

**Delayed Enrollment and College Plans:
Is there a Postponement Penalty?**

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Abstract:

Using a representative longitudinal survey of Texas high school seniors who graduated in 2002, we investigate how college postponement is associated with four-year college expectations and attendance, focusing both on the length of delay and the pathway to the postsecondary system. Like prior studies, we show that family background and student academic achievement explains the negative association between delay and college expectations, and these factors, along with two-year college entry pathway, largely account for the negative association between postponement and enrollment at a four-year institution in 2006. Although delays of one year or longer are associated with significantly lower odds of attending a baccalaureate-granting institution four years after high school, the longest delays do not incur the most severe enrollment penalties.

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Introduction

Most students who aspire to a postsecondary degree enroll in college the fall semester following their graduation from high school; however, growing numbers of college-bound high school graduates are choosing to delay college enrollment. Horn, Cataldi and Sikora (2005) report that nearly one-third of 1995-96 college freshmen delayed their college entry, but in the 1999-2000 school year, about 46 percent of *all* undergraduates experienced a hiatus between their high school completion and postsecondary enrollment (Barton, 2002). Nevertheless, relatively few studies examine the correlates and consequences of delayed enrollment; their general consensus is that six to eight years after high school graduation, degree attainment is substantially lower for students who delayed college entry compared with on-time enrollees (Carroll, 1989; Hearn; 1992; Bozick and DeLuca, 2005; Rowan-Kenyon, 2007).

Delayed enrollment need not undermine pursuit of baccalaureate degrees if the hiatus from academic work allows students to mature, to acquire work experience, and to accumulate resources for college. Postponement can be problematic, however, if the hiatus is long; if postponement increases the likelihood of beginning college in a two-year rather than a baccalaureate-granting institution; and if time away from academic activities lowers college expectations—all circumstances that are associated with failure to receive a bachelor's degree. Existing studies use inconsistent measures to represent delay, but they concur about the socio-demographic and academic profile of students who postpone college entry. Only two studies consider how the length of postponement

influences students' enrollment at a four-year postsecondary institution (Bozick and DeLuca, 2005; Rowan-Kenyon, 2007), although their measurements are questionable for reasons elaborated below. Except for the tendency for delayed enrollees to enter the postsecondary system through two-year colleges, evidence about the mechanisms through which delay influences pursuit of baccalaureate degrees is limited.

Accordingly, we exploit a rich longitudinal survey of Texas high school seniors to address two limitations of prior studies about delay, namely how educational expectations and length of postponement are associated with actualization of college plans. To broaden the external validity of our analysis, we compare Texas delay patterns with those based on national surveys. Although a four-year post-high school window precludes an analysis of degree completion, we examine two outcomes—one cognitive and one behavioral—that are highly predictive of degree attainment, namely college expectations and matriculation at a baccalaureate-granting institution four years after high school graduation (Messersmith and Schulenberg, 2008).

Consistent with prior studies, we find that family background and student academic achievement fully explains the negative association between delayed enrollment and educational expectations; moreover, these family and student attributes, along with two-year college entry pathway, largely account for the negative association between postponement and enrollment at a baccalaureate-granting institution four years after high school graduation. The relationship between the length of delay and students' college attendance is not linear, however, which we speculate is related to unobserved attributes that measure students determination to actualize their college plans.

Background

Early studies of college decision-making acknowledged the sequential character of the process and its grounding in post-secondary aspirations (Fuller, et al., 1982; Behrman, et al., 1998). Hossler and associates (1999) proposed three general stages to represent the sequential decisions leading to college enrollment, namely: (1) the predisposition to attend college; (2) the search for a choice set; and (3) matriculation. During the search stage, students test their aspirations against options based on their calculated probability of admission (Fuller, et al., 1982; Manski and Wise, 1983) and adjust application behavior accordingly. Submission of applications concludes the search process, but the onset and evolution of the predisposition stage is less clearly defined because expectations continue to evolve as students reconcile aspirations and predispositions with actual experiences (Kao and Tienda, 1998; DesJardins, et al., 1999; Messersmith and Schulenberg, 2008), and because some students delay their initial enrollment in a postsecondary institution for academic, financial and other personal reasons. If time spent away from school erodes college expectations, then pursuit of a college degree will be lower for delayers compared with on-time enrollees of comparable achievements.

Of the studies that have evaluated the correlates of college delay, Hearn (1992) confirmed that students with high educational aspirations were less likely to delay college enrollment and to attend part-time. His aspirations measure is based on a question that asked respondents to indicate the lowest level of education with which they would be satisfied, which Hearn claims is preferable to the more conventional measures that portray students' "unbounded idealism." It is difficult to interpret his results substantively

because the ordinal measure of aspirations is modeled as an interval scale. Hearn claims that similar findings obtain for educational expectations, but these are not reported (see fn. 9). Neither Rowan-Kenyon (2007) nor Bozick and DeLuca (2005) examine the association between college expectations and delay, either to establish whether college plans change or as a mediator of enrollment behavior.

Postsecondary expectations link the first and third stages of the college decision process described by Hossler and associates (1999), and as such, are important to consider when evaluating the consequences of postponement. Although aspirations and expectations are often used interchangeably, there is ample evidence that they are conceptually different (Kao and Tienda, 1998). The advantage of expectations over aspirations measures is that they include assessments of how difficult as well as how realistic is the stated educational goal. Expectations, unlike aspirations, represent “plans in action” (Messersmith and Schulenberg, 2008). For example, students who report that they expect a college degree tend to pursue a college curriculum; to take college entrance exams; and to excel in high school.

Educational expectations not only are strong predictors of postsecondary enrollment, but also are relatively stable over time; nevertheless, college plans can and do change. Messersmith and Schulenberg (2008) show, for example, that low-income students, and particularly those from lone-parent families, from minority backgrounds, and who reside in rural areas often fall short of realizing their expectations. However, they did not examine the timing of enrollment as a mechanism through which youth become derailed from their expected pathway, nor did they consider whether the type of institution initially attended lowered students’ college attainments relative to their

reported expectations.¹ Whether postsecondary expectations remain stable among students who delay college enrollment, however, is an empirical question that has not yet been addressed.

