

THE IMPACT OF FREE TUITION ON COURSE-LEVEL
STUDENT OUTCOMES

by

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A thesis

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DEDICATION

This effort is dedicated to my inspiring wife Hannah. The additional support provided while she was also working full-time and pursuing a master's degree made this work possible.

ACKNOWLEDGMENT

I would like to recognize my fellow College of Southern Idaho institutional researchers both past and present, Chris, Nancy, Ashley, Anna and Ken, I have appreciated working alongside you and learning from you. I also want to extend thanks to the wider College of Southern Idaho team, in particular those cited in this paper, all of whom were quick to answer my numerous questions. I am also grateful for my father, who was enthusiastic and eager to offer grammar review, which has to be a rare thing. Finally, I would like to acknowledge my primary thesis advisor, Dr. Kelly Chen. I greatly appreciated her expertise and willingness to challenge me.

AUTOBIOGRAPHICAL SKETCH

Being born and raised in Pittsburgh, Pennsylvania, my first exposure to higher education was at the Community College of Allegheny County (CCAC). Fortunately, thanks to the initiative of my high school counselor and CCAC, I was able to finish high school at the local community college which provided a head start. This certainly contributed to my appreciation for the low price, instruction-focused, open access mission and methods of community colleges.

Since then, I earned a Bachelors in Financial Economics and worked in market research and then institutional research at the College of Southern Idaho (CSI) for the last six years. In my time at CSI, I functioned as the IPEDS keyholder and led much of the other regulatory data-focused reporting. In addition, I have supported data-informed decision-making through the development of CSI's business intelligence platform and program-specific research and analysis.

After two years in market research and five years in higher education data analytics, I began pursuing an MS in Economics at Boise State to further develop my economic reasoning and advance my analytical capabilities. The mathematical and computational rigor of the program has been exactly what I was looking for. I appreciate the expertise and enthusiasm of the economics faculty here at Boise State.

ABSTRACT

The United States has experienced a substantial increase in tuition rates for higher education. At the national level free tuition at two-year public institutions has been one solution proposed by various leaders. The College of Southern Idaho (CSI) is a two-year public institution with an emphasis on serving the eight county South Central Idaho region. In the Summer of 2021, a year into the COVID pandemic, CSI leveraged federal COVID support funds to implement “First Eight on Us”. This first-dollar program provided students with up to eight credits for free, with minimal requirements. Then, in Summer 2022, a revised “First Six on Us” program was offered.

The objective of this study was to explore the impact of single semesters of free tuition on various student success outcomes. Outcomes considered included effort and course quality, which was aggregated from course evaluation data. In addition, grades in courses and subsequent enrollment in non-free semesters at CSI were analyzed using student information system data. Using a combination of linear and logistic regression, this analysis found the First Eight on Us program led to increased enrollment, moderate decrease in average grades, minor drop in self-reported effort, little-to-no impact on the perception of course quality, a positive impact in the percent of new student retention and, due to enrollment growth, an increase in the total number of new students retained into non-free semesters.

TABLE OF CONTENTS

DEDICATION	iv
ACKNOWLEDGMENT	v
AUTOBIOGRAPHICAL SKETCH	vi
ABSTRACT	vii
LIST OF FIGURES	xi
LIST OF TABLES	xii
LIST OF ABBREVIATIONS	xiii
1 INTRODUCTION	1
1.1 Research Objective	1
1.2 Economic Theory and Hypotheses	2
2 BACKGROUND	4
2.1 National Consideration	4
2.2 Literature Review	6
2.3 First Eight on Us	8
2.4 First Six on Us	9

3	METHODOLOGY	11
3.1	Overall	11
3.2	Dependent Variables	12
3.2.1	Perception of Effort and Course Quality	12
3.2.2	Performance in Courses	13
3.2.3	Enrollment into Non-Free Semesters	13
3.3	Control Variables	14
4	RESULTS	19
4.1	Perceived Effort in Courses	19
4.1.1	Modeling	20
4.1.2	Results	21
4.2	Perception of Course Quality	22
4.2.1	Modeling	22
4.2.2	Results	24
4.3	Performance in Courses	25
4.3.1	Linear Modeling	26
4.3.2	Linear Model Results	27
4.3.3	Logistic Regression Results	29
4.3.4	Within-Program Differences	30
4.4	Subsequent Enrollment into Non-Free Semesters	31
4.4.1	Summer-to-Fall Overall	32
4.4.2	Summer-to-Fall Modeling	32
4.4.3	Summer-to-Fall Results	34
4.4.4	Summer-to-Spring Overall	35

4.4.5	Summer-to-Spring Results	37
5	KEY FINDINGS	39
5.1	Overall	39
5.2	Limitations	39
5.3	Potential Implications and Future Research	40
	REFERENCES	41
	APPENDICES	45
A	CONTROL VARIABLES OVER TIME	46

LIST OF FIGURES

2.1	Rising Cost of Tuition and Fees	5
2.2	First Eight on Us Enrollment	9
2.3	First Six on Us Enrollment	10
4.1	Average Self-Reported Level of Effort	19
4.2	Average Perception of Course Quality	22
4.3	Grade Distribution by Year	25
4.4	Course Performance Linear Regression Residuals	29
4.5	Summer-to-Fall Retention	32
4.6	Summer-to-Spring Retention	36

LIST OF TABLES

4.1	Perception of Effort (OLS)	21
4.2	Perception of Quality (OLS)	24
4.3	Performance in Courses (OLS)	28
4.4	Performance in Courses (Binomial)	30
4.5	Summer-to-Fall Retention (Binomial)	34
4.6	Summer-to-Spring Retention (Binomial)	37

LIST OF ABBREVIATIONS

AY Academic Year

CSI College of Southern Idaho

FAFSA Free Application for Federal Student Aid

GPA Grade Point Average

IPEDS Integrated Postsecondary Education Data System

VIF Variance Inflation Factor

CHAPTER 1:

INTRODUCTION

1.1 Research Objective

The objective of this research was to evaluate the impact free tuition during two summer semesters had on course-level student outcomes. In addition, due to the uniqueness of the summer semester free tuition model, at least in terms of published research, an additional student-level retention outcome was considered. The research questions included:

Student Effort (Perception): Are students less invested in the coursework when it is free?

Course Quality (Perception): Do students perceive the course to be of less quality when it is free?

Performance in Courses (Grades): Do students perform worse in coursework as a result of free tuition?

Subsequent Enrollment in Non-Free Semesters (Retention): Did enrollment in non-free semesters (e.g. the subsequent fall semester) increase as a result of free tuition in the preceding summer semester.

Answers to these questions would add to the literature on enrollment impact and, perhaps, provide new perspective on the more day-to-day course-level impact.

Existing literature has mostly focused on more long-term measures of student success such as enrollment, retention and graduation rates. These outcomes are important and should be examined. That said, these measures tend to be extremely lagged. A two-year school would need to wait three years to evaluate the impact a particular initiative had on graduation within 150% of normal time. Four-year institutions would need to wait four to six years. The evaluation of grades, student effort and perception of course quality provide more leading indicators of student success within the first semester of implementation of a program or policy.

In addition, the combination of student information system, financial aid and course evaluation data allowed for a more holistic view of the student experience in the free tuition environment. Furthermore, this methodology allowed for the inclusion of more difficult-to-come-by controls such as course-level fixed effects and instruction experience in the regression modeling. Finally, as much of the existing literature surrounds year-long or multi-year promise programs, the context of only the summer semester free could provide interesting insight into how much benefit could be achieved at some portion of the cost.

1.2 Economic Theory and Hypotheses

One might expect that with less "skin-in-the-game" less effort would be produced, perhaps indirectly related to the endowment effect, which postulates that individuals tend to value things they own more than things they do not own. (Caceres-Santamaria, 2022) Similarly, the relationship between opportunity cost and time allocation (e.g. labor/leisure tradeoff) (Borjas, 2020) may also suggest a potentially negative relationship between price and effort put into course work. These two indirect theories may suggest the expected result would be some decrease in effort and

grades as a result of free tuition. This also suggests the need to control for factors such as student age and the unemployment rate that are likely correlated with opportunity cost and foregone earnings.

Studies have found a varied, but overall negative relationship with price and perception of quality. For example, one study found that this relationship existed in the purchase of televisions and t-shirts, but not with the less expensive toothpaste. (Verma and Gupta, 2004) Leveraging this example, with the cost of higher education being substantially closer to the cost of a television to that of the cost of toothpaste, one might expect that perception of quality may be negatively impacted by the shift to free tuition. One important caveat, however, is students knew that this free tuition was temporary and was intended to serve as support during the pandemic.

As the cost of the overall certificate or degree would become effectively lower as a result of a single free semester, basic economics would predict that the quantity demanded for that credential would increase. As a result, economic theory would predict some positive enrollment effect into subsequent non-free semesters.

