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ORIGINAL ARTICLE

Labor Market Conditions and Racial/Ethnic Differences in College Enrollment

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Abstract

The racial/ethnic differences in college enrollment are pervasive and persistent. In this article, I provide evidence of a business cycle-driven component to the college enrollment gaps among racial/ethnic groups in the USA. Using a nationally representative sample from the National Longitudinal Survey of Youths 1997 (NLSY97) and fixed-effects enrollment probability models, I find that Hispanics are more likely than non-Black-non-Hispanics to enroll in 2-year college during high unemployment periods. Similarly, I find that individuals who are Black are more likely than non-Black-non-Hispanic individuals to enroll in 2-year colleges but are less likely to enroll in 4-year colleges during periods of high unemployment. The positive effect of high unemployment rate on 2-year college enrollment for Blacks is almost entirely offset by negative effects on 4-year college enrollment. Non-Black-non-Hispanics are least sensitive to labor market conditions. The cyclicality of college enrollment rates of Blacks and Hispanics and the relatively smooth enrollment rates of non-Black-non-Hispanic individuals may be able to explain a part of the persistent gap in college enrollment.

Keywords Race and ethnicity · College enrollment gaps · Labor market conditions

JEL Classification 124

Introduction

Despite gains in the college-going rates for all demographic groups, gaps in college enrollment and attainment between certain racial and ethnic groups remain substantial. Figure 1[1] shows that while enrollment rates for both Blacks and Whites increased over the past 45 years, the gaps in enrollment rates persist. The difference between White and Black enrollment rates ranged from a low of − 0.05 percent in 1974 to a high of 19.9 percent in 1986, and this difference is primarily driven by large swings in black enrollment. This higher volatility suggests that enrollment rates for Blacks may be more susceptible to business cycles than for Whites. In this paper, I study the impact of economic conditions on enrollment rates of different racial/ethnic groups and illustrate the role of economic conditions as one source of the persistent gaps in college attendance and attainment among different groups.

Labor market downturns have been shown to affect different demographic groups differently. The impacts of the Great Recession (December 2007 to June 2009) in terms of job losses have been greater for younger workers, for men, and for Black and Hispanic workers, than for others in the labor market (Hoynes et al. 2012). Jobs and schooling compete for an individual's time in young adulthood, and research shows a significant impact of labor market conditions on the college enrollment behavior of young adults (for examples, see Betts and McFarlane 1995; Dellas and Sakellaris 2003; Ewing et al. 2010).

Per economic theory, higher unemployment in a weak economy should result in higher levels of schooling, all else equal, as the opportunity cost of enrollment is lower. At the same time, during a downturn, the lack of jobs means ability-to-pay for college will be lower, putting college out of reach for students who would otherwise work while enrolled. The net effect of economic downturns, then, depends on whether the opportunity cost or the ability-to-pay consideration

[1] Author's calculation from NCES data.

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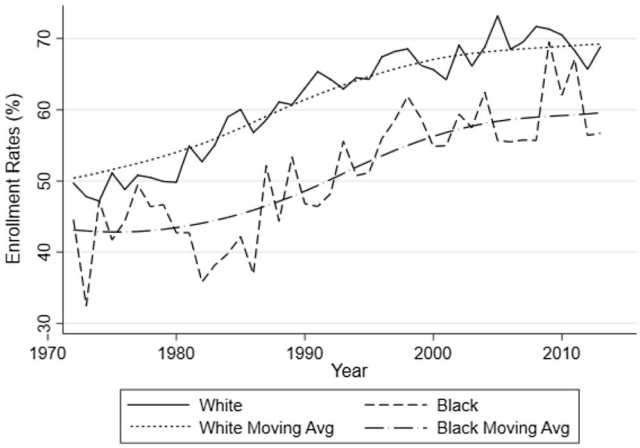

Fig. 1 Black and White enrollment rates since 1970

dominates. The different labor market experiences mean opportunity cost and the ability-to-pay considerations differ for different demographic groups. Thus, the state of the labor market may affect the enrollment rates of different groups differently.

College access and equity in college access are essential policy considerations as a college education is still one of the most significant determinants of future earnings. If economic conditions affect college participation of different demographic groups differently, they may serve to either exacerbate, lessen, or preserve the degree of economic inequality among these groups. Even a one-time economic downturn that affects the college participation gap may have lasting consequences on equity outcomes as a substantial portion of the increase in economic inequality can be traced to the rise in the returns to higher education (Lemieux, 2006). Dellas and Sakellaris (2003) shows that under some assumptions, schooling decisions for all groups display cyclical variation, and the cyclical effects do not offset each other over the business cycle but leave behind a permanent influence on the composition of the labor force and the quality of labor.

I study a nationally representative sample of the NLSY97 surveys and employ linear probability models to estimate the relationship between labor market conditions and the differences in the probability of enrolling in 2-year and 4-year colleges for Black, Hispanic, and non-Black-non-Hispanic[2] high school graduates. I find that as unemployment rates rise, Hispanics are more likely than non-Black-non-Hispanics to enroll in 2-year colleges. Hispanics are less likely than non-Black-non-Hispanics to enroll in 4-year colleges during high unemployment, but this difference is not statistically significant suggesting an increase in overall college enrollment during high unemployment periods but only at the 2-year college level. Likewise, Black individuals are more likely than non-Black-non-Hispanics to enroll in 2-year colleges during high unemployment, but Blacks are less likely to enroll in 4-year colleges. The increase in 2-year enrollment is entirely offset by the decrease in 4-year enrollment; thus, attainment rates for Blacks are harmed during economic downturns as individuals who experience high unemployment rates during early college-aged years are diverted from 4-year colleges into 2-year colleges

In addition to race and ethnicity, I explore whether enrollment rates differ over the business cycle by specific background attributes such as parental income and parental education. I find that, compared to high-income students, low-income students are more likely to enroll in 2-year colleges during high unemployment periods and middle-income students are less likely to enroll in 4-year college during high unemployment periods. Finally, individuals from low maternal education background are less likely than individuals from high maternal education background to enroll in college during periods of high unemployment and this adverse effect is mostly observed for 4-year college enrollment.

