Keeping the PROMISE: Factors Affecting Timing to Merit Scholarship Loss

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ABSTRACT

Despite increased attention paid to the advent and development of state merit scholarship policies (such as Georgia's Helping Outstanding Pupils Educationally) and some evidence that suggests differences in scholarship retention by socioeconomic status or other student characteristics, little empirical work has explored factors affecting scholarship retention. Moreover, no work has explored what affects the timing of scholarship loss. This study employs event history modeling to ascertain not only what factors impact students' retention of the West Virginia PROMISE Scholarship but also when these factors are most influential.

Key words: Merit aid, event history analysis, educational attainment, financial aid

INTRODUCTION

Since the early 1990s, numerous states have implemented broad merit-based state higher education scholarships. According to the National Association of State Student Grant and Aid Programs' (NASSGAP, 2013) 30 states have state merit-based programs. These scholarships vary in qualification and retention criteria, award amounts, and funding sources among other things, but share the core purposes of staunching brain drain from the state, increasing access to college, and increasing academic achievement of students (Domina, 2014). There is a growing body of evidence that merit aid programs promote college success and completion (Zhang & Ness, 2010).   However, critics of these programs have pointed to the large numbers of students who lose these scholarships before completing their degrees. Furthermore, systematic inequities in who maintains the scholarship and reaps its benefits could exacerbate the fact that these scholarships have already been shown to flow disproportionately to more advantaged students (Heller & Marin, 2002, 2004). The large state investments in these programs (more than $1.9 billion for the 2011–2012 academic year according to the National Association of State Student Grant Aid Programs' annual report on state-sponsored student financial aid (2013)) coupled with the push by the federal administration and others to focus on college completion, make it important to understand factors that contribute to scholarship loss and thereby mediate the efficacy of state merit aid in promoting college access and success.

Using event history analysis, this study examines the predictors of students losing West Virginia's Providing Real Opportunities to Maximize In-State Student Excellence (PROMISE) Scholarship. The PROMISE Scholarship began as a full-tuition-and-fees

scholarship for recent West Virginia high school graduates who earned a 3.0 core and overall high school GPA as well as achieved a minimum composite ACT score of 21.[1]

The scholarship can be renewed for eight total semesters of payment so long as students earn 30 credits per year and earn a 2.75 GPA in college their first year and maintain a 3.0 cumulative GPA thereafter (CFWV.com, 2015). West Virginia's program is an appropriate state to study since it has been around long enough to evaluate retention for a full four years, it is annually awarded to about 20% of the states' high school graduates, and as a full-tuition- and-fees scholarship can provide information about predictors of loss where the motivation would be the highest to retain the scholarship.

Literature Review

State merit aid programs have been the focus of much research into their intended as well as unintended effects (Baum & Schwartz, 1988; Doyle, 2006; Dynarski, 2004). Given that many of these programs are ostensibly designed to increase college going rates, much of the research on merit aid has focused on whether the scholarships increase access to

college. Georgia's HOPE was found to have increased enrollment in the state's colleges by 5.9%, with most of this effect at four-year schools (Cornwell, Mustard, & Sridhar, 2006). However, this increase was mostly the result of students being diverted from out-of-state to in-state institutions, not new entrants (Cornwell, Mustard, & Sridhar, 2006). Another study, however, found that HOPE increased the college-going rate of all eighteen - to nineteen-year-olds by about 7% (Dynarski, 2000). Although New Mexico's Legislative Lottery Scholarship was found to have increased four-year college enrollments, Binder and Ganderton (2002) found that this increase represented a shift in enrollment patterns from community colleges to four-year institutions, not an increase in overall access.

Some research on merit aid access outcomes has focused less on overall access and more on the differential effect on particular groups of students. Heller and Marin (2002) point to the "negative social consequences" of merit aid since these programs provide funding to many students who already could afford college and planned to attend. Conversely, research indicates that low-income and minority students are less likely to be eligible for this assistance in Georgia (Cornwell & Mustard, 2004), Massachusetts (Heller, 2004), New Mexico (Binder & Ganderton, 2004), Tennessee (Anderson & Wright, 2007), and across multiple states (Farrell, 2004). The high

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[1] Since implementation of the program, the ACT scores required to earn the scholarship have been raised three times to contain costs and now stand at requiring a composite score of 22 with a minimum score on each subject test of 20. Beginning with the high school class of 2010, the award is no longer full tuition and fees but the lesser of full tuition and fees or $4,750 per year.

school one attends has also been shown to affect receipt of Georgia's HOPE. As Cornwell and Mustard (2004) note, students who attend a large high school, or one with more African American, Hispanic, or low-income students, are less likely to receive the scholarship.

Research on the effect of different qualifying criteria has shown that increasing the academic cutoffs or tightening calculation methods excludes more minority, low-income, limited English-proficiency, and disabled students from scholarship eligibility (Cornwell & Mustard, 2004; Ledbetter & Seligman, 2003; Heller, 2004). The constriction of opportunity for low-income students is exacerbated by the fact that states choosing to venture down the merit-aid path tend to do so overwhelmingly to the detriment of need-based grants (Heller, 2002).

Research on actual enrollment of minorities and low-income students due to merit aid has been mixed. One study on Georgia's HOPE found that the scholarship had a larger positive effect on African American enrollment than for whites (Cornwell, Mustard, & Sridhar, 2006). Yet, another study using different data found that the HOPE increased inequality in college attendance between African American and white students (Dynarski, 2000). Singell, Waddell, and Curs (2006) found that the number of needy (Pell-eligible) students enrolled in

college in Georgia increased after HOPE relative to other southern states at both two-year and four-year institutions, but increases were larger at less-selective institutions.

