Factors Affecting Initial Enrollment Intensity: Part-Time versus Full-Time Enrollment

By

Leslie S. Stratton
Associate Professor

Dennis M. O'Toole
Associate Professor

James N. Wetzel
Professor

Department of Economics
Virginia Commonwealth University
1015 Floyd Ave.
P.O. Box 844000
Richmond, VA 23284-4000

Corresponding Author: James N. Wetzel
jnwetzel@vcu.edu
(804) 828-7145
FAX: (804) 828-1719

June 2003

A preliminary version of this Paper was presented at the 2001 AIR Forum in Long Beach, CA.

This material is based upon work supported in part by the Association for Institutional Research, the National Center for Education Statistics, and the National Science Foundation under the Association for Institutional Research 1999 Improving Institutional Research in Postsecondary Educational Institutions Grant Program. The Spencer Foundation Small Grants program also provided funding. Leslie Stratton gratefully acknowledges additional support from a 2001 Faculty Excellence Award from Virginia Commonwealth University. Any opinions, findings, conclusions, or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the Spencer Foundation, the Association for Institutional Research, the National Center for Education Statistics, or the National Science Foundation.

Factors Affecting Initial Enrollment Intensity:

Part-Time versus Full-Time Enrollment

May 2003

ABSTRACT

We develop a model derived from human capital theory that explicitly recognizes the role of opportunity costs, particularly employment opportunities, in determining full-time/part-time enrollment patterns for college students. Using national data from the 1990/94 Beginning Post-Secondary Survey, we test this model by comparing those initially enrolled part-time with those initially enrolled full-time. Empirical results are consistent with the conceptual model, indicating that, contingent upon the decision to attend college, individuals who are older or live in states with lower unemployment rates are significantly more likely to enroll part-time.

JEL Codes: I21, J24

KEYWORDS: Demand for Schooling, Human Capital.

Introduction

The stereotypical college student is an 18-year-old pursuing a full-time course load. The reality is that about forty percent of undergraduates enrolled in degree-granting institutions are attending on a part-time basis[1]. Many of those enrolled part-time are over the age of twenty-four and/or employed. However, relatively little is known about the factors associated with enrollment intensity: the decision to enroll part-time versus full-time.

We begin to address this gap in the literature by examining the decision to enroll initially as a part-time rather than a full-time student, contingent upon the decision to enroll. We call this decision the enrollment intensity decision. Our first step is to develop a conceptual model based on human capital theory that distinguishes between part-time and full-time enrollment. The driving force in this model is the opportunity cost of time and how that cost differs as a function of enrollment status. This model predicts that older individuals because of their greater current opportunity cost of time will be more likely to enroll part-time than younger individuals even though older individuals have less time to reap the post-graduation economic rewards.

We then proceed to empirically evaluate this conceptual framework using a probit model of first term enrollment intensity (part-time versus full-time), conditional upon having decided to enroll. The empirical evaluation uses individual level data from the Beginning Post-Secondary survey conducted by the National Center for Education Statistics. This data set contains information on personal and household characteristics for a national sample of students who first enrolled during the 1989-90 academic year. Information on labor market conditions is merged with these data in order to proxy for employment-based opportunity costs. We find that these

[1] The Digest of Education Statistics, 2001 reported that in 1999 39.0% of the undergraduate

opportunity costs significantly influence the enrollment intensity decision. For example, the higher the unemployment rate the more likely one is to enroll full-time since the probability of finding a good job is lower.

Literature Review

There have been a large number of institution-specific enrollment studies (Ehrenberg and Sherman, 1984; Seneca and Taussig, 1987; Dickey, Asher, and Tweddale, 1989; and Moore, Studenmund, and Slobko, 1991, to name a few). Those focusing on the University of Minnesota (Hoenack and Weiler, 1975, 1979; and Hoenack and Pierro, 1990) are particularly valuable because of the detailed data used and the development of the analysis over time. Still, for a number of reasons, these studies shed little light on the enrollment intensity decision. First, many institution-specific studies focus on traditional, residential colleges where the typical freshman is an 18-19 year old, recent high school graduate, who enrolls full-time[2]. It is not clear how well the results of such studies will generalize to commuter oriented schools in urban areas or to the national level. Second, institution-specific studies virtually preclude the use of economic factors as determinants of enrollment status, thus imposing limits on the specifications that can be tested. Variation in expected employment probabilities as well as expected earnings is relatively small within a narrowly defined geographic area over a short period of time[3]. This is particularly true when the student body at the institution is relatively homogeneous or when the

---

student population attending degree-granting institutions were enrolled part-time.

[2] One of the few articles to focus on enrollment decisions in a nontraditional sample is Seftor and Turner (2002), who examine the impact of Pell Grants on the decision to enroll among older students using difference-in-differences estimation on data from the Current Population Survey. They do not, however, distinguish between part-time and full-time enrollment.

[3] In his review of the literature, W. Becker (1990) discusses the use of labor market conditions in time-series analysis of the demand for education and points out how difficult controlling for such

sample is restricted to or consists mainly of recent high school graduates, as is often the case. Third, these studies do not typically distinguish between part-time and full-time enrollment, even though the fraction of first-term, degree-seeking undergraduates attending part-time is substantial: 21.6% in 1999[4].

By contrast, use of a national data set avoids most of these problems. The more diverse student population present yields results that are more representative of the population as a whole. Racial, ethnic, and geographic differences can also be exploited to identify differences in employment opportunities.

A number of researchers have used national data sets such as the National Longitudinal Surveys [NLS] (Borus and Carpenter, 1984; Cabrera, Stampen, and Hansen, 1990), the High School and Beyond [HS&B] (Zucker and Dawson, 2001), or the Current Population Survey [CPS] (Corman, 1983; McPherson and Schapiro, 1991) to examine the enrollment decision. One of the relatively few studies to control for economic factors is Light (1996). She uses data from the NLS Youth cohort on individuals who began but then left college, to estimate a hazard model of the decision to return to college at a later time and relates that to wages and the unemployment rate. She finds that the probability of reentering falls as tuition rates and wage rates rise, and as the unemployment rate falls. However, Light does not consider the initial enrollment decision nor (like most researchers) does she differentiate between full-time and part-time enrollment. Indeed, many of the national data sets used to examine enrollment consist of age-specific populations so that the age of the respondents is typically quite young. Since most of those enrolled part-time are older, the number of part-time students from age-restricted data sets may be too small to draw any conclusions. In part as a response to these data issues and in addition to

---

factors can be in cross-section analysis.

provide data useful for longitudinal research efforts, the National Center for Educational Statistics [NCES] has developed a number of national longitudinal data sets that look at the population of college students, unrestricted geographically or by age. These samples typically contain far more non-traditional students.

Recognizing the lack of research on older or part-time students, a number of researchers have begun looking at these non-traditional student populations, often using NCES data. Bean and Metzner (1985) present a summary of the relevant literature on nontraditional students and develop a conceptual model of attrition for this population in which home and employment considerations play a significant role. In later work (Metzner and Bean, 1987), they report empirical results supporting this model. Dissertations by Tynes (1993) and Starkey (1994) examine the characteristics of older and part-time students respectively. Placing part-time students into the same pool as full-time students may influence the empirical results if these different student populations react differently to causal factors affecting enrollment decisions. Thus, researchers have justified analyzing only full-time students. Others, like Horn (1998 – U.S. Department of Education), look at part-time enrollment as a risk factor driving attrition rather than as a decision itself. We model part-time enrollment as a choice and recognize that different student populations may be more or less likely to make that choice.

The Conceptual Model

Our approach to modeling enrollment derives from human capital theory (G. Becker, 1975). According to human capital theory, individuals invest in human capital today, if the cost of acquiring that human capital is at least covered by the discounted value of the expected future

[4] These statistics are drawn from the Digest of Educational Statistics, 2001.

benefits. The cost consists of both direct tuition costs and foregone earnings, with foregone earnings being the primary component. The benefits arrive in the form of higher future paychecks. In the standard model of the college enrollment decision, an individual either enrolls in college or works and cannot do both. Thus, college enrollment is viewed as a full-time commitment to human capital formation.