The overall findings of this research are that Black and Hispanic individuals and those from low maternal education homes and lower-income homes are most sensitive to labor market conditions and experience varying degrees of diversion away from 4-year into 2-year colleges during high unemployment. Enrollment rates for non-Black-non-Hispanic individuals and individuals from high education and high socioeconomic backgrounds are least sensitive to changes in the labor market.

Assuming symmetric effects over the business cycle, these results may partly explain the persistence in college attainment gaps. Regardless of the direction of the cyclical effects, as long as one group is relatively more responsive to changes in the labor market, gaps in attainment will persist as gains/losses in enrollment during low unemployment periods are lost/gained during high unemployment periods. When economic conditions change, it is enrollment rates for a different cohort that is affected. The cohort who experienced declines in enrollment due to the state of the economy is likely permanently scarred. Young adulthood is a crucial time to get an education and missed opportunities to get a college education during young adulthood are not entirely made up in later years (Dellas and Sakellaris 2003).

Funding for higher education, outreach, and financial aid programs may be cut when public support for higher education falls due to a weak economy, and this may have disproportionately adverse effects on minority students and students from lower educational parental backgrounds. This research highlights that efforts to smooth college investment decisions of economically disadvantaged groups over the business cycle can provide a possible avenue through which to affect the stubbornly persistent racial/ethnic gaps in college attainment.

[2] This category is created by the BLS in the NLSY97 surveys and includes Whites and other racial groups.

Conceptual Framework and Literature Review

The economic model of college enrollment posits that an individual will elect to attend college as long as the marginal benefits outweigh the marginal costs. The marginal benefits of college include short-term and long-term benefits. The short-term or consumption benefit is the benefit accrued while in college such as enjoyment of the college experience, participation in extracurricular activities, participation in cultural and social events, and elevation of social status. The long-term economic benefits include higher future wages and lower unemployment rates for college-educated individuals. The cost of college includes direct expenses such as tuition and fees and indirect costs such as the opportunity costs of foregone earnings while in school.

A weak economy affects both the benefits and costs of schooling, thus affecting enrollment decisions. A weak economy may increase or decrease the consumption benefit of college. It may be that students facing a weak economy find college a welcome reprieve from the economy, thus enhancing the satisfaction with the college experience. On the contrary, many studies have found that there is a psychic cost or psychosocial strain to being in school during a weak economy as mental health declines during a downturn (Ruhm 2000; Charles and DeCicca 2008).

Also, during economic downturns, appropriations are usually lower resulting in more students competing for fewer resources. Colleges typically respond by either raising tuition or engaging in other cost-cutting measures such as increasing class size, reducing course and extracurricular offerings, hiring more adjuncts or part-time instructors, closing undergraduate majors and minors, and terminating graduate programs (Berg-Cross and Green 2009). These factors not only lower the consumption benefit of college but also lead to increases in the direct cost of college, making it less likely that a student will enroll.

A poor economy may lead to an increase in the direct cost of schooling, which would lead to lower levels of enrollment. Additionally, since jobs are scarce and wages are low, the ability to pay for college may also be low. On the other hand, the opportunity cost of schooling is also low due to the scarcity of job opportunities, leaving more time to pursue college and enroll in extracurricular activities. In sum, some aspects of the benefit and cost side of the college enrollment equation are pro-cyclical while some elements are countercyclical, leading to a theoretically ambiguous effect of a poor economy on college investment decisions.

Effects of Economic Conditions on College Enrollment: Differences by Demographic Groups

College decisions of different demographic groups will differ over the business cycle if cycle-driven incentives and opportunities to invest are different for different demographic groups. Because some groups are hit harder in terms of job losses during economic downturns, the opportunity cost of schooling is lower for these groups that are hardest hit, conceivably leading to more substantial increases in enrollment for these groups. A greater scarcity of jobs also means that these groups have more time to spend on schooling. On the other hand, because these groups suffer greater job losses and declines in household incomes during a downturn, they are less able to fund their education with income from working.

This ability-to-pay effect is not just one and done. Certain demographic groups, particularly Black men, are usually last hired and first fired over the business cycle. When the economy weakens, the unemployment rate for Blacks rises by more than that for Whites in percentage points (Couch and Fairlie 2010). This may leave this group with fewer opportunities to work and save during good times to invest in human capital development in bad times. So, while groups hit the hardest in terms of job losses have lower opportunity costs and more time to spend on college and on extracurricular activities, their ability-to-pay for college is also lower. Additionally, if different groups operate in segregated labor markets and face different returns to college over the business cycle, the responses may be different for different groups.

Other background characteristics that vary among racial and ethnic groups may cause college-going decisions to vary over the business cycle. For example, individuals from backgrounds with low parental education may rely more on information from the labor market to assist them in making enrollment decisions (Beattie 2002). Individuals from lower familial educational background may see that their parents suffer more during a recession and decide to invest more in education during a recession. During the most recent recession in 2007–2009, the employment declines for those with a high school degree was 16%, compared with 7% for those with a college degree. The average weekly wage for a college graduate declined by 5% during the recession while high school diploma holder's paychecks fell by 10% (Red Bird et al. 2013). Given this realization about the college premium and seeing their parents suffer more during a recession relative to more highly educated parents, students from backgrounds with lower parental education may pursue more education during a downturn.