While increasing access to college is an aim of these programs, their ultimate goal is not merely access to, but success in, college. A number of different college success metrics have been used. A few studies have had negative or non-significant findings. Cornwell, Lee, and Mustard (2005) found that prior to policy changes to deter just such behavior, HOPE decreased full-load course-taking and increased course withdrawals at the University of Georgia, particularly among students on the margin of scholarship retention. A study of engineering students in Florida found that although merit aid students had higher GPAs, they also tended to take fewer credit hours and were more likely to leave engineering (Ahang, Min, Frillman, Anderson, & Ohland, 2006). Binder and Ganderton (2004) found that the inception of the merit aid program in New Mexico did not induce appreciable changes in either retention or hours earned by students. More studies, however, have found positive effects. Henry, Rubenstein, and Bugler (2004) found using a sample of students from all public Georgia institutions that HOPE students earned more credits hours, achieved slightly higher GPAs, and were more likely to graduate in four years. In addition, students at four-year institutions were more likely to

persist. Hernandez-Julian (2010) found that South Carolina's LIFE scholarship contributed to higher GPAs for men but not women. Penn and Kyle (2007) found that the Tennessee Education Lottery Scholarship had a small positive effect on retention of continuing students. With regard to actual completion, Dynarski (2008) found that the implementation of merit aid programs in Georgia and Arkansas resulted in a three percentage point increase in college completion of an associate's degree or higher with stronger effects for women. Similarly, Scott-Clayton (2010) found that West Virginia PROMISE recipients were more likely to complete a bachelor's degree in four-years than similar students just before the implementation of the program. She attributed this gain to the incentive the scholarship provides for students to take a full load of courses and maintain a minimum GPA.

Most of this research on merit aid and college outcomes models only initial eligibility for the scholarships and does not take into account the fact that many students lose eligibility as soon as the second year. For example, of the 3,555 PROMISE Scholars who began college in the fall of 2002, 75% retained the scholarship to the second year, 60% to the third year, and 52% to the fourth year. Similarly in Tennessee, for the fall 2004 cohort, half kept the award for the second year, 36% for the third, and 32% for the fourth

(Tennessee Higher Education Commission, 2008). To the extent that merit aid effects on educational outcomes are due to the actual benefits of the financial award (allowing a student to register for more hours, work fewer hours, afford an institution which is a better fit, etc.), and not due only to the honor of being named a scholar, then loss of the scholarship would affect estimates of program effects that extend beyond the first year of college attendance. For example, Henry et al. (2004) found that at four-year institutions, advantages for Georgia HOPE scholars in retention and graduation were only significant for those students who maintained their eligibility and the positive differences in GPA and credit earning were lower for those who lost the scholarship. In fact, students who kept HOPE earned 50 more credit hours, on average, than those who lost it.

To maximize positive program effects and protect both state scholarship and student investment, it is important to understand who is most likely to lose the scholarship and why. A few studies have contributed to this understanding. Wright and Anderson (2007) showed that even controlling for high school GPA and ACT score, which predictably increase the chances of scholarship retention, Black students and students from lower income families were more likely to lose the Tennessee scholarship in the second year. Furthermore, more students who qualified for the scholarship only through high school

GPA, rather than through their ACT score or both lost the scholarship. Interestingly, of those students who lost the scholarship, Black students as well as higher income students, were more likely to re-enroll. Dee and Jackson (1999) found no significant differences by race but did find that students majoring in science, engineering, and computing were more likely to lose Georgia's HOPE Scholarship than students in other majors. They pointed to the inequity here for students majoring in subjects where higher grades are more difficult to earn and the incentive this inequity may provide for students to not major in these fields. Another study of Georgia students found that students who lost the HOPE were less likely to have used recommended financial management practices and had higher credit card and student debt than those who retained the scholarship (Dynarski, 2000). This study does not imply causality in either direction but suggests that those students who lose the scholarship may be more financially vulnerable.

These studies of factors related to state merit scholarship loss leave out variables shown in other studies to be related to college persistence and completion. First, in addition to high school GPA and ACT score, academic preparation level is also indicated by whether students require remediation in college and whether students have earned college credits while in high school. Given that campuses

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vary widely in size, mission, resources, and peer composition, it is important to assess the extent to which these variables may be related to scholarship loss. Academic momentum variables such as declaring a major, semester GPA and transferring to another institution have been shown to shape college attainment and therefore likely affect scholarship loss. Finally, student costs at different institutions, as well as their levels of financial aid, may be related as none of the state merit aid scholarships cover expenses beyond tuition, fees, and in a few cases, books. Finally, given that students can lose the scholarship at different points in time and that many of these predictors can change values over the course of a student's college career, it is necessary to use modeling techniques that can accommodate the longitudinal nature of the data as well as differing effects of the predictors over time.

The research question addressed by this study is:

For first-time, first-year students receiving a full tuition and fees state merit scholarship in a state system of public, four-year institutions, what are the demographic, academic preparation, institution, college enrollment, and cost and financial aid predictors of losing eligibility for that scholarship at any time prior to exhausting full benefits?

