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The Equalizing Power of a College Degree for First-Generation College Students: Disparities Across Institutions, Majors, and Achievement Levels

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Abstract
Researchers have paid increasing attention to issues of access and retention among first-generation college students but have focused less on their post-college outcomes. We extend this literature by investigating if there is a generational wage gap, that is, a gap between first- and continuing-generation students' wages. We also ask how the generational wage gap varies across institutions, majors, and achievement levels, and what accounts for it. Using data from the Baccalaureate and Beyond Longitudinal Study, we show that 10 years after completing college there is a substantial generational wage gap. However, for women, the generational wage gap fades when controlling for individual characteristics such as race and motherhood status. For men, the generational wage gap does not disappear when controlling for individual characteristics, but does disappear when controlling for labor market characteristics. In addition, we find that the generational wage gap is more a product of how students are distributed into industries, jobs, and work locations than how they are distributed into educational institutions, majors, and achievement levels.

Keywords Higher education · First-generation · Inequality

Introduction

Do first-generation (students who do not have a parent with a bachelor's degree) and continuing-generation college students (those with at least one parent with a bachelor's degree) receive equal earnings upon graduating from college? Although the past 10 years have

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witnessed increasing attention to first-generation college students (Wildhagen 2015), we still do not know if a degree pays off equally for students of different generational statuses. This question is important as colleges are increasingly working to recruit and retain more first-generation students, and because it speaks to the larger question of whether a college degree generates a meritocracy among students from unequal social origins.

While the question of whether a college degree is an equalizer is old, the question of whether it is an equalizer for students of different generational statuses is new. This new question is particularly important as generational status operates in different ways than parental income and occupation, stratifying students' collegiate experiences even after accounting for these factors (Wilbur and Roscigno 2016). As such, studies about other aspects of background inequality (Chetty et al. 2017; Giani 2016, Torche 2011; Witteveen and Attewell 2017) do not account for the ways that first- and continuing-generation students' wages are equalized or stratified upon receipt of a college degree. Moreover, the overarching question of whether or not a college degree is an equalizer is under dispute. Some research maintains that, upon graduating from college, a meritocracy exists among students from unequal social origins (Hout 1988; Pfeffer and Hertel 2015; Torche 2011), but other research holds that social reproduction continues even after students receive degrees (Gregg et al. 2017; Laurison and Friedman 2016; Witteveen and Attewell 2017).

Furthermore, the question of whether a college degree is an equalizer for first- and continuing-generation students overlooks the important fact that a college degree is not a homogenous unit. Colleges vary tremendously, leading researchers to conceptualize higher education as "a complicated mosaic" rather than a single unit (Davies and Guppy, 1997, p. 1417). College students are stratified on at least three important dimensions: the selectivity of their institution, their major, and their achievement (Davies and Guppy 1997; Roksa et al. 2007). As not all types of colleges do the same amount to equalize other dimensions of background inequality (Chetty et al. 2017), the generational wage gap—the difference between continuing-generation and first-generation graduates' wages—may not be uniform across institutions, majors, and achievement levels.

In addition, we know little about what accounts for the creation or suppression of a generational wage gap. A wage gap may result from first- and continuing-generation students earning degrees at different universities, in different majors, and with different levels of achievement, but it may also result from first- and continuing-generation students receiving unequal earnings despite sharing the same credentials and grades. Moreover, although researchers often write of a college degree as a great equalizer (Hout 1988; Torche 2011), the measure of equalization is often earnings, which are allocated in the labor market. Thus, it is unclear if the generational wage gap—or the lack of one—is attributable to higher education or to the labor market. Understanding what accounts for the generational wage gap or its suppression is important as different causes imply different policy prescriptions.

Finally, we also do not know if the generational wage gap varies by gender. Though the promise of a meritocracy for first- and continuing-generation students is not conditional on gender, a long line of research suggests that the reality may belie the promise. A college degree, after all, does not provide men and women with equal earnings even when they graduate from similar universities and with similar majors and levels of achievement (Bobbit-Zeher 2007). Continuing-generation women's ability to out-earn first-generation women is then constrained by a gendered pay ceiling, raising the possibility that inequality related to gender suppresses inequality related to generational status among women.

We use data from the Baccalaureate and Beyond Longitudinal Study (B&B) to understand: (1) if a college degree is associated with equal earnings for first- and continuing-generation students, (2) what types of institutions, majors, and levels of achievement are

associated with equal earnings among first- and continuing-generation students and which are not, and (3) how the distribution into and returns to educational factors (institutions, majors, and achievement levels) and labor market factors (occupational sector, job, and hours worked) accounts for the generational wage gap that we observe. We find substantial overall wage gaps among both men and women and uneven wage gaps across institutions, majors, and achievement levels. However, most of these wage gaps decrease when comparing first- and continuing-generation students with similar demographic traits, graduate degrees, and labor market experiences, implying that inequality related to students' generational status is channeled through at least some of these factors. Our decomposition analysis pinpoints the sources of the wage gap, showing that it results less from how first- and continuing-generation students are sorted into educational institutions, majors, and achievement levels than how they are sorted into industries, occupations, and work locations.

Background

The Experiences and Earnings of First-Generation and Continuing-Generation College Students

Access to college and experiences within college do not level the playing field among first- and continuing-generation students. First-generation students are less likely than continuing-generation students to have parents who help them apply to and navigate college (Hamilton 2016; Radford 2013; Rowan-Kenyon et al. 2008). They also form fewer ties while in college (Kim and Sax 2009; Stuber 2011), ask for less help from professors (Yee 2016), and face greater financial challenges (Pascarella et al. 2004b). These disparities have consequences. First-generation students are more likely to drop out of college (Pascarella et al. 2004b; Wilbur and Roscigno 2016) and even those who graduate typically accumulate fewer signals of success. In particular, first-generation students are less likely to have résumés that include internships, study abroad experiences, and extracurricular activities (Bowen et al. 2005; Pascarella et al. 2004b; Wilbur and Roscigno 2016).

Despite entering and experiencing college unequally, some studies suggest that a college degree allows first-generation students to pivot onto an even playing field. Drawing from administrative data of over 30 million Americans who attended college, Chetty et al. (2017) find that students from rich and poor backgrounds who attend the same university later earn the same average salary. Analyzing multiple indicators of social origin, Torche (2011) uses five data sets to show that college graduates earn similar amounts regardless of their origins. These studies and others show that a college degree equalizes earnings for graduates whose parents have unequal occupational statuses, earnings, and family incomes—all of which are related to, though distinct from, generational status (Chetty et al. 2017; Hout 1988; Pfeffer and Hertel 2015; Torche 2011). However, other studies maintain that wage gaps by SES, parental occupation, and parental income remain after college and disadvantage students with low social origins (Bowen et al. 2005; Giani 2016; Laurison and Friedman 2016; Witteveen and Attewell 2017). Qualitative and audit studies concur, finding that students from lower social origins fare worse in the labor market compared to students from higher social origins (Armstrong and Hamilton 2013; Rivera 2015; Rivera and Tilcsik 2016). The few studies that have examined wage gaps in regard to generational status specifically have looked over a truncated time horizon—1 to 4 years after graduating,

long before wages tend to stabilize (Chetty et al. 2014). In this short time range, there is mixed evidence for a wage gap, with some studies finding wage gaps (Thomas and Zhang 2005; Zhang 2005) and others finding wage equality (Choy 2001). Overall, evidence about whether a college degree provides equal earnings to first- and continuing-generation students is incomplete, focusing on aspects of background inequality other than generational status or focusing on the short-term returns to a college degree.

In addition, several of the existing studies about whether college graduates receive equal earnings regardless of their social origin contain limitations that narrow their generalizability. Some studies consider only students at elite universities (Bowen et al. 2005), students who graduated during a recession (Giani 2016), or students who live outside of the United States (Laurison and Friedman 2016). Witteveen and Attewell (2017) focus on a nationally representative sample of American college students from the Baccalaureate and Beyond (B&B)—the same dataset that we use—but their measure of social origin, parents' income, is limited to the approximately 60% of students who were financially dependent on their parents while in college. To address this data limitation, Witteveen and Attewell use financially independent students' own income while in college as a measure of *family* income. As such, their study is almost as much one of how students' own college income relates to their later income as it is one of how parents' incomes relates to college graduates' incomes.

