Are Online Master's Courses Associated with Decreased Borrowing? Evidence from the University System of Georgia

Pearson M. Brown

Leslie E. Hodges, Ph.D.

University System of Georgia

Prepared for the 2024 Association for the Study of Higher Education Annual Conference

November 21, 2024

Author Note

This paper should not be cited without the authors' permission. Views expressed in this paper are that of the authors and do not reflect those of the Board of Regents of the University System of Georgia.

Abstract

Individuals who view a master's degree as a pathway for raising their earnings potential first consider the financial and opportunity costs that a master's entails. While many have touted online learning as possessing the potential to lessen higher education's financial burden, there appears to be a dearth in research that examines how online learning relates to student finances, especially at the master's level. To address this gap, we assembled a two-component research design that investigated how taking master's courses online is associated with student borrowing and then to postgraduation earnings. Results from our regression analyses suggest that online courses do not relate to master's students' propensity to borrow nor loan amounts but are linked to increased wages one year after graduation. These findings support the notion that by providing educational offerings that help students remain employed, institutions can leverage master's programs as an outlet for advancing graduates' earnings potential.

Keywords: Online Learning, Master's Debt, Postgraduation Earnings

Are Online Master's Courses Associated with Decreased Borrowing? Evidence from the University System of Georgia

Individuals increasingly viewing higher education as necessary for favorable employment outcomes has led many to regard an undergraduate degree as a prerequisite instead of as a differentiator in the job market. In fact, the National Association of Colleges and Employers (NACE; 2023) reported that nearly 70% of surveyed hiring managers indicated that their organization required entry-level employees to have earned a bachelor's degree. Most jobs requiring a bachelor's has likely contributed toward increased bachelor's degree obtainment rates, though more individuals earning this degree saturates job application pools with bachelor's recipients, necessitating additional experience, skills, or degrees to stand out. There is growing belief that more employers are considering bachelor's degrees as akin to high school diplomas, which may explain why more individuals are pursuing graduate degrees (Gumport, 2016). Graduate education has historically centered on refining research abilities, yet students are turning toward master's degrees—graduate-level degrees that instill industry-specific knowledge—in hopes of advancing their career. Gándara and Toutkoushian (2017) estimated that receiving a master's degree (across all disciplines) can increase an individual's lifetime earnings by more than $175,000, with master's in business and education producing even greater pay raises. While master's degree completion is associated with increased wages, prospective students must evaluate the monetary and time costs that a master's entails. As tuition and fee rates rise, more master's students are taking out loans, and borrowers are taking out greater amounts, on average (Webber & Burns, 2021). Indeed, 60% of master's recipients in 2016 graduated with student loans, with an average debt amount of $66,000 (National Center for Education Statistics [NCES], 2022). Student loan reliance has escalated over the years, with

average loan balances increasing (in constant dollars) from 1999-2000 to 2015-2016 across all master's degree fields (NCES, 2022). Even with loans amounts climbing, Monarrez and Mastudaira (2023) calculated that during a similar timeframe, the percentage of U.S. adults with a master's doubled.

Master's borrowing amounts and enrollment numbers concurrently rising has advanced interest in promoting master's degree affordability. It should be no surprise that online learning's ascent has invited speculation that taking classes via the internet could lessen higher education's financial burden (Allen & Seaman, 2014; Kerr & Wood, 2023; Moloney & Oakley; 2010). Online courses conceivably present monetary advantages for students through allowing students to avoid missing work to travel to campus and by expanding opportunities to complete coursework outside of traditional hours. Despite perceived financial benefits, there appears to be a dearth in the literature that considers the extent course modality (online vs. face-to-face) relates to student borrowing. Since master's degrees entail upfront costs, but can increase lifetime earnings, this study seeks to be among the first to examine whether master's course modality relates to both borrowing amounts and to post-graduation earnings. Specifically, this study tests these relationships by addressing the following research questions through the context of the University System of Georgia (USG):

1. What is the association between master's program modality and student borrowing?
2. How do institutional characteristics and student choices influence master's borrowing patterns across modality?
3. Do online master's students incur higher wages post-graduation than their peers in the same academic discipline who took courses in a face-to-face format?

The USG is comprised of 26 public four-year institutions of higher education that enrolled over 328,000 students in the Fall 2018 semester. Seventeen institutions in the USG offer master's programs, and in Fiscal Year 2019, encompassing Summer 2018, Fall 2018, and Spring 2019, these universities collectively conferred 12,560 master's degrees. USG institutions have ranging enrollments, academic focuses, and levels of urbanization, which allows this study's system-wide findings to carry transferability for state systems. As prospective students weigh a master's degree's costs, connecting how master's course modality relates to borrowing and post-graduation earnings can advance conversations surrounding master's degrees' return on investment.

Literature Review

Journals are replete with research that examines the three subjects that underly this study: (a) student borrowing, (b) online learning, and (c) postgraduation earnings. However, these works traditionally center undergraduates and/or solely focuses on one of these subjects, which could cause previous research to overlook ways these three factors converge to influence master's students' financial situations. With our study seeking to uncover whether online courses relate to how students pay for their master's and the later monetary benefits, we arrange our literature review into three sections to separately detail these subjects, which together ground this study's research design.

Master's Student Borrowing

Research on the determinants and effects of student borrowing largely pertains to undergraduate students (Webber & Burns, 2022), though graduate students carrying half of outstanding student debt underscores calls for more understanding of borrowing at the graduate level (Looney et al., 2020; Robinson, 2022). Graduate students' borrowing decisions differ from

undergraduates since graduate students are typically older (which can bring career and dependent considerations), yet graduate programs can provide funding opportunities that are not available to undergraduates. Prospective graduate students also consider debt they accumulated during their undergraduate education, such that high undergraduate loan debt is associated with reduced odds of applying to graduate school in the first place (Millett, 2003). Students who pursue graduate school also select from ranging degree types (master's, doctoral, etc.), which vary in cost and length. Graduate education's heterogeneity means this literature review focuses on works that examine outcomes for master's students and notes when research is based on other graduate degrees.

Studies that examine master's borrowing find that student characteristics, enrollment choices, and institutional factors relate to borrowing tendencies and financial inequities seen at the undergraduate level can be starker at the master's level. Starting with student-level characteristics, Black/African American master's students take out loans at higher rates and borrow greater amounts, on average, than their white peers, while master's graduates who identify as Asian accrue fewer loans, on average, than white master's recipients (Baum & Steele, 2018; Burns & Webber, 2019). Black/African American master's students being prone to greater borrowing levels presents additional implications since Black/African American undergraduates accumulate more loans, on average, than white undergraduates (Scott-Clayton & Li, 2016). Baum and Steele's (2018) descriptive analysis of the Baccalaureate and Beyond Study 2008-2012, concluded that master's students who qualified for Pell borrowed at higher rates than non-Pell recipients and individuals who earned a bachelor's before turning 23 were less likely to borrow as master's students than individuals who received their bachelor's after turning 27. Earning a bachelor's at a younger age grants individuals more time to generate income which can

build their financial base should they return for a master's. Just as increases in individual income are associated with reduced master's borrowing, master's students who are married tend to borrow less than their non-married peers (Burns & Webber, 2019; Webber & Burns, 2022). Greater household earnings lower the amount master's students borrow, though debt students retain from their undergraduate degree can compound a master's degree's financial strain. After recalling that undergraduate debt is associated with reduced odds of applying to graduate school (Millett, 2003), it is reasonable to assume that students with loans who continue their education may be averse to additional borrowing. Yet Belasco et al. (2014) showed that undergraduate borrowing positively relates to graduate borrowing (all degree types), leading the authors to muse that monetary needs may outweigh borrowing hesitance that undergraduate debt could instill. Webber and Burns (2022) also found a positive relationship between undergraduate borrowing and master's borrowing and noted this relationship's effect size was larger for master's students in 2016 compared to 2000. Student characteristics and financial circumstances relating to student loans means that master's students' backgrounds influence borrowing trajectories even before they select a degree program.

