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ABSTRACT

Adult Education Attendance and Postsecondary Outcomes*

This paper analyzes postsecondary enrollment and academic outcomes for people who attended adult education classes in Georgia between July 2017 and December 2020, using linked administrative records for students in the state's adult education, technical college, and university systems. The paper estimates discrete-time hazard models of the time from when people start attending adult education classes until they enroll in a Georgia public postsecondary institution. The models consistently indicate that the probability of enrolling in a public postsecondary institution increases with the hours of adult education attendance and assessed skills. The paper also estimates regression models which show that the credit hours and grades adult learners earn in their first postsecondary enrollment terms increase with their previous hours of adult education class attendance.

JEL Classification: I23, J24

Keywords: adult basic skills education, demand for schooling, human capital, administrative data, event-history modeling

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Adult Education Attendance and Postsecondary Outcomes

1. Introduction

Obtaining postsecondary schooling is an important educational milestone for adults in the United States. Having a postsecondary degree increases people's knowledge and skills which directly benefit their and their families' well-being and open more job opportunities (e.g., Becker, 1993; Kallison, 2017; Perna, 2006; Reder, 2014). Despite this importance, many people do not enroll in postsecondary education (e.g., Perna, 2006), with low levels of academic skills being an especially high barrier.

In 2017, an estimated 48 million working-age adults in the United States had low English literacy skills, and 69 million had low numeracy skills (Institute for Education Sciences, 2022). Federally funded adult education programs, including adult basic education (ABE), adult secondary education (ASE), and English as a second language (ESL) classes, are intended to improve people's academic skills. By increasing skills, the programs are also intended to help adult learners pass high school equivalency (HSE) tests, improve their job opportunities, increase their quality of life, and enroll and succeed in postsecondary schooling (e.g., Greenberg, 2008).[1] These programs served over 1.3 million adults in the 2018-2019 school year, though enrollment has subsequently declined following the COVID-19 pandemic (Office of Career, Technical, and Adult Education, 2023).

Although adult education may open doors to postsecondary schooling, there are gaps in

[1] The federal law that supports adult education, Title II of the 2014 Workforce Innovation and Opportunity Act (WIOA), recognizes the importance of postsecondary education by including the percentages of adult education students who enroll in postsecondary credential programs or obtain recognized credentials as key performance measures.

our understanding of these effects (Rutschow, 2019). Economic research has focused on the completion of HSE credentials (Heckman, Humphries, & Mader, 2011; Heller & Mumma, 2018; Jepsen, Mueser, & Troske, 2017; Tyler & Loftstrom, 2010) and found that these credentials increase postsecondary enrollments. The research on HSE credentials provides some evidence about the value of adult education, but it includes people who pass HSE tests without attending adult education classes[2] and does not tell us how adult education affects postsecondary outcomes for people without HSE credentials.[3] Research has also found positive effects for specialized types of adult education programs, such as bridge programs that combine adult education and college academic classes (Martin & Broadus, 2013), and integrated education and training (IET) programs that combine adult education and occupational classes (Martinson, Cho, Gardner, & Glosser, 2018; Zeidenberg, Cho, & Jenkins, 2010). These are useful findings, but they do not tell us how general attendance in adult education classes affects postsecondary outcomes. To date, only two studies—Reder (2014) and Yin, Cronen, Condelli, & Ogut (2022)—have directly examined this linkage.

This study analyzes postsecondary enrollment for adult learners who attended ABE, ASE, and ESL classes in Georgia between July 2017 and December 2020, using linked administrative records for students in the state's adult education, technical college, and university systems. The study estimates discrete-time hazard models of the time from when people start attending adult education classes until they enroll in a Georgia public postsecondary institution. The

[2] McLaughlin, Skaggs, and Patterson (2009) reported that among a 2004 survey of GED test takers, 18 percent relied solely on self-study, 4 percent only took practice tests, and 7 percent took the test with no preparation at all.

[3] Many colleges have programs that allow people without a high school diploma or HSE credential to enroll in credit-bearing classes. Nearly a third of the adult education students we observe in Georgia who subsequently enroll in postsecondary institutions do so without a diploma or HSE credential.

models focus on the associations that people's hours of attendance in adult education classes and assessed skill attainments have with enrollment outcomes. Among adult education students who enroll in postsecondary institutions, the study also estimates models of their first-term academic outcomes. The study answers two research questions:

1. What are the public postsecondary enrollment and academic outcomes for Georgia's adult learners, and how do these outcomes vary with their hours of attendance in adult education classes, skills, and other characteristics?
2. How do learners' attainments within the adult education system, including skills gains and HSE credentials, mediate the associations of attendance hours with postsecondary outcomes?

This paper has several notable features. First, it investigates a nontraditional path toward postsecondary schooling—the adult education system—that has received less attention from researchers than other paths. Within that system, the paper examines the broad population of participants, including people from different demographic groups and contexts, and investigates attendance and skills gains for general sets of classes. Unlike research on narrower populations or more specialized programs, the results are more likely to be applicable to adult education programs broadly.

Second, the data come from administrative records that have detailed and accurate information on learners' adult education experiences, such as their enrollment dates, attendance hours, and skills tests outcomes, and postsecondary outcomes. The data are not subject to recall errors or other problems with self-reported data, such as social desirability bias and non-response. They also include much finer detail, such as the hours attended on particular

days and specific skills test results, than could be reliably reported in most surveys.

Third, the study utilizes event-history models that control for the ordering of events (i.e., attendance and skills gains that preceded possible postsecondary outcomes), allow us to compare the timing of adult education experiences with public postsecondary enrollments, and account for right-censoring of the data (i.e., people possibly enrolling after our observation window ends).

Finally, the study examines how skill attainments mediate the associations between adult education attendance and postsecondary outcomes. Logically, we expect longer attendance to contribute to higher levels of skills and possibly the attainment of HSE credentials, which could affect postsecondary outcomes. The study is able to investigate whether adult education attendance has additional associations with postsecondary outcomes beyond its possible effects on measured skills.

2. Previous Studies

The relationship between school attendance and educational outcomes has been investigated in many different contexts. Pischke (2007) found that an exogenous reduction in school-year length in Germany increased grade repetition and lowered enrollment in higher secondary tracks, and García and Weiss (2018) summarize and develop evidence of how chronic absenteeism reduces student performance. Attendance may be especially important in adult basic skills education because of the structure of the curriculum. Adult education classes frequently allow students to attend when they are able and allow students to work at their own pace. Also, students work toward skills goals (instead of grades or course credits) and may stop attending once a goal is met. Because of the individualized and self-paced nature of adult

education instruction, attendance is a key measure of engagement, and students' attendance hours are recorded and reported. WIOA-supported programs are required to report outcomes for students who attend 12 or more hours during the year. Georgia's program guidelines for skills testing and other procedures are also specified in terms of attendance hours.

Adult education research has mostly examined learners' attendance in the context of skills gains. Comings (2007), Condelli, Wrigley, and Yoon (2002), and Yin, Cronen, Condelli, and Ogut (2022) have reported positive associations between attendance and skills gains. Comings (2007) has further summarized research that indicates that approximately 100 hours of adult education attendance are required to advance one grade-level equivalent in skills.

