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## **Something Good Out of the Bad Times? The Impacts of Reduced Opportunity Costs on the Intergenerational Inequalities in College Enrollment**

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### **Abstract**

This research examines whether the reduced opportunity costs observed during the Great Recession resulted in changing socioeconomic inequalities in college enrollment. The results of the multilevel logistic regression analyses of American high school graduation cohorts 2003-2013 with data from the Panel Study on Income Dynamics indicate that educational decision-making changed during the recession. The association between parental education and college enrollment decreased during the recession for both men and women, but the changes in the association between parental income and enrollment contrasted by gender. While the income differences in college enrollment were reduced among female high school graduates, it increased among male graduates. The opportunity costs at the time of graduation showed the decreasing influence of parental income and the increasing influence of parental education during the recession.

Keywords: higher education, opportunity costs, college enrollment, recession, intergenerational inequality

# 1 Introduction

A broad literature emphasize that enrollment rates in tertiary education increase during recessions (e.g., Dellas & Koubi 2003; Clark 2011), and most sharply in areas where the labor market experiences the largest decline (Long 2014). Simultaneously, the opportunity costs of higher education are significantly lower due to the lack of job opportunities for young adults. Although higher education enrollment requires a considerable amount of resources (Frenette 2007; Jæger & Holm 2007), according to the rational action theory, families base their educational decisions on the perceived costs, utilities and success of pursuing college (Goldthorpe 1998; Breen & Goldthorpe 1997), and hence changed opportunity costs can alter the educational decision-making of families. Educational expansion has pushed graduation from high school to nearly universal levels (Murnane 2013), resulting in the transition from high school to higher education or labor market to be the crucial point where individual social and economic outcomes are affected, and where the opportunity costs are most strongly weighted.

This paper examines whether changed opportunity costs influenced the educational decision-making between families with varying resources and whether this resulted in changes in intergenerational inequalities in college enrollment in the United States. The most recent substantial economic decline, the Great Recession in the beginning of the 21<sup>st</sup> century, was a major global crisis. In the US, the labor market experienced a large upheaval and employment plummeted, causing exceptional losses in income and wealth (Hout et al. 2011; Smeeding et al. 2011). Consequently, the opportunity costs of pursuing higher education were substantially reduced for high school graduation cohorts, as job opportunities were extremely scarce. At the same time, educational institutions experienced financial pressure that led to increased tuition, but, on the other hand, public financial aid for students was extended as well (Bettinger & Williams 2014). Although the negative impacts of the recession on American families have been extensively studied (e.g., Grusky et al. 2011; Hurd & Rohwedder 2010; Pfeffer et al. 2013), there is a shortage of evidence concerning how these complex changes during the recession affected both educational decision-making and educational inequalities.

Strong evidence exists that socioeconomic background factors, i.e., parental resources, affect the transition into higher education (Breen & Jonsson 2005; van Doorn et al. 2011). Secondary effects of social background, i.e., the impact of the families' socioeconomic resources on educational decisions, have been found to be related to the inequality of educational opportunities in multiple contexts (Jackson 2013; Morgan 2012). Further, attaining a college degree, or even finishing some college courses, is associated with positive social and economic outcomes compared to no college (Attewell & Lavin 2007; Brand & Xie 2010; Hout 2012). With the increasing rates of finishing high school in the U.S (Barro & Lee 2013), it is vital to understand the inequalities in the decision-making process of families on whether to pursue higher education or to enter the labor market after high school. The reduced opportunity costs of higher education can be viewed as an incentive for disadvantaged families, who less likely enroll in college, and might thus reduce the income and education inequalities in college enrollment. This can help clarify which factors impact the origin-education association, i.e., the parental influence in educational transitions.

This article studies how the changed opportunity costs during the recession influenced the educational decision-making of college entry among families with different levels of financial and educational resources. Data from the Panel Study on Income Dynamics enable to examine the relationships between family background, college enrollment and the recession among individuals who graduated from high school between 2003 and 2013. State-level information on unemployment rates is included in the analysis to explore the role of opportunity costs in the social stratification of college enrollment. This enables to study the connections between meso-level changes, i.e., changes in unemployment, and the micro-level events, i.e., inequalities in the process of educational decision-making of individuals and families. By applying multilevel logistic regression models with state-fixed effects, this paper provides empirical evidence regarding how the Great Recession affected the relationship between parental backgrounds and the transition of high school graduates into tertiary education in the United States.

## **2 Reduced opportunity costs and the changing inequalities in college enrollment**

Abundant evidence exists regarding the cyclical nature of college enrollment rates, which means that educational enrollment increases when economic growth is slow and unemployment is high (e.g., Betts & McFarland 1995; Clark 2011). This suggests that families react to changes in the economy; particularly to changing labor market opportunities. One explanation can be found in the rational action theory, which argues that individuals' actions are based on acknowledged decisions where the individuals obtain and use knowledge and subjective rationality to maximize their decisions' expected utility (Breen & Goldthorpe 1997; Goldthorpe 1998). Although some increased enrolment may be due to 'warehousing' where children are merely maintained within educational institutions between leaving school and entering work (see Field 2006, p150), these educational decisions are often based on the evaluation of the risks, costs and benefits of the specific educational transition by the families. The perceived costs, i.e., tuition and opportunity costs, and benefits, i.e., socioeconomic returns to education, change over time. The most evident decrease in the opportunity costs of pursuing higher education occurs during a recession when the job opportunities in the labor market are scarce. This raises the question whether these changes in opportunity costs result in changes in socioeconomic inequalities in higher education enrollment during economic recessions.