Individuals who apply to master's programs make a series of decisions regarding their enrollment status. With an underlying goal of most master's programs being to propel students' careers, many master's programs provide part-time options to allow students to maintain their employment. Even though taking classes part-time elongates time to degree, part-time enrollment is associated with decreased master's borrowing (Burns & Webber, 2019; Webber & Burns, 2022), possibly because part-time students can keep working full-time thereby reducing their need to borrow. Kim and Otts (2010) looked at the relationship between loans and time to degree at the doctoral level and found that for most disciplines, doctoral students with higher

loans took significantly less time to earn their degree. In addition to the number of courses a master's student takes each semester, there is some, albeit mixed, evidence that indicates a degree's academic focus impacts student debt. Webber and Burns (2022) found that students in STEM master's programs borrowed significantly more, on average, than master's students in non-STEM programs, while Burns and Webber (2019) found no borrowing differences between these students, and Belasco et al. (2014) found that Ph.D. students in STEM programs borrowed less than Ph.D. students in several non-STEM fields. One potential explanation for these divergent results is the prevalence of tuition-offsetting graduate assistantships, which vary by degree type and academic program. Graduate assistantships may provide students with a stipend, which does not eliminate costs that come with a master's but can help pay for living expenses. Access to tuition waivers and stipends likely explains why studies routinely return that graduate/research assistantships are negatively associated with student loans. However, assistantship funding is often tied to research grants, leading many graduate assistantships to be concentrated in doctoral programs (Baum & Steele, 2018). Jaquette (2019) noted that institutions can view professional degrees as "cash cows", which means some institutions may avoid negating a master's program's tuition revenue through awarding assistantships. The probability of a master's student receiving an assistantship is around one in 10 (Gándara & Toutkoushian; 2017), but there is tremendous upside for students who receive this funding opportunity as they can anticipate an income stream and a reduced need to borrow (Kim & Otts, 2010; Webber & Burns, 2021).

Several institutional characteristics relate to master's student borrowing with sector (i.e., public, private for-profit, private nonprofit) being a prominent contributor. As expected, it is more common for master's students who attend public institutions to graduate debt-free than

their peers who attend private institutions (Baum & Steele, 2018). While this is positive news for this study's population, which comes from public, four-year universities, literature suggests additional institutional characteristics, such as student tuition and fee rates, number of full-time equivalent (FTE) students, and institutional revenues relate to master's borrowing. Belasco et al. (2014) found that increases in graduate-level fees and institutional reliance on tuition as a revenue stream positively relate to graduate student debt and raise the odds graduate students will borrow. Webber and Burns (2022) did not control for tuition and fees, but their analysis contrarily found a small, inverse relationship between institutional reliance on tuition revenue and master's student debt. Increases in FTE enrollments are associated with decreased master's borrowing (Burns & Webber, 2019), though this may have more to do with larger institutions having more resources, rather than possessing a greater capacity to support students' academic journeys, as Belasco et al. (2014) indicated that an institution's expenditures per student do not relate to graduate student borrowing. FTE enrollments and expenditures per student attempt to quantify an institution's financial resources for supporting students, though studies do not seem to control for an institution's number of master's students nor the percent of an institution's students who are enrolled in master's programs, which could produce more relevant estimates.

Online Learning

Studies that investigate online learnings' effectiveness produce mixed at best results (Ortagus et al., 2023). Researchers who evaluate the academic outcomes of an undergraduate course's online sections to its face-to-face sections largely find that, when compared to their face-to-face counterparts, online students receive lower course grades and have higher withdrawal rates (Alpert et al., 2016; Figlio et al., 2013; Johnson & Majia, 2014; Xu & Jaggars; 2011, 2013). When pivoting to long-term outcomes, such as transferring from a two- to a four-

year institution and retention rates, there are reasons to believe that online learning can augment student success (Johnson & Majia, 2014; Ortagus, 2018). Many modality studies focus on introductory courses, which could suggest that course modality is most salient when students are adjusting to college. Master's students completed their bachelor's, making it reasonable to assume they are better situated to navigate higher education courses and logistical feasibility carries more weight in their modality decisions. Assessing academic outcomes for individual online master's courses is beyond this study's scope, but based on a master's degree's overarching purpose, we assume that master's students are less concerned with obtaining a particular grade and are more interested in advancing their career.

Master's students' life stages make managing responsibilities and financial practicality integral aspects of their course schedules. Before the COVID-19 pandemic, Bowen et al. (2014) speculated that online learning could evolve into a cost-effective solution for educating more students. The pandemic vaulted these projections into reality, and while online enrollments have plateaued, post-pandemic trends indicate that virtual instruction will remain above pre-pandemic levels (Coffey, 2024). When comparing undergraduate students at the City University of New York who took at least one course online to their fully face-to-face counterparts, Wladis et al. (2023) showed that online students devoted more time each week toward working and childcare, resulting in less "free time" for school. The authors found that increases in age and having children relate to less time for educational activities, and these factors are better predictors of retention than outcomes in online courses. Studies routinely indicate that "non-traditional aged" undergraduate students take online courses at higher rates (e.g., Johnson & Majia, 2014; Ortagus et al., 2023), which could mean that as students get older and accumulate responsibilities, they view online courses as a time management strategy. It is possible that positive outcomes in

online courses come when students view virtual instruction as a tool for reducing higher education's in-person requirements rather than as a substitute. For example, Ortagus et al. (2023) found that undergraduates who enrolled exclusively in online courses were less likely to earn a bachelor's than their classmates who took a mix of face-to-face and online courses. These results further the notion that online courses cannot replace the in-person classroom experience even if they expand access and bolster retention. Despite empirical evidence suggesting that online courses are associated with less favorable outcomes, researchers encourage readers to avoid interpreting their results as justification for ceasing online courses, and instead as a call to identify ways for improving online learning so it can reach its potential of counteracting many of higher education's impediments (e.g., Xu & Jaggars, 2013).

Postgraduation Earnings

Master's degrees being linked to student loans and non-curriculum-based hurdles means that for a master's to be a prudent investment, it should impart graduates with access to greater earnings. A sizeable body of research evaluates the extent bachelor's degrees raise earnings compared to workers whose highest degree is a high school diploma, yet far less knowledge exists regarding graduate degrees' earnings premiums compared to bachelor's recipients (Song et al., 2008; Stevenson, 2016). The Bureau of Labor Statistics (BLS; 2024) reported that the median weekly earnings for master's graduates was $244 above the median weekly earnings for bachelor's degree holders ($1,737 vs. $1,493, respectively) and master's degree holders enjoy a slightly lower unemployment rate than bachelor's recipients (2.0% vs. 2.2%, respectively). BLS data also indicate that going from a bachelor's to a master's results in comparatively less growth in median weekly earnings than moving from a high school diploma to a bachelor's degree (a $594 increase in median weekly earnings). While master's graduates anticipate increased

earnings, the magnitude of pay raises varies by employment sector, with master's graduates who started in lower wage fields incurring the largest increases. Minaya and Soliz (2024) found that individuals who pursued careers in education and health care gained the most financially from earning a master's, while a master's in engineering did not relate to increased earnings, possibly due to earnings increases in engineering fields going to workers with doctorates. A master's in arts and humanities can strengthen graduates' skillsets, yet these gains do not necessarily translate into increased earnings (Minaya et al., 2024; Minaya & Soliz, 2024). Prospective students should recognize that their master's program's academic focus presents financial implications, as this decision permeates into both borrowing and postgraduation earnings. Field's (2009) analysis of a law school financial aid packages unveiled that loan amounts exerted a negative influence on graduates practicing in the public sector, suggesting that increased loans can compel graduates to pursue more lucrative employment. Earnings premiums varying by and within graduate programs means that prospective master's students should consider their financial situation and evaluate the extent to which their aspirant employment sector can boon their earnings potential.