Only a few studies have examined the associations between attendance in adult education classes and postsecondary outcomes. Using longitudinal survey data, Reder (2014) found that 100 hours of adult education attendance substantially increased postsecondary enrollments and credits among people who did not complete high school but that 150 hours of attendance only had slightly higher impacts. Using administrative adult education data from one midwestern state, Yin, Cronen, Condelli, and Ogut (2022) similarly found that adult education attendance hours were positively associated with postsecondary enrollments. They also found that students' classroom contexts played a role with full-time teachers and programs operating at community colleges being associated with more postsecondary enrollments.

Research on postsecondary outcomes for adult education students has more frequently focused on their skills and academic preparation either entering or leaving adult education. As mentioned, several economic studies, including Heller and Mumma (2018), Jepsen, Mueser, and Troske (2017), and Tyler and Loftstrom (2010), have found that people who do not finish

high school are more likely to enroll in postsecondary schooling if they obtain HSE credentials (see also the review by Heckman, Humphries, & Mader, 2011). Yin, Cronen, Condelli, and Ogut (2022) found that learners with higher initial skills test scores at entry into adult education programs were more likely to enroll in postsecondary schooling.

3. Theoretical and Empirical Model

3.1. Theoretical Model

We frame our analysis of adult learners' postsecondary enrollments within Perna's (2006) theoretical model of college access and choice. Perna's model incorporates elements of economists' rational human-capital approach (e.g., Becker, 1993) and sociologists' status attainment models. The rational components of Perna's synthesis consider how people weigh the benefits and costs of college attendance, while the sociological components consider the valuations people put on postsecondary schooling and people's personal and ecological contexts. Central to her model, people's postsecondary enrollment outcomes depend on their prior academic preparation and achievement, their economic resources, the costs of college, and the monetary and non-monetary benefits of college.

We adopt a simplified version of this model focusing on the role of academic preparation, or skills, in the public postsecondary enrollment decisions of a Georgia adult learner who is not initially enrolled in postsecondary education. Georgia's public postsecondary institutions operate on a semester schedule with school terms in the spring, summer, and fall. Accordingly, we model the person as making term-by-term enrollment decisions in which they choose at the end of each postsecondary school term, t, whether to enroll in public postsecondary institution in the next term, E_{t+1} (= 0, 1).

Following Perna (2006), we assume the person's choice is affected by their skills during the term, S_t, and by other observable characteristics, X_t. This leads to a (hazard) probability of transitioning from non-enrollment to enrollment, which we write as

$$\text{Prob}(E_{t+1}=1 \mid E_t=0) = f[S_t, X_t].$$

We further assume that skills are augmented through a value-added process that depends on the person's attendance in adult education classes, A_t, and other characteristics, Z_t, such that

$$S_t = S_{t-1} + v(A_t, Z_t).$$

Substituting the equation for skills augmentation into the enrollment model, the hazard becomes

$$\text{Prob}(E_{t+1}=1 \mid E_t=0) = f[(S_{t-1} + v(A_t, Z_t)), X_t].$$

The effects of skills and attendance hours on postsecondary enrollments in this model are ambiguous. On the one hand, higher skills and more attendance increase learners' academic preparation and chances for success in postsecondary education, which should increase the probability of enrollment. On the other hand, higher skills also increase learners' job opportunities and the opportunity cost of attending college, which could reduce enrollments. Two other implications of the model are that skills mediate the effects of attendance and that enrollment may depend on the history of attendance if skills are imperfectly measured.

While the theoretical model indicates that skills and attendance might causally affect postsecondary enrollments, Perna's model points to many aspects of learners' personal and ecological contexts, such as learners' knowledge about educational options and the local

availability of educational programs, that could mutually affect both adult education attendance and postsecondary enrollments. Theories of adult education, or andragogy (see, Knowles, 1980), emphasize additional aspects of behavior, including motivation (Gardner, Maietta, Gardner, & Perkins, 2021), that influence adult education attendance and postsecondary enrollments. More generally, adult education attendance is a behavioral (endogenous) outcome, and we need to interpret empirical associations with this in mind.

3.2. Empirical model

We implement an empirical version of this model, using a discrete-time logit hazard specification (see Allison 1982) of adult learners' term-by-term transitions into enrollment, starting with the term that they begin attending adult education classes. We model the hazard probability as

$$\text{Prob}(E_{t+1}=1|E_t=0) = \frac{\exp(\alpha D_t + \beta S_{t-1} + \gamma A_t + \delta Z_t + \theta X_t)}{1 + \exp(\alpha D_t + \beta S_{t-1} + \gamma A_t + \delta Z_t + \theta X_t)}$$

where D_t is a set of duration indicators and α, β, γ, δ, θ are sets of coefficients to be estimated.

The use of a hazard model allows us to examine not only whether enrollments occur but also when they occur. This, in turn, lets us examine how the timing of enrollments changes with the timing of attendance and other time-varying circumstances of learners. The hazard model also adjusts for learners being followed for different lengths of time in our data and having enrollment sequences that might be right-censored.

4. Data

Our study examines administrative records from three data systems that describe the universe of students in Georgia's public adult education and postsecondary systems:

1. The Georgia Adult Learners Information System, which describes class, enrollment, daily attendance, skills test results, and other characteristics of learners in adult education programs operated by the Georgia Office of Adult Education (GOAE) from July 2017 to December 2020;[4]
2. Data on term-by-term enrollments and other characteristics for students in the 22 technical colleges operated by the Technical College System of Georgia (TCSG) from Fall 2017 to Spring 2021; and
3. Data on term-by-term enrollments and other characteristics for students in the 26 universities and colleges operated by the University System of Georgia (USG) from Fall 2017 to Spring 2021.

The data have information that allow us to link people's records across systems and over time within each system.[5]

4.1. Postsecondary outcomes

For each postsecondary term from Fall 2017 until Spring 2021, we construct a binary indicator of whether a person both enrolled and attempted any hours for credit that term at a TCSG or USG institution. The measure ignores students who enrolled in a postsecondary institution without attempting any hours. In addition to enrollment, we measure the number of credit hours students attempt, the number of credits they earn, and their grade point average (GPA) in their first term of postsecondary enrollment.

[4] The Technical College System of Georgia (TCSG) is responsible for the state's technical colleges, adult basic skills programs, and workforce training programs. GOAE is a division within TCSG.

[5] Records are linked using a person identifier constructed by the data analysis team at the authors' institution. The authors only utilize deidentified data and do not access any personally identifying information.

4.2. Adult education measures

Adult education classes operate on different schedules. Although some classes follow postsecondary calendars, others do not. Because of this heterogeneity, the records do not have a term-by-term structure. However, they do have *daily* information about the hours that students attend classes. To align the adult education data with the postsecondary outcomes, we reorganize the adult education data into periods that correspond to postsecondary terms. We use the calendar days between January 1 and May 14 as the Spring term, the days between May 15 and August 14 as the Summer term, and the days between August 15 and December 31 as the Fall term. For each adult education student, we construct a consecutive sequence of "term" observations that starts with the "term" that a learner begins attending adult education classes and continues until the learner enrolls in a postsecondary institution or reaches the end of our observation window in Fall 2020. The sequence of observations can include periods when the student is not attending adult education classes. We describe our time periods as "terms" even though they occur before learners enroll in a postsecondary institution and adult education classes may follow a different schedule.

The adult education data include results from periodic skills assessments that are expressed as standardized Educational Functioning Levels (EFLs), which we use as our measures of academic skills.[6] EFLs are reported as adult basic education levels (ABE1-ABE4) that correspond to primary grade equivalents, adult secondary education levels (ASE1 and ASE2) that correspond to secondary grade equivalents, and English as a second language levels (ESL1-

[6] National Reporting System for Adult Education. "Test Benchmarks for NRS Educational Functioning Levels (EFL) (updated August 2019)." U.S. Department of Education, <https://nrsweb.org/resources/test-benchmarks-nrs-educational-functioning-levels-efl-updated-august-2019>, accessed Feb. 24, 2023.