Three key studies that examine the prevalence of college delay and its evolution over time are based on nationally representative samples of high school seniors and largely corroborate several key findings.² For the high school class of 1972 (NLS-72), Eckland and Henderson (1981) show that compared with students who do not postpone college enrollment, delayed enrollees disproportionately hail from lower socioeconomic backgrounds, have lower academic credentials, and are more likely to enter the postsecondary system at two-year institutions. For the 1980 senior class, Hearn (1992) shows that delayed enrollment is associated with socioeconomic constraints and academic marginality. Bozick and DeLuca's (2005) analysis of college-going behavior for the 1992 senior class reveals that delay is more prevalent in the south and that students who postpone enrollment are less likely to attend four-year institutions compared with on-time enrollees. Owing to formidable changes in both the volume and the composition of high school graduates since 1992, Rowan-Kenyon (2007) concludes her analysis of delay with a call for analyses using more recent data.³

Despite agreement about two core determinants of delayed enrollment, namely family socioeconomic status and college readiness, existing studies differ in the window of time used to assess postponement behavior and the criteria used to define delay. In

¹ They did examine students aspirations to attend a two-year college, but aspirations are much weaker predictions of actual behavior than expectations (Kao and Tienda, 1998)

² Bozick and Deluca provide an excellent review of studies that use a variety of samples to investigate the correlates of delay, showing that the majority support findings from national studies.

³ The (ELS) tracks the 2004 cohort of high school seniors, but the most recent wave of data collection was obtained in 2006, just two years after high school graduation. Rowan-Kenyon argues (and we agree) that this period is too short for evaluating postponement behavior. The next ELS follow-up, planned for 2012, will likely not be available until 2014.

particular, there is very limited evidence about how the likelihood of enrollment in a baccalaureate-granting institution changes with the length of postponement. Eckland and Henderson (1981) classify students who enroll in the same year they graduated from high school as on-time enrollees; students who postpone college by one-semester are designated delayed enrollees. Hearn (1992) considers students who begin college within one year of high school graduation as on-time enrollees, but Bozick and DeLuca (2005) classify students who matriculate within seven months of high school graduation as on-time enrollees. Horn, Cataldi and Sikora (2005) classify students who matriculate one-semester after high school graduation as on-time enrollees. Using data for a 1995-96 cohort of college freshmen, they examine the correlates of the length of delay, which in their study ranges from 1 year to 10 or more years. Despite the longer observation window, Horn and associates' assessment of the length of delay conflates period and cohort differences in college enrollment behavior because their analysis is based on a sample of enrolled college freshmen that includes multiple cohorts of high school senior cohorts.

Bozick and DeLuca's (2005) study, which measures postponement in months, uses the highest level of measurement precision, but assumes a linear association between delay and eventual enrollment. This assumption may overstate the association between length of delay and college attendance for two reasons. First, degree-seeking students cannot enroll in a college in any month; rather, enrollment occurs on the basis of semesters or quarters, which requires categorical measurement. Second, there is reason to believe that a semester delay is qualitatively different from a hiatus that lasts a full year or longer. Single semester postponement allows students to attend classes with members

of their high school cohort, but longer delays do not. Furthermore, students who delay two or more years may differ in systematic ways from those who postpone enrollment for a single year. On the one hand, students who prolong delay are at higher risk of experiencing life course events, such as marriage and childbirth, which lower the likelihood of enrolling at a four-year institution. On the other hand, these delayers may be highly motivated to succeed and thus differ from typical delayers in attributes not measured by observable characteristics that are related to college attendance. That is, their postponement may reflect practical considerations, such as the need to accumulate savings in order to attend a four-year institution.

Using a recent high school senior cohort from Texas, we expand on prior research by examining how the length of college postponement is associated with postsecondary expectations and attendance at a baccalaureate-granting institution four years post high school graduation. Stated as questions, we ask: First, how is the length of postponement associated with college expectations? Second is the timing of college enrollment consequential for the likelihood of enrollment at a baccalaureate-granting institution during the observation window? Finally, to what extent are the observed differences in four-year college enrollment among delayed versus on-time enrollees due to systematic variation in family background, academic achievement and the two- versus four-year pathway to the postsecondary system?

Our data are based on a high school cohort for a single state rather than a national survey; therefore we address external validity of our findings by documenting a high similarity in the incidence of delay between the Texas senior cohort analyzed and several nationally representative cohort studies. An advantage of focusing on a single state is that

there is less variation in tuition costs across states, which Kane (1996) argues is a crucial determinant of the two- and four-year initial enrollment options across states. Two-year institutions have grown rapidly in Texas, and since the mid-1990s, the statewide share of postsecondary enrollment engaged in two-year colleges surpassed that of four-year institutions (Tienda and Sullivan, 2009). This development can potentially influence students' pursuit of baccalaureate degrees by increasing the number of students that begin their postsecondary training at community colleges and thus incur transfer hurdles.

Data and Analytical Strategy

The empirical analyses use the longitudinal survey data collected under the auspices of the Texas Higher Education Opportunity Project (THEOP). In spring 2002, a representative sample of Texas public high school seniors was surveyed (Wave 1); a random sub-sample of the senior cohort was re-interviewed the following spring (Wave 2) and again four years after high school graduation (Wave 3). The baseline survey obtained basic demographic, socioeconomic and standard tracking information as well as information about high school performance, experience and college plans. The first follow-up survey (Wave 2) recorded whether respondents actually enrolled in college one year after high school graduation, and if so, when and where. Wave 3 interviews solicited information about students' educational pursuits and college attainment.