In sociological research, relative risk aversion (RRA) theory extends from the rational action theory arguing that families seek to minimize the risk of downward mobility, meaning that high-status families pursue top-quality colleges, whereas lower-class families choose lower-risk educational pathways to avoid failure (Breen & Goldthorpe 1997; Holm & Jæger 2008). The theory is based on a rational choice between less or more risky options that are dependent on the parents' economic and social resources. Previous research demonstrates that risk aversion in the transition to higher education is minimal among the most advantaged students, as they will almost automatically proceed to college, but students from disadvantaged families are more risk-averse (Breen et al. 2014; Bailey & Dynarski 2011). While the opportunity costs notably reduce during economic recessions, the cost-benefit balance is shifted such that pursuing higher education is less costly, which is particularly important

for the disadvantaged families who are less likely to attend college. Long (2014) found that educational enrollment increases in areas where the labor market has the largest reduction from a recession, which supports the assumed link between the changed opportunity costs and educational responses. Therefore, the changes in opportunity costs during the recession is expected to result in positive outcomes of intergenerational inequalities in college enrollment, particularly among disadvantaged families. To conclude, it is assumed that

*The greater the change in opportunity costs is, i.e., the higher the unemployment growth is, the more apparent the changes in socioeconomic inequalities in college enrollment are (H1).*

Economic downturns deprive families of income and employment, which decreases the probability of attending college, and if deprivation of wealth also occurs, the possibilities of higher education enrollment are greatly decreased (Kalil & Wightman 2011; Wolff et al. 2011). As the overall net price of higher education increases, e.g., due to increased tuition, low-income parents spend less on education during a recession, whereas families with high incomes increase their educational spending (Kornrich & Lunn 2017; Long 2004). Despite the increased financial constraints, lowered opportunity costs are expected to increase the probability of low-income students enrolling in college after high school during a recession (Goldrick-Rab et al. 2016). Although high-income families are not expected to change their educational decision-making, as their resources are less affected by a recession, the positive effect of reduced opportunity costs, particularly for disadvantaged students, is expected to overtake this non-responsiveness, which would eventually result in positive changes in income inequalities in college enrollment. Therefore, it is expected that

*The association between parental income and the probability to enroll in college after high school decreases during a recession (H2).*

Educational mobility, i.e., the influence of the parents' education on the high school graduates' educational transitions, has been found to be stable across the developed countries (Pfeffer 2008). While previous findings indicate that different measures of social origin have distinctive independent effects on educational attainment (Bukodi & Goldthorpe 2013), the fact that a recession cannot reduce parents' educational resources provides an

interesting counter-hypothesis to parental income. Parental education can provide knowledge, ability and skills that influence the likelihood of the transition into higher education in a different manner than parental income. Moreover, Maximally Maintained Inequality (MMI) theory argues that parents utilize their educational resources to influence their children's educational path persistently until that educational level is saturated for them (Raftery & Hout 1993). Accordingly, previous findings suggest that educational inheritance persists, despite changes in the macro-level settings and institutions (Boliver 2011; Pfeffer 2008). These findings imply that despite the changes in job opportunities, economic recessions would not change the extent parents' education influences their children's educational transitions. Therefore, it is assumed that

*The association between parental education and the probability to enroll in college after high school does not change during a recession (H3).*

Although the gender gap in tertiary education enrollment has disappeared and women are enrolling and completing tertiary education more often than men (DiPrete & Buchmann 2013), the choices of men and women with regard to fields of study are highly gendered. Women more likely enroll in humanistic and care-related fields, whereas men tend to enroll in scientific and technical fields (Charles & Bradley 2009), and as a result, labor markets have remained segregated by gender (England 2010). When recessions affect male-dominated fields, such as construction, and people with low levels of education (Hout et al. 2011), the labor market opportunities are diminished for male high school graduates to a larger extent than for women. Therefore, the opportunity costs of pursuing higher education also decrease more for men, particularly from families with fewer resources. Considering that during economic growth, male students have been less likely to pursue higher education after high school than female students, the stagnation of job opportunities and the lower opportunity costs for men suggests that

*The changes in intergenerational inequalities in college enrollment after high school are more apparent among men than women during a recession (H4).*

### **3 The Great Recession and the United States**

The Great Recession had unique characteristics, such as a rapid unemployment growth and a widespread decline in home equity, which have influenced the prospects of pursuing college among American families (Hout et al. 2011; Lovenheim 2011; Smeeding et al. 2011). Not only the resources of the family but also the institutional setting influence how opportunity costs for higher education are perceived in the U.S. The financial aid system for college students is complex with aid provided in forms of loans, grants and scholarships by federal or state government, colleges and non-profit or private organizations. Most students receive financial aid either in the form of loans or grants to fund the costs of college enrollment (Snyder et al. 2018), but the aid often falls short for covering all of the costs for studying in college (Goldrick-Rab 2016). As the economy plummeted in the U.S. during the Great Recession, the decrease in the opportunity costs of higher education was exceptional. This makes the U.S. an excellent example for analyzing the intergenerational inequalities in the transition into college.