ESL6, and a category Georgia uses for ESL exits, ESLX). We order the ABE, ASE, and ESL outcomes into eight categories that range from ESL1 to ASE2.

The enrollment decisions in our theoretical model are based on the skills a person has at the end of a term; however, the adult education test dates rarely align with the end dates of our periods or the last day of adult education attendance within these periods. There are also no test results after learners leave the adult education system. For our principal specifications, we measure the learner's skills entering the first model period, S_0, as their initial (entry) EFL and the learner's skills entering subsequent model periods, S_{t-1}, as the highest EFL that was recorded prior to that period. As an additional measure of skills, we construct a time-varying indicator of whether the person earned a HSE credential by the end of the term.

We measure hours of adult education attendance during the learner's first "term," A_1, as the hours attended between the first and last days of the "term," and we measure the incremental attendance during the subsequent periods, A_t, as the hours attended between the date that the last EFL was recorded prior to the start of the "term" and the last day of the "term." In some analyses, we also examine the cumulative hours that a student had attended adult education classes since their first day of classes.

Besides hours of attendance, a few researchers have emphasized additional dimensions of learners' attendance patterns, including intensity (Condelli et al., 2002) and persistence (Comings, 2007). In sensitivity analyses, we examine the average weekly hours of attendance in the weeks that learners attend classes as a measure of the intensity of attendance. We also examine the coefficient of variation of the weekly hours of attendance in the weeks that learners attend classes as a measure of the variability of attendance, and we examine the

number of gaps between learners' attendance spells to measure interruptions or discontinuities in attendance. We summarize the paper's key measures and their construction in Table 1.

[Table 1 about here]

4.3. Learner characteristics

Our measures of learner characteristics include demographic attributes (age, sex, race, and ethnicity), the highest level of education the learner reported completing before starting adult education classes, and indicators for whether the learner reports having a physical or learning disability or special needs, being employed, being a single parent, or being a U.S. citizen. For all these characteristics, we use values that the learner reports at the start of their enrollment in adult education.

4.4. Class and program characteristics

Each term, we create an indicator for whether the student attended any ABE, ASE, or ESL classes outside of a correctional or institutional (e.g., rehabilitation center) setting. For each class that the learner attends, we create indicators for whether the teacher is employed full-time and the teachers' years of experience. For students who attend multiple classes in a term, we average the indicators across classes. We also measure whether the learner's adult education provider is in the bottom, middle, or top third of provider organizations in terms of enrolled students and whether the organization is a technical college, community-based organization, or public school district. As with class characteristics, we average outcomes across organizations for learners who take classes at multiple organizations.

4.5. Data restrictions

For our analysis data set, we begin with the universe of 113,054 learners who attended

GAOE adult education classes between July 2017 and December 2020. We restrict our analyses to learners who took at least one ABE, ASE, or ESL class outside of a correctional or institutional setting in their first term of adult education attendance, dropping 18,615 learners. We next drop records for 330 learners who were enrolled in a public postsecondary institution during their first term of adult education attendance. Lastly, we drop observations for 1,753 learners who did not take skills tests (and who lack entry EFLs) in their first term of adult education attendance and for 51 other learners with missing values of the covariates. Our final data set for the event-history analyses has information for 92,305 adult learners who are followed for an average of seven terms (645,369 learner/term observations total). Of these learners, we observe 5,050, or 5.5 percent, who ever enroll in a TCSG or USG institution.

5. Results

5.1. Descriptive results

Figure 1 displays the Kaplan-Meier hazard probabilities (top panel) and cumulative hazard probabilities (bottom panel) of the time from the start of adult learners' attendance in adult education classes to their possible initial transitions into postsecondary enrollment. Just over one percent of learners enroll in a TCSG or USG institution following their first "term" of adult education attendance. The hazard increases to just nearly 1.2 percent two terms after starting adult education classes, but the hazard generally decreases with subsequent terms.

[Figure 1 about here]

The observed postsecondary enrollment rate of 5.5 percent in our data is affected by some learners only being followed for a short time (for example, learners who start the adult education classes in Fall 2020 only have information for one term). The cumulative hazard rate

uses the hazard probabilities to predict the percentages of learners who would enroll in public postsecondary institutions if they were followed for different periods of time. The cumulative hazard probabilities predict that 7.2 percent of learners would enroll in a public postsecondary institution by the end of the 11th term following their start of adult education.

Table 2 reports means of the explanatory variables in our analysis data set for the first term that the adult learners are observed. The first column in Table 2 reports statistics for all the learners in the data, and the second and third columns report statistics separately for the learners who are and are not observed to enroll in a TCSG or USG institution.

[Table 2 about here]

The first eight rows in Table 2 list the proportions of learners who enter Georgia's adult education system with different EFLs. Georgia's adult education system serves learners with a wide range of skills. The vast majority (94 percent) of learners begin adult education with skills that are assessed to be below a secondary-grade level (ABE4/ESL6 or lower), and 77 percent enter with skills that are assessed to be below a seventh-grade level (ABE3/ESL5 or lower). Learners who enter in the four lowest EFL groups are significantly under-represented in the postsecondary enrollment group, while learners who enter in the three highest EFL groups are over-represented.

A different indication of learners' initial skills is the schooling that they completed before starting adult education classes. Although the levels of assessed skills are low, 86 percent of learners report completing a high school grade, and just over a quarter report completing high school. Learners with more schooling are moderately over-represented among the learners who are observed to enroll in public postsecondary institutions.

Much of the previous research on learners' postsecondary enrollments has focused on the completion of a HSE credential. Eight percent of the learners in our data are observed to earn a HSE credential, and 46 percent of the learners who enroll in a postsecondary institution are observed to earn a HSE credential. However, this implies that slightly more than half the learners who enroll in a TCSG or USG institution *are not observed* to earn this credential, which points to the importance of studying a more general group of adult learners. It is possible that some learners do not seek a HSE credential because they already have a high school diploma. Also, some postsecondary tracks allow students to enroll without a high school diploma or credential. Sixty nine percent of learners who enroll in public postsecondary institutions have a HSE credential or report completing 12^{th} grade.

Women, Black people, and Hispanic people are over-represented among the set of adult learners. Women learners are more likely to enroll in postsecondary institutions, while Hispanic, Native American, Asian, and younger learners are less likely than other groups to enroll. Most learners attend adult education classes at sites operated by technical colleges, and these learners are more likely than learners at other sites to enroll in TCSG or USG institutions.

5.2. Results from multivariate analyses of enrollments

Table 3 reports the results from our discrete-time logistic hazard models of learners' enrollments in public postsecondary institutions. The coefficients from the models are hard to interpret because they enter the models nonlinearly. To help with interpretation, we calculate and report marginal effects of the explanatory variables on the hazard probability of enrollment. Except for the duration variables, we calculate the marginal effects using data from the first term of adult education attendance for each learner and calculate the average

marginal effects across all learners.

[Table 3 about here]

The first column in Table 3 lists results from a parsimonious model that only includes learners' cumulative attendance hours (expressed in hundreds of hours), entering EFLs, and a nonparametric specification of the duration since starting their adult education programs as explanatory variables. The estimates indicate that the hazard probability of enrolling in a public postsecondary institution increases as learners attend more hours of adult education classes. The estimated effect of 100 hours of adult education is 0.0021, or about a 20 percent increase in the probability of enrolling.

