College-Going and Inequality: A Literature Review

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I. Introduction

Since 1973, when Congress undertook the last major structural reform of federal financial aid rules by establishing the Pell Grant program– a school voucher program for low-income undergraduates– very little has changed in the way government helps families pay for college. Meanwhile, the environment has changed dramatically. First, the labor market for college graduates is quite different. The percentage difference in earnings between those with and without a college degree has more than doubled since 1980. Second, there appears to be a supply response under way. The proportion of 18-24 year-olds enrolled in college has increased by more than one-third since 1980. This paper describes some of the characteristics of that supply response: which racial and gender groups are responding and which are not, and what role income inequality may be playing in shaping those responses.

Section II discusses changes over time in gaps in college-going by family income and by race. The large gaps in college-going by family income appear to be widening over time. Moreover, despite some closing of the racial gap in high school graduation rates and test scores, the racial gap in the proportion of blacks and whites attending college also appears to be widening.[1] Section III surveys the evidence on the "causal" role of parental income in determining college enrollment rates, citing the results of various attempts to control for any correlation between family income and other parental characteristics such as a preference for educational investments, that might be generating a correlation

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[1]This is true if one reports college going rates as a proportion of the population in a particular age group or as a proportion of high school graduates in a population group. Given the rise in high school graduation rates for blacks, the latter fact would be less surprising. It is the former that is discussed below.

between parental income and college-going. Section IV presents the evidence on the effect of tuition policies and financial aid on college-going. The section includes a summary of the evidence regarding the existence of any capital market constraints on students' ability to invest in schooling. Section V reports evidence on students' and parents' perceptions of college costs, the earnings payoffs to a college degree and parental savings decisions. In addition to presenting some tabulations of the National Education Longitudinal Study of 1988, the section includes recent evidence from a program intended to help public high school students in Boston apply to college. Section VI revisits the question of whether or not public financing of higher education increases or decreases family income inequality, a longstanding debate which flared up following the publication by Hansen and Weisbrod of an analysis of California higher education in 1968, but which has received much less attention recently. Finally, Section VII evaluates the evidence that capacity constraints in higher education during the early Seventies may have contributed to the rise in earnings inequality since the late Seventies. The section also reports some reasons why the supply response that is currently underway is may continue to be outpaced by the rise in demand for skilled labor.

II. Persistent and Widening Gaps in College-Going by Family Income

There are large gaps in college-going by family income. The top panel of Table 1 reports differences in college-going among seniors from the high school classes of 1980/82, as reported in Ellwood and Kane (2000).[2] Eighty percent (80%) of the students from the top income quartile

[2] These data rely upon the parent-reported family income data, rather than the less-reliable student responses. If students attended more than one type of postsecondary institution, they were categorized as four-year college if they ever attended a four-year college and, if not, as two-year college entrants if they ever attended a two-year college.

attended some type of postsecondary institution within 20 months of their high school graduation, as compared with fifty-seven percent (57%) of those from the lowest income quartiles. The gaps by family income were particularly large in four-year college entrance, with 55 percent of the highest-income youth attending a four-year college at some point and only 29 percent of the lowest income youth.

Moreover, although the evidence is somewhat more sparse, these gaps appear to be widening over time. It is surprisingly difficult to keep track of differences in college-going by family income with the data available in the federal statistical system. The annual October Current Population Survey, for instance, collects data on college enrollment of youth, but only collects income information for their current household, which is not necessarily their parents' household.[3] One observes parental income only if one is a member of one's parents' household. Moreover, the major longitudinal surveys collected by the National Center for Education Statistics (the High School and Beyond and National Education Longitudinal Study of 1988) which do contain information on the income of parents while their youth were in high school, asked about parental family income in slightly different ways in different years. The results in the bottom panel of Table 1 represent an attempt by Ellwood and Kane (2000) to define parental family income quartiles in consistent ways using the NELS and High School and Beyond.[4]

Although college entry rates grew for all groups between the high school classes of 1980/82 and 1992, the increases were larger for middle and higher income families. For example, there was a

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[3]For an analysis using the October CPS, see Hauser (1992).

[4]Both sets of estimates are based upon parent-reported, not student-reported, family income.

10 percentage point increase in the proportion of the highest income youth attending some postsecondary institution between 1980/92 and 1992. Moreover, the increase in postsecondary schooling was largest for high-income youth attending four-year colleges, rising from 55 percent to 66 percent. In contrast, we estimate that there was only a 3 percentage point rise in postsecondary entry for youth from the lowest income quartile and a 1 percentage point decline (albeit statistically insignificant) in the proportion of low-income youth attending a four-year college.

In other words, the persistently large gaps in college-going by family income appear to be widening. However, even if the gaps in college-going by family income were not widening, the rising payoff to college since 1980 has magnified the consequences of the pre-existing gap in college entry by family income. While the gap in postsecondary training between the highest and lowest-income quartiles grew by one-third (from 23 percentage points to 30 percentage points), the earnings differentials between college entrants and high school graduates more than doubled between 1980 and 1997. Between the two phenomena-- the widening gap in college enrollment by family income and the rising payoff to a college education-- the latter is likely to have larger implications for social mobility.

Widening Gaps in College Enrollment by Race, Despite Closing of the Racial Gaps in H.S. Graduation and Test Scores

While the Current Population Survey makes it difficult to track college-going rates by parental income level, it is possible to track college-going rates by race. Given the correlation between race and income, any increase in income gaps ought to be reflected in a widening of the racial gap. Figure 1 reports the trend in the percentage of 18-24 year-olds enrolled in college by race/ethnicity between

1972 and 1998.[5] The panel on the left reports enrollment rates by race; the panel on the right reports the difference in enrollment rate relative to whites for both blacks and Hispanics each year. After remaining flat for most of the Seventies, enrollment rates began to rise during the Eighties for all groups. The proportion of white 18-24 year-olds enrolled in college increased from 27 percent to 41 percent between 1980 and 1998. Enrollment rates for African American youth also increased over that period-- from 19 to 29 percent-- but the magnitude of the increase for African Americans (10 percent) was smaller than the magnitude of the increase for white non-Hispanics (14 percent).[6] As a result, as reported in the right panel of Figure 1, the gaps in college enrollment by race also increased.

The widening racial gaps in college enrollment rates are particularly striking when contrasted with the gradual closing of the racial gaps in high school graduation and test performance over the same period. Figure 2 reports the trends in high school status drop-out rates (the proportion of youth not enrolled in school who do not have a high school diploma) for 16-24 year-old youth by race/ethnicity, from 1972 through 1998. As in Figure 1, the left panel of Figure 2 reports the trends in high school status dropout rates by race/ethnicity; the right panel reports the differences in high school dropout rates for blacks and Hispanics relative to white non-Hispanics. Throughout much of the period, high school dropout rates were gradually falling for all three groups. However, the decline among African Americans accelerated between the mid-Seventies and the mid-Eighties, closing somewhat the black-white gap in high school graduation rates. Between 1975 and 1988, the status dropout rate fell from 11.4 to 9.6 percent for white non-Hispanics (a 1.8 percentage point drop) and from 22.9 to 14.5

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[5]The data in Figure 1 were drawn from the National Center for Education Statistics, *Digest of Education Statistics 1999*, Table 139.

[6]The increases over the time period were larger for women than for men.

percent for black non-Hispanics (a 8.4 percentage point drop).

Some portion of this closing racial gap in high school dropout rates may be attributable to a rise in GED receipt, rather than an increase in high school diplomas. However, it is unlikely that an increase in GED receipt among African Americans accounted for all of the closing. The Current Population Survey first began to distinguish between those completing high school diplomas and those completing GED's in 1988. In 1990, a small but roughly equal proportion of black and white 18-24 year-olds reported having completed a GED or other equivalent rather than a regular high school degree (5 percent).[7]

Figure 3 reports the trend in math and reading test scores on the National Assessment of Educational Progress exams by race/ethnicity for 13 and 17 year-olds since 1975.[8] For both age groups, in both reading and math, blacks and Hispanics were closing the gap in achievement relative to white non-Hispanics. A student-level standard deviation on the NAEP reading test was approximately 40 points over this time period. Between 1975 and 1988, the black-white gap in reading test scores at age 17 close from approximately 1.25 standard deviations to .5 standard deviations. Since 1988, it seems that the gap has opened up again slightly, but the gap remains considerably smaller than it was in 1975.

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[7]U.S. Department of Health and Human Services, *Trends in the Well-Being of America's Children and Youth, 2000*, p. 311.

[8]For a more detailed discussion of the closing gaps in test performance between blacks and whites, see Jencks and Phillips (eds.), *The Black-White Test Score Gap* (1998), particularly chapters 5 and 6.

Trends in Educational Attainment

Figure 4a reports trends in the proportion of 25-27 year-olds reporting any postsecondary enrollment by race and gender. Three facts are worth noting in Figure 4a. First, the timing of the rise in the proportion of 25-27 year-olds reporting ever having entered college matches roughly with the timing of the rise in college enrollment rates of 18-24 year olds. The rise for 25-27 year-old White non-Hispanic began in approximately 1987, meaning that the increase began with the cohort turning 18 in 1979-- the same year in which college enrollment rates began to rise. Second, because it reflects the "stock" of students enrolled in college and not the "flow" of new entrants, the magnitude of the rise in college enrollment of 18-24 year-olds somewhat overstates the rise in college entry. As we saw in Figure 1, the proportion of 18-24 year-olds enrolled in college grew by 31 percent between 1983 and 1994. (These cohorts should roughly correspond to the cohorts of 25-27 year-olds in 1988 and 1999.) The proportion of these cohorts *ever* entering college also rose (from 47 to 57 percent), but only by two-thirds as much (21 percent).

Figure 4b reports the proportion of 25-27 year-olds with a BA degree. Beginning in 1992, the format of the educational attainment question changed. As a result, we have to be careful in comparing rates of degree completion before and after 1992. Keeping the appropriate caveats in mind, the increases were roughly consistent with the rise in the proportion ever-entering college. Between 1988 and 1999, the proportion of 25-27 year-olds with a BA degree or higher rose by 23 percent (from 22.1 to 27.2 percent). On a proportionate basis, the rise in BA degree completion roughly matched the rise in college entry, implying that there was little decline in college completion rates over the period when college entry rates were rising.[9] Presumably, the larger proportionate rise in the "stock" of college enrollees than in the "flow" of college entrants or the "flow" in college completers reflects an increase in part-time enrollment and a lengthening time-to-degree.[10]

Figure 4c reports the racial/ethnic gaps in educational attainment among 25-27 year-olds over time and by gender. The top panel reports the gaps in the proportion of 25-27 year-olds reporting to have entered college at some point; the bottom panel reports the gaps BA degree completion rates for the same age group. Just as Figure 1 indicated a widening gap in college enrollment rates among 18-24 year-olds by race, there appears to have been a widening in the gaps in educational attainment among 25-27 year-olds by race. Moreover, the racial/ethnic gaps widened in the proportion ever-entering college as well as in the proportion completing BA degrees.

Gender Differences in Educational Attainment

As reported in Figure 4a, the rise in college entry since 1980 was larger for women than for men. Administrative data published by the U.S. Department of Education confirms that women now account for a disproportionate share of enrollment, and more than half of the associate, bachelors and master's degrees conferred.[11] As argued in Kane (1994) and Charles and Luoh (2001), it is difficult to attribute the widening gap by gender to any differences in the rise in the education wage premium since 1980, since the apparent rise in the payoff to schooling was quite similar for men and women through

[11]National Center for Education Statistics, *Digest of Education Statistics*, 1998, Tables 170 and 172. Men still account for the majority of doctorate and first-professional degrees conferred.

the early Nineties. Gottschalk and Pizer (1999) also report similar increases in the experience differential for college-educated men and women. There may be other explanations, such as advantages in non-wage characteristics of jobs for college graduates (e.g. flexibility in hours), that could account for the large increases in enrollment by women. However, this important trend is currently not very well understood.

Concentration of Peer Effects and Resources among BA Degree Holders

Hoxby and Terry (1999) studied the rise in income inequality among 32 year-old male college graduates in 1972, 1986 and 1995-- who had graduated from high school in approximately 1958, 1972 and 1981 respectively. They decompose the rise in earnings inequality into 3 components: that due to family background for college graduates (race, parental education, family size and parental income), college selectivity (using average SAT scores to break schools into 12 categories), and a third component, measured by expenditures per student at the college one attended and interactions between the variance in student SAT scores and college selectivity.

The interpretation of the variance decomposition is somewhat complicated by the fact that the authors did not have any direct measure of an individual's ability (such as an individual test score). As a result, the second component, reflecting the effects of college selectivity dummy variables, combines any change in the return to individual skill differences as well as any change in the payoff to attending a more selective institution. The component described by the authors as the "peer effect" from attending a more selective institution is actually the interaction between the variance in student test scores and college selectivity. As expected, they find that the wider the variance in test scores at an elite institution, the less of an advantage the elite institution provides (and the reverse for the bottom institutions). This may not be a "peer effect", however, since it may simply mean that a college's selectivity provides a less accurate proxy of a student's own ability than when a school is more homogeneous.