As with student borrowing and the propensity to enroll in online courses, student characteristics are inseparable from postgraduation earnings. Median annual earnings for workers with graduate degrees differ by race/ethnicity and gender; Asian and white graduate degree holders incur median earnings that exceed every other race/ethnicity and the median earnings for graduate degree recipients who identify as male is $34,000 above their female counterparts (Gulish et al., 2024). Differences in the academic program selection by race/ethnicity and gender help explain these troubling inequities. Gulish et al. (2024) also reported that when looking at graduate degree holders by gender, most graduates in higher

paying fields, such as STEM and business, identify as male, while the majority of graduate degree holders in fields that traditionally entail lower wages, such as education and humanities, identify as female. When shifting from graduates' earnings to master's degree's earnings premiums, academic focus and employment sector continue shedding light on differences by gender. Minaya and Soliz (2024) estimated that female master's recipients incur an earnings increase that is 11 percentage points above what males can expect, though more females pursuing their master's in low wage fields (which therefore have more room for earnings growth) drive these differences. Students who enroll in a master's program at a later stage in life can also expect a reduced earnings premium (Gándara & Toutkoushian, 2017), due to spending more time in the workforce and starting with a higher base salary.

Theoretical Framework

Human capital theory guides our approach as an individual's motivation to advance their workforce expertise largely underlies their choice to pursue a master's. Human capital theory asserts that education imparts individuals with knowledge and skills, which enable workers to be more productive and access greater wages (Becker, 1993). Increased workforce productivity spurs positive externalities, meaning the benefits of educational attainment extend beyond personal finances and relate to societal-level advancements. Education catalyzing workforce efficiency entails lasting upsides, though these gains involve frontend tradeoffs. Paulsen (2001) wrote that the decision to enroll in higher education presents financial costs in the form of tuition and forgone wages, but also requires individuals to invest time and energy toward school, all of which could have gone toward other pursuits. With most entry-level jobs expecting employees to have a bachelor's (NACE; 2023), pursuing a bachelor's degree may be more straightforward from a human capital theory standpoint, since without this credential, "traditional-aged"

undergraduates miss-out on over 40 years of greater wages. Though as individuals get older and potentially have a job and/or support dependents, electing to further invest in their education entails more facets. Should a prospective student conclude that returning to school is logistically possible, they must decide whether gaining more of education's benefits outweigh its costs (DesJardins & Toutkoushian, 2005). With master's degrees relating to increased earnings, but premiums varying by field and across student characteristics, the choice to enroll in a master's program is more complex from a human capital standpoint.

A student's cost-benefit assessment influences their enrollment decision, and secondarily, whether they elect to pursue their studies in an online or a face-to-face modality. Manski (1993) cautioned from assuming prospective students make decisions based initiating return on investment calculations, yet students recognize that education presents costs and offers returns. Should an enrollee perceive that online master's courses will provide the same educational credential as a face-to-face program, while not having to spend money or time commuting to campus (which may lead to work absences), taking courses online could allow them to reap a master's benefits while incurring lower front-end costs. Further, with the employment sector seeming to permit more remote/hybrid work opportunities post-pandemic, it is possible that master's students are increasingly familiar with virtual offerings and may not view online courses as a disadvantage. As students consider their previous debt, obligations, and envision how a master's will advance their career, finding ways to lessen frontend costs while preserving degree completion could make expected financial gains feel more realistic.

Research Design

Data and Sample

To analyze the relationship between master's course modality and aspects of master's students' financial situations, we assembled a dataset that allowed us to incorporate financial variables for four years of master's students' program enrollment up until four years after their graduation. Noting that prospective students weigh the costs and benefits of pursuing a master's (Manski,1993), our research design entailed two components, thus positioning our analysis to test how master's course modality relates to student borrowing and to postgraduation earnings. Our study's first component considered how master's course modality is associated with student borrowing. Data for our study's first component came from the USG's data warehouse, which includes information on student loans, that originally came from both FAFSA applications and the USG's financial aid collections. The sample for our study's first component was the 12,560 students who earned a master's degree from any of the 17 USG institutions that award master's degrees in FY2019 (which encompasses the Summer 2018, Fall 2018, and Spring 2019 academic terms).

Our study's second component examined the relationship between master's course modality and postgraduation earnings. As with the first component, data on student characteristics and course taking patterns is from the USG's data warehouse, though data on postgraduation earnings came from Georgia's Academic and Workforce Analysis and Research Data System (GA-AWARDS), which is Georgia's statewide longitudinal data system under the purview of Georgia's Governor's Office of Student Achievement. This dataset is a compilation of person-level data from Georgia state agencies (e.g., Georgia Department of Education, Technical College System of Georgia, Georgia Department of Labor, and the USG), and allows researchers

to track students through the education pipeline into the workforce. It is important to note that GA-AWARDS gathers employment data from entities that pay into Georgia's unemployment insurance, which means GA-AWARDS does not include wages that employees earned outside of Georgia, through the military, or via self-employment. Since it is possible that master's graduates secured employment but did so through outlets that are beyond GA-AWARDS's scope, we excluded students who never had reported wages from our second component's sample. This limitation led us to remove 4,346 individuals from our original sample of 12,560 master's graduates, resulting in our study's second component's sample entailing 8,214 students.

Variables

The dependent variables for our study's first component, whether master's course modality relates to student borrowing, were whether a master's student graduated with loans (any amount of loans = 1, no loans = 0) and the amount of loans a student accumulated upon graduation. Knowing that a range of student-level variables affect borrowing trajectories, we controlled for several demographics (gender, race/ethnicity, in-state residency), institutional characteristics (institution, received a paid assistantship position), and student choices (degree major, full-time status, and primary course modality). Our analysis leveraged data from across four fiscal years (FY2016-FY2019), enabling us to incorporate a 200% graduation timeframe. We created indicators to signify students' primary course modality, full-time status, and whether they had a paid graduate assistantship. We based these indicators on the classification that students held for the most terms during their master's degree. For example, if a student was full-time for three out of four semesters, we deemed them as being full-time, and if a student took four out of five classes in a face-to-face format, we coded their modality as face-to-face. We regarded students who took an even amount of face-to-face and online courses as "mixed",

leading our analysis to include three course modality indicators: (a) majority of courses taken in a face-to-face format, (b) majority of courses taken in an online format, and (c) an even mix of the two modalities. Due to the vast amount of master's degree fields, to assist with interpretation, we synthesized degree majors into seven categories based on two-digit CIP codes: (a) Arts and Humanities, (b) Business and Communication, (c) Education, (d) STEM, (e) Social/Behavioral Sciences, and (f) Trades.

Our study's second component, whether course modality relates to postgraduation earnings, incorporated the aforementioned controls for student demographics, institutional characteristics, and student choices though separately positioned annualized wages one- and four-years after degree receipt as outcomes of interest. To create annualized wages, we used GA-AWARDS wage data (provided in quarters) and calculated an individual's annual earnings by summing four consecutive quarters of wage data. Since master's students can receive their degree in either the summer, fall, or spring, a graduate's annual wages come from the first four quarters following their graduation. Examining wages at the one- and four-year marks allowed us to consider students' initial earnings trajectory as well as gauge how earnings evolved four years after graduation, (which also represents the most recent year of data available in GA-AWARDS).

Methodology

To address research questions 1 and 2, which pertain to our study's first component, we ran a logistic regression using a logit function to understand predictors that influence a master's student's odds of taking out loans. Our logistic regression controlled for this study's demographic variables, institutional factors, and student choices and took the following form:

$$\ln\left(\frac{P}{1-P}\right) = \beta 0 + \beta 1 Gender + \beta 2 RaceEthnicity + \beta 3 Residency + \beta 4 Institution + \beta 4 Assistantship + \beta 5 Major + \beta 6 FullTime + \beta 7 Modality + \varepsilon$$

Where $\ln(\frac{P}{1-P})$ represents the odds a master's student took out loans. Due to funding differences and institution-specific requirements for providing funding to master's students, we viewed holding a paid assistantship as an institutional variable and not a student choice akin to major or full-time status. In this model, institution is included as a predictor, as there was not sufficient variability within the dichotomous outcome to estimate a nested model.

After determining what factors relate to master's students' propensity to borrow, we initiated a series of fixed effects linear regressions to examine what factors relate to the amount of money master's students borrowed. Our modeling strategy featured three versions: Model I, which utilized demographic and institutional variables, Model II, which added variables that pertain to student choice, and Model III, which included the previous controls, while adding course modality, and took the following form:

$$y_{ic} = \beta_1 Gender + \beta_2 RaceEthnicity + \beta_3 Residency + \beta_4 Assistantship + \beta_5 Major + \beta_6 FullTime + \beta_7 Modality + \alpha_c + \mu_{ic}$$

Where y_{ic} represents the total amount a master's student (i) borrowed across their degree program at their institution (c). Students are nested within the 17 institutions, which means institutional environments and resources may affect student behavior in ways that our models do not capture. We controlled for these unobserved differences by including fixed effects for institutions (represented by α_c) and clustering standard errors at the institution level in every model (see Möhring, 2012 for a discussion on using the fixed effect approach rather than multilevel modeling for nested non-panel data).