We believe it is important to extend the study of social origin wage gaps to generational status as this indicator is important in its own right. College-educated parents inform their children about the professional labor market in ways that non-college-educated parents cannot (Hamilton 2016). Scholars argue that this knowledge gap results in stratified outcomes for their children and that it operates through a different mechanism than parents' income or occupation (Hamilton 2016; Stuber 2011). Although scholars assume that the difference in parental knowledge that children receive launches them on different earnings trajectories, this assumption has not been tested with long-term nationally representative data. Moreover, college students increasingly identify as first-generation, not low-income (Lee 2016). Studies that align with the ways college students identify can best inform them about their own groups.

Horizontal Stratification, Achievement, and the Leveling Power of a College Degree

The unanswered question of whether a college degree is associated with equal earnings for first- and continuing-generation students must account for the increasing stratification of American colleges. Four-year universities are highly stratified by institutional selectivity (Roksa et al. 2007). First-generation students are overrepresented in low selectivity universities and underrepresented in highly selective institutions (Astin and Oseguera 2004). Yet, conditional on entering institutions of the same selectivity, it is unclear whether first- and continuing-generation students receive the same returns—that is, the same earnings given the same experiences. Studies have found that disadvantaged students, compared to advantaged students, benefit more from attending college in general and attending high-selectivity colleges in particular (Brand and Xie 2010; Dale and Krueger 2002; Zhang 2005). These studies, however, investigate the returns to particular college experiences for advantaged and disadvantaged students in comparison to not attending college or attending a college of a different rank. They do not examine how equal students' earnings are given that they graduated from the same type of university. Other studies analyze the relationship between institutional selectivity and the equalizing power of a college degree. However,

they focus on the relationship between students' earnings and their parents' SES or family income (not generational status) (Giani 2016; Witteveen and Attewell 2017), or consider only relatively elite universities (Dale and Krueger 2014). It is then unclear whether institutions of all selectivity levels erase a potential wage gap between first- and continuing-generation students.

Colleges are also internally stratified by major. Majors are more consequential for subsequent earnings than institutional selectivity (Kim et al. 2015). In general, science, technology, engineering, health, and business majors out-earn fine arts, humanities, and education majors (Carnevale et al. 2015). How students are distributed across majors will then shape the wage gap, but few studies have examined if first- and continuing-generation students are proportionately represented in high-earning majors. Goyette and Mullen (2006) find that parents' education is associated with enrollment in arts and sciences versus vocational majors but do not discuss differences within arts and sciences majors by generational status—an important gap as there is tremendous variation in the typical earnings of different arts and sciences majors (Carnevale et al. 2015). Torche (2011) examines how students from three income terciles are distributed across majors, but her analysis uses the B&B's income measure—one that, as noted above, excludes nearly 40% of college students and 100% of financially independent students. Bowen et al. (2005) find that first-generation students are overrepresented in the social sciences, business, and humanities but underrepresented in the natural sciences. Their sample, however, only includes students in highly selective universities.

It is also unclear if each major offers the same returns to first- and continuing-generation students. Wolniak et al. (2008) find that parents' income and education relate to their children's post-college income across a wide range of majors, and that math, engineering, and computer science majors benefit most from having advantaged parents. However, their sample includes only alumni of Appalachian universities and does not address within-major wage gaps by generational status. Hansen (2001) finds that, among students whose parents work in different occupations, majors are associated with smaller wage gaps when they are based on "hard" and measurable skills. Yet, her sample comes from Norwegians born between 1950 and 1966, making it hard to compare to the contemporary United States.

College graduates also differ in their academic achievement, measured by grade point average (GPA). GPA is positively associated with earnings (Gerber and Cheung 2008; Thomas 2000). Previous studies have found that first-generation students have, on average, lower GPAs than their continuing-generation counterparts (Bowen et al. 2005; Walpole 2003). However, it is not clear if first- and continuing-generation students receive the same returns conditional upon obtaining the same GPAs. There are reasons to suspect that they do not. At earlier life stages, high-achieving students from high-income families are three times more likely to enroll in a selective university than high-achieving students from low-income families (Giancola and Kahlenberg 2016), and high school valedictorians with high social origins attend selective colleges at higher rates than high school valedictorians with low social origins (Radford 2013). It is possible that these trends endure upon graduating from college. If so, continuing-generation students would receive higher earnings than first-generation students with similar GPAs.

Finally, college graduates not only differ in their educational experiences and achievement levels, but also in their labor market experiences. Students enter different occupations, work in different economic sectors, work varied hours, and work in locations with variable pay. Each of these factors relates to graduates' earnings (Borjas 2002; Mouw and Kalleberg 2010; Yankow 2006). If first- and continuing-generation graduates unevenly sort

into these labor market experiences or receive unequal returns from them, then inequality is likely to result. Moreover, labor market factors are critical to the study of whether college graduates of different generational statuses receive equal pay. While colleges can prepare students for work, the labor market plays a major role in determining whether first- and continuing-generation graduates receive equal pay.

Using representative data from the United States, we make three primary contributions. We (1) identify whether and to what extent the generational wage gap exists at a life stage when graduates' wages approach stabilization, (2) describe how the generational wage gap varies among graduates from the same type of university and major and with the same level of achievement, and (3) decompose the wage gap to identify the extent to which it is due to educational factors, labor market factors, or both. In doing so, we also consider what theories best predict which institutions, majors, and achievement levels are associated with the largest wage gaps.

Theoretical Framework

The possibility that some degrees and levels of achievement are more equalizing than others raises the question of which institutions, majors, and achievement levels are associated with generational wage gaps. We predict which ones are associated with wage gaps by drawing upon two theories: effectively maintained inequality (EMI) and Bourdieu's theories of distinction and capital exchange. We focus our discussion of each theory on two processes: the *distribution* of students into institutions, majors, and levels of achievement, and the *returns* to them.

Effectively maintained inequality (Lucas 2001) holds that individuals from advantaged backgrounds obtain quantitatively more education when possible. However, when a level of education becomes saturated the privileged will seek qualitative advantages. Scholars extended Lucas' thesis to unsaturated domains and maintained that "enhanced access to any level of education also triggers 'effectively maintained' inequality" (Davies and Zarifa 2012, p. 143). Thus, according to EMI, enhanced access to college will lead continuing-generation students to seek qualitative advantages, such as entering institutions and majors associated with higher wages. In addition, continuing-generation students receive qualitatively better supplemental educational experiences through their greater likelihood of attending professors' office hours and using universities' support services—supplemental activities that are associated with higher GPAs (Walpole 2003; Yee 2016). According to EMI, the wage gap will then result from the uneven distribution of first- and continuing-generation students across institutions, majors, and GPAs.

Bourdieu's (1984, 1988) theories of distinction and capital exchange make different predictions about the sources of the generational wage gap. Bourdieu's work suggests that a generational wage gap will result both from the distribution of continuing- and first-generation students into institutions, majors, and achievement levels as well as from the uneven returns students receive from them. Bourdieu argues that individuals are habituated to distinguish themselves from others in different parts of the class structure. Those from more advantaged backgrounds, such as continuing-generation students, tend to distinguish themselves from those in lower social positions by *distancing themselves from necessity.* They do so by showing that they are not bound by economic need. Less advantaged individuals, such as first-generation students, distinguish themselves from those in higher social positions by *making a virtue of necessity.* They do so by

making economical choices. These differences should result in first- and continuing-generation students attending different universities, on average. Attending the most selective universities allows continuing-generation students to show their distance from necessity as it demonstrates that they can choose a college that is difficult to enter, high status, and, on average, expensive. By contrast, less selective institutions allow first-generation students to show that they make a virtue of necessity as it demonstrates that they make economical choices.

This pattern of distinction pertains to majors as well. According to Bourdieu's theory, continuing-generation students are likely to distance themselves from necessity by choosing a major that is not associated with high pay—one that shows their distance from necessity. In particular, Bourdieu (1984, 1988) argues that privileged individuals use the arts to show that they can focus on a field known for its intrinsic, rather than extrinsic, rewards. By contrast, according to Bourdieu's theory, individuals with less privileged social origins, such as first-generation college students, are likely to make a virtue of necessity by making economical choices. In this case, they are likely to focus on majors that are associated with high pay.

