



Broken promise of college? New educational sorting mechanisms for intergenerational association in the 21st century

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ABSTRACT

Previous studies have shown that intergenerational socioeconomic association becomes weaker as children's education level increases and is negligible among college graduates. A college degree is known as *the great equalizer* for intergenerational socioeconomic mobility. Recent studies, however, reported that the strong intergenerational association reemerges among advanced degree holders although it stays weak among BA-only holders. Despite the substantial theoretical importance and policy implications, the mechanisms behind the reemergence of the intergenerational association at the post-baccalaureate level have been less studied. In this paper, we examine the association between parents' education and children's earnings using the 2010, 2013, 2015, and 2017 National Survey of College Graduates data. Our results show that the strong intergenerational socioeconomic immobility among advanced degree holders is fully attributable to three educational sorting mechanisms: children from high-SES families (1) obtain expensive and financially rewarding advanced degrees, (2) attend selective institutions and major in hyper-lucrative fields of study such as law and medicine in graduate school, and (3) complete their education at a younger age and enjoy income growth over more years in the labor market. Implications of these findings are discussed.

1. Introduction

Until the late twentieth century, studies of intergenerational social mobility suggested that the resemblance between parents' and children's socioeconomic status (SES) declines across children's educational levels and becomes virtually null among college graduates (Hout, 1984, 1988). *The great equalizer* argument indicates that labor markets for college-educated workers are meritocratic (Breen and Jonsson, 2007) and thus the expansion of higher education is expected to promote greater intergenerational social mobility. In her seminal study, however, Torche (2011) reported that intergenerational socioeconomic association (hereafter, intergenerational association) across children's schooling levels forms a U-shaped curve. The influence of family background on children's SES becomes weaker as level of education rises, reaches its weakest point at the BA level, but resurfaces at the graduate level.

The reemergence of intergenerational association among advanced degree holders has substantial theoretical importance and policy implications in the era of mass higher education. Nonetheless, previous studies have rarely studied mechanisms beyond the strong intergenerational association among advanced degree holders. This study proposes that intergenerational association reemerges at the post-baccalaureate level because of the differentiated educational strategies by family background. More specifically, the reemergence can be attributed to three educational sorting mechanisms: upper-background children are more likely than lower-

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background children to (1) obtain costly but financially rewarding advanced degrees such as professional and doctoral degrees (vertical selection), (2) major in less lucrative, yet culturally distinctive and enriching, fields of study such as the humanities and sciences while attending selective schools at the BA level, switching to hyper-lucrative fields such as law and medicine at the post-baccalaureate level (horizontal selection), and (3) complete their education at a younger age and thus benefit more from years of labor market experience after obtaining an advanced degree (early degree completion).

Using the 2010, 2013, 2015, and 2017 National Survey of College Graduate datasets, we examine the association between parents' education and children's earnings. Because the key issue is the reappearance of stronger intergenerational association at the graduate level, this paper focuses on explaining how educational stratification processes are different for those who obtained a BA only and advanced degree holders. Our empirical results show that the three mechanisms we posited fully account for the reemergence of the strong intergenerational association among advanced degree holders.

2. Theoretical reviews

The stratification literature highlights the increasing importance of educational attainment in social stratification through industrialization and economic development (Blau and Duncan, 1967; Featherman and Hauser, 1978; Sewell and Hauser, 1975; Treiman, 1970). If children from low-SES families are college educated, they can reach socioeconomic parity with children from high-SES families (Breen and Jonsson, 2007; Hout, 1984, 1988). Hout (1984, 1988) showed that the socioeconomic association between parents and children becomes weaker across children's schooling levels and is nonsignificant among those holding a college degree. The weak intergenerational association among more educated children is noticeable not only in the United States but also in other industrialized countries (Breen and Jonsson, 2007; Breen and Luijckx 2007; Vallet, 2004). Hout (1988) suggested that a college degree enables children from low-SES families to overcome their disadvantages. Because of these characteristics, a college degree is known to be *the great equalizer*. The expansion of higher education seems to promise equal opportunity for everyone.

2.1. The puzzle: the U-shaped pattern of intergenerational association

Despite the promise of a college degree, scholars have suspected the possibility that postsecondary educational expansion can increase educational inequality among college goers (Arum et al., 2007; Boliver, 2011; Charles and Bradley, 2002; Davies and Guppy, 1997; Gerber and Cheung, 2008; Goyette and Mullen, 2006; Posselt and Grodsky, 2017). As organization theory suggests (Blau, 1970), the expansion of the education system has been accompanied by institutional differentiation. Variations in the type of degree, field of study, and selectivity of institutions reflect the institutional differentiation in higher education (Arum et al., 2007; Baker, 2014; Davies and Guppy, 1997; Gerber and Cheung, 2008). Within this differentiated education system, individual students experience differences in educational quantity and quality after entering college. As Maximally Maintained Inequality (MMI; Raftery and Hout, 1993) and Effectively Maintained Inequality (EMI; Lucas, 2001) theories indicate, upper-background children would have benefited from the stratification in the higher education system. Upper-background can possibly maintain their comparative advantage over the lower-background counterparts by seeking a higher level of educational degree, majoring in lucrative majors, and attending selective schools (Andrade and Thomsen, 2017; Sullivan et al., 2017).

Over the last century, the U.S. higher education system has undergone remarkable institutional expansion (Arum et al., 2007; Baker, 2014; Cohen, 2010; Goldin and Katz, 2009; Posselt and Grodsky, 2017). Among the population aged between 35 and 54, the proportion of bachelor's degree holders changed from 14.6% in 1992 to 22.1% in 2018. This expansion has not been limited to the bachelor's degree.¹ During the same period, MA holders including MBA increased from 6.6% to 10.2%. PhD holders also increased from 1.1% to 2.1%.² The expansion of graduate education beyond the bachelor's degree implies further educational stratification, which could have led to a new mechanism of intergenerational association. Nevertheless, previous studies of intergenerational social mobility have aggregated BA and diverse advanced degree into a single category. This is in part because of the lack of large datasets having detailed information on graduate education.

By utilizing multiple datasets, Torche (2011) was able to disaggregate postsecondary educational degrees into BA-only and graduate levels and examined the pattern of intergenerational association between parents' and children's SES across children's educational levels. She reported that intergenerational association declined up to the baccalaureate level but, unexpectedly, reemerged at the post-baccalaureate level. That is, the intergenerational association pattern is U-shaped across children's schooling levels. Torche (2011, 2016) demonstrated that the U-shaped pattern appears with various measures of intergenerational association, including class mobility, occupational status mobility, hourly earnings mobility, and family income mobility. Falcon and Bataille (2018) replicated the U-shaped pattern of intergenerational association between family background and children's schooling level in France.

Torche (2011) suggested that the reemergence of the intergenerational association for graduate-level education is a result of two mechanisms: horizontal stratification in higher education and occupational allocation and reward inequality in labor markets. She did not test these with statistical models. Instead, she provided very informative, yet at best circumstantial, descriptive statistics. This

¹ The proportion of bachelor's and advanced degree holders reported here is based on the author's own calculations using IPUMS-CPS datasets. We cannot differentiate MA and MBA holders due to the data information.