Conceptual Model
Our conceptual model rests on approaches developed in the study of student departure from higher education. Specifically, we utilize a student adjustment framework (Nora & Cabrera, 1994) to guide empirical analysis of timing to scholarship loss. The student adjustment model hypothesizes that students' experiences at postsecondary institutions occur in social and academic domains. The social domain is comprised of interactions with students, staff, and faculty that are informal in nature. Academic interactions are similar to those in the social domain, but are characterized by a greater degree of formality, such as structured co-curricular activities lead by student affairs staff or academic courses taught by faculty. Experiences in both domains are thought to propel the affective and intellectual development of the student that in turn affects institutional and goal (i.e., earning a degree) commitment. Moreover, experiences in the social and academic

domains are seen as interdependent and intertwined. Pre-college ability, external factors (such as ability-to-pay or parental encouragement), academic and intellectual development, and academic and social integration are all components of the student adjustment model (Nora & Cabrera, 1994). Similarly, we hypothesize that students' retention of the scholarship is affected by students' experiences in academic and social domains that in turn affect goal commitment. Scholarship loss may result from failing to enroll in school without an approved leave, in which case, the student adjustment theoretical approach to departure directly applies. Scholarship loss may also result from failure to complete the requisite number of credits or grade point average each year. These intermediate academic outcomes are assumed to be shaped not only by academic interactions and development but also by social interactions and development, prior ability, and external factors. We discuss the operationalization of our conceptual model in greater detail below.

A challenge in conducting this analysis is the relative paucity of empirical and conceptual work on loss of merit scholarships. Prior research demonstrates factors such as academic preparation play a role in students' initially receiving scholarships. However, with the exception of a study (Dee & Jackson, 1999) of factors affecting loss of the Georgia HOPE scholarship, our review of the

literature yielded no other studies similar to this one. Additional conceptual and empirical work is necessary to assess the extent to which the student adjustment model is a valid framework to guide empirical analysis.

Empirical Model

The outcome of interest is whether a student lost the PROMISE Scholarship. Loss of PROMISE can occur through not enrolling in school without obtaining a leave, not maintaining adequate academic progress defined as achieving a 2.75 GPA the first year and a 3.0 cumulative GPA thereafter, or not earning 30 credit hours each year. Once a student loses the Scholarship, it cannot be regained except if lost under extraordinary circumstances, and then, only through an appeals process. Therefore, a student has permanently exited the sample once the event of interest has occurred. Of the 2,530 PROMISE recipients, about 48% (n=1,216) lost their Scholarship prior to graduation. Variables included in the models were based on the conceptual model as well as prior research. They included measures of (a) student characteristics, (b) academic preparation, (c) enrollment characteristics, (d) institutional context (including both social and academic domains), and (e) cost and financial aid. Table 1 (see page 38) lists each construct as well as how it was operationalized in our empirical models.

Student Characteristics

Student background variables shown in previous research to shape college outcomes and included here are gender, race/ethnicity, and economic disadvantage. Economic disadvantage is a composite variable defined by the West Virginia Higher Education Policy Commission (WVHEPC) and applies to any student whose (a) parent(s), or guardian is a recipient of public assistance; (b) is institutionalized or under State guardianship; or (c) qualifies by virtue of a needs test for federal or state needs-based assistance.

Academic Preparation

Academic preparation has also been shown to be strongly related to postsecondary educational attainment. Thus we have included students' composite ACT scores (or an SAT equivalent), high school grade point average (GPA), and the number of college credits that students earned while in high school, and whether the student was noted as academically disadvantaged. This category refers, in this population, to students who were required to take developmental education.

Enrollment Characteristics

Once a student is enrolled in college, their decisions and actions are hypothesized to shape retention of the scholarship. These variables are students' decisions to enroll in a public two-year college rather than a four-year institution, transferring to another

Table 1

Operationalization of Timing-to-Scholarship Loss Model

Variable		Definition
Dependent Variables		
Loss of PROMISE Scholarship		The first fall during which the student was not reported as receiving PROMISE Scholarship funds (1=yes, 0=no)
Student characteristics		
Female		Gender reported by institution (1=female, 0=male)
White		Any person having origins in any of the original peoples of Europe, the Middle East, or North Africa as white (1=yes, 0=no). All students from a racial/ethnic minority serve as the reference category.
Economically disadvantaged		Refers to any of the following: (a) the student, parent(s), or guardian of the student is a recipient of public assistance; (b) the student is institutionalized or under State guardianship; (c) the student qualifies by virtue of a needs test for federal or state need-based aid. (1=yes, 0=no)
Academic preparation		
ACT Score		Composite ACT score reported by institution. If student only took SAT, combined score has been converted to ACT score via SAT/ACT concordance available at: http://www.act.org/solutions/college-career-readiness/compare-act-sat/#.UHLpmq52NEM
High school GPA		Student's high school Grade Point Average on a 4.0 scale.
College credits earned in high school		Total college hours a student earned while in high school.
Academically disadvantaged		Refers to a student requiring developmental education as determined by college admissions tests or institution specific test. (1=yes, 0=no)
Enrollment Characteristics		
Enrolled in community and technical college		Student enrolled at one of the state's community and technical colleges as opposed to a public, four-year institution. (1=yes, 0=no)
Transferred		Student transferred from another institution
Declared major		Student had a designated major (1=yes, 0=no)
STEM major		Student was enrolled as a STEM major during any term examined. (1=yes, 0=no)
Institutional Context		
Institutional selectivity		Average percent of applicants admitted during years analyzed. Community and technical colleges assumed 100%.
% Institution Pell recipients		Percent of institution's undergraduate headcount enrollment that are Pell recipients that academic year.
% Institution Racial/Ethnic Minority		Percent of institution's undergraduate headcount enrollment that are Black, Hispanic, Asian or Pacific Islander or American Indian/Alaskan Native that academic year.
Instructional expenditures		IPEDS data on expenses of the colleges, schools, departments, and other instructional divisions of the institution and expenses for departmental research and public service that are not separately budgeted.
Academic support expenditures		IPEDS data on expenses of activities and services that support the institution's primary missions of instruction, research, and public service.
Student services expenditures		IPEDS data on expenses for admissions, registrar activities, and activities whose primary purpose is to contribute to students emotional and physical well - being and to their intellectual, cultural, and social development outside the context of the formal instructional program.
Cost and Financial Aid		
Subsidized loans		Dollar amount of federal subsidized loans.
Unsubsidized loans		Dollar amount of all unsubsidized loans (federal, state, institutional and other).
Semester Tuition and Fees		Tuition and mandatory fees
Unmet need		Tuition and mandatory fees plus a local cost of living estimate minus all forms of grant aid.

institution, declaring one's major, and being a science, technology, engineering, or mathematics (STEM) major. Because students often begin rigorous related course sequences prior to formally declaring a STEM major, we have operationalized this variable as whether a student was ever a STEM major to capture the effect of being in a STEM trajectory even prior to declaration.

