Scientific Research Publishing

Sociology Mind, 2025, 15(4), 216-264
https://www.scirp.org/journal/sm
ISSN Online: 2160-0848
ISSN Print: 2160-083X

Timing Wealth Building to Maximize Return on Degree

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How to cite this paper: Elliott, W., Osafo Agyare, B., & Min, S. (2025). Timing Wealth Building to Maximize Return on Degree. *Sociology Mind, 15,* 216-264.
https://doi.org/10.4236/sm.2025.154013

Received: June 30, 2025
Accepted: September 15, 2025
Published: September 18, 2025

Abstract

America has a return on degree problem. This study uses data from the Panel Study of Income Dynamics (PSID) and the National Longitudinal Survey of Youth 1979 (NLSY79) to test whether the amount of wealth at different key transitional periods in a child's life increases their return on degree. Further, wealth is measured at birth (ages 0 - 3), at college enrollment (age 18), and at college graduation (age 25). Median net worth in U.S. households is used as the main proxy for return on degree. In the PSID, median net worth in U.S. households is measured at ages 37 - 42 (financially established adulthood) and 55 - 64 in the NLSY79 (pre-retirement). Findings reveal that even having $500 of either enrollment wealth or graduation wealth can have a substantial positive impact on the odds (42% and 52%, respectively) that a college graduate reaches median net worth of U.S. households by the time they are middle age. Further, findings indicate that the most impactful time for college graduates to receive a wealth transfer that has the best chance to maximize their return on degree is between ages 25 to 30. This is a period when the racial wealth gap college graduates experience is at its lowest (about $15,788). An implication of these findings is that, at the end of the spectrum, policies like the student loan policy can cause college graduates to have negative wealth. In the middle of the spectrum are policies like free college tuition, leaving children with no debt. Even these polices are unlikely to have the biggest impact on addressing America's return on degree problem. To equip the education system to fulfill its role as the "great equalizer", policies may be needed to provide college graduates with a wealth transfer shortly after graduating from college when the wealth gap is at its smallest.

Keywords

Return on Degree, Wealth Premium, Wealth Inequality, Economic Mobility, Student Loans

1. Introduction

The term *American dream* was popularized in James Truslow Adams's 1931 book, *The Epic of America.* The Dream has been a central driver in the history of America (Rank et al., 2014). It rests on the adage that effort and ability invested in education is a primary path for achieving a better life regardless of whether you are born poor or wealthy, Black or White. In this spirit, Horace Mann (1848) referred to education as the "great equalizer" in American society.

However, the American education system is suffering from a return on degree problem. The problem is that earning a degree does not appear to many to provide the conditions for college graduates with similar degrees and ability to be able to achieve similar economic outcomes. While there was a time when it seemed that the power of education was unquestioned, at least in the media, this is no longer the case. In the New York Times, Paul Tough (2023) writes,

> A decade or so ago, Americans were feeling pretty positive about higher education. Public-opinion polls in the early 2010s all told the same story. In one survey, 86 percent of college graduates said that college had been a good investment; in another, 74 percent of young adults said a college education was "very important"; in a third, 60 percent of Americans said that colleges and universities were having a positive impact on the country.
>
> He goes on to say, A decade later, Americans' feelings about higher education have turned sharply negative. The percentage of young adults who said that a college degree is very important fell to 41 percent from 74 percent. Only about a third of Americans now say they have a lot of confidence in higher education. Among young Americans in Generation Z, 45 percent say that a high school diploma is all you need today to "ensure financial security". And in contrast to the college-focused parents of a decade ago, now almost half of American parents say they'd prefer that their children not enroll in a four-year college.

Evidence increasingly shows education does not provide the same return on degree for everyone. In the case of low-income college graduates, Hershbein (2016) finds that bachelor's degree holders from low-income families start their careers earning about one-third less than those from high-income families. Similarly, De La Fuente and Navarro (2020) find that one year after graduation, the median income for Black graduates is $36,000, compared to $40,000 for White graduates. Carnevale, Cheah, & Van Der Werf (2022) examine whether the type of institution graduates attend can explain this difference. They find that the return on degree is less for low-income students (i.e., Pell Grant recipients) across all types of institutions. Specifically, they find at the bachelor's level, over their lifetime, low-income students earn $95,100 compared to $1,006,000 for their counterparts at public institutions. In the case of private nonprofit institutions, low-income students earn $863,000 versus $967,000 for their wealthier counterparts.

