



*Blurring the Boundary:
Changes in the Transition from College
Participation to Adulthood*

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ABSTRACT

The transition from post-secondary education to “adulthood” defined in terms of full-time, long-term labor force participation is less and less a “once and for all” decision and increasingly a gradual transition, extending well-beyond the years immediately following high school graduation. Increased enrollment among students older than the age of traditional undergraduate, growth in the combination of undergraduate enrollment and employment, and the rising combination of college enrollment with marriage and childrearing provide empirical support for the proposition that there is not a sharp demarcation between postsecondary enrollment and “adulthood.” Beyond documenting changes in the boundary between collegiate participation and adulthood, it is important to consider why such changes have occurred and whether these developments represent policy failures such as the growth of credit constraints associated with rising collegiate costs or adaptations to a changing labor market. This paper begins with the presentation of some of the basic descriptive statistics on the change in the timing and duration of college participation and attainment over the course of the last three decades. We then turn to the examination of the changing link between college enrollment and collegiate attainment, highlight the observed increase in the time to completion of the BA. In the final section, we examine how public policies and other adjustment mechanisms explain the increase in adult collegiate enrollment.

Today, college enrollment and activities like employment and raising a family are not mutually exclusive states. While during the early 1970s the majority of students enrolled in college as undergraduates were between the ages of 18 and 21 (in 1970, 74 percent of enrolled students were between the ages of 18 and 21), recent data show that only about 56 percent of undergraduate students are of traditional college age.¹

It is not just the age of college participants that has changed but the boundaries between college-going and other adult activities such as employment, marriage, and childrearing. Among those enrolled in college over the age of 24, nearly 70 percent are also employed, while the share of college students under the age of 24 also employed has increased markedly over the last two decades. At the start of the 1970s, it was uncommon for a woman in her mid-20s to be enrolled in college and rare for married women or women with children to be college students. By the year 2000, the enrollment rate of women in their 20s had grown beyond that of men, while the barriers to college enrollment for married women and women with children appear to have fallen appreciably.

In effect the boundary between collegiate enrollment and adulthood has become much more shaded. This paper begins by setting forth some of the basic descriptive statistics on the change in the timing and duration of college participation and attainment over the course of the last three decades. A central question concerns why this dynamic has changed. One set of explanations concerns market failures or barriers that prevent students from earning degrees through a full-time, direct course of study as is discussed in the most traditional investment models.² Such barriers include credit constraints, poor information about collegiate choices, and achievement deficits at high school graduation. A quite different type of explanation is that the increase in adult collegiate enrollment reflects an adaptation to changes in the labor market and the expansion of collegiate offerings to include continuing education, retraining, and skill development of workers displaced from the labor market.

Expansion of collegiate opportunities to allow students flexibility to return to study after time in the labor force or to combine school and work is, potentially, one of the great success stories of higher education. And, in fact, significant growth over the last three decades has occurred on the extensive margin, drawing into higher education older, nontraditional students. Yet, there is also cause for concern that some of the growth in non-traditional students represents the consequences of barriers to attainment, including credit constraints that may limit the capacity of students to withdraw from the labor force to complete collegiate programs. As we will show in this paper, the growth in non-traditional students is likely the result of *both* beneficial changes in the market and circumstances where market failure exists, though much of the evidence points to the former as the more influential factor driving the changes of the last three decades.

Section 1. Collegiate Participation Over Time And Ages

A. Overall college enrollment by age and by sex

College enrollment rates (defined as the share of high school graduates with less than a BA degree enrolled in college) have been on a generally upward trajectory for all ages over the

¹ Source: U.S. Census Bureau, Current Population Survey. Table A-7. College Enrollment of Students 14 Years Old and Over, by Type of College, Attendance Status, Age, and Gender: October 1970 to 2004, <http://www.census.gov/population/www/socdemo/school.html>

² See, for example, Mincer (1970). In his discussion of training, Mincer differentiates between “schooling”, a period of full-time investment in human capital, and “on-the-job-training” which occurs at work and after an individual has left school. While Mincer’s model allows for schooling at any age, the opportunity cost of investments in human capital increases with age, producing a negative link between age and the probability of full-time schooling, as well as the expectation that investments in education are decreasing in age.

last quarter century. Figure 1 shows the broad trend in undergraduate enrollment rates from 1968 to 2003, with younger students in the top panel and older students in the bottom panel. Still there are differences in the timing and relative rates of growth by age group. For the youngest groups (ages 18-19 and 20-21), which are most likely to represent recent high school graduates and traditional college students, enrollment actually fell between 1968 and 1973 (from 52.3 to 45 percent for the 18-19 year old group), before starting a relatively steady climb through the late 1990s with enrollment rates reaching 64 percent in 1998 (and again in 2003). Despite the retrenchment for younger students in the early 1970s, this period saw substantial increases in aggregate enrollment for older students followed by a period of relatively flat enrollment through 1986. Particularly for the 25-26 age group, the late 1980s show a period of sustained increase in enrollment, rising from 10 percent in 1986 to over 19 percent in 2002.

B. Linking Collegiate Enrollment and Attainment

While this analysis focuses on the incidence of college enrollment in relation to other life outcomes, enrollment – time spent participating in college -- needs to be understood in the context of collegiate attainment. What follows from the increases in enrollment rates by age just presented is that the number of years spent enrolled in college has increased markedly over the last three decades. Treating enrollment in October as indicative of a year of enrollment and looking at the horizon from age 18 to age 28, undergraduate college enrollment has increased from about 1.7 years for those born in 1950 to over 2.5 years for those born in 1975 (top panel, Figure 2).³

One question is how this increase in the stock of collegiate participation is divided among additional students entering the collegiate pipeline and inframarginal students accumulating more enrollment time. The most general stock measure is “college participation” indicating that an individual completed at least some college.⁴ The second panel in Figure 2 shows college participation by age for the same birth cohorts (1950-1975) and what we see is that college participation has risen over the interval, moving up steadily from 50 percent to 60 percent between the 1960 birth cohort and the 1975 birth cohort. What is also apparent is that there is little change in college participation after age 22. Most students who participate in college will have had at least some college enrollment in their early 20s, though we see some increase in the ‘new’ participation of women between the ages of 25 and 28 in the most recent birth cohorts. To this end, the growth in enrollment among those in their mid-to-late 20s visible in the first figure is not “new entry” into the collegiate pipeline but the participation of those with some prior collegiate experience.

The next panel of Figure 2 presents BA degree completion by age and birth cohort. Here we see substantial differences by age of observation: observed at age 22, the rate of college degree receipt has been largely flat over the last quarter century, while the measurement at older ages shows gains in college completion. Plainly, there has been a substantial increase in the share of college graduates receiving degrees between ages 22 and 28, indicating that these students have gone through an attainment process that is quite different than four-years of continuous

³ The figure also presents a second line showing the computation accounting for part-time enrollment. Both calculations produce similar qualitative results and the distance between these lines doesn't change appreciably over the interval.

⁴ The measure of ‘some college’ follows directly from the data available for the 1970 to 2000 period. Ideally, we would have more direct measures of attainment such as the fraction of the population receiving three years of college. A coding change in large surveys including the CPS and Census shifting the educational attainment question from years of attainment to specified degree attainment makes the comparison particularly difficult. The most ambiguous category in the new scheme is “Some college, no degree” which might include any level of attainment from dropping out in the first semester to completing three years at a four year institution.

enrollment after high school graduation. [This result is discussed in more detail in Turner (2004).]

Comparing outcomes eight years after high school graduation for the cohorts of 1972 and 1990, Bound, Lovenheim and Turner (2006) find that the median time to degree rose from 4 years to 5, while the proportion of graduates taking more than 6 years to complete increased from 15.3 percent to 23.2 percent.⁵ Understanding the cause of increased time to degree at the undergraduate level -- as distinct from the consideration of changes in the overall age structure of undergraduate enrollment pursued here -- is the subject of Bound, Lovenheim, Turner (2006) which examines the extent to which the shift is attributable to factors such as potential increases in the need for remediation (and extra time), additional financial constraints or reductions in the resources of colleges and universities limiting the capacity of students to enroll in required courses in a four-year period.⁶ Comparing outcomes for the cohort of BA recipients graduating from high school in 1972 (NLS 72) and students graduating from high school in 1988 (NELS:88), preliminary estimates show little evidence that student achievement or financial characteristics of parents have changed in such a way as to explain the observed increase in time to BA completion. However, there is clear evidence that the change in time-to-degree is nearly entirely concentrated among students who attend public colleges and universities outside the most highly-ranked research universities, though further work is necessary to understand the mechanism tied to this dynamic.

In reporting the observed increase in time to degree, we want to be clear that the welfare effects of this shift are theoretically ambiguous. Students may be taking longer to graduate because they can not borrow against future earnings to finance full-time collegiate enrollment (what economists call “credit constraints”). In such cases, the need to work to finance college displaces time spent in collegiate study and the resulting increasing in time-to-degree or is inefficient and reflects a failure in the market. However, the increased time to degree could also represent a change in behavior that is optimal for students. One example might be the student that takes a semester internship in order to better prepare for employment after graduation. In addition, with increased financial aid available to non-traditional students it may be that students completing college in recent years might not have been afforded the opportunity to complete a degree in earlier periods. Without question, the change in the timing of collegiate attainment patterns is representative of a behavioral change in one of the dimensions tied to the concept of “transitions to adulthood”.