Using a two-stage stratified sampling design, 13,803 seniors were interviewed using a paper and pencil in-class survey instrument in the baseline. For cost reasons a

random sub-sample of 8,345 seniors were selected for follow-up surveys.⁴ The response rate for Wave 2 interviews was 70 percent, generating 5,836 completed surveys. With weights, the Wave 2 sample represents the baseline population.

Due to the difficulty in locating respondents, Wave 3 field interviews lasted over a year, from January 2006 to March 2007; and 12 percent (485 out of 4114) of Wave 3 respondents were interviewed after August 2006 – four years after respondents' high school graduation. The Wave 3 response rate of 50 percent yielded 4,114 cases; wave 3 sample weights were developed to adjust the sample to the original population. Although the 50 percent response rate for Wave 3 survey raises questions about the representativeness of the sample, comparisons between the 8,345 random subsample of the baseline and the 4,114 Wave 3 respondents show a high degree of similarity based on ethno-racial composition and post-high school intentions.⁵

Delayed Enrollment Status

College enrollment status was ascertained in both the second and third wave interviews. We used IPEDS codes to determine and append institutional characteristics, including types of degrees offered (e.g., technical/vocational, associate, or baccalaureate). Texas 2002 high school graduates who matriculated at a post-secondary institution before the end of 2002 are designated as on-time enrollees; those who had not enrolled in any post-secondary institution by 2006-7, four years after high school graduation are non-

⁴ To guarantee the maximum possible precision for blacks and Asians, all baseline respondents from these groups were included in the longitudinal samples; proportionate samples of Hispanics and non-Hispanic whites were randomly drawn for the sample balance.

⁵ Tables comparing respondent attributes across waves are in the methods reports. The sampling scheme for the baseline is described in detail in the “Methodology Report,” http://theop.princeton.edu/surveys/baseline/baseline_methods_pu.pdf. For wave 2 surveys, the sampling scheme is described in “Senior Wave 2 Survey Methodology Report,” http://theop.princeton.edu/surveys/senior_w2/senior_w2_methods_pu.pdf. Finally, the wave 3 sampling scheme is described in “Senior Wave 3 Survey Methodology Report,” http://theop.princeton.edu/surveys/senior_w3/senior_w3_methods_pu.pdf.

enrollees. All other enrollees are classified as delayed enrollees. Based on the timing of enrollment, we classify students into one of five enrollment status categories:

- On-time (enroll by December, 2002);
- One-semester delay (enroll January 2003 - May 2003);
- One-year delay (enroll June 2003 – December 2003);
- Two-year delay (enroll in 2004);
- Three/four-year delay (enrolled in 2005 or 2006).

College Expectations and Four-Year College Attendance

Because the duration of the longitudinal survey spans only four years, it is not possible to examine college completion rates, which are generally assessed after six years. In fact, there is evidence that the length of time to college degrees has increased (Adelman, 2004; Wirt, et. al., 2004). Therefore, we analyze two correlates of college degree attainment that are influenced by the timing of postsecondary enrollment, namely (1) college expectations at Wave 3 and (2) enrollment status at a baccalaureate-granting institution four years post high school graduation (at Wave 3).

Students were asked about their college plans in all three waves. The baseline survey queried students about their postsecondary expectations by asking: “Realistically speaking, how far do you *think* you will go in school?”⁶ One year after high school graduation, when students were re-interviewed at wave 2, they were asked, “What is the highest level of education you ever *expect* to complete?” These items are comparable to those used in national surveys to distinguish between aspirations and expectations (Kao and Tienda, 1998). In the Wave 3 survey, which occurred four years after students graduated from high school, respondents were asked, “What is the highest level of

⁶ Students were also asked about their aspirations at baseline, but both for consistency in measurement across waves and because expectations are reality-checked versions of aspirations, we restrict our analysis to expectations.

education you think you will have completed *at age 30?*” From these questions, we construct three indicator variables to measure college expectations at each point in time. Specifically, respondents who indicated they expected a baccalaureate degree or higher at each interview are coded one, and other responses are coded zero.⁷

We constructed two college attendance variables: enrollment at a baccalaureate-granting institution four years after high school graduation (1 = yes; 0 otherwise), and type of postsecondary institution initially attended (two-year, vocational/technical or four-year institution). Enrollment status at Wave 3 is the second outcome variable of interest, and initial enrollment status measures college entry pathway.⁸ The appendix table summarizes the operational definitions of all measures analyzed.

Descriptive Results⁹

Table 1 reports college enrollment outcomes of the Texas high school senior class of 2002 and compares their enrollment distribution with that of three national studies based on cohorts of high school seniors for the last three decades of the 20th century. These studies use different periods and metrics to measure delay, yet there is a clear trend toward greater participation in the postsecondary education system. Just over half of the 1972 senior class enrolled in college four years after high school (Eckland and

⁷ Education expectations at age of 30 is not available for the 469 respondents whose interview was conducted by a proxy respondent in Wave 3, but we do not find that proxy status is correlated with individual characteristics and SES status. Proxy respondents can answer factual questions, such as enrollment status, but not attitudinal questions.

⁸ Only a handful of observations lack information about the type of institution initially attended; we omit these cases from descriptive analyses and constructed flags to represent these cases in multivariate analyses.

⁹ We apply Wave 2 weights for descriptive analyses based on wave 1 and wave 2 college expectations in order to take advantage of the larger sample size. Descriptive results are virtually identical whether Wave 2 or Wave 3 weights are used. These results are available upon request. We apply Wave 3 weights for descriptive and multivariate analyses on college expectations and attendance based on the 2006 interview.

Henderson, 1981), and over 80 percent of the 1992 high school class had enrolled in a postsecondary institution eight years after high school graduation (Bozick and DeLuca, 2005). A decade later, 80 percent of the Texas high school class of 2002 had enrolled in a postsecondary institution within four years of receiving their diplomas, and nearly two-thirds did so without delay.

Table 1 About Here

Given differences in the definition of on-time enrollment and the time metric to observe enrollment behavior, it is difficult to draw firm inferences about changes in the prevalence of delay based on the national studies. Nevertheless, the comparisons provide assurance that the behavior of the Texas high school senior cohort is reasonably similar to that of the most recent national cohort of students.