A different aspect of Bourdieu's theory of social class inequality suggests that the wage gap will result not only from uneven distributions but also from uneven returns. According to Bourdieu (1984) and his followers (Armstrong and Hamilton 2013; Rivera 2015), students receive jobs through a process of capital exchange: students present their cultural and social capital in exchange for the economic capital associated with jobs. Continuing-generation students have more cultural capital (familiarity with elite activities, styles, and ways of communicating) and social capital (connections that can help them find professional jobs) than first-generation students (Stuber 2011; Walpole 2003), and these disparities extend long after students graduate from college (Karp 1986; Streib 2015). As the amount of cultural and social capital students possess relates to the amount of economic capital they will receive, continuing-generation students will out-earn first-generation students—even when they attended the same university. However, wage gaps should be highest among graduates of the most selective universities, as employers who hire graduates from elite universities emphasize cultural and social capital more than employers who hire graduates of less selective universities (Erickson 1996; Rivera 2015; Thomas 2015).

Graduates' capital disparities are likely to play out differently in regard to major. While continuing-generation students tend to have more cultural and social capital than first-generation students in their major (Armstrong and Hamilton 2013; Bourdieu 1988), not all majors and occupational fields equally favor individuals with these forms of capital (Stuber 2005). Students who major in technical fields—such as science, technology, engineering, and math (STEM)—are likely to build skills that can be objectively judged, rendering cultural and social capital less important. Fields with more subjective criteria are more likely to use cultural and social capital to evaluate individuals (Bourdieu 1988)—suggesting that there will be a generational wage gap among all majors except for STEM. The wage gap is likely to be particularly large among arts and humanities majors as these fields use the most subjective criteria (Bourdieu 1984).

Finally, Bourdieu's theory of capital exchanges extends to academic achievement. According to Bourdieu (1988), students also present their cultural capital in exchange for their grades. As grades are awarded based on cultural capital more than merit, the distribution of students into levels of achievement is likely to vary by generational status. Continuing-generation students, who have more cultural capital, are likely to have higher GPAs. Among students with similar GPAs, employers are also likely to select students who have the most cultural and social capital. In this way, the returns to GPA are also likely to vary

by generational status. Specifically, continuing-generation students are likely to earn more than first-generation students who receive the same level of academic achievement.

In addition, applications of EMI and Bourdieusian theory must consider the deeply gendered nature of college and the labor force. On average, men and women major in different fields, receive different GPAs, and earn different amounts (Bobbit-Zeher 2007; Buchmann and DiPrete 2006; England and Li 2006). The segregated and unequal experiences of men and women in both college and the labor force suggests that EMI is best addressed by considering whether first and continuing-generation students *of the same gender* are evenly distributed across institutions and majors. In terms of distinction and capital exchange, Bourdieu (1984, p. 107) believes social origin and gender are inextricably linked, writing that "sexual properties are as inseparable from class properties as the yellowness of a lemon is from its acidity." Accordingly, research finds that men and women of each generational status possess different amounts of cultural and social capital and that they are differently evaluated on them (Dumais 2002; Rivera 2015; Rivera and Tilcsik 2016). However, this research focuses on a limited scope of cultural and social capital and evaluators in few fields, leaving uncertainty about how Bourdieu's theory operates by gender more widely. As such, we prioritize the discovery of findings over hypothesis testing and estimate separate models for men and women. Doing so also allows us to account for an important possibility—that women's lower average wages constrains continuing-generation women's ability to out-earn first-generation women, making it so that Bourdieu's theory is more characteristic of men's experiences than women's.

Data and Methods

Data and Measures

We draw on restricted-access data from the 1993/2003 Baccalaureate and Beyond Longitudinal Study (B&B:93/03), a nationally representative survey of college graduates sponsored by the National Center for Education Statistics (NCES). Specifically, we use data from a sample of college seniors who obtained their bachelor's degree in 1992/1993. Respondents were initially interviewed in 1993 and were re-interviewed in 2003 (Wine et al. 2005). The 1993/2003 data is the most recent data that follows respondents 10 years after graduating—an important factor as young adults' wages become more stable after age 30 (Chetty et al. 2014). We limit our sample to the 7380 students who were employed in 2003 and graduated before age 40, as older students have different work and life experiences.[1] Using this data, we estimate independent models for men and women, applying multiple imputation by chained equations to address missing data.[2]

[1] Limiting the sample to adults who graduated before age 40 removes 5% of the sample. We find no differences in employment rates for first- and continuing-generation men (95%), and only slightly higher employment rates for first-generation college women compared to continuing-generation women (84 vs. 79%). Two-stage selection models, predicting the probability of employment in the first stage and salary in the second stage, did not identify potential issues related to selection into employment.

[2] We use the mi impute chained command in Stata 14 (StataCorp 2015). We imputed values for occupation (17), job sector (32), school size (45), hours worked (112), postgraduate major (156), race (157), gender (157), age (184), having dependents (271), parental education (410), major (418), institutional selectivity (493), job placement rate (598), GPA (653), and location (662).

Our dependent variable is *earnings*, measured approximately 10 years after graduation in terms of graduates' current or most recent annual salary.

Our main independent variable is students' generational status: first-generation versus continuing-generation. Aligned with prior research, we define first-generation graduates as bachelor's degree holders without a parent with at least a bachelor's degree and continuing-generation graduates as bachelor's degree holders with at least one parent with a bachelor's degree or higher (Stephens et al. 2012; Wilbur and Roscigno 2016; Zhang 2005). We operationalize generational status with a dummy for first-generation students and use continuing-generation graduates as the reference category.

We measure institutional selectivity using the Barron's Profile of American Colleges. This classification system categorizes universities into seven main groups—most competitive, highly competitive, very competitive, competitive, less competitive, non-competitive, and special—based on their students' high school class rank, high school GPA, standardized test scores, and the percent of applicants they admit. We exclude the special category because its small sample size meant that there are no respondents in this category in some of our subgroups.

We also look at first- and continuing-generation graduates' earnings across college majors. We operationalize college *major* by academic discipline. Basing our categories on Wolniak et al. (2008), we divide majors into the following categories: arts and humanities, business, education, health, social sciences, STEM, and vocational. Students with multiple majors identified one major as their primary field; we use this information to assign them to majors.

Additionally, we consider how graduates' *GPA* relates to their earnings. The B&B standardizes GPA scores to fit onto a single scale that ranges from 0 to 4.0, where 4.0 reflects all As. We describe the mean GPA across first- and continuing-generation students and construct GPA quintiles to examine earnings by achievement level.

In order to account for confounding factors, we also control for a host of individual, educational, and labor market factors. Individual attributes include graduates' *race* (dummy for white), *SAT score*, *marital status* (dummy for single), *having dependents,* and *age.*[3] As a measure of individual attitudes about college and work, we also include a dummy indicating whether respondents used *job placement rates* to choose a college. In terms of educational factors, we include undergraduate and post-graduate factors as each relates to earnings and to generational status. *Institutional funding* distinguishes between public and private universities—a factor that is especially associated with earnings among graduates of highly selective institutions (Brewer et al. 1999). We control for *double major* as number of majors is associated with graduates' earnings (Rossi and Hersch 2008). We include *college size* because it relates to the degree of individual attention students receive in terms of academic and career preparation (Pascarella et al. 2004). It is captured by a dummy indicating small institutions (enrollment < 5000). We also control for respondents' *further education* using both their level of education and field. We distinguish between bachelor's degree only (reference), some post-baccalaureate education but no degree and, separately, master's degree in arts and humanities, business, education, health and medicine, social sciences, STEM, and other fields, as well as a professional degree in law, professional degree in medicine, and doctorate degree in any field. We also include *GPA* as a control

[3] To account for possibly non-linear effects of age, we also included a squared term for age.

and operationalize it as a continuous variable in all models, except when examining earnings by GPA quintiles.