Our third research question is the basis for our study's second component and looked at the relationship between course modality and annual wages both one and four years after graduation. We used fixed effects linear regression models that included the demographic,

institutional, and student choice variables from our earlier analyses and logged wage data to allow interpretation as percentage change in wages rather than as an absolute change. The regression equation for our study's second component took the following form:

$$y_{ic+1,4} = \beta_1 Gender + \beta_2 RaceEthnicity + \beta_3 Residency + \beta_4 Assistantship + \beta_5 Major + \beta_6 FullTime + \beta_7 Modality + \alpha_c + \mu_{ic}$$

Where $y_{ic+1,4}$ represents a master's graduate's earnings one and four years after their graduation from their institution.

Results

Table 1 provides descriptive information about master's students and borrowing amounts. About 56% of our first component's sample identified as female. Upon graduation, though female students had a higher percentage of students taking out loans (57.3% vs. 34.5%, respectively) male students had a higher mean loan amount ($24,694 vs. $20,976, respectively). The sample is majority white (53.1%), mostly in-state (62.9%), and has a high percentage of students who earned their degree in a STEM field (42.9%). Most students' primary modality was face-to-face, approximately three out of every four students did not have a paid assistantship, and 56% of students were full-time.

[Insert Table 1 Here]

Descriptive results largely align with existing literature. For example, full-time students had a higher average loan amount than part-time students (likely due to having less available hours to work) and students who held a paid assistantship borrowed less (on average) than non-assistantship holders ($14,573 vs. $18,888, respectively). The average borrowing amount for face-to-face master's students was $4,300 more, on average, than their online counterparts. Master's students who took an even split of online and face-to-face courses had the highest

average borrowing amount ($21,139), though this was also the smallest modality in terms of total enrollment (*n* = 1,810). Interestingly, the average borrowing amount for in-state students was more than three times greater than the average loan amount for out-of-state students, which could be due to differences between in- and out-of-state students (see Figure 1). Out-of-state students had comparatively lower FAFSA completion rates, which could suggest that these students come from financially advantaged backgrounds. Out-of-state master's students primarily attended institutions that belong to the USG's research sector (specifically, 53% of out-of-state students received a master's from Georgia Institute of Technology), which traditionally present more funding opportunities. A greater percentage of out-of-state students held paid assistantships and received a degree in STEM. Both in- and out-of-students primarily took courses face-to-face.

[Insert Figure 1 Here]

Table 2 presents descriptive statistics about employment status and wages one year after degree completion, and Table 3 showcases this information four years after graduation. At both points in time, males, graduates who did not have a paid assistantship, and former part-time students incurred higher mean and median wages than their counterparts (females, graduates who had an assistantship, and full-time students, respectfully). Graduates who identify as Asian, who earned a degree in a Business/Communications major, and who primarily took face-to-face courses had higher averages wages both one and four years after graduation than their peers. While average wages were higher for in-state students, in-state students also secured employment in Georgia at a higher rate, which could indicate that many out-of-state students seek employment outside of Georgia and are therefore not included in the dataset.

[Insert Table 2 Here]

[Insert Table 3 Here]

Table 4 presents the results from our logistic regression which analyzed the relationship between student choices and taking out loans. Please note, Table 4 depicts the regression outputs as odds ratios, though in the text, we discuss results as average marginal effects (meaning the difference in probability of the dependent variable based on a change in an independent variable when all other variables are held constant).

Starting with the demographic variables, our results indicate that differences in borrowing behavior vary by gender, race/ethnicity, and residency. Female students were 5.3 percentage points more likely to take out loans than male students, and in-state students were 25.1 percentage points more likely to take out loans than out-of-state students. Compared to White students, Black and Hispanic students were more likely to take out loans, while Asian students were less likely to borrow. Turning to the student choice variables, full-time students were 8.4 percentage points more likely to take out loans. Online students were 2.2 percentage points less likely to take out loans though this relationship was only significant at the $p < .1$ level ($p = .056$). Our results indicating that course modality does not meaningfully relate to master's students' propensity to borrow could be a preliminary challenge to the theory that students view online courses as a pathway for reducing higher education's costs.

[Insert Table 4 Here]

While primary modality did not predict the likelihood of borrowing, it may relate to the amount of money master's students borrow. Table 5 contains our fixed effects linear regression models with dollars borrowed as the dependent variable. Model I includes the demographic and higher education variables, which significantly predicted borrowing for master's degree recipients, ($F(7, 16) = 543.74$ $p < .001$). Gender, race/ethnicity, state residency, institution, and getting a paid assistantship accounted for approximately 12.1% of the variance in student

borrowing within each institution (R^2(within)= 0.121). Having a paid assistantship was associated with a $4,057 decrease in borrowing. Model II added the student choice variables and accounted for 13.5% of the variance in student loan borrowing amounts within each institution ((F(13, 16) =12,206.64, $p < .001$; R^2(within) = 0.1352), thus explaining an additional 1.4% of dollars borrowed. Full-time status was associated with an increase in borrowing of $5,325 compared to part-time status ($p < .01$). The results in Model II also suggest that there is not a significant relationship between major and total dollars borrowed for master's graduates. Model III represents this equation's full version and adds our independent variable of interest, course modality. This model accounted for 13.6% of the variance in dollars borrowed ((F(15, 16) =11,147.48, $p < .001$; R^2(within) = 0.1363). Net all other variables in the model, master's students in online courses borrowed less than face-to-face students, though this relationship was also only significant at the $p < .1$ level ($p = .06$) and is likely not meaningful in practice. Seeing that taking courses online does not impact students' likelihood of borrowing nor loan amounts could underscore the importance of institutional staff focusing on the logistical, and not the monetary benefits of online courses when they are advising students who are considering a master's degree.

[Insert Table 5 Here]

Course modality does not appear to relate to borrowing, but student choices (beyond selecting an institution) may impact students' postgraduation earnings. Table 6 shifts to our study's second component and provides estimates for a fixed effects regression which includes the set of controls and explains 14.5% of earnings variance within institutions (R^2(within) = 0.1446). The results in Table 6 suggest that demographic variables relate to earnings a year after receiving a master's degree. All else equal, identifying as female was associated with a 7.8

percent decrease in earnings, and Black graduates tended to earn less than white graduates one year after graduation, though this relationship does not exist for any other race/ethnic group. Having a paid assistantship was associated with a 25.3 percent decrease in earnings. Assistantships relating to decreases in first year earnings may seem counterintuitive since receiving a paid assistantship was linked to lower loan amounts. However, students pursue assistantships because they do not have a full-time job, which likely explains why holding an assistantship is associated with earning less one year after graduation compared to non-assistantship holders. These results could collectively indicate that while assistantships help reduce higher education's financial burden, working full-time is a better route for master's students who hope to increase their lifetime wages.

Our results further suggest that student choices relate more to post-graduation earnings than they do to borrowing tendencies. Compared to Business/Communication majors, all majors were associated with receiving lower earnings one year after graduation: Arts and Humanities a 58.4% decrease, Education a 29.2% decrease, STEM a 26.2% decrease, Social/Behavioral Sciences a 49.7% decrease, and Trades only a 15.1% decrease in earnings. When compared to master's graduates who completed their degree part-time, full-time status was associated with a 14.7% earnings reduction, bolstering the notion that assistantships are not a perfect financial substitute for full-time employment. Taking primarily online courses was associated with a 20.7% increase in earnings. Since we lack any reason to suspect these earnings differentials arise from online courses offering a superior education, we tend to believe that online courses' practicality helps drive this relationship. Indeed, if students can obtain a degree while reducing work absences, it should be no surprise that a year later, their earnings totals would be slightly higher than their peers who were not able to work as much.