Using a rather conservative measure of delay over an eight-year observation period, Bozick and DeLuca (2005) show that 16 percent of the 1992 senior class postponed their college enrollment *more than* one semester. With a four-year observation window, we show that 14 percent of Texas high school graduates delayed postsecondary enrollment *at least* one semester. These estimates are remarkably consistent given the differences in observation windows, which reflects the declining probability of enrollment over longer durations. For the Texas cohort we also present the distribution of delay by duration, which shows that half of the students classified as delayed enrollees postponed college by only one semester (which Bozick and DeLuca designated “on-time”); the rest delayed enrollment between three and four years (the maximum time observed in the survey).

Table 2 presents college expectations and enrollment status according to delay status for the Texas high school class of 2002. Compared with on-time enrollees, lower shares of students who delayed enrollment reported that they expected to complete at least a bachelor degree during their senior year of high school—57 versus 80 percent, respectively. That expectations rose for both groups the following year likely reflects students' realignment of their plans with a reassessment of realistic possibilities. The rise in college expectations was particularly pronounced for students who postponed enrollment, among whom four in five reported that they expected to complete a college degree. Even after goal realignment, eight percent more on-time enrollees expected to complete a bachelor degree or higher compared with delayers.

Once crystallized, educational expectations tend to remain stable (Messersmith and Schuleenberg, 2008), although differentials between on-time and delayed enrollees persist. Moreover, postsecondary expectations differ according to the length of postponement, but not in a monotonic way. Over 80 percent of students who postpone college enrollment either one semester or over three years reported that they expected a college degree, compared with only 76 to 78 percent of students who postponed one or two years, respectively. This pattern implies a nonlinear association between delay and expectations, but the small differences likely reflect systematic variations in characteristics that are associated with college plans, which we investigate below.

Table 2 About Here

Although crystallized educational expectations are reliable predictors of actual enrollment, postponement thwarts the prospect of enrollment at a baccalaureate-granting institution. About 65 percent of on-time enrollees were enrolled at a four-year institution

in 2006 compared with only 23 percent of students who delayed their college plans. Furthermore, students' enrollment status at a baccalaureate-granting institution differs according to the length of postponement, but not in a monotonic fashion. Approximately one-third of students who delayed their college plans by one semester or one year were enrolled at baccalaureate-granting institution in 2006 compared with only 10 percent of students who postponed two or more years. It appears that one year is a key postponement threshold such that students delay longer are substantially less likely to pursue their baccalaureate degree ambitions.

Prior national studies find that delayed enrollees are more likely than on-time enrollees to start their college career at community colleges (Eckland and Henderson, 1981; Bozick and DeLuca, 2005), which is consequential for the prospects of completing a four-year degree because large numbers of students who enter the postsecondary system at two-year institutions do not successfully transfer to a baccalaureate-granting institution (Brint and Karabel, 1989; Grubb, 1991; Dougherty, 1994). As shown in Table 3, compared to on-time enrollees, higher shares of Texas students who delay college plans begin their careers at two-year institutions. Nearly two-thirds of on-time enrollees entered the postsecondary system at a four-year institution, compared with only 20 percent of students who delayed enrollment. In fact, roughly half of students who postponed their college plans first enrolled at a community college and an additional 30 percent matriculated in a vocational or technical institution, compared with 35 and five percent, respectively, of on-time enrollees.

Table 3 About Here

The right panel of Table 3 shows how students' pathway to the postsecondary system depends on the length of delay. Among students who postponed their college careers by one semester or by a year, between 56 and 60 percent entered through the community college system and an additional 12 to 15 percent first enrolled at a vocational or technical institution. The two-year and vocational pathways are much more prevalent among students who postpone for longer periods, however. Community colleges serve as the postsecondary gateway for 42 and 28 percent, respectively, of students who postpone enrollment by two years or by three or four years. The vocational pathway to the post-secondary education system is highest among students who deferred college plans for three or more years.

Combined, Tables 2 and 3 provide evidence that students' success in actualizing college plans depends not only on the length of delay, but also how delay influences their enrollment pathway (i.e., via a two- or four-year institution) and determination to actualize college goals. Whether the nonlinear associations between delay and college plans are due to other factors that are systematically related both to the likelihood of postponement and its duration, as well as the pathway to the postsecondary system is an empirical question that requires multivariate methods, to which we now turn.

Multivariate Analysis

We estimate probit models to assess the association between postponement and both postsecondary expectations and attendance at a baccalaureate-granting institution in 2006. Formally,

$$Y = \alpha + \beta \text{Delayed} + \gamma Z + \epsilon \quad (1)$$

$$Y = \alpha + \beta_1(\text{one semester}) + \beta_2(\text{one year}) + \beta_3(\text{two years}) \\ + \beta_4(\text{three/four years}) + \gamma Z + \varepsilon \quad (1a)$$

where in model 1, delayed is a binary variable that indexes delayed enrollment status and in model 1a, the length of delay is explicitly specified. Z is vector of covariates that influence college expectations and enrollment outcomes, including students demographic characteristics (race/ethnicity), academic performance (dummy variables indicating top and second decile class rank; standardized test scores), college predisposition (dichotomous variables indicating whether respondents took college entrance exams and AP courses; when they first thought about going to college; and reporting college expectations during high school senior year); and socioeconomic background (represented by dummy variables for parents' education and home ownership status) as well as the college orientation of the high school (indexed by the socioeconomic composition of their high schools as well as having four or more close friends who planned to attend college). The appendix table summarizes the operational description of all covariates.