CHAPTER 2:

BACKGROUND

2.1 National Consideration

Higher education provides essential functions and services for government agencies, local communities and the students themselves. Federal agencies are constantly seeking an educated workforce to compete at the international level. For similar reasons, state governments have an incentive to invest in higher education to attract employers and, subsequently, jobs for its constituents. Students benefit from higher education, consistently reporting substantially higher median earnings relative to those who did not go on to college after high school. (Social Security Administration, 2015)

Nevertheless, the United States has experienced a substantial increase in tuition rates for higher education. (National Center for Education Statistics, 2022) (Federal Reserve Bank of Minneapolis, 2022)

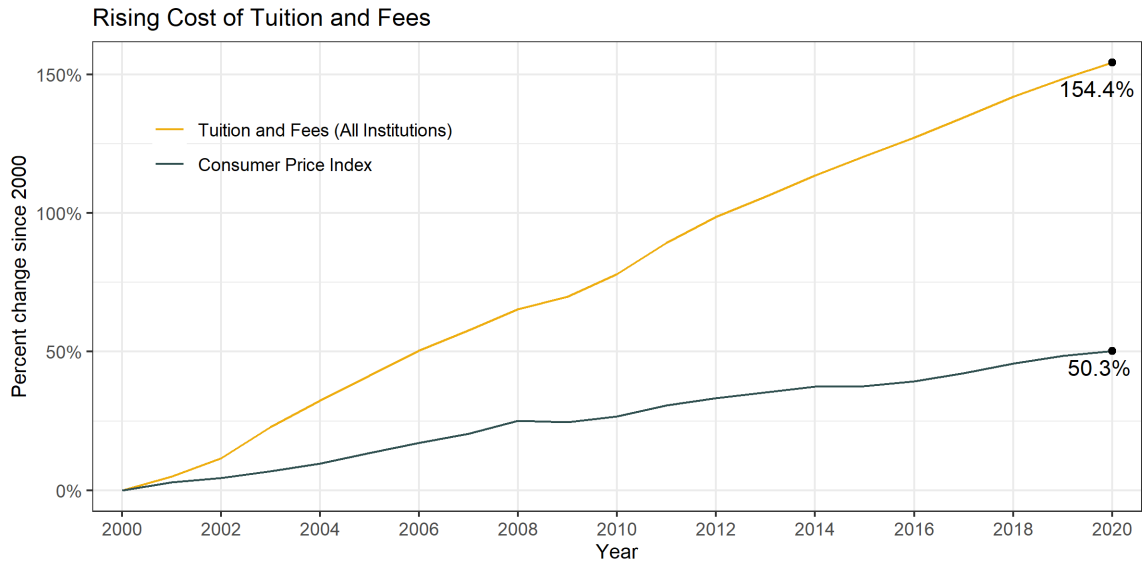


Figure 2.1: Rising Cost of Tuition and Fees

The rising cost of higher education has not gone unnoticed. For example, in 2015 President Obama proposed “...the first two years of community college free for everyone that is willing to work for it.” (Obama, 2015) Similarly, one of President Biden’s campaign proposals was “Providing two years of community college or other high-quality training program without debt for any hard-working individual looking to learn and improve their skills to keep up with the changing nature of work.” (Biden, 2022)

Free community college, in some form, is not an entirely new concept. A few states, including Tennessee and Oregon, have implemented promise programs. In addition, several local communities have implemented programs themselves. These free tuition initiatives have been varied in their requirements and qualifications. Many being last-dollar, some being first-dollar. (University of Pennsylvania, Alliance for Higher Education and Democracy, 2020) In addition, “Many active promise pro-

grams have eligibility requirements that may include residency, age, and merit factors.”(Christopher Lau, 2020)

2.2 Literature Review

The bulk of the research surrounding these promise programs has been centered around the impacts to enrollment and college go-on rates.

Several studies found positive enrollment increases as a result of promise programs. A few examples come from Tennessee, Oregon and Pittsburgh. Tennessee saw a noticeable increase in in-state enrollments (Bell, 2021). In addition, using difference-in-differences with synthetic control, Gurantz found that Oregon two-year schools experienced enrollment growth of around four to five percent as a result of the Oregon promise program.(Gurantz, 2019) Furthermore, Pittsburgh also found that high school graduates were more likely to enroll in college and also found that they were even more more likely to select a Pennsylvania institution.(Page et al., 2019)

It is worth mentioning that some of these studies found a shift from four-year schools to the promise program eligible two-year schools. For example, the place-based Tennessee promise program led to an increase in out-of-state students in these ineligible four-year schools.(Bell, 2021) However, a limitation of this study was that it only considered a two year post-implementation timeframe for its difference-in-differences approach. Therefore, this methodology didn’t allow for these “shifted” students to complete at the two-year school and then transfer. It is quite possible that these four-year institutions began to see an increase in transfer student applications a few years after the implementation of these programs.

A few studies examined the impact of these free tuition programs on retention. For example, the New York Excelsior program found its last-dollar program increased

retention, particularly with non-male students.(Conzatti, 2022) In addition, the aforementioned Pittsburgh program led to a 4 to 7 percentage points increased chance of being retained into the second year of postsecondary education.(Page et al., 2019)

Subsequently, research has also demonstrated increased credential attainment as a result of these promise programs. For example, the Tennessee Based Knox Achieves, which predated the statewide promise program, led to a higher likelihood of attaining a two-year college credential. In more detail, this study found that these gains were larger in lower-achieving students, in addition to minority students. They also found that some of the higher achieving students who may have attended a four-year school were less likely to complete the bachelor's degree.(Carruthers et al., 2020) In addition, the first-dollar Kalamazoo Michigan promise program saw a 10% increase in credential completion. These researchers also found higher effect sizes among women.(Bartik et al., 2021)

From the perspective of high school students aware of free tuition programs available to them, the Kalamazoo program led to less suspensions and an increase in high school credit completion.(Bartik and Lachowska, 2012) In another qualitative study, researchers reported improvements in student attitudes, goals, and aspirations as a result of the Kalamazoo Promise.(Miron et al., 2009)

Little published research has been completed on the experiences students have when engaging with free tuition. Topics like student effort, perception of course quality and grades, which this research emphasized, hopefully builds understanding surrounding the student experience. By exploring course performance and course evaluation data, it is the hope that this study adds to this growing pool of literature by providing measures of student success that would reflect the student experience

while benefiting from free tuition.

2.3 First Eight on Us

The College of Southern Idaho (CSI) is a two-year public institution with an emphasis on serving the eight county South Central Idaho region. In the Summer of 2021 (Academic Year (AY) 2020-21), a year into the COVID-19 pandemic, CSI put federal relief funding to use through the “First 8 Are On Us” program. “The College of Southern Idaho has recognized a great need for students who have been impacted by COVID-19 this past year. To assist, CSI is developing opportunities for students to take up to eight credits for free during the Summer 2021 semester. Federal emergency relief funding will be used to help cover tuition costs.” (CSI, 2021)

Eight credits were purposefully chosen instead of, say, nine credits. If a student was to take on a heavy workload for the expedited summer semester, CSI wanted the students to still have a certain amount of buy-in or skin in the game. Similarly, the institution did not want to create an incentive to enroll in more than three classes in that short summer term. It is worth noting that three-credit classes are common, but CSI also offers a variety of one, two, and four-credit classes as well. (Lord and Jenks, 2023)

College of Southern Idaho’s business and financial aid offices, who led the distribution of funds for this program, described the requirements as “...the rules were pretty simple and we didn’t exclude many students. In order to qualify a student had to be Title IV eligible or they had to self-certify that they had a need.” A student qualified if they submitted a FAFSA and were Title IV eligible. These student would have automatically received the funds through disbursement to their student account if they expressed they wanted the aid in that way. If CSI did not hear from the student

(e.g. no email response), a check would be sent to them in the mail. In addition, if a student did not submit a FAFSA they could submit an online form expressing how they were negatively impacted by the COVID pandemic to also qualify for the support funds.(Jenks and Zimmers, 2022a)

Naturally, CSI saw a spike in enrollments that summer semester, with 1,363 of the 1,653 students taking advantage of First Eight on Us.

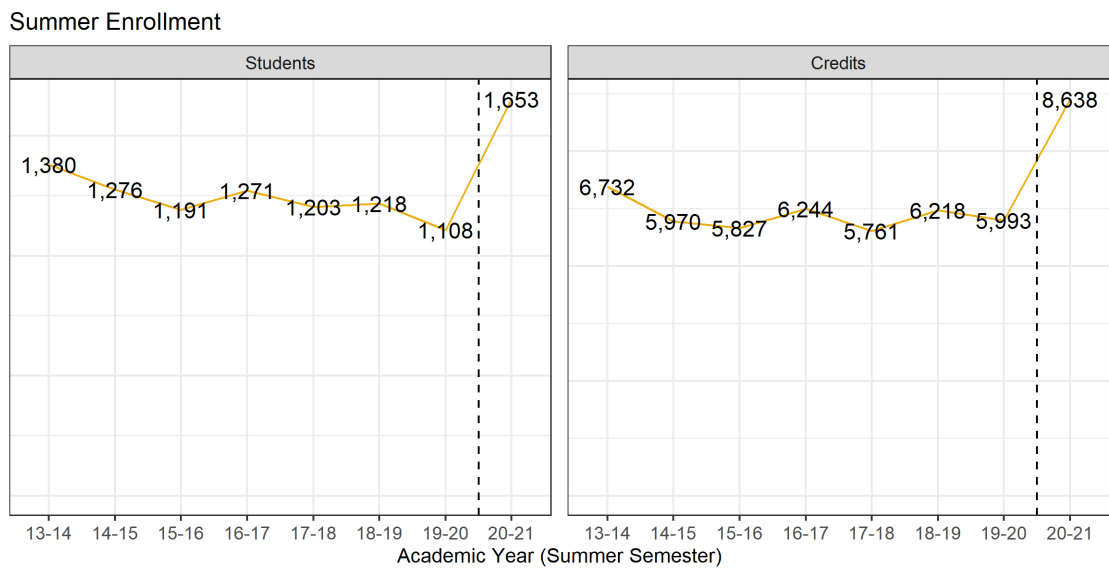


Figure 2.2: First Eight on Us Enrollment (CSI, 2023)

2.4 First Six on Us

Subsequently, in the Summer of 2022 (AY 2021-22), CSI adjusted the use of federal aid by offering “First Six Are On Us”. According to the business office, ”Student qualification was different. Students were required to self-certify that they had a need. If they did, they were then awarded a scholarship up to 6 credits. We removed the automatic qualification of being Title IV eligible. Distribution was the same. If the student gave us permission to apply the scholarship to their account we did so.