Much more straightforward to interpret is the fraction of the rise in earnings inequality that is attributable to changes in payoff to college expenditures per student and the variance in the expenditures per student. Roughly a third of the rise in earnings inequality among college graduates between 1972 and 1995 could be attributed to a rise in the payoff to attending an institution that spent more per student and the rise in the inequality in spending per student.[12] (The rise in the return to spending per student and the rise in the variance in spending per student were equally important.) The importance of this finding is highlighted by the fact that, since 1981, when the youngest cohort studied by Hoxby and Terry entered school, the most selective colleges have become rather more selective and the variance in expenditures per student in colleges has widened even further. Kane (1999) reports that expenditures per student rose by 70 percent in real value at private four-year institutions between 1980-81 and 1994-95, but only by 28 and 30 percent respectively at public two-year and four-year colleges. As a result, future work should study not only differences in college entry by family income, but also differences in spending per student in the institutions attended by high and low-income families.

III. Income or Other Factors Correlated with Income?

If the level of family income has a direct effect on college-going, then one might have expected the rise in income inequality over the past three decades to have had some effect on the inequality in

[12]The authors do not break out the effect of this subcomponent directly. I calculated the contribution of the component using the coefficients in Table 1 and the variances in the expenditures per student over time reported in the appendix.

college-going. However, the commonly-observed empirical relationship between income and college-going need not imply any causal relationship. After all, income differences are likely to be correlated with other differences in family background. Research on this question has taken one of four approaches: The first approach has been to try to control directly for observed characteristics that may be correlated with income-- test scores, grades, school attended, even parental education. This approach could lead to biases in either direction. On one hand, such estimates would exaggerate differences by family income to the extent that they are an incomplete list of the relevant differences between high and low-income youth. On the other hand, to the extent that parental family income in a given year is an imperfect measure and if test scores are more correlated with "true" income than they are with the measurement error, such differences may be understated. Moreover, anticipated differences in access to post-secondary options may lead low-income students to focus less on their studies in elementary and secondary school, leading to poorer performance on standardized tests. If so, controlling for test scores would understate the importance of family income.

Using observed differences in family background and test scores, much of the difference in college entry by family income remains, even after one attempts to control for test scores, high school grades and elementary schools attended by different youth. Table 2 reports differences in college-going by family income and by students' scores on a standardized test of basic math skills administered when youth were in 12th grade. Among students with test scores in the bottom third of the class of 1992, the differences in enrollment by family income are particularly large: 73 percent of youth from the highest income category went on to post-secondary schooling despite low test scores, while only 48 percent of low income students with such test scores went on to college. However, differences remain even among students with test scores in the top third of their class: 96 percent of high-income, high-test-score students went on to postsecondary schooling as compared with 82 percent of low-income high-test-score youth. The differences are particularly striking in four-year college entry. Only 68 percent of the low-income, high-test-score youth went on to a 4 year college within 20 months of high school graduation, as compared with 84 percent of high-income, high- test-score youth.

Although Table 2 accounts for only one difference between high and low-income youth (math test scores), Ellwood and Kane (2000) also included a longer list of student characteristics in attempting to control for other differences in academic preparation between high- and low-income students. Table 3 reports differences in the proportion of youth receiving any postsecondary training (at a 2-year, 4-year college or vocational school) and attending a 4-year college within 20 months of graduating from high school in 1992. The first column reports the simple difference one observes without controlling for other factors. Youth from the top quartile were 28 percentage points more likely to have attended any postsecondary training and 36 percentage points more likely to have attended a 4-year college within 20 months after high school graduation. (The proportion of the lowest quartile receiving any postsecondary training was 63 percent and the proportion entering 4 year college was 32 percent.) As reported in the second column of Table 3, large differences remained among youth with similar test scores and similar high school class ranks. For instance, there was an18 percentage point difference in the proportion entering any post-secondary training and in the proportion entering a 4-year college. (Although the difference was largest among youth with test scores in the bottom of the class, differences remained even among youth with test scores in the top quarter of the class.) The third column compares youth with similar test scores and high school class rank, who had also attended the same schools in 8th grade. Youth from the top quartile were 14 percentage points more likely to attend any post-secondary training and 12 percentage points more likely to attend a 4-year college.

The last column compares youth with similar parental education as well as similar test scores and high school class ranks.[13] There are advantages and disadvantages to including parental education as a control variable in such an exercise. On one hand, part of the difference in college-going by family income may reflect differences in parental "preferences" for education. As a result, one might want to control for such differences. On the other hand, parental education probably measures more than just parental encouragement for higher education, in that it is also likely to provide an indirect measure of family wealth. As a result, controlling for differences in parental education may overstate the importance of differences in parental tastes for education and understate the differences attributable to parental ability to pay. Nevertheless, much of the difference in college-going by parental income remains, even after including measures of parental education as regressors.

A second approach is to evaluate the impact of temporary changes in income on college-going, attempting to control for average income. Mayer (1997) measures the educational attainment of children in families who experienced a 35 percent or more decline income in two adjacent years over a ten-year period, controlling for average income over the period. Although families experiencing large drops in earnings did not differ on many outcomes, such as elementary school test scores, teen childbearing or high school drop-out, youth from families experiencing large declines in income did complete fewer years of schooling after high school.

However, the source of fluctuations in income-- one earner leaving the household, an error in reporting income, a marital status change, parental job loss-- may have its own direct effect on

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[13] Parental education was measured by including dummy variables for the highest level of education attended by either parent, as measured by an indicator of whether either of one's parents graduated from high school, attended college, completed a bachelor's degree or completed a graduate degree.

educational attainment or may be related to other factors influencing educational choices. Shea (2000) takes a related approach, exploring the relationship between parental family income differences associated with specific characteristics-- union status, industry of employment and recent job loss-- and various youth outcomes, including educational attainment. His hypothesis is that while union status or job loss have large effects on parental income, they may have no direct effect on youth educational attainment other than through income. When using the nationally representative component of the PSID sample, he finds no relationship between income differences associated with any of the above traits and children's educational attainment or earnings. However, when using the low-income sample from the PSID, he finds large, statistically significant effects of such variation in parental income on youth wages and earnings and marginally significant effects on youth educational attainment. Shea (2000) interprets these results as providing mixed evidence on the causal role of income fluctuations on educational attainment. However, it is not at all clear why such factors would not have their own direct effect on college going other than through family income. For instance, the children of union members may receive preferences for entry into union apprenticeship programs. Children whose parents work in industries with high wages for a given level of educational attainment may also have an edge in applying for jobs in these industries. If so, attending college may make less sense economically for these youth than for others, potentially explaining the fact that children of these parents do not have higher college entry rates.

A third approach involves exploiting changes in the income distribution over time, holding constant percentile ranking, and asking whether changes in levels of family income at different points in the family income distribution are related to changes in children's educational attainment. For instance, using the PSID, Mayer (1997) noted that average income for the poorest quintile fell by 21 percent in real terms between 1972-75 and 1980-83 and increased by 4 percent in the top two quintiles. She then studied changes in youth outcomes for those from the top and bottom of the income distribution over that time period and compared the changes to what one might have expected from the simple cross-sectional relationship between parental income and those same outcomes. The change in years of schooling for youth who were high school graduates-- both the decline for those in the bottom quintile and the rise for those in the top two quintiles-- was actually larger than one might have expected based upon the simple cross-section.

Acemoglu and Pischke (2000) take a related approach. Using the National Longitudinal Study of the Class of 1972, the High School and Beyond survey of the classes of 1980/82 and the National Education Longitudinal Study of those graduating from high school in 1992, the authors calculated mean college-going rates and mean parental family income for 4 income quartiles, in 4 regions for each of the 3 cohorts. They then studied the effect of changes in the absolute level of income within each quartile over time on changes in college enrollment rates. Like Mayer, they find estimates of the effect of income on college-going that are actually larger than the effects in the cross-section.

A fourth approach is to randomly provide additional income to parents and observe the effects on student enrollment. The income maintenance experiments conducted in a number of sites in the mid-Seventies essentially essentially did so. Although the primary purpose of those experiments was to evaluate the effect on parental labor supply of providing a guaranteed income, the experiments also kept track of children's school enrollment and work decisions. Venti(1984) studied the impact of the income maintenance programs in Seattle and Denver on youth's work and schooling decisions between the ages of 16 and 21. Among 18 and 19 year-olds, Venti (1984) estimated that being in a family participating in the income maintenance experiment was associated with a 14 and 9 percentage point increase in the probably of attending school respectively (relative to an enrollment rate of 28 and 13 percent respectively in the control group). Although he did not distinguish between high school and college enrollment, the impacts were largest among those of initial college age (18 and 19 years old). The impacts for 16 and 17 year-olds were only 2 and 4 percentage points respectively. Youth in the treatment group were also less likely to work.

It is not clear that these were purely income effects. Families in the program also faced higher tax rates on total household income that accompanied the guaranteed incomes. If parents passed along some this tax by retrieving from the student at least part of the reduction in family grant assistance attributable to the youth's earnings, then the program lowered the marginal payoff to working for youth and lowered the opportunity cost of going to school. In other words the negative income tax may not only have increased family income, but may also have lowered the opportunity cost of attending college, to the extent that parents would have demanded some of the youth's earnings. Without knowing how families passed along any taxes on the earnings of secondary workers, it is difficult to know how much was due to the income effect and how much was due to the change in the cost of schooling. However, these results were at least consistent with a causal role for family income.

IV. The Role of Rising Tuition Levels in Widening the Gaps in Enrollment by Family Income

After growing slowly between 1965 and 1980, tuition levels began rising more rapidly than overall inflation between 1980 and 1999.[14] Figure 5 portrays the trend in tuition levels at public and private, 2-year and 4-year universities. Between 1965 and 1980, the average tuition at a private 4 year

[14] All series were adjusted for inflation using the CPI-U-X1.

institution had risen only 22 percent faster than inflation. However, between 1980 and 1999, tuition at private 4-year institutions rose 136 percent in real terms. After rising by 17 percent in real value between 1965 and 1980, the average public 4-year tuition rose by 114 percent between 1980 and 1999.

Over the years, a large literature has developed, studying the impact of various types of tuition and financial aid policies on college-going. In their review of the literature on student responsiveness to changes in college cost, Leslie and Brinkman (1988) report a consensus estimate that a $1000 change in college costs ($1990) is associated with an approximately 5 percentage point difference in college enrollment rates. Table 4 summarizes the results from three recent sets of studies, published since the Leslie and Brinkman review: those that use differences in public tuition levels between states and over time, those that evaluate the impact of financial aid policies that operate outside the usual need-analysis system, and those evaluating changes in financial aid policy operating through the regular financial aid process.

The first three papers use between-state differences in state tuition policy and essentially compare the college entry rates of otherwise similar youth in high and low-tuition states. The empirical strategy in this literature uses the assumption that the price that is relevant for the marginal student is the tuition at public institutions in their state and evaluate the effect of tuition and college-going by comparing college-going rates in high and low-tuition states. Such studies also assume that the supply of college slots is perfectly elastic: given a change in price, it is solely student demand which determines enrollment and not the supply of college slots.

Two characteristics of these studies deserve comment: First, although they use 3 different data sets-- the October Current Population Survey, the National Longitudinal Survey of Youth and the High

School and Beyond-- each generates similar results. A $1000 difference in tuition is associated with a 6 percentage point difference in college-going. Indeed, these estimates are quite consistent with the older literature summarized by Leslie and Brinkman.

Second, a weakness of these studies is that they rely on relatively fixed differences in tuition levels between states. For instance, California has been a relatively low-tuition state for the past forty years. California has also built a number of community colleges around the state. One may be attributing to tuition policy the effect of these other policy differences, such as the construction of community colleges. As a result, Kane (1999) used administrative data to look at what happens to enrollments within a state when it raises tuition. Interestingly, one sees comparable effects of tuition changes within states over time as one would estimate looking across states.

Despite strong evidence of student and parent responsiveness to tuition costs, the evidence for the impact of the Pell Grant program is much weaker. Lee Hansen (1983) first noted that there had been little evidence of a disproportionate rise in college enrollment by low-income youth during the Seventies, when the Pell Grant program was established. Although that paper was criticized for relying too heavily on two years' of data and for including males, whose decisions may have also been affected by the end of the Vietnam War, later work (Kane (1994)) confirmed that the result was not sensitive to the choice of annual end-points or to the inclusion of males. Manski (1993) also reported little evidence of a disproportionate growth in BA completion by low-income youth graduating from high school between 1972 and 1980.

One hypothesis to reconcile the estimates of tuition impacts with the failure to find an increase in enrollment by low income youth following the establishment of the Pell Grant program is that students are expected to make a significant up-front investment to apply to college and to apply for financial aid, before they learn anything about the amount of aid available, whereas they can read about a tuition increase in the newspaper or see it in college's application materials.