Section 2. Changes in Demographics and Employment Choices of Students in College

A. Demographic changes and enrollment

Overall, one of the most dramatic changes is the rise in the participation of women, including older women, in college. Figure 3 shows enrollment rates separately for men and women. For each age group in the figure, the enrollment rates of men exceeded those of women in the late 1960s, sometimes by as much as a factor of three. However, by 2003, this statistic is

⁵ Other data sources enforce this finding: over 45 percent of BA degree recipients in 1977 finished in four years or less, while about 31 percent of degree recipients in 1993 finished in this time frame (McCormick and Horn 1996). Yet, some caution should be exercised in comparing time-to-degree among different entering cohorts of students as larger (smaller) recent cohorts will attenuate (extend) time-to-degree measured among those completing in a given year.

⁶ While we do not want to overestimate the importance of BA receipt to the exclusion of other forms of collegiate attainment such as the completion of certificate programs or associate degrees, it is nevertheless the case that considerable economic rewards are associated with BA degree receipt. What some have called “sheepskin effects”, representing the wage advantage associated with degree receipt net of years of schooling, are empirically large and estimates from Jaeger and Page (1996) find a return to a BA net of years of education of about 31 percent.

reversed, and in each age group the fraction of women enrolled as undergraduates is larger than the fraction of men enrolled. This mirrors a trend documented in both the press and in the economics literature.⁷ For women, the last three decades have brought substantial changes in labor force participation and, with the expectation of increases in labor force attachment, growth in collegiate investments (Goldin, Katz and Kuziemnko 2006).

It appears that changing labor force opportunities and expectations for women are a significant piece of the explanation for the convergence of enrollment rates in the 1970s. Bailey (2006a, 2006b) finds that variation in whether women had access to contraception at age 18, when they were likely to begin making collegiate investments and family commitments, had substantial effects on both fertility and labor force participation.⁸ States reduced the age at majority (or the age of adulthood in the legal sense) from 21 to 18 in different years in the late 1960s and early 1970s, while states also differed in the timing of offering access to family planning services to minors. These changes are used by Bailey (2006b) to estimate a 14 percent reduction in births before age 22 and an increase in labor force participation by about 4 percentage points for women ages 26-30. Investments in college are clearly a major aspect of the process through which women postponed childbearing. Bailey uses the same identification strategy with the March CPS data to show that early access to the pill and other contraception is tied to an increase in enrollment rates of 4-5 percentage points for those between ages 19 and 22 (Bailey 2006a).

Building on Bailey’s work, we are particularly interested in exploring whether the availability of contraception at early ages might also contribute to the substantial relative increase in enrollment for women in their mid-to-late 20s observed in the 1970s. At the start of the 1970s, the relative gap between men and women enrolled in their mid-20s was appreciably larger than the gap observed for traditional college age students, with the undergraduate enrollment rate for men ages 24-25 about 16 percent relative to an enrollment rate for women of about 4.5 percent. (To put this in perspective, men were only about 25 percent more likely to enroll as 18-19 year olds in 1970, rather than the factor of 3.5 observed for the older group.) One might think of this gap as a result of two related forces. First, at the start of the 1970s women in their mid-20s were much more likely to have young children, which likely increases the opportunity cost of attending college. Secondly, women in this group may have had lower labor force attachment and, in turn, lower returns to collegiate investments.

Using data from the October CPS, we estimate the effect of early access to contraception (at age 18) at the state level on undergraduate enrollment in the 24-29 age range over the period from 1977 to 1986.⁹ For women ages 24-29, our results suggest an effect of the early access

⁷ For references in the economics literature, see Jacob (2002) and Anderson (2002). For recent documentation in the popular literature, see the cover article of the January 30, 2006 *Newsweek* by Peg Tyre entitled “The Trouble with Boys”.

⁸ The importance of the widespread introduction of oral contraceptives in changing the educational and career decisions of women is well-documented in Goldin and Katz (2000) and Bailey (2006a).

⁹ Using the October CPS allows us to observe all women enrolled in school, even those that are working while enrolled. Bailey’s (2006a) estimates use a variable based on “Not in the labor-force because in school”, which may understate effects on older students if this group is most likely to combine work and school. What is more, the question of how family planning services available at age 18 affect enrollment at older ages has the advantage of concentrating the variation in somewhat later years of the CPS for which all states are identified (1977 and after). To be clear, what we estimate is:

$$E_{isct} = \alpha + \beta_1 ELA + \beta_2 UnemRate + \beta_3 Black + \delta_1 Age25 + \delta_2 Age26 + \delta_3 Age27 + \delta_4 Age28 + \delta_5 Age29 + \gamma_s + \lambda_t + \eta_c + \varepsilon_{isct}$$

where s indicates state, t indicates year, and c indicates cohort.

We estimate this separately for men and women because it is likely that state, time and cohort effects do differ for men and women over this interval. We also add age parameters as it is well-established that

provisions of nearly 1 percentage point on undergraduate enrollment, which is substantial given the relatively low baseline level of enrollment for this group (Table 1). We estimate the same specification for men, which can be interpreted as a falsification exercise if the supply of post-secondary opportunities is elastic or a test of whether this entry of women “crowded out” men if supply is not elastic. These results are consistently negative, but not statistically different than zero (second column of Table 1).¹⁰

Throughout this paper, we emphasize that the rise in collegiate participation beyond the immediate post-high school years is a substantial transformation over the last three decades. Central to understanding this development is the rise in the participation of women in post-secondary education among college students in all age groups, as it was in the enrollment outcomes for older students where the largest relative gaps between men and women existed in the early 1970s. Still, by the early 1980s women had largely “caught up” to men in enrollment and the explanation of the overall expansion in the collegiate participation of those in their mid-20s in the last 15 years must rely on other changes in the labor market and collegiate sector.

Although the enrollment rates of minorities have not quite “caught up” to those of whites, there have been large gains for these groups. In 1968, African Americans trailed their white counterparts in college enrollment at all ages.¹¹ For example, the enrollment rate of blacks ages 18 and 19 in 1968 were 77 percent of those of same aged whites (approximately 41 and 53 percent, respectively) and enrollment rates of blacks aged 26 and 27 were about 50 percent of the rate observed for whites (about 3 and 6 percent, respectively). The narrowing of the black-white gap in college enrollment for black and white students has been decidedly uneven by age. For those ages 18-19, the gap has closed somewhat - the enrollment rate for blacks was about 86 percent of the rate observed for whites in 2003. Yet, for those above age 24, blacks are now somewhat more likely to be enrolled as undergraduates. (For example, the enrollment rate of blacks aged 24 and 25 was 13 percent in 2003, while the enrollment rate of whites the same ages was 11 percent.

Not only have enrollment rates by age and gender changed over the course of the last thirty years, but the characteristics of those enrolled (along with the demographics of the population more generally) have changed. Transition to adulthood is traditionally defined in terms of both employment and formation of independent families.¹² College enrollment today does not necessarily conflict with many indicators of adulthood: employment, marriage and childrearing are now less determinant of enrollment status than in the decade of the 1970s.

The age at first marriage has declined secularly over the course of the last two decades. Concurrently, the proportion of those in age 22 to 23 who were married declined from about 65 percent in 1968 to less than 30 percent in 2003 (top panel of Figure 4). Despite these secular changes, the last thirty years have seen a marked increase in the enrollment of married women (bottom panel of Figure 4). With similar changes for other age groups in their 20s, descriptive evidence suggests that, while marriage may make college enrollment less likely, it does not preclude it.

undergraduate enrollment rates decline with age. The specification (and the organization of the data) lead to the assumption that current state is the same as the state at age 18.

¹⁰ We also consider the extent to which these effects differ by type of institution (bottom panel of Table 1). While these results suggest that the enrollment effects are concentrated at public two-year institutions and public four-year schools, we are limited in our capacity to make strong inferences about these estimates.

¹¹ Enrollment rates reported are based on the authors’ calculations using the CPS October supplement; these rates indicate the fraction enrolled among the population with at least a high school diploma but no college degree.

¹² For further discussion of the development of the ideas of “transition to adulthood” and the changing nature of the transition, see Furstenberg et al. (2005).

It is well-known that fertility has declined somewhat among those in their 20s over the last three decades. The mean age of a woman having her first child rose from 21.4 to 24.9 over the period from 1970 to 2000, while the number of births per 1000 women dropped from about 150 to 115.¹³ Although the CPS does not provide a complete time series in relation to the presence of children, the data since 1980 – particularly since 1990 – show that enrollment rates of parents with children have been on a steady upward trajectory. In 1980, enrollment rates of individuals of all ages with children were 3.86 percent. In 2003, they had risen by almost 50 percent to 5.75 percent.

B. Employment and Enrollment

Employment is another potential line of demarcation to adulthood. However, in a broad sense, we do not find evidence of a persistent separation between work and school. At least since the 1970s, a sizable portion of students have combined work and undergraduate enrollment. As can be seen in the first two panels of Figure 5, employment of male students older than 22 years has remained fairly constant over the period, while employment of younger male students has increased moderately (for example, the share of those age 18 and 19 working while in school rose by about five percentage points).¹⁴ Meanwhile, the increase in women working while in school is much more dramatic. For younger women aged 18 to 23, the share of those working while enrolled in college has risen by an average of about 18 percentage points from 1970 to 2003. For women ages 24-35, the rise over the same period in the share combining work and college is slightly more moderate, averaging about 15 percentage points.¹⁵

These findings confirm those in Bacolod and Hotz's (2005) analysis of NLS cohorts from the late 1960s, 1970s and 1980s. By looking at individuals between the ages of 18 and 28, they find that the fraction of men who worked at some point while in college increased only slightly (0.6 percent) between the 1970s and 1980s but that the fraction of women who had worked while in college had increased substantially (by 30 percent). What remains unanswered in the literature is why students choose to work while in school, especially since the evidence seems to suggest that doing so does not lead to an increase in future earnings and may well increase time to degree attainment.¹⁶

One explanation is that students are liquidity constrained, though it is unlikely that credit constraints affect the entire population of working students. Another possible explanation is that students balance uncertainty about the risks of enrolling in school and/or the opportunity cost of their time by both working and attending school.¹⁷ Other possible explanations involve adaptations on the supply side of the higher education market. It may be that colleges are increasingly responding to the preferences of students by offering courses of study that allow

¹³ According to the CDC (http://www.cdc.gov/nchs/data/nvsr/nvsr50/nvsr50_05.pdf) most of that decrease happened in the 1970s. (also referenced <http://www.cdc.gov/nchs/data/statab/t981x07.pdf>).