² As for the number of doctoral recipients, all science and engineering areas including social sciences have shown the growth over the last two decades (National Science Foundation, 2018). The only area which experienced the decline is education. The number of doctoral recipients in humanities and arts remains stable during the same period.

might be because the datasets she utilized do not have enough information and the sample of advanced degree holders is not big enough for multivariable analyses. Torche demonstrated that there is horizontal stratification by family background among advanced degree holders, whereas there is no such stratification among BA-only holders. Upper-background children are more likely to choose lucrative majors in graduate school, such as business, law, and medicine, and they are more likely than their lower-background counterparts to attend a selective private institution. The pronounced horizontal stratification among advanced degree holders sounds like a plausible explanation. However, it raises the question of why upper-background families do not adopt the same strategy of horizontal stratification for undergraduate education. The second mechanism Torche suggested, drawn from the literature of ascriptive labor market inequality, consists of two labor market processes: differentiated occupational allocation and the within-occupation earnings gap. She contended that “occupational allocation is strongly patterned by family origin, with upper-class background graduates much more likely to hold more lucrative managerial jobs than their less advantaged counterparts” (Torche, 2011:799).

Occupational distribution differentiated by family background among advanced degree holders is an informative finding. Nevertheless, there are two problems with the argument that this finding suggests. First, the reason why the labor market for advanced degree holders resembles ascriptive labor market inequality whereas the labor market for BA-only holders is meritocratic is unclear. Enhanced social capital among advanced degree holders is, in our view, a weak rationale for the segmented labor market argument. Second, there is the possibility that occupational allocation inequality is a simple reflection of differences in field of study. As is well known, the occupational distribution is closely related to choice of major (Altonji et al., 2012; Lemieux, 2014; Morgan et al., 2013; Robst, 2007).

2.2. Three mechanisms for the right side of the U-Curve

To address the concerns raised above, we suggest three potential educational mechanisms that can lead to the reemergence of strong intergenerational association beyond the undergraduate level. The broad premise of our argument is that parents and children adopt different educational strategies according to their social background because of the difference in either financial resources (Breen and Goldthorpe, 1997; Goldthorpe, 2007) and/or cultural preferences (Bourdieu, 1984; Jæger and Breen, 2016; Lamont and Lareau, 1988). We assume that given these differentiations, upper-background children are more likely to choose longer-term, more ambitious, and more academically-focused courses whereas lower-background children are more sensitive to their chances of success in the labor market, and thus they are more likely to develop educational strategies that avert the risk associated with educational investment (Bourdieu and Passeron, 1990; Goldthorpe, 2007).

2.2.1. Vertical selection

Graduate education consists of different educational programs. Although it is not as stratified as the difference between the BA and graduate levels, there is vertical stratification within graduate education. MA holders, on average, have lower earnings than other advanced degree holders, whereas MBA or other professional degree holders tend to enjoy higher returns from their education, often more than PhD holders (Day and Newburger, 2002; Hersch, 2014; Posselt and Grodsky, 2017). We suspect that the vertical stratification in graduate education is related to the strong intergenerational association among advanced degree holders. The vertical stratification mechanism is relevant to the Maximally Maintained Inequality (MMI) theory (Raftery and Hout, 1993). As the higher education system has expanded, high-SES families have strategically maintained the relative superiority of their children by expanding educational quantity. However, the vertical stratification process is more complex than the simple expansion of upper-background children's education quantity.

Because educational decisions depend on the individual's evaluation of costs and benefits (Breen and Goldthorpe, 1997), the likelihood of obtaining a more financially rewarding advanced degree varies by socioeconomic background. The post-baccalaureate transition to a more lucrative advanced degree requires more years of education (e.g., sociology PhD versus sociology MA), more expensive tuition (e.g., MBA versus MA in humanities), and more training after acquisition of the degree (e.g., MD versus business PhD). The tuition fees for profit-guaranteeing professional degree programs (e.g., law school and medical school) are high. High-SES families are able to financially support their children's postsecondary education (Rauscher, 2016) but their peers from middle/low-SES families are more likely to need a loan or rely on other funding sources (Choy and Bradburn, 2008; Houle 2014; Quadlin, 2017). These high educational costs create a greater risk for students in need of a loan, while children who have full support from their parents tend to experience relatively lower financial barrier for graduate education.

Another reason why educational decision may differ by family background is cultural preference. Highly educated parents tend to have higher expectation for children's education and encourage their children to seek a post-baccalaureate degree (Bourdieu and Passeron, 1990). According to Bourdieu (1984), education is a major subfield of society where cultural capital is crucial. Educational credential is an important form of institutionalized cultural capital which is actively invested and strongly reproduced by high status families (Bourdieu and Passeron, 1990; Jæger and Breen, 2016). As higher education expands, high status families will pursue advanced degrees which signal their social status.

As for educational decision, the rational choice based on the evaluation of costs and benefits and cultural preferences to reproduce social status are not two mutually exclusive processes.³ Nor is one completely dependent on the other. However these two processes are

³ For example, Jæger and Breen (2016, p.1089) assume that “parents are utility maximizers who seek to transmit as much as possible of their cultural capital to the child”.

entangled, we can assume that as a result of these processes, children from high-SES families are more likely to choose a graduate program that is expensive and time-consuming but also financially and culturally rewarding (Mullen et al., 2003), whereas students from low-SES families are inclined to choose two other types of programs: a program that is less financially rewarding but comes with offers of financial aid such as a teaching or research assistantship, or a program requiring less training time so that compensation from the educational investment occurs relatively quickly. In any case, the variety in the type of graduate degree is associated with the U-shaped pattern. We call these processes vertical selection.

Hypothesis 1-: The control of the types of advanced degree will account for the stronger intergenerational association among advanced degree holders compared to BA-only.

2.2.2. Horizontal selection

Agreeing with Torche (2011), we also hypothesized that two horizontal stratification processes, institutional selectivity and field of study, are important factors for the reemergence of intergenerational association at the graduate level. Horizontal stratification as a strategy for maintaining the advantage of upper-background children is hypothesized by Effectively Maintained Inequality (EMI) theory (Lucas, 2001). Upper-background children benefit not only by expanding education quantity but also by improving educational quality.

Institutional selectivity is presumed to be relevant to the substantial intergenerational socioeconomic resemblance because students from low-SES families are less likely than their counterparts from high-SES families to obtain their degree from a selective institution (Flint, 1992; Gerber and Cheung, 2008; Hoxby and Avery, 2013; Posselt and Grodsky, 2017). A problem is that stratification by institutional selectivity is not unique to graduate education. The selectivity of institutions at the undergraduate level is also sharply stratified by social origin (Hersch, 2014). That is, institutional selectivity alone cannot explain why intergenerational association among bachelor's degree holders is negligible, whereas it is strong among graduate degree holders.

The next element of horizontal stratification is field of study. It is a well-known fact that the economic returns from higher education vary depending on field of study (Kim et al., 2015; Rumberger and Thomas, 1993). College graduates majoring in business, law, or medicine, as well as in science, technology, engineering, or mathematics (STEM), obtain better labor market outcomes on average than those holding degrees in arts/humanities, education, or social science (Gerber and Cheung, 2008).