We also account for labor market factors associated with earnings. We control for *job sector* (self-employed, for-profit, not-for-profit, local government, state government, federal government, the military, and teachers), *occupation* (distinguishing by field and level: blue-collar, business support, clerical, educators, human services, humanities and arts professionals, legal support, legal professionals, managers, sales/customer service, STEM support, STEM professionals, and other), and the number of *hours worked per week*. Lastly, as job opportunities and earnings vary by location, we control for the location of a respondent's job in 2003 using the Urban Influence code.[4] Table 1 shows weighted[5] descriptive statistics for each variable.

Analytic Strategy

After describing the distribution of first- and continuing-generation students across institutions, majors, and GPA quintiles, we estimate students' earnings 10 years after graduation using a generalized linear model (GLM) with a log link and robust standard errors.[6] This method is appropriate and superior to the standard practice of using an ordinary least square regression on a log transformation of the dependent variable when the dependent variable is non-negative and skewed (Gould 2011; Nichols 2010; Wooldridge 2010).

Running each analysis on separate samples for men and women, we start by examining bivariate differences in earnings between first- and continuing-generation students by including a dummy for first-generation (*Model 1 Bivariate*). Next, we fit three interactions models. We interact generational status with, respectively, institutional selectivity level, major, and GPA quintile. In this way, we allow the association between generational status and earnings to differ across institutions, majors, and GPA quintiles. Next, we estimate multiple regression models by adding the control variables specified above. We do so in three subsequent steps. *Model 2 Individual* adds individual level controls to Model 1, including age, race, SAT score, marital status, having dependents, and whether respondents used job placement rates to choose a college. *Model 3 Education* adds controls for educational factors to Model 2, including institutional selectivity, major, GPA, whether a respondent had a double major, college size, institutional funding, and respondents' level of further education and field. *Model 4 Labor market* is our full model. It adds controls for labor market characteristics to Model 3, including occupational sector, occupation, hours worked, and location urbanicity.

Last, we apply the Blinder–Oaxaca decomposition (Blinder 1973; Oaxaca 1973) to understand the extent to which each factor explains the generational wage gap. The decomposition separates the generational wage gap into two portions: explained and unexplained. The explained variation reveals the percentage of the wage gap attributed to the distribution of students across institutions, majors, and GPA quintiles, among other factors. The unexplained variation reveals the portion of the wage gap due to different returns to each

[4] For more information, see http://www.ers.usda.gov/data-products/urban-influence-codes.aspx.

[5] Following the consensus in the literature, we apply survey weights and replicate weights to construct descriptive statistics (Kish & Frankel, 1974).

[6] Following Winship and Radbill (1994), we do not apply weights when running the regression analyses.

Table 1 Descriptive Statistics, N = 7380

	Men	Women		Men	Women
Institutional selectivity			Occupational sector		
Most competitive	2.7%	2.3%	Self employed	10.6%	7.3%
Highly competitive	8.5%	5.7%	For profit	59.6%	41.1%
Very competitive	24.4%	22.9%	Not for profit	9.8%	19.6%
Competitive	46.3%	46.4%	Local government	3.7%	4.5%
Less competitive	12.4%	16.4%	State government	5.8%	6.1%
Non competitive	5.6%	6.3%	Federal government	2.7%	2.5%
Majors			Military	1.6%	0.4%
Arts and humanities	14.0%	15.5%	Teachers	6.3%	18.6%
Business	25.3%	18.2%	Occupation		
Education	6.7%	17.8%	Blue collar	8.3%	3.1%
Health	6.3%	14.1%	Business support	11.2%	10.3%
Social sciences	12.5%	13.9%	Clerical	6.3%	8.2%
STEM	27.4%	14.4%	Educators	9.5%	26.1%
Vocational	6.9%	4.8%	Human services	2.6%	5.2%
Institutional characteristics			Humanities and arts	2.7%	4.3%
Private institution	31.0%	32.6%	Legal professional	2.8%	2.2%
Small institution	24.7%	28.8%	Legal support	0.7%	0.8%
Post-graduate education			Managers	15.1%	8.2%
None	52.6%	43.3%	Sales	8.2%	6.1%
Some, no degree	21.8%	28.7%	STEM professional	25.8%	17.1%
MA: Arts and humanities	4.0%	2.6%	STEM support	1.2%	1.7%
MBA	5.8%	4.3%	Other	5.6%	6.6%
MA: Education	3.0%	7.8%	Individual characteristics		
MA: Health	0.9%	1.9%	Job placement rates	29.1%	28.7%
MA: social sciences	1.8%	2.5%	Double major	4.4%	5.2%
MA: STEM	1.0%	0.9%	GPA (mean [SD])	3.08 [1.04]	3.21 [0.93]
MA: Other	2.4%	2.6%	SAT (mean [SD])	1004 [5.10]	948 [5.21]
JD	2.6%	2.5%	Demographics		
MD	2.1%	1.3%	Single	21.8%	20.8%
PhD	2.7%	1.7%	Has dependents	42.5%	42.1%
Occupational characteristics			White	88.1%	86.3%
Hours worked (mean [SD])	49 [0.30]	42 [0.29]			
Urbanicity (mean [SD])	1.9 [0.51]	1.9 [0.07]			

Authors' calculations based on weighted data from the B&B 93/03

MA master's degree

N is rounded to the nearest 10

characteristic. Together, the explained and unexplained portions tell us what factors contribute to the generational wage gap.

The Blinder–Oaxaca decomposition can be expressed as:

$$W_{FG} - W_{CG} = \left\{F\left(X_{FG}\beta_{FG}\right) - F\left(X_{CG}\beta_{FG}\right)\right\} + \left\{F\left(X_{CG}\beta_{FG}\right) - F\left(X_{CG}\beta_{CG}\right)\right\}$$

with *FG* and *CG* referring respectively to first-generation and continuing-generation college graduates. W refers to respondents' earnings and X represents the matrix of all covariates. F(.) is a function mapping a linear combination of X (Xβ) to Y; in our case, this function is $e^{X\beta}$ (Powers et al. 2011). The component $\{F(X_{FG}\beta_{FG}) - F(X_{CG}\beta_{FG})\}$ represents the explained variation while the component $\{F(X_{CG}\beta_{FG}) - F(X_{CG}\beta_{CG})\}$ represents the unexplained variation. These effects reflect the counterfactual comparison of differences in wages if continuing-generation graduates had, respectively, the same characteristics (endowment) and the same behavioral responses to each characteristic (coefficient) as first-generation graduates (Jann 2008). We perform the Blinder-Oaxaca decomposition using the mvdcmp command in Stata 14 (Powers et al. 2011).

We also consider selection issues. Endogenous selection bias (Elwert and Winship 2014) may distort our estimates of the generational wage gap as first-generation students must overcome more obstacles than continuing-generation students to graduate from college. This raises the possibility that the former are positively selected on motivation and ambition. These potential differences are likely to downwardly bias our estimates of the association between generational status and earnings as the most motivated and ambitious first-generation students compete against continuing-generation students with a wider range of motivation and ambition. This issue pertains both to selection into graduating from college as well as to selection into graduating from particular institutions, majors, and levels of achievement.

To address selection issues, we considered several options. Though some scholars address selection by assuming that students signal their ambition through the schools to which they apply (Dale and Krueger 2002), we do not take this approach as it assumes that students' enrollment decisions are uncorrelated with unobserved characteristics associated with their earning potential. We also do not use a counterfactual approach to compare our results to students who did not graduate from college as our design focuses only on college graduates. Instead, we partly account for selection by controlling for observed characteristics that can differentiate first- and continuing-generation students' earnings. Three variables from our individual and education controls also serve as proxies for ability, motivation, and emphasis on earnings. We include *SAT score* as a proxy for general ability, *double major* as a proxy for students' motivation, and *job placement rate* as a proxy for how much students emphasize earnings. As we show below, our decomposition model reveals that these measures of ability, motivation, and emphasis on earnings did not account for the generational wage gap.

Results

We first look at how first- and continuing-generation students are distributed across institutions, majors, and GPA quintiles. As Table 2 shows, continuing-generation men and women are more likely than first-generation men and women to attend the three types of most selective sets of universities, whereas first-generation men and women are more likely to attend the three least selective types of universities.