¹⁴ We also examined hours worked while enrolled, breaking down the potential hours into bins of 10 hours (0 to 10, 10 to 20, etc.). While there seemed to be a small increase in the number of hours worked for all age groups, the share working hours in any given range never increased by more than 10 percentage points. This 10 percentage point increase was a change in the share of 26 to 30 year olds working 30 to 40 hours a week from 33 percent in 1970 to 43 percent in 2000.

¹⁵ In order to determine how much of the changes in enrollment were related to changes in the demographic make-up of the population rather than changes in behavior, we did a simple Oaxaca decomposition. The results mimic the discussion here and are available from the authors upon request.

¹⁶ Early estimates (Meyer and Wise 1982; Ruhm 1997) suggest that the effects of working while in high school on future earnings are positive. However, Hotz, Xu, Tienda, and Ahituv (2002) show that the effects on earnings go to zero when structural modeling techniques, including modeling employment and enrollment decisions, are used to control for sample selection and endogeneity issues.

¹⁷ Sjogren and Saez-Marti (2004) present a model of investment in education that uses uncertainty about the opportunity cost of one's time to generate an optimal strategy of delaying school enrollment, particularly for those students for whom the returns to education are low. It may be that similar uncertainties are driving the decision to work while in school.

them to attend school while working. Alternatively, younger students may be working while in school in order to gain on-the-job skills and experience valued by employers. Understanding the nexus between employment and collegiate attainment is of significant importance and represents an open area for future research.

Section 3. Policy Changes and College Enrollment

Public policy designed to influence decisions to enroll in higher education is decentralized, with initiatives at the state, federal, and institutional level affecting the financing of colleges and universities and the supply of collegiate opportunities. Even within federal policy, there is no single ‘student aid policy’ but rather a loosely coupled set of loan and grant programs administered on the basis of need, as well as some categorical programs such as veterans benefits. Variation in funding for higher education at the state level and changes in tuition levels at state institutions also have a substantial effect on the cost of college. What is more, a whole set of other social welfare programs and regulations that are not explicitly part of higher education policy including welfare reform, unemployment insurance and trade policy may also affect college participation.

In this section, we focus first on how federal student aid policies have quite dramatically changed the financing of college for students outside the model of traditional high school graduates. Then, we turn to the question of how state policies and economic circumstances affect the enrollment of students of all ages, with particular attention to the question of whether the current price and student aid structure in higher education leaves students from low-income families unable to afford full-time attendance.

A. Federal aid policy: The transformation in “access” for older students

At the federal level, higher education policies include grants, loans, tax credits and savings incentives. While the introduction of broad-based federal funding for college outside of categorical programs (such as the G.I. Bills)¹⁸ through grants and loans dates to the Higher Education Act of 1965, it was the changes in federal financial aid policy with the reauthorization of the Higher Education Act in 1972 and the introduction of Pell grants (at that time known as the Basic Educational Opportunity Grant) that dramatically changed funding options for many potential college students. The primary instruments for federal policy designed to increase collegiate attainment over the last three decades have been the programs under Title IV of the Higher Education Act, notably Pell Grants and Stafford student loans; operating through the revenue side rather than the expenditure side of the federal budget, tax credits (including Lifetime Learning Credits) are a much more recent addition, adopted in 1997.

The Title IV financial aid programs are often described as the cornerstone of federal higher education policy; in academic year 2003-04, Pell grant aid totaled \$12.6 billion in expenditures while loan programs provided over \$55.4 billion in capital, with about \$25 billion of which was provided through the subsidized Stafford loan program.¹⁹ For federal means-tested programs, eligibility is determined through the evaluation of available assets and incomes through the FAFSA form. An innovation of the legislation crafting the Pell

¹⁸ The G.I. Bill which provided collegiate funding for veterans returning from World War II is an example of an early categorical program. Notably, both the G.I. Bill and the Social Security Student Benefit program had generally significant effects on both collegiate enrollment and completion (Dynarski 2003; Bound and Turner 2002). The G.I. Bill and the Social Security student benefit program share several design features including the transparency of eligibility determination, meaning that potential beneficiaries knew their eligibility and the level and duration of benefits without additional calculations or waiting for the results of a bureaucratic process, and the substantial size of the benefits, often covering the majority of college costs.

¹⁹ Statistics from the College Board’s (2005b) report entitled *Trends in Student Aid*.

grant was the explicit provision for separate needs evaluation for “independent” students who were no longer dependent on parents for financial support, which applied to the determination of both loan and grant eligibility.²⁰

Pell Grants

The student’s “ability to pay” and, in turn, eligibility for aid, is calculated by the application of a tax rate to a measure of available resources, both income and assets, with fixed adjustments for family size and number of members of the family in college to determine the student’s “ability to pay.” If this amount is less than allowable college costs, the student is aid eligible. Today, the maximum Pell grant is set at \$4,050 which is higher in real terms than the award level in the mid-1990s though well below the constant dollar value of the program award from the mid-1970s (about \$4,800). Given that college costs have risen over the last quarter century, the Pell grant now covers a lower share of the burden of paying for college than it did originally.

Despite the rhetoric surrounding the Title IV programs as the key dimensions of federal policy aimed at eliminating credit constraints,²¹ empirical evidence on the behavioral effects of these programs is mixed. Focusing first on the enrollment effects for traditional college-age students (defined as students who are recent high school graduates and still depend on their parents for financial support), evaluations consistently yield no evidence that the program changed enrollment (Hansen 1983; Kane 1994).²² One explanation for why the Pell grant program has had such modest effects is that the complexity of the program and the difficulty in determining benefit eligibility may impose a high cost, inhibiting many potential students at the margin from applying. Another explanation is that factors beyond financial constraints, including academic achievement, are the factors limiting college enrollment and college attainment for the marginal low-income student.

While the Pell grant program has not had a discernable effect on the collegiate attainment of recent high school graduates, the effects on college participation for non-traditional students have been marked. A key part of the explanation is that the institutions attended by non-traditional students are unlikely to have provided much financial aid and many students in their early or mid-20s would have accumulated few assets to use to finance college. When Seftor and Turner (2002) examined the effect of the program introduction on non-traditional students (following a difference-in-differences setup similar to that used by Kane (1994)), they found strong evidence of a substantial enrollment effect for non-traditional students. More generally,

²⁰ Under Title IV of the Higher Education Act, federal financial aid policy makes a statutory distinction between “dependent” and “independent” students in the determination of program eligibility. Eligibility for independent students rests only on the financial position of the applicant and his or her spouse, relative to direct college costs and other demands on resources including the number of children in the family. To be eligible for aid as an independent student, an individual must not be claimed as a dependent in the prior or current year for tax purposes and may only receive limited cash and in-kind contributions from parents. Eligibility for students claiming independent status has become more restrictive since the inception of the program. The 1986 amendments to the Higher Education Act required students to be at least 24 years old, married, or with children to qualify for aid as an independent student.

²¹ To illustrate the symbolic attachment to these programs, it is notable that in the 2004 presidential debate on domestic policy, both candidates invoked the Pell grant as a policy tool, with Kerry mentioning the program twice and Bush mentioning the program six times.

²² In one of the initial assessments of the program using time series data, W. Lee Hansen examined the relative enrollment rates of more and less affluent students before and after the introduction of the Pell program. Hansen’s review of the evidence “suggests that expansion of federal financial aid programs and their targeting toward youth from lower-income and lower-status families did not alter to any appreciable degree the composition of postsecondary students or the college enrollment expectations of high school seniors over the 1970s.” (Hansen 1983)

the share of Pell grant recipients who are independent has risen steadily over the last three decades from about 30 percent in 1975 to over 60 percent in the early 1990s, before dipping to about 58 percent in 2003-2004. Expansion of the availability of federal financial aid for undergraduates to older students appears to be one mechanism opening enrollment in higher education to many individuals who would not have been able to enroll in higher education in earlier decades.

Student Loans

Beyond grant funding, low income students may turn to the federal government for loan assistance in funding college, though the availability to finance through borrowing is not unconstrained. Loan limits vary by year of study and status as a student (dependent, independent), with dependent undergraduate students limited to borrowing \$2625, while a graduate student may borrow up to \$18,500 (with no more than \$8,500 in subsidized loans). The mechanics of subsidized student loans are that students can borrow (a limited amount) from the federal government with the government paying interest while the student is enrolled and then offering students a repayment at a subsidized rate when college is completed.

Unfortunately, there is little evidence on student loans and even less evidence on their effect on college enrollment and attainment. What little evidence there is suggests that their role in impacting the decisions of young adults to enroll is small (Ionescu 2006). This may be because when all students are considered together, the differences in behavior among students of different types is missed. For example, the increase in the use of loans seen in the last decade are driven mostly by the introduction of the unsubsidized Stafford Loan Program, which allows students to borrow regardless of their (families') demonstrated need (Baum 2003). It is likely that these unsubsidized Stafford loans substitute for other sources funds (e.g. borrowing from home equity) by students (or their families) who would attend college even without loan receipt.