However, to understand the full depth of the return on degree problem, wealth must be considered. For example, when net worth is considered, Emmons and Noeth (2015) find that Black students ($32,780) receive less benefit from their college degree than do their White ($359,780) counterparts. Similarly, Hamilton, Darity, Price, Shridharan, and Tippett (2015) find that Black families who have a head of household who graduated from college have about 33% less wealth than White families who have a head of household who dropped out of high school. Research also shows that children who have a parent who is a college graduate are also more likely to have more wealth postgraduation. Specifically, the Pew Research Center (2020) finds evidence that the median wealth of first-generation households with a college graduate is $92,500 less ($152,000 vs. $244,500, respectively) than for college graduates with a parent who was also a college graduate. In a simulation model, Traub, Sullivan, Meschede, and Shapiro (2017) find that even if Blacks graduated college at the same rate as Whites, it would only slightly reduce the racial wealth gap. These findings align with recent findings that show the wealth premium education has typically produced is shrinking or in some cases has vanished. These findings indicate that a small wealth premium remains for White college graduates born in the 1980s when compared to White high school graduates (Emmons et al., 2019). However, in the case of Black college graduates born in the 1980s, they find the wealth premium had disappeared altogether when compared to Black high school graduates during the same time (Emmons et al., 2019). Researchers point to the rising cost of college and student debt as a reason the wealth premium is disappearing.

1.1. Student Debt's Impact on Wealth Accumulation

Research consistently shows that low-income and Black students are more likely to have student loans than their wealthier White counterparts. For example, research indicates that about 84% of bachelor's degree recipients at public colleges who receive Pell Grants (grants for low-income students) borrow for the credential, compared to 46% of those who never received Pell (Huelsman, 2015). Similarly, Neelakantan (2023) finds that about 66% of White students took out student loans in 2017 compared to about 86% of Black students. Black students also borrow more. Four years after earning a bachelor's degree, Black graduates in the 2008 cohort on average held $24,720 more student loan debt than white graduates ($52,726 vs. $28,006) (Scott-Clayton & Li, 2016). Given that Black students are more likely to borrow and have borrowed more, it is not surprising that they are also more likely to struggle to pay back their loans. According to Jones and Jackson (2020), "a Black bachelor's degree recipient is more likely to default than a White college dropout [42% vs. 11%, respectively], and Black borrowers from families in the highest income quintile have higher default rates than White borrowers in the lowest income quintile [34% vs. 23%, respectively]" (parg. 5; bracketed information added). Furthermore, defaulting on student loans can reduce credit scores by 50 to 90 points (Blagg, 2018).

Giving students access to loans they are not financially capable of paying back as a policy for making education more accessible seems dubious from the start, and at the very least counterproductive in terms of assuring the opportunity for an equal return on degree. Research indicates that college graduates with student debt take jobs that have higher initial salaries but lower potential wage growth (Minicozzi, 2005). Similarly, Hiltonsmith (2013) finds that college graduates with student loans start off earning more than students without college debt but end up earning less by the time they reach their 40's, and significantly less by their mid-50s. The negative impact of student loans is not only on graduates' incomes, having student loans also makes it less likely to start a new business (Ambrose et al., 2015). The wealth impacts are also considerable. For example, college graduates who owe on student loans delay buying a home (Blagg et al., 2022; Cooper & Wang, 2014) one of the biggest assets most Americans hold (Schuetz, 2020). The impacts of being in debt not only affect the economic well-being of college graduates shortly after leaving college, but these impacts also reverberate long after. For example, Egoian (2013) finds that college graduates who have student loans delay saving for retirement (Egoian, 2013) even though it is well established that even short delays have a substantial impact on the amount of retirement savings (Charles Schwab, 2025).

Maybe most important for this study, research has shown that student loan debt can result in a delayed economic launch into adulthood. Elliott and Rauscher (2018) measure mobility as the likelihood and rate of achieving median household net worth among four-year college graduates or above who were at least age 22. After controlling for key differences, they found that acquiring the relatively small amount of $10,000 in student loans is associated with an 18% decrease in the rate of achieving median net worth. Policies like deferment, forbearance, income-based repayment plans, and pay-it-forward have been implemented to attempt to reduce the negative impact that student debt can have on graduates' ability to accumulate wealth. However, they may only extend their negative impacts farther into adulthood (Elliott & Lewis, 2018). Free college policies attempt to eliminate the need for student loans altogether. But the return on degree problem is more than the absence of student loan debt. Graduates may also need to have wealth of their own to maximize the return on their degree.