[Insert Table 6 Here]

Wages one year after graduation foster some insight into graduates' career trajectories, though the COVID-19 pandemic coincided with this timeframe and all but certainly affected earnings totals. To understand how earnings play out in a post-pandemic landscape, we reran our previous wage models with wages four years after graduation as the dependent variable. Table 7 provides estimates for a fixed effects linear regression model that included all demographic, institutional, and student choice variables, and this model explained 9.0% of earnings variance four years after the master's degree (R^2(within) = 0.0899) and suggests that demographic variables continue to relate to earnings amounts four years after graduation. These results align with our analysis of one-year earnings by suggesting that graduates who identify as female not only continue incurring lower wages than male graduates, but the effect size increases, thus suggesting that time exacerbates earnings inequities. Four years after graduation, Asian graduates incur average earnings that was 13.2% above white graduates though this relationship did not exist across any other race/ethnic groups. Consistent with the one-year analysis, having a paid assistantship was associated with a 17.% decrease in earnings.

At this later timepoint, student choices of full-time attendance and online modality are no longer associated with significant changes in earnings. Student choice of major continues to be associated with significant changes in earnings; compared to Business/Communications majors, most other majors are associated with significant decreases in earnings. Being an Art/Humanities major is associated with a 55.4% decrease in earnings, Education a 34.7% decrease, STEM a 24.4% decrease, Social/Behavioral Sciences a 48.4% decrease. There is not a meaningful difference in annual wages across modality types four years after graduation. This means that

while online courses may relate to increased earnings a year after graduation, these financial benefits appear to be nonexistent a few years later.

[Insert Table 7 Here]

Limitations

There are several limitations that readers should keep in mind when interpreting our results and subsequent discussion. Firstly, our study only analyzed a single cohort of master's degree recipients, meaning our entire sample was subject to the same temporal influences of major events such as the COVID-19 pandemic (which would affect early earnings and career growth). Additional cohorts of students would allow for variability in those influences, and possibly reveal greater insight into course modality's influence. Secondly, financial information for graduate students is relatively limited since these students have lower FAFSA completion rates. Information such as spousal or family support (through marital status and dependency status) could provide a different picture of financial decision-making. It may be that for single students, course modality has a greater influence on loan-taking behavior than for students with a partner who is employed. In addition, this study entailed a cross-sectional examination of loans and wages. Looking longitudinally at term-level loan behavior and course modality could provide more granular insight toward how course modality impacts loans in both the short- and long-run. Finally, as previously mentioned, wage data was only available for people employed at entities that pay into Georgia's unemployment insurance. This means that students who left Georgia after receiving their degree are not observed, nor are graduates who started their own small business.

Implications and Conclusion

The purpose of our study was to uncover whether master's program modality related to student financial outcomes with an emphasis on borrowing and postgraduation earnings. In terms of student borrowing, the results from our analysis' first component indicate that course modality does not relate to lower odds of borrowing, though the effect moves in that direction. Adding course modality to our regression model hardly increased the variance that student borrowing explained, though taking courses online and in a mixed format were trending toward significantly relating to decreased borrowing totals. These results suggest that while online master's courses can promote access through allowing students to complete coursework at unique times and in non-traditional spaces, taking courses online does not reduce students' need to borrow. With several student characteristics being associated with increased borrowing, one implication from our analysis is the imperative for institutions to identify student populations that are prone to excess borrowing and prioritize financial assistance that extends beyond adding online classes.

Our second research question asked about the influences of institutional characteristics and other student choices on borrowing. Having a paid assistantship did not relate to the likelihood of master's students taking out loans yet was associated with fewer dollars borrowed. Though at the same time, our analysis showed that full-time status was linked to a higher likelihood of taking out loans and increased borrowing. Full-time students have less time to earn money through work and are best situated to hold a graduate assistantship. Recognizing that master's students receiving a paycheck relates to borrowing reductions underscores the importance of institutions using paid graduate assistantships as a means to propel affordability efforts, especially for students who pursue their master's full-time.

Pivoting to our study's second component (research question 3), our results produced evidence to suggest that taking master's courses online was associated with earnings increases one year after graduation though this relationship had evaporated by the four-year mark. Perhaps online courses provided flexibility for other career building pursuits and the career benefit is evident early on and then plateaus. With only one cohort of students, it's challenging to disentangle the effects of timing – the pandemic certainly affected this sample's earnings totals. Considering the effects of COVID-19 in providing more availability for online learning, modality may play a bigger part in borrowing behavior for later cohorts. Moreover, some decisions associated with higher borrowing likelihood and amounts, such as attending a master's program full-time, were also associated with a decrease in wages earned. On the flip side, having a paid assistantship was associated with lower borrowing but decreased wages postgraduation.

These results provide support for the hypothesis that taking courses online present some advantages, but these benefits do not involve lowering a master's degree's upfront costs nor a higher earnings premium in the long run. The institution where a master's student elects to enroll, as well as their degree's focus both relate to borrowing behavior and to postgraduation earnings. Institutional leaders and policymakers could learn from these findings through seeing that online learning may provide a pathway to expanding access and consider ways within their context to advance affordability. As more individuals evaluate the costs and benefits of pursuing a master's degree in attempts to increase their lifetime earnings, our study advances knowledge around this subject by helping prospective students and institutions see a potential value of online master's courses, particularly in early career points.

References

Allen, E., & Seaman, J. (2014). Grade change: Tracking online education in the United States. *The Sloan Consortium*. https://www.bayviewanalytics.com/reports/gradechange.pdf

Alpert, W. T., Couch, K. A., & Harmon, O. R. (2016). A randomized assessment of online learning. *American Economic Review, 106*(5), 378-82. http://dx.doi.org/10.1257/aer.p20161057

Baum, S., & Steele, P. (2018). *Graduate and professional school debt: How much students borrow* [AccessLex Institute Report #18-02]. AccessLex Institute and The Urban Institute. https://papers.ssrn.com/sol3/papers.cfm?Abstract_id=3103250

Becker, G. S. (1993). *Human capital: A theoretical and empirical analysis with special reference to education*. The University of Chicago Press.

Belasco, A. S., Trivette, M. J., & Webber, K. L. (2014). Advanced degrees of debt: Analyzing the patterns and determinants of graduate student borrowing. *The Review of Higher Education, 37*(4), 469-497. https://doi.org/10.1353/rhe.2014.0030

Bowen, W. G., Chingos, M. M., Lack, K. A., & Nygren, T. I. (2014). Interactive learning online at public universities: Evidence from a six-campus randomized trial. *Journal of Policy Analysis and Management*, *33*(1), 94-111. https://doi.org/10.1002/pam.21728

Burns, R. A., & Webber, K. L. (2019). Achieving the promise of educational opportunity: Graduate student debt for STEM vs. Non-STEM students. *Journal of Student Financial Aid, 48*(3), 1–29. https://doi.org/10.55504/0884-9153.1659

Coffey, L. (2024, January 30). *Students distancing from distance learning*. Inside Higher Education.

https://www.insidehighered.com/news/tech-innovation/teaching-learning/2024/01/30/online-college-enrollment-continues-post-pandemic#:~:text=Students%20Distancing%20From%20Distance%20Learning,all%20in%20on%20online%20courses.&text=Online%20enrollments%20are%20seeing%20a,COVID%2C%20according%20to%20new%20data.&text=The%20number%20of%20students%20participating,decline%2C%20new%20enrollment%20data%20show.

DesJardins, S. L., & Toutkoushian, R. K. (2005). Are students really rational? The development of rational thought and its application to student choice. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. 20, pp. 191–240). Springer. https://doi.org/10.1007/1-4020-3279-X_4

Field, E. (2009). Educational debt burden and career choice: Evidence from a financial aid experiment at NYU Law School. *American Economic Journal: Applied Economics, 1*(1), 1–21. https://www.jstor.org/stable/25760145

Figlio, D., Rush, M., & Lu, Y. (2013). Is it live or is it internet? Experimental estimates of the effects of online instruction on student learning. *Journal of Labor Economics, 31*(4), 763-784. https://doi.org/10.1086/669930

Gándara, D., & Toutkoushian, R. (2017). Updated estimates of the average financial return on master's degree programs in the United States. *Journal of Education Finance, 43*(1), 21-44. https://muse.jhu.edu/article/678326

Gulish, A., Morris, C, Cheah, B. & Strohl, J. (2024). *Graduate degrees: Risky and unequal paths to the top*. Georgetown University Center on Education and the Workforce. https://cew.georgetown.edu/graduatedegrees

Huntington-Klein, N. (2021). *The Effect: An Introduction to Research Design and Causality*.