Another possibility, pointed out by Avery and Hoxby (2004), could be that students are not responding "rationally" to loan packages. The authors show that students misevaluated the value of loans compared to grants and were fooled by the name of a funding opportunity (e.g. scholarship instead of grant). The Avery and Hoxby study included students with very high SAT scores. These issues are likely to be exacerbated as the students being discussed move down the SAT ladder and families are lower on the income ladder. Such students are likely to have less information, or lower quality information, upon which to base their decisions and there is some evidence that low income families are more reluctant to borrow (Orfield 1992). While it is common to bemoan the potentially high loan burdens assumed by students, it is far from clear that student loan debt is causing a delay in the transition to adulthood.²³ By one line of argument, greater access to credit would allow students an opportunity to attend full-time and complete degree programs in a shorter period of time.

The distribution of aid eligibility under the federal needs analysis formula does not, however, guarantee that a student will have all need met, as it is quite possible that the sum of the Pell grant, Stafford loan and whatever aid is available from the institution may be less than total need in many circumstances. When low income students are limited to federal sources of support to finance college, it is surely possible that they are credit constrained – perhaps constrained to the extent that they must combine school and work or turn down a residential collegiate program to live at home while attending college.²⁴ Even if low income students are

²³ For a brief discussion of both sides of the loan argument see <http://www.usatoday.com/life/2001-12-03-student-loans.htm>.

²⁴ Kane (1999, Figure 4-1) demonstrates a high degree of stacking in the distribution of student loans, with many students apparently constrained at the lower division limit of \$2625 and the upper division limit of \$4,000.

also able to take advantage of the private sources of financing, most are likely still credit-constrained in some sense of the term.²⁵

Tuition tax credits and lifetime learning

Tuition tax credits form the final prong of federal aid discussed in this chapter. Most notably, this aid is non-refundable, implying that eligible students are unlikely to be among the most economically disadvantaged. Long (2004) notes that these credits are aimed at the middle class, with about 2/3 of the population potentially eligible; those with limited tax liability are ineligible as are those with incomes above a ceiling. The Hope Credit, the first arm of the 1997 tax credit program, provides a tax credit equal to 100 percent of the first \$1000 of qualified tuition expenses and 50 percent of the second \$1000 for the first two years of post-secondary education. The Lifetime Learning Tax Credit, the second arm of the program, covers 20 percent of the first \$5000 in tuition expenditures up to \$1000 and is available for upper level undergraduates, adults upgrading skills or graduate and professional students. The College Board (2005a) estimates that the implicit tax expenditures through this program have risen from \$3.3 billion in 1998-1999 to about \$6.3 billion in 2003-2004. By most accounts, the first order motivation for this policy was the provision of an appealing tax cut to the middle class (not the reform of student aid policy) and the extent to which advocates for need-based student aid viewed these policies as in opposition to established programs such as Pell may well have undermined the alternative of helping low income students through a refundable tax-credit (Starch 2005).

The evolution of federal student aid policy embodied in the title of the Lifetime Learning Tax Credit is that access and participation in post-secondary education can be expected to continue through the working life. As such, these benefits do not follow the model of “once and for all” school completion or full-time attendance.²⁶ In principle, these benefits provide for either continuing education or “retooling” for adults through the post-secondary system and some opportunity for financial aid in the wake of job displacement. Yet, because these benefits are non-refundable, it is unlikely that they serve the needs of those who have been displaced from permanent jobs.²⁷

Taken as a whole, federal financial aid policy in the form of grants, loans and tax benefits is likely insufficient to fund full-time collegiate enrollment for students of any age and the share of total college-related expenses covered by federal sources has likely declined for many potential college students from low income families since the early 1970s, as neither federal loan limits nor Pell grants have kept pace with inflation. Nevertheless, changes in federal student aid policy since the early 1970s have clearly opened some financing for college to students beyond the immediate post-high school years with the availability of aid for “independent” students through Title IV programs and the introduction of programs such as Lifetime Learning Credits for adults participating in postsecondary education.

B. Tuition increases and collegiate enrollment

²⁵ Private borrowing for college increased from \$1 billion in the 1995-1996 academic year to \$5 billion in 2001-2002. (<http://www.collegejournal.com/aidadmissions/financialissues/20030109-chaker.html>) However, this type of financing might not be available to low income families or older students who do not have sufficient credit and/or collateral to borrow in the private market.

²⁶ The allocation of Title IV aid is more generous for students enrolled at least ½ time, while receipt of the Hope tax credits requires at least 6 credits of enrollment per term.

²⁷ Choitz, Dowd, and Long (2004) examine the extent to which the tax benefits were received by middle income parents or working adults. Nearly 80 percent of the Lifetime Learning Credits were received by the primary filer or spouse rather than on behalf of a dependent in 2001 (relative to about 58 percent for the Hope credits). As one would expect, the benefits of these credits appear to accrue to people from moderate incomes as less than 20 percent of Lifetime Learning Credit recipients for 2001 earned less than \$40,000 annually in 2001.

In the last three decades, tuition (in constant dollars) charged at private, public four year and public two year institutions has doubled. It is common in the press and in policy circles to proclaim that such price changes are a major causal force in reducing opportunities for students to enroll in college and complete undergraduate studies.²⁸ Many popular discussions focus on the changes in sticker price at the most selective private institutions, while such changes are unlikely to affect the choices of students at the margin of college enrollment. With high completion rates and little change in time to degree completion at these institutions over the last quarter century, pricing at these institutions is unlikely to be related to the observed increase in collegiate participation of those beyond traditional college ages. Most college students are enrolled at schools where tuition is less than \$6,000, not at schools where tuition approaches \$30,000.²⁹

The Effect of Increasing Tuition Charges

We open a discussion about the impact of tuition and college costs on enrollment and attainment with two basic propositions. First, the demand for college education is decreasing in price or tuition – in other words, increasing tuition works in the direction of reducing the number of students enrolled. Second, there is a compelling case that credit constraints plausibly limit collegiate attainment for students from economically disadvantaged households and these effects are likely to be exacerbated by increases in tuition or other dimensions of college costs. While these propositions generate considerable agreement, they are not sufficient to produce the conclusion that increases in tuition charges have substantial effects on collegiate attainment or the timing of college enrollment. For increases in tuition to be an important dimension of the growth in undergraduate enrollment beyond traditional college years, it would need to be the case that tuition increase led to either delays in college enrollment or increases in the share of students enrolled part-time.

The measurement of the effect of changes in tuition on collegiate attainment is not altogether straightforward: cross-sectional comparisons among states are likely to confound differences in public college pricing with other systematic differences across states including income. At the same time, within-state approaches are not immune from critique as researchers should be concerned that changes in tuition at state-supported institutions are likely to be tied to a host of other changes in local economic conditions affecting enrollment. The same factors affecting the determination of tuition on the supply-side of the market (e.g. recessionary periods within a state) may also affect the demand for college. In such circumstances, the counterfactual to raising tuition at public institutions may be lower resources per student as states essentially raise tuition to compensate for declines in appropriations. When we observe a change in tuition within a local market, it may reflect changes in demand, changes in supply or as is most often the case changes in demand and supply. Complicating the problem yet further, measurement of “price response” will vary with the scope of the market, as well as individual characteristics.³⁰

²⁸ In 2003, U.S. Representatives John A. Boehner and Howard P. “Buck” McKeon put forward a Congressional analysis report entitled “The College Cost Crisis”. In it they report the increases in tuition at public and private four year institutions are threatening to put college “out of reach” for low- and middle-income students. However, they miss the point that forty percent of students (as calculated from the IPEDS enrollment survey) are at institutions where the highest degree attainable is a two year degree.

²⁹ In 2004 the average tuition for a resident student at a public four-year institution was \$5,132 while the average total expenses (including room and board, transportation, books and supplies) for such students was \$14,640. Average total expenses are even higher for those that commute or are from out-of-state.

³⁰ One of the most commonly cited literature review pieces on responsiveness of enrollment to changes in tuition (Leslie and Brinkman 1988) suffers from the aggregation of estimates from very different markets. We would expect the enrollment response to a change in tuition at one institution (when there are a number of collegiate substitutes) to be much larger than the price response to a change across a more broadly defined market.

Evaluating the effect of changes in price on changes in enrollment within states is the approach we employ, essentially treating the state as the relevant definition of a market. There are two empirical approaches in this type of analysis. One approach is to use CPS data at the level of the individual (or aggregated to the level of the state), with these data also revealing the age of students enrolled in college. While CPS micro data have the advantage of information on age and current economic circumstances, estimation is limited by relative small sample sizes within states. In both our analysis (and within state estimates produced by Kane (1995)), regressions of enrollment rates on tuition with state and year fixed effects often produce small and insignificant effects of college price on enrollment.³¹ The results in Table 2 show the coefficients on tuition variables for measures of enrollment rates (separately distinguishing total enrollment from enrollment at public institutions and enrollment at two-year schools). Overall, we find that our estimates of the effect of public college prices on enrollment rates are indistinguishable from zero, indicating that total enrollment for all ages and for those ages 17-19 is essentially inelastic. We would expect to see the larger price response or enrollment elasticities at two-year schools as these institutions are most likely to reach students who are at the margin of enrollment. Yet, for this measure, a \$1000 increase in tuition would yield a predicted change in the two year enrollment rate between 8 and 16 percent. Note that this effect is only significantly different from zero when four-year college tuition is the price measure.