The overall educational enrollment in higher education increased throughout the U.S. during the Great Recession and was particularly strong in the states where unemployment growth was the highest during the Great Recession (Long 2014). This increase reflects a significant variation in college enrollment rates between the states even before the recession (see Snyder et al. 2018 Table 302.50 for state-specific rates). A large segment of the enrollment growth was caused by young adults who enrolled part-time or were returning to school because job opportunities were lacking (Barr & Turner 2015; Long 2014), but less is known regarding the educational behavior among high school graduates. As the finishing rates of high school are reaching universal levels in the U.S. (Barro & Lee 2013), it places families and youth in the position of educational decision-making between college enrollment and labor market participation during the last years of high school. By focusing on high school graduates, it enables to examine how the Great Recession affected educational decision-making of the transition into college among families with differing resources in the U.S.

Previous research has found educational institutions and policies significant, particularly the ones affecting access to higher education, in determining the inequalities in tertiary education enrollment (Brunello & Checci 2007; Pfeffer 2008). During the Great Recession, educational institutions in the U.S. experienced financial pressure from reductions in endowments and public funding, which caused certain colleges, particularly public institutions, to increase tuition (Barr and Turner 2013). This tuition increase also influenced the educational decisions of families with restricted financial resources during the recession. However, public need-based financial aid for college students, such as the Pell Grant and the Stafford programs, was increased and expanded during the recession (Barr and Turner 2013; Bettinger and Williams 2014; Long 2014). These programs increased incentives and opportunities for high school graduates from low-income families to pursue higher education. These institutional changes, which had impacts on the lives of American families during the Great Recession in the United States, provide a unique circumstance to study the relations between opportunity costs, educational decisions and inequalities in college enrollment.

#### **4 Data and methods**

This research used micro-level data obtained from the Panel Study of Income Dynamics (PSID 2016), a longitudinal survey that contains information on demographics and various types of resources for multiple generations. Because certain parts of the analysis include state-level measures of unemployment, all states with less than ten observations were dropped, resulting in a sample of 2598 high school graduation cohorts in 37 states who graduated between 2003 and 2013. The dependent variable measures whether the respondent enrolled in college for a maximum of one year after graduating from high school.

The main independent variables are parental resources, i.e., parental income and parental education, which were measured when the respondent was between 10 and 15 years old, an age when educational pathways are strongly guided by family background. Further, this age range allows the biannual survey to have one missing round of information on parental income without the respondent to be dropped from the sample.



Parental income is the total household income adjusted for inflation, which was measured as an average of at least two observation years and weighted with standardized family longitudinal weights to adjust for the over-sampling of low-income families. For analysis purposes, this income average was used both continuous (natural logarithm) and as relative income (quintiles). Relative incomes, the low-, middle- and high-income groups, were defined as the top and bottom 20% in the income distribution, whereas the middle-income group represented the remaining 60% of the income distribution. These were used primarily when the focus of the analysis was on the influence of parental resources on college enrolment over graduation cohorts, while the continuous income measure was used when examining the influence of the opportunity costs on the parental resources - college enrollment association.

Parental education was measured as the highest year of education that the respondent's parents attained, and categorised into whether at least one parent had a college degree (more than 13 years of schooling completed). Using educational categories enabled the comparison of high school graduates with the same financial and educational standing and provided an unambiguous view of the possible mechanisms of educational inequalities at the top and bottom resource levels. All of the models control for the other parental resource; therefore, the results indicate the effects of the resource net of the other. Additionally, gender, race and the number of children in the household when the respondent was a teen were controlled in the models (see Appendix Table A1 for summary statistics of all the variables).

Two different sets of multilevel logistic regression models were completed to determine how the Great Recession impacted the relationship between socioeconomic backgrounds and college enrollments. In both sets, the high school graduates were nested within the states in which they lived in during graduation. Because there are multiple state-specific institutions and characteristics in place, fixed effects on the state level were included in the models. This enabled an analysis of within-state effects that were explained by the covariates. All of the models were weighted with standardized PSID individual longitudinal weights measured at the year (or one year before due to biannual observations) the respondent graduated high school, of which a mean was taken for each state.

The first set examined the intergenerational inequalities in educational enrollment over time and whether the inequalities differed depending on the high school graduation year (2003 to 2013) or graduation cohorts, i.e., whether a person graduated before (2003-2007), during (2008-2010) or after (2011-2013) the recession. These multilevel logistic regression models include origin \* graduation cohort interaction and were reported as predictive margins (Figure 1), coefficients (Tables 1 and 2) or average marginal effects (Figures 2-3). The results demonstrate the over-time changes in the association between parental resources (education and income) and the probability to enroll in college after high school.