Unlike the case with institutional selectivity, there is an important twist with regard to horizontal stratification by field of study. Previous studies (Davies and Guppy, 1997; Davis, 1965; Goyette and Mullen, 2006) reported a negative correlation between parental SES and the likelihood of choosing a vocational field of study at the baccalaureate level. Undergraduate students with a low-SES background incline to choose a more vocational field of study, which helps them attain a high-paying job. In contrast, children of high-SES parents are more likely to choose a non-vocational field of study, such as arts and sciences, which enriches their cultural capital and increases the likelihood of advancing to graduate school (Goyette and Mullen, 2006).

In fact, this twist is related to the first mechanism discussed above. Because students from low-SES families are less likely to pursue an advanced degree, they may regard their undergraduate major as their main instrument for socioeconomic success in the labor market (Davies and Guppy, 1997; Davis, 1965). Contrary to this, upper-background students may have freedom to choose their undergraduate major without considering the financial potential in labor markets as seriously as lower-background students do. Upper-background children tend to major in liberal arts or sciences, fields associated with high levels of cultural capital, academic knowledge and intellectual skills, which eventually increases their chances of entering graduate school (Goyette and Mullen, 2006). Importantly, this difference in field of study by family background might conceal the substantial intergenerational association at the baccalaureate level. We suspect that the intergenerational association at the baccalaureate level would emerge if field of study were controlled, because differentiated preferences function as a suppresser of intergenerational association at the BA level.

At the post-baccalaureate level, upper-background students may utilize their advantage by choosing an expensive but financially lucrative field of study (e.g., law and medicine). The high tuition costs and the lack of other financial support to study in these financially lucrative fields in graduate school discourage lower-background children from applying, whereas the same conditions work in favor of upper-background children. We are not arguing that the choice of fields in graduate school is exclusively driven by financial interests. Their undergraduate education may nurture upper-background children to have interests in areas that differ from their undergraduate majors. Nevertheless, it is reasonable to assume that the reduction in less lucrative majors in graduate school compared to that in undergraduate is at least partially associated with the financial potential in labor markets for upper-background children. When high SES students are not choosing lucrative graduate majors, they would be more likely to pursue PhD degrees than low SES students. That is, the second mechanism, horizontal selection, is not independent from the first mechanism, vertical selection. Two mechanisms are closely entwined. Upper-background children may pursue either or both mechanisms depending on their preference to take advantage of educational expansion. The second hypothesis of this study attributes the strong intergenerational association among advanced degree holders to different choices of field of study and institutional selectivity by family background. That is, upper-background children major in a non-vocational field of study at the BA level and a hyper-lucrative field of study at the post-baccalaureate level attending selective institutions.

Hypothesis 2-1-: The initially insignificant intergenerational association among BA-only will turn out to be statistically significant net of undergraduate majors.

Hypothesis 2-2-: The control of fields of study will reduce the significant intergenerational association among advanced degree holders.

2.2.3. Early degree completion and more work experience

In addition to horizontal stratification in education, two labor market processes, allocative inequality and within-occupation reward inequality, have been proposed as potential mechanisms behind the strong intergenerational association among advanced degree holders. An important question here is how these labor market processes can result in stronger intergenerational association among advanced degree holders, whereas it does not have the same consequence for BA-only holders.

Occupational allocation is closely associated with choice of field of study. Unless field of study is controlled, occupational allocative inequality could be a reflection of educational stratification rather than of a labor market process. As for within-occupation reward inequality, we pay attention to variation in the timing of degree completion (Zarifa et al., 2018). The age at which the highest educational degree is conferred is highly correlated with the age at entering the labor market. Those who complete their degree at a younger age accumulate more years of labor market experience, which leads to a higher earnings premium at the same age (Taniguchi, 2005). We suspect that the benefit from early degree completion is greater for advanced degree holders, because age of completing graduate education varies more than that of completing undergraduate education, and the annual income growth rates for advanced degree holders are steeper than those for BA-only holders (Day and Newburger, 2002; Tamborini et al., 2015).

Although the number of older college students has increased, the majority of college graduates begin their undergraduate education right after high school graduation and obtain a bachelor's degree before age 25 (Jacobs and King, 2002; Taniguchi and Kaufman, 2005). Contrary to this, the time needed to earn an advanced degree varies depending on socioeconomic family background (Goldrick-Rab, 2006). Students from low-SES families are more likely to work after BA completion, save money for further education, and go back to school to obtain a graduate degree, rather than advance to a graduate program right after college. In contrast, students from high-SES families advance to graduate school without the gap years. Thus, they complete their education at a younger age, and they have more years of post-graduate degree work experience than their lower background counterparts of the same age. On the surface, this looks like a labor market process (i.e., within-occupation reward) but it is in fact part of the educational stratification process.

Hypothesis 3: The control of the age of degree completion will account for the stronger intergenerational association among advanced degree holders than among BA-only.

3. Analytic strategy

To examine the above hypotheses, we utilize data from the 2010, 2013, 2015, and 2017 National Survey of College Graduates (NSCG). The NSCG, a nationally representative survey of individuals who attained at least a bachelor's degree, provides information on both parents' education, specific degree type in post-baccalaureate education, type of institution, field of study, and earnings. No other available datasets provide such extensive information on graduate education from large enough samples to test our hypotheses.

We limit our sample to respondents between 35 and 54 years of age to encompass the primary working ages after completion of graduate education.⁴ Only positive earners are selected. A small number of cases for which parents' education information is not available are dropped. The final sample sizes for the combined multi-year NSCGs are 54,567 for men and 45,056 for women. Among these, 23,327 men and 23,338 women have an advanced degree.

3.1. Main dependent and independent variables

For our measure of children's outcomes, we focus on earnings because that is the most reliable socioeconomic measure that the NSCG datasets offer. Cross-sectional earnings have greater predictive power of lifetime earnings than any other socioeconomic variable (Brady et al., 2018; Kim et al., 2018). Detailed occupation might also be a good proxy for lifetime earnings (Erikson et al., 1979; Featherman and Hauser, 1978; Hauser and Warren, 1997; Weeden and Grusky, 2005), but the occupational measures of the NSCG are uniquely coded and hardly comparable with those used in other research.

The lack of earnings information about parents in many datasets can be a methodological problem for studies on intergenerational social mobility (Jerrim et al., 2016). However, the U-shaped pattern of intergenerational association has been studied using a variety of measures. Torche (2011, 2016) examined intergenerational association using personal earnings, family income, wealth, and occupational standing. Falcon and Bataille (2018) and Wakeling and Laurison (2017) studied intergenerational association using parents' social class (measured by the Erikson-Goldthorpe-Portocarero (EGP) or a modified EGP classification) and children's educational achievement. Although not frequently used, the intergenerational association between parents' education and children's socioeconomic status has been studied as well (e.g., Pfeffer and Hertel, 2015).