1.2. It Is Not Enough to Eliminate Student Loans

Solving the return on degree problem requires that students are able to produce wealth from their degree. However, being able to produce maximum amounts of wealth is dependent on the amount of wealth graduates have to launch into adulthood after graduating. From this perspective, wealth is not only important for becoming college ready (Pfeffer, 2018) or for paying for college (e.g., Conley, 1999; Elliott, Sorensen, & O'Brien, 2024), but also to augment graduates' ability to produce wealth thereby strengthening their return on degree.

Shapiro, Meschede, & Osoro's (2013) provide evidence of the importance of

wealth for producing wealth. They find that a $1 increase in income translates to a $5 increase in wealth for White families but only a 70-cent increase for Black Families. But they also find when Black families start off with similar levels of wealth, they have a return of $4.03. This suggests that initial wealth is important to how much return can be generated from income. It also suggests that to fully close the racial wealth gap, policies might need to give more to Black families than to similarly situated White families to account for longstanding racial and structural inequalities (see, Weller, 2024). Importantly, Elliott, Rauscher, and Nam (2018) find evidence that suggests while holding a degree makes a substantial difference in the amount of net worth younger adults have when they are older, a college degree matters more when younger adults start off with assets. More specifically, they find evidence that suggests wealth among college graduates in 1989 (shortly after graduating college) is a stronger predictor of wealth in 2011 than income is for families in the 50th and 75th wealth percentile. However, in the case of the lowest percentile (25th percentile) income in 1989 is a stronger predictor of 2011 wealth than 1989 wealth. That is, income matters more for building wealth than wealth shortly after graduation does for the lowest wealth groups. They speculate that this is because low-income young adults start with so little wealth. There is also evidence that growing up with wealthy parents as a child is associated with being more likely to be wealthy as an adult (Conley, 1999; Davenport, Levell, & Sturrock, 2021; Pfeffer & Killewald, 2019). For example, Conley (1999) finds that parental wealth is a more important predictor of young adults' wealth than education, income, or age. These findings suggest for graduates to experience the full power of owning wealth, the amount of wealth they start off with plays an important role in the return on degree they can achieve. However, research on the power of wealth for building wealth is still an area understudied.

A practical example might help better explain how wealth begets more wealth when placed in a financial institution designed for building wealth rather than simply storing wealth. Let's imagine a student has $1000 they want to save. The student has access to both a traditional savings account with Annual Percentage Yield (APY) of half percent, primarily a secure place to store money for the future. They also have access to a high yield savings account with an APY of 5%. If they invest $1000 into a traditional bank account, they will end up with about the same amount they put in by the end of the year. However, if they have the skill to invest the $1000 into the high yield account, the $1000 produces an additional $51 by the end of year for them. If they have $20,000, the account produces $1023; if they have $50,000, it produces $2558, and if they have $1,000,000, the account produces $51,162. This is above and beyond any effort they expend on their own. Or we could say the institution produces over $51,000 more for the wealthy graduate than it does for the low-wealth graduate. What becomes evident from this example is that financial institutions build wealth on behalf of individuals above and beyond their own individual financial capability. Therefore, if a college graduate does not have access to this kind of wealth building institution, their return on

degree is going to be less.

Further, and more directly related to this study, the high yield example illustrates the idea that the amount of wealth a graduate starts with is a determining factor in the return on degree they can achieve. Certainly, as the example illustrates, financial knowledge and skills (the decision to use the high yield account) also can play an important role in the return on degree. However, the high yield example also illustrates that even if they have financial knowledge and skills, it is not enough without access to wealth building institutions and startup wealth. Emmons and Ricketts (2017) estimate that up to 70% of wealth gaps among college graduates may be structural and not behavioral. Based on the evidence presented here, we suggest that policies that seek to address the return on degree problem will likely have to go beyond free tuition and provide graduates with startup wealth so that they can maximize their return on degree.