Also cited in Table 4, Sue Dynarski has recently estimated the impact of two other programs which operated outside of the federal need-analysis framework: one looking at the impact of the cessation of tuition benefits for Social Security survivors and the other evaluating the effect of the Hope Scholarship program in Georgia.   Dynarski (1999) found that after the discontinuation of the Social Security Student Benefit program, college entry by students with deceased parents declined by 19.4 to 25.6 percentage points relative to other youth.   To convert this estimate to a similar scale reported above, Dynarski calculated that the value of the benefit program had been roughly $5300 ($1990). This implies an impact of 3.7 to 4.8 percentage points per thousand dollar change in price.

In a second paper, Dynarski studied enrollment rates for youth in Georgia relative to other southern states, before and after the Hope Scholarship program was initiated in that state. She estimates that the program increased college enrollment rates of 18 to 19-year-olds by 7.0 to 7.9 percentage points.   Given the value of the Hope Scholarship, this estimate converts to an estimate of 3.1 to 3.5 percentage points per $1000 difference in cost.

Interestingly, because both programs operate outside the typical need analysis system, eligibility was known *a priori*, and did not require one to submit a FAFSA form and wait for an award letter to know whether or not one qualified for the aid.   As such, both financial aid programs operated similarly to a tuition increase, which is relatively costless to anticipate.   In contrast, the Pell Grant program requires remarkable foresight. One has to fill out a FAFSA, be assigned an expected family contribution and receive an award letter from a school simply to learn how much federal aid is on offer. It may not be a coincidence that the estimated impacts of such non-traditional forms of aid and tuition increases are so similar, and larger than the apparent impact of the establishment of the Pell Grant program.

Interaction between Tuition and Family Income

Manski and Wise (1983), Radner and Miller (1970), Bishop (1977), Kohn et. al. (1976) all report greater responsiveness to tuition differences among those from lower income quartiles. More recently, McPherson and Schapiro (1991) and Kane (1994 and 1995) also find greater impacts of tuition on the enrollment decisions of low-income youth. Ellwood and Kane (2000) reported findings with the NELS data that are somewhat sensitive to specification. In some specifications they find an interaction effect, but not in others. Cameron and Heckman (1998) also fail to find robust evidence of an income interaction effect: although their point estimates show decreasing effects of tuition as parental income rises, they could not reject the hypothesis tuition has similar effects at varying income levels.

Table 5 provides one set of estimates of the effect the tuition increases of the Eighties and Nineties may have had on racial and income gaps in college-going. The estimated effects of a $1000 change in tuition are drawn from Kane (1994), who used cross-sectional differences between states in tuition levels at public four-year colleges to estimate the impacts on college enrollment rates of 18-19 year-old high school graduates. The estimates in Kane (1994) reported strong interactions between income and the relationship of tuition to college-going for whites, but not for blacks. One potential explanation is the large wealth gap between blacks and whites of equal income. An alternative explanation is that there were too few high-income blacks in the sample with which to estimate an effect.

Between 1980 and 1992, the average public four-year tuition rose by $824 in $1988. If we were to simply multiply that change by the estimated marginal impact of tuition on college-going among blacks and whites of various income levels, we would have expected a 2.4 percentage point widening of the gap in college enrollment by income. That is about one-third of the actual widening in college entry among recent high school graduates by family income reported in Ellwood and Kane (2000).

Tuition is estimated to have a larger impact on college enrollment for African Americans at all income levels. The bottom panel of Table 5 reports similar estimates of the likely effect of a tuition increase on the racial gap in college enrollment. Aside from the correlation of race with income, one might have expected a rise in tuition to have led to a widening of the racial gap. The correlation of income and race would have contributed as well. The estimates at the bottom of the table suggest that one might have expected the racial gap to grow by 4.5 percentage points, based simply on the rise in tuition at the average public four-year college. This was approximately half as large as the actual widening.

Not included in the above decomposition is the potential effect of a decline in the real value of federal financial aid. Between 1980 and 1992, the real value of the Pell Grant fell by $564 in $1988. Pell Grants are targeted at those in the bottom quartile of family incomes. If Pell Grant aid were to have similar effects on college-going as the estimated impact of tuition above, the decline in aid would have accounted for an additional 3 percentage point widening in the gap between the highest and lowest-income groups. In other words, if one were to combine the tuition and Pell Grant impacts, one could account for more than half of the widening between the top and bottom income quartiles. However, as noted above, this is probably attributing too much to the effect of costs on the widening gaps, since there is little evidence that the Pell Grant program has had similar effects of college-going as tuition policy.

Comparatively Sluggish Response to Rising Returns to College

Parents and students appear to be extremely sensitive to tuition policies, at least relative to their responsiveness to the rise in the labor market payoffs to college. Recall from Table 1, there was a 7 percentage point increase in college entry by high school graduates between 1980/82 and 1992, from 68 percent to 75 percent. This seems large, until you realize that the rise in college enrollment witnessed during the Eighties was roughly as large as we might have expected to see in response to a $1000 to $1500 increase in annual tuition, based upon the empirical estimates cited above. For someone who was considering being in school over 4 years, this would have amounted to a $3700 to $5500 increase in anticipated expense over 4 years (using a discount rate of 6 percent).

Obviously, the actual payoff of a college degree for the cohort of youth graduating from high school in 1992 remains to be seen, since they have yet to enjoy the benefit of a full career. However, it is possible to form a reasonable estimate based upon contemporaneous evidence. And any such estimate would likely suggest that the payoffs to college have risen much more than $5500 in present value. Suppose youth considering college formed an expectation of the payoff to college by looking around themselves at people of varying ages and educational attainment to form an estimate of the value of a college degree. Among 25-34 year-old males, high school graduates working full-year, full-time earned $26,984[15] in 1980 while college graduates earned $34,096. The differential in annual earnings between the two educational groups had grown from $7,112 in 1980 to $14,579 by 1992. The differential in annual income among 35-44 year olds had grown from $16,486 per year to $24,391; $21,886 to $26,051 among 45-54 year olds; $22,355 to $24,141 among 55-64 year olds.

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[15]All figures in this paragraph have been converted to $1990 using the GDP deflator.

Discounting each of these back to the viewpoint of a 21 year-old considering 4 years of college, the estimated value of a college degree would have increased by $78,649 over the period 1980/82 to 1992, using a 6 percent discount rate.

Of course, not everyone could expect to finish a four-year degree, particularly those on the margin of college entry. However, the present value of completing 1-3 years of college would also have increased by a sizable $47,574 using a similar method.

Although parents did seem to respond to the estimated increase in the present value of earnings differentials earned by college graduates, the increase was only about as large as we would have expected from a much smaller increase in tuition. Either people are hypersensitive to tuition or they are making a much more conservative estimate of the future value of a college degree than a cross-section estimate would suggest. In either case, it would be important to attempt to reconcile the large estimates of the impact of tuition differences, with the seemingly more muted response to the rise in the value of a college education over time.

Borrowing Constraints?

As pointed out by Gary Becker in his classic volume, *Human Capital*, the capital market for college investments is likely to be imperfect. Potential college entrants have little collateral to provide to investors. And, as a result, without contracts allowing for indentured labor, there is no way for lenders to force college graduates to earn up to their potential. Families are likely to be in the best position to do so (although as any parent would testify, even their points of leverage are limited). Those with greater family resources are likely to have the greatest access to such capital.

The federal government has attempted to create such a market, by providing a federal guarantee on loans made to qualified students attending qualified institutions. However, the solution is incomplete. The most a student can borrow under the federally guaranteed student loan programs is $2625 their first year in college, $3500 the second year and $5500 for subsequent undergraduate years. With the average tuition at public two-year and four-year institutions and at private four-year institutions being $1600, $3200 and $14,500 respectively in 1998-99, such loan limits may be sufficient to pay tuition expenses at some institutions, but generally fall well short of the full cost of attendance, which would include foregone earnings. Beginning in 1993, a students' parents could borrow to cover the combined cost of tuition and room and board costs for a student-- but payments on such parental loans begin immediately, limiting their usefulness to those parents with insufficient cash flow. Although parental loans have accounted for much of the growth in loan volume over time, a small share of parents have taken advantage of such loans.

The large differences in college-going by family income among those with similar test scores and the greater sensitivity of low-income youth to tuition differences would be consistent with borrowing constraints. However, they would be consistent with other explanations as well. For instance, a single test score is likely to be an imperfect measure of a students' academic preparation. Observed differences in college-going by family income among students with similar test scores may simply reflect unmeasured differences in academic preparation between high and low-income youth. Cameron and Heckman (1998) report that with a sufficiently general allowance for family background selectivity with the NLSY, one could not reject the hypothesis that the estimated effect of parental income is zero. Moreover, Keane and Wolpin (2000) argue that borrowing constraints are not necessary to produce an interaction between tuition sensitivity and parental income.

A recent literature has suggested that those on the margin, whose decisions about entering college are influenced by such things as proximity to college and college costs, have higher than average payoffs to college. Such results would also be consistent with borrowing constraints, since only those with higher-than-average returns to college would have surmounted the barriers presented by borrowing constraints to attend. In the presence of borrowing constraints, Lang (1997) and Card (1995a) point out that the estimated payoff to college should be higher for those on the margin, since their cost of borrowing funds would higher. Recent instrumental variable estimates using geographic distance to college to estimate payoff to college (Kane and Rouse (1994) and Card (1995)) have found that those on the margin, whose decisions about college are influenced by such factors, do tend to exhibit higher marginal returns. This would be consistent with the presence of borrowing constraints.

A recent paper by Cameron and Taber (2000) takes issue with such an interpretation of the instrumental variable results. They argue that borrowing constraints are more likely to be binding with respect to direct costs of college-- such as tuition and transportation costs-- than with respect to foregone earnings. They proceed by comparing the instrumental variable estimates one finds using proximity to college and the average earnings of high school graduates in one's county as two different sources of variation in college costs. In fact, they do not find higher payoffs to college when using college proximity as an instrument than when they use foregone earnings as an instrument.[16] They cite this as evidence against the presence of borrowing constraints.

However, it is not clear why Cameron and Taber would expect borrowing constraints to apply to direct costs and not to at least some portion of the cost of foregone earnings. Suppose that in the absence of borrowing constraints, one would be consuming at a particular level. (For example, suppose

[16]They also report the results from a structural model which also uses the same assumption for identification, that is, that borrowing constraints should apply to direct costs and not to indirect costs.

one had a dependent spouse or child, one would face substantial costs of feeding and clothing them while in school). If one could not finance both one's tuition and that desired level of consumption, then one is liquidity constrained. In fact, in *Human Capital*, Becker (1962) discussed the symmetry of direct costs and foregone earnings in families investment decision.

A final piece of evidence that may be useful in identifying the potential importance of borrowing constraints is the difference in timing of college entry in high and low tuition states. Kane (1996) finds that youth graduating from high school in states with higher levels of tuition for state residents at public colleges in the state (presumably the least cost alternative for most students) tend to enter college later. This too would be consistent with borrowing constraints, because in the absence of borrowing constraints, students would want to complete their educational investments as early in life as possible. The basic reasoning is as follows: by delaying a year, one is delaying costs as well as benefits. If, for a particular individual, the benefits to college are greater than the costs of college, then the costs of any delay in terms of deferred benefits must exceed the benefits of a delay in terms of any deferred costs. As a result, both delayed entry and part-time enrollment, may themselves by prima facie evidence of borrowing constraints. The fact that delayed entry is more common in high tuition states provides further corroboration for such an interpretation.

However, as above, there may be alternative explanations for the observation of delayed timing in high-tuition states. For example, if labor market experience after high school provides some information regarding opportunity costs and the potential payoff to college, students in high tuition states may be more eager to collect such information before making the investment in college than those in low-tuition states, since the cost of learning whether or not one is "college material" by entering college first is lower. Such an explanation may also predict delayed entry in high tuition states.

In summary, even though there are a number of pieces of evidence that would be consistent with borrowing constraints, it is difficult to find a definitive test of the existence of borrowing constraints in the literature. In each case, there are alternative explanations for the same facts, which would not require borrowing constraints to be part of the story. In this regard, the debate over borrowing constraints is similar to the debate over whether the payoff to educational attainment is a payoff to concrete skill or a payoff to the signal provided by that skill. Although the answer is fundamental to any consideration of the social benefits of further investments in training, many pieces of evidence would be consistent with either interpretation.[17]

V. Poor Information

The decision about whether or not to attend college poses increasingly high stakes for parents and students. An important role of the financial aid system is to send clear signals to help students and parents plan for college. However, it is remarkable how inaccurate students' perceptions are regarding their college prospects, even as late as their senior year in high school.

During the spring of their senior year in high school, student respondents in the NELS survey were asked to report "As things stand now, how far in school do you think you will get?." Table 6 presents a cross-tabulation of student responses to that question along with their subsequent postsecondary enrollment over the 2 years following graduation. It is striking that 42 percent of those who expected to complete "some college" and 64 percent of those who expected to attend a

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[17]Weiss (1996) provides explanations for the same set of empirical findings that would involve either education as a skill or education as a job market signal.

vocational, trade or business school had not enrolled in a postsecondary institution 20 months after high school. Moreover, only 57 percent of those who expected to finish a bachelor's degree and 72 percent of those who expect to finish a graduate degree had ever attended a 4-year college within that time. Indeed, 16 percent of those expecting a bachelor's degree and 10 percent of those expecting a graduate degree did not attend any postsecondary institution 20 months after high school.