If they didn't, we sent them a refund either through BankMobile or a check.” (Jenks and Zimmers, 2022b)

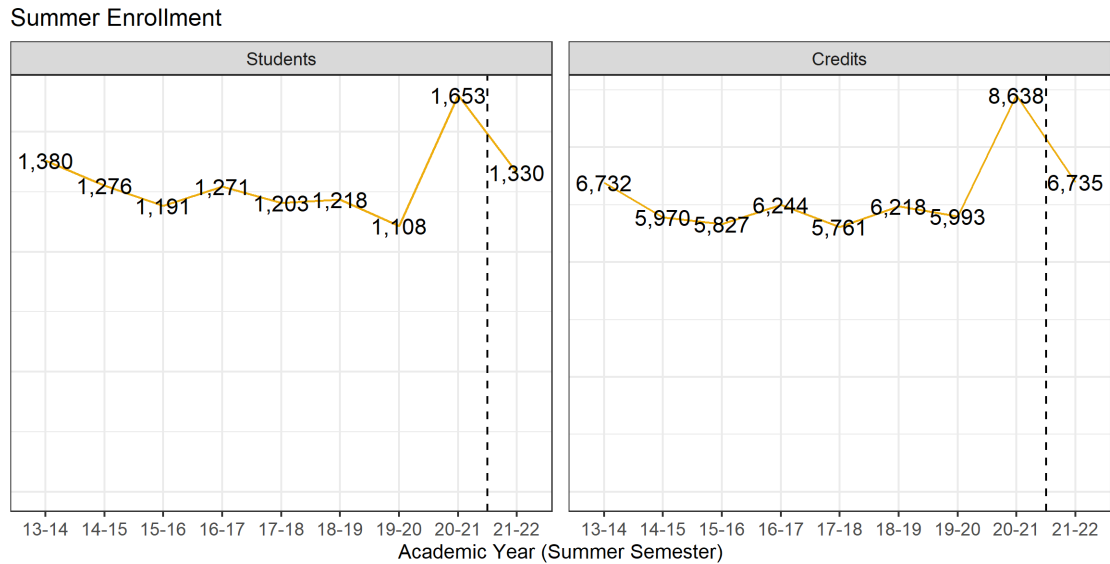


Figure 2.3: First Six on Us Enrollment (CSI, 2023)

It is worth noting that both prospective and existing students were made aware of the First Eight on Us support through various marketing channels. However, for First Six on Us in Summer 2022, only “already registered” students were notified of the program. Of course, word of mouth likely existed during First Six on Us. (Lord, 2023)

CHAPTER 3:

METHODOLOGY

3.1 Overall

For each of the aforementioned outcomes, linear and/or logistic regression analysis was performed in an effort to isolate the impact of free college on these course-level student outcomes.

The data included credit-bearing enrollments from AY 2012-13 through 2021-22. This date range was chosen largely due to the course evaluation data availability in the software and format currently used. Data was directly queried from CSI's internal student information system and financial aid databases. In addition, data was extracted from the course evaluation software used by CSI.

Additional criteria was used to get as close as possible to course enrollments that occurred at the traditional standard tuition rate. Students concurrently enrolled in high school participating in dual credit were excluded. Credit by exam and courses being audited were also excluded. Various credit-bearing professional development courses often offered at a reduced rate and seldom taken by degree-seeking students were also not included. Athletes were excluded from the research due to their distinct financial aid packages.

When presenting the model results, data derived at the student-specific level (e.g.

High School GPA) is indicated by an ‘s’ subscript . Course section level data (e.g. Class Size) is indicated by a ‘c’ and time period (e.g. Academic Year) is notated with a ‘t’ .

3.2 Dependent Variables

3.2.1 Perception of Effort and Course Quality

Course evaluations at the College of Southern Idaho are self-reported, optional and anonymous. Two questions asked in every course evaluation completed by a student is the question:

“Please rate YOUR overall effort in this course”.

“Honestly rate the overall quality of this course”.

Numeric	Description
5	Excellent
4	Above Average
3	Average
2	Below Average
1	Unsatisfactory

The structure of the data analysis revolved around the combination of anonymous course evaluation data and student-level enrollment data. Average self-reported effort per course section was calculated and associated with each student in that particular section. For example, if there were ten sections of ENGL 101 in a particular semester, each would be treated separately and have their own computed average effort. The *course section average effort* was the dependent variable for the linear regression modeling. The same method was used for perception of course quality.

This ‘aggregated value associated with an individual’ challenge is a natural limitation of anonymous data with, of course, the upside of more honest feedback. As the limitation exists across the entire dataset (free and non-free semesters), the comparison analysis performed still should have merit.

3.2.2 Performance in Courses

Grades were quantified to Grade Point Average (GPA) format for this analysis. Withdrawals after the last day to add/drop classes (grade of W) were included and treated like a grade of F. Less common grading scale course enrollments, such as pass/fail courses, were excluded from this analysis.

3.2.3 Enrollment into Non-Free Semesters

The retention portion of this analysis was focused on enrollment into non-free semesters, whether the free summer program potentially offset some of the cost of the term. As such, credential attainment is not the main focus of this work.

The analysis considered students who were enrolled in the summer and did not complete any degree or certificate that summer (denominator) and whether or not they enrolled in the Fall semester or not (numerator). It also included a similar measure for the Spring semester, excluding Summer 2021-22 students based on the timing/data availability of this study. Future research could take a longer term perspective on enrollment impacts.

It may be worth mentioning that these measures of retention veer significantly from traditional statistics submitted into the Integrated Postsecondary Education Data System (IPEDS) data system, which look primarily at Fall-to-Fall retention. As such, comparisons between these data and IPEDS data should not be done.

3.3 Control Variables

Naturally, many factors impact student outcomes. First Eight and First Six were not the only student initiatives or business process changes that occurred during this time. As such, control variables were used and their associated definitions included:

First Eight on Us (Binary): All enrollments outside of Summer 2021 were not associated with First Eight on Us. Most, but not all, students during Summer 2021 took advantage of First Eight on Us. Financial aid data was used to identify students who participated and how much they received. If a student participated but took more than eight credits that summer semester, the date of registration was used to estimate which enrollments were free.

A few definitional examples used in this analysis: If a student took six credits, all would be counted as First Eight on Us. If the student enrolled in nine credits during Summer 2021 (three separate three-credit courses), all would be counted as free. Technically, that student would have paid for one credit.

If the student enrolled in four classes for a total of twelve credits, the class or classes that were *entirely* above eight credits would not be counted as First Eight On Us. The classes in this situation were chosen somewhat arbitrarily, with the latest date(s) of registration not counted as free.

First Six on Us (Binary): All enrollments outside of Summer 2022 were not associated with First Six on Us. Financial aid data was used to identify students who participated and how much they received. If a student participated but took more than six credits that summer semester, the date of registration was used to estimate which enrollments were free using similar logic to First Eight.

High School GPA (Numeric): CSI attempts to capture high school GPA tran-

script data from its entering students. That said, as an open enrollment institution, the college hesitates to block registration in the absence of this information. As such, it is not always available. Transcribed GPA was used where possible, and self-reported GPA from the application was used when it was not. Even still, it is not uncommon for both to be missing for the study. As such, when looking at new students, two models were used. One includes high school GPA and one excludes it to capture a larger pool of the new student body.

Career GPA (Numeric): For non-new students only. Leveraged the most recent career GPA for the student that preceded the summer semester of enrollment.

Career Hours Earned (Numeric): For non-new students only. The number of credit hours earned by the student prior to the relevant summer semester.

College or High School GPA (Numeric): Specifically when modeling course evaluation data, as a course could be made up of both new and non-new students, a variable that combined college and high school GPA was leveraged. If a student was new to college, their high school GPA was used. Otherwise, their college career GPA was used. This coalesced variable was used as a measure of prior academic performance.

New to College (Binary): First-time post secondary student or not. Dual credit or AP credits are not considered when determining first-time post secondary status.

Bridge to Success (Binary): Starting in the Summer of AY 2017, CSI has offered a Summer Bridge to Success program.

”The Bridge program provides first time, degree-seeking students a head start in their transition to CSI. The program introduces students to the academic expectations of CSI. Moreover, the program develops skills that are essential in the classroom and

in the workplace, familiarizes students with valuable campus resources to increase student success, and fosters social and academic relationships with peers, faculty, and staff.” of Southern Idaho (2022)

Typically, 40 to 60 students participated in the program each summer. In Summer 2021, the same semester of First Eight on Us, the college purposefully expanded the program to serve a larger base of students. Around 200 students participated that semester. As such, it was important to control for participation in the Bridge program when examining the impact of First Eight on Us.

Prior Dual (Binary): With the growth of the State of Idaho’s Advanced Opportunities Fast Forward program, which pays for high school students to take college classes, an increasing number of new CSI students begin college with prior credits earned.

Gender (Binary): Dichotomous variable marked 1 if the student self-reported as female.

Age (Numeric): Age of the student at the start of the semester.

Full-time (Binary): For fall and spring semesters, 12 or more credits was considered full-time. For the shorter summer semester, 6 credits or more was considered full-time. It is possible that students decided to take more credits because it was free. It was important to control for the number of credits taken to better isolate the impact of free tuition.

Pell Eligibility (Binary): These data are collected from the Free Application for Federal Student Aid (FAFSA). If a student did not complete a FAFSA, the student would be considered not Pell eligible for the purposes of this study.