The average level of community college tuition for all states in our sample is \$1,297 (in 2003 dollars); thus, an increase in community college tuition of \$1000 is nearly so large as to be “out of sample”.³² While the largest change (in absolute terms) of the real price of community college tuition from one year to the next in a given state was an increase of 80 percent, the average change from year to year within a state is less than 4 percent.³³ For an increase of the average community college tuition (in real terms) of 4 percent, our preferred estimates (column 3, Table 2) indicate that enrollment rates at 2 year institutions would decrease by about one half of a percent (0.59 percent). Since the average enrollment rates across states for the period discussed is 15 percent, the predicted decrease is tiny, 0.09 percentage points.

A different approach is to use institutional data or the responses from surveys to colleges and universities on the number of students enrolled at each level in the fall. In this setup, it is also then common to focus on tuition charged by public universities and community colleges as the key explanatory variable, while also including state and year fixed effects so that the full identification of the tuition variable is based on within-state changes over time. One problem in relating this type of enrollment measure to enrollment rates generated from a micro survey like the CPS is that it is necessary to turn to another source (such as age by state population counts) to generate a denominator; as such, we refer to these measures as enrollment ratio rather than enrollment rates.³⁴

³¹ We present our regressions weighting by the square root of a state’s college age population (defined as those between ages 18 and 24). Doing so generally leads to predicted effects of tuition hikes which are somewhat larger in absolute value than those obtained without such weighting.

³² It is worth remembering that the doubling of tuition at public institutions has occurred over the course of the last three decades. Also, we make no argument as to what repeated large increases in the real cost of tuition would do to enrollment. Because this is not the case over the time of our data doing so would involve predicting out of sample.

³³ The largest outliers were for two increases in the average community college tuition in California. From 1991 to 1992 community college tuition increased from \$120 to \$210 and the following year it increased again to \$390 (in constant 2003 dollars). Enrollment rates at two year institutions also dropped over the period, from 13.2 to 11.7 to 11.3 percent.

³⁴ While we believe that these institutional measures give quite accurate counts of enrollment, we are very skeptical about the interpretation of these measures as exactly comparable to CPS-style enrollment rates for the following reasons. First, because the age structure of college enrollment differs across states, over time, and within-states over time, some variation in a measure such as Enrollment/Pop 18-24 will be

At first glance it is plain that estimates using state-level enrollment rates for traditional college age students yield quite different effects than those generated with institutional level enrollment counts. Table 3 shows this basic comparison with the dependent variable specified as the log of total enrollment ratio. Particularly for enrollment at two-year schools, these estimates produce quite large enrollment responses to tuition changes, with a \$1000 increase in tuition associated with a decrease in enrollment of between 1 and 6 percent.³⁵ Yet, this type of estimation is likely to be significantly misspecified with the omission of the related cohort size as a dependent variable as cohort size is both correlated with tuition levels chosen within-state and also directly related to enrollment levels at a rate that is known to be less than 1:1 (see Bound and Turner, 2004). What we observe in the remaining columns of Table 3 is that the inclusion of a measure of the size of the college age population reduces the magnitude of the tuition effect by as much as a factor of 5. While some of the enrollment effects presented in columns (4)-(6) are negative and distinct from zero, the effects are relatively small in magnitude, suggesting that tuition per se has not been the primary factor affecting the enrollment decisions of recent high school graduates over the last three decades. What we focus on somewhat later in this section is how the effect of changes in tuition prices varies by age. Still, in concluding that changes in tuition charges at public universities have been a modest determinant of collegiate enrollment, we want to be clear in stating that this finding does not imply that total college costs are unimportant in explaining the timing and intensity of enrollment decisions. As discussed below, there is evidence to suggest that total college costs (including living expenses) do affect the timing and intensity of college going and the results presented above are limited to the range of observed tuition changes and surely should not be applied to out-of-sample changes such as the effect of doubling tuition at public institutions.

C. Paying for College: Total College Costs and Family Circumstances

In making the point earlier that there appears to be little strong empirical evidence identifying changes in tuition as the “culprit” in the changes in the overall enrollment or time to degree, we do not want to leave the reader with the impression that there have been no changes in the capacity of families to pay for colleges. Quite the contrary: changes in the structure of earnings and the living expenses associated with college completion likely have had dramatic effects on college choices, particularly for students from low-income families.

While tuition increases have been episodic over the course of the last two decades, the change in the structure of earnings has been more sustained, with the real family income of those in the bottom quartile actually falling during much of the 1980s and the 1990s and the real family income of those in top quartile rising over the same period. In 1980, the mean income of families with children between 17 and 19 still living at home in the bottom quartile was \$22,285 (in constant year 2000 dollars). By 2000, the mean family income for the same group had fallen

generated by changes in the enrollment of potential students over the age of 24 rather than changes in the true enrollment rate of a defined age group (such as those ages 18-24). In addition, one might prefer a denominator based on high school graduates and excluding those with completed collegiate attainment when examining the link between undergraduate enrollment and tuition, which is not possible with the combination of institutional measures and population counts.

³⁵ In many respects, these results parallel other results reported in the literature. For example, Heller (1999) estimates an increase in community college tuition of \$1000 would result in a (statistically significant) 2.1 percent drop in enrollment at public institutions. Kane (1995) finds a similar estimate, -2.9 percent. These estimates are produced by including the cohort size only in the denominator of the dependent variable, rather than also including it as an explanatory variable. However, this is the equivalent of including population as an explanatory variable and restricting the coefficient to be -1, which implies a perfectly elastic supply side response.

to \$18,579, a decrease of 17 percent. Over the same period, the real income of families in the top quartile increased by 22 percent from \$115,411 to \$140, 661.³⁶

Compounding the problem of erosion of family income for those from low income families is the recognition of rising overall living costs, particularly for housing in urban areas. Of course, young people would be expected to pay for food or housing independent of enrollment decisions. Yet, to attend full-time (even at a low-tuition public institution) presupposed a source of financing for housing and food. To illustrate, while average tuition and fees for attendance at a public 2-year school were \$2,191, the College Board (2005b) estimates that the total annual cost of attendance would be \$11,692 with the inclusion of expenditures on rent, food and books. Though numbers on these total expenses are not available more than a few years back in time, some evidence can be gleaned by looking at the costs of room and board at postsecondary institutions that offer such services. Tuition, fee, room and board at a four year public institutions was \$6,462 (2005 dollars) in 1976. By 2005-2006, it had nearly doubled to \$12,127.³⁷

D. Enrollment responses to economic shocks through the age distribution

Much attention has been focused on the question of how cyclical shocks affect enrollment and persistence of traditional college-age students, following an implicit assumption that school leaving is a once-and-for-all decision. Empirical analysis of the educational investments of youth show a large effect of the unemployment rate on high school graduation, a modest effect on college enrollment, and no effect on degree attainment (Kane 1994; Card and Lemieux 2000). Yet, those most likely to seek postsecondary training in response to cyclical shocks may be outside the set defined as traditional college students especially if it is possible for students to combine work and school. For those already in the labor force, it is well known that on-the-job training opportunities are likely to decline in cyclical downturns (Lynch 1992) and post-secondary institutions may serve as an important channel for further skill development. Because cyclical downturns reduce the opportunity cost of time, it is expected that workers shift training investments to relatively slack labor market periods. In addition, shocks to labor demand may be tied to technological changes that make some skills obsolete (or open new opportunities in emerging industries). We begin this section with the basic question of whether the response of (relatively) older potential students in college enrollment to cyclical shocks is greater than that observed for recent high school graduates.

One test of the proposition that the cyclical nature of the post-secondary enrollment response is concentrated among those beyond the immediate high school years is to examine how college enrollment changes with variation within states in the October unemployment rate (corresponding to the October CPS). Results presented in Table 4 for show the coefficient on the interaction of age groups with the state-level unemployment rate from 1977 to 2002. In the specification where the dependent variable is the overall enrollment rate (column 1), we find that increasing the unemployment rate yields changes in college enrollment for those age 21 and younger that are negative. For those 24 and older, post-secondary enrollment is demonstrably positively responsive to cyclical shocks; a 1 percentage point change in the local unemployment rate produces about a 0.7 percentage point change in enrollment for those between the ages of 28 to 35.

While these results are clear in demonstrating a greater enrollment response to cyclical shocks for those in their mid-20s relative to those in their late teens, the central question in this paper concerns the causes of the broader increase in college enrollment of those in their mid and

³⁶ Reported amounts are in constant dollars (2000) and are based on the authors' calculations from the 1980 and 2000 Decennial Census 5 percent Samples. Fry, Turner and Carnevale (2000) report similar changes using other data sets.

³⁷ The increases in the full cost of going to college could be behind the increase in recent decades of young adults living with their parents reported in Schoeni and Ross (2005).

late 20s who are on the “boundary” of adulthood. We put forward the hypothesis that institutional arrangements in the offerings of higher education and the financing of higher education have changed in ways since the early 1970s that facilitate the enrollment of individuals who have already entered the labor force. The opening of Pell grants, tax credits and student loans under Title IV to independent students is one channel of increased access to college for these students. What is more, the relative growth in non-residential programs has also opened the supply of opportunities in the collegiate sectors to those who wish to combine labor force participation and collegiate enrollment.³⁸

Ideally, we would examine the enrollment response to cyclical shocks by age over distinct intervals – eg, 1950 to 1975 and 1976 to 2000. Yet, micro data at the state level do not afford such comparisons and, in fact, we are only able to look at the effect of cyclical shocks on enrollment behavior *after* the introduction of the Pell grant, with these regressions using 1977 as the starting year. That Pell grant receipt also varies with cyclical shocks supports this basic proposition. Turner (2003) finds that across all types of post-secondary options, increases in state-level unemployment produce significant increases in the number of Pell grant recipients, on the order of 4.7-5.9 percent per percentage point increase in the unemployment rate, with these effects concentrated among public colleges and for-profit institutions.