As expected, enrollments strongly increase with learners' entering skill levels. The probability of a learner who entered with an ASE2 EFL is 3.5 percentage points higher than the probability of a learner who entered with an ABE1 EFL. Like the descriptive results from Figure 1, the hazard probability of enrolling in a public postsecondary institution decreases with the number of terms that elapse after starting adult education classes, after the second term.

The second column of Table 3 lists results from a model that adds controls for whether the learner attended adult education classes during the term, the learners' personal characteristics, class and organization characteristics, term, and year. In this richer specification, cumulative hours and higher levels of skills at entry into adult education continue to be positively associated with public postsecondary enrollments. The hazard of postsecondary enrollment at the end of the term is also higher if learners attend adult education classes during the term, are women, have completed more schooling, have a full-time teacher, or are in their summer or fall terms. The hazard of postsecondary enrollment is lower if learners are

Black or Hispanic, are older, report special needs or a disability, are single parents, or attend adult education classes at a community-based organization or public-school-district site.

The third column of Table 3 lists results from a parsimonious model that aligns more closely with our theoretical specification. The model includes the learners' incremental hours of attendance in adult education since the last EFL that was recorded before the start of the term, the highest EFL they obtained before the start of the term, and the duration since starting adult education classes. Like the two previous models, hours of attendance in adult education classes and skills are positively associated with the hazard probability of public postsecondary enrollment and the number of terms since beginning adult education classes is negatively associated with enrollments.

The specification in the fourth column adds all the personal, class, organization, and calendar time controls that we considered in the second column. Additionally, the model includes a control for earning a HSE credential. Including these controls reduces the strength of the associations of incremental adult education attendance hours and skills beyond the ABE3/ESL6 level with public postsecondary enrollments, but significant positive associations remain. As expected, earning a HSE credential has a strong positive association with postsecondary enrollments; this association occurs even though the models also account for skills through EFLs. Many of the estimated associations for the other controls are similar to those from the specification in the second column. However, learners who are Black, employed, or citizens are estimated to be more likely to enroll in public postsecondary institutions, and learners who report special needs or disabilities are estimated to enroll at the same rate as other learners.

The specification in the last column of Table 3 reintroduces measures for the learner's cumulative attendance in adult education classes and initial skills. We expect the controls for the highest EFLs recorded prior to each term to mediate the associations from cumulative attendance and initial skills. However, residual associations may remain if the EFLs are imperfectly measured or if they do not capture all the aspects of skills that are relevant to postsecondary enrollments. The added variables are jointly significant, with cumulative attendance and initial EFLs of ABE1/ESL3 or higher each being positively associated with postsecondary enrollments. Incremental attendance and the highest EFLs before the start of the term also continue to be positively associated with postsecondary enrollments, though the estimated associations are weaker than in the previous model. Thus, learners' attained skill levels partially mediate the associations between attendance and postsecondary enrollments. The estimated associations from the other personal, class, organization, and calendar time controls do not change appreciably.

The association of attendance in adult education classes with postsecondary enrollments may differ with learners' skill levels. We examine this possibility in the first four columns Table 4, which re-estimates our final model from Table 3 separately for learners who entered adult education with EFLs of ABE 1-2 or ESL 3-4 (column 1), ABE 3-4 or ESL 5-6 (column 2), and ASE 1-2 or ESL X (column 3) and with 12 years of schooling (column 4). The incremental attendance measure is estimated to be positively associated with postsecondary enrollments for all four groups. Cumulative attendance is estimated to be significantly positively associated with postsecondary enrollments for the learners who entered with moderate and high EFLs and those who completed 12 years of schooling but not for the low EFL group. Attending adult

education classes during the term is estimated to be significantly positively associated with postsecondary enrollments for the two lower skill groups and for learners who completed 12 years of school but not for the highest EFL group. As an additional analysis, we also estimated models for learners who entered adult education with an ABE or ASE skill level (that is, we omitted learners who entered with ESL skill levels). The results for the ABE/ASE entrants (available upon request) are similar to the results from Table 3 for all learners.

[Table 4 about here]

Learners who began adult education after the start of the COVID-19 pandemic in the spring of 2020 may have also had different enrollment patterns than learners who attended classes before the pandemic. The fifth column of Table 4 lists marginal effects from enrollment models that are estimated for learners who began their adult education programs in Fall 2019 or earlier. The vast majority of learners in our analyses began their adult education programs before the COVID-19 pandemic, and the results for these learners are nearly identical to our general analyses.

5.3. Other academic outcomes

Table 5 reports coefficient estimates and standard errors of regression models of first-term attempted credit hours, earned credit hours, and GPAs for the learners who enrolled in TCSG and USG institutions. The models provide information about whether adult education attendance and skills are associated with learners' postsecondary academic success. The results indicate that learners' cumulative adult education attendance hours are negatively associated with the postsecondary hours they attempt but not associated with the credit hours they earn or their GPAs. In contrast, the hours learners attend in their last term of adult education are

positively associated with the postsecondary credit hours they earn and their GPAs. Learners who attended adult education classes in the term before their postsecondary enrollments attempt and earn fewer credit hours, while learners who complete a HSE attempt and earn more credit hours. Learners' entering and ending EFL levels are not associated with their first-term postsecondary academic outcomes.

[Table 5 about here]

5.4. Sensitivity analyses

We re-estimated our enrollment and academic outcome models adding more extensive controls for learners' adult education attendance experiences including the average hours they attended during the weeks with any attendance, the coefficient of variation of hours they attended during the weeks with any attendance, and the number of gaps in their attendance spells. The estimates (available upon request) indicate that average weekly hours of attendance and the coefficient of variation in weekly hours of attendance are positively associated with enrollment but not with other academic outcomes. The estimates also indicate that gaps in attendance are positively associated with the number of postsecondary hours that learners attempt in their first term of enrollment but not with other outcomes. Including measures for additional dimensions of attendance does not alter the estimated associations for attendance hours and skills from our simpler specifications.

We also re-estimated models restricting the data to learners who attended at least 12 hours of classes. Yin, Cronen, Condelli, and Ogut (2022) adopted this restriction, which corresponds to the hours at which learners are considered "participants" for federal reporting purposes. The results (available upon request) for the restricted group are very similar to the

results for the general set of learners.

Lastly, to address concerns about left-censoring in our data, we estimated models dropping learners who were taking classes at the beginning of our observation window in Summer 2017 and who may have been in an ongoing spell of adult education attendance. The results for the enrollment model are similar to those for the full data set. However, the estimates for attendance variables in the first-term course credit and GPA models are insignificant.

6. Conclusion

Postsecondary schooling in the United States is a gateway to increased economic and personal well-being (e.g., Becker, 1993; Kallison, 2017; Perna, 2006; Reder, 2014), but low levels of academic skills prevent many people from enrolling in college. Federally-funded adult education programs can improve attendees' academic skills and open the door to college. This study focuses on this nontraditional path to college to examine postsecondary enrollment and academic outcomes for people who attended adult education classes in Georgia. Specifically, it uses linked administrative data from the state's public adult education system, technical colleges, colleges, and universities to estimate multivariate event-history models of how adult learners' postsecondary enrollments are associated with their hours of attendance in adult education classes and assessed skills. It also estimates regression models of the credit hours and GPAs students earned in their first terms of postsecondary enrollment.