The NSCG does not provide information on family income when the respondents were young, but it does provide parents' schooling levels. In this study, we examine intergenerational inheritance using the association between parents' education and children's earnings. Given that we assume differentiated educational choices by family background, parents' education is a good, if not better than family income, measure of family background. Parents' education shapes their children's educational aspirations and choices (Breen and Goldthorpe, 1997; Bourdieu and Passeron, 1990; Lareau, 1989; Mullen et al., 2003), probably more so than parents' income. Furthermore, parents' education might be a better measure of their child's long-term earnings (or implicitly the socioeconomic status of the respondents' families when they were young) than single digit occupation, EGP classification, or average years of

⁴ The average age of degree completion for an MA is around 31 years, and for a PhD it is about 33. A sensitivity analysis using samples of ages 30 to 59 yield very similar results.

education by detailed occupation (Kim et al., 2018).

We use the highest number of years of schooling completed by either parent as the main independent variable.⁵ We check the sensitivity of our results by estimating our models using each parent's schooling years. As an additional sensitivity check, we test our models using predicted family income at respondents' age 13.

3.2. Statistical models

We start from a base model that does not control for the variables related with the three mechanisms and move to the full model to estimate the effect of each mechanism by adding relevant covariates on top of the base model. Equation (1) shows our base model:

$$\ln Y = \alpha + \beta P + X' \delta + \varepsilon \quad (1)$$

where $\ln Y$ is an indicator of the log-transformed, inflation-adjusted, annual earnings of the child. P refers to parents' schooling years. Thus, β quantifies the expected change in the log-transformed child's earnings as parents' schooling year increases by one year. X is a vector of demographic variables and survey-year dummies. The demographic variables are age, age-squared, race/ethnicity (white, black, Hispanic, Asian, other), marital status (currently married, not married), and having children. We estimate our models separately for BA-only and advanced degree holders to fully account for the different impacts of control variables on the two groups.⁶ Thus, if the right side of the U-shaped pattern is replicated, β for bachelor's degree holders (hereafter, β_{BA}) is statistically zero whereas β for advanced degree holders (hereafter, β_{Ad}) is statistically significantly positive.

Next, we evaluate the three hypothetical mechanisms by estimating how much the β s are changed by adding the relevant covariates (V , H , and C) to the right side of Equation (1), as follows:

$$\ln Y = \alpha + \beta P + X' \delta + (V' \zeta + H' \eta + C' \theta) + \varepsilon, \quad (2)$$

where V refers to a vector of dummy variables for type of advanced degree: MA, MBA, PhD, or other professional degree. One thing we hasten to add before discussing our models further is that we do not aim to demonstrate causality here. Instead, we focus on how much intergenerational association remains net of potential mechanisms. If vertical selection is responsible for the strong intergenerational association among advanced degree holders, β_{Ad} should be substantially decreased by adding V (Hypothesis 1). For the models for bachelor's degree holders, we omit V because there are not multiple degree types, by definition.

To evaluate the horizontal selection mechanism, we add H which indicates a vector of field of study, institutional selectivity, and the interaction terms between field of study and institutional selectivity. Field of study is measured by the nine majors: Art/Humanities, Science, Math, Engineering, Business, Social Science (= reference), Health, Law, and Other.⁷ Institutional selectivity is classified as five tiers: Private Research I and II, Private Liberal Arts I, Public Research I, other four-year universities (= reference), and specialized institutions (cf. Hersch, 2014). For advanced degree holders, fields of study and institutional tiers at both the undergraduate and graduate levels are included in our models.

If the stronger intergenerational association among advanced degree holders is attributable to upper-background students majoring in a hyper-lucrative field of study at the graduate level, β_{Ad} should decrease by controlling for field of study (Hypothesis 2-2). Contrary to this, β_{BA} should increase with control of field of study, because students from low-SES families major in a vocational field at the undergraduate level, whereas students from high-SES families major in less-lucrative fields for the BA (Hypothesis 2-1).

In Equation (2), C refers to age at degree completion. Because age and age-squared at the time of the survey are controlled for, the coefficient of age of degree completion is indistinguishable from the effect of potential years of work experience, which is defined as the difference between the year of the highest degree completion and the survey year. We expect that age at degree completion would account for part of the intergenerational association (Hypothesis 3).

If the three mechanisms fully account for the reemergence of strong intergenerational association at the post-baccalaureate level, both β_{Ad} and β_{BA} should become non-significant in our full model. Throughout our analyses, we test whether the account for three mechanisms significantly decrease β s. Person weights are applied to adjust for differences in the probabilities of sample selection. We estimate all the models separately for men and women.

4. Empirical findings

4.1. Educational stratification and earnings disparities by family background

Tables 1 and 2 show how children's educational achievement and labor market earnings vary by parents' education for men and women respectively. Children of highly educated parents are more likely than children of less educated parents to obtain a lucrative

⁵ The seven educational categories of the NSCG were recoded into schooling years as follows: less than high school = 9, high school diploma = 12, some college = 14, BA = 16, MA = 18, professional degree = 20, and PhD = 22. Slight changes in the recoding procedure do not alter our results.

⁶ When we estimated models using a sample combining BA-only and advanced degree holders, the results are almost identical with what we report here.

⁷ To check whether the degree of disaggregation of field of study matters, we did sensitivity analyses using 31 and 144 fields of study. These analyses yielded basically the same results as those we report here.

graduate degree at an upper-tier institution and more likely to earn a degree at a younger age. Children of highly educated parents are also more likely to choose a liberal art major and less likely to choose a business major for their undergraduate degree. In graduate school, the children of highly educated parents are more likely than the children of less educated parents to choose professional fields such as law and medicine. Interestingly, the proportion of arts/humanities or social science majors becomes higher among the children of less educated parents at the graduate level.

As for labor market earnings, the children of highly educated parents earn more than the children of less educated parents. The higher earnings of the children of highly educated parents are more conspicuous among advanced degree holders than among BA-only holders. These tendencies are evident for both men and women.

4.2. What mechanisms explain the puzzle of the right side of the U-curve?

We start our multivariable analyses by examining whether the upswing of the intergenerational association among advanced degree holders compared to BA-only holders that Torche (2011) reported is replicated with our datasets. As shown in Table 3, for Model 1, which controls only for demographic variables and survey year dummies, the coefficients of parents' education are for both genders statistically zero for BA-only holders, whereas they are positive and statistically significant for advanced degree holders. Among advanced degree holders, for each 1-year increase in parents' schooling, earnings rise by 2.3% for men and 1.2% for women. This upswing, the right side of the U-curve, is steeper for men than for women. As this upswing is apparent in our data, we now examine whether the three hypothetical educational mechanisms can explain the upswing.

Model 2 tests the vertical selection hypothesis by controlling for degree type. Compared to Model 1, the coefficient for male advanced degree holders declines from 0.023 to 0.012, a 47.8% reduction, although the coefficient for parents' years of schooling is still statistically significant. The coefficient for female advanced degree holders declines just as substantially, from 0.012 to 0.002, an 83.3% decline. The coefficient for female advanced degree holders becomes non-significant when holding type of advanced degree constant. The strong intergenerational association among advanced degree holders is, thus, at least partially accounted for by the greater likelihood for the upper-background children to obtain an advanced degree which is expensive and financially rewarding and often requiring longer time commitment. These results support Hypothesis 1.