Race/Ethnicity (Binary): Three binary variables for Hispanic, White or Other.

Aggregation in this form was due to CSI demographics and low sample size for the varied "Other" if disaggregated further. To avoid perfect collinearity, the Other category was excluded from the regression modeling.

Class Size (Numeric): The number of students enrolled in a given section associated with the particular enrollment. As First Eight on Us led to growth in enrollment, it is possible that class sizes also grew, muddying the effects of free tuition if not controlled for.

Delivery Method (Binary): Three binary variables for In-Person, Online, or Other. First Eight on Us occurred during the second summer of the COVID pandemic. Face-to-Face enrollments were back, but online enrollments were still higher than pre-pandemic levels. As such, controlling for delivery method was important. To avoid perfect collinearity, the Other category was excluded from the regression modeling.

Instructor Experience (Numeric): The number of semesters the instructor had taught at CSI. Teaching experience outside of CSI was not included due to data availability. One method for scaling operations alongside increased enrollment was leveraging adjunct instructors. This strategy may have impacted student outcomes on its own and was important to include in the regression analyses. Due to multicollinearity with other control variables, this variable was excluded from the final model.

Instructor Summer Experience (Numeric): The number of semesters the instructor taught a summer semester course. As CSI experienced a substantial increase in enrollment during First Eight on Us, some instructors who typically do not teach a summer course were asked to teach. If teachers who are not accustomed to the accelerated pace had impact on student outcomes, this may sway results if not con-

trolled for. Due to multicollinearity with “Instruction Experience”, this variable was excluded from the final model.

Course Fixed Effects (Binary): In an effort to control for the possibility of varied course offerings during First Eight and Six, course fixed effects were included in the modeling. Naturally, hundreds of courses are offered. As such, only five of the more popular courses were included in the presentation of the model results. Of course, all courses were included in the actual modeling.

Idaho Region 4 Unemployment Rate (Numeric): The average June unemployment rate in the eight county primary service region for CSI (U.S. Bureau of Labor Statistics, 2022). These counties included Blaine, Cassia, Camas, Gooding, Jerome, Lincoln, Minidoka and Twin Falls. Unlike the Academic Year categorical variable, based on Variance Inflation Factor (VIF) values, the continuous unemployment rate variable did not create multicollinearity. This variable has also been shown to be highly correlated with enrollment at two-year community colleges.(c. Sorensen and Hwang, 2021) For improved readability of regression output, the variable was multiplied by 100 (e.g. .02 would be represented as 2).

A longitudinal review of how these control variables have changed over time can be found in the Appendix.

CHAPTER 4: RESULTS

4.1 Perceived Effort in Courses

The graphic below is a visual representation of the distribution of self-reported effort.

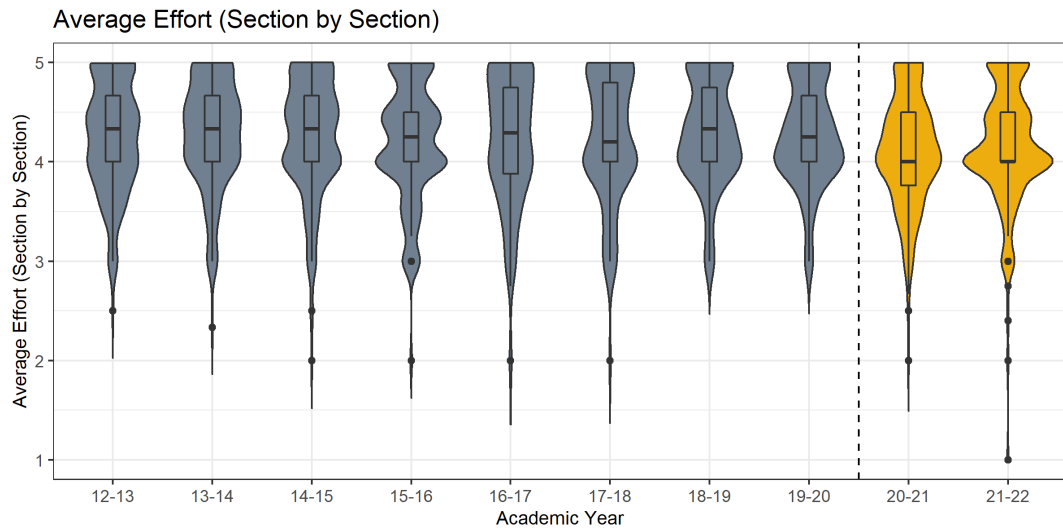


Figure 4.1: Average Self-Reported Level of Effort (CSI, 2023)

During this time period, there was a moderate decrease in student self-reported effort, with fewer students proportionally exhibiting maximum effort per class and more students reporting an average amount of effort.

4.1.1 Modeling

Of course, many factors may have contributed to this minor drop in average effort per course. The linear regression results below control for many of these variables in an attempt to isolate the impact of free tuition on student effort. The specification for the linear regression model was as follows:

$$\begin{aligned}
 \text{AverageEffort}_c = & \beta_0 + \beta_1 \text{FirstEightonUs}_s + \beta_2 \text{FirstSixonUs}_s \\
 & + \beta_3 \text{CollegeOrHighSchoolGPA}_s + \beta_4 \text{NewToCollege}_s \\
 & + \beta_5 \text{BridgeProgram}_s + \beta_6 \text{PriorDual}_s + \beta_7 \text{Female}_s + \beta_8 \text{Age}_s \\
 & + \beta_9 \text{FullTime}_s + \beta_{10} \text{PellEligible}_s + \beta_{11} \text{DeliveryMethod}_c \\
 & + \beta_{12} \text{ClassSize}_c + \beta_{13} \text{InstructorTermCount(All)}_c \\
 & + \beta_{14} \text{UnemploymentRate}_t + \beta_{15} \text{CourseFixedEffects}_c + \epsilon
 \end{aligned}
 \tag{4.1}$$

4.1.2 Results

Table 4.1: Perception of Effort (OLS)

	<i>Dependent Variable</i>		
	Average Effort _c	s.e	p
(Intercept)	4.93	0.10	0.00
First Eight _s	-0.13	0.01	0.00
First Six _s	0.00	0.02	0.99
Career or HS GPA Coalesce _s	0.01	0.01	0.25
Career Hours Earned _s	0.00	0.00	0.72
Bridge _s	-0.05	0.02	0.00
Prior Dual _s	0.02	0.01	0.03
Semester Hours _s	0.00	0.00	0.38
Age _s	0.00	0.00	0.03
Female _s	-0.01	0.01	0.53
Hispanic _s	0.01	0.01	0.40
Pell Eligible _s	-0.01	0.01	0.21
Class Size _c	0.00	0.00	0.02
Online _c	-0.24	0.01	0.00
Instructor Experience _c	0.00	0.00	0.00
Unemployment Rate _t	0.01	0.00	0.01
College Algebra _c	-0.62	0.09	0.00
English Comp 1 _c	-0.84	0.09	0.00
Anatomy and Physiology 1 _c	-0.51	0.10	0.00
Intro to Psychology _c	-0.90	0.09	0.00
Fund. of Oral Comm _c	-0.75	0.09	0.00
Observations:	17251		
R-Squared:	0.249		
Residual Std. Error:	0.472		
F Statistic:	24		

With a p-value of near zero and a negative coefficient, the First Eight on Us program was shown to decrease self-reported effort by some small amount. Now, with a coefficient of -.13 on a survey scale from 1 to 5, this effect is marginal at best. Nevertheless

the result was statistically significant. The results for First Six on Us was statistically insignificant.

This finding may be attributed to the differing structures of the First Eight and First Six models, the latter being targeted to students already registered, as opposed to the more openly communicated First Eight.

4.2 Perception of Course Quality

Initially, there does not appear to be any significant movement in perceived course quality. See below:

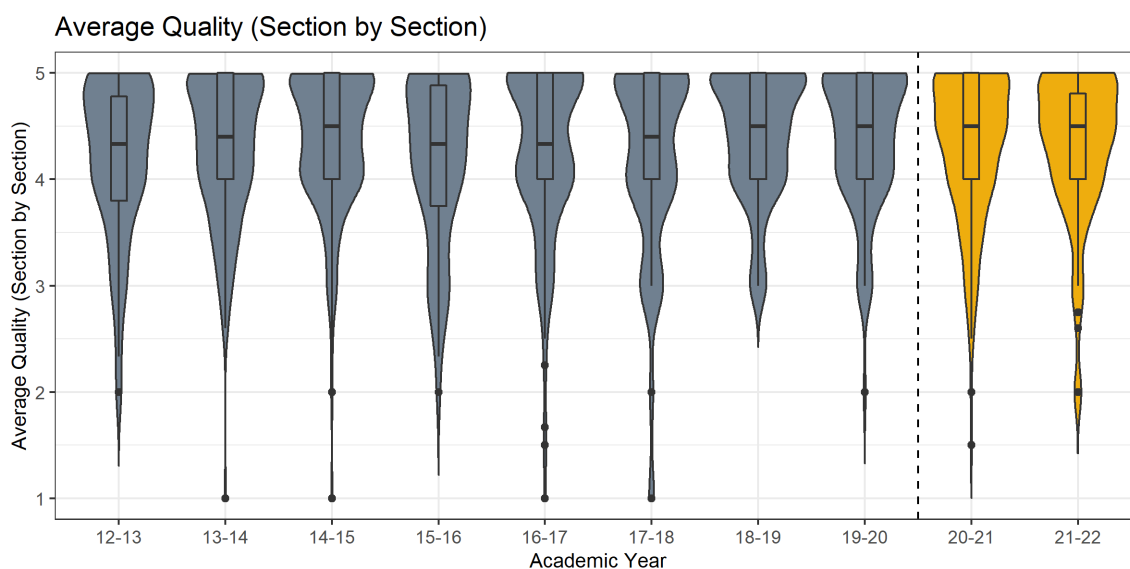


Figure 4.2: Average Perception of Course Quality (CSI, 2023)

4.2.1 Modeling

Of course, many factors contribute to perception of course quality. The linear regression results below control for many of these variables in an attempt to isolate the impact of free tuition on course quality, if any exists.