Our study is based on Perna's (2006) theoretical model of college access and choice. We hypothesize that adult education students' postsecondary enrollment is affected by their adult education attendance, academic skills, and other characteristics. Several of the study's results

support our choice of Perna's model and its applicability to adult education students. First, we find evidence that low levels of academic skills form a substantial barrier to adult education students' college entry. Only six percent of the students in our data enter adult education with skills that are at a secondary level, and 77 percent enter with skills that are assessed to be below a seventh-grade level. Consistent with these low average levels of academic skills, only 5.5 percent of the adult learners in our data are observed to enroll in public postsecondary institutions.

Second, postsecondary enrollments are higher for adult learners who attend more hours of adult education classes and attain more academic skills. The associations between attendance hours and postsecondary enrollments appear both when attendance hours are measured cumulatively from the start of a person's adult education program and when they are measured incrementally from the date of the person's last skills assessment. The results consistently appear for subgroups of learners, including learners who enter adult education with different levels of skills, with different educational backgrounds, and at different times. We likewise find positive associations of assessed skills regardless of whether they are measured at a person's entry into adult education or as the highest attainment prior to the period when they are considering their postsecondary enrollment.

Third, characteristics and contexts of adult education students are important. Adult learners who are women, are Black or Asian, enter adult education with more schooling, and attend classes with full-time teachers and at technical colleges have higher rates of public postsecondary enrollment than other students. Students who are Hispanic, are older, and have more experienced teachers have lower rates of public postsecondary enrollment. The results

for teacher and institution characteristics confirm several findings initially reported by Yin, Cronen, Condelli, & Ogut (2022).

Fourth (and unique to this study), higher skills attainments mediate some of the association between adult education attendance and postsecondary enrollments, but significant residual associations remain. The residual associations may occur because the tests that are used to measure skills are imperfect or only capture a few dimensions of skills. They could also occur if attendance is associated with motivation, access to educational facilities, non-cognitive skills, or other characteristics of learners that are not captured in our administrative data.

In addition to these results, we also find that adult education attendance is positively associated with the credit hours that learners complete and the GPAs they achieve in their first terms as postsecondary students. We find little association, however, between learners' academic skills and their first-term postsecondary outcomes.

Our study has several distinctive features. It focuses on a less-studied, nontraditional adult population—people who have participated in adult education classes before enrolling in postsecondary schooling. It uses administrative data with detailed and accurate measures of adult education attendance and testing outcomes. The data describe a large and diverse group of adult learners within a general set of adult education classes. The study's data and methods also allow us to examine adult education experiences that precede postsecondary enrollments or outcomes, reducing concerns about biases from reverse or mutual causality.

However, the study also has limitations that must be considered in evaluating the results. A key limitation is that adult education attendance and skills test results are behavioral

outcomes, and the associations that we estimate may reflect influences from unmeasured characteristics that affect adult education experiences and postsecondary outcomes. Although the learners in our study are diverse and representative of adult learners in Georgia, they may not be representative of learners in other states, and their outcomes may not generalize to other states' adult education programs. Our outcome variables are also limited to postsecondary enrollments in public institutions in Georgia and omit enrollments in private and out-of-state institutions. The final years of our data also occur during the COVID-19 pandemic.

One of the goals of federally funded adult education programs is to increase participants' postsecondary enrollments and academic success, and logically, we expect the programs to improve postsecondary outcomes through their effects on academic skills and preparation. Our findings of positive associations between attendance in general adult education classes and adult learners' postsecondary outcomes provide evidence that adult education programs work in ways that are both intended and expected.

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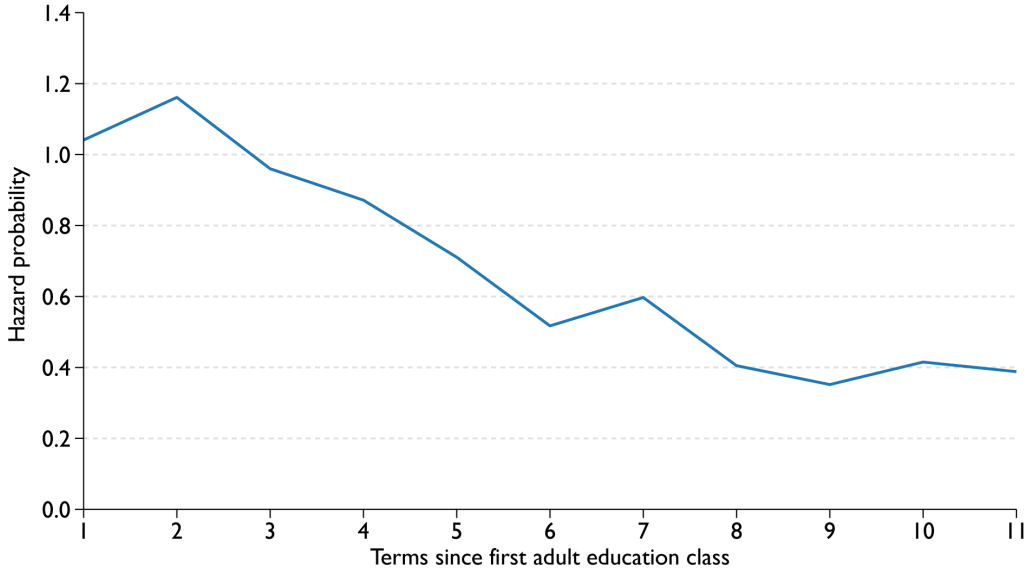
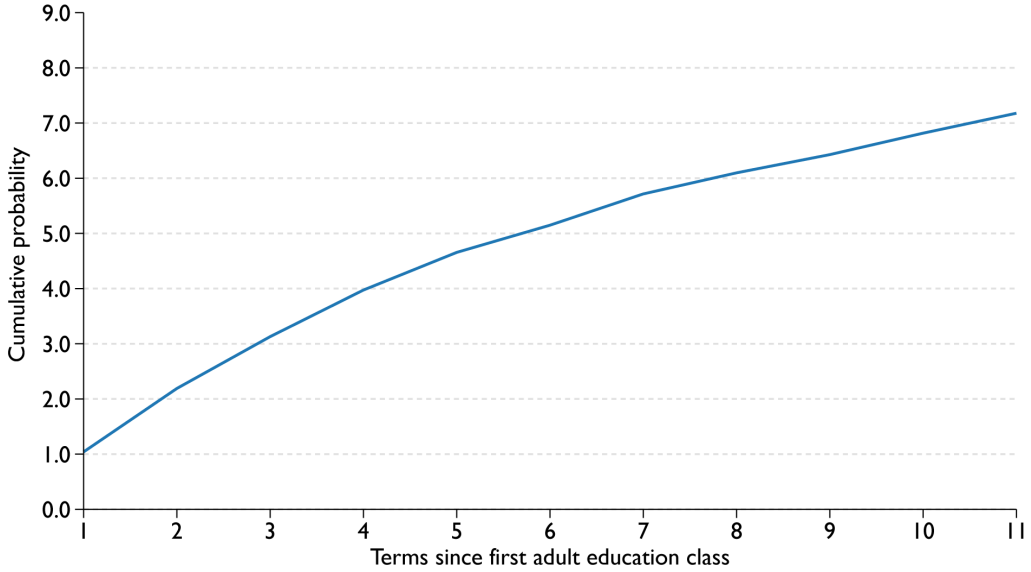
Figure 1. Kaplan-Meier Hazard and Cumulative Hazard Probabilities of Adult Learners' Initial Enrollments in Georgia Public Postsecondary Institutions

a. Hazard probabilities



b. Cumulative hazard



Notes: Authors' calculations using administrative records for 92,305 learners (645,369 learner/term observations) who (a) began attending TCSG adult education classes between July 2017 and December 2020, (b) initially attended an ASE, ABE, or ESL class, (c) had an entry EFL, and (d) were not initially co-enrolled in a TCSG or USG postsecondary institution.