Statistics indicate, however, that many of those enrolled in college are simultaneously employed and that employment status is highly correlated with enrollment status. Data from the October 2000 CPS indicate that 15.7% of those enrolled in college full-time were employed full-time, 37.8% were employed part-time, and 46.5% were not employed at all. The comparable measures for those enrolled in college part-time were 70.5%, 15.7%, and 13.8%.[5] Thus, seventy percent of part-time students hold a full-time job while more than eighty percent of full-time students either do not work or work part-time.

This finding suggests a link between employment and enrollment intensity. Hence in this work, we extend the standard human capital model to consider the enrollment intensity decision or the decision to enroll on a part-time rather than full-time basis. This extension requires explicitly considering how the costs and benefits to enrollment differ by enrollment intensity. Consider equations 1 and 2:

$$(1) \quad NPV^{F}_{College} = \sum_{t=0}^{G^F} \frac{-C^F + g^F W_t^{HS}}{(1+r)^t} + \sum_{t=G^F+1}^{T} \frac{W^{C}_{t-G^F-1}(g^F, G^F)}{(1+r)^t}$$

[5] These statistics are available at http://www.census.gov/population/socdemo/school/ppl-148/tab11.txt.

$$(2) \quad NPV^{P}_{College} = \sum_{t=0}^{G^P} \frac{-C^P + g^P W_t^{HS}}{(1+r)^t} + \sum_{t=G^P+1}^{T} \frac{W^C_{t-G^P-1}(g^P, G^P)}{(1+r)^t}$$

where

C represents the direct costs associated with college,

W^{HS} reflects the expected earnings of an unenrolled high school graduate,

W^C reflects the expected earnings of a college graduate,

γ is a multiplier that reflects the fraction of earnings ($0 \leq \gamma \leq 1$) an enrolled individual can expect to receive relative to the earnings of one who is not enrolled but is actively engaged in the labor force,

G is the time it takes to complete the college degree, to graduate,

T is the time till the individual retires,

F and P are superscripts that refer to full-time and part-time enrollment respectively,

t is a subscript that reflects time, and

r is the discount rate.

Many of the variables are a function of enrollment intensity and/or time. Thus, the direct costs associated with college (tuition, fees, books) differ depending upon one's course load. C^F reflects the costs associated with full-time enrollment, while C^P reflects the costs associated with part-time enrollment. Similarly, G^F is the length of time it takes to graduate when enrolled full-time, and G^P is the length of time it takes to graduate when enrolled part-time. The subscript t reflects the passage of time and particularly the accumulation of employment experience. Thus the earnings of both high school graduates (W^{HS}) and college graduates (W^C) are allowed to vary

with time since graduation (likely at a decreasing rate). The subscript to the college earnings measure is more complex (t – G – 1) than that for high school earnings (t) because the subscript is adjusted to equal zero in the period immediately following graduation from college. The wage function and γ are discussed in further detail below. Equation (1) reflects the net present value (NPV) associated with attending college on a full-time basis; equation (2) the NPV associated with attending college on a part-time basis. Enrollment intensity will be determined by which value is greater.

Four factors are permitted to have an effect on NPV that differs by enrollment intensity: (1) time till graduation (G), (2) direct enrollment costs (C), (3) the fraction of earnings an enrolled individual can expect to receive relative to the earnings of one who is not enrolled but actively engaged in the labor force (γ), and (4) post-graduation wages (W^C). We assume that it takes longer to graduate when enrolled part-time than when enrolled full time ($G^P > G^F$). Given that a certain number of credits must be earned to graduate and part-time students receive fewer credits per term, this assumption is quite reasonable. We also assume that the per term enrollment cost is greater for full-time than for part-time students ($C^F > C^P$). While it is typically less expensive per credit to enroll full-time, part-time enrollment does cost less per term. The relation between enrollment intensity and G and C is reasonably self-explanatory; the relation between enrollment intensity and γ and W^C is more complex.

The earnings multiplier, γ, may differ by enrollment intensity for three reasons. First, as observed above, students enrolled part-time work significantly more hours per week than students enrolled full-time, with seventy percent employed full-time as compared with only sixteen percent of those enrolled full-time. Second, it is well known that, all else constant, average hourly earnings are generally higher on full-time jobs than on part-time jobs. Third,

part-time jobs are disproportionately likely to be in the low wage service sector of the economy (ie. all else is not constant). Thus, γ^P would be no less than γ^F because on average part-time students are employed more hours per week than full-time students and because full-time workers are likely to be paid more per hour on average. Further analysis (reported in Appendix A) suggests that $0 \leq \gamma^F < \gamma^P \leq 1$ with at most one of the equalities binding.

The fourth enrollment-dependent term is post-graduation earnings. The post-graduation earnings stream (W^C) is expected to differ depending upon the work experience garnered both during and after college. It is modeled as a function of γ, G, and time post-graduation (the subscript described above). As discussed in the previous paragraph, on average those enrolled full-time work fewer hours per week than those enrolled part-time. Thus, those enrolled full-time accumulate less work experience for each year enrolled. The type of work experience acquired by those enrolled full-time is also likely to be different than that acquired by those enrolled part-time. Full-time workers who are part-time students are more likely to be employed in career-related jobs than full-time students who usually are constrained to find employment that will fit around their class schedule. Career-related job experience will be valued more highly post-graduation than simple service sector jobs. Thus, the higher is γ, the higher is W^C. The duration of the enrollment period (G) matters in that the longer is G, the more job experience one is likely to obtain while enrolled. Finally, post-graduation earnings will be a function of post-graduation experience. The higher is t-G, the higher is W^C, with wage growth typically rising with experience but at a diminishing rate.

The complexity of this situation is best illustrated with an example. Consider wages in period t = 9. An individual who went to college full-time and finished in four years may have accumulated four years of some part-time job experience and five years of post-graduation

experience in a career path position. An individual who went to college part-time while working full-time and finished in eight years will have accumulated eight years of more intense pre-graduation work experience but only one year of post-graduation experience. Off-hand it is not possible to say whose earnings would be higher at t = 9. Further discussion of this issue is presented below.

The assumptions so far include:

$$C^F > C^P$$

(3) $$G^P > G^F$$

$$0 \le g^F < g^P \le 1$$

with no more than one of the final equalities binding[6]. Given these assumptions, the difference between the NPV associated with part-time enrollment and that associated with full-time enrollment can be expressed as follows:

$$(4)\quad NPV^{P}_{College} - NPV^{F}_{College} = \sum_{t=0}^{G^F} \frac{C^F - C^P + \left(g^P - g^F\right)W_t^{HS}}{\left(1+r\right)^t} + \sum_{t=G^F+1}^{G^P} \frac{-C^P + g^P W_t^{HS} - W^C_{t-G^F-1}\left(g^F, G^F\right)}{\left(1+r\right)^t} + \sum_{t=G^P+1}^{T} \frac{W^C_{t-G^P-1}\left(g^P, G^P\right) - W^C_{t-G^F-1}\left(g^F, G^F\right)}{\left(1+r\right)^t}$$

When this expression is positive, the NPV of attending part-time exceeds the NPV of attending full-time and the individual would enroll part-time. The first term of equation (4) will be positive given the assumptions regarding C and γ. The second term is likely negative as the

[6] As argued in the appendix, it is likely that $1 > \gamma^P$ since otherwise few would choose to stop their education.

wages of newly minted college graduates are typically higher than those of high school graduates of the same age[7]. This implies that W_t^{HS} is less than $W_{t-G^F-1}^{C}$ even without the addition of part-time enrollment costs (γ^P or C^P). Similarly it seems reasonable to assume that the final term will be negative in most cases, since earnings tend to rise quite rapidly with experience for college graduates and pre-graduation experience is likely to count less than post-graduation experience. If this is the case, then part-time enrollment will be more attractive to those closer to retirement (with a lower T), as this will lower the disadvantage of part-time enrollment, provided it is still worth enrolling at all[8].