While students from lower familial educational background respond to labor market signals, individuals whose parents have attended and completed college may view attending college as a birthright (Beattie 2002) and thus may be less susceptible to broad-scale changes in unemployment. More highly educated parents are more likely to invest in their child's education as a consequence of their own educational experience, while children whose parents did not attend college may lack sufficient information about college preparation or application (Long, 2004). During a downturn, more highly

educated parents may reinforce the importance of college education. Also, outreach programs and financial aid programs may be cut when public support for higher education falls due to a poor economy, and this may have disproportionately adverse effects on lower-income students or students from lower educational backgrounds.

Previous Literature

The literature in this area is mixed, and findings vary based on background characteristics of study subjects, types of institutions studied, and the measure of economic conditions used. Betts and McFarland (1995) examined the impact of business cycles on community college enrollment between 1960 and 1980. They found that a 1% increase in the adult unemployment rate is associated with a 4% increase in full-time community college participation. They studied enrollment in community college by institutions rather than at the individual level as is done in this paper. Since they studied enrollment at community colleges, they cannot conclude that high unemployment rate leads to more college-educated individuals since individuals may be foregoing 4-year college in favor of 2-year college. By looking at both 2-year and 4-year enrollment, this paper can capture whether there is a diversion or substitution between 2-year and 4-year enrollment during periods of high unemployment.

Dellas and Sakellaris (2003) studied the relationship between higher education participation and the business cycle for 18- to 22-year-olds using the current population survey. They measured economic conditions using state-level unemployment rates, earnings, and real interest rates. They found that college participation is strongly counter-cyclical, after controlling for observable and time-varying characteristics. They found that the effects of aggregate economic variables on demand for education are similar for men and women but differ across race where enrollment decisions for Blacks are not related to the state of the business cycle or real wage but strongly associated with interest rates. The current study is different from the Dellas and Sakellaris paper in two ways. One, the years under investigation in the Dellas and Sakellaris study are between 1968 and 1988, so this current study extends these years. The college environment in terms of funding and availability of jobs has changed since the 1980s, so it is possible that the effects of labor market conditions have changed over time. Two, Dellas and Sakellaris considered enrollment into 2-year or 4-year combined. It is possible that enrollment responses to changes in economic conditions are different for the different level of schooling, a possibility that is accounted for in this paper.

Ewing, Beckert and Ewing (2010) studied enrollment responses at US colleges and universities to unexpected changes in macroeconomic activity. They used economic growth and inflation to measure economic activity and vector autoregression to calculate enrollment response to economic shocks between 1963 and 2004. They found that men respond to an unexpected rise in economic growth by reducing college enrollment, while women enrollment does not respond. Women, on the other hand, react immediately to sudden unforeseen increases in inflation with higher enrollment. Men respond likewise but with a lag. Ewing, Ewing and Beckert looked at aggregate enrollment at US institutions and did not differentiate between 2-year and 4-year enrollment and does not say whether demographic groups other than gender display different sensitivities to economic conditions.

Reflecting the conditionality of the findings in this area, Bedard and Herman (2008) found that college enrollment is countercyclical, pro-cyclical, or a-cyclical depending on gender, GPA, and type of degree pursued. They additionally found that graduate school enrollment is countercyclical for women and a-cyclical for men. While most studies found some business cycle effects, Berger and Kostal (2002) and Card and Lemieux (2001) found an insignificant relationship between college enrollment and the business cycle. These mixed findings highlight that literature in this area is inconclusive and suggest the need for further research, especially as it applies to the effects of unemployment on the enrollment rates of different racial and ethnic groups and enrollment into different types of colleges.

Empirical Model

For the empirical strategy, I employ a college participation probability model with interaction effects that capture the differential effects of the unemployment rate on the likelihood of college participation. The estimated model is

$$Prob(Enroll_{it}) = \beta_0 + \beta 1 \times UR_{,t-1} + \beta_2(X_i \times UR_{i,t-1}) + \beta_3 \times Z_{it} + \delta_j + \tau_t + \eta_i + u_{it} \quad (1)$$

where $Enroll_{it}$ is an indicator variable for whether or not individual i enrolled in college at time t. Time t ranges from 0 to 3 years post-high school degree completion. UR_{it-1} is a one-period lag of regional unemployment rate, X_i is a vector of individual background characteristics, Z_{it} includes time-varying background characteristics, and δ_j , τ_t, and η_i are region, year, and individual fixed effects.

Dependent Variables

Individuals who were enrolled in any type a college received a 1 for the enrollment variable and 0 otherwise. I study the probability of being enrolled for any of the first 3 years post high school graduation. This dependent variable, thus, captures the immediate transition into college for young

adults after completing high school. Enrollment into college during the initial years after high school graduation is crucial for college completion. Bozick and DeLuca (2005) found that students who delay at enrollment by at least 1 year are 64% less likely to complete than those who enroll immediately after high school.

Some demographic groups are more likely than others to pursue 2-year versus 4-year degrees (Ehrenberg 2007). There is also evidence that labor market conditions affect 2-year college enrollment (Betts and McFarland 1995), and this may be different from the effects on 4-year college enrollment. In light of this, the dependent variables studied include enrollment into any college, enrollment into 2-year college, and enrollment into 4-year college.