Evidence in this section and the more general observation that students often combine work and school (Figure 5), particularly among those in their mid to late 20s suggests that any firm demarcation between “work” and “college” that may have existed 35 years ago has been eroded. Students in their mid- to late twenties move between college and work, often combining these activities based on opportunities in the labor market.

Section 4. Discussion

The empirical results presented in this chapter make it unambiguously clear that the age structure of undergraduate participation has shifted markedly over the last three decades. No longer is undergraduate enrollment confined to the immediate post-high school years as more than 45 percent of undergraduates are over the age of 21 relative to a little more than 25 percent of undergraduates three decades ago. Beyond the simple aging of the undergraduate population, data make clear that there has been a significant extension of time spent enrolled and the mapping with indicators such as receipt of the BA degree.

There is no single explanation for this blurring of the boundary between college enrollment and other activities. The one dimension of this change that is clear is the transformation of the enrollment behavior of women in the 1970s to equal (and then exceed) the levels of men at all ages. Reproductive control, postponement of childbearing and marriage surely facilitated college enrollment of women at both traditional and older ages.

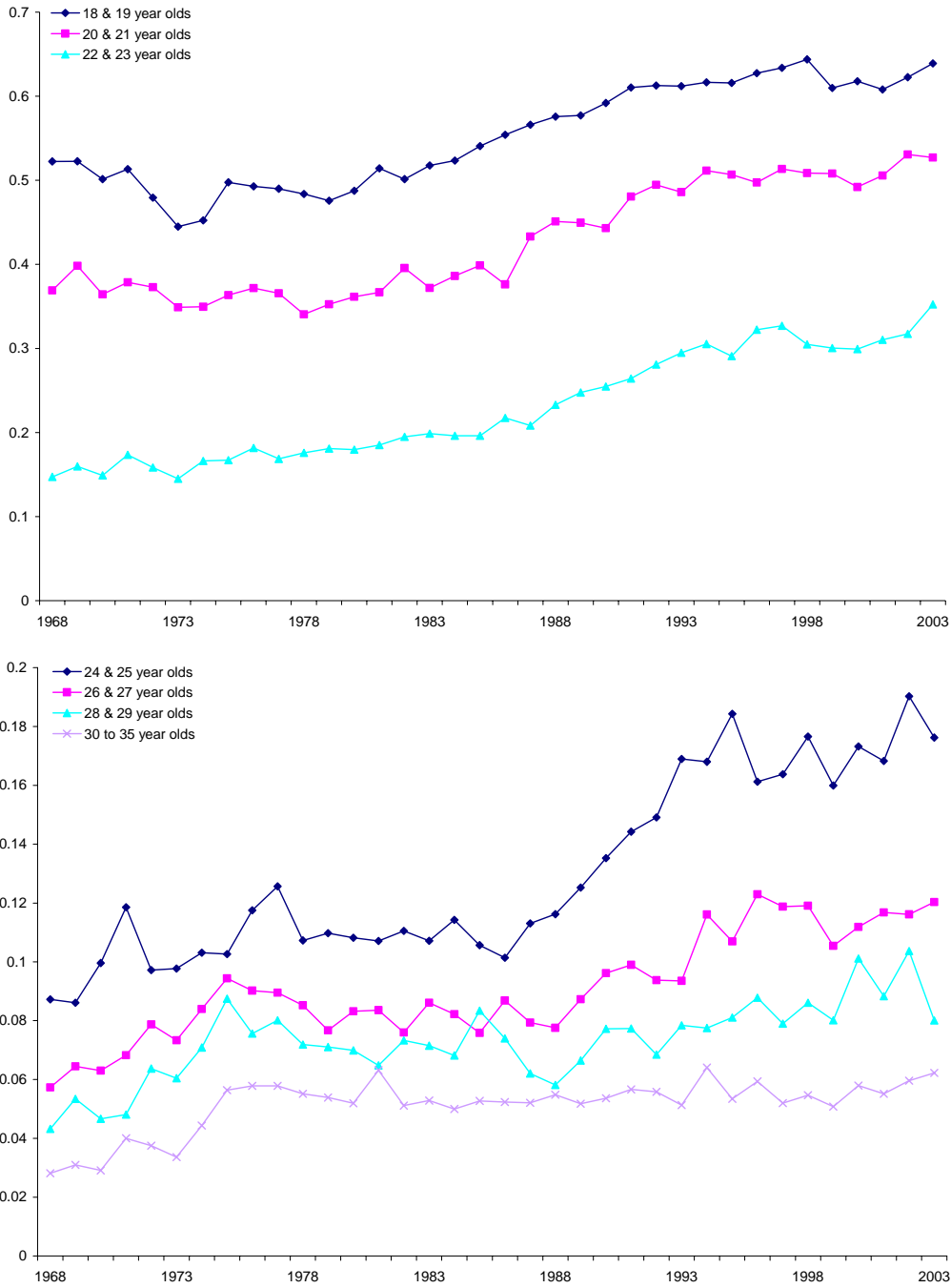
By the mid 1980s men and women enrolled in college in their mid 20s were likely to also be participating in the labor force, with the enrollment of these age groups moving up steadily through the late 1980s and the 1990s. What is yet to be resolved is the development of a clear understanding of the mechanism for this pattern. How much of the combination of work and college is an adjustment to credit constraints (implicitly extending time-to-completion) or a choice through which individuals are able to acquire skills which may substitute for on the job training or complement employment persistence we do not yet know.

In concluding this analysis, we want to caution readers against making strong statements about the welfare implications of the evidence we have presented. Whether the “blurring” of the boundary between college enrollment and traditional indicators of adulthood such as full-time employment and family formation is a policy success or a policy failure is plainly ambiguous. The explanation for the rise in adult collegiate participation is not uncausal. There is sufficient

³⁸ Moreover, as suggest by Taber (2004), it may be that firms have shifted to recognize post-secondary training as a substitute for on-the-job training.

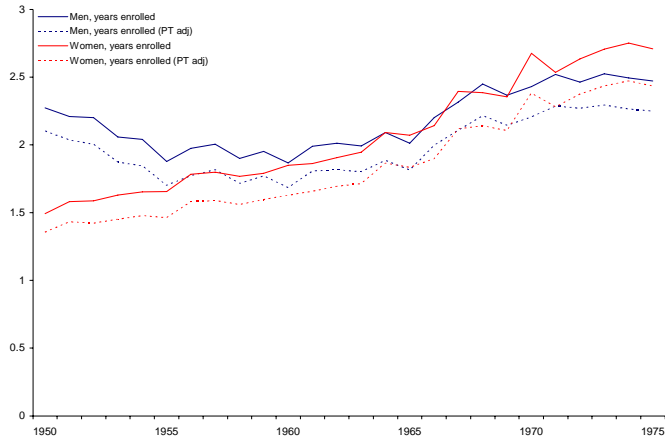
evidence to support the proposition that credit constraints may extend the period of enrollment, limiting the rate of collegiate attainment; such effects have clearly negative welfare implications. At the same time, adjustments in federal financial aid and the structure of collegiate opportunities have plainly changed the college participation decision from a “once and for all” window to afford meaningful opportunities to return to college in response to labor market shocks, to invest in training not provided by firms or in response to changes in personal circumstances. Surely this expansion of choice and opportunities is a positive feature of the U.S. market for higher education.

Figure 1. College enrollment by age, October CPS, 1968-2003

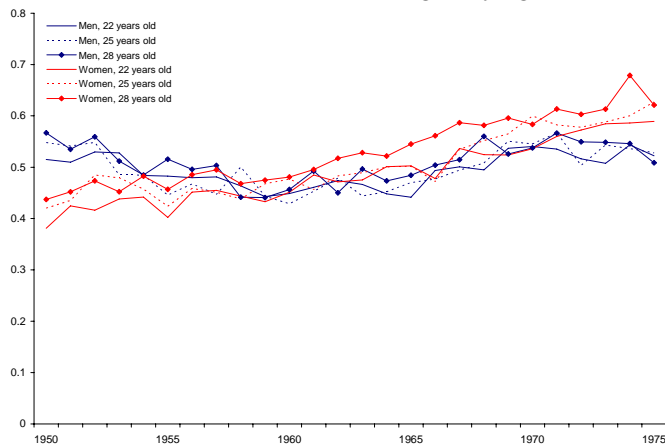


Source: Authors' calculations based on data from the October CPS. Enrollment rates are percentages of the population of the specified age with high school diplomas who have not received the BA degree or completed 16 years of education. CPS weights have been used to correct for differences in the sample and the population.