Lessons from the COACH Project in Boston

Funded by the Andrew W. Mellon Foundation, the COACH project brings graduate students from Harvard University into 3 high schools in Boston to help youth submit college and financial aid applications. In October of 2000, the project surveyed students in 3 high schools in the Boston Public School system as well as students in 2 suburban high schools (Concord-Carlisle and Wellesley high schools). As portrayed in Table 7, the students in the suburban and Boston Public School samples were quite different: while 75 percent of the Boston Public School students were Latino or black, non-Hispanic (31 percent Latino and 44 percent black non-Hispanic), only 9 percent of the suburban students fell into either group (3 percent Latino and 6 percent black non-Hispanic); while only 22 percent of the Boston Public School students had a parent who was a college graduate, 87 percent of the suburban youth had a parent who was a college graduate (indeed, 60 percent of the suburban youth had a parent with a graduate degree).

Yet, despite the differences in background, Table 8 reports that students maintained similar plans for postsecondary enrollment as late as the fall of their year in high school. In October of their senior year in high school, students were asked whether they planned to attend postsecondary schooling in the fall of 2001. They were also asked how much education they thought they would eventually complete. Virtually all of the suburban students planned to attend postsecondary institutions (97%), with nearly all of these planning to attend 4-year institutions. A similar proportion of the Boston Public School students reported that they planned to attend postsecondary institutions (94%), although not all were planning to attend 4 year schools (9 percent planned to attend vocational, trade schools and 17 percent planned to attend community colleges). A vast majority of both groups planned to complete at least a bachelor's degree (68 percent of the Boston Public School students and 94 percent of the suburban students).

Yet, the two groups differed dramatically in the extent to which they had taken concrete steps to prepare for the transition from high school to college. The results in Table 9 were limited to those who reported that they planned to attend a four-year institution the following fall. While 97 percent of the suburban students had already taken the SAT by October, only one third of the Boston Public School students had taken the test. While nearly two-thirds of the suburban students had spoken with a guidance counselor 4 or more times about their college choices over the past year, only a quarter of the Boston Public School students had. While 38 percent of the suburban students had already applied to a college in October, less than half of as many of the Boston Public School students had applied early. While 78 percent of the suburban students had visited a college, only 28 percent of the Boston Public School students had. While 91 percent of the suburban students reported that they already had an application for the institution they were "most likely to attend", only 39 percent of the Boston Public School students had. Although the two groups had similar aspirations, the suburban youth were much more successful in identifying and executing the concrete tasks required to realize those aspirations.

Overestimating the Cost of Higher Education

Families and students report that they are quite concerned about the costs of higher education. A 1998 survey of 2000 adults between the ages of 21 and 65 sponsored by the American Council on Education found that "the cost of a college education" was among parents' top five worries about their children's welfare, second only to worries about their children using illegal drugs.[18] The proportion of Americans worrying about the cost of higher education (65 percent) was higher than the proportion worrying about health care for their children (55 percent) or the quality of public schools (55 percent). Yet, in that poll, the public greatly overestimates the costs of college tuition. Their estimated cost of in-state tuition at a community college ($4026) and a four-year college ($9694) was roughly triple the actual average cost of tuition at such institutions at such institutions ($1501 at community colleges and $3111 at four year colleges).

The COACH program in Boston found similar results when it surveyed students regarding the estimates of tuition at several local institutions. Table 10 reports student responses to the following question:

> "About how much do you think it costs to attend the following colleges full-time per year? (Think of the cost of full tuition. Do not adjust for financial aid. Do not include housing dormitory fees or food.)"

Students were then asked to check one of a number of categories of tuition amounts, reported in Table 10. Even though the actual tuition at Bunker Hill Community College in the fall of 2000 was $3,140, only 9 percent of the suburban students and 13 percent of the Boston Public School students got the answer right. The tuition at the University of Massachusetts-Boston was $4,222 in the fall of 2000. Yet only 6 percent of the suburban students and 8 percent of the Boston Public School students

[18] American Council on Education (1998).

identified the cost correctly.   Using the mid-points of each of the categories and a value of $25,000 for those estimating the costs to be above $20,000, the mean response for both groups was roughly twice the actual tuition at Bunker Hill Community College and three times the actual tuition at the University of Massachusetts-Boston.

Youth Perceptions of the Payoff to College

As part of the COACH survey, students were also asked to report how much they thought they would earn with and without a college degree. Specifically, students were asked to respond to the following questions:

> "About how much money do you think you would earn per year (or per hour) if you did not go to a vocational/trade school or college and worked full-time?"
> (Next year and at age 25)

> "About how much money do you think you would earn per year (or per hour) if you graduated from a 4-year college/university?"
> (At age 25)

The responses of both groups of students are reported in Table 11. Table 11 also reports the actual wages such workers working full-time, full-year in the Boston metropolitan area in the CPS from 1996-99.   Three facts reported in Table 11 are particularly striking. First, despite their dramatically different backgrounds, the two groups of students had remarkably similar expectations of future wages, at the median and above. The 50th, 75th and 90th percentiles were remarkably similar for the two groups at all three combinations of educational attainment and age. The Boston Public School (BPS) students seemed to be slightly more pessimistic at the 10th and 25th percentiles.   Second, the wage expectations of both groups as high school graduates working full-time immediately out of high school were quite similar to the actual. The wage expectations of the suburban youth were generally within $3,500 of the actual earnings of high school graduates at the 10th, 25th, 50th, 75th and 90th percentiles. Third, both groups entertained inflated expectations of their earnings at age 25, particularly as college graduates. The median expectation of both groups is that they would earn close to $30,000 per year as high school graduates-- roughly $7,000 more than the actual earnings for high school graduates in the Boston area at that age. Their expectations were even more out-of-line for college graduates, with both groups expecting to earn $50,000 working full-time per year as college graduates as college graduates-- considerably more than the $33,843 median in the Current Population Survey. In other words, both groups seem to overstate the payoff to educational attainment as well as to experience on the job.

Table 12 report the distribution of the present value of a college degree implicit in students' responses to the questions about tuition and expected earnings. (Several assumptions were necessary to do so: that all students were using a discount rate of 6 percent, that students were not expecting any financial aid from colleges or from their parents and that the absolute value of the earnings gap between high school and college remains constant for the remainder of their careers.) The suburban youth were slightly more sanguine about the payoffs to attending college, with 76 percent of youth reporting wage and tuition expectations consistent with a positive present value of a college degree. In contrast, 68 percent of the Boston Public School youth made responses that implied a positive present value of a college degree..

The bottom of Table 12 reports the cross-tabulation of students' stated educational plans with an indicator of whether their answers implied a positive or negative payoff to college. Interestingly, for the Boston Public School students, one could strongly reject the hypothesis that there was no correlation between intentions and beliefs about the payoff to college. Holding optimistic expectations regarding the payoffs to college seemed to be positively associated with a student's plans to attend college. However, for the suburban students, one could not reject the hypothesis that their educational plans were independent of their beliefs about the payoff to a college degree. This reflects the fact that virtually all of the suburban youth reported that they planned to complete a bachelor's degree, even though three-quarters of them seemed to believe it was a worthwhile investment.

One hypothesis to account for the findings in Tables 11 and 12 is that the locus of the decision for students considering college was different for the suburban and the BPS students. For the suburban youth, it was their parents who were making the decision about whether or not the youth should be attending college. Regardless of whether their children agreed, parents could enforce this judgement by subsidizing the cost of a college education. In contrast, because their parents are less likely to be able to help pay for college, it is the beliefs of the students themselves that drives the decisions being made by the Boston Public School students. Of course, this is all conjecture, but it suggests that there is much still to be learned regarding the way in which different students think about the decision to enroll in college.

Parental Saving for College

In light of the fact that students and parents seem to overestimate the cost of college tuition, it is ironic that a large share of parents admit to having done nothing to prepare financially for their children's education. When their children were in 8th grade, parents of the NELS sample were asked "Have you or your spouse/partner done anything specific in order to have some money for your eighth graders education after high school?" The question was asked only of those who reported earlier in the survey that they expected their 8th grader to go on to additional education beyond high school. Later, when their children were in 12th grade, parents were asked "What grade was your teenager in when you began to prepare financially for his/her education after high school?". Again, the question was asked only of those who reported that their children planned to continue their education after high school.

Table 13 reports parents' responses to those questions by family income quartile. Less than half (48.7%) of the parents reported having begun to prepare financially for their children's postsecondary education when their children were in 8th grade. Moreover, there were large differences in preparation by family income: while 73 percent of parents of 8th graders from the top income quartile report having begun to prepare financially, only 31 percent of those from the bottom income quartile reported having begun to prepare.

However, while their children are in high school, an increasing number of parents do begin to prepare. For instance, the proportion reporting to have begun to prepare financially rose from 49 to 71 percent as their children progressed from 8th to 12th grade. (Note also that the increases in the proportion of parents reporting having begun to prepare were also larger for the top 3 income quartiles than in the bottom income quartile.) Yet, even during the spring of their children's senior year in high school, 29 percent of parents report that they have not yet even begun to prepare financially for their children's education. (Recall that this table is limited to those parents who are reporting that their children do plan to continue their education.)

Parents who reported having begun to prepare financially were later asked "About how much have you set aside for your teenager's future educational needs?". When their children were in 8th grade, only 20 percent of those parents who reported having begun to prepare financially had set aside more than $10,000, implying that less than 10 percent of all parents of 8th graders had set aside that much (.203*.487). The proportion having set aside more than $10,000 was slightly higher when their children were in 12th grade: 24.6 percent of those having begun to prepare or 17 percent of all parents of 12th graders (.246*.706).

There were very large differences in financial preparation by family income quartile. By the time their children were in 12th grade, 89 percent of parents in the top income quartile had begun to prepare financially and 62 percent of these report having set aside more than $10,000, implying that 55 percent of all top income quartile parents had set aside more than $10,000 for their child's postsecondary education. In the bottom income quartile, only 46 percent had begun to prepare and 5 percent of these had set aside a substantial sum, implying that roughly 2 percent had set aside more than $10,000 for their child's education.

On one hand, the lack of saving by parents imposes important political constraints on higher education finance policy. For instance, state legislators are under considerable pressure to keep tuition low to maintain affordability for middle income families with little savings. On the other hand, as long as tuition is low, families have little reason to save for college. Three trends are upsetting that historical balance: First, as college enrollment rates rise, more families are eager to take states up on their generous offers of low tuition. Second, the costs per student have been rising faster than inflation, at least partially because the going wage for the type of highly educated labor hired by colleges have been rising faster than other wages. Third, the children of the baby boom are reaching college age. The size of the college age population is expected to rise by roughly a quarter over the next 20 years. The increases are expected to be much larger in a few states such as California, which is anticipating a 50 percent rise in the size of college-age cohorts.

During the 1980's, concern over the impending retirement of the baby-boom cohort and their apparently low levels of retirement savings led to a number of policies intended to encourage savings. A large literature has developed estimating the impact of these policies on savings. The recently enacted Bush tax cut plan includes several important new incentives to encourage greater savings for college. The literature on retirement savings may be useful in attempting toe anticipate the impact of these policies on parental savings for college.[19]

VI. Does Public Financing Increase or Decrease Inequality?

In 1968, W. Lee Hansen and Burton Weisbrod calculated the value of the subsidies received and taxes paid by families with students attending the University of California and compared those benefits to the subsidies and taxes paid by students attending other institutions in the state– the California State University system and the Community College system– as well as those not attending post-secondary schooling at all. The calculations implied a large net subsidy for families attending the University of California, a more modest subsidy for those attending less selective public institutions in the state and a net transfer from families with students not attending college. Given the correlation between family income and attendance at the University of California, Hansen and Weisbrod suggested that the system for financing higher education in California increased rather than decreased inequality.

The original Hansen/Weisbrod paper provoked nearly a decade-long debate, leading the *Journal of Human Resources* to publish 7 responses to the original article between 1970 and 1977. The debate raised a number of issues, but perhaps the most important critique came from Pechman (1970). Rather than calculate net subsidies for different parts of the University of California system and then point to the correlation between attendance and income as evidence for the inequity of higher

[19] For a survey of the retirement savings literature, see Engen, Gale and Scholz (1996), Hubbard and Skinner (1996) and Poterba, Venti and Wise (1996).

education finance as Hansen and Weisbrod did, Pechman used the same data to directly calculate net subsidies received by family income. When calculated by income class, rather than by institution attended, the calculations revealed that higher-income families actually paid more in taxes to support higher education than they received in benefits. In other words, although those attending the University of California received large subsidies, attendance at the university was not sufficiently correlated with income to offset the fact that higher income families pay a large share of the taxes that support the system.