Table 1. Construction of Key Measures

Measure	How the measure is constructed
Postsecondary enrollment	Any enrollment and attempted hours at a TCSG or USG institution between the first day of term *t*+1 and the last day of term *t*+1
Postsecondary academic outcomes	Learners' attempted hours, earned hours, and GPAs in the first term of enrollment if the enroll in a TCSG or USG institution
Skills	a. Entry EFL within term if $t = 1$ b. Highest EFL prior to term *t* if $t > 1$
Incremental attendance	Total hours and other measures of attendance in all adult education classes between a. the first day of term *t* and the last day of term *t* if $t = 1$ b. the last EFL assessment before term t and the last day of term *t* if $t > 1$
Cumulative attendance	Total hours attended in all adult education classes between the first day of term 1 and the last day of term *t*

Table 2. Average characteristics of learners at the start of adult education classes

	All learners	Never enrolled in a Georgia public postsecondary institution	Ever enrolled in a Georgia public postsecondary institution
Entering educational functioning level			
ESL1	0.06	0.06	0.00**
ESL2	0.07	0.07	0.01**
ABE1 or ESL3	0.07	0.07	0.02**
ABE2 or ESL4	0.27	0.28	0.12**
ABE3 or ESL5	0.31	0.31	0.32
ABE4 or ESL6	0.17	0.16	0.33**
ASE1 or ESLX	0.04	0.03	0.12**
ASE2	0.02	0.02	0.09**
Adult education attendance hours in term	30.93	30.32	41.32**
Mean attendance hours when attending	5.83	5.75	7.34**
CV for attendance hours when attending	0.38	0.38	0.42**
Gaps in adult education attendance	0.49	0.49	0.39**
Female	0.59	0.59	0.61**
White	0.44	0.44	0.50**
Native American	0.04	0.04	0.02**
Asian	0.08	0.08	0.05**
Black	0.40	0.40	0.39
Other or multiple race	0.04	0.04	0.04
Hispanic	0.21	0.21	0.10**
Age	30.36	30.69	24.59**
Did not complete high school	0.14	0.14	0.09**
Completed 9th grade	0.17	0.17	0.14**
Completed 10th grade	0.21	0.21	0.24**
Completed 11th grade	0.21	0.21	0.24**
Completed 12th grade	0.27	0.27	0.29**
Ever earned HSE credential [a]	0.08	0.06	0.46**
Completed 12^{th} grade or earned HSE [a]	0.34	0.32	0.69**
Reports special needs or disability	0.07	0.07	0.07
Employed	0.46	0.46	0.42**
Single parent	0.17	0.17	0.15**
Reports being a citizen	0.82	0.82	0.85**
Full-time teacher	0.50	0.49	0.59**
Teacher has <1 year of experience	0.11	0.11	0.10**
Teacher has 1-3 years of experience	0.23	0.23	0.23

Teacher has 4-10 years of experience	0.33	0.33	0.35**
Teacher has 10+ years of experience	0.33	0.33	0.31*
Small organization	0.10	0.10	0.12**
Medium organization	0.32	0.32	0.29**
Large organization	0.58	0.58	0.59
Community-based provider	0.05	0.05	0.01**
Public school district	0.10	0.10	0.05**
Technical college provider	0.86	0.85	0.94**
Fall	0.39	0.39	0.33**
Spring	0.31	0.31	0.29**
Summer	0.30	0.30	0.39**
2017	0.29	0.29	0.40**
2018	0.31	0.31	0.36**
2019	0.27	0.27	0.20**
2020	0.13	0.13	0.04**
Number of learners	92,305	87,255	5,050

Notes: Authors' calculations of means of learners' characteristics, using administrative records for learners who (a) began attending TCSG adult education classes between July 2017 and December 2020, (b) initially attended an ASE, ABE, or ESL class, (c) had an entry EFL, and (d) were not initially co-enrolled in a TCSG or USG postsecondary institution. Except as noted, characteristics are measured when the learner initially attended adult education classes.

[a] Measures whether the learner was ever observed earning a HSE credential.

* Means for never- and ever-enrolled students different at $p<0.05$ level.

** Means for never- and ever-enrolled students different at $p<0.01$ level.

Table 3. Marginal effects from hazard models of adult learners' initial postsecondary enrollments

	(1)	(2)	(3)	(4)	(5)
Cumulative adult education hours attend (/100)	0.0021*** (0.0001)	0.0022*** (0.0001)			0.0007*** (0.0001)
Incremental adult education hours attended (/100)			0.0052*** (0.0003)	0.0038*** (0.0003)	0.0029*** (0.0003)
Attended adult education classes this term		0.0027*** (0.0003)		0.0032*** (0.0003)	0.0030*** (0.0003)
Entering EFL					
ESL 2	0.0010*** (0.0002)	0.0011*** (0.0003)			0.0032 (0.0017)
ABE 1 or ESL 3	0.0026*** (0.0003)	0.0026*** (0.0004)			0.0036* (0.0015)
ABE 2 or ESL 4	0.0046*** (0.0003)	0.0043*** (0.0003)			0.0071*** (0.0015)
ABE 3 or ESL 5	0.0105*** (0.0004)	0.0096*** (0.0004)			0.0075*** (0.0015)
ABE 4 or ESL 6	0.0193*** (0.0007)	0.0172*** (0.0007)			0.0074*** (0.0015)
ASE 1 or ESL X	0.0312*** (0.0016)	0.0261*** (0.0014)			0.0071*** (0.0016)
ASE 2	0.0382*** (0.0022)	0.0321*** (0.0019)			0.0067*** (0.0017)
Highest EFL before start of term					
ESL 2			0.0003 (0.0002)	0.0004 (0.0004)	-0.0004 (0.0014)
ABE 1 or ESL 3			0.0025*** (0.0004)	0.0035*** (0.0006)	0.0040* (0.0016)
ABE 2 or ESL 4			0.0042*** (0.0003)	0.0055*** (0.0005)	0.0038** (0.0014)
ABE 3 or ESL 5			0.0101*** (0.0004)	0.0105*** (0.0005)	0.0082*** (0.0014)
ABE 4 or ESL 6			0.0201*** (0.0008)	0.0144*** (0.0007)	0.0117*** (0.0016)
ASE 1 or ESL X			0.0354*** (0.0016)	0.0175*** (0.0010)	0.0147*** (0.0018)
ASE 2			0.0449*** (0.0022)	0.0170*** (0.0011)	0.0150*** (0.0021)
Earned high school equivalency credential				0.0706*** (0.0031)	0.0707*** (0.0031)