1.3. The Timing of Wealth Might Also Help Determine Its Impact on the Return on Degree

This study investigates the impact that wealth might have at three different time periods across a college graduate's life. The three time periods are birth wealth (ages 0 - 3), enrollment wealth (age 18), and graduation wealth (age 25). Evidence reviewed in the next section suggests that each has an important impact on the return on degree graduates ultimately can achieve. However, it might be that wealth's impact is different at different developmental stages. Therefore, policies might be needed to provide wealth transfers at different critical transitional periods in a child's life if America is going to live up to its moniker of being a meritocracy, or education to its moniker as the great equalizer.

1.3.1. Birth Wealth

In this study, birth wealth refers to the amount of wealth a household has in the first few years after a child is born. While many families, particularly White families, help their child pay for college and provide post-graduation support for large purchases such as buying a car or home, children experience the full impact of their family's wealth while they live at home. Therefore, we propose that the biggest impact of birth wealth might be on the child's early life outcomes prior to their graduating high school and moving out of their parents' house.

The effects of birth wealth have been shown to be an important predictor for determining children's outcomes across the education pipeline (i.e., kindergarten through college completion). It has impacts starting early in the education process, and these impacts overlap and accumulate over time. For example, children who grow up wealthier are more likely to have higher test scores during their early education (Yeung & Conley, 2008), more likely to attend so called Ivy-Plus[1] colleges which provide access to selective leadership positions in the US and the opportunity for larger earnings postgraduation, receive more financial aid (Helhoski,

[1]Chetty, Deming, & Friedman (2023) define Ivy Plus schools as the eight Ivy League colleges, plus Chicago, Duke, MIT, and Stanford.

2020), and graduate from college at higher rates (Pfeffer, 2018) than their lower wealth counterparts.

However, little is known about whether there are key developmental transitions that might be the most important and effective times for a wealth transfer for the purpose of improving the return on degree graduates can achieve. For instance, Loke (2013) finds evidence that youth living in lower-wealth households who experience significant asset accumulation over time have similar college completion rates as youth born into high-wealth households. This suggests that wealth at birth may not be the best indicator of the impact that wealth can have on the return on degree. In line with this finding, we posit that the effects of birth wealth may lessen further along the education pipeline the child travels and that wealth later in a child's life might be more predictive of the return on degree than birth wealth.

1.3.2. Enrollment Wealth

Enrollment wealth is the amount of family wealth graduates have around the age they enroll in college (around age 18). In this study, enrollment wealth is measured as family net worth. As such, it is not specifically money to pay for college, but how much wealth is at their family's disposal at the time they reach the age of 18. However, a substantial body of research indicates that the amount of income and wealth a family has is positively associated with contributing to paying for their child to attend college (e.g., Hossler & Vesper, 1993).

While not specifically a disbursement of wealth at age 18, research on family educational support may inform the impact that having wealth to attend college has on children's outcomes. On average, researchers find that White students report receiving $12,000 in financial assistance from their parents, while Back students report receiving $4000 (Addo et al., 2016). This support can affect children's future financial outcomes. For instance, Rauscher (2016) finds that predicted household income and net worth is higher for adults who received parental financial support for education than for those receiving no parental educational support. This is the case even with relatively modest amounts. To have a positive impact on college graduates' wealth, Rauscher (2016) finds that parents' education support just had to exceed $600 to have a positive impact on adult children's income, and about $2200 to have a positive impact on their wealth. We suggest that wealth in Children's Savings Accounts (CSAs) mimic or can act as a substitute for the parental educational support wealthier parents more often are able to provide for their children (Meschede et al., 2017).

CSAs may be the best example of what we mean by a program designed to provide children with enrollment wealth. CSAs are wealth building programs designed to transfer wealth to children at age 18 specifically to help pay college expenses. There is a growing body of evidence that show CSAs providing children with wealth at age 18 for college, has important impacts that not only help prepare children to prepare to attend college, but also helps them enroll in college, and graduate from college (for a review of this literature see Elliott, 2024). There is a smaller body of evidence, but most relevant to this study, that indicates that these

accounts may also have important financial impacts that extend beyond college.