First- and continuing-generation students are also unevenly distributed across majors. Among both men and women, continuing-generation graduates are more likely than first-generation graduates to major in arts and humanities and continuing-generation men are more likely than first-generation men to major in social sciences and STEM. In contrast, first-generation men and women are more likely than continuing-generation men and

Table 2 Average earnings and distribution of first- and continuing-generation men and women across institutions, majors, and GPA quintiles

	Earnings ($)		Distribution (%)			
	Men	Women	Men (N = 3480)		Women (N = 3900)	
			CG	FG	CG	FG
Totals	67,232	47,587	52.8	47.2	47.5	52.5
Institutional selectivity						
Most competitive	92,791	56,077	4.6	0.5	3.7	1.0
Highly competitive	74,245	55,377	11.6	5.1	8.6	3.0
Very competitive	68,589	51,270	27.2	21.4	27.4	18.9
Competitive	65,702	46,256	42.0	51.2	45.2	47.5
Less competitive	59,906	44,468	10.0	15.1	10.2	21.9
Non competitive	67,264	41,987	4.6	6.8	4.7	7.8
Majors						
Arts and humanities	61,116	45,482	16.6	11.2	17.7	13.5
Business	73,565	51,261	21.5	29.6	15.0	21.1
Education	51,600	39,468	6.4	7.2	17.4	18.2
Health	66,282	51,160	5.9	6.8	12.5	15.6
Social science	69,817	49,298	14.3	10.5	15.0	12.9
STEM	69,554	51,278	29.0	25.7	15.8	13.1
Vocational	58,170	43,779	5.5	8.4	5.1	4.6
GPA quintile [average GPA per quintile]						
1 [2.57]	63,027	45,470	25.6	27.0	16.2	17.5
2 [2.96]	65,657	44,971	23.6	22.0	17.6	21.3
3 [3.18]	67,275	48,637	23.4	25.7	24.7	22.3
4 [3.44]	72,855	47,941	12.7	11.4	18.9	17.9
5 [3.79]	72,642	50,152	14.8	13.8	22.6	21.0

Authors' calculations based on weighted data from the B&B 93/03

Ns are rounded to the nearest 10

CG continuing-generation, *FG* first-generation

women to major in business, and first-generation men are more likely than continuing-generation men to major in vocational fields. In regard to GPA, Table 2 also shows that first- and continuing-generation students are fairly equally distributed across GPA quintiles.

Table 3 addresses our question of whether a generational wage gap exists. Specifically, Table 3 shows the (exponentiated) coefficients from the regression analyses estimating graduates' earnings. The coefficients can be interpreted as the ratio between first-and continuing-generation students' earnings.[7] We start with a bivariate model that only controls for generational status. In Models 2, 3, and 4, respectively, we then add controls for individual, educational, and labor market characteristics.

Table 3 reveals the size of the generational wage gap. The bivariate analysis shows significant generational wage gaps: a 0.89 ratio for men, or an 11% generational wage gap,

[7] β coefficients indicate the change in the difference in the logs of expected counts for a one unit change in the predictor variable; after exponentiating, coefficients can be interpreted as an incidence rate ratio (IRR).

Table 3 Estimates from regression models predicting earnings. N = 7380

	Men				Women			
	Model 1 Bivariate	Model 2 Individual	Model 3 Education	Model 4 Labor market	Model 1 Bivariate	Model 2 Individual	Model 3 Education	Model 4 Labor market
Wage gap	0.89**	0.94**	0.94**	0.96	0.91**	0.97	0.97	0.98
Individual characteristics								
Age		0.90*	0.97	0.98		1.00	1.01	1.01
Age squared		1.00*	1.00	1.00		1.00	1.00	1.00
SAT score		1.00**	1.00	1.00		1.00**	1.00**	1.00
White		0.95	1.00	1.00		0.87**	0.91**	0.95
Single		0.91**	0.91**	0.92**		0.98	0.98	0.96
Dependent		1.12**	1.10**	1.11**		0.94**	0.94**	1.00
Job placement rate		1.01	1.00	0.99		0.99	0.97	0.97
Education: institutional selectivity								
Most competitive (ref. cat.)								
Highly competitive			0.89	0.86*			1.13*	1.08
Very competitive			0.83*	0.82**			1.10	1.04
Competitive			0.78**	0.80**			1.05	1.01
Less competitive			0.76**	0.77**			1.06	1.01
Not competitive			0.82*	0.83			0.99	0.96
Education: major								
Arts and humanities (ref. cat.)								
Business			1.19**	1.12*			1.12**	1.05
Education			0.87**	0.98			0.90**	0.99
Health			1.15**	1.11*			1.20**	1.15**
Social science			1.08	1.08			1.04	1.03

Table 3 (continued)

	Men				Women			
	Model 1 Bivariate	Model 2 Individual	Model 3 Education	Model 4 Labor market	Model 1 Bivariate	Model 2 Individual	Model 3 Education	Model 4 Labor market
STEM			1.11**	1.09*			1.09**	1.06
Vocational			0.99	1.05			1.00	1.01
Education: GPA								
GPA			1.00**	1.00**			1.00*	1.00**
Education: undergraduate								
Small school			0.86**	0.90**			0.87**	0.90**
Private school			1.079**	1.06			1.090**	1.06*
Double major			0.99	1.00			1.00	1.02
Education: post-graduate								
None (ref. cat.)								
some, no degree			0.89**	0.94*			0.93**	0.97
MA—Arts and humanities			0.70**	0.90			0.78**	0.88*
MBA—Business			1.18**	1.12**			1.28**	1.22**
MA—Education			0.76**	1.02			1.00	1.16**
MA—Health			1.06	1.11			1.18**	1.18**
MA—Social and behavioral sciences			0.65**	0.83			0.97	1.11
MA—STEM			0.97	0.99			1.22**	1.19**
MA—Other			0.96	0.99			1.07	1.12**
JD			1.38**	1.16			1.31**	0.95
MD			1.20*	1.18*			1.44**	1.19*
PhD			0.89*	0.98			1.16*	1.10

Table 3 (continued)

	Men				Women			
	Model 1 Bivariate	Model 2 Individual	Model 3 Education	Model 4 Labor market	Model 1 Bivariate	Model 2 Individual	Model 3 Education	Model 4 Labor market
Labor market: occupational sector								
Self-employed (ref. cat.)								
For profit				0.86**				1.09
Not for profit				0.69**				0.92
Local government				0.79**				0.98
State government				0.61**				0.94
Federal government				0.83**				1.09
Military				0.86*				1.01
Teachers				0.63**				0.96
Labor market: occupation								
Clerical (ref. cat.)								
Blue collar				0.91				1.15*
Business support				1.34**				1.34**
Sales/customer service				1.18**				1.28**
Legal professionals				1.40*				1.83**
Legal support				0.94				1.17*
STEM professionals				1.26**				1.46**
STEM support				0.83**				1.16**
Educators				1.04				1.04
Human services				0.86**				1.13**
Humanities and arts professionals				1.10				1.21**
Managers				1.28**				1.43**
Others				1.12*				1.40**

Table 3 (continued)

	Men				Women			
	Model 1 Bivariate	Model 2 Individual	Model 3 Education	Model 4 Labor market	Model 1 Bivariate	Model 2 Individual	Model 3 Education	Model 4 Labor market
Labor market: other								
Urban indicator				0.97**				0.96**
Hours worked				1.01**				1.01**

Exponentiated coefficients from Poisson regression models. Authors' calculations based on data from the B&B 93/03

Ns are rounded to the nearest 10; ref. cat. = reference category

*p < 0.05; **p < 0.01

Table 4 Simple regression (poisson): average predicted earnings ($) and (exponentiated) coefficients for generational status by institution, major, and GPA quintile