Table 14 reports similar calculations for a more contemporary sample from Kane (1999). The table employs information on student aid received by students in the National Postseconday Student Aid Survey of undergraduates in 1992/93 merged with data from the Integrated Postsecondary Education Data System on state and local appropriations per student at each of the institutions attended. Data on college enrollment rates and years in college by parental family income were calculate using the National Education Longitudinal Survey sample of those graduating from high school in 1992. Subsidies were calculated by income level. The first column reports information state and federal grant aid received by undergraduates of various income levels. Given the mean-testing for most state and federal grant aid programs, such subsidies are clearly targeted a lower income families, with students from incomes of $13,000 or less receiving $1848 on average, roughly 10 times as much state and federal grant aid received by those with parental income above $90,000. The second column reports the subsidy value of the state and federal loans received by the same students– using a rough rule of thumb that a dollar in loan aid contains a subsidy equal to roughly a third of its value. Loan subsidies too were quite unequally distributed. The third column reports state and local appropriations per student at the institutions attended by the students of varying parental income levels. Perhaps surprisingly, there is not a strong relationship between the state and local appropriations received by students of varying income levels. On one hand, high income students attending public institutions did tend to attend the public institutions with large subsidies. On the other hand, higher income students were also considerably more likely to attend private universities. The two effects were roughly offsetting. The fourth column reports the sum of grant, loan and direct institutional subsidies for the average student from various income levels, revealing a modest progressivity in the targeting of public subsidies to low-income students.

What drives the correlation between family income and public subsidies to college is not the fact that high income college students attend expensive places like University of California-Berkeley, but that they are simply more likely to attend any college at all. As reported in columns 5 and 6, higher income students are more likely both to attend college and to remain in college conditional upon enrolling. The last column in Table 14 accounts for both of these effects and one finds that high school graduates from families earning over $90,000 per year are nearly double the subsidies received by families with incomes less than $13,000.

Table 14 does not report the taxes paid by students of varying income levels. Usually, it is difficult to identify the marginal source of tax revenue or expenditure used to pay for higher education. However, it is also clear that any tax would have to be extremely regressive in order to reverse Pechman's conclusion that despite a correlation between income and college-going, public financing of higher education provides larger benefits to low-income students than the taxes paid by low-income families to support them. The reason is that while the highest income category families received subsidies that were *twice* as large as the lowest-income families of high school graduates, their incomes are more than *seven* times as large. If higher education were supported by a proportional income tax, higher income families will have paid more than than the value of the subsidies they received, even though they were more likely to receive subsidies than lower-income parents. Moreover, the average lower-income student will receive greater subsidies than the taxes their parents will have paid. Therefore, while it is true that public funding of higher education is a transfer from those not sending their children to college to those who do, and higher income families are more likely to attend college, it still serves on net to redistribute income from higher to lower income families, because the differences in college going are not nearly as large as the differences in average income between high and low-income families.

Taxes would have to be extremely regressive to reverse this finding. For instance, the Hope Scholarship program in Georgia is paid for with the proceeds from a state lottery. Moreover, because eligibility for the Hope Scholarship is based not only on college entry, but on college entrants who had a B average or better in high school, the benefits are likely to be even more disproportionately targeted at higher income families than the estimates in Table 14. Georgia may be one example where the tax is sufficiently regressive such that higher income families receive more of a subsidy than they pay.

VI. The Direct Effect of the Supply of College Labor on Wage Inequality

Most of the discussion of the rising payoff to a college education in the late Eighties and early Nineties looked for explanations by focusing on demand-side factors-- computerization, the changing nature of work, the rise of the "knowledge economy". However, an important paper by Katz and Murphy (1992) identified an important potential role of supply side factors as well. They noted that one could get surprisingly far in explaining trends in the payoff to educational attainment by positing a constant rate of increase in demand for skilled labor in postwar America, with the fluctuations in the college premium driven by a sharp rise in the educational attainment of the workforce during the Seventies and a sharp slowdown in the supply of skilled labor during the Eighties. Although Autor, Katz and Krueger

(1997) find evidence of some acceleration in the demand for skilled labor beginning in the Seventies, fluctuations in the rate of growth in the supply of college labor account also seemed to play an important role. Card and Lemieux (2000) also point to the importance of a slowdown in the relative supply of college educated workers as an important cause of the rising education premium.

The potential importance of supply factors noted by Katz and Murphy (1992) leads immediately to two additional questions: First, what factors accounted for the sharp slowdown in educational attainment? Second, might the current growth in college enrollment eventually surpass the growth in demand for skilled labor and lead to a closing of the wage gap between more and less educated workers?

Figure 6 reports trends in educational attainment by age and cohort for those turning 26-30 between 1950 and 2008. Following Autor, Katz and Krueger (1997), I report the log of the relative supply of college graduates to high school graduates. Specifically, the relative supply is calculated as the log of the ratio of the proportion of college equivalents (the proportion of the cohort with a bachelor's degree plus 1.2 times the proportion with a graduate degree plus .5 times the proportion with "some college") to the proportion with the equivalent of a high school degree (the proportion with a high school degree plus .83 times the proportion high school drop-out). The advantage of this statistic is that it collapses into one dimension any changes in several different levels of educational attainment: BA degree completion, high school drop-out rates, etc. One alternative would have been to calculate average number of years of schooling, but changes in the way educational attainment was collected in the CPS in 1993 makes that impossible.

The results in Figure 6 pool information across a number of Current Population Surveys. Estimates are reported by the year in which the cohort was aged 26-30. The educational attainment of a given cohort was observed at different ages. Cohorts tend to report higher educational attainment as they age, reflected in the vertical discontinuities in the line segments in Figure 6. (Data are reported were reported for the population in each cohort, and were not limited to employed persons, for instance.) Figure 6 also includes projections of educational attainment through 2001. I projected the trends in the supply of college equivalent workers for the cohorts of 26-30 years from 1997 through 2008, using data on the college enrollment of 18-24 year-olds in recent years.

Three facts are apparent in Figure 6: First, after steady growth in college attainment for those turning 26-30 between 1950 and the mid to late Seventies, the growth largely stalled by the late Seventies. (Those who were 26-30 in the late Seventies graduated from high school in the late Sixties.) Second, although the change in trend was particularly dramatic for men, the slowdown is evident for both men and women. Third, the rise in college attainment resumed for those cohorts turning 26-30 in the late Eighties, albeit at a slower pace than the pace that was observed prior to the slowdown.

What might have accounted for the slowdown in college entry? The size of the college age cohorts were growing rapidly during the late Sixties and early Seventies, as the baby boom moved through college. (The largest cohort of 18 year-olds was observed in 1978-79.) In order for the relative supply of college graduates to have maintained its prior pace as the size of the college-age cohorts swelled, the absolute number of college enrollments would have had to grow dramatically. Figure 7 reports the trend in college enrollment from 1947 through 1995. These figures reflect “head counts” of students enrolled, as opposed to proportions of various cohorts entering college. The trend in the number of students enrolled in higher education has not exhibited the same dramatic discontinuities in enrollment as the trends in educational attainment in Figure 6. On the contrary, despite some acceleration during the Seventies and some slowdown recently, the number of college slots on campus has grown at a fairly steady pace since 1952.

The underlying difference between Figures 6 and 7 is the trend in the cohort size. Cohort sizes were growing during the Seventies, and college enrollment rates fell, at least for men. However, the total number of students accommodated on college campuses never fell; in fact, the total number of students on campus rose even faster during the Seventies.

One hypothesis to account for the slow-down is that the baby boom cohorts simply faced capacity constraints; that the postsecondary sector was simply unable to continue to grow at a rate fast enough to both absorb the larger cohort sizes of the baby boom and allow the share of each cohort entering college to grow at the same rate as before.

<u>Some Preliminary Results</u>

I used the 1/1000 sample from the 1990 Public Use Microdata Sample to examine trends in the relative supply of the college-education population in the states with more and less rapid changes in the size of the college-age population during the late Sixties. To avoid having to account for changes in demographic characteristics over time, I limited the sample to white, non-Hispanic persons born in the United States. The sample was limited to those over age 25. I then sorted the sample by reported state of birth and calculated the trend in educational attainment by birth cohort. I calculated the relative supply of college-equivalent workers for three cohorts (those who turned 18 in 1950-55, 1965-70 and 1977-82). Table 15 reports the results of state-level regressions of changes in the relative supply of college-equivalent workers and changes in the size of the cohorts. In each of the comparisons, the point estimate on the relationship between the change in the relative supply of college-equivalents and the change in the cohort size was negative. Moreover, the coefficient on was generally statistically distinguishable from zero.

Figure 8 portrays the trend in educational attainment of cohorts of men and women born in two groups of states: states with the fastest percentage change in the size of cohorts entering the labor market between the Fifties and Eighties and states with the most stable cohort sizes.[20] The top two graphs report separately for men and women the trend in the relative supply of college-equivalents among the population born in those states by the year in which they turned 18. Although the "stable" population states also underwent a slowdown in the proportion of these cohorts receiving college education during the Seventies the change was less dramatic. As reported in the graph in the bottom left quadrant, educational attainment in the "stable" population states grew more rapid than the fast growing states throughout most of the period. As reported in the graph in the bottom right quadrant, the number of 18 year olds fell by similar proportions in both groups of states after 1980. Interesting, the difference in relative supply of college equivalents in the populations also remained steady during this period.

Impediments to the Returning to the Historical Growth Path

Two factors contributed to the rapid rise in the proportion of the work force with a college degree during the Sixties and Seventies: First, the new entrants to the labor force were much more highly educated than the cohorts that were retiring. This simply reflects the fact that college enrollment rates grew continuously from the 1920's through the late 1960's. Second, the size of these new cohorts entering the workforce with relatively high levels of education were also larger than previous cohorts.

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[20]The states with the slowest growth in the white, non-Hispanic native born population over this period were OK, KY, AL, PA, TN, VT, AR, WY, MS, NC. The states with the fastest growth were RI, OR, NV, WA, NM, FL, DC, AZ, CA, AK.

Neither of these is true now. Because of the slowdown in the rate of growth in educational attainment for college-age cohorts beginning during the Seventies, the difference in educational attainment between the new entrants and retirees is not as large has it had been. Moreover, the number of 18 year-olds is only now climbing out of a trough, after declining by roughly one fifth since the late Seventies. As Ellwood (2001) notes, both facts imply that growth in the relative supply of college graduates in the workforce over the next 20 years is likely to be sluggish, despite the recent rises in college enrollment.

VI. Conclusion

The U.S. system for financing higher education is at least as misunderstood today as the health care finance system was 20 years ago. Not only are parents paying for their child's college education in more ways than they realize-- through direct subsidies to institutions, through financial aid programs to college, through generous new tax benefits for college-- the impact of each of those subsidies on the decisions of various groups of youth is not well understood by policymakers. In 2003, it will have been 3 decades since the Pell Grant program was established, yet differences in college-going by family income remain wide and, according to some recent evidence, appear to be widening. The higher education policy debate has become so bogged down with incremental questions involving issues such as changes in the need-analysis formula to notice the bigger questions: Why is it that there was no apparent impact of the Pell Grant program's establishment on college enrollment rates of low-income youth? What is the "bang-for-the-buck" achieved with different types of public subsidies-- across-the-board subsidies to keep tuition low, Pell Grants, loan subsidies? Why do so few parents save for college and how are their decisions influenced by state and federal policies? We will not make progress in closing the gaps in college enrollment by family income unless we have some of the answers to such questions.

The answers to these questions may have implications far beyond the higher education sector itself. We usually think about higher education policy as merely responding to the labor market-- as if the price of college labor were dictated exogenously by technological factors. As a result, despite a brief flourishing during the Seventies, the economics of higher education has typically been viewed as a quiet backwater in the larger field of labor economics, of interest primarily to college administrators and financial aid specialists. However, recent evidence suggests that higher education policy may have played a role in contributing to the rise in the payoff to educational attainment in the first place. It is a field of vital importance, not only to those seeking to understand the rise in the payoff to educational attainment, but also to policymakers formulating our national response to the change in the payoff to a college degree.

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Table 1.
Proportion of Students from Families in Each Income Quartile Who Enroll in Postsecondary Schools Within 20 Months of High School Graduation

Parental Income Quartile	Any Postsecondary Schooling:			
	Total	Vocational, Technical	2-Year College	4-Year College
	Class of 1980/82			
Bottom	*0.57*	0.12	0.16	0.29
3rd	*0.63*	0.11	0.19	0.33
2nd	*0.71*	0.10	0.22	0.39
Top	*0.80*	0.06	0.19	0.55
Total:	*0.68*	0.10	0.19	0.39
	Class of 1992			
Bottom	*0.60*	0.10	0.22	0.28
3rd	*0.70*	0.07	0.25	0.38
2nd	*0.79*	0.06	0.25	0.48
Top	*0.90*	0.05	0.19	0.66
Total:	*0.75*	0.07	0.23	0.45

Note: Based upon tabulations of the High School and Beyond Survey and National Education Longitudinal Study of 1992. Parental income was reported by parents. Figures were reported in Ellwood and Kane (2000).