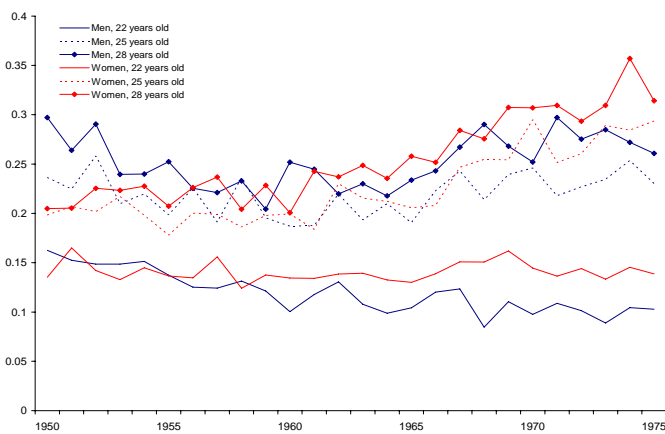
Figure 2. Enrollment and attainment by birth cohort
 A. Enrollment over ages 18-28



B. Share of cohort with “some college” by age

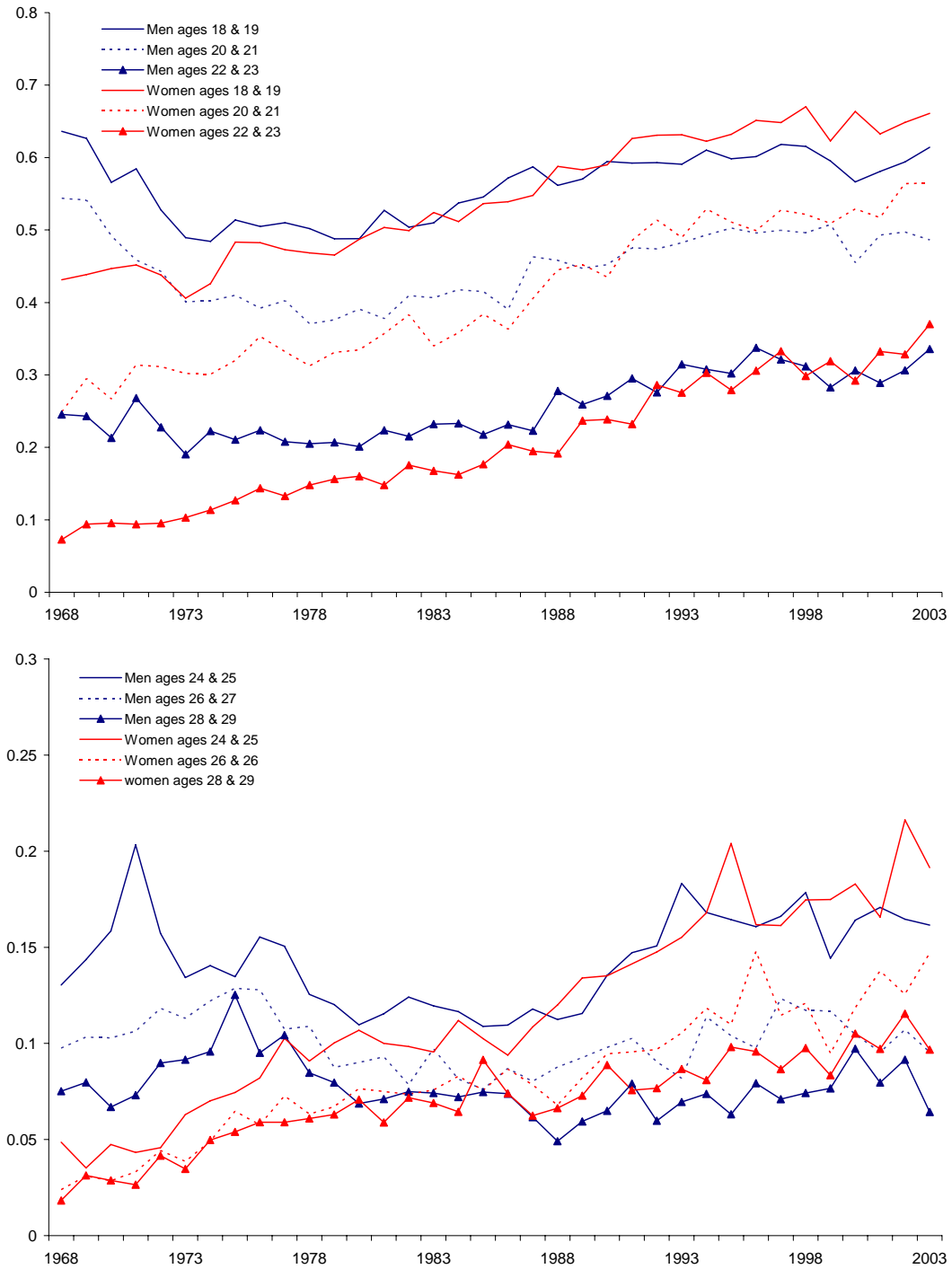


C. Share of cohort with BA degree by age



Source: Authors' calculations based on data from the October CPS. Enrollment rates are percentages of the population with HS diplomas who have not received the BA degree or completed 16 years of education. CPS weights were used. Measures that are part time adjusted (PT adj) are those in which the computations include part time enrollment, giving part time enrollment half the weight of full time enrollment. The measures of years relative to enrollment are calculated at age 28 by taking the enrollment rate as a fraction of the achievement rate

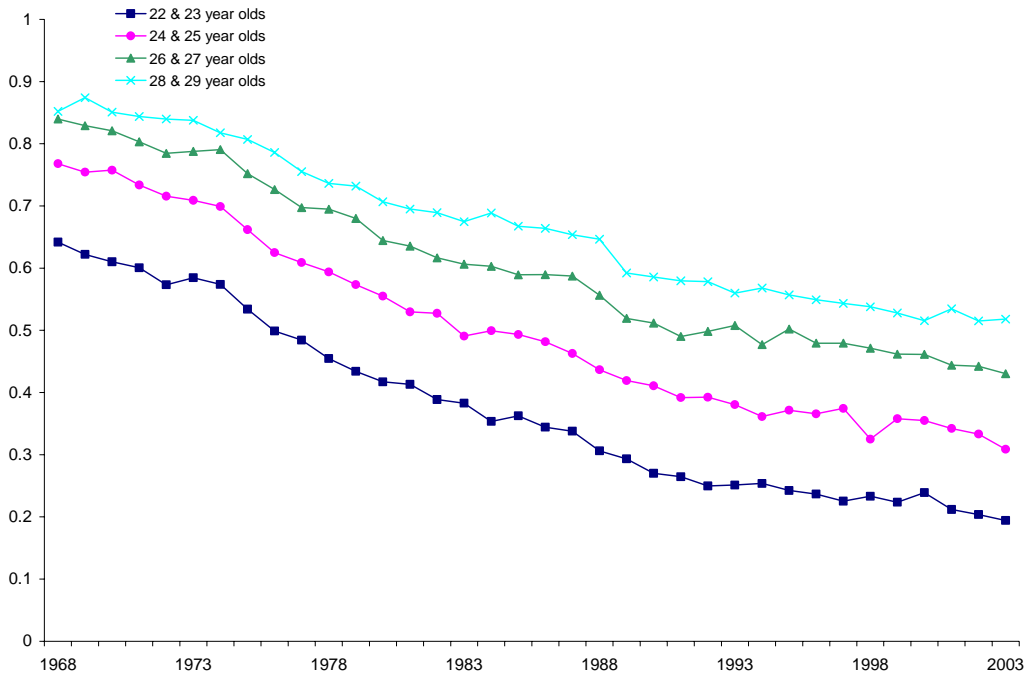
Figure 3. Undergraduate college enrollment by age and sex, 1968-2003



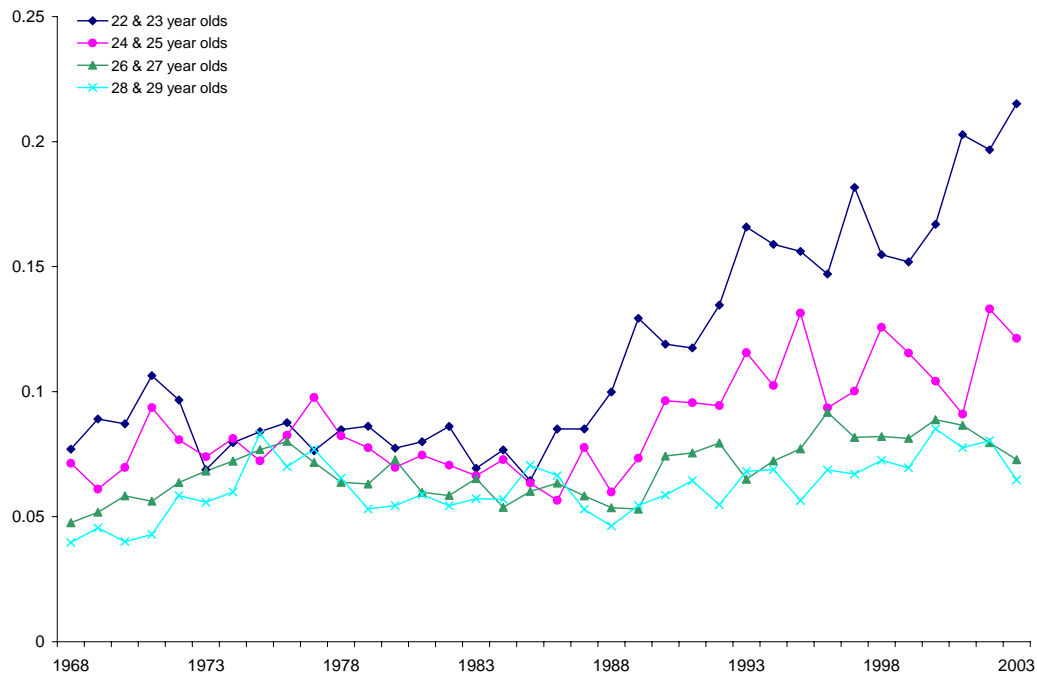
Source: Authors' calculations based on data from the October CPS. Enrollment rates are percentages of the population with high school diplomas but who have not received the BA degree or completed 16 years of education. CPS weights were used.