Models 3 (field of study) and 4 (selectivity of institution) estimate the explanatory power of horizontal stratification. After controlling for field of study in Model 3, compared to Model 1, the coefficient of parents' education increases considerably (100%) for BA-only men and becomes statistically significant. This suggests that the weak intergenerational association among BA-only holders is due to the negative correlation between family background and the likelihood of selecting a financially lucrative undergraduate major. The difference in intergenerational association between BA-only and graduate degree holders is negligible in Model 3. Net of field of study, the extent to which parents' education and children's earnings are associated is not different between BA-only and graduate degree holders.

Unlike the effect of field of study, the control of institutional selectivity in Model 4 reduces the coefficient of the parents' education among BA-only holders. That is, the two educational horizontal stratification mechanisms drive the intergenerational association among BA-only holders, but in opposite directions. The effects of field of study and institutional selectivity seem to cancel each other out at the undergraduate level. The trade-off between the two horizontal stratification mechanisms accounts for the weak intergenerational association among BA-only holders.

In contrast to bachelor's degree holders, for advance degree holders both field of study and institutional selectivity attenuate the association between parents' education and children's earnings. The explanatory power of institutional selectivity is particularly strong. It accounts for 60.9% of the coefficient of the parents' education for male advanced degree holders and 66.7% for the females. These findings are consistent with Hypotheses 2-1 and 2-2.

Next, we examine whether age at degree completion mediates the association between parents' education and children's earnings. Age at degree completion reduces the coefficients of parents' education, not only for graduate degree holders but also for BA-only holders. This result partially supports Hypothesis 3 (early degree completion and longer work experience). This result provides a partial explanation for the relation between the within-occupational earnings gap and family background that Torche (2011) suggested.

Finally, when all three mechanisms are added together in Model 6, the coefficients of the parents' education are neither substantially nor statistically significant for any of the educational groups, regardless of gender. The coefficients of parents' education in Model 6 are almost identical for both levels of education and for both genders. The three mechanisms fully account for the strong intergenerational association among graduate degree holders. It is worth noting that control of the first two mechanisms, vertical selection and horizontal selection, does not fully explain the influence of parents' education (results not shown here). Only when all three mechanisms are added simultaneously, the difference in the coefficients of parents' education between the two educational levels disappear.⁸ The change in the coefficient of parental education ($=\beta$) between Model 1 and Model 6 for graduate degree holders is statistically significant for both genders.⁹

⁸ We test our models deleting the interaction terms between fields of study and institutional selectivity from Model 6, finding the results are not altered. The effect of parents' education become null. This implies that even though many interaction terms are statistically significant, both fields of study and institutional selectivity have independent explanatory power on the intergenerational association.

⁹ We applied KHB methods (Karlsen et al., 2012) as well as Structural Equation Modeling methods to estimate the statistical significance of the difference between β of Model 1 and β of Model 6.

Table 1
Descriptive statistics, men.

	Total	Parents' Education		Δ
		<BA	BA+	
Types of degrees				
BA	0.664	0.719	0.617	−0.102***
MA	0.149	0.142	0.156	0.014*
MBA	0.088	0.078	0.097	0.019***
Professional	0.068	0.041	0.091	0.049***
PhD	0.030	0.020	0.039	0.019***
Types of institutions				
BA-only holders				
Private Research I and II	0.043	0.027	0.059	0.032***
Private Liberal Arts I	0.028	0.016	0.040	0.023***
Public Research I	0.218	0.186	0.249	0.063***
Other four-year universities	0.660	0.719	0.602	−0.117***
Specialized institutions	0.051	0.052	0.050	−0.002
Advanced degree holders				
Private Research I and II	0.161	0.108	0.194	0.087***
Private Liberal Arts I	0.006	0.006	0.007	0.001
Public Research I	0.230	0.189	0.257	0.068***
Other four-year universities	0.480	0.555	0.433	−0.122***
Specialized institutions	0.123	0.143	0.110	−0.034**
Fields of study				
BA-only holders				
Art/Humanities	0.097	0.079	0.116	0.038***
Science and Math	0.148	0.145	0.151	0.007
Engineering	0.144	0.146	0.142	−0.004
Business	0.308	0.363	0.254	−0.109***
Social Science	0.121	0.103	0.140	0.037***
Health	0.024	0.025	0.023	−0.002
Law	0.003	0.002	0.004	0.003
Other	0.153	0.137	0.169	0.032**
Advanced degree holders				
Art/Humanities	0.046	0.044	0.048	0.004
Science and Math	0.104	0.097	0.109	0.012
Engineering	0.081	0.079	0.082	0.003
Business	0.266	0.281	0.256	−0.025
Social Science	0.051	0.047	0.053	0.005
Health	0.124	0.108	0.135	0.027**
Law	0.115	0.083	0.135	0.053***
Other	0.213	0.262	0.183	−0.079***
Mean age of degree completion				
BA-only holders	24.900	25.659	24.139	−1.520***
Advanced degree holders	30.386	31.390	29.751	−1.639***
Mean annual earnings (\$ in 2017)				
BA-only holders	115,880	110,236	121,537	11,302*
Advanced degree holders	161,843	140,372	175,419	35,047***
N	54,567			

Note: Person weights are applied.

*p < .05; **p < .01; ***p < .001 (two-tailed tests on the differences between < BA and BA+).

Source: National Survey of College Graduates (NSCG) 2010, 2013, 2015, and 2017.

4.3. Intergenerational association by type of advanced degree

Table 3 shows that in Model 2 the type of advanced degree explains a substantial portion of the strong intergenerational association among graduate degree holders. We now turn our attention to the differences in intergenerational association by graduate degree type. Table 4 shows the results before and after controlling for field of study, institutional selectivity, and age of degree completion for each degree type.

The coefficients of parents' education are statistically significant for male MA, PhD, and professional degree holders, but not for MBA holders. Intergenerational association is particularly strong for male professional degree holders. Net of horizontal selection and age of degree completion, the coefficient of parents' education is still significantly positive for male professional degree holders whereas those for MA and PhD are virtually zero. To investigate whether occupational allocation can explain this, we test models (not

Table 2
Descriptive statistics, women.