Chapman and Hall/CRC.

Jaquette, O. (2019). Do Public Universities Replace State Appropriations with Master's Students? *The Review of Higher Education, 42*(3), 1101-1144. https://doi.org/10.1353/rhe.2019.0031

Johnson, H., & Majia, M. C. (2014). *Online learning and student outcomes in California's community colleges*. Public Policy Institute of California. https://eric.ed.gov/?id=ED561973

Kim, D., & Otts, C. (2010). The effect of loans on time to doctorate degree: Differences by race/ethnicity, field of study, and institutional characteristics. *Journal of Higher Education, 81*(1), 1–32. https://doi.org/10.1353/jhe.0.0079

Looney, A., Wessel, D., & Yilla, K. (2020, January 28). *Who owes all that student debt? And who'd benefit if were forgiven?* Brookings Institution. https://www.brookings.edu/articles/who-owes-all-that-student-debt-and-whod-benefit-if-it-were-forgiven/

Manski, C.F. (1993). Adolescent econometricians: How do youth infer the returns to schooling? In C.T. Clotfelter and M. Rothschild (Eds.), *Studies of Supply and Demand in Higher Education*. University of Chicago Press.

Millett, C. M. (2003). How undergraduate loan debt affects application and enrollment in graduate or first professional school. *Journal of Higher Education, 74*(4), 386–427. https://doi.org/10.1080/00221546.2003.11780854

Minaya, V., Scott-Clayton, J., & Zhou, R. Y. (2024). Heterogeneity in labor market returns to master's degrees: Evidence from Ohio. *Research in Higher Education, 65*(5), 775-793. https://doi.org/10.1007/s11162-024-09777-8

Minaya, V., & Soliz, A. (2024). *The economic value of master's degrees: Evidence from a large, urban public university system* (Postsecondary Equity & Economics Research Project). George Washington University, Columbia University, and Student Defense. https://peerresearchproject.org/peer/research/body/PEER_Value-of-Masters_D.pdf

Möhring, K. (2012). The fixed effects approach as an alternative to multilevel analysis for cross-national analyses. GK Soclife Working Paper 16. Cologne: University of Cologne.

Moloney, J. F., & Oakley II, B. (2010). Scaling Online Education: Increasing Access to Higher Education. *Journal of Asynchronous Learning Networks*, *14*(1), 79-94.

Monarrez, T., & Matsudaira, J. (2023). *Trends in federal student loans for graduate school*. U.S. Department of Education. https://sites.ed.gov/ous/files/2023/08/OCE_GraduateDebtReport202308.pdf

National Association of Colleges and Employers. (2023). *Recruiting benchmark report*. National Association of Colleges and Employers.

National Center for Education Statistics. (2022). Trends in Student Loan Debt for Graduate School Completers. *Condition of Education*. U.S. Department of Education, Institute of Education Sciences.

Ortagus, J. C. (2018). National evidence of the impact of first-year online enrollment on postsecondary students' long-term academic outcomes. *Research in Higher Education*, *59*(8), 1035-1058. https://doi.org/10.1007/s11162-018-9495-1

Ortagus, J. C., Hughes, R., & Allchin, H. (2023). The role of influence of exclusively online degree programs in higher education. (EdWorkingPaper: 23-879). https://doi.org/10.26300/xksc-2v33

Paulsen, M. B. (2001). The economics of human capital and investment in higher education. In

M. Paulsen and J. Smart (Eds.), *The Finance of Higher Education: Theory, Research, Policy & Practice*. (pp. 55-94). Agathon Press.

Robinson, C. (2022, December 6). *5 things we don't know about graduate student debt*. Third Way. https://www.thirdway.org/blog/5-things-we-dont-know-about-graduate-student-debt

Scott-Clayton, J., & Li, J. (2016). Black-white disparity in student loan debt more than triples after graduation. *Evidence Speaks Reports, 2*(3). Brookings Institute. https://www.brookings.edu/wp-content/uploads/2016/10/es_20161020_scott-clayton_evidence_speaks.pdf

Song, M., Orazem, P. F., & Wohlgemuth, D. (2008). The role of mathematical and verbal skills on the returns to graduate and professional education. *Economics of Education Review, 27*(6), 664–675. https://doi.org/10.1016/j.econedurev.2007.09.008

Stevenson, A. (2016) The returns to quality in graduate education, *Education Economics, (24)*5, 445-464. https://doi.org/10.1080/09645292.2016.1150418

United States Bureau of Labor Statistics. (2024, August 29). *Earnings and unemployment rates by educational attainment, 2023*. United States Department of Labor. https://www.bls.gov/emp/chart-unemployment-earnings-education.htm

Webber, K. L., & Burns, R. A. (2021). Increases in graduate student debt in the US: 2000 to 2016. *Research in Higher Education*, *62*(5), 709–732. https://doi.org/10.1007/s11162-020-09611-x

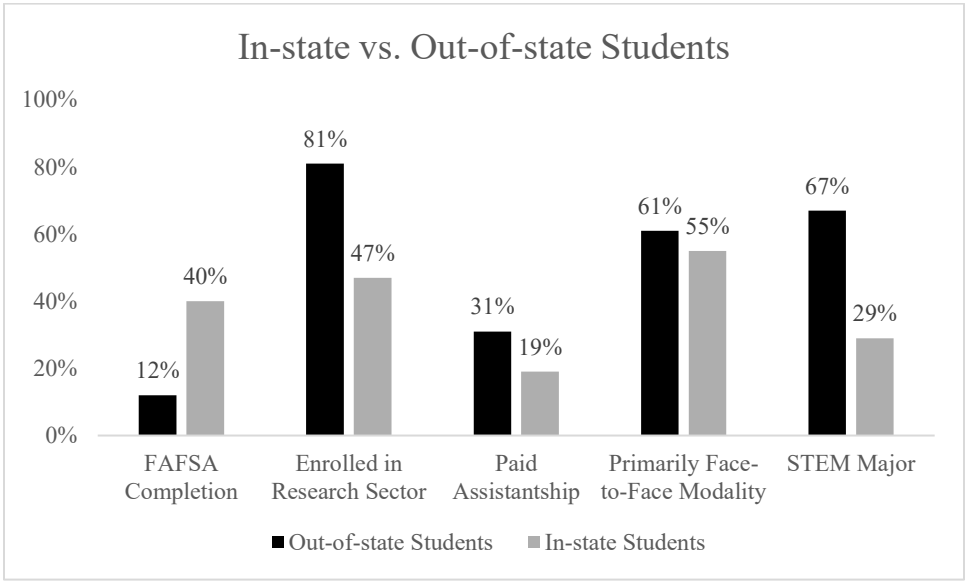
Webber, K. L. & Burns, R. A. (2022). The price of access: Graduate student debt for students of color 2000 to 2016. *The Journal of Higher Education, 93*(6), 934-961. https://doi.org/10.1080/00221546.2022.2044976

Wladis, C., Hachey, A. C., & Conway, K. (2023). Time poverty: A hidden factor connecting online enrollment and college outcomes? *The Journal of Higher Education, 94*(5). https://doi.org/10.1080/00221546.2022.2138385

Xu, D., & Jaggars, S. S. (2011). The effectiveness of distance education across Virginia's community colleges: Evidence from introductory college-level math and English courses. *Educational Evaluation and Policy Analysis, 33*(3), 360–377. https://doi.org/10.3102/0162373711413814

Xu, D., & Jaggars, S. S. (2013). The impact of online learning on students' course outcomes: Evidence from a large community and technical college system. *Economics of Education Review, 37*(1) 46-57. https://doi.org/10.1016/j.econedurev.2013.08.001

Figure 1



Notes: Comparison of in-state and out-of-state students. Research sector institutions include Augusta University, Georgia Institute of Technology, Georgia State University, and University of Georgia.