	Men's earnings ($)			Women's earnings ($)		
	CG	FG	Exp(β)	CG	FG	Exp(β)
Average	69,816	62,341	0.89**	49,428	45,086	0.91**
Institutional selectivity						
Most competitive	87,372	90,588	1.04	56,773	46,198	0.81*
Highly competitive	77,479	76,100	0.98	54,405	59,223	1.09
Very competitive	73,313	63,351	0.86**	53,060	48,332	0.91*
Competitive	66,524	60,532	0.91**	46,972	44,813	0.95
Less competitive	56,700	58,636	1.03	45,637	42,220	0.93
Not competitive	62,944	65,189	1.04	42,477	39,980	0.94
Major						
Arts and humanities	65,784	54,430	0.83**	47,774	43,965	0.92
Business	77,938	70,102	0.90	54,291	48,229	0.89*
Education	49,541	48,041	0.97	39,808	37,495	0.94
Health	77,660	61,902	0.80**	55,914	50,833	0.91*
Social sciences	75,451	59,584	0.79**	51,617	45,682	0.89*
STEM	70,872	68,182	0.96	54,572	50,379	0.92
Vocational	60,877	58,605	0.96	48,113	40,414	0.84*
GPA quintile (and average GPA per quintile)						
1 (2.57)	64,378	58,997	0.92*	44,639	43,461	0.97
2 (2.96)	68,352	60,820	0.89*	47,364	44,100	0.93*
3 (3.18)	69,895	63,629	0.91*	50,529	45,968	0.91*
4 (3.44)	76,668	62,073	0.81**	51,991	45,190	0.87**
5 (3.79)	73,543	72,323	0.98	50,993	46,672	0.92*

Authors' calculations based on data from the B&B 93/03. "Average" indicates results from models including main effects only. Under "Institutional selectivity", "Major," and "GPA quintile" we present results from models including interaction terms between generational status and, respectively, institutional selectivity, major and GPA quintile. In the interaction models, each β was computed adding main and interaction term for each level. The contrast command in Stata was used to compute significance levels

CG continuing-generation, *FG* first-generation

*p < 0.05; **p < 0.01, based on robust standard errors

and, for women, a 0.91 ratio, or a 9% generational wage gap. For men, the generational wage gap lessens but remains statistically significant when holding individual level traits and educational experiences constant. It becomes non-significant when controlling for labor market experiences. For women, the wage gap becomes non-significant when adding individual level controls, suggesting that the generational wage gap that exists among women is channeled through race and motherhood.

We turn to Tables 4 and 5 to examine the size of the generational wage gap across institutions, majors, and achievement levels. Findings listed in Table 4 do not include control variables. Findings listed in Table 5 include all control variables. The first row ("Average") in Tables 4 and 5 show, respectively, results from Model 1 and Model 4. In each table, the rows below display results from models interacting generational status with, respectively, institutional selectivity level, major, and GPA quintile. Each row shows the average marginal effects (AMEs), which indicate the average predicted wages for first-generation and

Table 5 Multiple regression (poisson): average predicted earnings ($) and (exponentiated) coefficients for generational status by institution, major, and GPA quintile

	Men's earnings ($)			Women's earnings ($)		
	CG	FG	Exp(β)	CG	FG	Exp(β)
Average	67,503	64,928	0.96	47,482	46,849	0.99
Institutional selectivity						
Most competitive	79,265	77,850	0.98	45,655	40,318	0.88
Highly competitive	67,283	67,376	1.00	46,531	51,460	1.11
Very competitive	66,354	60,646	0.91*	46,730	45,530	0.97
Competitive	63,636	60,283	0.95	45,428	44,751	0.99
Less competitive	57,443	61,954	1.08	46,022	44,266	0.96
Not competitive	64,758	64,123	0.99	43,553	42,241	0.97
Major						
Arts and humanities	62,290	55,626	0.89*	43,773	43,901	1.00
Business	68,757	63,844	0.93	46,730	44,970	0.96
Education	56,397	59,597	1.06	42,483	44,135	1.04
Health	70,099	61,578	0.88	52,301	48,990	0.94
Social sciences	67,060	61,170	0.91	45,810	44,615	0.97
STEM	64,439	64,811	1.01	46,536	45,802	0.98
Vocational	60,696	63,800	1.05	45,320	43,119	0.95
GPA quintile (and average GPA per quintile)						
1 (2.57)	61,655	60,315	0.98	42,385	43,532	1.03
2 (2.96)	62,547	59,990	0.96	45,121	43,542	0.97
3 (3.18)	64,861	61,856	0.95	46,770	45,806	0.98
4 (3.44)	69,554	61,957	0.89*	46,327	45,061	0.97
5 (3.79)	67,555	70,383	1.04	47,163	46,674	0.99

Authors' calculations based on data from the B&B 93/03. "Average" indicates results from models including main effects only. Under "Institutional selectivity", "Major," and "GPA quintile" we present results from models including interaction terms between generational status and, respectively, institutional selectivity, major and GPA quintile. In the interaction models, each β was computed adding main and interaction term for each level. The contrast command in Stata was used to compute significance levels

All models also control for job sector, occupation, hours worked per week, race, SAT score, double major, marital status, having dependents, choosing a college based on job placement rates, college size, and institutional funding

CG continuing-generation, *FG* first-generation

*$p < 0.05$, based on robust standard errors

continuing-generation graduates in each category. Each row also includes the coefficient (exponentiated) for the generation status dummy, which indicates the generational wage gap among students in each institutional type, major, and achievement level.

We begin by examining the generational wage gap at institutions of varying levels of selectivity. Among men, most institutions are associated with non-significant and negligible wage gaps. Institutions at the top and bottom of the selectivity hierarchy, in particular, are associated with equal earnings for first- and continuing-generation men. However, wage gaps do appear among graduates of mid-selectivity universities. As Table 4 shows, among men, wage gaps at mid-selectivity universities range from 14% ($9963) at very competitive

universities to 9% ($5992) at competitive universities. After adding controls, as Table 5 shows, the generational wage gap among men at very competitive universities is smaller but remains significant and substantial, at 9% ($6248), while the wage gap at competitive universities decreases and becomes statistically insignificant. In sum, once we control for individual, educational, and labor market factors, only one type of university—very competitive universities—shows a generational wage gap among men.

Among women, we also find that institutions of most levels of selectivity are associated with non-significant and negligible wage gaps. As for men, when wage gaps exist at the bivariate level, they are at mid-selectivity universities. Specifically, graduates of very competitive universities see a 9% ($4728) generational wage gap. Unlike among men, among women, there is also a generational wage gap at the most competitive universities. This wage gap is large, at 19% ($10,575). However, after adding controls, this gap narrows to 12% and loses statistical significance. In fact, after adding controls, we find no significant differences among first-generation and continuing-generation women's wages at institutions of any level of selectivity.

In sum, among both men and women, institutions at the middle of the selectivity distribution are associated with the largest wage gaps—ones that advantage continuing-generation students. However, when comparing first- and continuing-generation graduates with the same individual, educational, and labor market characteristics, we find very few wage gaps at institutions of most levels of selectivity.

In regard to major, our bivariate analysis (Table 4) shows uneven and, at times, large generational wage gaps. Among men, statistically significant wage gaps reach 21% ($15,867) for social science majors, 20% ($15,758) for health majors, and 17% ($11,354) for arts and humanities majors. However, after including individual, educational, and labor market controls (Table 5), we see only one significant generational wage gap: an 11% ($6664) wage gap among arts and humanities majors. While no other major shows significant wage gaps among men, other majors do show sizeable ones: 12% for health majors and 9% for social science majors. Other majors, however, show relatively equal earnings among first-and continuing-men in both our bivariate models and our models with all controls. These include education, STEM, and vocational majors.

Among women, we also see uneven wage gaps across majors at the bivariate level and no significant wage gaps after adding controls. At the bivariate level, generational wage gaps reach 16% ($7699) among vocational majors, 11% among social science and business majors ($5935 and $6062, respectively), and 9% among health majors ($5081). However, in our multiple regression analysis with controls for individual, educational, and labor market characteristics, we find no majors that are associated with a statistically significant wage gap.