More generally, when comparing part-time and full-time enrollment this model suggests that part-time enrollment will be more likely the lower the direct costs of part-time enrollment (C^P) relative to the direct costs of full-time enrollment (C^F), the higher the earnings of those enrolled part-time as compared to those enrolled full-time (suggesting a higher W^{HS}, a higher γ^P, and a lower γ^F), the greater the time spent enrolled full-time (G^F) relative to the time spent enrolled part-time (G^P), the lower the wages for a college graduate who enrolled full-time relative to the wages for a college graduate who enrolled part-time, the higher the discount rate (r), and, generally speaking, the lower is T. Good employment opportunities for high school graduates will make college enrollment less attractive in general, and full-time enrollment less

---

[7] The 1990 Census indicates that the earnings of full-time, full-year male high school graduates between the ages of 25 and 29 average about $22,360 while those of full-time, full-year male college graduates between the ages of 18 and 24 are $23,430 (http://govinfo.kerr.orst.edu).

[8] One is better off enrolling part-time than not enrolling when $\sum_{t=0}^{G^P} \frac{-C^P-(1-g^P)W_t^{HS}}{(1+r)^t} + \sum_{t=G^P+1}^{T} \frac{W_{t-G^P-1}^{C}(g^P,G^P)-W_t^{HS}}{(1+r)^t} > 0$ This is more likely the lower is C^P, W^{HS}, and r; the higher is W^C, γ, and T. The impact of G^P is indeterminate as higher values extend the costs and increase the benefits.

attractive than part-time enrollment. 'Good employment opportunities' may arise in the form of low unemployment rates and/or high high-school relative to college graduate wages. Part-time enrollment may be particularly attractive to older individuals who chose to work after completing high school, as these individuals will have a greater opportunity cost, due to their employment experience, and a lower T. In general, this model suggests that employment opportunities are a key factor in the enrollment decision.

However, part-time enrollment may be chosen for reasons unrelated to employment as well. For example, individuals' opportunity cost of time may be driven not only by employment, but also by household responsibilities. Those bearing greater household responsibilities could choose to delay enrollment and/or to enroll on a part-time basis. Such family responsibilities may also impart a gender bias as men and women may experience different pressures. Married men and men with children may feel more pressure to be breadwinners now (may have a higher current opportunity cost) and may be less inclined to enroll and, if enrolled, less likely to enroll full-time. Women with young children may be less likely to enroll and, if enrolled, less likely to enroll full-time, at least until the children are of school age. By comparison with those who delay college in order to acquire work experience, however, women who delay college on account of household responsibilities may be more likely to enroll as full-time students, because their potential earnings while enrolled are smaller.

Alternatively, the opportunity cost of college may be a function of academic ability and/or financial circumstances. Less able students may need more time to study than more able students in order to maintain an acceptable GPA, especially if they are working. Less able students may not be able to translate an hour of study time into a desired grade outcome. If these students are less productive per hour of study time, then achieving a target grade requires more

study effort and time. This could be modeled by making the opportunity cost of college a function of ability level as well as enrollment status, with more able individuals having lower costs particularly when enrolled full-time. Imperfect capital markets and financial constraints may also increase the cost of full-time enrollment relative to part-time enrollment for some lower income students and dissuade them from enrolling full-time. The lower one's income, the greater the value assigned to the next dollar of earned income. Each of these factors needs to be considered in the empirical estimation to follow.

Data

The data set we use is the 1990/94 Beginning Post-Secondary [BPS] restricted-access survey available from the NCES. These data consist of a national sample of individuals who attended a post-secondary institution for the first time in the 1989-90 academic year. We restrict our analysis to include only those individuals who were seeking a degree (associates or higher) and enrolled in an academic rather than a technical degree program during this year. Those seeking certificates are excluded and enrollment in technical programs by those seeking an academic degree is ignored. This reduces the sample size from 7253 to 5481 individuals[9].

For this sample, the BPS provides a wealth of personal and household data. Information on gender, race, ethnicity, and age is available for virtually every respondent. Unlike the NLS or the HS&B surveys, the BPS does not restrict the sample by age. The youngest respondents are teenagers; the oldest are in their 60's. Information on marital status and household composition

[9] Also excluded at this stage were individuals who were only enrolled in the summer of 1989-90 (13), who graduated in less than two years (6), and who were selected into the sample because they were attending a less-than-two-year institution (13). It was necessary to remove the latter individuals in order to accurately control for the complex sample design because all enrollment at less than two-year institutions was excluded from analysis. Further details regarding the

is recorded as is self-reported academic ability, parental education, and employment status. Matched to this data set is information on economic opportunity garnered from the Census Bureau and the Department of Labor Statistics.

Restricting the sample to those for whom no key variables are missing brings the sample to 4609[10]. Sample statistics by initial enrollment status are reported in Table 1 for these individuals. All statistics and significance levels take into account sampling weights, clustering, and stratification, as is necessary to fully accommodate the complex sample design of the BPS (see Dowd 2001 for further information). The fraction initially enrolled part-time as calculated without the weights is 7.5%. The weighted incidence is, however, 18.1%, indicating that those initially enrolled part-time were under-sampled relative to those initially enrolled full-time. This weighted incidence is comparable to the national estimate of 21.6% for degree seeking, first-time freshmen who were enrolled part-time during the fall of 1999.

An analysis of the individual specific characteristics by enrollment status, reported in Table 1, reveals a number of notable results. For example, race (p-value 0.79) and gender (p-value 0.82) do not differ significantly by initial enrollment status. However, Hispanic ethnicity does (p-value 0.00). Of those initially enrolled full-time, only 5.6% are Hispanic as compared with 15.6% of those initially enrolled part-time[11]. Thus, while 18% of the sample was enrolled part-time, 38% of Hispanics chose part-time enrollment.

---

sample selection criteria are available in Appendix B.

[10] The majority of the exclusions at this stage (798) were caused by failure to report whether initial enrollment status was full-time or part-time – the dependent variable in this analysis. Another fifty-five individuals failed to self-describe their math ability. Only nineteen other observations were excluded due to missing values.

[11] Jamieson, Curry, and Martinez (2001) also note the frequency with which Hispanics choose part-time over full-time enrollment.

Another individual-specific characteristic typically included in enrollment studies is academic ability. As discussed earlier, less able students are hypothesized to find full-time enrollment more costly in terms of hours devoted to study time to maintain grades than more able students. Unfortunately, the ability measure typically used, SAT/ACT score, is missing for almost half this sample. A disproportionate share of those missing data are enrolled part-time. A measure that is almost universally available is a self-rated skill measure. Individuals were asked to self-rate their academic skills as either above average, average, or below average. These skill measures were significantly positively correlated with both SAT and ACT test scores for that population for which both were reported. Information on self-reported math skills is used in this study as math skills were found to be a more significant determinant of initial enrollment status than either self-reported overall or verbal skills. A test of the hypothesis that self-reported math ability is uncorrelated with initial enrollment status is rejected at even the 1% significance level. 32% of respondents enrolled full-time report having above average math skills as opposed to 17% of respondents enrolled part-time.

Another measure of academic ability is the type of high school degree the respondent received. A dummy variable is created that takes on a value of one when the respondent received a GED or other certificate in lieu of a high school diploma. As expected, those without a traditional high school diploma are more likely to enroll initially on a part-time basis. Thus both ability measures suggest that less able students are more inclined to "try out" college by enrolling part-time rather than full-time.

Family background measures are included to capture both psychological and financial support for educational goals. Individuals whose parents have attended college are presumed to be more likely to have their parents' support for higher education. Simple statistics provide

some evidence for this hypothesis. While 57% of those enrolled full-time report that at least one of their parents completed college, only 28% of those enrolled part-time report the same background. Overall, the hypothesis that parental education is similar for those enrolled full-time and those enrolled part-time is rejected (p-value 0.00)[12]. As expected individuals who are enrolled part-time are more likely to be older, independent from their parents, married, and/or have children of their own. Women are more likely than men to have children and to have been married at some point, suggesting a possible gender bias in terms of household responsibilities.

