-0.003	0.075	-0.176	0.077	-0.043	0.094	-0.073	-0.108
	-0.032	-0.038	-0.062	-0.045	-0.043	-0.049	-0.074	-0.060	-0.049	-0.048	-0.069	-0.057
Local wage	-0.033				-0.002				0.181			
	-0.011				-0.034				-0.042			
Local unemployment rate	0.029				0.007				0.040			
	-0.014				-0.008				-0.020			
Tuition	-0.319				-0.374				-0.352			
	-0.120				-0.137				-0.117			
Transfer				0.043				-0.249				-0.040
				-0.056				-0.059				-0.062
N	11419	6241	2509	4444	7422	5089	2203	3573	6114	4850	2092	3419
Log Likelihood	-6209	-3593	-1390	-2696	-3345	-2924	-1257	-2051	-4255	-2406	-1118	-1779