I use fixed-effects linear probability models to estimate the enrollment probabilities. As a robustness check, I also run more appropriate probit models. Although the linear probability model does not bound the predicted probability between 0 and 1, it is preferable over other bounded probability models (such as probit and logit) because of more consistent estimators and ease of computation and interpretation. As long as the probabilities are not at either extremes (close to 0 or 1), the linear probability models give reliable results.

Independent Variables

UR_{it-1} is the regional unemployment rate faced by individual i in the previous year and is used to measure the state of the economy. I use a one-period lag of unemployment rate because students likely make college application and enrollment decisions in advance of enrolling. X_i is a vector of racial/ethnic characteristics, specifically, Black, Hispanic, and non-Black-non-Hispanics. I also consider other demographic characteristics, namely, mother's education and parental income. To answer the research question, the background variables are interacted with the unemployment rate, $X_i * UR_{it-1}$. The coefficient on the interaction term, β_2, captures the change in the enrollment probability differences among the different racial/ethnic groups as unemployment rises. For example, if the coefficient on the interaction between Blacks/non-Blacks (where 1-Black and 0-non-Black) and the unemployment rate is negative, this means that Blacks are less likely than non-Blacks to be enrolled when unemployment rises, cetaris paribus. η_i captures individual fixed effects and controls for the differences in enrollment probability that are due to individual background characteristics. The fundamental identifying assumption is that in a fixed-effects framework, the difference in enrollment probability that is due to background characteristics is fixed; thus, the coefficient on the interaction term allows us to capture the difference in enrollment that is due to changes in the unemployment rate.

The fixed-effects model, however, cannot control for time-varying factors that may affect enrollment probability and that are also likely to vary by demographic groups. For example, some demographic groups are expected to graduate high school at an earlier age than others and age affects the likelihood of enrolling in college. Thus, differences in the college enrollment probability may be capturing differences in high school completion rates among different groups. Also, because I am using a one period lag of unemployment rate, at least some of the effects captured may be the effect of unemployment on high school graduation. To control for these time-varying and sample selection factors that may bias the enrollment probability differences, I include a control for individuals age at time t, Z_{it}, and perform the estimation on a restricted sample of individuals who all completed high school no later than age 19. Finally, I include region and year fixed effects, δ_j and τ_t, to control for differences by region and year.

Data

The data used in this study is the NLSY 97 survey. The NLSY97 survey consists of approximately 9000 individuals between the ages of 13 and 17 when first interviewed in 1997. The NLSY97 is ideal for this research for the extensive detail on individual demographic characteristics, the yearly information about schooling enrollment, and the longitudinal nature. The NLSY survey oversamples Black and low-income individuals. I use the entire survey sample including the oversample and employ sample weights defined by the Bureau of Labor Statistics (BLS). I apply sample restrictions to control for possible sample selection issues. Some estimates are that roughly half of the difference in college entry by different income groups is explained by inequality in high school graduation (Bailey and Dynarski 2011).

To control for the differences in high school graduation rates among different demographic groups, I employ two strategies. Firstly, I include in the primary sample only students who have already graduated from high school. About 90% of the sample graduated from high school between ages 17 and 20 with the other 10% graduating as early as age 14 and as late as age 30. I count GED holders as high school graduates. The model estimates the probability that an individual is enrolled in college the 3 years immediately post high school graduation. Individuals in the estimation sample graduated high school between the years 1997 and 2012. Since it is likely that the age of high school graduation is correlated with both individual background characteristics and state of the economy, the second strategy I employ include performing the analysis on a restricted sample of individuals who all completed high school no later than age 19. The full estimation sample consists of 6670 individuals and 23327 person-period observations.

Table 1 Descriptive statistics

Variable	Mean	Std dev	Min	Max
Unemployment rate	5.01	.499	3.59	6.53
Age	20.08	1.53	15	30
Black	0.142			
Hispanic	0.117			
Non-Black-non-Hispanic	0.741			
Enrolled	0.496			
Enrolled 2-year college	0.134			
Enrolled 4-year college	0.361			
Person-year Obs	23,327			
Number of individuals	6670			

Note: Statistics are person-year averages for 3 years after high school degree

Descriptive Statistics

Summary statistics for the full estimation sample are presented in Table 1. The sample is made up of 15% Black individuals, 12% Hispanics, and 73% classified as non-Black-non-Hispanic. These percentages are similar to the demographic make-up of the population in the late 1990s when the surveys were first collected. About 50% of the sample enrolled in college within the first 3 years of graduating high school, but as is shown in Fig. 2, this differs by demographic groups.

Figure 2 displays the gaps in enrollment for different groups. Year 0 is the year the individual graduated high school and thus measures the immediate transition into college after high school. Non-Black-non-Hispanic individuals have a 10–15% enrollment advantage over Black and Hispanic individuals (Fig. 2a). The enrollment gap between Hispanics and non-Black-non-Hispanic individuals decrease slightly over time as Hispanics have higher persistence rates. Figure 2b, c shows substantial differences in enrollment rates by income and mothers' education.