The specification for the linear regression model was as follows:

$$\begin{aligned}
AverageCourseQuality_c = & \beta_0 + \beta_1 FirstEightonUs_s + \beta_2 FirstSixonUs_s \\
& + \beta_3 CollegeOrHighSchoolGPA_s + \beta_4 NewToCollege_s \\
& + \beta_5 BridgeProgram_s + \beta_6 PriorDual_s + \beta_7 Female_s \\
& + \beta_8 Age_s + \beta_9 FullTime_s + \beta_{10} PellEligible_s \\
& + \beta_{11} DeliveryMethod_c + \beta_{12} ClassSize_c \\
& + \beta_{13} InstructorTermCount(All)_c \\
& + \beta_{14} UnemploymentRate_t + \beta_{15} CourseFixedEffects_c + \epsilon
\end{aligned}
\tag{4.2}$$

4.2.2 Results

Table 4.2: Perception of Quality (OLS)

	<i>Dependent Variable</i>		
	Average Quality _c	s.e	p
(Intercept)	5.01	0.12	0.00
First Eight _s	-0.01	0.01	0.57
First Six _s	0.11	0.02	0.00
Career or HS GPA Coalesce _s	0.00	0.01	0.60
Career Hours Earned _s	0.00	0.00	0.44
Bridge _s	-0.07	0.02	0.00
Prior Dual _s	0.00	0.01	0.77
Semester Hours _s	0.00	0.00	0.04
Age _s	0.00	0.00	0.32
Female _s	-0.01	0.01	0.28
Hispanic _s	0.02	0.01	0.02
Pell Eligible _s	0.01	0.01	0.14
Class Size _c	0.01	0.00	0.00
Online _c	-0.44	0.02	0.00
Instructor Experience _c	0.00	0.00	0.23
Unemployment Rate _t	0.02	0.00	0.00
College Algebra _c	-0.91	0.11	0.00
English Comp 1 _c	-0.90	0.12	0.00
Anatomy and Physiology 1 _c	-0.20	0.12	0.11
Intro to Psychology _c	-0.71	0.11	0.00
Fund. of Oral Comm _c	-0.73	0.11	0.00
Observations:	17251		
R-Squared:	0.292		
Residual Std. Error:	0.581		
F Statistic:	29		

With a p-value of .57, First Eight likely did not have any influence on the perceived quality of the education received. First Six, however, did have minor positive impact of perceived course quality. Now, with a coefficient of .11 on a survey scale from 1 to

5, this effect is very minimal. Nevertheless the result was statistically significant.

It is, of course, difficult to discern how each respondent defined the word “quality” when responding to the question. One might hypothesize that lowering the price could lower the perception of quality. From another perspective, “value” might come into play when determining “quality”. Regardless, the CSI student body’s perception of course quality, perhaps relative to alternative educational venues, appears to be unaffected by the “free” price tag and perhaps appreciative of the value provided. That said, it is worth noting that students were aware of the short-term emergency nature of the funding.

4.3 Performance in Courses

A visual representation of the shift in grade distribution, especially among new to college students, can be found below.

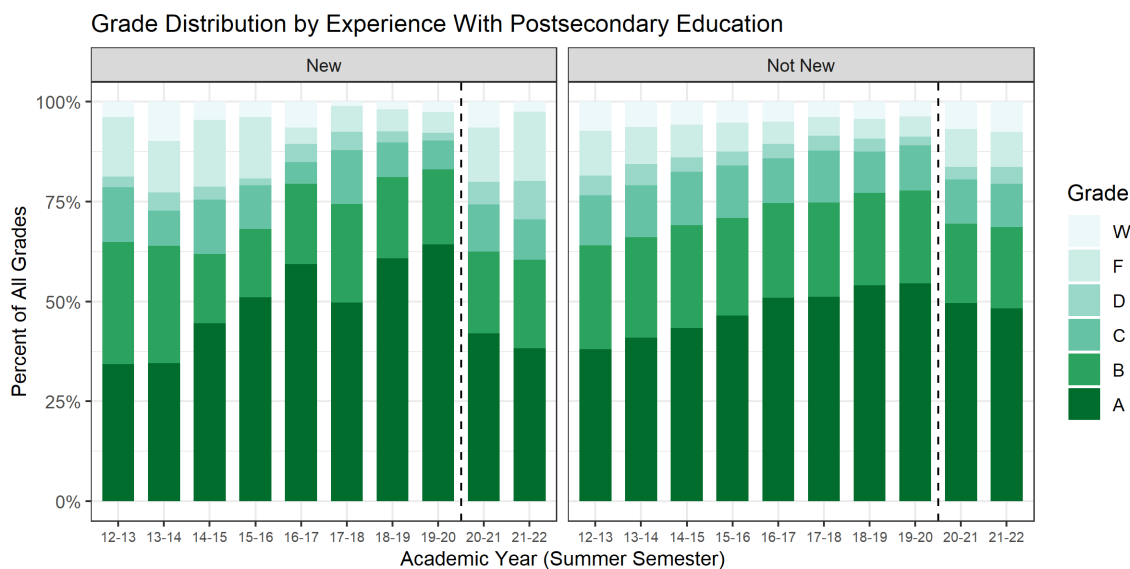


Figure 4.3: Grade Distribution by Year (CSI, 2023)

As an example, the percent of new student enrollments that were passing grades

(D or Better at CSI) was around 92% in 2019-20, the year preceding First Eight on Us. Then, in 2020-21, the year of First Eight, this same rate dropped to around 80%. From another perspective the rate at which new students received a C or Better was around 90% in 2019-20, dropping to 74% in 2020-21.

There was also a decrease, although not as severe, in the passing rate of students not new to college, shifting from around 91% in 2019-20 to around 84% in 2020-21.

The other side of the coin, one might argue, is that there were also more successful grades completed in terms of raw numbers due to enrollment increases. As an example, there were 424 passing enrollments among new students in 2020-21, relative to 142 in 2019-20. Nevertheless, the measurable shift in grade distribution was worth studying further.

4.3.1 Linear Modeling

Naturally, many factors impact how students perform in their course work. The results of the linear regression can be found below. The specification for the initial linear regression model was as follows:

$$\begin{aligned}
GradeinCourse_s = & \beta_0 + \beta_1 FirstEightonUs_s + \beta_2 FirstSixonUs_s \\
& + \beta_3 CollegeOrHighSchoolGPA_s + \beta_4 NewToCollege_s \\
& + \beta_5 BridgeProgram_s + \beta_6 PriorDual_s + \beta_7 Female_s + \beta_8 Age_s \\
& + \beta_9 FullTime_s + \beta_{10} PellEligible_s + \beta_{11} DeliveryMethod_c \\
& + \beta_{12} ClassSize_c + \beta_{13} InstructorTermCount(All)_c \\
& + \beta_{14} InstructorTermCount(Summer)_c \\
& + \beta_{15} UnemploymentRate_t + \beta_{16} CourseFixedEffects_c + \epsilon
\end{aligned} \tag{4.3}$$

Based on the initial distinct change in grade distribution among new and not new students, separate modeling took place for each. In addition, this was also useful as different variables could be used for the populations. For example, high school GPA, when available, was used for new to college students. Career GPA and Career Hours earned could be used for non-new students.

Based on high VIF values when including instructor related variables, multiple delivery method fields and year fixed effects, multicollinearity existed. As such, these were removed from the model. The following final linear model was used that resolved multicollinearity issues.

4.3.2 Linear Model Results

The findings from the linear regression can be found below.

Table 4.3: Performance in Courses (OLS)

	<i>New (With HS GPA)</i>			<i>New (Exclude HS GPA)</i>			<i>Not New</i>		
	Course Grade _S	s.e	p	Course Grade _S	s.e	p	Course Grade _S	s.e	p
(Intercept)	0.15	1.33	0.91	3.07	0.83	0.00	1.22	0.25	0.00
First Eight _S	-0.36	0.09	0.00	-0.37	0.08	0.00	-0.10	0.03	0.00
First Six _S	-0.35	0.12	0.00	-0.47	0.11	0.00	-0.12	0.04	0.00
High School GPA _S	0.95	0.07	0.00	-	-	-	-	-	-
Career GPA _S	-	-	-	-	-	-	0.65	0.01	0.00
Career Hours Earned _S	-	-	-	-	-	-	-0.00	0.00	0.00
Bridges _S	0.12	0.10	0.21	0.05	0.09	0.58	-0.02	0.05	0.72
Prior Dual _S	0.18	0.08	0.04	0.45	0.07	0.00	-0.01	0.02	0.64
Semester Hours _S	-0.05	0.02	0.00	-0.03	0.01	0.01	-0.01	0.00	0.06
Age _S	0.05	0.01	0.00	0.01	0.00	0.01	-0.00	0.00	0.75
Female _S	0.12	0.08	0.13	0.27	0.06	0.00	0.05	0.02	0.03
Hispanic _S	-0.02	0.08	0.85	-0.29	0.07	0.00	-0.15	0.02	0.00
Pell Eligible _S	0.01	0.08	0.88	-0.23	0.07	0.00	-0.13	0.02	0.00
Class Size _C	-0.00	0.01	0.58	-0.00	0.01	0.47	0.01	0.00	0.01
Online _C	-0.41	0.10	0.00	-0.29	0.08	0.00	-0.22	0.03	0.00
Instructor Experience _C	-0.00	0.00	0.11	-0.00	0.00	0.01	-0.00	0.00	0.83
Unemployment Rate _T	0.04	0.03	0.24	0.02	0.03	0.52	-0.02	0.01	0.01
College Algebra _C	-1.50	1.29	0.25	-0.74	0.82	0.37	-0.78	0.25	0.00
English Comp 1 _C	-1.05	1.28	0.41	-0.49	0.81	0.54	-0.09	0.25	0.71
Anatomy and Physiology 1 _C	-0.50	1.57	0.75	0.02	0.93	0.98	-0.47	0.26	0.07
Intro to Psychology _C	-1.51	1.29	0.24	-1.01	0.81	0.21	-0.46	0.24	0.06
Fund. of Oral Comm _C	-1.49	1.29	0.25	-0.93	0.81	0.25	-0.46	0.24	0.06
Observations:	1426			2468			18723		
R-Squared:	0.233			0.144			0.36		
Residual Std. Error:	1.274			1.382			1.194		
F Statistic:	4			3			33		