Figure 4. Trends in marriage and enrollment for young adults, 1968-2003

A. Overall trends in marriage

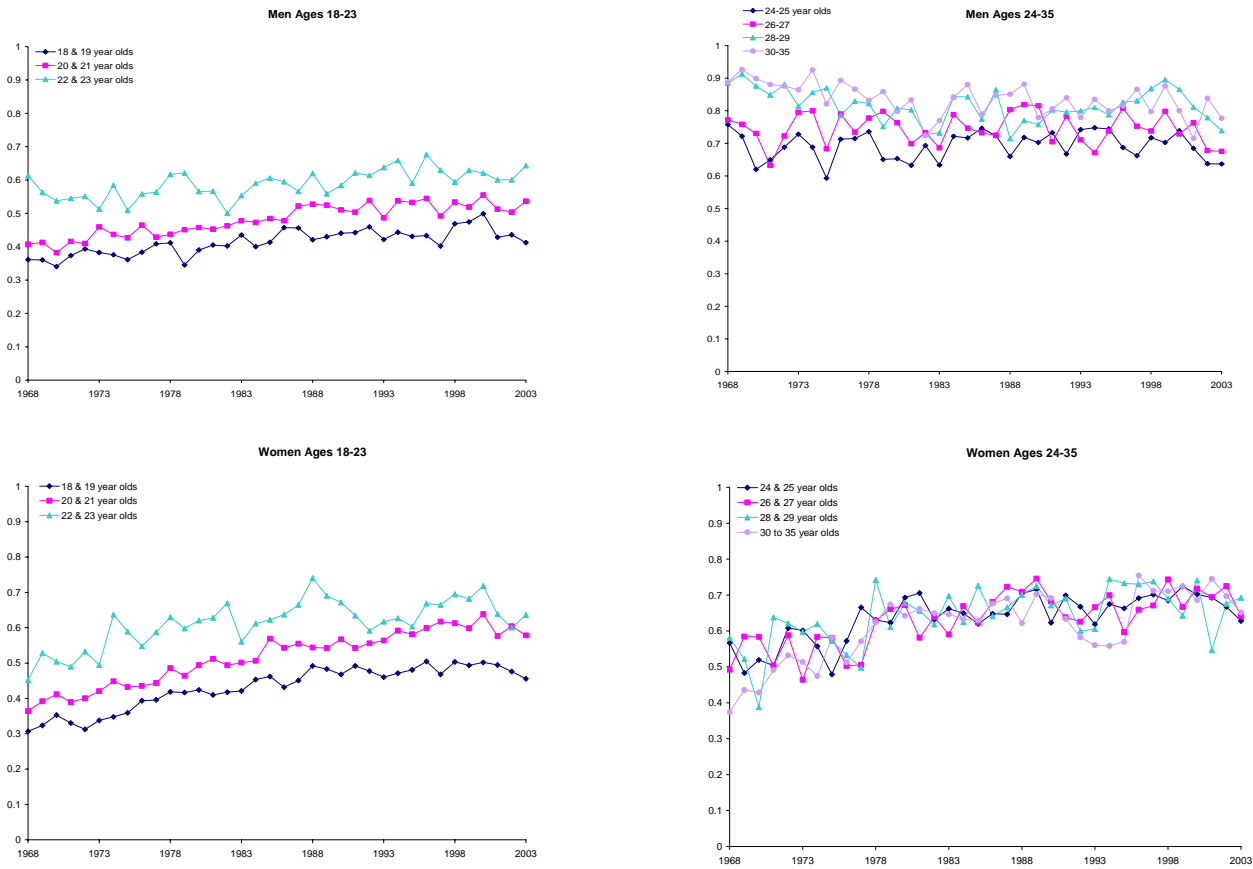


B. Trends in college enrollment among married individuals



Source: Authors' calculations based on data from the October CPS. Enrollment rates are percentages of the population with high school diplomas but who have not received the BA degree or completed 16 years of education. CPS weights were used.

Figure 5. Share of those enrolled also employed



Source: Authors' calculations based on data from the October CPS. Enrollment rates are percentages of the population with high school diplomas but who have not received the BA degree or completed 16 years of education. CPS weights were used.

Table 1: Parameter estimates from regressions of undergraduate enrollment by type of institution on early legal access (Bailey measure) and covariates, ages 24-29, October CPS, 1977-1986 [linear probability model]

	Women	Men
All Institutions	0.008 (0.004)	-0.009 (0.008)
<i>By type of institution:</i>		
Public 2-Year	0.003 (0.002)	-0.001 (0.003)
Public 4-Year	0.003 (0.003)	-0.006 (0.004)
Private Colleges	0.001 (0.002)	0.001 (0.004)

Notes: Each coefficient and standard error is from a separate regression with undergraduate enrollment as the dependent variable, limiting observations to those with at least a high school degree and less than a college degree. Each regression includes a full set of state fixed effects, time effects (CPS year), birth cohort effects, and age effects. Regressions also include the state level unemployment rate and an indicator for race.

Standard errors corrected for heteroskedasticity and clustered at the state level

Table 2. Effects of tuition on enrollment rates (in logs) within states, estimates from the CPS

	All 17 to 19 year olds			All 18 to 35 year olds		
<i>Tuition Variables</i>	(1)	(2)	(3)	(4)	(5)	(6)
College	0.014 (0.035)	0.014 (0.036)	-0.165 (0.081)	-0.009 (0.024)	-0.033 (0.031)	-0.006 (0.024)
University	0.005 (0.016)	0.006 (0.019)	-0.080 (0.044)	-0.008 (0.014)	-0.019 (0.015)	-0.002 (0.016)
Community College	0.043 (0.032)	0.025 (0.054)	-0.115 (0.103)	0.029 (0.040)	0.027 (0.048)	0.040 (0.041)
Type of Enrollment	Overall	Public	2 Year	Overall	Public	2 Year

Notes: Data on enrollment are from the October CPS from the years 1976-2000. Data on tuition from the same years are from the Washington State Higher Education Coordinating Board. Only those with at least a HS diploma who have not yet received a BA or completed 16 years of education are used in the calculation of enrollment rates. Tuition is in thousands of constant 2003 dollars. The dependent variable is the natural log of a state's enrollment rate of the reported type, where reported enrollment in October is assumed to be indicative of enrollment for the year and population is calculated using the CPS. Standard errors are clustered at the state level and when enrollment is aggregated to the state level the CPS weights were used. The regressions use the square root of a state's population aged 18 to 24 as weights. Population information can be found in the 2000 Census Summary File 3. Regressions include year and state fixed effects, the annual state unemployment rate, the natural log of the population aged 18 to 24 (from the Census) and the indicated tuition variable. Overall enrollment is defined as enrollment at any type of institution, public enrollment is enrollment at any public institution, and two year enrollment is enrollment at any 2 year public institution. It should be noted that the authors' ran specifications without weights, with levels of enrollment rates and logs of tuition and the results were not qualitatively different than those presented.

Table 3. Effects of tuition on enrollment ratios within states, estimates from institutional measures of enrollment

Tuition Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
College	0.028 (0.022)	-0.024 (0.017)	-0.068 (0.033)	0.000 (0.016)	-0.010 (0.017)	-0.048 (0.041)	-0.008 (0.025)
University	0.010 (0.017)	-0.030 (0.010)	-0.057 (0.021)	-0.016 (0.013)	-0.026 (0.013)	-0.051 (0.031)	-0.011 (0.012)
Community College	0.064 (0.038)	-0.039 (0.030)	-0.091 (0.061)	0.014 (0.035)	-0.008 (0.037)	-0.047 (0.089)	-0.029 (0.026)
Type of Enrollment	Overall	Public	2 Year	Overall	Public	2 Year	Overall
Includes Ln Population 18-24	No	No	No	Yes	Yes	Yes	No
With state trends?	No	No	No	No	No	No	Yes

Notes: Each coefficient is from a separate regression with the indicated covariates and type of enrollment. Data on enrollment are from WebCasper database by the NSF and include the years 1976-2000. Data on tuition from the same years are from the Washington State Higher Education Coordinating Board. Tuition is in thousands of constant 2003 dollars. The dependent variable is the natural log of a state's enrollment rate of the reported type where population information is from the 2000 Census (see below). Standard errors are clustered at the state level. The regressions use the square root of a state's population aged 18 to 24 as weights. Population information can be found in the 2000 Census Summary File 3. Regressions include year and state fixed effects, the annual state unemployment rate and the indicated tuition variable. When indicated (columns 4-6) the regressions also include the natural log of the population aged 18 to 24 (from the Census) as controls. Overall enrollment is defined as enrollment at any type of institution, public enrollment is enrollment at any public institution, and two year enrollment is enrollment at any 2 year institution.

Table 4: Estimates of the effect of state unemployment on college enrollment by age

	(1)	(2)	(3)
Unemployment Rate x 18-20	-0.009 (0.002)	-0.009 (0.001)	-0.005 (0.001)
Unemployment Rate x 21-24	-0.006 (0.001)	-0.006 (0.001)	-0.003 (0.001)
Unemployment Rate x 24-27	0.003 (0.001)	0.002 (0.001)	0.000 (0.001)
Unemployment Rate x 28-35	0.007 (0.001)	0.005 (0.001)	0.001 (0.001)
Type of Enrollment	Overall	Public	Two Year

Source: Each column indicates the coefficients on the interaction of the indicated age and the state level unemployment rate. In addition to unemployment, each regression includes tuition at community colleges in the state (from Washington State Higher Education Coordinating Board), the natural log of the population age 18 to 24 in the state and state, year and age group fixed effects. The observations are weighted by the square root of the population age 18 to 24 (from the Census). Other data are from the October CPS, 1977-2003.

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