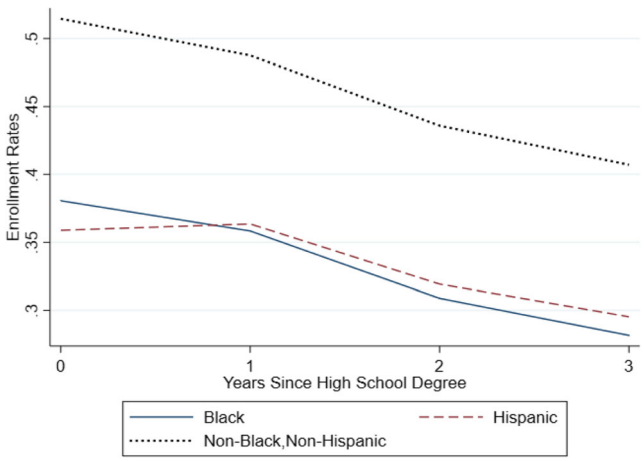

Fig. 2 Enrollment rates by demographic group and years since high school degree

Results

Table 2 displays results from a fixed-effects linear probability model using the full sample. Both the probit and linear probability models give similar predictions. Results are also almost identical for the entire sample and the sample restricted based on age of high school graduation. These results show that Hispanic individuals are 3.1 percentage points more likely than non-Black-non-Hispanics to be enrolled in any college for every 1% increase in unemployment rate. The effect of unemployment on the difference in overall enrollment probability between Black and non-Black-non-Hispanic individuals is positive but not statistically significant. The coefficient on unemployment rate (β_1), which captures the effect for the omitted group (non-Black-non-Hispanic) is also positive but not statistically significant.

Gap in College Enrollment by Race\Ethnicity

Figure 3 contains plots of the interaction effects which gives a clearer picture of the enrollment gaps as unemployment rises. The vertical axis shows the predicted probability of enrollment in any college, and the horizontal axis shows unemployment rates. The lines demonstrate the relationship between the predicted probability of enrollment and unemployment rate for each racial/ethnic group. These interaction graphs show two effects: one, they show the changes in predicted enrollment for each group as unemployment rate rises (the slope of each line), and two, they show the differences/gaps in enrollment among the different groups and how these differences change as unemployment rises. The interaction coefficients (presented in Table 2) capture the latter (the differences among the groups) but not the former effect (the slope of each line), that is, the coefficient does not tell us whether predicted enrollment for each group is increasing as the unemployment rate rises but it tells us whether the differences in enrollment among the groups are growing as unemployment rate rises. The graphs allow us to see both effects. These graphs show that the effect of higher unemployment on enrollment in any college is close to zero for Black and non-Black-non-Hispanic individuals but is positive for Hispanics.

The predicted probabilities for each group range between 0.4 and 0.7 with the 95% confidence intervals ranging from 0.4–0.7 to 0.2–0.9. Since these predicted probabilities are not at the extremes, the linear probability model performs closely to bounded probability models. In the next section, I consider enrollment into 2-year and 4-year colleges. It is possible that the effects of unemployment rates differ based on level of schooling and the results offset or reinforce each other.

Table 2 Effect of unemployment rate on college enrollment probability by racial/ethnic groups

Variable	Any college enrollment	Two-year enrollment	Four-year enrollment
Unemployment	0.0002 (0.012)	0.006(.011)	−0.006 (0.576)
Interaction effects (base = non-black-Non-Hispanic)			
Unemployment*Black	0.009 (0.011)	0.026**(.009)	−0.016* (0.011)
Unemployment*Hispanic	0.031** (0.06)	0.031**(.012)	−0.004 (0.013)
Observations	23,327	23,327	23,327

The significance levels use robust standard errors (reported in parentheses) clustered at the individual level. Fixed-effects models include year fixed effects, age fixed effects, individual fixed effects, and region fixed effects and controls for the interactions between the yearly unemployment rate and mother's highest level of education and income group at age 14 and 16, respectively. Continuous variables are centered at their means

*$p < .10$; **$p < .05$; ***$p < .01$

College Enrollment by Race/Ethnicity: Two-Year Versus Four-Year Enrollment

Table 2 also displays results for the model where the dependent variable is disaggregated by type of college (2-year and 4-year). The results displayed here are for linear probability models based on the full sample. Results are consistent using probit models and for the sample that accounts for age of high school graduation. These results show that Hispanics are 3.1 percentage points more likely than non-Black-non-Hispanics to enroll in 2-year college for every 1% increase in unemployment. Similarly, Black individuals are 2.6 percentage points more likely than non-Black-non-Hispanics to enroll in 2-year college. Both coefficients are statistically significant at the 0.05 level or less.

Both Blacks and Hispanics are less likely to enroll in 4-year colleges when the unemployment rate increases, but the effects are not significant for Hispanics. Black individuals are 1.6 percentage points less likely than non-Black-non-Hispanic individuals to enroll in 4-year college for every 1% increase in unemployment. The results in the previous section that Blacks are no less likely than non-Black-non-Hispanics to be enrolled in any college appears to be because the positive effect on 2-year enrollment and the negative effect on 4-year enrollment are offsetting each other. This points to a diversionary impact of high unemployment periods where individuals substitute 4-year college enrollment for 2-year college enrollment, leading to lower attainment rates for young adults during high unemployment periods. This result also underscores the fact that looking at aggregate enrollment rates or singly looking at enrollment into 2-year or 4-year colleges may mask these more nuanced outcomes.

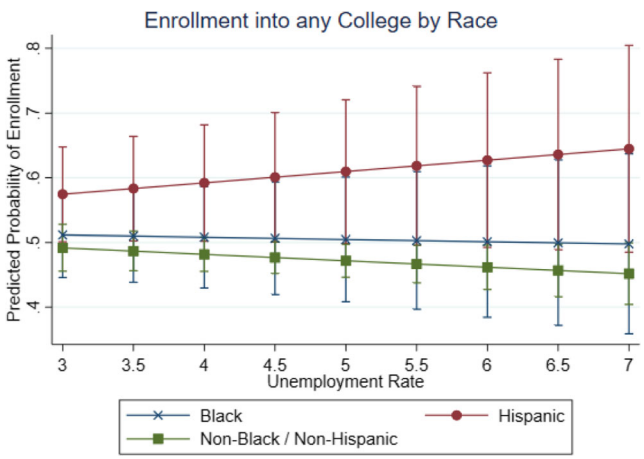

Fig. 3 Effect of unemployment rate on predicted enrollment in any college by race/ethnicity

The interaction effects for 2-year and 4-year enrollment are plotted in Fig. 4. Figure 4a shows that Blacks and Hispanics are more likely than their counterparts to enroll in 2-year colleges and are more likely to enroll as the unemployment rate rises. These results are in line with previous research that finds community college enrollment increases during high unemployment periods (Betts and Macfarlane 1995).