	Total	Parents' Education		Δ
		<BA	BA+	
Types of degrees				
BA	0.638	0.696	0.579	−0.117***
MA	0.245	0.223	0.268	0.045***
MBA	0.044	0.037	0.051	0.014***
Professional	0.050	0.030	0.072	0.042***
PhD	0.023	0.015	0.031	0.017***
Types of institutions				
BA-only holders				
Private Research I and II	0.040	0.025	0.060	0.035***
Private Liberal Arts I	0.038	0.023	0.056	0.032***
Public Research I	0.188	0.146	0.239	0.092***
Other four-year universities	0.681	0.738	0.609	−0.129***
Specialized institutions	0.054	0.067	0.037	−0.031***
Advanced degree holders				
Private Research I and II	0.095	0.060	0.122	0.062***
Private Liberal Arts I	0.017	0.021	0.014	−0.006
Public Research I	0.202	0.153	0.239	0.086***
Other four-year universities	0.599	0.676	0.541	−0.135***
Specialized institutions	0.086	0.090	0.083	−0.007
Fields of study				
BA-only holders				
Art/Humanities	0.126	0.102	0.157	0.054***
Science and Math	0.086	0.083	0.089	0.006
Engineering	0.022	0.019	0.027	0.008***
Business	0.263	0.285	0.235	−0.051***
Social Science	0.141	0.133	0.152	0.019**
Health	0.109	0.116	0.101	−0.015*
Law	0.004	0.006	0.003	−0.003*
Other	0.247	0.255	0.237	−0.018
Advanced degree holders				
Art/Humanities	0.053	0.039	0.064	0.025***
Science and Math	0.052	0.045	0.057	0.012**
Engineering	0.015	0.014	0.017	0.003
Business	0.122	0.123	0.121	−0.003
Social Science	0.078	0.076	0.079	0.004
Health	0.160	0.154	0.166	0.012
Law	0.082	0.062	0.098	0.036***
Other	0.437	0.488	0.399	−0.089***
Mean age of degree completion				
BA-only holders	25.484	26.533	24.172	−2.362***
Advanced degree holders	31.095	32.301	30.188	−2.113***
Mean annual earnings (\$ in 2017)				
BA-only holders	63,562	58,727	69,606	10,879***
Advanced degree holders	87,917	81,197	92,970	11,773*
N	45,056			

Note: Person weights are applied.

* $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed tests on the differences between < BA and BA+).

Source: National Survey of College Graduates (NSCG) 2010, 2013, 2015, and 2017.

shown here) controlling for occupation in addition to the covariates of Model 2. There are no meaningful changes.¹⁰ For women, the coefficient of parents' education is significant only for professional degree holders in Model 1. When horizontal selection and age of degree completion are controlled for, no degree types exhibit a positive association between parents' education and children's earnings.

Interestingly, the coefficients of parents' education become negative for male MBA and female PhD holders in Model 2. Occupational allocation does not help in accounting for these cases. The negative coefficient for male MBA holders could be because of the positive selection of the lower-background children into MBA programs. MBA programs are relatively short in duration and are often financially supported by employers if the employee exhibits great managerial potential and commitment. This makes the financial barrier faced by lower-background children lower for MBA programs than for other graduate programs. In any case, our results pose new puzzles regarding the variation in intergenerational association across degree types. Further research in this line of study is

¹⁰ Probably because the occupational coding of the NSCG is closely linked to field of study, controlling occupation may not have reduced the coefficients of intergenerational association. Besides occupation, we also control for employment sector, size, new business in the previous five years, and linear/quadratic tenure, finding that these additional control variables did not change the results.

Table 3
OLS estimates of the effects of parents' schooling years on children's earnings.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Demographic variables	Y	Y	Y	Y	Y	Y
Survey year	Y	Y	Y	Y	Y	Y
Types of advanced degrees		Y				Y
Fields of study			Y			Y
Institutional selectivity				Y		Y
Fields of study $\times$ Institutional selectivity						Y
Age of degree completion					Y	Y
Men						
BA-only holders						
Parents' years of schooling	0.005 (0.004)	n.a. n.a.	0.010* (0.004)	0.001 (0.004)	−0.001 (0.004)	0.001 (0.004)
Adjusted R ²	0.071	n.a.	0.108	0.085	0.098	0.144
N	31,240					
Advanced degree holders						
Parents' years of schooling	0.023*** (0.004)	0.012*** (0.004)	0.013*** (0.004)	0.009* (0.004)	0.017*** (0.004)	0.001 (0.004)
Adjusted R ²	0.058	0.166	0.212	0.122	0.106	0.287
N	23,327					
Women						
BA-only holders						
Parents' years of schooling	0.003 (0.005)	n.a. n.a.	0.006 (0.005)	0.000 (0.005)	0.001 (0.005)	0.000 (0.005)
Adjusted R ²	0.017	n.a.	0.046	0.020	0.019	0.056
N	21,718					
Advanced degree holders						
Parents' years of schooling	0.012* (0.005)	0.002 (0.005)	0.007 (0.005)	0.004 (0.005)	0.009 (0.005)	−0.002 (0.005)
Adjusted R ²	0.007	0.073	0.073	0.020	0.014	0.117
N	23,338					

Note: Control variables are age up to quadratic, race/ethnicity, marital status, having children, and survey year. Numbers with parentheses are standard errors. Person weights are applied.

*p < .05; **p < .01; ***p < .001 (two-tailed tests).

Source: National Survey of College Graduates 2010, 2013, 2015, and 2017

warranted.

4.4. Robustness checks

We use the highest year of schooling completed by either parent as our main independent variable. To check whether our results are sensitive to how we measure parents' education and family background, we re-estimate the models of Table 3 using father's years of schooling, mother's years of schooling, a dummy indicating at least one parent has a bachelor degree, predicted family income at age 13. As shown in Table 5, the results are remarkably similar to what we report in Table 3. The association between parents' SES and children's earnings is null among BA-only holders whereas it is statistically significantly positive among graduate degree holders. When a dummy of at-least-one-parent-has-a-BA is used, the parent education looks statistically significant for BA-only men, but only at 0.05 alpha level. When type of advanced degree, field of study, institutional selectivity, and age at degree completion are taken into account, the strong intergenerational association among advanced degree holders disappears. In addition, we re-estimate our models by age group (35–44 and 45–54). The results for the two age groups (not shown here, but available upon request) are similar. The intergenerational association is stronger among graduate degree holders, but it becomes zero net of all three mechanisms.

5. Discussion

College has been thought to be *the great equalizer*, attenuating the association between parents' and children's SES (Hout, 1984, 1988). Recent studies (Falcon and Bataille, 2018; Posselt and Grodsky, 2017; Torche, 2011, 2018; Wakeling and Laurison, 2017), however, have found that a strong intergenerational association reemerged at the graduate level. In this study, we examined the mechanisms that account for the upswing in intergenerational association at the graduate level.

Our empirical results show that the reemergence of intergenerational association between parents' education and children's earnings at the post-baccalaureate level can be fully accounted for by three educational sorting mechanisms: children of highly educated parents (1) obtain an expensive and financially rewarding advanced degree such as a PhD or other professional degree (vertical selection), (2) major in a hyper-lucrative post-baccalaureate field of study such as law or medicine while attending a selective institution (horizontal selection), and (3) complete their education at a younger age and enjoy earnings growth over more years of labor market experience (early degree completion and greater work experience).

Table 4

OLS estimates of the effects of parents' schooling years on children's earnings by degree type among advanced degree holders.