Table 2. Percent of Students Enrolling in Post Secondary Schools Within 20 months by Parental Income Quartile and Test Scores (Class of 1992)

Any Post-secondary Enrollment

	Math Test Tertile			
Parental Income Quartile	Bottom	Middle	Top	**Overall Average**
Lowest	48%	67%	82%	**60%**
	(1.6)	(1.8)	(2.1)	**(1.1)**
Second	50%	75%	90%	**71%**
	(1.9)	(1.6)	(1.2)	**(1.0)**
Third	64%	83%	95%	**82%**
	(2.1)	(1.3)	(.8)	**(.8)**
Highest	73%	89%	96%	**90%**
	(2.4)	(1.2)	(.6)	**(.7)**
Overall Average	**55%**	**79%**	**93%**	**76%**
	(1.0)	**(.8)**	**(.6)**	**(.5)**

Enrollment in a 4-Year College

	Math Test Tertile			
Parental Income Quartile	Bottom	Middle	Top	**Overall Average**
Lowest	15%	33.%	68%	**30%**
	(1.1)	(1.8)	(2.5)	**(1.0)**
Second	14%	37%	69%	**39%**
	(1.3)	(1.8)	(1.8)	**(1.1)**
Third	21%	47%	78%	**52%**
	(1.8)	(1.8)	(1.5)	**(1.1)**
Highest	27%	59%	84%	**67%**
	(2.3)	(2.0)	(1.1)	**(1.0)**
Overall Average	**17%**	**44%**	**77%**	**47%**
	(.7)	**(.9)**	**(.8)**	**(.5)**

Note: Standard errors in parentheses. Based on authors' tabulation of 8313 observations from the National Education Longitudinal Study of 1988. Figures reported in Ellwood and Kane (2000).

Table 3. Differences in Postsecondary Training for the H.S. Class of 1992 by Parental Family Income Quartile

Parental Income Quartile:	Difference in Proportion Entering Any Postsecondary Training within 20 Months Relative to Youth from the Bottom Quartile:			
3rd	.109 *	.068 *	.058 *	.044 *
2nd	.215 *	.145 *	.135 *	.105 *
Top	.278 *	.176 *	.141 *	.098 *
Parental Income Quartile:	**Difference in Proportion Entering a 4-Year College within 20 Months Relative to Youth from the Bottom Quartile:**			
3rd	.090 *	.017	.010	-.009
2nd	.204 *	.081 *	.074 *	.035 *
Top	.357 *	.176 *	.121 *	.061 *
Other Variables Held Constant:	None	Math & Reading Test Scores, H.S. Grades	Math & Reading Test Scores, H.S. Grades, 8th Grade School	Math & Reading Test Scores, H.S. Grades, 8th Grade School, Parents' Education

Note: * indicates that difference is statistically different from zero at .05 level. Based on author's tabulation of 6652 observations from the *National Education Longitudinal Study of 1988*.

Table 4. Estimated Impact of a $1000 Change in Direct Cost of College on College Entry Rates College (per $1000 1990)

Study:	Estimate:	Brief Description:
Literature Before 1987:		
Leslie and Brinkman (1987)	-.05 (.005)	Literature review of 25 articles
Based on Between-State Differences in Tuition:		
Cameron and Heckman (1999)	-.07 (.02)	State differences in public tuition charges. (NLSY)
Kane (1994)	-.05 (.01)	State differences in public tuition charges. (October CPS)
Kane (1999)	-.05 (.01)	State differences in public tuition charges. (NELS)
Based On Non-Traditional Financial Aid:		
Dynarski (1999)	-.04 (.02)	End of Social Security Student Benefit Program
Dynarski (2000)	-.03 (.02)	Hope Scholarship Program in Georgia
Before-After the Pell Program was Established in 1973:		
Hansen (1983)		No disproportionate growth by low-income. (Oct. CPS)
Kane (1994)		No disproportionate growth by low-income. (Oct. CPS)
Manski (1993)		No disproportionate growth in BA Completion by Low-Income (NLS-72 and HSB)

Table 5.
Estimated Effects of Rise in Public 4-Year Tuition on Racial and Income Gaps in College-going

Estimated Impact of a $1000 Change in Tuition ($1988) on Likelihood of College Attendance Among 18-19 Year Old H.S. Graduates			
	Blacks	**Whites**	
Bottom	-0.085	-0.046	
3rd	-0.088	-0.038	
2nd	-0.086	-0.030	
Top	-0.081	-0.012	
Changes in College Enrollment: (Relative to Bottom Quartile) (Based upon Tuition Changes Alone)			
	Predicted	**Actual**	***Proportion Explained***
3rd	0.005	0.040	*0.131*
2nd	0.011	0.050	*0.222*
Top	0.024	0.070	*0.347*
Changes in College Enrollment by Race: (Relative to Black non-Hispanics) (Based upon Tuition Changes Alone)			
	1980-92 Predicted	**Actual**	***Proportion Explained***
Whites	0.045	0.088	*0.511*

Note: The estimated enrollment effects of tuition increases are drawn from Thomas J. Kane, "College Attendance By Blacks Since 1970: The Role of College Cost, Family Background and the Returns to Education" Journal of Political Economy (1994) Vol. 102, No. 5, pp. 878-911.

Table 6. Post-secondary Enrollment within 20 Months of H.S. Graduation by Student Expectations as H.S. Seniors

	Enrollment within 20 months of high school: (Row Percent)				
"As things stand now, how far in school do you think you will get?"	None	Private <4yr, Public <2yr	Public 2-Year	4-Year (Public or Private)	Percent of Seniors:
H.S. Only	.904	.015	.069	.011	6.5%
Vocational, Trade or Business School	.640	.103	.216	.040	11.0%
Some College	.417	.080	.366	.138	14.0%
4 or 5-Year Degree	.156	.028	.248	.568	35.4%
Graduate School	.100	.013	.171	.717	33.1%
Total	.276	.038	.224	.462	

Note: Based upon author's tabulation of the NELS 2nd and 3rd Follow-up.

Table 7.
Demographic Characteristics of Suburban and BPS Samples

	Surburbs (Wellesley, Concord-Carlisle)	Boston Public Schools (Boston,Dorchester, Charlestown)
Race/Ethnicity:		
Hispanic	3%	31%
Black, Non-Hispanic	6	44
Asian, Pacific Islander	7	15
Native American	1	0
White, Non-Hispanic	82	10
Parental Education:		
HS Dropout	1%	27%
HS Graduate	4	27
Some College	8	24
College Degree	27	14
Graduate Degree	60	8
Sample Size	277	286

Table 8.
Postsecondary Plans & Contact with Others Regarding College Plans

	Surburbs (Wellesley, Concord-Carlisle)	Boston Public Schools (Boston,Dorchester, Charlestown)
Plans for Fall 2001:		
Vocational/Trade School	0%	9%
Two-Year College	2	17
Four-Year College	95	68
Total Some Postsecondary:	*97*	*94*
Plans for Eventual Attainment:		
BA or More	94	68
MA	46	12
MD or JD	10	9
PhD Degree	9	6
Sample Size	302	268

Table 9.
Specific Activities
Among Those Planning to Attend a 4-Year College

	Surburbs (Wellesley, Concord-Carlisle)	Boston Public Schools (Boston,Dorchester, Charlestown)
Taken SAT/ACT	97%	34%
Met With Guidance Counselor 4+ Times	61	23
Already Applied to Any College	36	18
Visited a College	78	28
Already have an application from institution "most likely" to attend.	91	39

Note: Based upon Fall 2000 baseline survey conducted by COACH program.

Table 10.
Student Estimates of Tuition at Various Institutions

"About how much do you think it costs to attend the following colleges full-time per year? (Think of the cost of full tuition. Do not adjust for financial aid. Do not include housing, dormitory fees or food."

	Bunker Hill Community College		University of Massachusetts-Boston	
	Suburbs	BPS	Suburbs	BPS
$0-499	3%	3%	0%	0%
$500-999	5	6	0	1
$1,000-1,999	9	13	2	3
$2,000-2,999	14	17	2	4
$3,000-3,999	9	13	3	4
$4,000-4,999	12	8	6	8
$5,000-7,499	14	13	14	11
$7,500-9,999	15	8	18	8
$10,000-14,999	11	8	31	22
$15,000-19,999	6	7	18	17
$20,000 +	1	3	5	21
Implied Mean using Midpoints of Categories	$6,312	$6,055	$11,191	$12,730
Actual	$3,140		$4,222	

Note: Based upon results of COACH survey of students in the Fall of 2000.

Table 11.
Student Estimates of Earnings of H.S. and College Graduates

"About how much money do you think you would earn per year (or per hour) if you did not go to a vocational/trade school or college and worked full-time?"
(Next year and at age 25)

"About how much money do you think you would earn per year (or per hour) if you graduated from a 4-year college/university?"
(At age 25)

	As h.s. graduate next year			As h.s. graduate at age 25			As college graduate at age 25		
	Suburb	BPS	CPS	Suburb	BPS	CPS	Suburb	BPS	CPS
10th	$10000	$4,000	$9,826	$18,000	$10,000	$15,186	$30,000	$20,000	$17,485
25th	15,000	10,000	12,817	20,000	20,000	18,478	40,000	30,000	24,931
50th	18,600	18,000	16,341	30,000	28,900	23,430	50,000	50,000	33,843
75th	21,500	24,000	21,161	40,000	40,000	29,830	70,000	67,500	45,124
90th	30,000	30,000	26,702	60,000	60,000	38,770	100,000	100,000	62,655

Note: CPS data are for full-time workers in the Boston CMSA in the Merged Outgoing Rotation Group data. They were assumed to be working 52 weeks per year.

Table 12.
Implied Estimates of Present Value of College Degree

	Implied PV of College Degree (Assuming constant absolute earnings gap after age 25, no financial aid and 6 percent discount rate.)	
	Suburbs	BPS
10th percentile	-$106,401	-105,685
25th percentile	4,186	-32,133
Median	137,357	92,163
75th percentile	337,122	283,274
90th percentile	657,101	708,211
% > 0	76	68

Cross-Tabulation of Implied Present Value and Educational Plans

	Suburbs (Concord-Carlisle, Wellesley)			BPS (Boston, Charlestown Dorchester)		
	Don't Plan BA	Plan BA	Total	Don't Plan BA	Plan BA	Total
PV< 0	1	42	43	23	24	47
PV $ 0	1	133	134	18	82	100
Total	2	175	177	41	106	147
p-value on ?^{2} of Independence	.394			.000		

Table 13.
Proportion of Parents Reporting Having
Begun to Prepare Financially for Their Children's Postsecondary Education

	Proportion Reporting Having Begun to Prepare:		*Of Those Preparing,* Proportion Having Set Aside >$10,000	
	Child in 8th Grade	Child in 12th Grade	Child in 8th Grade	Child in 12th Grade
Bottom Income Quartile	.308	.464	.089	.047
Income Quartile 3	.390	.612	.102	.010
Income Quartile 2	.550	.807	.173	.217
Top Income Quartile	.731	.893	.432	.615
Total:	.487	.706	.203	.246
Sample Size	9274	8925	4145	6171

Note: Based upon author's analysis of the NELS parent survey. Estimates were weighted using the panel weight. The questions were asked only of those who expected their child to be attending postsecondary schooling.

Table 14.
Public Subsidies to College Students by Parental Family Income ($1992)

Parental Income: ($1992)	State and Federal Grant Aid (1)	State and Federal Loan Aid (2)	State and Local Appropriations (3)	*Total Annual Subsidy per Student (4)*	Proportion Entering College (5)	Years of Enrollment (6)	*Total Subsidy (4)x(5)x(6)*
$0-13,000	$1848	$334	$1790	*$3972*	.390	3.11	*$4812*
13,000-25,000	1132	266	1813	*3211*	.535	3.35	*5750*
25,000-35,000	719	252	1929	*2900*	.558	3.45	*5573*
35,000-45,000	352	164	1549	*2066*	.643	3.44	*4559*
45,000-65,000	243	129	2145	*2517*	.720	3.83	*6927*
65,000-90,000	172	136	1965	*2273*	.822	4.12	*7647*
90,000+	161	50	2114	*2325*	.898	4.41	*9195*

Note: Table drawn from Kane (1999). The above estimates combine data from the National Postsecondary Student Aid Survey in 1992-93 with data from the Integrated Postsecondary Education Data System on state and local appropriations per student. Students at any public or private, two-year or four-year college or proprietary school were included. Part-time students were allocated one-third of the state and local appropriation per student. Independent students were excluded. Data on college entry rates were drawn from the 1994 follow-up of the NELS sample of 8th grade students in 1988. The students were two years out of high school. Data on academic years of enrollment were drawn from the High School and Beyond survey of high school sophomores in 1980 when they were followed up in 1992. Years of enrollment does not refer to years of college completed, but the number of years during which a student reported some enrollment.