Because delayed enrollees are more likely than on-time enrollees initially to matriculate at community colleges (Eckland and Henderson, 1981; Bozick and DeLuca, 2005), we also estimate whether the institutional pathway to postsecondary schooling drives the association between length of delay and the likelihood of attending a baccalaureate-granting institution (at Wave 3). To estimate whether initial enrollment in a two-year college influences the chances of attending a degree-granting institution at the

end of the observation period, we expand model (1) by considering college entry pathway. Formally,

$$Y = \alpha + \beta_{\text{Delayed}} + \gamma Z + \delta_{\text{Pathway}} + \epsilon \quad (2)$$

$$Y = \alpha + \beta_1(\text{one semester}) + \beta_2(\text{one year}) + \beta_3(\text{two years})$$

$$+ \beta_4(\text{three/four years}) + \gamma Z + \delta_{\text{Pathway}} + \epsilon \quad (2a)$$

where “pathway” is a set of dummy variables denoting the type of institution initially attended (four-year; two year; or vocational/technical).¹⁰ For each specification we estimate a baseline with no covariates and a second model that includes the full set of covariates.

Statistical Results

Table 4 reports summary statistics of the covariates used in the multivariate analysis for the sample of students who ever enrolled in a postsecondary institution during the observation window. Consistent with findings based on nationally representative samples of high school graduates, delayed enrollees from the Texas class of 2002 are weaker academically and average lower socioeconomic status than their classmates who enrolled immediately after high school. Higher shares of students who postpone their college plans for a semester or longer have parents with less than a high school education and exhibit weaker college dispositions than on-time enrollees. Slightly more men than women postpone enrollment by a semester or more, and Hispanics have higher rates of delay than both white and Asian students. Compared with students who delay, higher shares of on-time enrollees graduated from an affluent high school, rank in the top 20 percent of their high school class, completed one or more AP courses, and

¹⁰ We also estimated a model where delayed status is allowed to interact with pathway. Because the interaction terms do not consistently achieve statistical significance, we present the additive specification.

report having multiple college-bound friends. Furthermore, lower shares of delayed enrollees took a college entrance exam during their senior year compared with on-time enrollees, which signals lower expectations during high school, and they averaged about 90 fewer points on the SAT.¹¹

Table 4 About Here

Consistent with prior research, Texas students who postpone college enrollment are more disadvantaged economically and average lower academic achievement than on-time enrollees, but there is also considerable socioeconomic and academic differentiation among students who delay. Consistent with the enrollment differentials by length of delay reported in Table 2, students who delay one semester or one year are more similar to each other than either group is to students who postpone two or more years. Still, among students who delay enrollment, those who postpone by one year are the most advantaged based on family background and academic achievement, and those who postpone by three to four years are the most disadvantaged. For example, 41 percent had college-educated parents, compared with one-third of students who delayed two and three or more years. One-year delayers averaged SAT scores of 912, compared with 890 for those who postponed by one semester. By comparison, students who delayed three to four years barely topped 850 points on the SAT examination. Among students who postponed postsecondary enrollment, those who delayed by one year also surpassed all others in their AP course completion, which is a strong predictor of college intentions.

¹¹ We converted ACT scores to their SAT equivalent, if available or predict missing SAT scores using students' decile class rank, high school curriculum, most recent math and English grades, whether they have taken English and math AP courses, whether languages other than English are spoken at home, gender, race/ethnicity, college disposition, parental education, home ownership, high school types, and several high school attributes obtained from Texas Education Agency reports, including percent enrolled in grades 11 to 12 taking AP courses, percent AP exams passed, percent students passed an algebra test, percent with college plans, and high school dropout rate.

Table 5 presents estimates for the baseline association between delayed enrollment and degree expectations four years after high school graduation using two measures of postponement. The left panel reports marginal effects on college expectations using the binary measure of delay and the right panel disaggregates delay by duration. Compared with on-time enrollees, students who delay are eight percentage points less likely to report that they expect to complete a bachelors degree or higher. This difference in educational expectations is due entirely to systematic variation in family background, college orientation, and academic achievement. Consistent with claims that expectations are relatively stable once crystallized, the association between baccalaureate degree expectation at Wave 1 and Wave 3 is strong and positive; moreover, the point estimate is unaltered by the operational measurement of delay (column 2 and 2a).

Table 5 About Here

The baseline model for the association between educational expectations and the length of delay affirms the nonlinear association reported in Table 2. Four years after high school graduation, students who delayed postsecondary enrollment by one semester are five percentage points less likely to report that they expect to complete a bachelors degree or higher and those who postpone college by a year are 10 percentage points less likely to expect to do so. These differences largely reflect systematic variation in family background and academic accomplishments.

Table 6 evaluates the association between delay and attendance at a baccalaureate-granting institution and sequentially considers potentially mediating mechanisms. The left panel reports the average marginal effects of delayed enrollment on baccalaureate-granting institution attendance status in 2006. Point estimates for the

baseline model indicate that seniors who postpone college enrollment by any amount are 40 percentage points less likely to be enrolled at a baccalaureate-granting institution in 2006 compared with their classmates who enrolled on time. Column 2 reports estimates from the model that includes measures of family background and students' academic achievement (estimates not shown) as well as Wave 1 college expectations. These covariates account for just over half of the delayers' lower likelihood of attending a baccalaureate-granting institution four years post high school graduation (compare columns 1 and 2). The association partly works through college entry pathway as the point estimate drops to 12 percentage points when entry pathway is modeled (column 4). Notably, the estimates are robust to alternative specifications of delay (columns 2 and 2a, columns 4 and 4a). High school seniors who reported college expectations were 11 to 12 percentage points more likely to attend a baccalaureate-granting institution in 2006 compared with statistically comparable classmates with lower educational expectations.

Table 6 About Here

The results in columns (3) and (4) reveal that the four-year college enrollment penalties associated with delay also derive from students' postsecondary entry pathway. Nearly three-quarters of the enrollment penalty associated with delay reflects student differences in family background, academic achievement and college entry pathway. Both because they incur a transfer hurdle and because they differ systematically in characteristics that predict four-year college attendance, students who begin their postsecondary careers in community colleges or vocational and technical schools are between 26 and 37 percentage points less likely to be enrolled in a baccalaureate-granting institution in 2006 compared with statistically similar students who first enrolled in a

four-year institution. The marginal effects associated with college pathway, which are robust across specifications that use different measures of delay (see columns 3 and 3a, 4 and 4a), are consistent with other studies that question the viability of the community colleges as a steppingstone to college degree attainment (Dougherty, 1994; Long and Kurlaender, 2009).