Figure 4b shows that 4-year enrollment responses are strongest for Blacks, meaning Blacks are most sensitive to high unemployment rates. The Hispanic and non-Black-non-Hispanic lines are parallel demonstrating a lack of interaction effect. Blacks have the lowest predicted probability of enrollment in 4-year colleges, and they suffer the most significant declines in enrollment at 4-year colleges as unemployment rates increase.

To summarize, Blacks and Hispanics have greater sensitivity than their counterparts to labor market conditions, but Hispanics see the most significant positive impact of higher unemployment rates. Non-Black-non-Hispanic individuals are least sensitive to high unemployment as demonstrated by a near-zero slope of the line representing this group.

Additionally, there appears to be a slight diversionary impact of high unemployment on enrollment for Hispanics where enrollment in 2-year colleges increases but enrollment at 4-year college decreases. Since the decrease at 4-year college is statistically insignificant and smaller than the gain at 2-year colleges, the net effect is positive. Thus, Hispanics appear to have an increase in college attainment when the unemployment rate rises. The story seems to be slightly different for

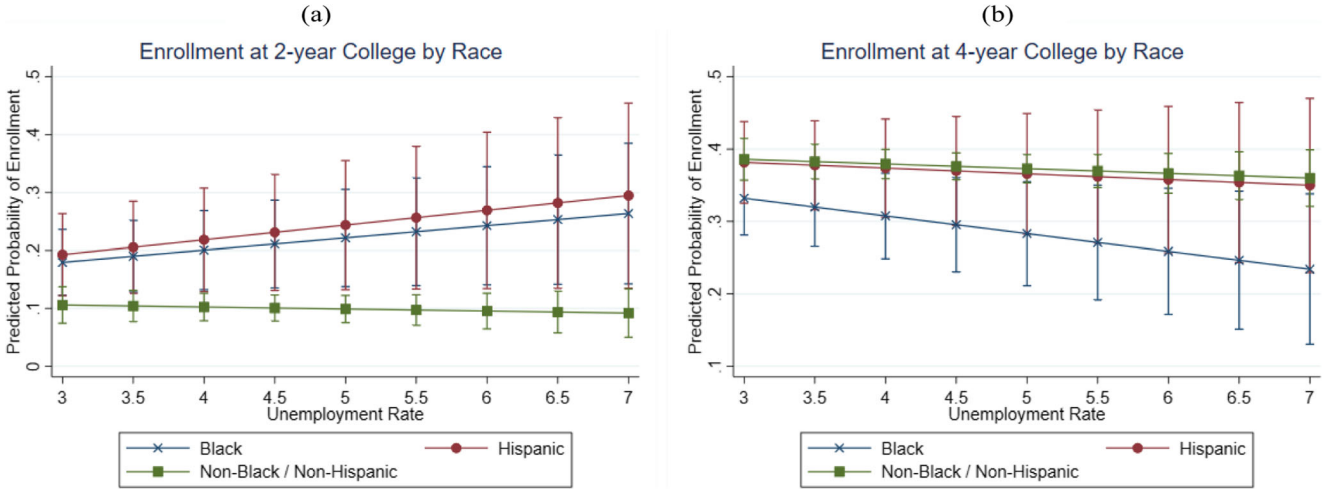

Fig. 4 Effect of unemployment rate on predicted enrollment in 2-year and 4-year colleges by race/ethnicity

black individuals: while Black students are more likely to enroll in 2-year colleges than non-Black-non-Hispanic students when unemployment rises, they are less likely to be enrolled in 4-year college by an amount that is almost equal to the increase in 2-year colleges. The positive enrollment at 2-year colleges is almost entirely offset by a decrease in enrollment at 4-year colleges. Thus, Blacks appear to experience no change in overall college enrollment when the unemployment