Institutional Context

It is also hypothesized that various institutional characteristics shape the likelihood of a student losing his or her PROMISE Scholarship. The first of these is the size of the institution's enrollment (small, medium, or large). Next are a group of variables that shape the peer effects present on a campus: institution selectivity (percent admitted), and the percent of enrollment that are Pell recipients or that are from a racial/ethnic minority group. Finally, we model institutions' expenditures in three areas to determine their relationship to scholarship loss: instruction, academic support, and student services. Expenditures in these areas may promote student success and thereby student retention of their award.

Cost and Financial Aid

The final grouping of variables follows from extensive research showing relationships between student costs and financial aid on the one hand and college retention and completion on the other. We extend these findings to explore the relationship of cost and academic scholarship retention. We explore the effect of the amount of tuition and mandatory fees, or, given that the award is equal to full tuition and fees, the award value. We include net cost of attendance which is tuition and fees plus a local cost of living estimate minus total grant aid received. And finally, we test the effect of both federal subsidized loans and all unsubsidized loans on award loss.

Methodology

While educational attainment has long been acknowledged to be a temporal process (Tinto, 1982; St. John, Cabrera, Nora, & Asker, 2000), until recently most research has employed static cross-sectional analyses (DesJardins et al., 2002a). Scholars have begun adapting event history techniques used in other fields to the study of higher education (e.g., Chen and DesJardins, 2008; DesJardins, 2003; DesJardins et al., 2002a, 2002b; DesJardins, Ahlburg, and McCall, 2006; Ishitani, 2006). Event history analysis (EHA) is a group of techniques that use longitudinal data to estimate the influence of relevant variables on the likelihood of events of interest (Allison, 1984). EHA explicitly incorporates the temporal dimension in estimating coefficients and the overall fit of the model, while allowing for variation from time period to time period in explanatory variables. For a more detailed discussion of the use of event history techniques in

studying educational attainment, see DesJardins (2003).

Data

Data for this study come from the West Virginia Higher Education Policy Commission (WVHEPC) which maintains a statewide longitudinal data system (SLDS) consisting of student information systems (SIS) data from each institution. SIS data are collected at the student level for enrollment-related transactions—for example, courses taken, grades received, race, ethnicity, and all other information necessary for institutional business. These data include information on standardized testing; academic preparation; and any financial aid from institutional, state, and federal sources. SIS data represent the universe of students enrolled in public postsecondary institutions for students attending any public postsecondary institution in the state. Financial aid information includes award amounts by type of aid as well as source of aid (institution, state, federal government) for each academic year. Institutional data regarding enrollment, racial composition, and selectivity were collected from the Integrated Postsecondary Data System (IPEDS). The institutional proportion of students receiving a Pell grant was calculated from WVHEPC data. Institutional expenditures were obtained from annual institution financial statements available on the WVHEPC website.

Sample

The sample consisted of first-time, in-state, degree-seeking freshmen who enrolled in public baccalaureate degree-granting institutions in West Virginia in the fall term of 2002 and who received the PROMISE Scholarship (N=2,593). Given the absence of information on students' educational aspirations and consistent with prior research (Adelman, 2006) students were included only if they were seeking a bachelor's degree and earned six or more credits during the first fall/spring academic year. Students were tracked for four years, each fall and spring term for a total of eight possible observations per student.

Method

A series of discrete-time models were estimated in Stata/MP version 12.1 with time (t) measured in academic semesters. Discrete-time models are appropriate in instances where time is measured in discrete units and when many events of interest occur at the same time (i.e., are tied) (Allison, 1984; DesJardins, 2003; Singer & Willett, 2003). Equation 1 denotes the general form of the model where $h_i(t)$ represents the hazard for observation i at time t. The five blocks of variables from the conceptual model (academic preparation, student background, academic domain, social domain, and financial aid) are represented by x_1 through x_5. To account for clustering of students by campus and multiple observations per

student (as is common in person-period data files), standard errors were estimated using the *vce(cluster)* option in Stata.

Equation 1.
General Form of Discrete-Time Survival Model

$$\text{logit}h(t_j) = \begin{array}{l}[\alpha_1 D_1 + \alpha_2 D_2 + \dots + \alpha_7 D_7] + \\ [\beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5]\end{array}$$

All time-varying variables were measured each semester except for financial aid amounts. Annualized financial aid data were split evenly across the terms in which a student enrolled for each academic year. Several assumptions underlie the event history model employed here. First, the discrete-time proportional model assumes that the ratio of the hazard for any two individuals is constant and is not dependent on time. However, discrete-time event history models are model robust to violations of the proportional hazards assumption (Allison, 1984). Analysis of the Schoenfeld residuals indicated that our models violate this assumption (χ^2=82.93, df=19, p-value<0.001).