The right panel of Table 6 illustrates the importance of specifying the length of postponement in order to understand the association between delay and eventual degree attainment. Compared with on-time enrollees, students who postpone college entry by one-semester are 28 percentage points less likely to attend a baccalaureate-granting institution in 2006 and those who delay enrollment by a full year are 30 percentage points less likely to do so (column 1a). Those with longer delay incur a much higher attendance penalty in that they are nearly 60 percentage points less likely than on-time enrollees to attend a baccalaureate-granting institution four years after high school graduation.

The negative association between postponement and baccalaureate-granting institution enrollment is largely due to variation in students' family background, prior academic achievements and college expectations (column 2a) and initial college pathway (columns 3a and 4a). In fact, these factors fully account the attendance penalty associated with a semester delay. That is, students who postpone enrollment by one semester are indistinguishable from statistically similar students who enroll immediately following high school graduation. This is not the case for longer delays; moreover, and the net association between delay and enrollment in a baccalaureate-granting institution four years after high school is nonlinear.

It appears that students who delay college entry for two years are most disadvantaged vis-à-vis on-time enrollees; specifically, they are 24 percentage points less likely to be enrolled in a baccalaureate-granting institution in 2006 compared with statistically similar classmates who did not experience a hiatus in their educational careers. By comparison, students who postpone college by one year or by three or four years incur an enrollment penalty of approximately nine percentage points. However, the coefficient for delays of three or four years is imprecisely estimated due to greater heterogeneity of this group, which is evident in the large standard error. Because students who postpone college by three or four years are the most socially and academically disadvantaged among all who delay postsecondary enrollment, family socioeconomic status and academic achievement explain a larger share of their enrollment penalties compared with other delayers (compare models 1a, 2a and 4a).

In short, delays of one year or longer are associated with significantly lower odds of attending a four-year post-secondary institution, yet students with the longest delays do not incur the most severe enrollment penalties. We suspect that unobservable characteristics, such as motivation, determination and maturation may undergird these results, but our data do not permit a further investigation of these mechanisms. This is an empirical question that invites further research.

Summary and Conclusions

Despite general agreement that students who delay postsecondary enrollment are at considerable risk of not completing a college credential compared with their peers who enroll on time (Carroll, 1989), less evidence has been brought to bear on the length of

delay as an important mechanism through which postponement influences baccalaureate degree attainment. The few existing studies about the correlates of delay confirm the socio-demographic profile of students who postpone their college careers and acknowledge their higher propensity to enter the postsecondary system via two-year institutions.

Using a representative longitudinal sample of the Texas high school class of 2002, we investigate how the timing of college enrollment and the pathway to the postsecondary system is associated with students' college expectations and attendance at a baccalaureate-granting institution in 2006. Results show that the influence of delay on enrollment at a baccalaureate-granting institution four years after high school graduation depends not only on family background, prior academic achievement and whether initial enrollment occurred at a two- or four-year institution, as other studies show, but also on the length of delay and the students' college expectations. That our estimates of the prevalence of delay for a single state are quite similar to those based on recent national studies this inspires confidence in the external validity of our findings. Given the short observation period, however, our estimates of delay and its attendant consequences are likely to be conservative.

We find that compared with on-time enrollees, students who postponed college enrollment were less likely to expect a bachelor or higher degree and much less likely to attend a postsecondary institution four years post high school graduation. The double-whammy of delay and two-year pathway warrants further investigation to identify circumstances that are amenable to targeted policy intervention. Students who delay enrollment for one semester incur a modest attendance penalty that largely reflects their

lower college readiness, socioeconomic status and higher likelihood of initial enrollment at a two-year college. Enrollment delays of one year or longer are associated with a significantly lower likelihood of attending a four-year institution that are not fully explained by these factors. Yet, somewhat surprisingly, the longest delays do not incur the most severe enrollment penalties, which we speculate reflects unobserved differences such as motivation and determination.

That many students graduate from high school expecting to eventually attain a bachelor's degree warrants some attention to the circumstances that thwart their college plans. Prior studies have signaled the two-year pathway as a risk factor in that students who begin their postsecondary careers in community colleges or technical and vocational institutions experience additional barriers associated with transfer and commuting. Some of these downside risks can be mitigated through stronger advising at two-year institutions, particularly if such initiatives can be targeted to students who *both* want to complete a Baccalaureate degree and also demonstrate the ability to succeed in a four-year academic program.

Of course, a four-year degree may not be appropriate or even beneficial to all students. The recently published "Pathways to Prosperity" report (Harvard Graduate School of Education, 2011) notes that the demand for jobs requiring technical skills or less than four years of college is increasing and many of these workers have better wage prospects than some bachelor degree holders, particularly majors in humanities, arts and some social sciences. Over 60 percent of Texas students who delayed their postsecondary training three or four years enrolled in a vocational/technical institution, which suggests that the school hiatus may have provided them with the labor market feedback about

alternative ways to improve their wage prospects short of pursuing a four-year college degree. The policy challenge, then, is to identify talented students for whom delay thwarts postsecondary plans despite their high educational expectations and results in nonenrollment from students for whom delay provides labor market feedback relevant to a vocational/technical postsecondary career.