For example, Friedline and Elliott (2013) find that children between ages 15 to 19 who have savings are more likely to have a savings account, credit card, stocks, bonds, vehicle, and a home at age 22 to 25 than if they did not have savings of their own between ages 15 to 19 (Friedline & Elliott, 2013). Findings also show that most young adults (age 18) own a savings account at or before acquiring financial products such as checking, CD, money market, savings bond, stock, and retirement accounts (Friedline, Johnson, & Hughes, 2014). Having savings as an adolescent led to greater asset accumulation in other forms such as stocks, retirement accounts, and real estate. For example, they find that while owning a savings account as a young adult only contributed $50 toward liquid assets, the added contribution of combined stock and retirement accounts—themselves products of savings account ownership—was $5283 (Friedline et al., 2014). This suggests that CSAs may be a gateway not only to greater educational attainment, but a conduit of economic mobility, and of a more diversified asset portfolio. As a gateway financial instrument, CSAs may lead to greater asset accumulation in other forms such as stocks, retirement accounts, and real estate.

Baby Bonds proposals are another popular wealth building program that transfers wealth to children at age 18 (Hamilton & Darity, 2010). Unlike the current form of CSAs, Baby Bonds can be used for multiple purposes such as buying a home, starting a business, retirement, and paying for college. Regardless of their wealth building goal, these policy interventions are designed to provide children with wealth at the age of 18. There is no existing research on the impacts of participating in a Baby Bonds program to date that the authors know of. However, there have been several simulations estimated that indicate that Baby Bonds have the potential to reduce the racial wealth gap (for a review of this research, see Brown et al., 2024)

Research indicates that financial support to pay for education and to buy a home are the most impactful for augmenting the return on degree college graduates can achieve (Meschede et al., 2017; Rauscher, 2016). In the next section we directly discuss the impact that post-graduation support (e.g., wealth to help buy home) can have on the return on degree.

1.3.3. Graduation Wealth

In this study graduation wealth refers to the amount of wealth young adults have about the time they graduate from college to start independent living. This wealth can be used to augment a college graduate's capacity to strengthen the return on degree (i.e., increase their net worth). According to the U.S. Bureau of Labor Statistics (2014) the time when most young adults move out of their parents' home and launch into adulthood is around the ages of 24 to 27. This is around the same time most children who attend college earn a bachelor's degree in the U.S., age 24 (Finn, 2023). However, little is known about the wealth holdings of young adults and those beginning families (Zagorsky, 1999).

Addo, Houle, and Simon (2016) report that among young adults with some

post-secondary education, Whites report having $17,000 more in net worth at age 25 than Black adults the same age. While still a large racial wealth gap, the racial wealth gap at age 25 appears to be much smaller than what it is when Black and White families reach their prime wealth producing years in their 40s and 50s (Ando & Modigliani, 1963; Banterle, 2002; Modigliani, 1986). In comparison to the $17,000 gap Addo et al. (2016) find that when young adults are age 25, when considering all adult age groups, researchers find the wealth gap is much larger. For example, the Pew Research Center (2020) finds that in 2016 median family wealth among lower-income families was $11,300, for middle-income families it was $115,200, and for upper-income families it was $848,400 (in 2018 dollars). The racial wealth gap is even larger. McKay (2022), an economist with the Federal Reserve Bank of Minneapolis estimates that,

> White Americans hold 84 percent of total U.S. wealth but make up only 60 percent of the population—while Black Americans hold 4 percent of the wealth and make up 13 percent of the population. Put another way: The wealth of the richest 400 Americans is approximately equal to that of 43 million Black Americans. (para, 21)

The idea that the wealth gap is much smaller for young adults aligns with research on intergenerational transfers of wealth as well. For example, Nolan, Palomino, Van Kerm, and Morelli (2021) find that intergenerational transfers of wealth make up only 8% to 10% of overall wealth inequality in America. Further, Feiveson and Sabelhaus (2018) find that about half of all inheritances are less than $50,000. So, while intergenerational transfers of wealth are an important part of the story of wealth inequality (Oliver & Shapiro, 1995), it does not make up a large portion of the story of wealth inequality in America.

It would appear then that wealth inequality might be at its smallest, when children are preparing to launch into becoming financially established adults. We posit that it is at this point of development that a wealth transfer might be most effective and efficient at strengthening the return on degree college graduates can achieve. It is worth noting that this does not diminish the relevance of wealth at different stages. Instead, it suggests that wealth transfers at different time periods might be more effective for achieving different policy goals than wealth transfers at other time periods. However, right now there is a shortage of research on the different purpose wealth transfers can have at different developmental stages. In the next section we will discuss some different developmental stages adult children pass through.