	Men		Women	
	Model 1	Model 2	Model 1	Model 2
Demographic variables	Y	Y	Y	Y
Survey year	Y	Y	Y	Y
Fields of study		Y		Y
Institutional selectivity		Y		Y
Fields of study $\times$ Institutional selectivity		Y		Y
Age of degree completion		Y		Y
MA holders				
Parents' years of schooling	0.011*	−0.002	−0.005	−0.005
	(0.005)	(0.004)	(0.006)	(0.007)
Adjusted R ²	0.061	0.257	0.006	0.050
N	12,887		15,851	
MBA holders				
Parents' years of schooling	0.001	−0.020*	0.028	0.012
	(0.010)	(0.010)	(0.017)	(0.016)
Adjusted R ²	0.057	0.188	0.029	0.157
N	4467		2396	
Professional degree holders				
Parents' years of schooling	0.031***	0.035***	0.020*	0.013
	(0.009)	(0.008)	(0.010)	(0.009)
Adjusted R ²	0.078	0.194	0.029	0.153
N	2666		2293	
PhD holders				
Parents' years of schooling	0.018**	−0.002	−0.012	−0.017*
	(0.006)	(0.005)	(0.008)	(0.008)
Adjusted R ²	0.062	0.287	0.028	0.142
N	3307		2798	

Note: Control variables are age up to quadratic, race/ethnicity, marital status, having children, and survey year. Numbers with parentheses are standard errors. Person weights are applied.

* $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed tests).

Source: National Survey of College Graduates 2010, 2013, 2015, and 2017

These results shed new light on the educational stratification theories. High-SES families have a greater financial and cultural capacity to support their children's graduate education. Consistent with the MMI theory (Raftery and Hout, 1993), students raised in high-SES families are taking advantage of post-baccalaureate educational transitions through vertical selection.

As the EMI theory implies (Lucas, 2001), educational expansion enhances horizontal stratification in higher education (Arum et al., 2007; Gerber and Cheung, 2008). However, horizontal stratification does not linearly evolve to the benefit of upper-background children. One of the unique contributions of this paper is to show that horizontal stratification functions differently at the undergraduate and graduate levels. At both educational levels, students from high-SES families are more likely to earn a diploma offered by a selective institution, which leads to better economic returns (Gerber and Cheung, 2008; Posselt and Grodsky, 2017).

At the undergraduate level, however, students from low-SES families tend to select a vocational field of study (Davies and Guppy, 1997; Davis, 1965; Goyette and Mullen, 2006). The selection of a vocational field of study by students from low-SES families offsets the effects of institutional selectivity at the baccalaureate level. Meanwhile, students raised in high-SES families are more likely to choose non-vocational fields of study, such as arts/humanities and science, for their undergraduate education, which increases their chances of entering graduate school (Goyette and Mullen, 2006).

This difference in horizontal stratification between undergraduate and graduate school implies that horizontal stratification is entwined with vertical stratification in higher education. Both upper- and lower-background students may make educational choices strategically to maximize the holistic benefit of education by balancing personal interests and financial return. The gap in available financial and cultural resources by family background may alter the balancing points. Available resources might not rule educational choices fully, but they will condition the probability between different choices. Given the gap in available financial and cultural resources, both upper- and lower-background students make bounded yet reasonable educational choices which lead to the reemergence of intergenerational association at the graduate level. Thus, the U-curve pattern is a result of adaptive educational strategies differentiated by family background.

To check whether the differentiated strategic choices discussed above are empirically evident further, we classify fields of study into more lucrative and less lucrative, and institutional types into more selective and less selective. Then we track the choice patterns across undergraduate and graduate education. Table 6 shows the results. Among BA-only holders, children of less educated parents are more likely to choose more lucrative majors than less lucrative majors, whereas children of highly educated parents are more likely to choose less lucrative majors than more lucrative majors. A similar choice pattern is evident for women. Among male and female advanced degree holders, the choice of a more lucrative BA major followed by a more lucrative graduate major is the most common pattern, and the switch from a more lucrative BA major to a less lucrative graduate major is the least common one. The switch from a

Table 5

OLS and two-sample two-stage regression estimates of the effects of socioeconomic family background on children's earnings.

	Men		Women	
	Model 1	Model 2	Model 1	Model 2
Demographic variables	Y	Y	Y	Y
Survey year	Y	Y	Y	Y
Types of advanced degrees		Y		Y
Fields of study		Y		Y
Institutional selectivity		Y		Y
Fields of study $\times$ Institutional selectivity		Y		Y
Age of degree completion		Y		Y
BA-only holders				
Father's years of schooling ^a	0.003 (0.004)	−0.001 (0.004)	0.009 (0.005)	0.006 (0.005)
Adjusted R ²	0.071	0.144	0.017	0.056
Mother's years of schooling ^a	0.008 (0.004)	0.003 (0.004)	0.004 (0.006)	0.001 (0.006)
Adjusted R ²	0.071	0.144	0.017	0.056
At least one parent has a BA degree ^a	0.054* (0.023)	0.033 (0.022)	0.016 (0.031)	−0.010 (0.032)
Adjusted R ²	0.071	0.144	0.017	0.056
Predicted family income ^b	0.060 (0.031)	0.020 (0.031)	0.067 (0.040)	0.015 (0.041)
Adjusted R ²	0.071	0.144	0.017	0.056
N	31,240		23,327	
Advanced degree holders				
Father's years of schooling ^a	0.026*** (0.004)	0.006 (0.003)	0.012** (0.004)	−0.003 (0.005)
Adjusted R ²	0.061	0.288	0.007	0.117
Mother's years of schooling ^a	0.022*** (0.004)	−0.001 (0.004)	0.016** (0.005)	0.004 (0.005)
Adjusted R ²	0.056	0.287	0.008	0.117
At least one parent has a BA degree ^a	0.127*** (0.028)	−0.013 (0.025)	0.041 (0.028)	−0.031 (0.028)
Adjusted R ²	0.056	0.287	0.006	0.117
Predicted family income ^b	0.169*** (0.037)	−0.015 (0.032)	0.108** (0.039)	0.003 (0.038)
Adjusted R ²	0.055	0.287	0.007	0.117
N	21,718		23,338	

Note: Control variables are age up to quadratic, race/ethnicity, marital status, having children, and survey year. Person weights are applied.

*p < .05; **p < .01; ***p < .001 (two-tailed tests).

^a Ordinary Least Square models are estimated.

^b The two-sample two-stage least squares (TS2LS) techniques are applied for models of family income. First, we estimate predicted family income based on six characteristics: father's years of schooling, mother's years of schooling, children's birth year, gender, race/ethnicity, and high school region, using the 1970, 1980, and 1990 Census datasets. Second, we impute the match of the predicted log-family income to the NSCG data with respect to these six characteristics, and then we assess the association between family income at age 13 and children's earnings. The issue of smaller standard errors related to the generated regressor is addressed by applying the Murphy-Topel method (Murphy and Topel, 1985).

Source: National Survey of College Graduates 2010, 2013, 2015, and 2017

less lucrative BA major to a more lucrative graduate major is more frequent among children of highly educated parents than among children of less educated parents.