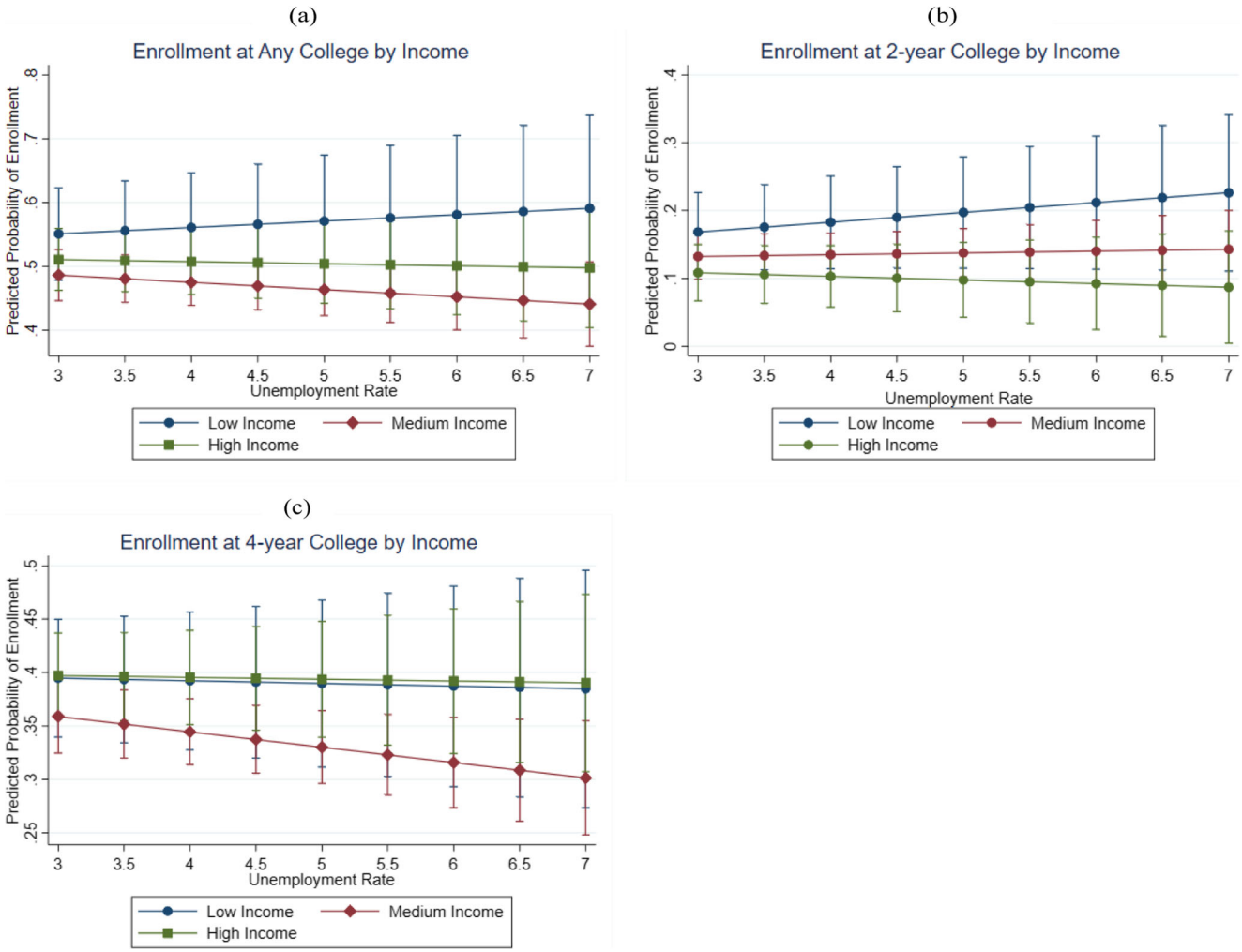

Fig. 5 Effect of unemployment rate on predicted enrollment by income

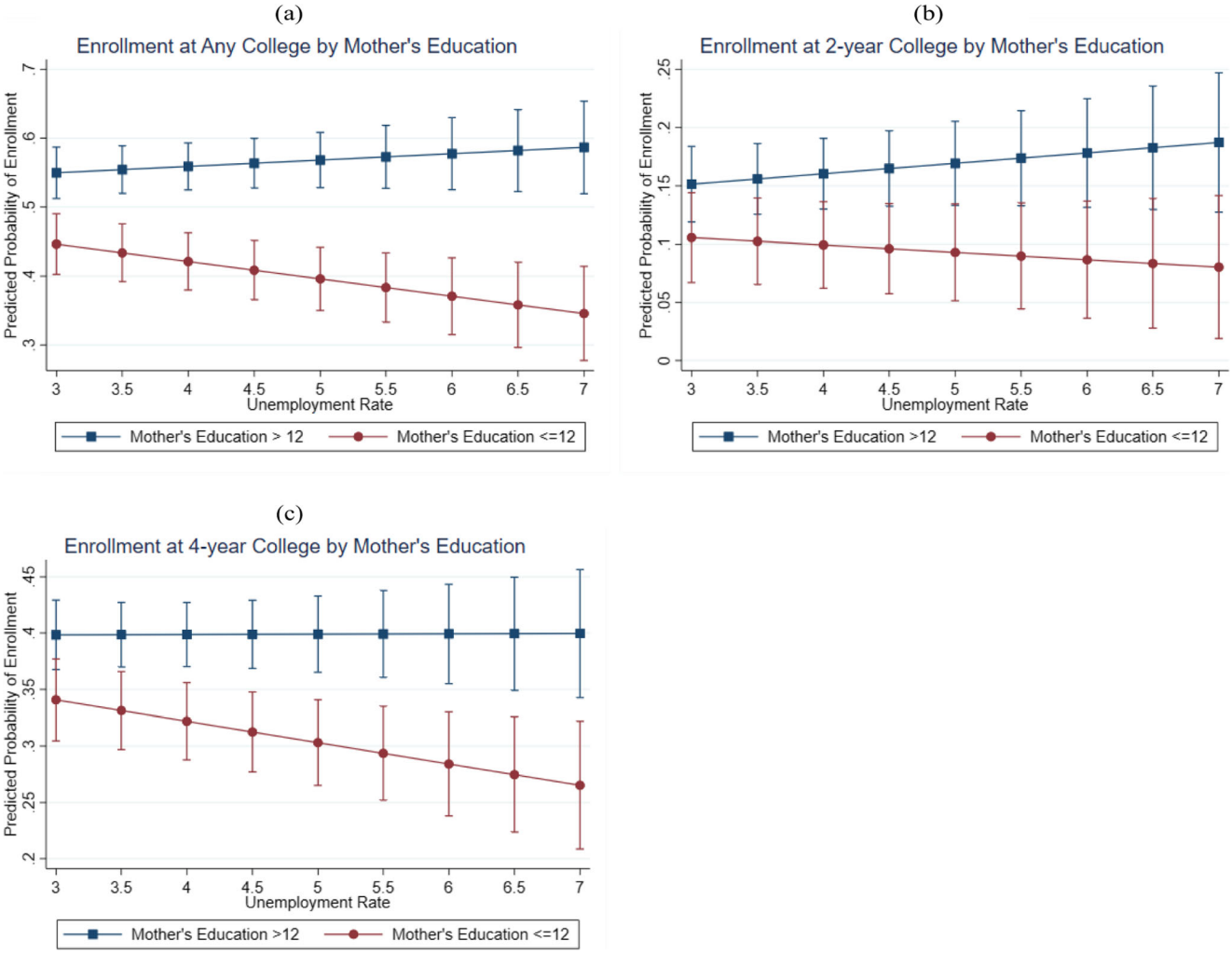

Fig. 6 Effect of unemployment rate on predicted enrollment by mother's education level

rate increases. However, since 2-year colleges represent fewer years of schooling than 4-year colleges, the effect on overall attainment is negative.

Differences by Other Background Characteristics

I also explore the differences in enrollment based on two other background characteristics; parental income and parental education. Individuals from minority groups are more likely to come from low income and low familial education backgrounds so these variables may be able to shed some light on the previous results.

Gap in Enrollment by Income

Figure 5 shows the differences in the effect of unemployment on the enrollment probability of different income groups. Figure 5b, c shows that low-income individuals are more likely to enroll in 2-year colleges and medium-income individuals are less likely to enroll in 4-year colleges. The high-income group is least sensitive to economic conditions.

Gap in Enrollment by Mother's Education

In Fig. 6, individuals are placed into two groups; mother's education greater than 12 years and mother's education less than or equal to 12 years. Figure 6a, b shows that first-generation college students are less likely than their counterparts to enroll when unemployment rises.

Figure 6b, c shows that these negative effects for first-generation students are particularly pronounced at the 4-year college level. Enrollment rates for their counterparts are less sensitive to increases in the unemployment rate.

This finding that enrollment rates for individuals from low-education backgrounds are more susceptible to changes in labor market conditions supports the theory by Beattie (2002) who posits that students from lower education background may rely more on information from the labor market to assist them in making enrollment decisions, while individuals

whose parents have attended and completed college may view attending college as a birthright and thus may be less susceptible to changes in unemployment. Since racial minorities are more likely to be from lower parental education background homes, this may be one explanation for greater sensitivity of Black and Hispanic individuals to increases in the unemployment rate.

Finally, I test whether the greater sensitivities of Blacks and Hispanics to changes in the unemployment rate are indeed related to parental income and education. To do this, I estimate the effect of the unemployment rate and the interaction between the unemployment rate and mother's education and interaction between the unemployment rate and income on separate samples of Black and Hispanic individuals. Neither of these interaction effects was statistically significant for either group. I also performed the same analyses separately for Black women, Black men, Hispanic Women, and Hispanic men. Results were statistically insignificant as well. These results suggest that the findings regarding Blacks and Hispanics are due to pure labor market effects as the impact of unemployment rates is similar for Blacks and Hispanics regardless of the other background characteristics. It is possible that some other background variable not considered here may be able to explain the effects.