While the BPS contains substantial information on the institution attended, we chose not to include such variables in the analysis. Two-year institutions are far more likely to offer/encourage part-time enrollment than are four-year institutions. Individuals who choose to attend two-year institutions may do so because of this flexibility. Thus, the choice of institution (and hence institutional characteristics) will likely be a function of the enrollment intensity decision rather than a determinant of it.

The final rows present information pertaining to the earnings potential of the respondents. The unemployment rate in the respondents' state of residence is incorporated to capture the probability of finding a job. These data were obtained from the 1989 CPS. The sample statistics indicate that on average unemployment rates are higher for those enrolled full-time than for those enrolled part-time.

Not only the probability of finding a job but the earnings one would expect to receive on such a job are important. Theory indicates that the higher an individual's earnings without a college degree, the more likely such an individual will be to enroll part-time because his/her

[12] Due to well-documented concerns (Adelman 1999) regarding students' knowledge of their parents' education, we used parental self-reports whenever possible. In less than thirty percent of the cases, these reports were not available and an alternative measure was used. In less than

opportunity cost of time will be greater. Information on the average earnings of full-time, full-year workers with a high school degree is available by gender, age, race, and ethnicity[13]. Sample statistics indicate that those enrolled part-time do have higher potential earnings than those enrolled full-time ($17,000 versus $15,000).

Post-graduation earnings also play a role in the theoretical model. At any age (t), such as age 35, the enrollment intensity decision has two effects on income. Individuals age 35 who attended college full-time and graduated at the traditional age of 22 will have 13 years of post-graduation experience but relatively little pre-graduation experience. Individuals who attended college part-time graduate at an older age. They may have more overall work experience by age 35 but will have less post-graduation work experience. Post-graduation experience is a more significant determinant of wages than pre-graduation experience, so that holding age constant the earnings of those who attended college full-time are likely higher than the earnings of those who attended college part-time. Unfortunately no measure of the magnitude of this difference is available. Census data report only the average earnings of all college graduates of a particular age. This measure does not distinguish between those who attended college on a full-time versus part-time basis or between those who attended college at the age of 18 versus the age of 30. We constructed several alternative measures of the return to a college education, but none were statistically significant and none captures the essence of the third term in equation (4). To capture something of the foregone earnings in the second term of equation (4), we include a measure of the ratio of college to high school earnings for full-time, full-year workers with

---

two percent of the cases a missing values indicator is used.

[13] We distinguish only between white non-Hispanic, black non-Hispanic, white Hispanic, black Hispanic, and Other in matching data by race and ethnicity due to both concerns about sample size and concerns about information available to the respondents. These data are obtained from the 1990 Census and reflect earnings in 1989.

approximately no experience, differentiated by gender and race/ethnicity but not age. This measure exhibits relatively little variation within the data, ranging from a low of 1.58 to a high of 1.94 with a mean of 1.91, and as such may not have a well-estimated effect. Given our inability to adequately control for post-graduation earnings, the estimated coefficient to the high school earnings measure may be biased, if post-graduation earnings are positively correlated with current earnings potential and are an important determinant of enrollment intensity.

All the economic opportunity cost variables discussed thus far are of a general nature and would be appropriate in a reduced form specification of enrollment status. These measures do not take into account the actual employment status of the respondent, only his/her potential employment status. Given that enrollment and employment are likely to be jointly determined, this is the preferred approach. However, the influence of economic factors on enrollment intensity may be a function of labor force attachment. Within the BPS there exists additional information that may be used to proxy for labor force attachment. Specifically, individuals are asked whether their choice of college was dictated in part by their ability to work while enrolled. We use this question to construct a dummy variable (Work is Very Important) that takes a value of one for those individuals who reply that it was very important that they choose a school that enabled them to work while enrolled. Of those initially enrolled part-time, 72% agree with this statement; of those initially enrolled full-time only 35% agree with this statement. This measure does not reflect actual outcomes, only intentions, and so may be exogenous with respect to enrollment status and yet proxy for labor force attachment. To be conservative, we estimate two basic specifications – (1) a purely reduced form model and (2) a specification including this measure of labor force attachment.

The Initial Enrollment Intensity Decision

Using the BPS data, we estimate a probit model of the initial enrollment intensity decision, conditional upon the decision to enroll. The dependent variable in this analysis takes a value of one for those individuals who enroll on a part-time basis during their first college term. Results are reported in Table 2 for three different specifications. The first are as described above: the reduced form specification (1) and the parameterization that controls for labor force attachment (2). The last (2') includes interaction terms that allow the role of the economic factors to differ depending upon labor force attachment. All parameter estimates are adjusted for the complex survey design of the BPS, taking into account the weights, clustering, and stratification of the sample[14]. Positive coefficient estimates indicate that respondents with higher characteristic values are more likely to attend part-time.

The results from specification (1) are for the most part similar to those reported in the univariate statistics. Hispanics are significantly more likely to enroll part-time (p-value = 0.000), while race does not appear to be a significant factor (p-value = 0.66). Financial independence is also statistically insignificant (p-value = 0.45) as (in results not reported here) is household income. This finding suggests that financial constraints are either not important or do not differ by enrollment intensity, contrary to our expectations, but similar to results reported by Clotfelter (1991, p. 75). In contrast to the univariate results, this multivariate analysis indicates that, holding all else equal, women are less likely to enroll part-time than men (p-value = 0.049). The most significant finding amongst the individual specific characteristics is that older persons are more likely to enroll part-time (p-value = 0.00)[15]. This result supports the predictions of the

[14] In particular, we employ the SYV commands within STATA. Again, see Dowd (2001) for further information.

[15] In results not reported here we used a series of dummy variables to measure age rather than

theoretical model that conditional upon enrollment, for older persons the shorter post-graduation earnings benefit associated with full-time enrollment makes the lower opportunity cost associated with part-time enrollment more attractive. Surprisingly, we found (in results not reported here) that older women were just as likely to enroll on a part-time basis as older men. However, while there are no gender specific age effects, marital and parental status effects do differ by gender, as might be suggested by gender differences in household responsibilities.

Ability measures influence the enrollment intensity decision as expected. Those reporting above average math skills are less likely to enroll part-time, perhaps indicating that they find full-time enrollment less costly than average or less able students. The same relation also holds when measures of self-reported verbal or overall academic ability are used but it is math ability that is most highly correlated with enrollment intensity (p-value = 0.007 for math ability versus 0.063 for verbal and 0.092 for academic ability).

The impact of parental education is significant (p-value = 0.001), but non-linear. As compared with those whose most educated parent completed college, those whose most educated parent completed only high school or started but did not complete college were significantly more likely to enroll part-time. Such individuals may receive less support when pursuing a college degree. However, those whose parents failed to complete high school are not significantly more likely to enroll part-time than those whose parents completed college. One would expect these individuals to receive even less support, but this lack of support may manifest itself more in the decision to enroll rather than in the enrollment intensity decision.

---

the mix of continuous (age and age squared) and dummy (teenagers) variables employed here. We found significant differences in enrollment intensity decisions between those age 18 and 19, 19 and 20, 24 and 25, and 34 and 35. The results obtained from this specification are similar to those reported here, though the fit of this alternative specification was slightly worse using both F-test and predicted outcome measures of goodness-of-fit.

The role of household characteristics is expected to differ by gender as a result of gender differences in household responsibilities. This hypothesis receives some support as the impact both of marital status (p-value = 0.09) and of children (0.08) is statistically significant for men, with both marriage and children increasing the probability of part-time enrollment for men. However, this was not the case for women (p-value = 0.42 and 0.31 for marriage and children respectively). Only the presence of school age children has a marginally significant impact for women, increasing the probability of attending full-time, presumably because more time is freed in the home once children start going to school. More generally, it may be the case that marriage and children primarily affect the enrollment decision for women, rather than the enrollment intensity decision. In a more general test for gender differences, we interact gender with every other variable in the analysis. Jointly these additional variables have a p-value of 0.65 and only one variable is individually significant at even the 10% level. These results indicate that it is not unreasonable to pool men and women in a single sample.