With a p-value of near zero and a negative coefficient, the First Eight on Us program was shown to decrease average grades by some amount. With a coefficient of -0.36 on a GPA scale of 0 to 4, this effect is noteworthy. This is essentially a shift from an A average to an A- average, as an example. With a coefficient of -0.10, the effect on non-new students was significant but smaller.

Now, it is worth noting that with non-normal residuals, some heteroskedasticity was present in the model.

The linear model rarely predicted a course GPA of 0, leading to the heteroskedasticity problem. This is reasonably expected, as the outcome variable of course GPA is closer to an ordinal categorical variable (A, B, C, etc).

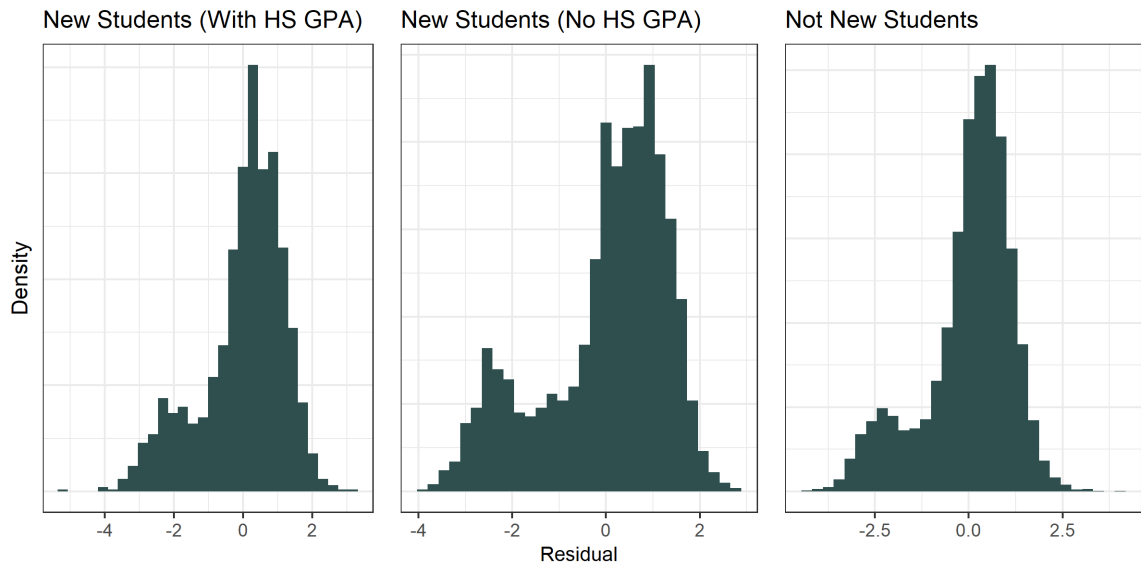


Figure 4.4: Course Performance Linear Regression Residuals

The benefit of the linear model is the ease of interpretation, however, due to the heteroskedasticity issue, an additional logistic regression approach was taken to add robustness to the preceding findings.

4.3.3 Logistic Regression Results

This method of examining the impact of free tuition on course performance used a binary pass/fail as the dependent variable in question. As before, multicollinearity was evaluated and controlled for via the removal of the same variable. The resulting model can be found below:

Table 4.4: Performance in Courses (Binomial)

	<i>New (With HS GPA)</i>			<i>New (Exclude HS GPA)</i>			<i>Not New</i>		
	Passed _S	s.e	p	Passed _S	s.e	p	Passed _S	s.e	p
(Intercept)	13.22	6522.64	1.00	18.08	3755.79	1.00	-0.11	0.55	0.84
First Eight _S	-0.69	0.21	0.00	-0.56	0.16	0.00	-0.29	0.08	0.00
First Six _S	-0.47	0.29	0.10	-0.60	0.21	0.00	-0.34	0.10	0.00
High School GPA _S	1.31	0.18	0.00	-	-	-	-	-	-
Career GPA _S	-	-	-	-	-	-	0.93	0.03	0.00
Career Hours Earned _S	-	-	-	-	-	-	-0.00	0.00	0.00
Bridges _S	0.01	0.23	0.96	0.01	0.18	0.93	0.05	0.13	0.69
Prior Duals _S	0.47	0.20	0.02	0.76	0.14	0.00	-0.06	0.06	0.34
Semester Hours _S	-0.09	0.04	0.01	-0.06	0.02	0.01	-0.02	0.01	0.07
Age _S	0.09	0.03	0.00	0.01	0.01	0.21	-0.01	0.00	0.00
Female _S	0.25	0.19	0.19	0.47	0.13	0.00	0.16	0.05	0.00
Hispanic _S	0.20	0.19	0.31	-0.25	0.14	0.06	-0.20	0.05	0.00
Pell Eligible _S	-0.18	0.19	0.34	-0.50	0.13	0.00	-0.21	0.05	0.00
Class Size _C	-0.02	0.02	0.31	0.01	0.01	0.36	-0.00	0.01	0.97
Online _C	-0.61	0.24	0.01	-0.29	0.16	0.08	-0.40	0.08	0.00
Instructor Experience _C	-0.00	0.01	0.36	-0.00	0.00	0.20	-0.00	0.00	0.41
Unemployment Rate _T	0.07	0.09	0.40	0.03	0.06	0.57	-0.05	0.02	0.00
College Algebra _C	-17.06	6522.64	1.00	-16.91	3755.79	1.00	-0.54	0.53	0.31
English Comp 1 _C	-16.61	6522.64	1.00	-16.81	3755.79	1.00	0.17	0.54	0.76
Anatomy and Physiology 1 _C	-0.08	7875.65	1.00	0.64	4273.36	1.00	0.46	0.58	0.43
Intro to Psychology _C	-16.93	6522.64	1.00	-17.11	3755.79	1.00	-0.10	0.53	0.85
Fund. of Oral Comm _C	-16.91	6522.64	1.00	-17.08	3755.79	1.00	0.11	0.53	0.84
Observations:	1426			2468			18723		
McFadden Pseudo R2:	0.199			0.141			0.162		
Null deviance	1185			2207			14250		
Residual deviance	950			1895			11941		

Once again, the free tuition models of First Eight and First Six were found to have impact on grades. Converting the log-odds shown above to the change in the odds ratio, new students who participated in First Eight were 43 to 50% less likely to pass while non-new students were 25% less likely to pass. Participation in First Six led to new students being 38 to 45% less likely to pass (at 90% confidence), while non-new students were 29% less likely to pass.

4.3.4 Within-Program Differences

Most, but not all, of the students in Summer of 2020-21 received First Eight funding support. This naturally led to the question of how those who did not receive the

funds that semester performed relative to those that did receive the funds. This distinction was not a randomized control group and so this comparison would simply add a descriptive perspective to the findings but may be of interest nonetheless.

Of the 2,868 course enrollments in Summer 2020-21, 2,426 had First Eight funds applied (using the logic described in the methodology section of this report). The 442 enrollments that did not have First Eight associated with it had an average course GPA of 2.66 compared against a 2.90 average for those that did receive the funds.

These two groups of students had comparable prior performance in academics, both with around 3.12 average high school GPA and 3.00 college GPA. There were likely differences in income among these two groups, with around 52% of those who received First Eight being Pell eligible and around 11% of those who did not receive First Eight. The average age of those who did not receive First Eight was around 28, while the average age of those that did was 25.

4.4 Subsequent Enrollment into Non-Free Semesters

The emphasis on the retention portion of this analysis was focused on enrollment into non-free semesters, potentially offsetting some of the cost of a free summer term. As such, credential attainment is not the main focus of this work.

The analysis looked at students who were enrolled in the summer and did not complete any degree or certificate that summer (denominator) and whether or not they enrolled in the Fall semester or not (numerator). It also included a similar measure for the Spring semester, excluding Summer 2021-22 students based on the timing/data availability of this study. Future research could take a longer term perspective on

enrollment impacts.

It may be worth mentioning that these measures of retention veer significantly from traditional statistics submitted into the IPEDS data system, which look primarily at fall-to-fall retention. As such, comparisons between these data and IPEDS data should not be done.