Table 15:
Changes in the Relative Supply of College Educated Workers and Growth in the Cohort Size by State of Birth

	Dependent Variable: Change in Relative Supply of College Educated Workers For Cohorts Turning 18	
WLS coefficient:	Men	Women
	Age 18 in 1950-55 versus 1965-70	
Proportional Change in Cohort Size	-.152 (.077)	-.052 (.065)
	Age 18 in 1965-70 versus 1977-82	
Proportional Change in Cohort Size	-.252 (.157)	-.413 (.160)
	Age 18 in 1950-55 versus 1977-82	
Proportional Change in Cohort Size	-.158 (.044)	-.147 (.044)

Note: All of the above were estimated weighting by the average cohort size in the state over each period.

Figure 1. College Enrollment Rates of 18-24 Year-Olds by Race (1972-99)

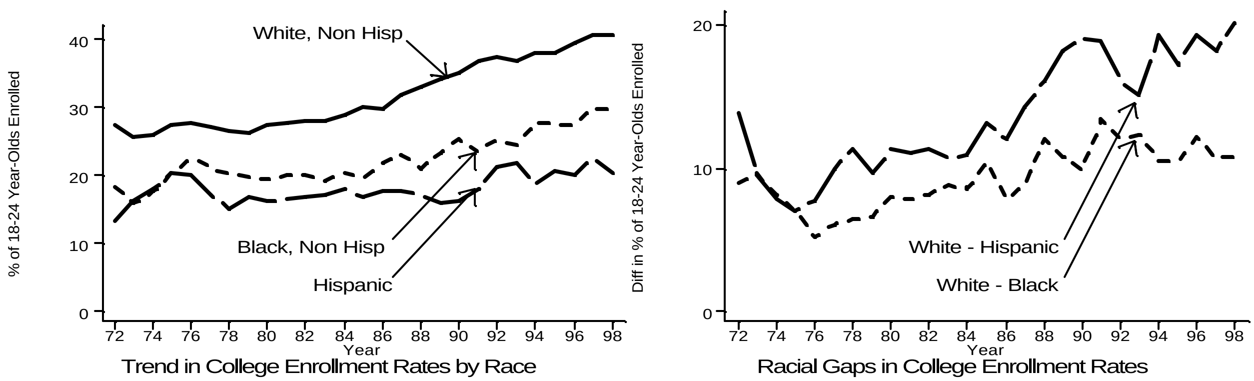


Figure 2. H.S. Status Drop-Out Rates Among 16-24 Year-Olds by Race (1972-99)

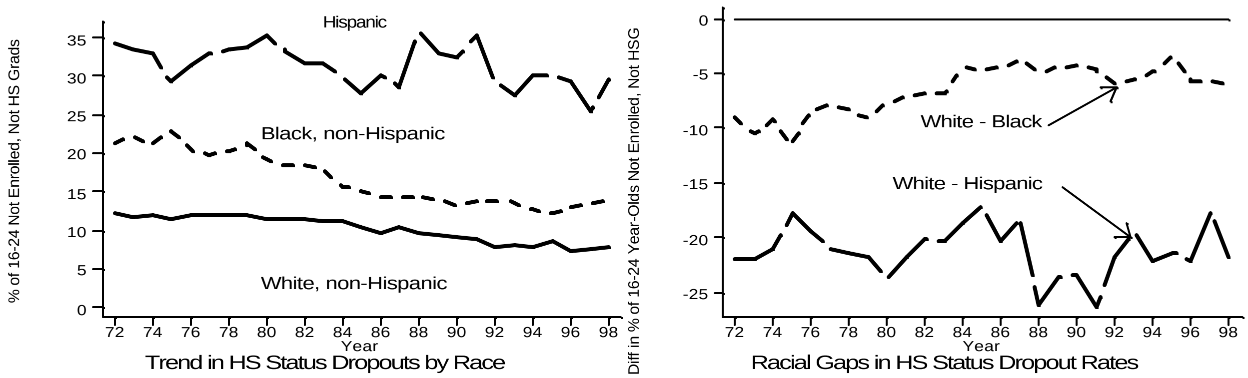
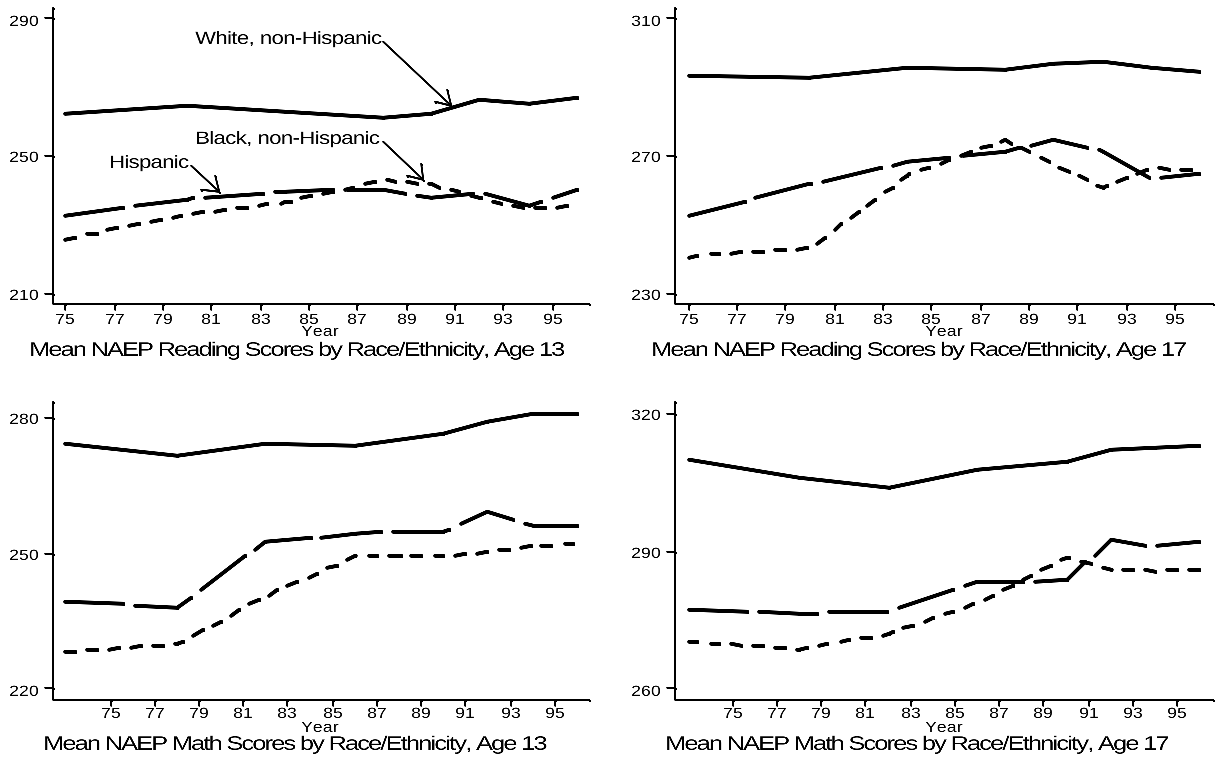
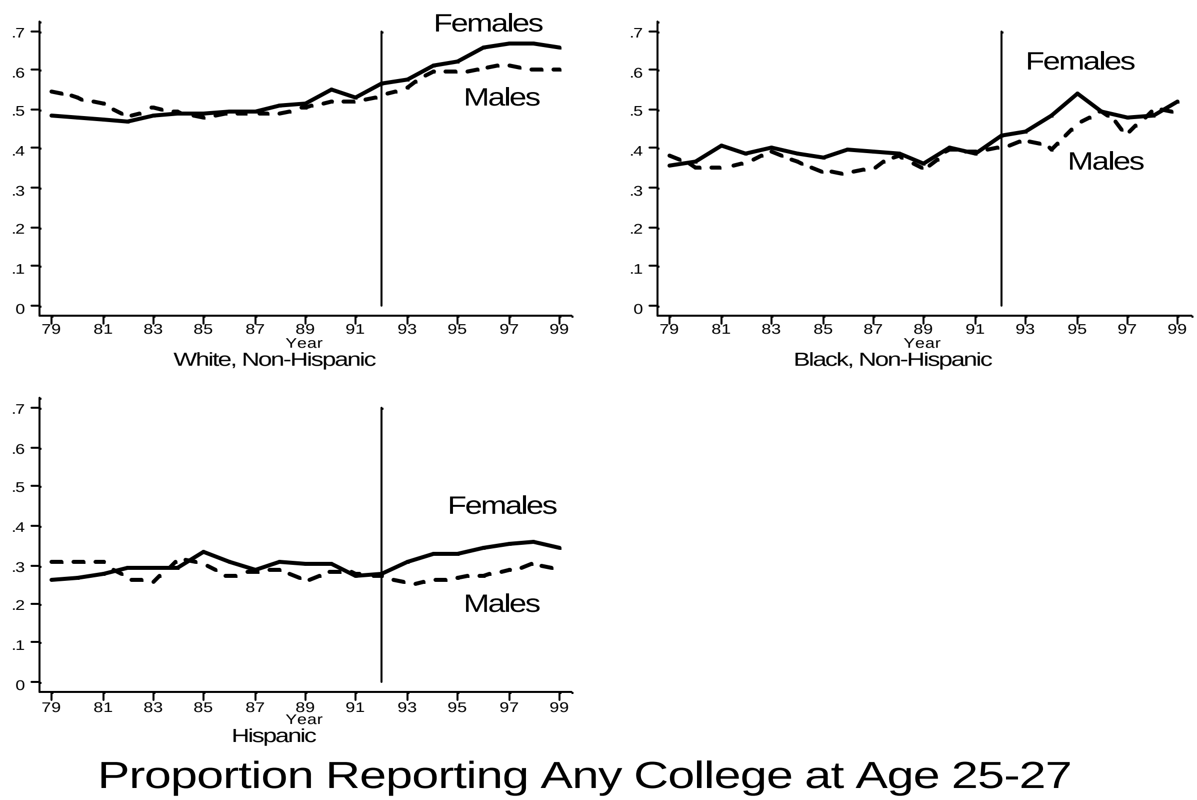


Figure 3. NAEP Test Scores by Race, 1974-99



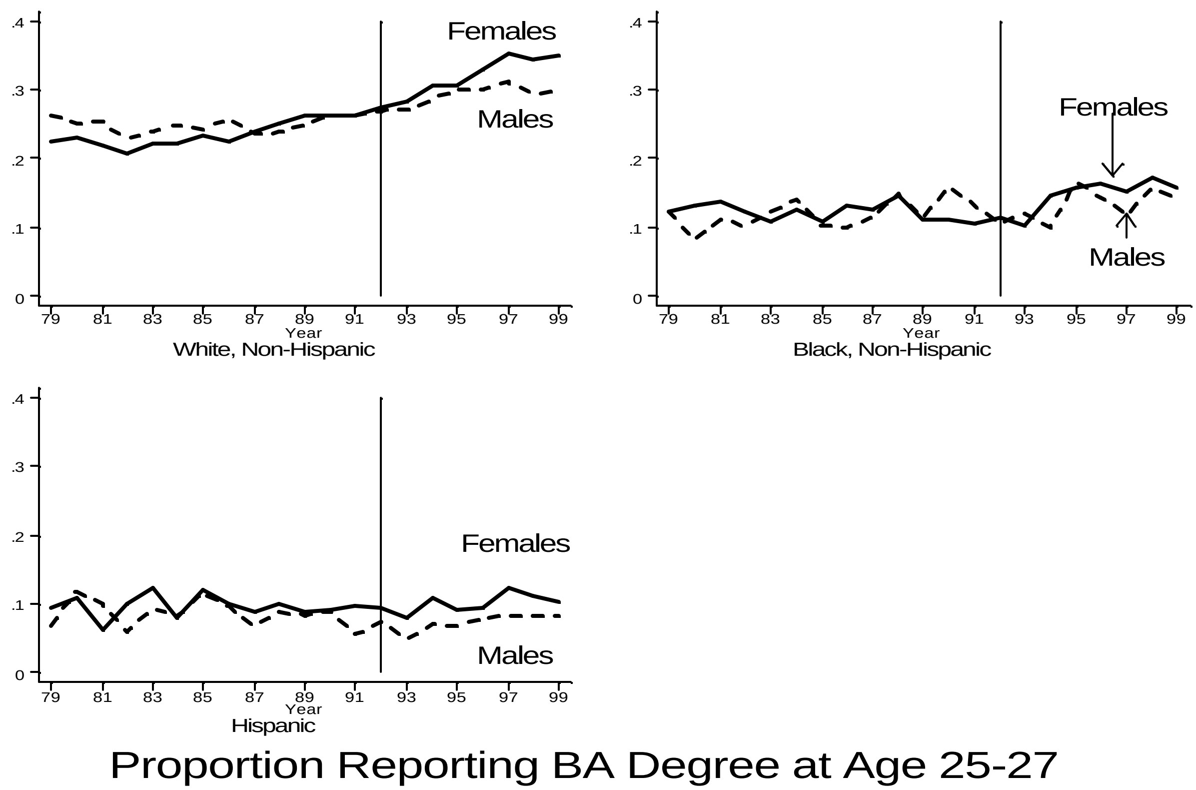
Note: Scale has been adjusted for each graph to be equal to 2 standard deviations.