The second set examines if the influence of parental resources on college enrollment was moderated by opportunity costs, i.e., the unemployment rate. There was considerable variation between the states regarding how the recession influenced the economic setting (Connaughton & Madsen 2012), and an aggregate analysis would provide flawed results. Therefore, state-level unemployment rates were obtained from the U.S. Bureau of Labor Statistics (Local Area Unemployment Statistics) for the years 2003 to 2013, measured at the end of each year (for the 2003 cohort, a measure from December 2002 was used). There were two different measures for opportunity costs: current opportunity costs (the unemployment rate approximately six months before high school graduation) and the changed opportunity costs (the change in the unemployment rate between the graduation year and the year before). This approach allowed for an examination of the effect of the opportunity costs in general on the association between parental resources and college enrollment, and an analysis of whether families reacted to the changes in the opportunity costs differently. In order to examine these, the models included a three-way interaction between parental resources, opportunity costs and high school graduation cohort. This way the varying impacts of the recession in different states could be used to examine if and how opportunity costs or the changes in them resulted in different outcomes in the relationship between socioeconomic background and college enrollment after high school.

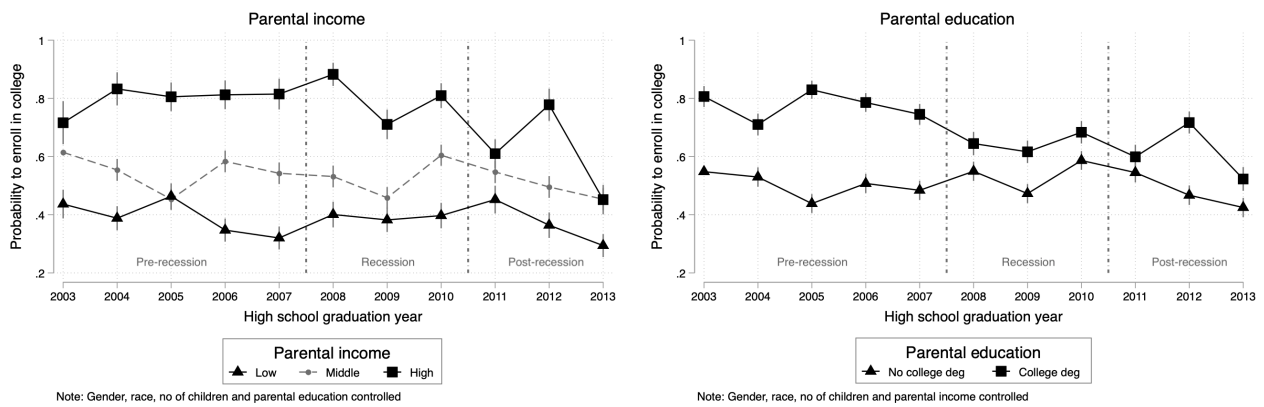
## 5 Results

To study how the recession influenced the associations between parental resources and college enrollment, two sets of multilevel logistic regression models were completed. First, the over-time models (Figures 1-3 and Table 1) show how the associations between parental resources (income and education separately) and college enrollment have changed over time and whether there were noticeable changes in the associations during the Great Recession. After demonstrating the annual associations between parental resources and college enrollment, the high school graduation cohorts were divided into three groups: pre-recession (2003-2007), recession (2008-2010) and post-recession (2011-2013). The differences in the influence of parental resources on the probability to enroll in college after high school were analyzed for each group (Figure 2 for parental income and Figure 3 for parental education). This approach provided an analysis of whether the changes over time or during the recession were statistically significant. The opportunity cost models (Table 3) examine whether (current and changed) opportunity costs influenced college enrollment decisions differently depending on the level of parental resources and the timing of high school graduation.

### 5.1 Parental resources and college enrollment over graduation cohorts

Figure 1 illustrates how the intergenerational inequalities in college enrollment, i.e., the likelihood of enrolling in college after high school by parental resources, changed across the high school graduation cohorts between 2003 and 2013. The results show that parental income and parental education had different impacts on college enrollment over time. The probability of attending college decreased among the 2008-2011 high school graduates whose parents had a college degree and increased marginally among those whose parents did not have a degree. Parental income, on the other hand, seems not to have any noticeable change among the recession graduates in any income group; the association between parental income and college enrollment was relatively stable across all high school graduation years. These results suggest that the Great Recession had a positive influence on the educational inheritance and diminished the education gap in the probability of enrolling in college after high school.

**Fig. 1** Impact of parental resources on college enrollment over high school graduation years (predictive margins of parental resources, multilevel logistic regression models)



To examine whether the changes in educational inequalities in college enrollment during the Great Recession were significant, the high school graduates were pooled into cohorts who graduated before (2003-2007), during (2008-2010) and after (2011-2013) the recession, with men and women being pooled also separately. The changes within or between the parental income groups over time appear minor in Figure 1, and the statistically insignificant interaction effects for the total sample (Model 1 in Table 1) confirm this. However, the results by gender (Figure 2, full results in Models 2 and 3 in Table 1) provide contrasting results in the changing inequalities in college enrollment. The difference in the probability of college enrollment between low- and high-income families was increased among male recession cohorts, whereas this difference was reduced among women. In other words, during the recession the probability to enroll in college after high school decreased among male students from low-income backgrounds and increased among male students from high-income families. On the contrary, the probability to enroll in college decreased among female students from high-income families but increased among female students from low-income backgrounds. The contrasting changes in income inequalities in college enrollment between men and women provide interesting evidence of the change in educational decisions during the recession.

Figure 3 demonstrates that the association between parental education and the probability to enroll in college over the graduation cohorts, contrary to parental income, were similar between men and women (full results in

Models 5 and 6 in Table 1). The probability to enroll in college decreased for students with parents who had a college degree, as opposed to those whose parents did not, and graduated from high school during the recession. This increase in downward educational mobility advocates decreased educational inequalities among both male and female high school cohorts who graduated during the Great Recession.