4.4.1 Summer-to-Fall Overall

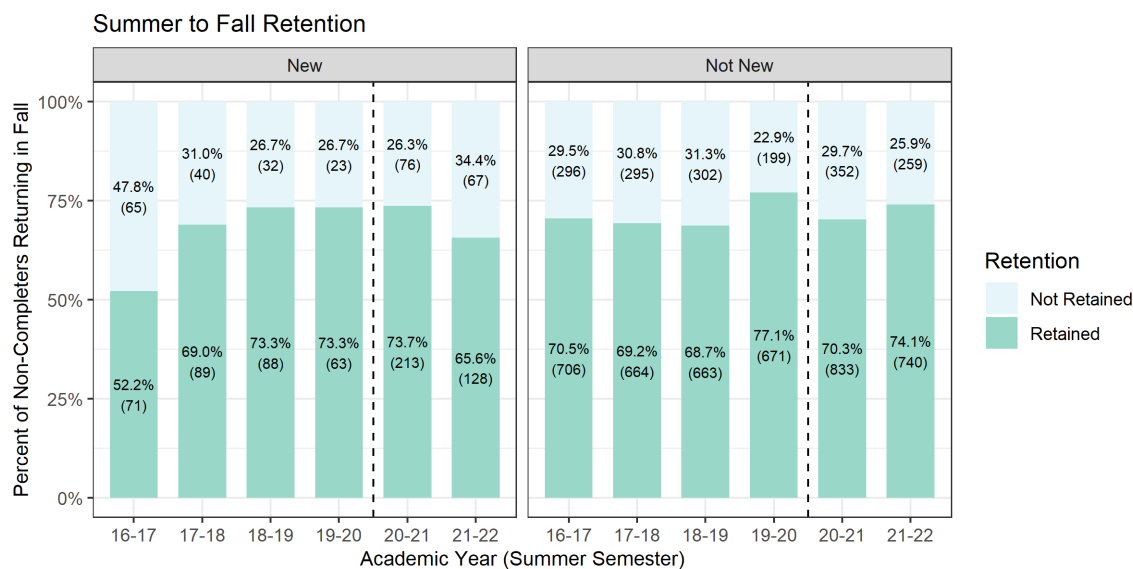


Figure 4.5: Summer-to-Fall Retention (CSI, 2023)

Initially, there does not appear to be any major change in the percent of non-completing students attending in the summer that return to CSI in the Fall. Nevertheless, there does appear to be a large increase in the raw number of students retained.

4.4.2 Summer-to-Fall Modeling

Naturally, many factors impact student retention from one semester to the next. See the logistic regression results below.

$$\begin{aligned}
Retained_s = & \beta_0 + \beta_1 FirstEightonUs_s + \beta_2 FirstSixonUs_s \\
& + \beta_3 SummerTermGPA_s + \beta_4 BridgeProgram_s \\
& + \beta_5 PriorDual_s + \beta_6 Female_s + \beta_7 Age_s + \beta_8 FullTime_s \quad (4.4) \\
& + \beta_9 PellEligible_s + \beta_{10} UnemploymentRate_t \\
& + \beta_{11} CourseFixedEffects_c + \epsilon
\end{aligned}$$

Applied as a logistic regression with Summer-to-Fall Retention as the dependent variable:

$$Logit(SummertoFallRetention) = \frac{1}{1 + e^{-(Model)}}$$

4.4.3 Summer-to-Fall Results

Table 4.5: Summer-to-Fall Retention (Binomial)

	<i>New</i>			<i>Not New</i>		
	Retained _s	s.e	p	Retained _s	s.e	p
(Intercept)	-1.83	0.43	0.00	-0.67	0.14	0.00
First Eight _s	0.42	0.21	0.05	-0.26	0.09	0.00
First Six _s	0.41	0.25	0.10	-0.09	0.11	0.44
Transfer Student _s	-	-	-	-0.59	0.05	0.00
Summer Term GPA _s	0.46	0.05	0.00	0.31	0.02	0.00
Bridge _s	1.46	0.26	0.00	0.52	0.16	0.00
Prior Dual _s	0.71	0.17	0.00	-0.10	0.06	0.10
Age _s	-0.03	0.01	0.00	-0.01	0.00	0.02
Female _s	0.25	0.15	0.10	0.10	0.06	0.07
Hispanic _s	0.01	0.17	0.94	0.09	0.06	0.15
Pell Eligible _s	0.63	0.17	0.00	0.69	0.05	0.00
Unemployment Rate _t	0.04	0.06	0.54	0.04	0.02	0.02
College Algebra _c	-1.23	1.87	0.51	-0.03	0.49	0.95
English Comp 1 _c	-0.51	1.85	0.78	0.03	0.50	0.96
Anatomy and Physiology 1 _c	-2.02	2.57	0.43	0.21	0.68	0.75
Intro to Psychology _c	-1.21	1.86	0.52	-0.24	0.49	0.62
Fund. of Oral Comm _c	-1.07	1.85	0.57	0.06	0.49	0.90
Observations:	1474			10330		
McFadden Pseudo R2:	0.312			0.166		
Null deviance	1991			12498		
Residual deviance	1370			10426		

With a p-value of .05 and a positive coefficient, the First Eight on Us program was shown to have a positive impact on subsequent enrollment into a non-free semester for new students (at 95% confidence). Comparable results were found for First Six (at 90% confidence). With a negative coefficient and a p-value of near zero, non-new students were around 23% less likely to return in the subsequent Fall semester in the First Eight program and were likely unaffected by First Six. This result for

non-new students was curious. Students who completed a degree or certificate during the summer semester were excluded. Transfer students who only came for the free tuition was controlled. Future research could pursue if these students were more likely to transfer to another school without a certificate or degree after taking advantage of a free semester. In addition, perhaps former "stop-out" students, those who never finished the degree and did not transfer, decided to give college another shot.

These findings, coupled with the sizable increase in enrollment, may suggest positive enrollment impact and cost mitigation for the college in non-free semesters particularly for new students. For non-new students, at least for First Eight, many factors may have contributed to less non-new students returning. As "swirl" (students attending multiple institutions) becomes more prevalent, it is possible that more of these non-new transfer students were simply at CSI for First Eight with all intention to simply return to their home institution. A "Transfer Student" control variable was included for this reason, but specifically controlling for that intent is difficult. As First Six was not marketed nearly as heavily, and seeing no impact on non-new student retention, this explanation may be plausible.

4.4.4 Summer-to-Spring Overall

To add another perspective on retention, analysis also included looking at the impact, if any, of Summer-to-Spring retention.

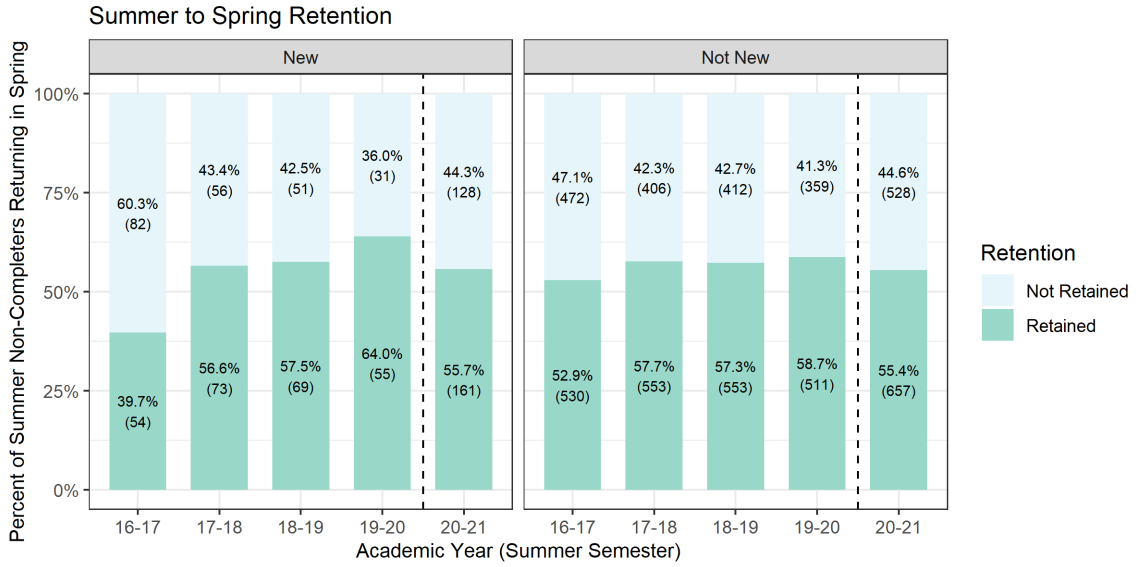


Figure 4.6: Summer-to-Spring Retention (CSI, 2023)

Initially, as with the Fall semester, there does not appear to be noteworthy changes in the percent of students enrolling in the non-free Spring semester, but a noticeable increase in the number of students.

4.4.5 Summer-to-Spring Results

Table 4.6: Summer-to-Spring Retention (Binomial)

	<i>New</i>			<i>Not New</i>		
	Retained _s	s.e	p	Retained _s	s.e	p
(Intercept)	-1.20	0.90	0.19	-1.49	0.27	0.00
First Eight _s	-0.18	0.21	0.38	-0.22	0.08	0.01
Transfer Student _s	-	-	-	-0.37	0.05	0.00
Summer Term GPA _s	0.52	0.06	0.00	0.21	0.02	0.00
Bridge _s	1.09	0.25	0.00	0.80	0.16	0.00
Prior Dual _s	0.87	0.18	0.00	-0.08	0.06	0.15
Age _s	0.00	0.01	0.78	0.00	0.00	0.12
Female _s	0.16	0.16	0.30	0.10	0.05	0.06
Hispanic _s	0.49	0.18	0.01	0.17	0.06	0.00
Pell Eligible _s	0.11	0.17	0.54	0.47	0.05	0.00
Unemployment Rate _t	0.12	0.06	0.06	-0.01	0.02	0.71
College Algebra _c	1.23	0.38	0.00	0.32	0.10	0.00
English Comp 1 _c	0.56	0.22	0.01	0.36	0.13	0.00
Anatomy and Physiology 1 _c	-0.73	1.23	0.55	0.57	0.24	0.02
Intro to Psychology _c	0.19	0.28	0.51	0.13	0.10	0.18
Fund. of Oral Comm _c	0.70	0.26	0.01	0.49	0.10	0.00
Observations:	1279			9331		
McFadden Pseudo R2:	0.283			0.13		
Null deviance	1765			12763		
Residual deviance	1265			11106		

With a p-value of .38, First Eight likely did not impact new student retention into the subsequent Spring semester. Similar to Summer-to-Fall, non-new students were about 20% less likely to return in the Spring.