A second assumption is that the covariates are measured without error and that no covariates that affect the hazard have been omitted from the model. In the limitations section, we discuss concerns regarding unobserved differences with respect to self-selection. As Cellini (2008) notes, endogeneity—caused by reverse causality or

self-selection bias within models—limits our ability to make causal inference. Absent controlled experimentation, it is difficult to discern to what extent unobserved student characteristics, such as motivation, affect the outcomes of interest. Selection bias can be particularly thorny in the study of merit aid because students may self-select at key points along their educational trajectory. For example, prior to entering college, institutional offers of aid may affect which institution a student attends, initial commitment to that institution, and subsequent decisions to re-enroll (Singell, 2004). Moreover, some scholarships are awarded only to students whose propensity to apply for aid may be indicative of underlying (and unmeasured) characteristics. Applying for aid is hypothesized to be related to factors such as motivation, parental encouragement, and access to information about college (DesJardins, 2001)—all of which can affect propensity to persist. For more detailed discussion on selection bias and financial aid research see Alon (2005) Deming & Dynarski (2009), Dowd (2006), or Titus (2007).

Two steps were taken to address unobserved differences that may affect the outcomes of interest. Key variables were lagged to reduce the effects of reverse causality. For example, loan amounts from the first year were used to predict likelihood of exit during the second year. This helps eliminate the question of

whether enrollment lead to taking out loans or taking out loans lead to enrollment. Conceptually using lagged variables also makes sense. What a student does and experiences one year affects what happens the following year. Moreover, this helps eliminate issues of state dependence in our explanatory variables.

Second, we estimated a series of frailty models. Frailty models are the event history equivalent of a random effects model, which assumes unmeasured covariates introduce heterogeneity (Wienke, 2003). As a check of robustness, we estimated parametric (normal as well as gamma mixture distribution), as has been done in prior research (e.g., Chen & DesJardins, 2010). Finally, it is worth noting that because our analysis focuses on timing to scholarship loss, we eliminate an element of self-selection.

Our third and final assumption is that censoring is unrelated to the event of interest. Censoring occurs in EHA when complete information about survival time is unavailable (Leung, Elashoff, & Afifi, 1997). If the censoring mechanism is unobserved and related to the outcome of interest, our results are likely to be biased. We address left censoring (i.e., students who began college before our observation period) by including only first-time, first-year entrants in the sample. Right censoring occurs when student do not experience the event of interest by the

end of the observation period (i.e., losing the PROMISE Scholarship). For the purpose of this study, we assume independent censoring with respect to right censoring. That is, survival time to scholarship loss is independent of observations being censored. Students are considered censored at the time of scholarship loss.

Analysis

In total, three models were run with different assumptions regarding hazard and with respect to the students included. Following estimation of the main proportional hazards model, an analysis of the Schoenfeld residuals indicated that the hazard was non-proportional (i.e., varied over time with respect to the baseline hazard) for high school GPA, college semester GPA, institutional selectivity, Higher Education Grant Program (HEGP) receipt, and unmet need. Although Allison (1984) notes that discrete-time models are robust to violation of the proportionality assumption, we ran a non-proportional model in which these variables were interacted with a linear function of time. In addition, as a robustness check, we ran a third model that excluded students who lost PROMISE during the middle of an academic year (n=62). These students lost the Scholarship due to dropping out of school in between terms, not due to failure to meet renewal requirements at the end-of-year progress checks. We hypothesize that this may be due to a variety of reasons (e.g., obtaining a job, pregnancy) dissimilar

from those shaping PROMISE loss due to not maintaining eligibility requirements. Finally, we estimate a frailty model which assumes unmeasured covariates introduce heterogeneity (Wienke, 2003). As a check of robustness, we estimated parametric (gamma mixture distribution) frailty model, as has been done in prior research (e.g., Chen & DesJardins, 2010). The frailty model was not statistically different from the main model. Overall, results from these three models did not differ substantively from those of the main model, therefore we focus our discussion on the main model (additional details regarding the other models are available on request).

Limitations
Before considering the findings, it is important to acknowledge some limitations of this work. This study is limited by its examination of only one cohort of students. Later cohorts should be examined as data permits because the scholarship criteria have risen and this may affect the relationship between predictors and scholarship loss. The study is also limited in its study of one state. West Virginia is a unique state and the PROMISE is a unique program and thus the findings here may not be generalizable to other settings and other scholarships and grants.   The study would also benefit from the addition of data regarding the rigor of high school preparation as well as income of all participants. High school GPA, ACT

scores, and an economic disadvantage variable are employed here because they are available for all students. Despite these limitations, the study provides important insights into the demographic, academic, financial, and institutional factors shaping merit scholarship loss over time.

Empirical Results

Descriptives
Table 2 (see page 44) provides descriptive information on the sample of 2,530 PROMISE recipients in their first term of enrollment. Over half of the sample is female (57.2%) and 97.1% is white. By comparison, whites made up 95% of the full cohort of in-state first-time, first-year students at these institutions as well as the overall population of West Virginia (U.S. Census Bureau, 2009). Twenty-four percent of PROMISE recipients are characterized as economically disadvantaged meaning that they have qualified for need-based assistance such as a Pell grant or that the student or his/her parents or guardians have qualified for public assistance. This compares with 31% for the full student cohort. The proportion of students classified as academically disadvantaged due to being enrolled in remedial courses is 6.1% (for this cohort of students, there were not minimum subject test requirements so students could qualify for the scholarship with their composite ACT but still need remediation in a subject). The average high school GPA was a