Terms since starting adult ed.					
2	0.0006	0.0019***	-0.0008	-0.0013**	-0.0014**
	(0.0005)	(0.0006)	(0.0005)	(0.0005)	(0.0005)
3	-0.0015***	-0.0001	-0.0031***	-0.0029***	-0.0031***
	(0.0005)	(0.0006)	(0.0004)	(0.0005)	(0.0005)
4	-0.0026***	-0.0013*	-0.0040***	-0.0037***	-0.0039***
	(0.0004)	(0.0006)	(0.0004)	(0.0005)	(0.0005)
5	-0.0044***	-0.0031***	-0.0054***	-0.0049***	-0.0051***
	(0.0004)	(0.0006)	(0.0004)	(0.0005)	(0.0005)
6	-0.0062***	-0.0053***	-0.0069***	-0.0064***	-0.0066***
	(0.0004)	(0.0005)	(0.0004)	(0.0004)	(0.0004)
7	-0.0058***	-0.0052***	-0.0064***	-0.0061***	-0.0063***
	(0.0004)	(0.0005)	(0.0004)	(0.0005)	(0.0005)
8	-0.0074***	-0.0067***	-0.0078***	-0.0072***	-0.0074***
	(0.0004)	(0.0005)	(0.0004)	(0.0004)	(0.0004)
9	-0.0079***	-0.0069***	-0.0081***	-0.0074***	-0.0075***
	(0.0004)	(0.0005)	(0.0004)	(0.0005)	(0.0005)
10	-0.0077***	-0.0075***	-0.0078***	-0.0076***	-0.0078***
	(0.0004)	(0.0005)	(0.0004)	(0.0005)	(0.0005)
11	-0.0083***	-0.0077***	-0.0082***	-0.0073***	-0.0076***
	(0.0005)	(0.0006)	(0.0005)	(0.0006)	(0.0006)
Female		0.0027***		0.0031***	0.0032***
		(0.0003)		(0.0003)	(0.0003)
Native American		-0.0009		-0.0000	-0.0001
		(0.0011)		(0.0010)	(0.0010)
Asian		0.0005		0.0019*	0.0021**
		(0.0008)		(0.0008)	(0.0008)
Black		-0.0008*		0.0025***	0.0024***
		(0.0003)		(0.0004)	(0.0004)
Other race or multi-racial		-0.0021**		-0.0005	-0.0006
		(0.0006)		(0.0006)	(0.0006)
Hispanic		-0.0047***		-0.0036***	-0.0035***
		(0.0004)		(0.0004)	(0.0004)
Age		-0.0005***		-0.0003***	-0.0003***
		(0.0000)		(0.0000)	(0.0000)
Completed 9th grade		-0.0000		-0.0004	-0.0003
		(0.0004)		(0.0005)	(0.0004)
Completed 10th grade		0.0014**		0.0004	0.0005
		(0.0004)		(0.0004)	(0.0004)
Completed 11th grade		0.0027***		0.0013**	0.0014**
		(0.0005)		(0.0005)	(0.0005)
Completed 12th grade		0.0132***		0.0148***	0.0150***
		(0.0008)		(0.0009)	(0.0009)

Reports special needs or disability	-0.0016**	0.0002	-0.0000
	(0.0005)	(0.0006)	(0.0006)
Employed	-0.0003	0.0010**	0.0010**
	(0.0003)	(0.0003)	(0.0003)
Single parent	-0.0014***	-0.0001	-0.0001
	(0.0004)	(0.0004)	(0.0004)
U.S. citizen	0.0002	0.0012**	0.0011**
	(0.0004)	(0.0004)	(0.0004)
Full-time teacher	0.0037***	0.0025***	0.0024***
	(0.0004)	(0.0004)	(0.0004)
Teacher with 1-3 years of experience	0.0006	-0.0011	-0.0011
	(0.0006)	(0.0006)	(0.0006)
Teacher with 4-10 years of experience	0.0010	0.0002	0.0002
	(0.0006)	(0.0006)	(0.0006)
Teacher with 10 or more years of experience	-0.0015*	-0.0022***	-0.0021***
	(0.0006)	(0.0006)	(0.0006)
Small organization	0.0008	0.0011*	0.0010*
	(0.0005)	(0.0005)	(0.0005)
Medium organization	-0.0007	0.0001	0.0000
	(0.0003)	(0.0003)	(0.0003)
Community-based organization	-0.0042*	-0.0055**	-0.0052**
	(0.0018)	(0.0018)	(0.0018)
Public school district	-0.0053***	-0.0066***	-0.0066***
	(0.0007)	(0.0007)	(0.0007)
Summer term	0.0096***	0.0104***	0.0103***
	(0.0004)	(0.0005)	(0.0005)
Fall term	0.0063***	0.0059***	0.0059***
	(0.0004)	(0.0004)	(0.0004)
2018	0.0015**	0.0002	0.0002
	(0.0005)	(0.0006)	(0.0006)
2019	0.0031***	0.0009	0.0007
	(0.0006)	(0.0006)	(0.0006)
2020	0.0020**	-0.0002	-0.0003
	(0.0007)	(0.0007)	(0.0007)

Notes: Average marginal effects calculated from logit hazard models of first postsecondary enrollments estimated using administrative records for 92,305 learners (645,369 learner/term observations) who (a) began attending TCSG adult education classes between July 2017 and December 2020, (b) initially attended an ASE, ABE, or ESL class, (c) had an entry EFL, and (d) were not initially co-enrolled in a TCSG or USG postsecondary institution. Except for the duration variables, the marginal effects are calculated in learners' first period of adult education attendance. Standard errors are shown in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4. Selected marginal effects of adult learners' initial public postsecondary enrollments estimated separately for different entering characteristics

	Learner entered adult education				
	With ABE 1-2 or ESL 3-4	With ABE 3-4 or ESL 5-6	With ASE 1-2 or ESL X	With 12 years of schooling	Before Spring 2020
Cumulative adult education hours attend (/100)	0.0002	0.0008***	0.0031*	0.0008*	0.0007***
	(0.0002)	(0.0002)	(0.0013)	(0.0004)	(0.0001)
Incremental adult education hours attended (/100)	0.0016***	0.0040***	0.0072*	0.0035***	0.0029***
	(0.0004)	(0.0005)	(0.0031)	(0.0009)	(0.0003)
Attended adult education classes this term	0.0013***	0.0047***	0.0043	0.0038**	0.0030***
	(0.0004)	(0.0005)	(0.0039)	(0.0012)	(0.0004)
Entering EFL					
ESL 2				0.0069	0.0033
				(0.0062)	(0.0017)
ABE 1 or ESL 3				0.0040	0.0036*
				(0.0060)	(0.0016)
ABE 2 or ESL 4	0.0021**			0.0092	0.0073***
	(0.0007)			(0.0059)	(0.0015)
ABE 3 or ESL 5				0.0108	0.0077***
				(0.0060)	(0.0015)
ABE 4 or ESL 6		0.0005		0.0067	0.0075***
		(0.0008)		(0.0062)	(0.0015)
ASE 1 or ESL X				0.0064	0.0071***
				(0.0065)	(0.0016)
ASE 2			0.0003	0.0063	0.0067***
			(0.0060)	(0.0071)	(0.0017)
Highest EFL before start of term					
ESL 2				-0.0024	-0.0007
				(0.0094)	(0.0015)
ABE 1 or ESL 3				0.0173*	0.0037*
				(0.0087)	(0.0017)
ABE 2 or ESL 4	-0.0009			0.0188*	0.0037*
	(0.0011)			(0.0086)	(0.0015)
ABE 3 or ESL 5	0.0009			0.0234**	0.0080***
	(0.0013)			(0.0087)	(0.0015)
ABE 4 or ESL 6	0.0018	0.0027**		0.0289**	0.0117***
	(0.0016)	(0.0009)		(0.0088)	(0.0017)
ASE 1 or ESL X	0.0074**	0.0038**		0.0328***	0.0147***
	(0.0028)	(0.0013)		(0.0090)	(0.0019)
ASE 2	0.0090	0.0058**	0.0016	0.0294**	0.0152***
	(0.0049)	(0.0018)	(0.0061)	(0.0094)	(0.0022)