Because the comparability of two separate logit models (in this instance, by gender) can be considered problematic (Mood 2010), linear multilevel probability models were run as sensitivity checks. Because the probability to enroll in college was approximately 100% among specific groups (e.g., female students from high-income backgrounds) and because of the restricted sample size, the linear probability models were not feasible and operated only as robustness checks in this study. The results remained the same between these two sets of models, although due to the small group sizes, the statistical significance of most of the interaction terms was lost (see online appendix Table OA1 for full results of the linear multilevel models by gender).

**Table 1.** *Impact of parental resources on college enrollment over high school cohorts, total sample and by gender (coefficients of multilevel logistic regression models, standard errors in parentheses)*

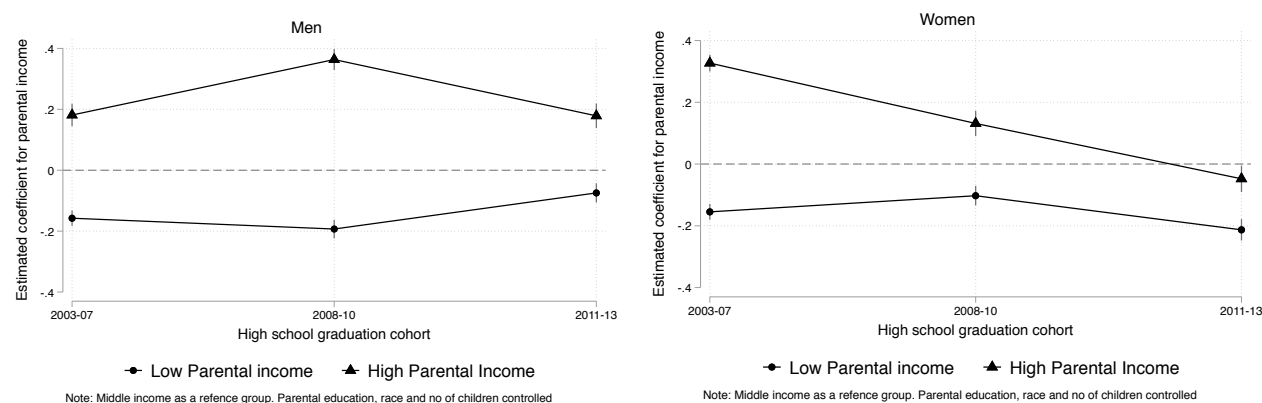
	<b>Parental income</b>			<b>Parental education</b>		
	<b>(1) Total</b>	<b>(2) Men</b>	<b>(3) Women</b>	<b>(4) Total</b>	<b>(5) Men</b>	<b>(6) Women</b>
<b>Parental income</b>						
Low income	-0.677*** (0.040)	-0.672*** (0.057)	-0.679*** (0.057)	-0.629*** (0.028)	-0.600*** (0.039)	-0.677*** (0.041)
High income	1.301*** (0.081)	0.821*** (0.096)	2.142*** (0.177)	0.986*** (0.044)	1.118*** (0.059)	0.715*** (0.068)
2008-10 # Low income	0.076 (0.061)	-0.193* (0.091)	0.224* (0.087)			
2008-10 # High income	0.005 (0.114)	1.033*** (0.156)	-1.482*** (0.208)			
2011-13 # Low income	0.082 (0.065)	0.350* (0.089)	-0.263** (0.097)			
2011-13 # High income	-0.912*** (0.101)	-0.058 (0.130)	-2.353*** (0.195)			
<b>Parental education</b>						
College degree (ref: no college)	0.881*** (0.028)	0.739*** (0.038)	1.117*** (0.046)	1.342*** (0.044)	1.265*** (0.060)	1.524*** (0.068)
2008-10 # College degree				-0.845*** (0.064)	-0.934*** (0.085)	-0.635*** (0.102)
2011-13 # College degree				-0.757*** (0.065)	-0.801*** (0.090)	-0.856*** (0.099)
<b>Individual controls</b>						

HS cohort (ref 2003-07)						
2008-10	-0.045 (0.033)	-0.208*** (0.045)	0.142** (0.052)	0.176*** (0.030)	0.065 (0.042)	0.271*** (0.045)
2011-13	-0.184*** (0.035)	-0.343*** (0.048)	0.004 (0.053)	-0.077* (0.032)	-0.084 (0.044)	-0.054 (0.047)
Race (ref: white)						
Non-white	-0.192*** (0.028)	-0.302*** (0.039)	-0.108** (0.042)	-0.185*** (0.028)	-0.309*** (0.039)	-0.098* (0.041)
No. of children in teen HH						
	-0.108*** (0.010)	-0.097*** (0.014)	-0.133*** (0.014)	-0.117*** (0.010)	-0.097*** (0.014)	-0.132*** (0.014)
Gender (ref: male)						
	0.448*** (0.023)			0.447*** (0.023)		
Observations	2598	1318	1280	2598	1318	1280