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Table 1. Enrollment Delay and Measurement: A Comparison of Four Studies

Cohorts and Data	College Enrollment Distribution (Row percent)			By the Length of Delay				Measurement	
	Not Enrolled	On Time Enrollees	Delayed Enrollees	One Semester	One Year	Two Years	Three/ Four Years	Years Since High School Graduation	Window for On-Time Enrollment
1972 Seniors (NLS-72) ^a	49	41	10	- ^e	-	-	-	4	Same calendar year of high school graduation
N = 19015									
1980 Seniors (HS&B) ^b	37	52	10	-	-	-	-	2	Within 1 year of high school graduation
N = 8203									
1992 Seniors (NELS 88) ^c	17	67	16	-	-	-	-	8	Within 7 months of high school graduation
N = 11366									
2002 Texas Seniors ^d	20	66	14	→	7	3	2	4	Same calendar year of high school graduation
N = 5836									

Note: Row percents may not add to 100 due to rounding - data not available

a. Eckland and Henderson, 1981 Table 1.1

b. Hearn, 1992 Table 1

c. Bozick and DeLuca, 2005

d. Texas Higher Education Opportunity Project, Senior Wave 1, 2 & 3 Data (THEOP); Row percent excludes 38 cases, unknown enrollment.

e. Data not available

Table 2. College Expectations and Four-Year Institution Enrollment by Delay Status (in percent)

	On-time Enrollee	All Delayed	All Delayed by Length of Delay ^a			
			One Semester	One Year	Two Years	Three/ Four Years
Percent Expected College Degree						
High School Senior Year (Wave 1) [N]	80 [3841]	57 [781]	- ^b	-	-	-
One Year After High School Graduation (Wave 2) [N]	88 [3841]	80 [781]	-	-	-	-
Four Years After High School Graduation (Wave 3) [N]	88 [2611]	79 [648]	83 [261]	76 [161]	78 [104]	82 [99]
Percent Ever Attended 4-year Institution						
Enrolled at Wave 3 [N]	65 [2755]	23 [663]	34 [272]	32 [165]	11 [104]	10 [99]

Source: Texas Higher Education Opportunity Project, Senior Wave 1, 2 & 3 Data

Note: Difference in case numbers for college expectations at Wave 3 and 4-year enrollment at Wave 3 is due to proxy cases;

a. For 23 cases month of enrollment is missing; these observations are excluded from analyses by length of delay.

b. - Not Applicable.

Table 3. Initial Postsecondary Pathway by Delay Status (in percent)

Initial Enrollment	On-time Enrollees	All Delayed	All Delayed Length of Delay ^a			
			One Semester	One Year	Two Years	Three/ Four Years
4-Year Institution	61	21	24	31	17	10
2-Year Institution	35	49	60	56	42	28
Vocational/Technical	5	29	15	12	41	61
<i>Column total</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>
[N]	[2755]	[663]	[272]	[165]	[104]	[99]

Source: Texas Higher Education Opportunity Project, Senior Wave 1, 2 & 3 Data

a. For 23 cases month of enrollment is missing; these observations are excluded from analyses by length of delay.

Table 4. Summary Statistics for Covariates [N in parenthesis]

	All Enrollees		All Delayed by Length of Delay				
	On-time	Delayed	One Semester	One Year	Two Years	Three/ Four Years	
			[3841]	[781]	[444]	[177]	[78]
Parental Education							
Less Than High School	0.12	0.20	0.19	0.15	0.22	0.29	
High School (reference)	0.18	0.25	0.21	0.24	0.24	0.22	
Some College	0.25	0.21	0.21	0.20	0.22	0.19	
College and Higher	0.30	0.17	0.19	0.21	0.13	0.03	
DK/Missing	0.15	0.17	0.20	0.20	0.19	0.27	
Home Ownership							
Rent	0.12	0.17	0.16	0.17	0.21	0.24	
Own (reference)	0.76	0.66	0.67	0.66	0.62	0.59	
Do Not Know/Missing	0.12	0.17	0.17	0.17	0.17	0.17	
First Thought About College							
Always (reference)	0.67	0.48	0.50	0.55	0.36	0.38	
Middle High School	0.11	0.15	0.15	0.15	0.15	0.14	
High School	0.13	0.20	0.18	0.15	0.35	0.29	
DK/Missing	0.09	0.17	0.17	0.15	0.14	0.19	
Race/Ethnicity							
Black	0.18	0.20	0.21	0.19	0.17	0.20	
Hispanic	0.29	0.43	0.41	0.35	0.56	0.57	
Asian	0.09	0.05	0.05	0.07	0.00	0.07	
White (reference)	0.42	0.30	0.38	0.43	0.27	0.19	
Other/Missing	0.02	0.02	0.02	0.03	0.00	0.04	
Sex							
Female	0.52	0.48	0.45	0.50	0.51	0.50	
High School Economic Status							
Affluent	0.29	0.19	0.20	0.19	0.19	0.16	
Average (reference)	0.62	0.69	0.67	0.73	0.72	0.72	
Poor	0.09	0.12	0.13	0.08	0.09	0.13	
Region							
SouthEast	0.43	0.47	0.46	0.47	0.64	0.41	
Class Rank							
Top Decile	0.22	0.07	0.07	0.12	0.03	0.03	
Second Decile	0.21	0.13	0.15	0.14	0.09	0.07	
Third Decile or Lower (reference)	0.57	0.80	0.78	0.74	0.88	0.90	
Testscore Information							
SAT Score	976	887	890	912	862	851	
(S.D.)	(193)	(157)	(165)	(152)	(144)	(123)	
SAT Imputed	0.24	0.52	0.48	0.44	0.60	0.71	
AP Course Taking							
Taken AP	0.53	0.34	0.34	0.39	0.31	0.26	
College-Going Peers							
Four or More College-Going friends	0.83	0.71	0.70	0.76	0.68	0.66	

Source: Texas Higher Education Opportunity Project, Senior Wave 1, 2 & 3 Data

Table 5. Marginal Effects of Delay on Bachelor Degree Expectation at Wave 3 [N=3259]