The other measures of opportunity cost are economic in nature. The impact of the unemployment rate on enrollment intensity is negative as expected with a p-value of 0.088. The higher the unemployment rate in an individual's state of residence, the higher is the probability with which that individual will enroll full-time. The marginal p-value associated with this measure could be attributed to its lack of variation. If it were only the absolute level of the unemployment rate at the time of enrollment that mattered, then additional variation could be introduced by constructing a measure of the unemployment rate that reflects the age, race, ethnicity, and even education level of the respondent. However, it is likely the relative level of unemployment at the time of enrollment that matters. A black teenager, who faces an unemployment rate of 20%, may be less likely than a white teenager, facing an unemployment

rate of 15%, to enroll part-time because a 20% unemployment rate is relatively low for a black teenager while a 15% unemployment rate is relatively high for a white teenager[16]. We did estimate the model (results not shown) using statewide unemployment rates that differed for teenagers. These results support our finding that higher unemployment rates are associated with lower part-time enrollment probabilities, but the magnitude of the effect is smaller, presumably to moderate the greater variation in the unemployment rate observed for teenagers. The variation in the cross-state unemployment rate that identifies the coefficient to the unemployment rate in the results reported probably more closely mimics the local and possibly temporary economic conditions that are more likely to influence enrollment intensity decisions.

The final two variables included in specification (1) are the expected earnings measures. The first measure represents expected earnings of the respondent if he/she worked full-time and did not attend college. The second measure is an estimated ratio of his/her college to high school graduate earnings. Theory predicts that the first term should have a positive coefficient, as higher current earnings are possible when one is enrolled part-time ($\gamma^P > \gamma^F$). If the ratio measure is accurate no matter one's experience level, the latter term should have a negative coefficient. The actual estimates have the opposite signs. The ratio measure is never statistically significant, perhaps indicating it is a poor measure of relative earnings. The high school graduate earnings measure is statistically significant (p-value = 0.064) and may be positive because it is indicative of not only relative high-school earnings but also expected college earnings. Those expecting high earnings post-graduation would want to attain those higher earnings faster by attending college full-time. Several alternative specifications were attempted – with interactions between

[16] The relative unemployment rate following graduation and the unemployment differential between those who attend college part-time versus full-time will also influence the enrollment intensity decision, but such detailed measures are not available.

age and earnings, age and ratio, the absolute wage difference between college and high school graduates with little experience, and the percentage wage difference between college and high school graduates with little experience - to no avail. Basically, there is no clear proxy for the relative earnings of college graduates who enrolled full-time versus those who enrolled part-time.

In order to test the robustness of the model, particularly the economic factors, we reestimated the model restricting the sample to include only those under age 19. These results (available upon request) were quite similar to those from the unrestricted sample with ethnicity, ability, and marital status having approximately the same effect on enrollment intensity. Within this sample, blacks were found to be more likely to enroll part-time, but not women. Potential earnings has a positive effect, meaning that those whose expected earnings with a high school degree are higher are more likely to enroll part-time. This is as we originally predicted. However, those with higher post-graduation earnings were also more likely to enroll part-time, contrary to our expectations but readily attributable to poor measurement. Most importantly, the unemployment rate continues to have a negative impact on intensity. This relation is somewhat stronger when the average unemployment rate for teenagers within the state is used, but is significant (p-value 0.07) even when using the unemployment rate for persons of all ages. Both results demonstrate the robustness of the unemployment rate effect to the choice of sample.

Specification (2) adds a control for the respondent's labor force attachment by controlling for the importance assigned to employment. The resulting specification provides a better fit of the model as measured by both the fraction of observations correctly predicted and the mean sum of the squared residuals. However, inclusion of this measure of labor force attachment has relatively little impact on the coefficients to the non-economic related variables in the model.

The economic measures, not surprisingly, are less precisely estimated. In specification (2') we interact the 'Work is Very Important' variable and the economic factors to test the hypothesis that the effect of economic factors differs with the respondent's labor force attachment. The joint p-value on the interaction terms is 0.11 and the direction of the effects makes logical sense. For example, the impact of the state's unemployment rate is greater for those for whom work is not 'very important', perhaps because those for whom it is important already have a job and hence are not as worried about their probability of finding a job. In addition, the impact of the high school earnings variable is negative and statistically significant only for those for whom work is not 'very important' or labor force attachment is low. Those more attached to the labor force may consider earnings potential more of a current opportunity cost than a post-graduation gain.

In order to better understand the magnitude of the coefficient estimates reported in Table 2, we calculate the predicted probability individuals with various characteristics will enroll part-time. Table 3 presents these predicted probabilities. The base case against which all comparisons are made is that of: an 18-year-old white, non-Hispanic male with a high school diploma, average math ability, living in a state with the sample average unemployment rate (5.2%), and having parents upon whom he is still dependent and who themselves completed college. The opportunity cost and ratio measures are those for white, male, non-Hispanic teenagers. Columns (1) and (2) present results from the reduced form specification (1).

One complication introduced to these predictions is that a change in the gender, race, ethnicity, and/or age of an individual generally changes the value of several variables in the model. For example, to predict the initial enrollment status of a woman, one would need to change the value of the variable Female to 1 as well as change the value of the two earnings

measures to reflect the different average earnings potential of women as compared to men. To predict the initial enrollment status of an older person, the value of Age and Age Squared would of necessity change, but so would the measure of potential high school graduate earnings, as this measure is also age dependent. In order to illustrate how a change in only the indicator variables and not the earnings measures would affect the initial enrollment outcome, we present two sets of predictions for the reduced form specification (1). Predictions that maintain the base case earnings values (those for a white, non-Hispanic male age 18) are presented in column (1). Predictions that change all gender, race, ethnicity, and age related values are presented in column (2). Column (1) is left blank where the adjusted and unadjusted measures are identical.

The predicted probability of part-time enrollment for an individual with base case characteristics using the reduced form model (specification 1) is 5.7%, considerably lower than the sample average probability of 18.1%. The coefficient for Female is significant and negative in the model. This indicates that women have a significantly lower probability of enrolling part-time than men, holding all else equal. Indeed, holding all else equal, a woman with base case characteristics has only a 2.7% probability of initially enrolling part-time. However, women have substantially lower expected earnings than men ($13,272 versus $16,745 for the base case) and when these are taken into account (see column 2), their probability of part-time enrollment is not substantially or significantly different from that for men (5.9% for women versus 5.7% for men). Being black and being Hispanic increase the probability of part-time enrollment, all else equal (to 8.0% and 25.0% respectively). Accounting for the lower expected earnings of these groups further widens the differential between full-time and part-time enrollment rates. Approximately fifteen percent of the difference between the fully adjusted Hispanic enrollment probability and the base case enrollment probability is due to earnings differences.

The impact of the unemployment rate is gauged by comparing the part-time enrollment probability for an individual living in a state with a 5.2% unemployment rate with that of an otherwise similar individual living in a state with a 3.2% unemployment rate. This 2.0 percentage point change in the unemployment rate leads to a 2.6 percentage point or 45% increase in the probability of enrolling part-time. These predictions demonstrate that the unemployment rate as a measure of opportunity cost not only has a significant effect on part-time enrollment probabilities, but also a substantial one.

The remainder of Table 3 demonstrates the tremendous importance of age and marital status for men and women. While proclaiming independent status has little influence on the probability of part-time enrollment, age does have a significant effect. Being independent and age 25 increases the probability of part-time enrollment by a factor of almost ten, all else equal (to 55.7%). However, older persons have higher earnings, which acts to decrease their probability of part-time enrollment, in this case to 33.7%.

Predictions for specification (2) are presented in column 3 of Table 3. The base case for specification (2) additionally assumes that work is not 'very important'. All these predictions are fully adjusted for earnings differences by gender, race, ethnicity, and age. Of interest is the finding that the predicted probability of part-time enrollment is much smaller under the base case and the impact of the labor force attachment measure substantial. The probability that an individual with base case characteristics is enrolled on a part-time basis falls from 5.7% in the reduced form model to 3.1% in the model specifying that work is 'not important'. The probability of being enrolled part-time then increases by a factor of four to 12.5% if an individual with otherwise base case characteristics states that "work is very important". Controlling for labor force attachment clearly has a significant impact upon predicted enrollment

status, though we remain concerned about possible simultaneity bias in these estimates.