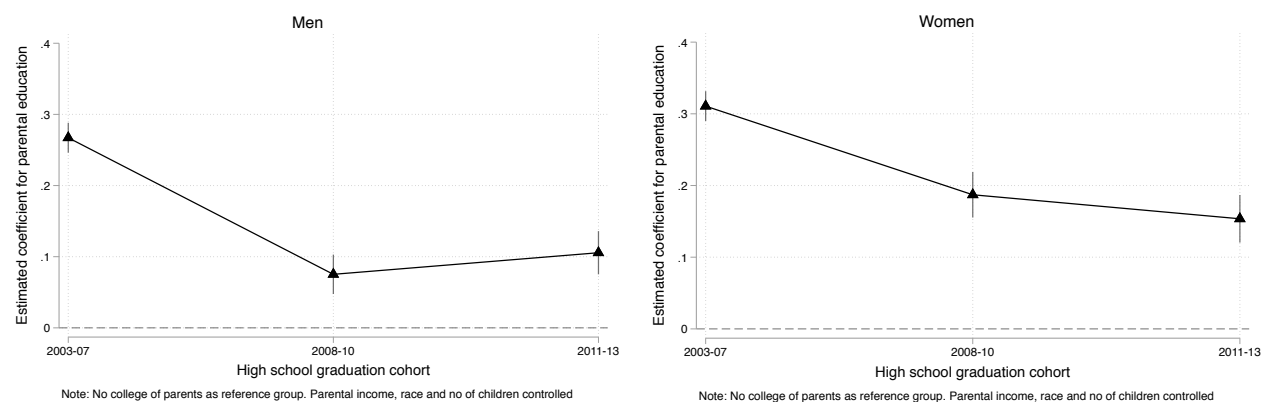
Note: Data weighted with PSID individual longitudinal weights.

$p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

**Fig. 2** Impact of parental income on college enrollment over high school graduation cohorts (average marginal effects of parental income, multilevel logistic regression models)



**Fig. 3** Impact of parental education on college enrollment over high school graduation cohorts (average marginal effects of parental education, multilevel logistic regression models)



## 5.2 Opportunity costs and parental resources

The over-time trends can illustrate some period-effects on the influence of the socioeconomic background on college enrollment after high school. However, it cannot directly be concluded that families reacted to the changes the recession brought or that it was the lack of job opportunities, lowered opportunity costs or instability in the labor market that influenced their educational decisions. Therefore, the next analysis focused on whether the level of opportunity costs moderated the influence of parental resources on college enrollment after high school, i.e., whether the unemployment rates altered the educational decision-making between families with different levels of resources. Models 1 and 2 in Table 2 present the results of multilevel logistic regression models where the unemployment rate was included as an interaction with parental resources (income and education separately) and high school graduation cohorts. These results display if and how opportunity costs, i.e., the unemployment rate at the time of graduation, interacted with the association between parental resources and college enrollment and whether this differs between graduation cohorts. For clarity, parental income was used as a continuous measure in these models.

The results in Table 2 show the opposite effects of opportunity costs with regard to the influence of parental income and education on college enrollment: lower opportunity costs, i.e., higher unemployment rates, appeared to reduce the influence of parental income on college enrollment but increased the influence of parental education for both during and after recession graduation cohorts compared with pre-recession graduates. These findings indicate that the opportunity costs of higher education did influence the educational decision-making of families with different levels of resources. However, the relationship between opportunity costs and family background vary regarding the parental resource in question.

In order to analyze whether the changes in opportunity costs during the Great Recession had an impact on educational decision-making, a second set of interaction models were run. Models 3 and 4 in Table 2 illustrate a three-way interaction between parents' resources, high school graduation cohorts and the volume of the unemployment growth from the previous year within the state where the cohort graduated. The results display

statistically insignificant interaction effects for the recession cohorts, which indicate that the changes in opportunity costs, e.g., the changes in unemployment rates, did not influence the educational decision-making of families during the recession. In other words, the socioeconomic inequalities in college enrollment were influenced by the prevalent opportunity costs at the time of the educational decision-making, rather than the changes from previous conditions of the labor market within the state where the cohorts graduated.

*Table 2. Opportunity costs and parents' resources on college enrollment (coefficients of multilevel logistic regression models, standard errors in parenthesis).*

	<b>CURRENT OPP.COSTS</b>		<b>CHANGED OPP. COSTS</b>	
	<b>Par. Income</b>	<b>Par. Education</b>	<b>Par. Income</b>	<b>Par. Education</b>
	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>
<b>MAIN EFFECTS</b>				
Parental income (log)	0.192** (0.074)	0.444*** (0.013)	0.496*** (0.017)	0.438*** (0.013)
Parental education (ref: no college)	0.927*** (0.028)	2.295*** (0.239)	0.932*** (0.028)	1.353*** (0.046)
2008-10	-0.662*** (0.129)	-0.118 (0.139)	0.190** (0.034)	0.321*** (0.038)
2011-13	-1.237*** (0.162)	-0.845*** (0.177)	-0.089 (0.047)	-0.063 (0.052)
Unemployment rate	-0.040 (0.021)	0.013 (0.022)		
Change in unemployment			-0.165*** (0.033)	-0.163*** (0.036)
<b>TWO-WAY INTERACTIONS</b>				
2008-10 # Unemployment rate	0.103*** (0.022)	0.036 (0.023)		
2011-13 # Unemployment rate	0.141*** (0.024)	0.093*** (0.026)		
2008-10 # Change in unemployment			0.094*** (0.035)	0.094* (0.039)
2011-13 # Change in unemployment			0.189*** (0.053)	0.042 (0.060)
2008-10 # Parental income (log)	0.431*** (0.090)		-0.103*** (0.026)	
2011-13 # Parental income (log)	0.403*** (0.115)		-0.068* (0.033)	
Parental income (log) # Unemployment rate	0.059*** (0.014)			
Parental income (log) # Change in			-0.038	