Earned high school equivalency credential	0.0757*** (0.0092)	0.1024*** (0.0052)	0.1065*** (0.0093)	0.0273*** (0.0017)	0.0713*** (0.0032)
Learners	31,259	43,888	5,519	24,662	80,468

Notes: Average marginal effects calculated from logit hazard models of first postsecondary enrollments estimated using administrative records for learners with the listed entering characteristics who (a) began attending TCSG adult education classes between July 2017 and December 2020, (b) initially attended an ASE, ABE, or ESL class, (c) had an entry EFL, and (d) were not initially co-enrolled in a TCSG or USG postsecondary institution. Models include the personal, class, organization, and calendar date controls from column 5 of Table 3. Except for the duration variables, the marginal effects are calculated in learners' first period of adult education attendance. Standard errors are shown in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5. Regression models of academic outcomes for adult learners in their first term of public postsecondary enrollment

	Attempted hours	Earned hours	GPA
Cumulative adult education hours attend (/100)	-0.166*	0.027	0.034
	(0.065)	(0.082)	(0.027)
Incremental adult education hours attended (/100)	0.097	0.373*	0.170***
	(0.122)	(0.146)	(0.047)
Attended adult education classes in term prior to enrolling	-0.646***	-0.461*	-0.039
	(0.142)	(0.179)	(0.058)
Entering EFL			
ESL 2	2.036	2.379	0.114
	(1.376)	(1.352)	(0.597)
ABE 1 or ESL 3	2.276	1.023	-0.773
	(1.377)	(1.338)	(0.586)
ABE 2 or ESL 4	1.702	1.376	-0.437
	(1.301)	(1.262)	(0.581)
ABE 3 or ESL 5	1.882	1.391	-0.448
	(1.289)	(1.248)	(0.578)
ABE 4 or ESL 6	2.363	1.632	-0.477
	(1.300)	(1.262)	(0.582)
ASE 1 or ESL X	2.568	1.809	-0.491
	(1.316)	(1.286)	(0.591)
ASE 2	2.566	1.468	-0.579
	(1.338)	(1.321)	(0.597)
Highest EFL prior to enrolling			
ESL 2	-0.285	-1.753	0.671
	(2.250)	(2.239)	(0.864)
ABE 1/ESL 3	-1.338	0.304	1.424
	(1.987)	(2.161)	(0.817)
ABE 2/ESL 4	-1.471	-1.324	0.711
	(1.903)	(2.091)	(0.811)
ABE 3/ESL 5	-1.377	-0.662	1.028
	(1.886)	(2.072)	(0.806)
ABE 4/ESL 6	-1.350	-0.407	1.160
	(1.891)	(2.078)	(0.809)
ASE 1/ESL X	-1.499	-0.682	1.182
	(1.899)	(2.087)	(0.815)
ASE 2	-1.308	0.187	1.455
	(1.912)	(2.104)	(0.817)
Earned high school equivalency credential	1.220***	0.962***	0.047
	(0.118)	(0.146)	(0.048)

Terms since starting adult educ.			
2	0.424*	-0.119	-0.172*
	(0.178)	(0.214)	(0.071)
3	0.265	-0.403	-0.208*
	(0.217)	(0.262)	(0.087)
4	0.121	-0.788**	-0.328***
	(0.231)	(0.285)	(0.094)
5	0.046	-1.151***	-0.499***
	(0.255)	(0.312)	(0.102)
6	-0.139	-0.976**	-0.332**
	(0.280)	(0.347)	(0.114)
7	0.132	-0.600	-0.225
	(0.311)	(0.375)	(0.121)
8	-0.394	-1.136**	-0.386**
	(0.345)	(0.434)	(0.141)
9	0.005	-0.795	-0.319*
	(0.381)	(0.449)	(0.155)
10	-0.340	-1.044*	-0.417*
	(0.382)	(0.530)	(0.176)
11	0.559	-1.278	-0.692**
	(0.497)	(0.695)	(0.242)
Female	-0.376***	-0.107	0.106*
	(0.112)	(0.137)	(0.043)
Native American	0.153	-0.602	-0.280
	(0.380)	(0.498)	(0.152)
Asian	0.336	0.524	0.303***
	(0.277)	(0.286)	(0.091)
Black	-0.217	-0.871***	-0.339***
	(0.119)	(0.148)	(0.048)
Other race or multi-racial	0.309	-0.050	-0.097
	(0.257)	(0.326)	(0.102)
Hispanic	-0.088	0.009	0.129
	(0.188)	(0.229)	(0.073)
Age	-0.013*	0.037***	0.022***
	(0.006)	(0.007)	(0.002)
Reports special needs or disability	-0.239	-0.291	-0.128
	(0.202)	(0.246)	(0.079)
Employed	-0.247*	0.219	0.135**
	(0.107)	(0.130)	(0.042)
Single parent	-0.149	-0.635***	-0.264***
	(0.147)	(0.180)	(0.060)
U.S. citizen	-0.237	-0.011	0.034
	(0.149)	(0.196)	(0.061)
Completed 9th grade	-0.497*	-0.218	-0.135

	(0.211)	(0.275)	(0.088)
Completed 10th grade	-0.090	-0.073	-0.088
	(0.198)	(0.255)	(0.081)
Completed 11th grade	-0.263	-0.064	-0.125
	(0.195)	(0.253)	(0.081)
Completed 12th grade	0.052	0.609*	0.123
	(0.196)	(0.252)	(0.082)
Full-time teacher	-0.009	-0.055	-0.001
	(0.126)	(0.156)	(0.050)
Teacher with 1-3 years of experience	-0.206	-0.307	-0.094
	(0.216)	(0.279)	(0.090)
Teacher with 4-10 years of experience	-0.382	-0.187	-0.006
	(0.205)	(0.265)	(0.085)
Teacher with 10 or more years of experience	0.116	0.215	0.046
	(0.208)	(0.268)	(0.086)
Small organization	0.920***	0.996***	0.175**
	(0.166)	(0.208)	(0.064)
Medium organization	0.338**	0.300*	-0.038
	(0.118)	(0.150)	(0.049)
Community-based organization	-0.403	-0.762	-0.070
	(0.660)	(0.702)	(0.257)
Public school	0.023	-0.253	-0.088
	(0.231)	(0.292)	(0.093)
Summer term	2.180***	1.568***	0.045
	(0.143)	(0.172)	(0.062)
Fall term	1.880***	1.435***	0.135*
	(0.148)	(0.176)	(0.064)
2018	0.192	0.174	-0.067
	(0.209)	(0.240)	(0.079)
2019	0.301	0.683**	0.057
	(0.218)	(0.253)	(0.084)
2020	0.226	0.386	0.092
	(0.242)	(0.282)	(0.092)
R^2	0.119	0.071	0.082

Notes: The table lists coefficients and standard errors (in parentheses) from regression models estimated using administrative records for 5,050 learners who (a) began attending TCSG adult education classes between July 2017 and December 2020, (b) initially attended an ASE, ABE, or ESL class, (c) had an entry EFL, (d) were not initially co-enrolled in a TCSG or USG postsecondary institution, and subsequently enrolled in a TCSG or USG institution.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$