Table 2

Sample characteristics by scholarship loss, first year enrolled

Variable	Full Sample	Students Retained PROMISE	Students Lost PROMISE
		Percentage/Mean (S.D.)	
N	2,591	1,313 (50.7%)	1,278 (49.3%)
Demographic Characteristics			
Female	57.2%	61.5%	52.7%
White	97.1%	97.9%	96.2%
Economically Disadvantaged	24.0%	19.8%	28.2%
Academic Preparation			
Academically Disadvantaged	6.1%	4.5%	7.7%
High School GPA	3.68 (0.271)	3.75 (0.250)	3.61 (0.271)
Composite ACT	24.4 (2.872)	24.9 (2.978)	23.8 (2.660)
College credits in H.S.	5.16 (6.597)	6.11 (7.083)	4.2 (5.903)
Institution Variables			
Percent Admitted	87.1 (7.72)	87.8 (6.93)	86.4 (8.39)
Percent Non-white	6.8 (1.90)	6.6 (1.63)	7.0 (2.12)
Percent Pell	28.2 (6.72)	27.9 (6.59)	28.5 (6.83)
Instruction Expenditures	5,271 (1178)	5358(1156)	5,181 (1194)
Academic Support Expenditures	1,058 (290)	1,077 (281)	1037(297)
Student Services Expenditures	838 (145)	836 (137)	841 (154)
Declared Major	83.1%	83.6%	82.6%
STEM Major	26.5%	25.1%	28.0%
Semester GPA	2.99 (0.922)	3.30 (0.831)	2.66 (0.897)
Full-Time Student	100.0%	100.0%	100.0%
Cost and Financial Aid			
Semester Tuition and Fees	1,535 (89.4)	1,541 (89.9)	1,530 (88.4)
Receiving Higher Education Grant	22.4%	18.8%	26.1%
Subsidized Loan Amount ($)	120 (335)	95 (309)	145 (358)
Unsubsidized Loan Amount ($)	336 (782)	271 (695)	40 2(857)
Unmet need ($)	3,189 (1325)	3,098 (1288)	3,283 (1356)

3.68; the average ACT score was 24.4; and the average number of college credits earned in high school was 5.16. In the first term, 73.2% of students were in large institutions (defined as undergraduate student body of more than 8,000) and 8.8% were in small institutions (up to 3,000 undergraduates) with the remaining 18.1% in medium-sized institutions (3,000-8,000 undergraduate students). No students were at community colleges in the first term by definition of the sample. The average percent of applicants admitted at their institution was 87.1; percent of non-white students at the institution was 6.8; and percent of students that received Pell at the institution was 28.2. Regarding academic progress variables, 83% of these students had declared a major and a quarter (26.6%) were designated as STEM majors. By definition of the sample as first-time freshmen scholarship recipients, no students were transfers in this first-term but we model transfer status in later time periods.

In terms of costs and financial aid, average semester tuition and fees was about $1,535. The average subsidized loan amount for the semester (with those students not taking out loans included in the calculation) was $120 while the average unsubsidized loan amount was $340. The average amount of unmet need was $3,190.

The second and third columns of Table 3 show the same descriptive data for the populations of PROMISE recipients who retained the scholarship for the full eight terms (or graduated earlier) and those who ever lost it. About half of student (49.3%) lost the scholarship prior to graduating during the time period studied. Compared with students who kept the PROMISE, students who lost the scholarship consisted of fewer female and white students and more economically and academically disadvantaged students. Predictably, students who lost the scholarship had lower high school GPAs, composite, ACTs, and college credits earned in high school. Fewer of them were at large institutions and more were at small and medium size institutions. There was very little difference in the institutions attended in terms of selectivity or demographic composition. However, students who lost the scholarship were at institutions with lower instructional and academic support expenditures, based on data reported to the Integrated Postsecondary Education Data System. A slightly lower proportion of students who lost the scholarship had declared a major in their first term but a slightly higher proportion ever became STEM majors. These students had a semester GPA their first term 0.64 lower than those students who retained the scholarship. While there was little difference in tuition and fees, a larger proportion of students who lost the scholarship were receiving the Higher Education Grant and these students had higher subsidized and unsubsidized loans as

well as unmet need. Overall the students who lost the scholarship were more likely to be disadvantaged economically with lower academic preparation levels attending schools that spent less on instruction and academic support. Though these students had lower tuition, they had higher loans and net cost. None of these descriptives are very surprising. What remains to be seen is which of these predictors contribute to scholarship loss controlling for the other independent variables and how that relationship might vary over time.

Descriptive Findings for Event Patterns

Descriptive analysis shows that losing PROMISE was most common at the end of the first (n=679) and second years (n=389) of enrollment (See Table 2). Students losing the award in the third, fifth, and seventh terms coincides with the academic progress checks conducted after each year of enrollment to determine renewal eligibility. By the end of the study period, about 49% of students had lost their Scholarship. The incidence rate (i.e., average proportion of students losing the Scholarship across all periods) was about nine percent.

Table 3
Kaplan-Meier Survival Estimates,
Timing to PROMISE Loss.

Term	Beginning Total	Lost Scholarship	Net Lost	Survivor Function	Standard Error
2	2593	27	0	0.9896	0.0020
3	2566	679	0	0.7277	0.0087
4	1887	18	0	0.7208	0.0088
5	1869	389	0	0.5708	0.0097
6	1480	9	0	0.5673	0.0097
7	1471	148	0	0.5102	0.0098
8	1323	8	1315	0.5071	0.0098

Differences emerged with respect to likelihood of Scholarship loss by gender, economic advantage, and academic advantage. A Log-Rank test for equality of Scholarship loss survivor functions confirms the conclusion that there is a significant difference with respect to likelihood of PROMISE loss and gender, race/ethnicity, socioeconomic status, and academic preparation.