Conclusion

Most research studies dealing with college enrollment have, for a variety of reasons, focused on full-time students and either ignored part-time enrollment or treated full-time and part-time enrollment as the same activity. Yet part-time students are observed making substantially different choices both in the labor market and in the education area than full-time students. We exploit these differences to examine the factors associated with enrollment intensity: the decision to initially attend college on a part-time rather than full-time basis. A conceptual model derived from human capital theory is developed to identify factors that affect the decision to attend part-time versus full-time. This model predicts that older individuals and those with higher current opportunity costs will be more likely to attend part-time.

Using a national sample of undergraduates from the BPS 90/94 data set and conditioning on the decision to enroll, we find substantial evidence supporting this theoretical model. A probit specification of the empirical model suggests that not only do personal and household characteristics affect the decision to attend part-time (for example, Hispanics and married men are significantly more likely to attend part-time), but also that age and economic factors play an important role. Older persons are significantly and substantially more likely to enroll part-time. In addition, for the modal student each one percentage point decrease in the unemployment rate can increase the probability of part-time enrollment by more than one percentage point. There is some evidence that the impact of the unemployment rate is greater for those not currently in the labor market. Lower expected earnings also lead to higher part-time enrollment probabilities. There is some evidence that this effect is greater for those now less attached to the labor force,

who may be less likely to treat expected earnings as an opportunity cost.

Several questions remain. While the presence of school age children increases the probability that women will attend college full-time, these results hold only conditional upon the decision to attend college at all. It would be of interest to jointly estimate the decision to attend and the intensity decision, preferably using an unconditional specification and extending the analysis to consider persistence as well as enrollment. Our model points out the important impact pre-graduation work experience can have on post-graduation earnings, but we were unable to obtain data distinguishing between earnings by either enrollment intensity or pre-graduation work experience. More detailed data would permit a more complete test of this theory. The role of cost factors was also identified theoretically, but not empirically. We only had data on full-time tuition rates, not part-time rates, and on financial aid opportunities conditional upon enrollment intensity. Further research distinguishing between the net cost of college for part-time and full-time enrollment would aid identification of the model. Extending the model to distinguish between two and four-year institutions, between residential and commuter-oriented institutions, could aid institutional researchers in their analysis.

Policy makers seeking to expedite graduation need to better understand the enrollment decisions students make when they enter college. The decision to attend college part-time clearly has a significant impact on one's expected time to graduation as well as one's expected income. This paper takes us a step closer to understanding the enrollment intensity decision.

Appendix A

A Further Analysis of γ

To see the importance of γ, we considered two extreme cases: a case in which $\gamma^F = \gamma^P$ and a case in which $\gamma^P >> \gamma^F$.

When $\gamma^F = \gamma^P$ the opportunity cost associated with college enrollment is not a function of enrollment status and the wage of college graduates is a function of enrollment intensity only indirectly via the time spent enrolled. Then part-time enrollment would be preferred to full-time enrollment only if:

$$(A1) \quad NPV^{P}_{College} - NPV^{F}_{College} = \sum_{t=0}^{G^F} \frac{C^F - C^P}{(1+r)^t} + \sum_{t=G^F+1}^{G^P} \frac{-C^P + gW_t^{HS} - W^{C}_{t-G^F-1}(G^F)}{(1+r)^t} + \sum_{t=G^P+1}^{T} \frac{W^{C}_{t-G^P-1}(G^P) - W^{C}_{t-G^F-1}(G^F)}{(1+r)^t} > 0$$

This preference ordering is more likely: (1) the lower the cost of part-time as compared to full-time enrollment ($C^P << C^F$), so that the direct benefits attributable to part-time enrollment are high; (2) the higher are the earnings of those enrolled in college (γW^{HS}) relative to college graduates (W^C) and (3) the smaller the difference in time to graduation ($G^P \approx G^F$), so that the opportunity costs associated with the extended enrollment are smaller; (4) the more nearly job experience while enrolled is a substitute for job experience following graduation, so that post-graduation returns are nearly equalized; and (5) the higher is the discount rate (r), so the negative value of the third term does not weigh so heavily. The first and third factors operate at odds with

one another. Direct costs are typically substantially different only when there is a substantial reduction in credit hours, and those taking substantially reduced loads necessarily take significantly longer to graduate. To evaluate factors two, four, and five it is important to remember that part-time enrollment will only be observed if part-time enrollment is preferred to no enrollment at all. Factors two, four, and five suggest a smaller return to college graduation as a whole and hence a lower probability of attending no matter the intensity. If $\gamma^F = \gamma^P$, part-time enrollment is unlikely to be observed at all, since it makes more sense to enroll either full-time or not at all.

When $\gamma^P >> \gamma^F$, the earnings potential of those enrolled part-time is substantially greater than the earnings potential of those enrolled full-time. In this case, part-time enrollment becomes more attractive relative to full-time enrollment. In the limit $\gamma^P = 1$ and $\gamma^F = 0$, meaning that part-time college students can earn as much as high school graduates, while full-time college students do not work at all. In this situation, an individual would choose to enroll part-time rather than forego college altogether so long as the individual's higher future earnings as a college graduate recoup the direct costs of part-time enrollment. There would be no opportunity cost associated with attending college if one attended part-time and earned exactly what a high school graduate could earn. Since the greatest cost associated with college is the opportunity cost, in this extreme case virtually everyone would prefer part-time enrollment to no enrollment. Since we know many individuals choose not to go to college, this suggests that in reality γ^P must be less than one.

Part-time enrollment would be preferred to full-time enrollment when $\gamma^P = 1$ and $\gamma^F = 0$ so long as the higher near term income benefits of part-time enrollment ($C^F - C^P + W^{HS} > 0$) were large enough to offset the lower future earnings (see the second and third terms in equation

(A2)). Lower future earnings arise both because part-time students graduate later, thus begin receiving college graduate earnings later, and because those attending college part-time have fewer years to enjoy higher post-graduation wages.

$$(A2) \quad NPV^{P}_{College} - NPV^{F}_{College} = \sum_{t=0}^{G^F} \frac{C^F - C^P + W_t^{HS}}{(1+r)^t} + \sum_{t=G^F+1}^{G^P} \frac{-C^P + W_t^{HS} - W^C_{t-G^F-1}(0, G^F)}{(1+r)^t} + \sum_{t=G^P+1}^{T} \frac{W^C_{t-G^P-1}(1, G^P) - W^C_{t-G^F-1}(0, G^F)}{(1+r)^t} > 0$$

However, it is also true that those attending college part-time accumulate some work experience while in college that is likely to enhance their post-graduation pay. No return for work experience is expected on time spent enrolled full-time, if those enrolled full-time do not work. But holding post-graduation experience constant (at τ), the wages of those who attended college part-time will exceed the wages of those who attended college full-time if pre-graduation experience is at all valuable in the post-graduation workplace : $W_t^C(1, G^P) > W_t^C(0, G^F)$. This earnings adjustment will act to reduce the future earnings differential attributable to part-time rather than full-time enrollment, making part-time enrollment more attractive. Indeed, in this extreme case ($\gamma^P = 1$ and $\gamma^F = 0$), the benefits associated with part-time enrollment likely dominate the benefits associated with full-time enrollment. In this limiting case there is no opportunity cost from foregone earnings associated with part-time attendance and the only benefit to full-time enrollment is earlier graduation to a college graduate's earnings.

These special cases shed light on the model by suggesting bounds on γ. When the opportunity cost of attending college is not a function of enrollment intensity ($\gamma^F = \gamma^P$), virtually all those attending would attend full-time since the opportunity cost of attending is not a function of enrollment intensity and part-time attendance delays post-graduation earnings. When those attending part-time incur no opportunity cost, part-time enrollment will likely be the dominant outcome since the direct costs of college are generally low relative to the benefits. This is especially true if those enrolled full-time are not employed at all ($\gamma^F = 0$) and so bear the full opportunity cost of enrollment. The fact that a significant but not dominant share of college students choose to attend part time suggests that $\gamma^P > \gamma^F$ and both multipliers are not at boundary levels of 0/1. This is equivalent to stating that there are different opportunity costs associated with different enrollment intensities.