Looking across GPA quintiles, our bivariate regressions reveal large wage gaps at all but the top achievement level for men and the bottom achievement level for women. These gaps show that first-generation men need to reach the fifth GPA quintile (the 80th to 99th percentile) before they earn more than continuing-generation men in the bottom GPA quintile (the 0 to 19th percentile), and first-generation women in the fifth GPA quintile (the 80th to 99th percentile) earn less than continuing-generation women in the second quintile (the 20th to 39th quintile). After adding controls, first-generation men in the fourth GPA quintile earn about the same amount as continuing-generation men in the first quintile, and first-generation women in the highest quintile earn less than continuing-generation women in the third GPA quintile. In four out of five quintiles, first-generation men and women also earn less than continuing-generation men and women, though not all differences are large or significant.

Table 6 Blinder–Oaxaca decomposition of wage gaps between first- and continuing-generation graduates

	Men (N = 3280)			Women (N = 3900)								
	$	(%)	p	$							(%)	p
Endowment effect	5602	75	0.00	3697							85	0.00
Coefficient effect	1873	25	0.18	645							15	0.42
Gap	7475	100		4342							100	
Detailed decomposition	Explained	%	p	Unexplained	%	p	Explained	%	p	Unexplained	%	p
Institutional selectivity												
Most competitive	637	8.52	0.01	51	0.68	0.91	1	0.02	0.99	88	2.03	0.48
Highly competitive	29	0.39	0.81	−326	−4.36	0.78	32	0.74	0.72	−479	−11.03	0.42
Very competitive	7	0.09	0.95	3727	49.86	0.65	54	1.24	0.59	−143	−3.29	0.81
Competitive	205	2.74	0.24	4751	63.56	0.65	18	0.41	0.79	−318	−7.32	0.83
Less competitive	524	7.01	0.00	−3400	−45.48	0.64	−70	−1.61	0.65	644	14.83	0.56
Not competitive	38	0.51	0.60	−273	−3.65	0.87	58	1.34	0.48	198	4.56	0.67
Major												
Arts and humanities	−104	−1.39	0.47	2552	34.14	0.64	−161	−3.71	0.05	−567	−13.06	0.54
Business	−139	−1.86	0.17	811	10.85	0.79	−39	−0.90	0.52	237	5.46	0.69
Education	135	1.81	0.10	−632	−8.45	0.76	72	1.66	0.04	−675	−15.54	0.53
Health	−24	−0.32	0.14	1608	21.51	0.66	−238	−5.48	0.00	621	14.30	0.51
Social sciences	93	1.24	0.26	2274	30.42	0.65	−10	−0.23	0.62	−295	−6.79	0.67
STEM	17	0.23	0.63	−3206	−42.89	0.67	33	0.76	0.38	75	1.73	0.89
Vocational	85	1.14	0.57	−1502	−20.09	0.71	4	0.09	0.79	43	0.99	0.89
Other institutional traits												
Private	138	1.85	0.40	−3411	−45.63	0.68	79	1.82	0.26	−1411	−32.49	0.47
Small	108	1.44	0.02	2761	36.94	0.69	254	5.85	0.00	−502	−11.56	0.75

Table 6 (continued)

Detailed decomposition	Explained	%	p	Unexplained	%	p	Explained	%	p	Unexplained	%	p
Degree												
BA only	−107	−1.43	0.64	6086	81.42	0.66	396	9.12	0.00	−44	−1.01	0.99
Some post−graduate	85	1.14	0.01	−3699	−49.48	0.65	117	2.69	0.00	828	19.07	0.59
MA—Arts and humanities	−71	−0.95	0.44	−338	−4.52	0.70	−40	−0.92	0.24	−59	−1.36	0.77
MA—Business	142	1.90	0.01	876	11.72	0.67	−5	−0.12	0.39	−349	−8.04	0.47
MA—Education	−9	−0.12	0.59	−120	−1.61	0.86	8	0.18	0.75	−942	−21.69	0.40
MA—Health and medicine	26	0.35	0.26	150	2.01	0.72	5	0.12	0.88	−273	−6.29	0.45
MA—Social sciences	81	1.08	0.00	−1476	−19.75	0.63	79	1.82	0.12	400	9.21	0.42
MA—STEM	−14	−0.19	0.01	−323	−4.32	0.65	8	0.18	0.77	−39	−0.90	0.57
MA—Other	1	0.01	0.95	−192	−2.57	0.81	13	0.30	0.48	54	1.24	0.82
JD	344	4.60	0.10	2207	29.53	0.64	−138	−3.18	0.17	225	5.18	0.50
MD	166	2.22	0.09	−99	−1.32	0.89	62	1.43	0.43	−9	−0.21	0.95
PhD	55	0.74	0.60	611	8.17	0.64	20	0.46	0.70	34	0.78	0.80
Individual traits												
White	−50	−0.67	0.53	−13,195	−176.52	0.66	−154	−3.55	0.25	−161	−3.71	0.97
GPA	298	3.99	0.01	−5793	−77.50	0.88	94	2.16	0.03	11,067	254.82	0.51
SAT	−334	−4.47	0.65	5870	78.53	0.89	686	15.80	0.14	5,269	121.32	0.71
Placement rate	−23	−0.31	0.28	−2948	−39.44	0.66	−64	−1.47	0.23	−265	−6.10	0.77
Hours	257	3.44	0.00	12,866	172.12	0.74	177	4.08	0.00	−3847	−88.58	0.62
Double major	7	0.09	0.83	931	12.45	0.66	−29	−0.67	0.31	−620	−14.28	0.42
Single	−134	−1.79	0.04	−625	−8.36	0.85	−60	−1.38	0.42	545	12.55	0.55
Has dependents	−585	−7.83	0.00	4977	66.58	0.69	−11	−0.25	0.96	−277	−6.38	0.90
Urban	785	10.5	0.00	−13,084	−175.04	0.64	1054	24.27	0.00	−2471	−56.90	0.50
Age	−948	−12.7	0.87	401,965	5377.46	0.73	1974	45.46	0.61	−192,278	−4427.3	0.51
Age squared	1,472	19.7	0.79	−201,940	−2701.5	0.72	−1789	−41.2	0.63	87,510	2,015.0	0.51

Table 6 (continued)

Detailed decomposition	Explained	%	p	Unexplained	%	p	Explained	%	p	Unexplained	%	p
Labor market												
Self-employed	364	4.87	0.00	1962	26.25	0.65	54	1.24	0.46	450	10.36	0.49
For profit	314	4.20	0.00	6094	81.53	0.66	18	0.41	0.00	391	9.00	0.78
Non – profit	− 191	− 2.56	0.00	− 2751	− 36.80	0.63	− 73	− 1.68	0.01	− 25	− 0.58	0.97
Local government	66	0.88	0.55	− 914	− 12.23	0.71	14	0.32	0.35	− 194	− 4.47	0.55
State government	206	2.76	0.00	1016	13.59	0.66	87	2.00	0.00	− 949	− 21.85	0.41
Federal government	12	0.16	0.05	92	1.23	0.86	− 25	− 0.58	0.01	184	4.24	0.49
Military	− 54	− 0.72	0.14	− 67	− 0.90	0.90	1	0.02	0.86	2	0.05	0.97
Teachers	345	4.62	0.00	− 401	− 5.36	0.85	35	0.81	0.52	279	6.42	0.83
Job												
Arts professionals	66	0.88	0.51	1174	15.71	0.64	− 36	− 0.83	0.34	− 29	− 0.67	0.91
Blue collar	395	5.28	0.00	− 1256	− 16.80	0.70	7	0.16	0.54	216	4.97	0.57
Business support	166	2.22	0.00	629	8.41	0.77	− 22	− 0.51	0.19	27	0.62	0.96
Clerical	61	0.82	0.29	616	8.24	0.72	261	6.01	0.00	− 634	− 14.60	0.46
Educators	8	0.11	0.89	1786	23.89	0.69	204	4.70	0.00	− 790	− 18.19	0.69
Human services	74	0.99	0.00	333	4.45	0.75	82	1.89	0.06	14	0.32	0.97
Managers	− 204	− 2.73	0.00	2623	35.09	0.65	45	1.04	0.06	− 343	− 7.90	0.57
Others	4	0.05	0.80	− 837	− 11.20	0.66	32	0.74	0.00	378	8.70	0.49
Legal professionals	196	2.62	0.31	− 1637	− 21.90	0.65	379	8.73	0.00	174	4.01	0.71
Legal support	11	0.15	0.07	− 48	− 0.64	0.80	6	0.14	0.46	8	0.18	0.93
Sales	0	0.00	0.15	− 230	− 3.08	0.88	− 5	− 0.12	0.68	− 350	− 8.06	0.52
STEM professionals	452	6.05	0.00	4367	58.42	0.66	128	2.95	0.00	− 638	− 14.69	0.53
STEM support	112	1.50	0.00	− 125	− 1.67	0.79	27	0.62	0.28	33	0.76	0.86

Authors' calculations based on data from the B&B 93/03

Table 6 displays the results of the Blinder-Oaxaca decomposition, addressing our question about what factors contribute to the generational wage gap. For both men and women, the overall wage gap is primarily driven by differences in the characteristics of first- and continuing-generation graduates. As such, the wage gap is mostly the product of how graduates are distributed into various positions and only somewhat the product of the returns first- and continuing-generation graduates receive upon entering the same positions.