Table 4
Equality of Survivor Functions

Variable	Test			
	Log-Rank	Wilcoxon	Tarone-Ware	Peto-Peto
Economic Disadvantage	27.89	28.1	28.17	28.58
Academic Disadvantage	11.34	9.41	10.36	10.2
Female	20.79	19.6	20.34	20.15
White	7.89	7.27	7.62	7.54

Note. χ^2 values shown. Values significant at the 0.01 level.

Of course, bivariate analysis does not control for the complex set of factors that affect students' propensity to lose the Scholarship. We consider next findings from the inferential models.

Inferential findings

Overall, we find that students were most likely to lose the scholarship at the end of their second year of enrollment compared to losing it after their freshman year, controlling for all else. There was no significant difference in the likelihood of losing the scholarship at the end of the first or third year. We discuss findings for each conceptual block of variables next.

Student background

Once we control for academic preparation, college contexts, college enrollment characteristics, and financial aid, we find that women are still less likely than men to lose the scholarship (see Table 5 on page 48). There was no significant difference in losing the scholarship for white students compared to students of color, although some caution is warranted in these results given the small numbers of racial/ethnic minority students who received the scholarship. Socioeconomic status was not significantly related to likelihood of PROMISE loss. Academic disadvantage (i.e., taking developmental education) was related to increased likelihood of losing the scholarship.

Academic preparation

As might be expected, given the academic criteria necessary to obtain and retain the Scholarship, the academic preparation variables were significantly related to losing the PROMISE. Specifically, an increase in ACT composite score as well as high school GPA was associated with decreased likelihood of losing PROMISE. Furthermore, having earned college credits in high school was related to lower likelihood of losing the award.

College enrollment characteristics

Few of the behaviors of students once enrolled in college were related to PROMISE loss in the final model, controlling for student background, academic preparation, institutional context and financial aid. Being a STEM major was weakly (at the 0.10 level of significance) associated with increased likelihood of losing the scholarship. Most pronounced was the relationship between transferring and scholarship loss. The odds of scholarship loss increased almost five fold for students who transferred at any point in time, controlling for all else. Having a declared major and also enrolling in a community college were unrelated to losing the award.

Campus contexts

Several variables related to the type of institution in which a student was enrolled proved to matter in PROMISE loss. Enrolling in a more selective institution was related to a

Table 5
Survival Model Results, Timing to PROMISE Loss

Variable	Coefficient (Standard Error)
Compared to end of 1st year	
End of 2nd year	1.12 (0.07)****
End of 3rd year	0.08 (0.10)
Academic preparation	
High school credit	-0.01 (0.00)***
High school GPA	-0.86 (0.11)****
ACT score	-0.06 (0.01)****
Student characteristics	
Economic disadvantage	-0.13 (0.08)
Academic disadvantage	0.24 (0.11)**
Women compared to men	-0.20 (0.06)***
White students	0.10 (0.17)
Enrollment characteristics	
Enrolled in STEM major	0.11 (0.07)*
Transferred	1.57 (0.17)****
Declared major	0.09 (0.10)
Semester GPA	-0.54 (0.11)****
Enrolled in community college	0.01 (0.47)
Institutional context	
% Institution Pell recipients	0.02 (0.01)**
Institutional selectivity	-0.01 (0.00)***
%Nonwhite at institution	0.04 (0.02)**
Instructional expenditures	-0.06 (0.05)
Academic support expenditures	0.91 (0.25)****
Student services expenditures	-0.01 (0.32)
Financial aid	
Subsidized loan	-0.06 (0.05)
Unsubsidized loan	0.14 (0.03)****
Unmet need	0.00 (0.00)****
Log Likelihood	-4384.78

n= 20,213

****$p<0.001$. ***$p<0.01$. **$p<0.05$. *$p<0.10$

moderate decrease in likelihood of loss. Having a higher proportion of students that are receiving Pell grant at one's institution was also related to increased odds of losing the award as was the percent of the institution's enrollment that were racial/ethnic minority students. Of the three institutional expenditures variables included in the model, only academic support expenditures were significantly related to losing the scholarship. An increase in institutional spending on academic support services was associated with about a 2.5 times increase in the odds of losing the scholarship, holding all else constant.

Cost and financial aid
The final block of variables are those related to cost and financial aid. Students with higher amounts of unsubsidized loans were more likely to lose their award. The reasons for this are difficult to discern. It is possible that these students are those whose families have levels of financial need that are not met by need-based aid. Unsubsidized loans are available to students up to federal limits that are inclusive of subsidized as well as unsubsidized loans (e.g., up to $5,500 for first year students). Data from the National Postsecondary Student Aid Study (NPSAS: 12) suggest a modest correlation between the number of hours worked per week and the amount of unsubsidized loans a student borrows. Perhaps, students who work more hours have less time to devote to their

courses, and are more likely to lose the scholarship. Additionally, the negative relationship between loans and educational attainment has been observed in other (e.g., Dowd, 2006) studies. Unmet need was negatively related to keeping PROMISE and statistically significant, but it was substantively unimportant given the small effect size (-0.002).

DISCUSSION
The descriptive findings that men and students who are either economically disadvantaged or required to enroll in remedial courses are more likely to lose their PROMISE Scholarship is consistent with prior research on educational attainment (Cabrera, Nora, & Castañeda, 1992; St John, Paulsen, & Carter, 2005). At least descriptively, their likelihood of keeping a merit-based scholarship is consistent with their lower rates of postsecondary completion and the incentive provided in the scholarship does not change this disadvantage.

Differences by gender and academic disadvantage persist even after controlling for variables related to academic preparation, institutional context, academic progress, and finance. This is intriguing given that about 80% of those students classified as academically disadvantaged were women. Nonetheless, women were better prepared academically in terms of the number of college credits they had earned in high school

and their high school GPA (see Table 6). Men had somewhat higher ACT scores than women.