Future research could attempt to quantify an estimated dollar amount of cost recovery from increased future enrollment. This would, of course, need to take into account tuition dollars and state funding. In addition, increased credential attainment

may impact state-specific, outcome-based funding models. Also, whether existing state funding methodologies could support such programs should be considered. The financial modeling would also need to consider how alternative educational institutions would react to the implementation of such a program. In addition, the First Eight and First Six models were known to be short-term by the student population. If permanent programs were put into place, how student financial behavior might change would also need to be considered.

CHAPTER 5: KEY FINDINGS

5.1 Overall

College of Southern Idaho's Summer 2021 free tuition First Eight on Us and First Six programs led to:

- Substantial growth in enrollment.
- Moderate decrease in grades.
- Minor decreases in self-reported effort.
- Little-to-no impact on perception of course quality.
- Positive impact on the *percent* of first-time student retention into non-free semesters; some negative impact on non-new student retention.
- An increase in the *number* of first-time students retained into non-free semesters.

5.2 Limitations

One noteworthy limitation is the differing nature of the First Eight and First Six programs, discussed in more detail in the Background portion of this report. As such, marginal effects shifting from eight free credits to six ought not be considered.

Different interpretations for the different structures (e.g. external marketing vs only internal marketing) are perhaps more appropriate.

Another potential limitation is the difficulty in differentiating between the COVID-19 pandemic effect and the free tuition effect. The first summer of COVID, Summer 2020 (AY 2019-20), was pre-implementation of free tuition programs. There was no significant drop in grade distribution which may suggest that the free tuition is the driving variable. However, instructors were inclined and expected to be lenient with grades that first Summer semester in particular. When simply looking at within-program, for example 2020-21, students who did not receive free tuition performed measurably better than those who did, which also would suggest that the First Eight program caused the drop in grades. Nevertheless, this finding is also not perfectly clean, as the distinction between receiving and not receiving the funds was not random.

5.3 Potential Implications and Future Research

With measurable increases in enrollment and no proportional impact on retention into subsequent non-free semesters, the free Summer semester had positive enrollment impact on the college. This may suggest increased access and better high school-to-college go-on rates. There may have been less of an opportunity cost to attend college during this time frame. However, the inclusion of unemployment rate and age as independent variables likely controlled for any possible changes in foregone earnings.

More research would be necessary to establish how much of the increase in enrollment was simply a shift from one college to another and how much was associated with students who would not have attended any college if tuition was not free. In addition, as discussed in the literature review, if early-stage shift from four-year to

two-year occurred, future research could more thoroughly examine the long-term effects on four-year school enrollment.

As time passes, additional methodologies become possible as well. For example, a comparison between students who were offered eight credits for free (First Eight) and those who were offered six (First Six) on measures of student retention could better isolate free tuition relative to the COVID effect. Additional student outcomes such as graduation rates, transfer to four-year schools and labor market outcomes should be considered. If free tuition improves graduation rates, economic gains related to the labor market may offset some of the cost to deliver the free college program.

In conclusion, this research found that the way students approach their education may change by some amount when it is free. Financial implications are likely to be the driving factor on whether colleges, states or the nation adopt free community college. Nevertheless, higher education administrators, faculty and staff should be aware of some of the additional effects free tuition may have on their students and faculty. For example, planning for a moderate negative shift in grade distribution with additional advising, tutoring, strategic use of data or other methods may help to mitigate or prevent these effects altogether.

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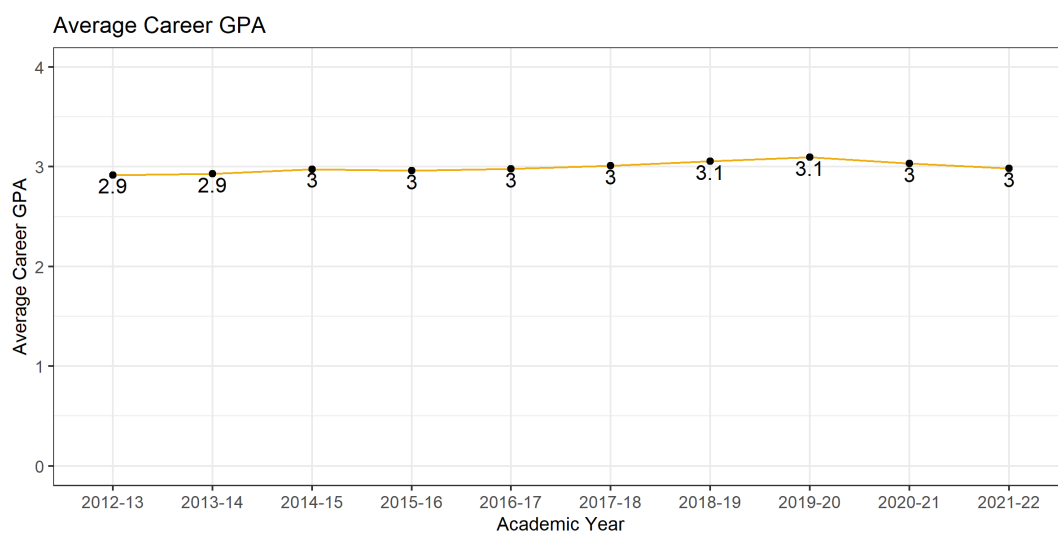
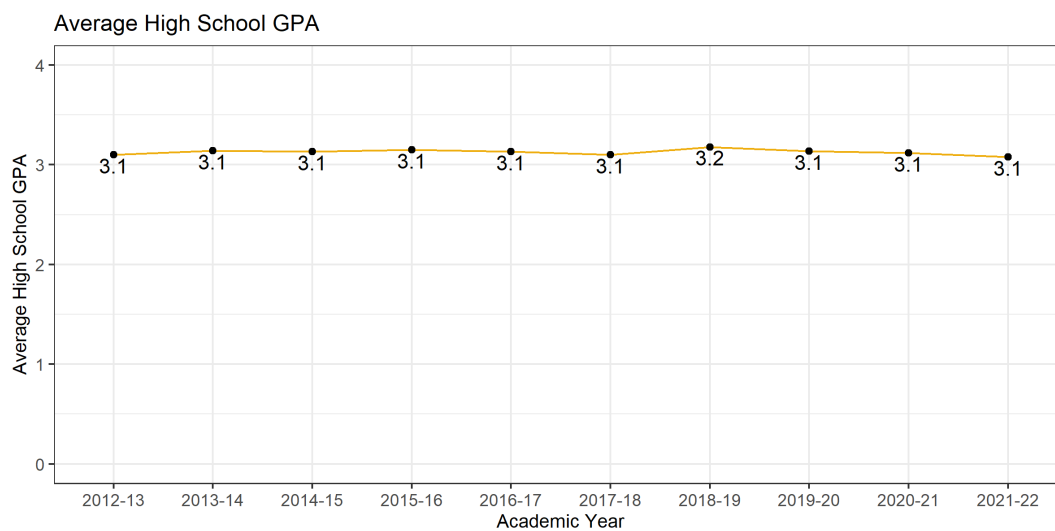
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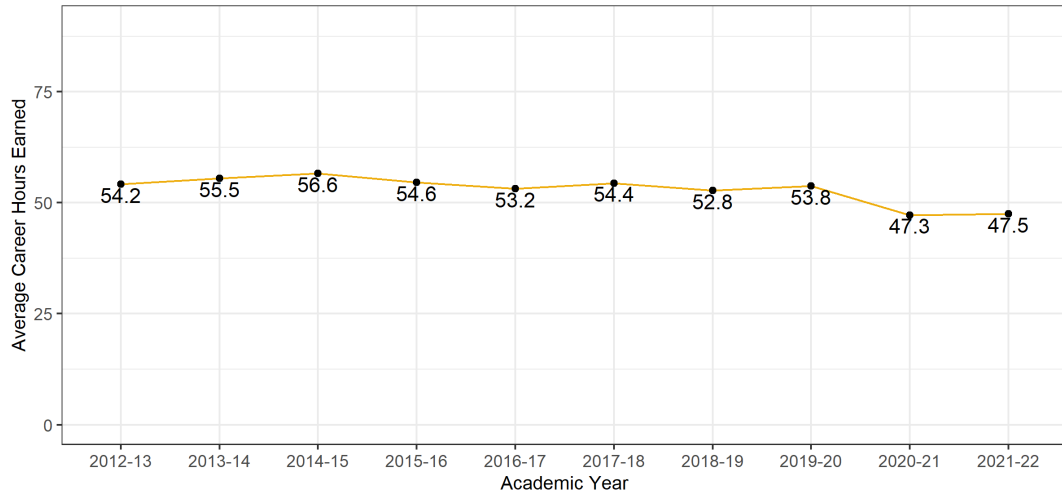
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APPENDIX A: CONTROL VARIABLES OVER TIME



Average Career Hours Earned



First-time Postsecondary