1.4. Failure to Launch

Psychologists determine that by early middle age (37 - 42) an individual should be in the stage of their life they call the established adulthood stage (Mehta et al., 2020). During this stage of life, adults are expected to be financially independent from their parents and established in their careers (Day et al., 2008). Psychological

research finds that experiencing financial problems during this critical period in a person's development is linked to being at higher risk of poor mental health outcomes such as exhibiting symptoms of depression (Wang et al., 2023). However, psychologists have almost exclusively focused on the effects of lack of income (i.e., living in poverty), and have ignored the role wealth plays in an individual's mental health. In Study 1of this paper, we use several different measures of wealth from the Panel Study of Income Dynamics (PSID) to determine whether by early middle age (37 - 42) a college graduate has launched into being a financially established adult. During this stage a college graduate who is receiving an age-appropriate return on their degree should be able to begin producing wealth in a high enough amount that they could (i.e., on track to) achieve their financial goals.

In study two, we use data from the National Longitudinal Survey of Youth (NLSY) 1979, and with similar wealth measures examine whether by late middle age (55 - 64) a college graduate has successfully launched into the pre-retirement stage of their life. During this stage a college graduate with a strong return on degree should be able to begin focusing on paying off their mortgage and other debts, ensuring a comfortable retirement. Failure to successfully launch into the pre-retirement stage of life is critical not only for the graduate themselves but for others as well. Lachman, Teshale, and Agrigoroaei (2015) say, "Those in the middle age play a central role in the lives of those who are younger and older at home, in the workplace, and in society at large" (p. 20). What this suggests is that the economic status of college graduates in the pre-retirement stage of life can have a tremendous impact on the perpetuation of economic inequality that exists in society.

Within the life course literature, there is little research on the middle age stage of life. And within educational research on the return on degree, there is little research that examines how wealth let alone wealth at different stages (birth wealth, college age, and wealth shortly after graduating) of the life course impact return on degree. In this paper we conduct two studies using different measures of wealth in early middle age and later middle age as proxies for the return on degree. We use these wealth proxies to examine the potential impact that wealth at different earlier stages of development has on a college graduate's return on degree. Study one uses data from the Panel Study of Income Dynamics in early middle age and whether graduates successfully launch into the financially established adult stage of their lives. Study two uses data from the National Longitudinal Survey of Youth 1979 as a robustness test for findings in Study 1 in late middle age and whether graduates successfully launch into the pre-retirement stage of their lives.

Study 1: The Impact Wealth Has on Launching into the Financially Established Adulthood Stage of Life: Data from the Panel Study of Income Dynamics (PSID)

Key Research Questions

The main way a college graduate launches into being a financially established

adult is operationalized in this study is by determining whether they are at or above the median net worth of U.S. households by early middle age.

Logistic Analysis Questions: Odd Ratio:

1) Does being Black decrease the odds a college graduate launches into what should be the financially established adulthood stage of their life (ages 37 - 42)?

2) Does having student loans decrease the odds a college graduate launches into what should be the financially established adulthood stage of their life (ages 37 - 42)?

3) Does being financially literate increase, the odds of a college graduate launching into what should be the financially established adulthood stage of their life (ages 37 - 42)?

4) Does family birth wealth (ages 0 - 4), family enrollment wealth (ages 17 - 22), or the adult child's graduation wealth (25 - 30) increase the odds they launch into the financially established adulthood stage of their life (ages 37 - 42)?

Marginal Effects:

1) What is the percent change in the probability of a financially literate adult child launching into the financially established adulthood stage of their life for every one dollar increase in birth wealth, enrollment wealth, or graduation wealth?

2) What is the percent change in the probability of a White or Black adult child launching into the financially established adulthood stage of their life for every one dollar increase in birth wealth, enrollment wealth, or graduation wealth?

Survival Analysis:

Kaplan-Meier Curves

1) How many years does it take a White compared to a Black college graduate, from the time they graduate from college until the time they reach early middle age, to launch into being a financially established adulthood?

2) How many years does it take a college graduate who is financially literate compared to one who is not, from the time they graduate from college until the time they reach early middle age, to the time they launch into being a financially established adulthood?