unemployment			(0.023)	
2008-10 # Parental education	-1.856 <sup>***</sup>			-0.705 <sup>***</sup>
	(0.283)			(0.079)
2011-13 # Parental education	-1.102 <sup>**</sup>			-0.214 <sup>*</sup>
	(0.353)			(0.108)
Parental education # Unemployment rate	-0.173 <sup>***</sup>			
	(0.043)			
Parental education # Change in unemployment				-0.120
				(0.081)
<b>THREE-WAY INTERACTIONS</b>				
2008-10 # Unemployment rate # Parental income (log)	-0.086 <sup>***</sup>			
	(0.015)			
2011-13 # Unemployment rate # Parental income (log)	-0.081 <sup>***</sup>			
	(0.017)			
2008-10 # Change in unemployment # Parental income (log)			0.046	
			(0.025)	
2011-13 # Change in unemployment # Parental income (log)			0.0871	
			(0.037)	
2008-10 # Unemployment rate # Parental education	0.200 <sup>***</sup>			
	(0.047)			
2011-13 # Unemployment rate # Parental education	0.106 <sup>*</sup>			
	(0.052)			
2008-10 # Change in unemployment # Parental education				0.116
				(0.086)
2011-13 # Change in unemployment # Parental education				0.688 <sup>***</sup>
				(0.123)
<b>CONTROLS</b>				
Gender (ref: male)	0.439 <sup>***</sup>	0.448 <sup>***</sup>	0.444 <sup>***</sup>	0.451 <sup>***</sup>
	(0.023)	(0.023)	(0.023)	(0.023)
Race (ref: white)	0.220 <sup>***</sup>	0.212 <sup>***</sup>	0.226 <sup>***</sup>	0.213 <sup>***</sup>
	(0.033)	(0.033)	(0.033)	(0.033)
No. of children in teen hh (cnt)	-0.111 <sup>***</sup>	-0.120 <sup>***</sup>	-0.113 <sup>***</sup>	-0.122 <sup>***</sup>
	(0.010)	(0.010)	(0.010)	(0.010)
Observations	2598	2598	2598	2598

Note. Data weighted with PSID individual longitudinal weights.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

## 6 Discussion

This paper presents how opportunity costs influence the educational decision-making of families and thus alter the intergenerational inequalities in college enrollment among high school graduates. The distinctive negative effects of the Great Recession in the early 21<sup>st</sup> century, not only on the lives of individuals but also on higher education and the labor market in the United States, make it a prime example of how the reduced opportunity costs of pursuing higher education has influenced educational decision-making, and how it differs according to the level of parents' financial and educational resources. The Great Recession had undeniable negative impacts on individuals, families and institutions. This study, however, along with certain other counter-intuitive findings (e.g., Burgard et al 2013 regarding pro-cyclical mortality), provides empirical evidence also of the recession's positive influences: the reduced income inequalities in college enrollment among female high school graduates and the diminished impact of parental education for both men and women who graduated during the recession.

The results with the PSID illustrate that American families did react to the Great Recession, and that opportunity costs influenced their college enrollment decisions during the economic decline. However, it seems that it was the prevalent opportunity costs that were significant during the recession rather than the changes in the opportunity costs. Therefore, the hypothesis that increased changes in opportunity costs, e.g., unemployment growth, result in increased changes in educational inequalities (H1), was rejected. Nevertheless, the opportunity costs at the time of graduation showed a decreasing probability of college enrolment for parental income and an increasing probability for parental education during the recession resulting in both reduction and increase of intergenerational inequalities in college enrollment.

The hypothesis that the association between parental income and college enrollment decreased during the recession (H2) is only partially supported by the results. First, the incentives of reduced opportunity costs and expanded financial aid resulted in a higher probability of college enrollment among female graduates with low parental income, whereas, on the contrary, the probability to enroll in college decreased among male students from low-income families. Second, the association between high parental income and college enrollment for

female graduates decreased among the recession cohorts, thereby supporting the hypothesis; however, the probability of college enrollment among male graduates increased for high-income families. The results for low-income graduates show positive changes in the educational decision-making of college enrollment among women, but contrarily negative changes among men. This indicates that the costs of higher education, e.g., increased tuition combined with reduced family resources, were not stabilized sufficiently by the increased public financial need-based aid for male graduates, but boosted college enrollment of women.

The gender-contrasting findings of high-income graduates imply both genders acknowledging the exceptional changes in the economy during the recession but reacting differently. The decreased probability to enroll during the recession among women from high-income families may be derived from the restricted possibility to increase enrolment as the rates for high-income female students were extremely high already (see Snyder et al. 2018). Similarly, Erola (2009) found restricted educational mobility of women during the 1990's recession in Finland. High-income families with male graduates could have felt more strongly that their advantaged position was threatened, Perhaps partly due to the gender gap favoring women, thus increasing the pressure on the transition into college in order to maintain an advantage in the education system (Lucas 2001). On the other hand, the findings of Hopcroft (2005) suggest gender-biased investment in education by parents as she found that high-status families invest more in their sons' education whereas low-status families invest more in daughters'. This may be further amplified by the constraints imposed by the recession, and may also explain the positive increase in the probability of low-income women to enroll in college during the recession.