Discussion/Conclusion

This study examines the effect of labor market conditions on the differences in college enrollment among different racial and ethnic groups. Using an individual fixed-effects approach and data from the NLSY97, I find statistically significant differences in the effect of high unemployment on college enrollment among Blacks, Hispanics, and non-Black-non-Hispanics. I find that for every 1% increase in the unemployment rate, Hispanics are about 3 percentage points more likely than non-Black-non-Hispanics to enroll in college but this effect is only significant at the 2-year college level.

Similarly, I find that Black individuals are 2.6 percentage points more likely than non-Black-non-Hispanics to enroll in 2-year college for a 1 percent increase in unemployment. However, Blacks are 1.6 percentage points less likely than non-Black-non-Hispanics to enroll in 4-year college during an economic downturn, offsetting the positive effects at 2-year colleges. These results combined means that Black college attainment rates decline during high unemployment periods.

Parts of the results of this study are in line with previous studies, such as Betts and MacFarlane 1995, who found greater enrollment at 2-year colleges during economic downturns. This study highlights a possible shortcoming in the literature that looks only at enrollment into any college or enrollment into 2-year and 4-year colleges separately as they are not able to capture any substitutions between 2 and 4-year enrollment.

Regardless of the direction of the cyclical effects, the fact that college enrollment for some groups is more sensitive than for others to economic conditions raises a few implications. First, even if enrollment rates rebound when the economy rebounds, these higher enrollment rates are for a different cohort. There may be permanent scarring for Black and low parental education cohorts who experience a downturn in the few years after high school as college enrollment probability declines with age. Compared to an 18-year-old, the expected probability of enrollment is 5% lower for a 19 year-old person, 9% lower for a 20-year-old, 12% lower for a 21-year-old, and 22% lower for a 22-year-old (Dellas and Sakellaris 2003). These cohorts of underrepresented youths who forego college due to the state of the economy are less likely to go to college when economic conditions change leading to possibly permanent effects.

College enrollment is only the first step towards college attainment and gaps in enrollment translate into longer-term attainment gaps. The business-cycle effects on college enrollment may contribute to persistent differences in outcomes later in life. The strong pro-cyclicality of state funding, student aid (including loans and grants), and extra support for college application and enrollment may be contributing to these results. Policies geared towards increasing equity in college outcomes should include efforts to smooth college investment decisions of groups who are most sensitive to economic conditions.

Compliance with Ethical Standards

Conflict of Interest The author states that there is no conflict of interest.

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