We argue that the weak intergenerational association for BA-only holders and the strong intergenerational association for advanced degree holders are not the results of two different processes, but they are the flip side of the same process. Given their limited financial resources, lower-background students are more likely to obtain a stable and solid-income job by choosing for the BA a vocational field of study that confers occupationally oriented concrete skills than upper-background students (Goyette and Mullen, 2006). On the other hand, upper-background students aim to not only gain occupational skills but also enhance their cultural capital through their undergraduate education. Less lucrative but entertaining and enriching undergraduate majors are affordable and desirable for upper-background children. Students at institutions requiring a large proportion of courses in arts and science fields tend to acquire greater academic knowledge and better intellectual skills, such as critical thinking and writing (Dressel and Mayhew, 1954; Forrest, 1982). These raise the likelihood for them to proceed to graduate school, earn a higher-level advanced degree, and eventually get a lucrative job. Since upper-background children are more likely to be non-first-generation college students (Pascarella et al., 2004; Terenzini et al., 1996), their college-educated parents help them navigate the strategic practices in higher education “in the form of familiarity with high culture, sophisticated use of verbal and written language, and confidence in their broad knowledge of history, culture, and politics” (Goyette and Mullen, 2006:525–26).

Then, why has the difference in the sequence of strategic choices as a function of family background become more prominent

Table 6

Parent's education and children's horizontal stratification in higher education.

	Men				Women			
	Sub-total	Parents' education		Δ	Sub-total	Parents' education		Δ
		<BA	BA+			<BA	BA+	
BA-only holders								
Fields of study								
More lucrative	0.754	0.776	0.732	−0.044***	0.788	0.814	0.754	−0.060***
Less lucrative	0.246	0.224	0.268	0.044***	0.212	0.186	0.246	0.060***
Institutional selectivity								
More selective	0.071	0.043	0.099	0.055***	0.078	0.048	0.115	0.067***
Less selective	0.929	0.957	0.901	−0.055***	0.922	0.952	0.885	−0.067***
N	31,240				21,718			
Advanced degree holders								
Fields of study								
More lucrative BA/more lucrative Grad.	0.633	0.667	0.611	−0.056***	0.694	0.753	0.649	−0.104***
More lucrative BA/less lucrative Grad.	0.043	0.048	0.039	−0.009***	0.029	0.026	0.032	0.006*
Less lucrative BA/more lucrative Grad.	0.217	0.192	0.233	0.041***	0.201	0.163	0.230	0.067***
Less lucrative BA/less lucrative Grad.	0.108	0.093	0.117	0.024***	0.075	0.057	0.089	0.032***
Institutional selectivity								
More selective BA/more selective Grad.	0.078	0.040	0.102	0.062***	0.054	0.025	0.076	0.051***
More selective BA/less selective Grad.	0.109	0.062	0.138	0.076***	0.105	0.063	0.137	0.073***
Less selective BA/more selective Grad.	0.089	0.074	0.099	0.025***	0.058	0.055	0.060	0.005
Less selective BA/less selective Grad.	0.724	0.825	0.661	−0.164***	0.782	0.856	0.727	−0.129***
N	23,327				23,338			

Note: More selective institutions are Private Research I/II, and Private Liberal Arts I. Less selective institutions are other institutions. More lucrative fields of study are Engineering, Business, Social Science, Health, Law, and Other. Less lucrative fields of study are Art/Humanities, Science, and Math. Person weights are applied.

*p < .05; **p < .01; ***p < .001 (two-tailed tests on the differences between < BA and BA+).

Source: National Survey of College Graduates (NSCG) 2010, 2013, 2015, and 2017.

recently? We suspect that privatization in higher education plays a role. Since the 1980s, massive private funding has fueled post-secondary education expansion (Arum et al., 2007; Baker, 2014; Cohen, 2010; Ehrenberg, 2005; Levine, 2001; Lyall and Sell, 2006). On the one hand, the inflow of large amounts of private capital might widen access to higher education, although children from low-SES families did not benefit much from educational expansion (Arum et al., 2007; Raftery and Hout, 1993). On the other hand, privatization induces stratification in the higher education system, resulting in a hierarchical differentiation between selective institutions that retain substantial private funding and their counterparts that need financial support. Higher education institutions are competing to raise private funding and attract students for the purpose of organizational survival (Baker, 2014; Goldin and Katz, 2009). The rapid growth in MBA programs and the spread of vocational curricula in diverse fields of study reflect the capitalistic transformation of higher education (Baker, 2014; Chandler, 1977; Cohen, 2010).

The for-profit competition among postsecondary educational institutions has been accompanied by a rise in tuition fees (College Board, 2017; Goldin and Katz, 2009). During the past three decades, college tuition and fees have increased 2.3 times for private institutions and 3.5 times for public institutions, while the costs of attending private institutions have been more than three times higher than those for public institutions (College Board, 2017). The increasing educational costs create higher financial barriers for children from low-SES families. Whereas high-SES families can afford to support their children's higher education financially, students from low-SES families are more likely to depend on loans or need other financial aid to afford tuition (Choy and Bradburn, 2008; Houle 2014; Quadlin, 2017; Rauscher, 2016). These soaring educational costs may have greater impacts on those seeking an advanced degree than those obtaining a BA only.

Overall, our findings cast doubt on the notion that expansion of higher education can boost equal opportunity regardless of family background. Expansion of the higher education system has evolved along with institutional differentiation in higher education, increasing inequality among college goers (Arum et al., 2007; Gerber and Cheung, 2008; Posselt and Grodsky, 2017). As higher education becomes more complex and costlier, parents and children adjust their educational choice strategies taking into account the available financial and cultural resources and perceived opportunity costs. Upper-background families find a way to exploit the potential of this institutional differentiation to their favor.

Our research has several limitations. Some may wonder whether the U-shaped pattern is a result of selection. That is, upper-background children are selected positively into advanced degrees based on their academic performance, while lower-background children are not. Because of the lack of information on the academic performance in college, we cannot test this possibility. However, given that a smaller proportion of lower-background children earn advanced degrees compared to upper-background children, the positive selection into graduate school would be more likely for lower-background children than for upper-background children. In any case, further study on this possibility is warranted.

Because of data limitations, the empirical analyses do not identify precisely when the three mechanisms of strong intergenerational earnings immobility emerged. An examination in future research of change (or stability) over a longer period is warranted. To measure the selectivity of institutions, we divided higher educational institutions into five tiers, following Hersch (2014). Detailed information

about educational institutions is publicly unavailable due to confidentiality issues. Previous research warns that the effects of institutional selectivity on labor market outcomes vary depending on how it is measured (Black and Smith, 2004; Gerber and Cheung, 2008). Our relatively crude five-tier classification may have underestimated the effects of institutional selectivity.¹¹ The variation in the dynamic of three mechanisms across college types and undergraduate fields needs further investigation. The strong intergenerational association among MBA and other professional degree holders should be addressed in future research as well. Gender differences in intergenerational association among the college-educated are another future research topic. For all levels of higher education, intergenerational association is weaker among women than among men. The current study does not uncover the factors related to these gender differences.

Overall, we show that the reemergence of intergenerational association at the post-baccalaureate level is a result of the sequence of strategic choices differentiated by family background. Our results also raise the possibility that the notion of college as *the great equalizer* is a short-lived hope, resulting from the lack of detailed information on vertical and horizontal stratification in higher education. At a minimum, we have demonstrated that the stratification within higher education is closely associated with the change in intergenerational mobility. Future research needs to inquire into which areas and by what mechanisms upper-background children maximize the human and social capital they acquire through higher education.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ssresearch.2019.102375>.

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¹¹ The use of the Carnegie classification did not improve model fitness or explanatory power with respect to intergenerational association.

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