The distribution of students into educational institutions and majors, however, is not the main reason for the generational wage gap. Among women, the distribution of first- and continuing-generation graduates into the most selective colleges does not contribute to the wage gap and neither does how they are distributed into institutions of any other selectivity. The distribution of first- and continuing-generation women into majors also plays no role in creating the wage gap; in fact, the distribution of first- and continuing-generation women into arts and humanities and health majors lowers the generational wage gap. The distribution of first- and continuing-generation women into achievement levels also plays little role in constructing the generational wage gap; only 2% of the wage gap is accounted for by first- and continuing-generation women receiving different average GPAs. In addition, among women, graduate education plays some role in accounting for the wage gap but not through the field in which women receive their degrees. Rather, the distribution of first- and continuing-generation women into receiving a post-graduate degree at all—compared to stopping their education after a bachelor's degree or not completing a graduate degree—contributes to the generational wage gap.

Among men, the sorting of first- and continuing-generation students into institutions plays a modest role in constructing the generational wage gap. If first- and continuing-generation men were evenly distributed into the most selective universities, the generational wage gap would decrease by 9%. It would decrease by an additional 7% if first- and continuing-generation men were equally likely to graduate from less competitive universities. The allocation of men into majors, however, plays no discernable role in determining the generational wage gap, and the allocation of men's GPAs accounts for only 4% of the gap. The placement of first- and continuing-generation men into MBAs plays a small role in constructing the wage gap, and the sorting of students into law and medical school may, too, as these wage gaps are substantive but fall just short of significance.

We find that, despite the profound level of horizontal and vertical inequality in higher education, the generational wage gap is more a product of labor market factors than educational ones. Specifically, the wage gap is primarily a result of how first- and continuing-generation students are distributed into the labor market. The wage gap would be substantially reduced if first- and continuing-generation men and women worked the same amount of hours and were equally spread across about half of labor market sectors (for-profit, state, and federal government for men and women, and self-employment and teaching for men), and about half of all jobs (especially blue collar and STEM jobs for men and clerical, education, legal professional, and STEM professional jobs for women). Our results also show that the biggest single contributor to the wage gap is the geographic location where graduates work—whether they work in a city or not. In this way, a college degree may be a great equalizer, but the labor market sectors, occupations, and geographic locations that first- and continuing-generation students enter after college counteracts these effects.

Discussion

We investigated whether a college degree operates as a great equalizer among first- and continuing-generation graduates. We find a substantial overall generational wage gap and uneven wage gaps across institutions, majors, and achievement levels. However, we also find that most of these gaps disappear when comparing students who share individual characteristics, educational credentials, and labor market experiences. We also find that the generational wage gap largely results from how first- and continuing-generation students are distributed in the labor market.

In particular, our decomposition analysis shows that the uneven distribution of students into labor market sectors, occupations, hours worked, and urban locations is more responsible for the wage gap than the distribution of students into and within educational institutions. Despite recent evidence that prestigious firms favor students from privileged class backgrounds (Rivera and Tilcsik 2016), we find little evidence that the wage gap is caused by unequal returns to the same degree. The long arm of social origin is associated with a generational wage gap, then, not so much because of which schools students attend, what they major in, or what grades they receive but, primarily, because students of different generational statuses enter different sectors of the labor market, work in different jobs, and work in different locations.

We find that the generational wage gap also differs by gender. The overall generational wage gap is smaller among woman than among men. Controlling for other characteristics, women also receive equal earnings at every level of institutional selectivity, major, and achievement, while men experience generational wage gaps at very competitive universities, among arts and humanities majors, and in one GPA quintile. It is possible that women's overall lower earnings provides a wage ceiling that constrains the size of generational wage gaps.

Our findings have implications for EMI and Bourdieu's theories of distinction and capital exchange. Regarding institutional selectivity, inequality operates according to the predictions of both EMI and distinction: continuing-generation students are more likely to enter institutions associated with higher pay. Regarding major, inequality by generational status shows modest support for Bourdieu's theories of distinction and capital exchange. Continuing-generation students are over-represented in the major Bourdieu argues they most use to show distinction—arts and humanities majors—though continuing-generation students are not over-represented in all low-paying majors. As Bourdieu predicts, majors most associated with objective criteria—STEM majors—show equal returns for men and women from different generational statuses while the majors most associated with subjective criteria—arts and humanities majors—show a generational wage gap among men. Regarding achievement, neither theory explains the relatively equal distribution of GPAs among first- and continuing-generation students, though Bourdieu's theory is again consistent with the uneven returns students receive for their GPAs. The mixed support for each theory highlights the need to think of neither theory as right or wrong but as applicable in different situations.

Of course, our findings must be interpreted in light of the study's limitations. First, we used data from the 1993/2003 cohort, the most recent cohort for which we have data on earnings 10 years past graduation. We believe that our numbers provide a lower bound of the contemporary generational wage gap as inequality between first- and continuing-generation students has risen over the past decades, making it more difficult for a college degree to translate into equal wages (Autor 2014). Second, we focused on personal earnings, but

respondents may also gain income from investments, spouses, and parents. This focus, too, likely creates a lower bound on the overall generational wage gap. Third, we could not measure generational wage gaps controlling for parents' occupations and incomes. Approximately two-thirds of mothers' and fathers' occupational data is missing and data on parental income was limited to the 59% of students who were financially dependent on their parents during college. However, our focus on generational status remains a useful indicator of the leveling power of a college degree as parental education matters more than parental income and occupation for children's status attainment (Erola et al. 2016).

Despite these limitations, our study has important implications for future research. First, if sorting into different segments of the labor market and different locations creates a generational wage gap, we need to know more about how this process unfolds. Some research suggests that students from different social origins have different work preferences (Mullen 2010), but differences in what jobs first- and continuing-generation graduates take may also relate to what jobs they are familiar with, where jobs are located, who they are networked with, and how employers in each field hire. Similarly, we find that, of any single indicator, urban location plays the largest role in creating the wage gap. We know little about geographic segregation among graduates from different generational statuses and we need to know more. In addition, scholars argue that generational status is an important feature of social origin as it addresses parents' ability to help their children enter the labor market. We find that this difference in parental advice remains a possible mechanism of inequality as it may be a source of the bivariate wage gaps that we observed.

Our findings also have policy implications. If we care about equal earnings for first- and continuing-generation college graduates, we need to think past the current efforts to get first-generation students into elite universities and high paying majors. Our analysis shows that getting more first-generation women into the most elite schools would not change the wage gap at all, and, for men, it would only do a small amount to close it. In regard to major, first-generation students are already in several high paying majors and their distribution into majors is not what shapes the wage gap. Rather than focusing on changing where students attend college and what they major in, we should instead focus on helping first-generation graduates enter the occupational sectors, occupations, and locations that pay the most—at least, if students wish to maximize their earnings.

Lastly, our findings can be read in multiple ways. We find that there is a negligible generational wage gap when considering first- and continuing-generation students with the same graduate degrees, labor market sectors, jobs, locations, hours worked, and demographic traits, but a sizeable generational wage gap when not controlling for these features. We believe that the bivariate analysis deserves attention. If we narrow our definition of a meritocracy to equal rewards for individuals who have reached the same positions, we have forgotten that inequality by social origin operates by stratifying the ability to reach those positions in the first place.

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