Figure 4a. Trends in Educational Attainment by Race and Gender



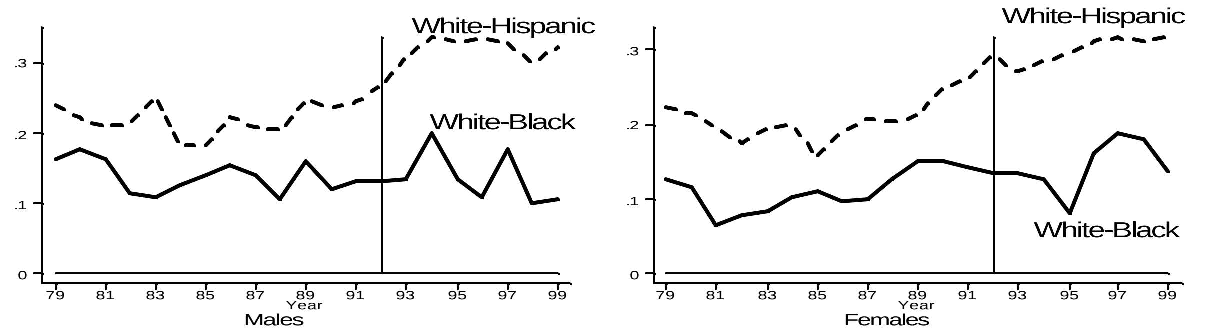
Note: Based upon Author's tabulation of CPS Outgoing Rotation Groups. The educational attainment question changed format in 1992.

Figure 4b. Trends in Educational Attainment by Race and Gender

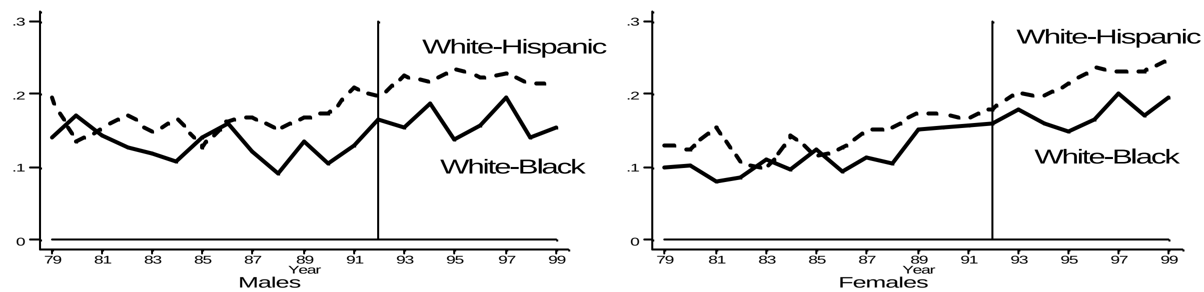


Note: Based upon Author's tabulation of CPS Outgoing Rotation Groups. The educational attainment question changed format in 1992

Figure 4c. Trends in Educational Attainment by Race and Gender

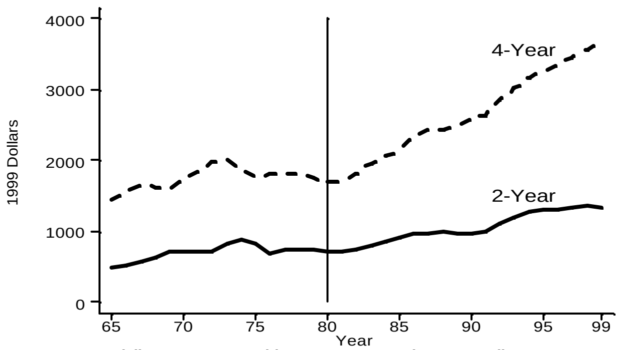


Racial Gaps in Reporting Any College Age 25-27

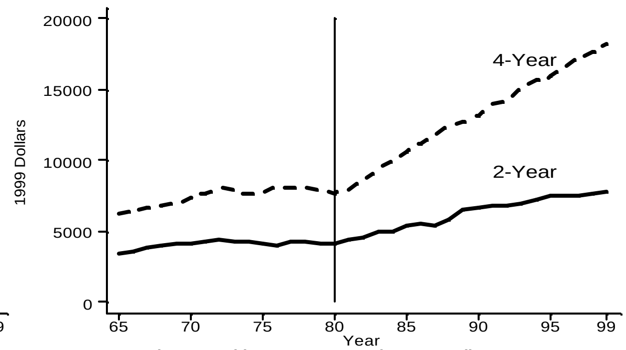


Racial Gaps in BA Completion by Age 25-27

Figure 5. Trend in Real Tuition Levels at Public and Private Institutions (1999 Dollars)



Public In-State Tuition at 2-Yr and 4-Yr Colleges



Private Tuition at 2-Yr and 4-Yr Colleges

Figure 5.
Distributions of Expected Earnings in
Boston Public Schools and Suburban Schools From COACH Survey

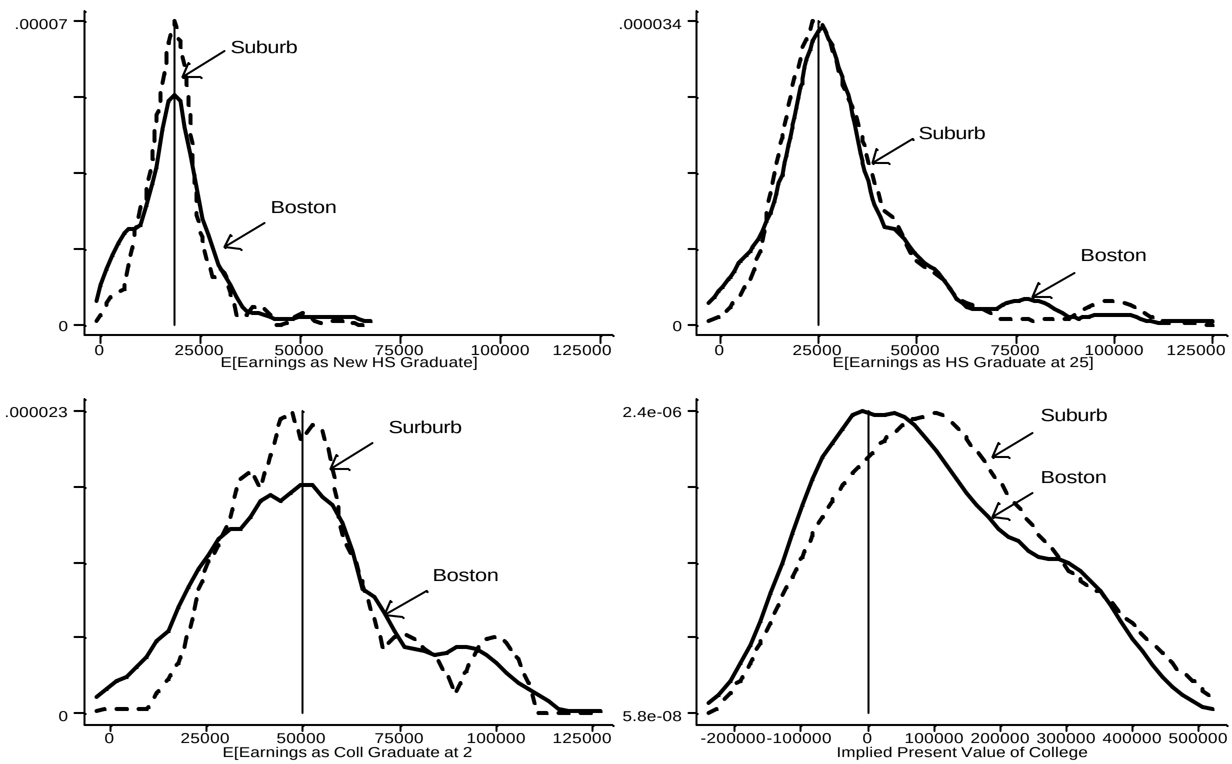
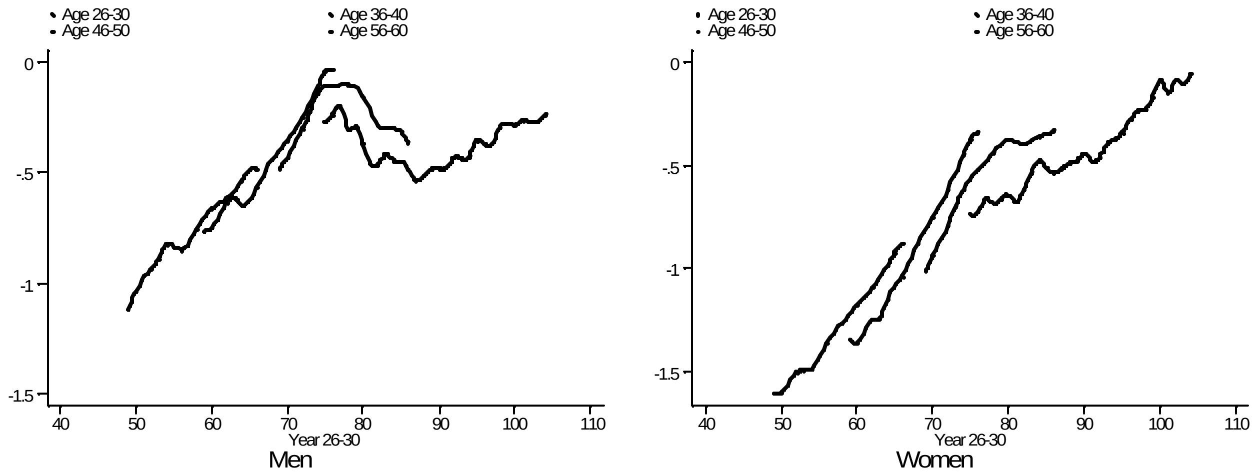


Figure 6.
Trends in the Relative Supply of College-Educated Population
by the Year in Which Each Cohort was Aged 26-30



Note: See text for description of data elements.

Figure 7.
Trend in Total Enrollment in U.S. Higher Education

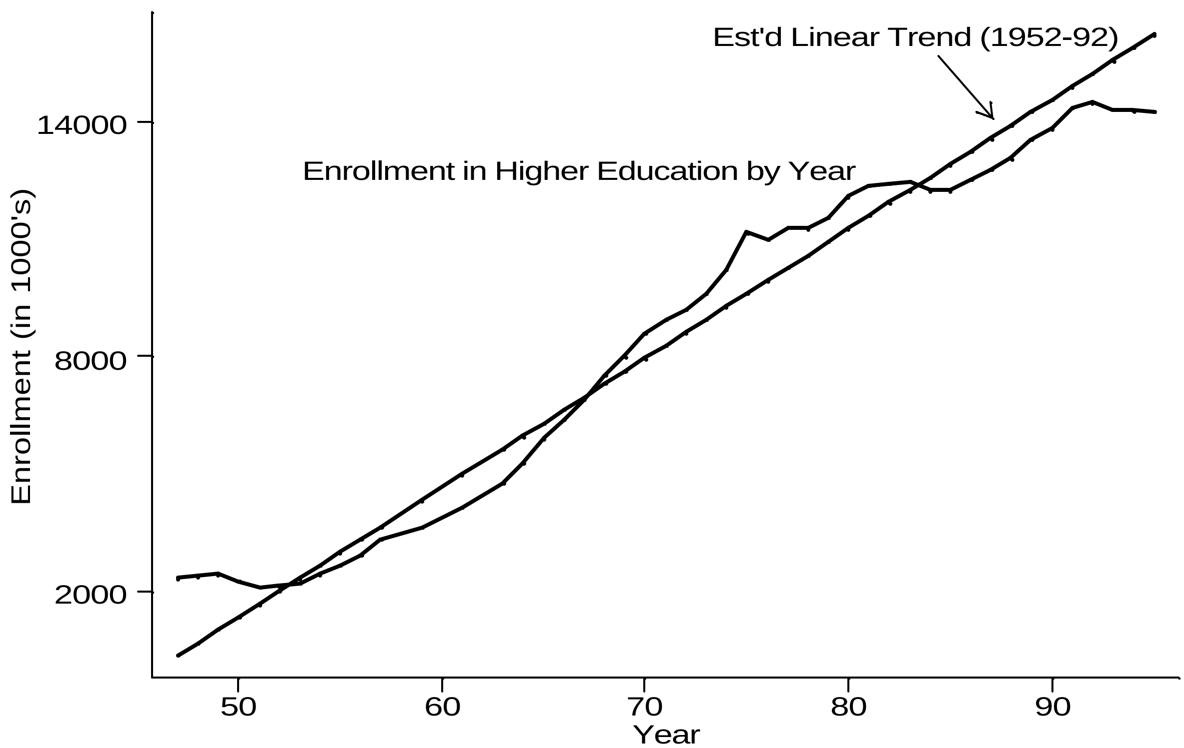


Figure 8.
Trends in the Relative Supply of College-Educated Population in States with Fast and Slow Rates of Population Growth