Appendix B

Further Details Regarding Sample Selection Criteria

The sample used in this analysis was created with an eye to including only those individuals seriously interested in pursuing an academic post-secondary degree. To this end, we restricted the sample to include only those individuals seeking more than a certificate degree or (when this information was unavailable) to include only those individuals who report expecting to receive more than a trade school education both in the 1990 survey and at least one of the follow-up surveys. Thus, we exclude individuals who were not actively seeking an academic post-secondary education. The NCES staff suggested this restriction. Approximately 75 percent of those individuals excluded from our final sample were excluded on these grounds.

We also excluded enrollment data from institutions offering less than a two year program of instruction and from non-academic two and four-year institutions. The decision to exclude attendance at all institutions offering less than a two-year program of instruction was also quite straightforward. First, there were relatively few cases of such enrollment within this sample. Of almost 45,000 terms for which attendance was reported over the 5 year interval, only 745 represented attendance at less than two-year institutions. Second, NCES staff indicated that few credits obtained at such institutions could be used towards a bachelor's degree. In fact, over a third of these institutions self-reported having no academic program! Futhermore, less than ten percent of the respondents reported receiving academic instruction while enrolled at these institutions. The decision to exclude information from two and four-year nonacademic institutions was a more difficult one. In all, attendance information from 164 of 788 two-year and 17 four-year institutions was deleted. The schools that were excluded at this stage were primarily bible schools, technical or business colleges, military institutes, and beauty and art

schools. Thus, even for those individuals who reported seeking an academic degree, attendance at trade schools and culinary institutes was effectively not counted as enrollment for the purposes of our study. A few individuals who were never enrolled in an academic institution despite expressing an interest were eliminated at this stage. We believe that our sample includes all individuals who express an interest in and actually enroll in an academic program (AA or higher).

References

Adelman, C. (1999). Answers in the Tool Box: Academic Intensity, Attendance Patterns, and Bachelor's Degree Attainment. Washington, D.C.: U.S. Department of Education.

Bean, J.P. & Metzner, B.S. (1985). A Conceptual Model of Nontraditional Student Attrition. Review of Educational Research, 55 (4), 485-540.

Becker, G. (1975). Human Capital. New York: National Bureau of Economic Research.

Becker, William. (1990). The Demand for Higher Education. In S.A. Hoenack & E.L. Collins, The Economics of American Universities: Management, Operations, and Fiscal Environment. Albany: State University of New York Press.

Borus, M.E. & Carpenter, S.A. (1984). Factors Associated with College Attendance of High School Seniors. Economics of Education Review, 3 (3), 169-176.

Cabrera, A.F., Stampen, J.O., & Hansen, W.L. (1990). Exploring the Effects of Ability to Pay on Persistence in College. The Review of Higher Education, 13 (3), 303-336.

Clotfelter, C.T. (1991). Demand for Undergraduate Education. In C.T. Clotfelter, R.G. Ehrenberg, M. Getz, & J.J. Siegfried, Economic Challenges in Higher Education. Chicago: The University of Chicago Press.

Corman, H. (1983). Postsecondary Educational Responses by Recent High School Graduates and Older Adults. Journal of Human Resources, 18 (2), 247-67.

Dickey, A.K., Asher, E.J. Jr., & Tweddale, R.B. (1989). Projecting Headcount and Credit Hour Enrollment by Age Group, Gender, and Degree Level. Research in Higher Education, 30 (1), 1-19.

Dowd, A.C. (2001). Computing Variances from Data with Complex Sampling Designs: A Comparison of Stata and SPSS. Paper presented at the North American Stata Users Group.

Ehrenberg, R.G. & Sherman, D.R. (1984). Optimal Financial Aid Policies for a Selective University. Journal of Human Resources, 19 (2), 202-30.

Hoenack, S.A. & Pierro, D.J. (1990). An Econometric Model of a Public University's Income and Enrollment. Journal of Economic Behavior and Organization, 14 (3), 403-23.

Hoenack, S.A. & Weiler, W.C. (1975). Cost-Related Tuition Policies and University Enrollments." Journal of Human Resources, 10 (3), 332-60.

_____. (1979). The Demand for Higher Education and Institutional Enrollment Forecasting. Economic Inquiry, 17 (1), 89-113.

Jamieson, A., Curry, A., & Martinez, G. (2001). School Enrollment in the United States -- Social and Economic Characteristics of Students." Current Population Reports, October 1999, 7-9.

Light, A. (1996). Hazard Model Estimates of the Decision to Reenroll in School. Labour Economics, 2, 381-406.

McPherson, M.S. & Schapiro, M.O. (1991). Does Student Aid Affect College Enrollment? New Evidence on a Persistent Controversy. American Economic Review, 81 (1), 309-318.

Metzner, B.S. & Bean, J.P. (1987). The Estimation of a Conceptual Model of Nontraditional Undergraduate Student Attrition. Research in Higher Education, 27 (1), 15-37.

Moore, R.L., Studenmund, A.H., & Slobko, T. (1991). The Effect of the Financial Aid Package on the Choice of a Selective College. Economics of Education Review, 10 (4), 311-21.

Seftor, N.S. & Turner, S.E. (2002). Back to School: Federal Student Aid Policy and Adult College Enrollment." Journal of Human Resources, 37 (2), 336-52.

Seneca, J.J. & Taussig, M.K. (1987). The Effects of Tuition and Financial Aid on the Enrollment Decision at a State University. Research in Higher Education, 26 (4), 337-62.

Starkey, J.B. (1994). The Influence of Prices and Price Subsidies on the Within-Year Persistence by Part-time Undergraduate Students: A Sequential Analysis. Ph.D. diss., University of New Orleans.

Tynes, S.F. (1993). The Relationship of Social, Economic, Academic, and Institutional Characteristics to Persistence of Nontraditional Age Students in Higher Education: Implications for Counselors. Ph.D. diss., University of New Orleans.

U.S. Bureau of the Census. (2002). On-line. Available http://www.census.gov/population/socdemo/school/ppl-148/tab11.txt.

U.S. Bureau of the Census. (1990). On-line. Available via the Government Information Sharing Project at http://govinfo.kerr.orst.edu under "Earnings by Occupation and Education".

U.S. Department of Education. (2001). National Center for Education Statistics. Digest of Education Statistics, 2001. Available at http://nces.ed.gov/pubs2002/digest2001.

U.S. Department of Education. (1998). National Center for Education Statistics. "Stopouts or Stayouts? Undergraduates Who Leave College in Their First Year." NCES 1999-087. by Laura Horn. Project Officer: Dennis Carroll. Washington D.C.

Zucker, B. & Dawson, R. (2001). Credits and Attainment: Returns to Post-Secondary Education Ten Years After High School, National Center for Educational Statistics, (NCES Electronic Catalog #2001168), 1-72.