Concerning parental education, the influence of the Great Recession was similar for both men and women: the association between parental education and college enrollment decreased among the recession cohorts, suggesting increased educational mobility. This finding rejects the hypothesis of the stagnant influence of parental education on the educational transition into college (H3). Although the theory of MMI (Raftery & Hout 1993) argues that parents will maintain an influence on their children's education, these results suggest that the Great Recession had such a profound influence on the economy or the resources of the families, that the probability to enroll in college was reduced for highly educated families. In other words, these middle-income

families, rather than high-income families, with a college degree have lost employment, income or wealth as a result of the financial crisis, which together with rising tuitions reduced their chances of sending their children to college (Long 2014). This, in turn, has made a greater number of students eligible for financial aid, which was extended in large parts during the recession, and increased the competition to access college. This could explain the lowered probability of students from highly educated families enrolling college.

There appear to be clear differences in how educational decision-making changed during the recession between families with female and male high school graduates, particularly in relation to parental income. However, these nor the results on parental educational and college enrollment do not provide support for the hypothesis that the changes in inequalities were more apparent among men (H4). Positive is that college enrollment can be advanced for male students, but problematically only for the high-income ones. While the gender gap favors women in the U.S., it is alarming if the income inequalities among male college students increase during economic decline. Further, the changes in the influence of parental income and parental education on college enrollment during the recession among men were opposed to each other, with an increased association to parental income and a diminished relationship to parental education. This suggests that high parental incomes, but not education, are important in increasing the college enrollment for male high school graduates.

The positive changes among families with low parental education combined with the reduced impact of high parental income (among women) on college enrollment do not confirm yet whether these positive results also indicate increased educational attainment in the forms of increased years of college, or, conversely, if students left college after a short time. Therefore, further research is needed regarding whether the positive influence of the recession on the socioeconomic inequalities in college enrollment has contributed to positive effects on inequalities in socioeconomic outcomes. Furthermore, the influence of other institutional changes on educational inequalities could reveal the stratification of the educational decision-making process and provide information on the institutional factors that increase educational equality. For example, examining how equally the increased financial aid was distributed or how unemployment by industry have influenced the changing intergenerational

inequalities in both enrollment and attainment of college would provide knowledge on promoting higher equality of opportunity.

To conclude, this paper contributes to the existing literature on the relationship between institutions and educational inequalities by providing empirical evidence on how the reduced opportunity costs observed during the Great Recession resulted in changing socioeconomic inequalities in college enrollment. The institutional changes in higher education and the labor market in the United States created a plunge in employment opportunities, increased the costs of college and increased the financial constraints of families (Hout et al. 2011; Long 2014). Despite these drawbacks, the recession brought positive changes to educational inequalities. The results of this paper demonstrate diminished income inequalities among female students and greater educational mobility for all high school graduates during the Great Recession. Nonetheless, the results of increased income inequalities among male high school graduates during the recession raise an alarm of more restricted access to college at the time when male enrollment is declining. Overall, the variation in the results, by both gender and by parental resource, raises questions of more complex mechanisms in the relationships between parental background, national institutions and educational transitions.

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APPENDIX

**Table A1. Variable summary statistics**

**Categorical variables**

Attended college after HS					State
No	37.05%				AL 1.12%
Yes	62.95%				AZ 1.96%
High school graduation year					AR 1.69%
2003	5.54%				CA 11.77%
2004	9.54%				CO 1.81%
2005	9.77%				CT 0.58%
2006	9.70%				DC 0.92%
2007	9.70%				FL 3.35%
2008	9.58%				GA 3.66%
2009	9.89%				IL 4.00%
2010	9.93%				IN 2.46%
2011	8.85%				IA 1.69%
2012	8.66%				KS 0.58%
2013	8.85%				KY 1.42%
Gender					LA 1.50%
Men	50.75%				MD 4.35%
Women	49.25%				MI 5.43%
Race					MN 0.77%
White	44.13%				MS 4.85%
Non-white	55.87%				MT 3.23%
Parental education					NE 0.65%
No College	67.06%				NV 0.38%
College degree	32.94%				NJ 2.50%
Parental income					NY 3.85%
Low	26.05%				NC 5.31%
Middle	58.91%				OH 3.92%
High	15.04%				OK 0.81%
					OR 1.42%
<b>Continuous variables</b>	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	PA 3.58%
No of children in hh at teen (centered at mean in analyses)	2.48	1.21	1.00	9.00	SC 4.92%
Parental income (log)	10.77	0.86	7.06	14.84	SD 0.42%
Parents' education (in years)	12.64	2.65	2.00	17.00	TN 1.65%
Current unemployment rate	6.97	2.26	2.70	13.90	TX 6.00%
Change in unemployment rate	5.61	1.38	1.80	9.70	UT 0.58%
					VA 3.35%
					WA 1.89%
					WI 1.62%