Table 1

Descriptive Statistics for Master's Graduates Loans in the University System of Georgia (FY2019 Cohort)

	N	Percent with Loans	Mean	Median	Max.
Primary Modality					
Face-to-Face	7,173	44.2%	$18,713	$0	$253,510
Online	3,550	46.1%	$14,450	$0	$123,947
Mix	1,810	61.2%	$21,139	$15,338	$178,948
Gender					
Female	7,010	57.3%	$20,976	$12,133	$192,590
Male	5,550	34.5%	$24,694	$0	$253,510
Race/Ethnicity					
Asian	2,204	11.7%	$4,261	$0	$154,374
Black	2,258	78.7%	$32,934	$33,240	$253,510
Hispanic or Latino	614	53.6%	$20,041	$7,560	$157,553
Other Races	811	38.8%	$15,603	$0	$58,652
White	6,673	48.7%	$17,320	$0	$224,471
Residency					
In-State	7,905	63.2%	$23,941	$18,717	$224,471
Out-of-State	4,655	19.3%	$7,529	$0	$253,510
Paid Assistantship					
Had Assistantship	2,999	42.8%	$14,573	$0	$192,590
No Assistantship	9,561	48.6%	$18,888	$0	$253,510
Major Type					
Arts & Humanities	489	45.8%	$17,134	$0	$188,114
Business & Comm.	2,430	50.2%	$21,759	$2,689	$253,510
Education	2,596	69.9%	$21,769	$18,799	$143,428
STEM	5,382	31.5%	$13,099	$0	$192,590
Social/Beh.Sciences	1,539	60.4%	$22,485	$15,830	$171,909
Trades	124	34.7%	$11,511	$0	$70,987
Full-Time Status					
Primarily Full-Time	7,060	48.7%	$19,427	$0	$253,510
Primarily Part-Time	5,473	45.2%	$15,826	$0	$138,512
Total	12,560		$17,858	$0	$253,510

Notes: Data comes from the USG's data warehouse. Descriptive statistics for loans are based on the full cohort of graduates and therefore include graduates who did not borrow. American Indian/Alaska Native, Native Hawaiian and Other Pacific Islander, Two or More Races, or Race Unknown categories were combined into one category due to small cell sizes. Major type is based on 2-digit CIP code. A student is classified as primarily full-time if they were a full-time student for most terms that they were enrolled in their master's program. Primary modality is based on the modality in which a student took the majority of their courses. If a student took the same number of online and face-to-face courses, they belong to the 'mix' modality.

Table 2

Descriptive Statistics for Master's Graduates Wages One Year After Degree in the University System of Georgia (FY2019 Cohort)

	N	Percent Employed in GA	Mean	Median	Max.
Primary Modality					
Face-to-Face	4,592	91.7%	$51,713	$44,775	$808,000
Online	2,226	96.5%	$55,865	$51,170	$421,815
Mix	1,423	93.9%	$42,751	$44,620	$487,214
Gender					
Female	5,282	94.6%	$46,534	$45,503	$504,426
Male	2,959	91.1%	$59,772	$52,667	$626,452
Race/Ethnicity					
Asian	755	86.6%	$57,574	$52,151	$528,216
Black	1,893	94.3%	$45,719	$43,675	$451,195
Hispanic or Latino	398	91.7%	$52,626	$47,762	$412,952
Other Races	455	91.4%	$46,082	$46,256	$437,121
White	4,740	94.4%	$52,897	$47,768	$626,452
Residency					
In-State	6,942	95.1%	$53,233	$38,896	$626,452
Out-of-State	1,299	83.9%	$40,888	$47,985	$341,073
Paid Assistantship					
Had Assistantship	1,865	88.6%	$35,390	$33,588	$181,668
No Assistantship	6,376	94.8%	$55,937	$49,474	$626,452
Major Type					
Arts & Humanities	303	85.2%	$26,721	$20,270	$118,500
Business & Comm.	1,911	94.6%	$73,396	$59,809	$626,452
Education	2,338	97.7%	$45,152	$47,137	$444,990
STEM	2,510	89.7%	$50,881	$48,958	$504,425
Social/Beh.Sciences	1,071	92.3%	$32,106	$31,881	$180,557
Trades	108	95.4%	$61,478	$61,743	$157,906
Full-Time Status					
Primarily Full-Time	4,552	91.2%	$45,567	$42,485	$626,452
Primarily Part-Time	3,689	96.0%	$58,347	$52,093	$528,216
Total	8,241	93.4%	$51,287	$47,178	$626,452

Notes: Data comes from the USG's data warehouse and GAAWARDS labor data. 'Percent Employed in GA' indicates non-zero wage data in the relevant four labor quarters for graduates who are employed in Georgia. American Indian/Alaska Native, Native Hawaiian and Other Pacific Islander, Two or More Races, or Race Unknown categories were combined into one category due to small cell sizes. Major type is based on 2-digit CIP code. A student is classified as primarily full-time if they were a full-time student for most terms that they were enrolled in their master's program. Primary modality is based on the modality in which a student took the

majority of their courses. If a student took the same number of online and face-to-face courses, they belong to the 'mix' modality.

Table 3

Descriptive Statistics for Master's Graduates Wages Four Years After Degree in the University System of Georgia (FY2019 Cohort)

	N	Percent Employed in GA	Mean	Median	Max.
Primary Modality					
Face-to-Face	4,592	81.1%	$54,033	$38,849	$808,000
Online	2,226	90.1%	$52,288	$49,980	$421,815
Mix	1,423	85.4%	$41,519	$37,409	$487,214
Gender					
Female	5,282	84.9%	$44,489	$37,338	$552,083
Male	2,959	83.3%	$63,741	$51,849	$808,000
Race/Ethnicity					
Asian	755	77.1%	$63,655	$48,501	$696,530
Black	1,893	83.4%	$46,389	$35,849	$552,083
Hispanic or Latino	398	85.4%	$55,788	$41,230	$439,331
Other Races	455	82.2%	$46,543	$40,749	$185,324
White	4,740	85.8%	$51,549	$43,117	$808,000
Residency					
In-State	6,942	87.1%	$53,174	$43,391	$808,000
Out-of-State	1,299	69.5%	$41,926	$27,913	$555,453
Paid Assistantship					
Had Assistantship	1,865	76.5%	$37,748	$45,971	$339,216
No Assistantship	6,376	86.6%	$55,395	$29,000	$808,000
Major Type					
Arts & Humanities	303	76.2%	$26,799	$21,000	$208,031
Business & Comm.	1,911	87.2%	$76,741	$61,020	$808,000
Education	2,338	90.9%	$42,495	$40,225	$184,217
STEM	2,510	79.4%	$52,684	$44,012	$644,263
Social/Beh.Sciences	1,071	78.2%	$29,811	$26,002	$256,898
Trades	108	88.0%	$49,149	$45,272	$207,580
Full-Time Status					
Primarily Full-Time	4,552	82.1%	$47,549	$36,594	$808,000
Primarily Part-Time	3,689	87.1%	$56,155	$48,043	$644,263
Total	8,241	84.3%	$51,401	$41,317	$808,000

Notes: Data comes from the USG's data warehouse and GAAWARDS labor data. 'Percent Employed in GA' indicates non-zero wage data in the relevant four labor quarters for graduates who are employed in Georgia. American Indian/Alaska Native, Native Hawaiian and Other Pacific Islander, Two or More Races, or Race Unknown categories were combined into one category due to small cell sizes. Major type is based on 2-digit CIP code. A student is classified as primarily full-time if they were a full-time student for most terms that they were enrolled in their master's program. Primary modality is based on the modality in which a student took the

majority of their courses. If a student took the same number of online and face-to-face courses, they belong to the 'mix' modality.