	(1)	(2)	(1a)	(2a)
All Delayed	-0.08 *	0.00	- ^b	-
	(.042)	(.024)		
Length of Delay ^a				
One Semester	- ^b	-	-0.05 *	0.02
			(.026)	(.020)
One Year	-	-	-0.10 **	-0.03
			(.039)	(.041)
Two Years	-	-	-0.09	-0.02
			(.073)	(.032)
Three/Four Years	-	-	-0.06	0.07
			(.082)	(.054)
W1 College Expectations	-	0.14 *** (.020)	-	0.14 *** (.019)
Covariates	No	Yes	No	Yes

Source: Texas Higher Education Opportunity Project, Senior Wave 1, 2 & 3 Data

Note: Covariates include race/ethnicity dummies, female, top decile dummy, second decile dummy, SAT score, SAT score imputed dummy, Taken AP dummy, have four or more friends planning to go to college in high school senior year, high school economic status dummies, south-east region dummy, parental education dummies, home ownership dummies, first thought about college dummies, college expectations in high school senior year.

a. For 23 cases month of enrollment is missing; these observations are excluded from analyses by length of delay.

b. Not Included

***p<0.001, **p<0.01, *p<0.05, †p<0.10

Table 6. Marginal Effects of Delay on Four-year College Enrollment at Wave 3 [N=3418]

	(1)	(2)	(3)	(4)	(1a)	(2a)	(3a)	(4a)
All Delayed	-0.40 *** (.038)	-0.17 *** (.025)	-0.17 *** (.027)	-0.09 *** (.020)	- ^b	-	-	-
Length of Delay ^a								
One Semester	- ^b	-	-	-	-0.28 *** (.032)	-0.11 *** (.023)	-0.10 *** (.030)	-0.03 (.023)
One Year	-	-	-	-	-0.30 *** (.054)	-0.13 ** (.047)	-0.15 *** (.045)	-0.09 * (.037)
Two Years	-	-	-	-	-0.57 *** (.079)	-0.35 *** (.074)	-0.33 *** (.054)	-0.24 *** (.041)
Three/Four Years	-	-	-	-	-0.58 *** (.091)	-0.14 ** (.050)	-0.27 *** (.056)	-0.09 † (.047)
W1 College Expectations	-	0.17 *** (.023)	-	0.12 *** (.023)	-	0.17 *** (.022)	-	0.11 *** (.021)
2-Yr Pathway	-	-	-0.38 *** (.013)	-0.26 *** (.020)	-	-	-0.38 *** (.015)	-0.26 *** (.020)
Vocational Pathway	-	-	-0.54 *** (.067)	-0.37 *** (.064)	-	-	-0.52 *** (.065)	-0.35 *** (.058)
Covariates	No	Yes	No	Yes	No	Yes	No	Yes

Source: Texas Higher Education Opportunity Project, Senior Wave 1, 2 & 3 Data

Note: Covariates include race/ethnicity dummies, female, top decile dummy, second decile dummy, SAT score, SAT score imputed dummy, Taken AP dummy, have four or more friends planning to go to college in high school senior year, high school economic status dummies, south-east region dummy, parental education dummies, home ownership dummies, first thought

a. For 23 cases month of enrollment is missing; these observations are excluded from analyses by length of delay.

b. Not Included

***p<0.001, **p<0.01, *p<0.05, †p<0.10

Appendix. Variable Definitions

Variable	Questionnaire Items and/or Operational Definitions
<u>Outcome Variables:</u>	
2006 College Expectations	"What is the highest level of education you think you will have completed <i>at age 30?</i> " BA or higher = 1, less than BA = 0
2006 Four-Year Enrollment Status	If students were enrolled at a 4-year post-secondary institution at Wave 3 = 1; Other enrollment or nonenrollment = 0
<u>Key Independent Variables</u>	
On-Time Enrollment	Same Calendar Year of high school graduation
Delayed Enrollment	First post-secondary enrollment after December 2002
Length of delay	
One Semester	First post-secondary enrollment between January and May 2003 (within 7 months post high school)
One Year	First post-secondary enrollment between June and December 2003
Two Years	First post-secondary enrollment in 2004
Three/Four Years	First post-secondary enrollment in 2005/2006
Senior Year Post-Secondary Expectations	"Realistically speaking, how far do you think you will go in school?" BA or higher = 1; less than BA = 0
Initial Enrollment	
4-Year Institution	First enrollment at a 4-year institution = 1
2-Year Institution	First enrollment at a 2-year institution = 1
Vocational/Technical institution	First enrollment at a vocational/technical institution = 1
<u>Covariates</u>	
Parental Education	Five categories: (1) Less than high school; (2) High school; (3) Some college; (4) College and higher; (5) Missing/Don't know Use mother's education level primarily and use father's education level if mother's is missing
Home Ownership	"Does your family own or rent the home you live in?" Three categories: (1) Own; (2) Rent; (3) Missing/Don't know
College Orientation	"When did you first think about going to college?" Four categories: (1) Always; (2) Middle high school; (3) High school; (4) Missing/Don't know
Race/Ethnicity	"What term best describes your racial and ethnic origin?" Five categories: (1) Black; (2) Hispanic; (3) Asian; (4) White; (5) Missing/Other
Sex	Female = 1; Male = 0
High School Economic Status	Percent of High School students ever economically disadvantaged (based on receipt of free or reduced price lunch) Three categories: (1) Affluent (lowest quartile); (2) Average (middle two quartile); (3) Poor (highest quartile)
Region	If high school located in South or East Texas = 1; Otherwise = 0
Class Rank	Self-reported class rank. Three Categories: (1) Top decile; (2) Second decile; (3) Third decile or lower
Testscore Information	
SAT Score	SAT scores, Missing test scores are replaced with converted ACT score if available or imputed using a broad set of variables
SAT Imputed	Yes=1, No=0
AP Course Taking	"Have you taken or are you currently taking any Advanced Placement (AP) course?" Yes = 1; No = 0
College-Going Peers	"About how many friends that you spend time with plan to go to college?" Four or more=1, Three or fewer=0

Source: Texas Higher Education Opportunity Project, Senior Wave 1, 2 & 3 Data