Table 1

Sample Characteristics

by First Term Enrollment Status

	Enrolled	
Characteristics	Full-Time	Part-Time
Female	53.25%	54.14%
White	85.73%	86.82%
Black	8.39%	8.57%
Other Race	5.88%	4.61%
Hispanic	5.57%	15.61%
Self-Reported Math Ability		
Above Average	32.18%	17.33%
Average	51.11%	61.84%
Below Average	16.71%	20.83%
No High School Diploma	3.41%	7.97%
Highest Parental Education Level[a]		
Less Than High School	5.29%	11.65%
High School/Trade School	27.84%	43.62%
Some College	8.36%	8.62%
College or More	57.16%	27.80%
Missing	1.35%	8.30%
Teenager	89.33%	39.80%
Age	19.15	24.76
Age Squared	382.34	692.48
Not Dependent upon Parents	10.17%	49.75%
Marital Status by Respondent's Gender		
Men: Never Married	97.26%	74.79%
Men: Married	2.33%	19.19%
Men: Divorced, Separated, Widowed	0.40%	6.02%
Women: Never Married	92.84%	55.41%
Women: Married	5.13%	34.62%
Women: Div.,Sep.,Wid.	2.03%	9.96%

Number of Children[b] by Respondent's Gender		
Men: # Less Than Age 7	0.02	0.14
Men: # Age 7-12	0.01	0.08
Men: # Age 13-18	0.00	0.10
Women: # Less Than Age 7	0.05	0.24
Women: # Age 7-12	0.04	0.18
Women: # Age 13-18	0.02	0.21
Unemployment Rate in Home State	5.22%	5.13%
Earnings of High School Graduate[c]	$15.04	$16.89
Ratio of College to High School Earnings[d]	1.91	1.91
"Work is Very Important"	34.51%	71.91%
Number of Observations – Unweighted	4263	346
Percentage of Observations – Weighted	81.92%	18.08%

a As reported by the parent in over seventy percent of the cases.

b Age is approximate. Those in the youngest group were born after 1981, those listed as age 7-12 were born in 1976-81, and those listed as age 13-18 were born in 1970-75.

c Reported in thousands of dollars per year and differentiated by gender, age, race (White/Black/Other), and ethnicity (for Whites and Blacks). Based on 1990 Census reports for full-time/full-year workers.

d Average earnings of 25-29 year old college graduates divided by average earnings of 18-24 year old high school graduates working FT/FY and differentiated by gender, race (White/Black/Other), and ethnicity (for Whites and Blacks). Based on 1990 Census reports for full-time/full-year workers.

Except as noted, all measures are calculated using sample weights.

Table 2

Probit Model of Initial Enrollment Intensity

Variables	Specification (1)	Specification (2)	Specification (2')
Constant	-3.7164	-5.1169	-4.1355
	(5.3351)	(5.1769)	(5.8043)
Female	-0.3516 **	-0.3628 **	-0.3931 **
	(0.1780)	(0.1762)	(0.1845)
Black	0.1787	0.2155	0.2315
	(0.3670)	(0.3573)	(0.3557)
Other Race	-0.1802	-0.0834	-0.0878
	(0.2308)	(0.2367)	(0.2265)
Hispanic	0.9078 ***	0.9540 ***	0.9581 ***
	(0.2353)	(0.2223)	(0.2196)
Above Average Math Ability	-0.3243 ***	-0.3394 ***	-0.3362 ***
	(0.1165)	(0.1195)	(0.1182)
Below Average Math Ability	0.0572	0.0290	0.0365
	(0.1131)	(0.1182)	(0.1170)
No High School Diploma	-0.5529 **	-0.5035 **	-0.5235 **
	(0.2392)	(0.2232)	(0.2269)
Highest Parental Education Level			
Less than High School	-0.0928	-0.1267	-0.1058
	(0.2018)	(0.1986)	(0.1952)
High School/Trade School	0.3705 ***	0.3022 ***	0.3036 ***
	(0.1100)	(0.1149)	(0.1151)
Some College	0.3863 **	0.2997 *	0.3037 *
	(0.1598)	(0.1590)	(0.1577)
Missing	0.3444	0.3874	0.3955
	(0.2500)	(0.2550)	(0.2633)
Teenager	-0.9618 ***	-0.8870 ***	-0.8616 ***
	(0.1802)	(0.1827)	(0.1850)
Age	0.1770 **	0.1725 **	0.1854 **
	(0.0791)	(0.0794)	(0.0853)
Age Squared	-0.0020 **	-0.0021 **	-0.0022 **
	(0.0010)	(0.0010)	(0.0011)
Not Dependent upon Parents	0.1384	0.0293	0.0306
	(0.1821)	(0.1826)	(0.1804)
Married Man	0.5557 *	0.6152 **	0.5870 **
	(0.3013)	(0.2933)	(0.2932)
Sep/Div/Widowed Man	0.9088 *	1.2955 **	1.7675 ***
	(0.4773)	(0.5090)	(0.6122)
Married Woman	0.3000	0.4425 *	0.4395 *
	(0.2399)	(0.2353)	(0.2341)
Sep/Div/Widowed Woman	0.0885	0.2641	0.3019

	(0.2820)		(0.2580)		(0.2554)	
Number of Children						
Men: # < Age 7	-0.0210		-0.0634		0.2603	
	(0.2315)		(0.2231)		(0.4350)	
Men: # Age 7-12	0.1194		0.1687		0.2676	
	(0.2855)		(0.2532)		(0.2495)	
Men: # Age 13-18	1.0043	**	0.6900	*	-0.0773	
	(0.4187)		(0.3967)		(0.2320)	
Women: # < Age 7	-0.0662		-0.0494		-0.0068	
	(0.1569)		(0.1471)		(0.1567)	
Women: # Age 7-12	-0.2650	*	-0.2818	*	-0.2762	
	(0.1540)		(0.1641)		(0.1736)	
Women: # Age 13-18	-0.0090		-0.0065		-0.0563	
	(0.1701)		(0.1568)		(0.1487)	
Unemployment Rate in Home State	-0.0985	*	-0.1125	*	-0.1366	*
	(0.0577)		(0.0585)		(0.0766)	
Earnings of High School Graduate	-0.0883	*	-0.0760		-0.1361	**
	(0.0476)		(0.0472)		(0.0597)	
College/High School Earnings	1.3500		1.8753		1.8028	
	(2.7985)		(2.7384)		(3.0407)	
"Work is Very Important"			0.7187	***	-1.5059	
			(0.0904)		(5.1748)	
"Work"*Unemployment Rate					0.0535	
					(0.0845)	
"Work"*High School Earnings					0.0879	**
					(0.0377)	
"Work"*College/High School Earnings					0.3135	
					(2.6441)	
F-Test Statistic	15.91		15.79		14.73	
Fraction Correctly Predicted	85.9%		87.7%		88.0%	
Of Those Attending FT	95.0%		95.7%		96.0%	
Of Those Attending PT	44.4%		51.5%		51.4%	
Sum of the Squared Residuals	0.1034		0.0956		0.0948	

Dependent variable has a value of 1 if respondent initially enrolled part-time.
All estimates are adjusted for sample weights, clustering, and stratification.
Asymptotic standard errors are reported in parentheses below coefficient values.
* (**) [***] Indicates statistical significance at the 10% (5%) [1%] level, 2-sided test.

Table 3

Predicted Probability of Initially Enrolling Part-Time By Specification and Characteristics

Characteristic	Specification (1) Unadjusted	(1) Adjusted	(2) Adjusted
Base Case	0.057	0.057	0.031
	(0.013)	(0.013)	(0.010)
Female	0.027	0.059	0.030
	(0.012)	(0.012)	(0.009)
Black	0.080	0.102	0.058
	(0.053)	(0.039)	(0.026)
Hispanic	0.250	0.285	0.202
	(0.074)	(0.069)	(0.060)
Independent		0.074	0.033
		(0.030)	(0.017)
Independent & Age 25	0.557	0.337	0.197
	(0.088)	(0.098)	(0.078)
Independent & Age 35	0.755	0.290	0.171
	(0.137)	(0.159)	(0.122)
Independent, Age 35, Female	0.633	0.580	0.372
	(0.144)	(0.119)	(0.125)
Independent, Married, Age 35		0.501	0.369
		(0.163)	(0.166)
Independent, Married, Age 35, Female		0.692	0.546
		(0.104)	(0.123)
Unemployment Rate = 3.2% Versus 5.2%		0.083	0.050
		(0.026)	(0.020)
Base Case + Work is Important			0.125
			(0.029)

Asymptotic standard errors reported in parentheses beneath the predicted probabilities.
Unadjusted means the earnings measures were unadjusted for differences by gender, race, ethnicity, and age.

Base Case: White, non-Hispanic male, having high school diploma, average ability, parents who completed college, age 18, dependent, never married, and no children. Specification (2) additionally assumes the respondent did not indicate that work was very important.