Table 4

Borrowed (Yes/No) for Master's Graduates Loans in the University System of Georgia (FY2019 Cohort)

Borrowed	Odds Ratio	Std. Err.	Z	[95% CI]
Gender				
Female	1.3503	.0632	6.42***	1.2319, 1.4800
Male *(comparison)*				
Race/Ethnicity				
Asian	0.34793	.0278	-13.19***	0.2974, 0.4070
Black	3.3358	.2122	18.93***	2.9447, 3.7789
Hispanic or Latino	1.6248	.1562	5.05***	1.3458, 1.9616
Other Races	0.9098	.0783	-1.10	0.7685, 1.0770
White *(comp.)*				
Residency				
In-State	3.6418	.1946	24.19***	3.2797, 4.0440
Out-of-State *(comp.)*				
Paid Assistantship				
Had Assistantship	0.9236	.0537	-1.37	0.8242, 1.0351
No Assistantship *(comp.)*				
Major				
Arts & Humanities	0.9359	.1078	-0.58	0.7468, 1.1729
Education	1.5042	.1098	5.59***	1.3038, 1.7355
STEM	0.7934	.0500	-3.67***	0.7011, 0.8978
Social/Beh.Sciences	1.2971	.1007	3.35**	1.1141, 1.5103
Trades	0.3180	.0687	-5.31***	0.2082, 0.4856
Business/Comm. *(comp.)*				
Full-Time Status				
Primarily Full-Time	1.6228	.0869	9.04***	1.4611, 1.8023
Primarily Part-Time *(comp.)*				
Primary Modality				
Online	0.8790	.05948	-1.91	0.7698, 1.0036
Mix	1.0009	.06912	0.01	0.8742, 1.1459
Face-to-Face *(comp.)*				
Constant	0.2729	.0289	-12.25***	0.2217, 0.3359
Model $\chi^2 = 4225.43$, $p < .001$				
Pseudo $R^2 = 0.2437$				
n = 12,533				

Notes: The dependent variable in this analysis is having a non-zero amount of student loans (binary yes/no). Please see Table 1 for data considerations. Baseline groups are listed as comparison or comp. *$p < .05$; **$p < .01$; ***$p < .001$

Table 5

Total Dollars Borrowed for Master's Graduates Loans in the University System of Georgia (FY2019 Cohort)

Total Dollars Borrowed	Model I β (SE)	Model II β (SE)	Model III β (SE)
Gender			
Female	1897.01(658.95)*	1736.67(549.12)**	1754.67(563.72)**
Male *(comparison)*			
Race/Ethnicity			
Asian	-6890.86(1127.00)***	-7079.49(1184.05)***	-7275.12(1118.03)***
Black	13793.33(1637.01)***	13843.66(1674.09)***	13764.62(1642.71)***
Hispanic or Latino	3822.96(1418.87)*	3540.10(1505.34)*	3485.49(1464.97)*
Other Races	137.44(1165.97)	327.96(1004.30)	224.69(1034.34)
White *(comp.)*			
Residency			
In-State	11244.87(1653.50)***	10783.51(818.55)***	10603.38(747.47)***
Out-of-State *(comp.)*			
Paid Assistantship			
Had Assistantship	-2066.93(1834.79)	-3757.05(1718.51)*	-4056.95(1727.52)*
No Assistantship *(comp.)*			
Major			
Arts & Humanities		-1719.82(2314.94)	-1609.55(2267.72)
Education		-2765.70(2227.15)	-1790.64(2032.42)
STEM		-4194.32(3766.85)	-3658.19(3667.04)
Social/Beh.Sciences		-1267.39(2280.34)	-826.62(2142.69)
Trades		-11417.71(6594.51)	-11661.28(7143.25)
Business/Comm. *(comp.)*			
Full-Time Status			
Primarily Full-Time		5325.47(1528.38)**	4576.92(1503.66)**
Primarily Part-Time *(comp.)*			
Primary Modality			
Online			-2363.72(1176.22)
Mix			-1645.78(1358.33)
Face-to-Face *(comp.)*			
Constant	8749.131(1690.26)***	9283.87(1238.69)**	10359.4(1775.94)
F	F(7,16)=543.74	F(13,16)=12206.64	F(15,16)=11147.48
R^2(within)	0.1207	0.1352	0.1363

Notes: Please see Table 1 for data considerations. Borrowing amounts are based on the full cohort of graduates and therefore include graduates who did not borrow. Baseline groups are listed as comparison or comp. Both models include fixed effects for institutions. *$p < .05$; **$p < .01$; ***$p < .001$

Table 6

Wages One Year Post-Degree for Master's Graduates in the University System of Georgia (FY2019 Cohort)

Wages(ln) One Year After Graduation	β	SE	t	[95% CI]
Gender				
Female	-0.0812	.0192	-4.24**	-0.1219, -0.0406
Male *(comparison)*				
Race/Ethnicity				
Asian	0.0123	.0775	0.16	-0.1519, 0.1765
Black	-0.1016	.0278	-3.67**	-0.1603, 0.0429
Hispanic or Latino	0.0132	.0455	0.29	-0.0834, 0.1097
Other Races	-0.1109	.0788	-1.41	-0.2781, 0.0562
White *(comp.)*				
Residency				
In-State	0.2269	.0666	3.41**	0.0857, 0.3680
Out-of-State *(comp.)*				
Paid Assistantship				
Had Assistantship	-0.2910	.0333	-8.75***	-0.3615, -0.2205
No Assistantship *(comp.)*				
Major				
Arts & Humanities	-0.8775	.1349	-6.50	-1.1636, -0.5915
Education	-0.3447	.0556	-6.19	-0.4626, -0.2267
STEM	-0.3040	.0824	-3.69	-0.4789, -0.1292
Social/Beh.Sciences	-0.6879	.0707	-9.73	-0.8377, -0.5380
Trades	-0.1631	.3000	-0.54	-0.7991, 0.4729
Business/Comm. *(comp.)*				
Full-Time Status				
Primarily Full-Time	-0.1592	.0464	-3.43**	-0.2576, -0.0608
Primarily Part-Time *(comp.)*				
Primary Modality				
Online	0.1882	.0688	2.73*	0.0423, 0.3340
Mix	0.0320	.0413	0.77	-0.0555, 0.1195
Face-to-Face *(comp.)*				
Constant	10.8855	.1032	105.51***	10.6668, 11.1042
F(15,16)	841.76			
R^2(within)	0.1156			

Please see Table 2 for data considerations. Baseline groups are listed as comparison or comp. Model includes fixed effects for institutions. *$p < .05$; **$p < .01$; ***$p < .001$. Coefficient is for log-transformed wage data.

Table 7

Wages Four Years Post-Degree for Master's Graduates in the University System of Georgia (FY2019 Cohort)

Wages(ln) Four Years After Graduation	β	SE	t	[95% CI]
Gender				
Female	-0.1421	.0227	-6.25***	-0.1903, -0.0940
Male *(comparison)*				
Race/Ethnicity				
Asian	0.1239	.0520	2.38	0.0138, 0.2341
Black	-0.0287	.0305	-0.94*	-0.0933, 0.0358
Hispanic or Latino	-0.0319	.0538	-0.59	-0.1459, 0.0822
Other Races	-0.0530	.0377	-1.40	-0.1329, 0.0270
White *(comp.)*				
Residency				
In-State	0.1577	.03888	4.06**	0.0753, 0.2401
Out-of-State *(comp.)*				
Paid Assistantship				
Had Assistantship	-0.1885	.0406	-4.64***	-0.2746, -0.1024
No Assistantship *(comp.)*				
Major				
Arts & Humanities	-0.8064	.1438	-5.61***	-1.1112, -0.5016
Education	-0.4260	.0545	-7.81***	-0.5416, -0.3104
STEM	-0.2794	.0682	-4.09**	-0.4240, -0.1347
Social/Beh.Sciences	-0.6612	.0550	-12.02***	-0.7778, -0.5445
Trades	-0.2857	.1658	-1.72	-0.6371, 0.0657
Business/Comm. *(comp.)*				
Full-Time Status				
Primarily Full-Time	-0.0826	.0649	-1.27	-0.2201, 0.0549
Primarily Part-Time *(comp.)*				
Primary Modality				
Online	0.0862	.0462	1.86	-0.0118, 0.1842
Mix	-0.0275	.0356	-0.77	-0.1030, 0.0481
Face-to-Face *(comp.)*				
Constant	11.0609	.0661	167.40***	10.9208, 11.2010
F(15,16)	4897.14			
R^2(within)	0.0899			

Please see Table 3 for data considerations. Baseline groups are listed as comparison or comp. Both models include fixed effects for institutions. *$p < .05$; **$p < .01$; ***$p < .001$. Coefficient is for log-transformed wage data.