Table 6
Academic preparation by gender

	Women	Men
	Mean	
HS Credits	5.34	4.92
HS GPA	3.72	3.64
ACT	24.07	24.74

Note: All differences statistically significant at 0.001

This warrants additional investigation, but it may be suggested that use of ACT scores to place students in remedial education (thus defining them as academically disadvantaged) disproportionately classifies women as unprepared for college. A 2001 report by the West Virginia Association for Developmental Education (Parks, 2001) expressed concern about the use by the state college system of ACT and SAT scores for placement into remedial education despite these tests not being created for that purpose. Moreover, these findings point to the need for additional work on how college experiences affect the likelihood of losing PROMISE and how this differs by gender. Although women were overrepresented among those placed in remedial education, some combination of their academic preparation and college experiences may have contributed them to

still being more likely than men to keep the PROMISE Scholarship.

In the area of academic preparation, it is not surprising that students with higher high school GPAs and standardized test scores are less likely to lose PROMISE. It is surprising, however, that the variable for academic disadvantage was not significant. While it seems contradictory that students receiving a merit scholarship should need remediation, with this cohort of students, there was not a minimum subscore requirement on the ACT and so students could achieve the overall minimum composite ACT score but still place into remediation in a particular subject. Remediation today of incoming PROMISE Scholars would be even lower since the composite score requirement is higher and the minimum subscores in reading, math, science, and English are higher than the Higher Education Policy Commission cutoffs for placement into remedial services. While it is encouraging that this population, despite academic deficits, is maintaining the scholarship at equal rates, more research is needed to understand if they are on track to graduate or if the time spent in remedial courses has slowed their progress. These findings suggest that institutional context in terms of student body composition plays a role in scholarship maintenance. When only examining students who lost the scholarship at progress checks (end of years), students at less selective institutions were less

likely to lose the award. Perhaps in the context of low selectivity, the grades to maintain the scholarship are easier to earn. Or perhaps in less selective institutions, there are better services available to support students academically and otherwise. The finding that the students who leave mid-year are pulling the results in the opposite direction is interesting and bears further research to determine how selectivity might be related to the reasons that students lose the scholarship by not enrolling rather than having it revoked. The finding that PROMISE recipients at schools with higher proportions of non-White students and Pell recipients are more likely to lose the award seems consistent with other research that finds that minority and low-income students themselves are less likely to complete degrees. Yet this does not tell us why, controlling for student race and economic disadvantage, students at these schools are more likely to lose the award. It may be that these variables are proxies for other variables such as the proportion of first-generation college students, the level of curricular preparation for college, family/cultural orientation toward college, the amount students have to work to pay for college, and general levels of social and cultural capital available at the school. While good data exists on how outcomes at schools vary by their sector, control, and selectivity, there is little research available on how outcomes vary by school racial/ethnic and socioeconomic composition.

Among the college enrollment characteristics, higher semester GPA was associated with lower odds of losing the scholarship. Given that maintaining a certain GPA is required to renew the scholarship, this makes sense. Having declared a STEM major was associated with decreased odds of keeping the scholarship, although the coefficient was marginally significant statistically. It is possible that STEM majors are more challenged to maintain the GPA requirement necessary to keep the scholarship. Transfer increases likelihood of losing the scholarship. Given that this dataset only includes students beginning at four-year institutions, transfer would either have to be lateral, to another four-year institution, or reverse, to one of the state's community and technical colleges. The approximately one-third of transfers to Marshall University and West Virginia University may have been planned but the 43% of lateral transfers to the regional campuses probably were due to a poor fit, academic or other difficulties, or to move closer to home. The approximately one-quarter of the transfers that took place to a community college likely were also unplanned and due to difficulties. Transfer itself would entail fitting in at a new institution and has been shown in the literature (Bahr, 2012; Wang, 2009) to be associated with lower grades. Further research is needed to understand the timing of transfer and scholarship loss and also to assess the prevalence of transfer after scholarship loss.

Keeping the PROMISE

Intriguing findings emerged among the finance variables. An increase in unmet need (tuition and fees and a cost of living estimate minus all forms of grant aid) was shown to decrease chances of losing the scholarship beginning with the third term, but the effect size is so small as to render the practical implications of this finding meaningless. More interesting is the relationship between unsubsidized loans and scholarship loss. An increase in subsidized loans was associated with increased odds of losing the scholarship. The same was not true of subsidized loans. Unmet need captures what students actually have to pay after receiving their PROMISE and other awards. Those students with higher unmet need may either be well-off students who do not need PROMISE and therefore are not incentivized to strive to keep it or poor students who are burdened by unmet need and are working to meet costs. The analysis would benefit from both income and hours worked data. The positive relationship between unsubsidized loans and PROMISE loss also illustrates the adverse effect that financial burden can have on academic outcomes. These findings are consistent with the Georgia study (Dynarski, 2002) that found high student loan debt associated with HOPE loss.

In this study, we continue an important line of research into the influence of state finance policy on college persistence and graduation rates. While there has been a great deal of research on the effects of merit aid on initial enrollment, this study adds to the smaller body of work on the relationship of merit aid to continuation and graduation. DesJardins (2002) and others have pioneered the use of event history methods to explore the relationship between forms of financial aid and its timing on student enrollment behaviors. This study benefits from that work and adapts it to the state policy arena by including a whole state of public institutions and parsing out the individual contribution of state aid. The results of this study give insight into the relative effectiveness of different forms of state aid expenditure in encouraging completion. **JCA**

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