3) How many years does it take for an individual with low college debt compared to one who has high college debt, from the time they graduate from college until the time they reach early middle age, to launch into being a financially established adulthood?

Cox-Proportional Hazard Model

1) Does being Black increase the time it takes to launch into being a financially established adult?

2) Does having student debt increase the time it takes to launch into being a financially established adult?

3) Does being financially literate reduce the time it takes to launch into being a financially established adult?

4) Does having higher amounts of birth wealth, enrollment wealth, or adult wealth reduce the time it takes to launch into being a financially established adult?

2. Methods and Analysis Plan

2.1. Data

This study uses longitudinal data from the Panel Study of Income Dynamics (PSID), a nationally representative sample of over 18,000 individuals living in 5000 families in the United States. PSID collects information on employment, income, and wealth with a high degree of validity (Juster et al., 1999; Pfeffer et al., 2016). The survey was conducted annually from its first survey in 1968 until 1997, and biannually thereafter. Wealth information has been collected every 5 years from 1984 until 1999, and every other year since then. Although it is a longitudinal study, the PSID has consistently achieved high response rates, staying above 95% since 1970 (Schoeni et al., 2013). For detailed information about the PSID data, readers are referred to Beaule et al. (2023).

2.2. Sample

Since the first available wealth information is from 1984, the time frame analyzed in this study is 1984 to 2021. To investigate the impact of birth wealth, the age of the sample was restricted to 0- to 5-year-olds in 1984. These individuals were aged 37 - 42 by 2021, which is referred to as early middle age or established adulthood stage (Levinson et al., 1986). For testing the impact of financial capability, this study uses the Well-Being and Daily Life 2016 Supplement survey data and restricts the sample to those who responded to the study. The sample in this study is restricted to Black and White individuals who hold a bachelor's degree from a four-year college or university to investigate the return on their degree after graduation. The focus on these racial groups is justified by the small number of individuals from other racial backgrounds. The small number of other racial groups is because in the basic PSID sample did not include Latinos unless they co-resided with persons in the U.S. in 1968. Further, the Latino supplemental sample was not added to the PSID until 1990 (Beaule et al., 2023). With these restrictions, our sample included 576 households.

3. Measures

3.1. Outcomes: Measuring the Return on Degree

Reaching the Median Net Worth in U.S. Households. To assess the return on degree, we measure whether an individual's household net worth surpasses U.S. median each year. When individuals reach median net worth offers insight into the return on degree individuals attain relative to national benchmarks. In addition, it provides insight into when college graduates can launch into the established adulthood stage defined not solely by age, but when graduates reach median net worth. To ensure accuracy, we source median net worth figures from external datasets, reflecting national trends over time. Median household net worth data spanning 1979 to 2021 are derived from (Board of Governors of the Federal Reserve System, 2023). This benchmark provides a robust measure of absolute return

on degree, allowing for a comparative analysis of financial progression across different cohorts and economic conditions.

3.2. Variables of Interest

Race. Race was indicated with White as the reference group, given that the study focused exclusively on Black and White individuals.

Student Loan Amount. Additionally, a measure of student loans was obtained, representing the cumulative amount of student loans held by all household members as of 2011. Both the student loan and household income variables were inflation-adjusted to 2021 dollars. Over a quarter of households reported having zero student loans, while others had varying amounts. Like household income discussed below, we address this by transforming the student loan variable using the Inverse Hyperbolic Sine (IHS) transformation.

Financial Literacy. The financial literacy measure in this study is modeled closely after the approach used by Bialowolski et al. (2021). We use data from the Well-Being and Daily Life 2016 Supplement survey to create a binary variable that serves as an indicator of financial literacy. This measure, widely utilized in the literature (see Lusardi & Mitchell, 2007; Schmeiser & Seligman, 2013), is based on respondents' correct answers to the following three questions:

1) "If the chance of getting a disease is 10 percent, how many people out of 1000 would be expected to get the disease?"

2) "If 5 people all have the winning numbers in the lottery and the prize is $2 million, how much will each of them get?"

3) "Suppose you have $200 in a savings account. The account earns 10 percent interest each year. How much would you have in the account at the end of two years?"

Respondents who answered all three questions correctly are classified as financially literate. Importantly, for conducting longitudinal analysis, research shows that financial literacy is relatively stable over time (Angrisani et al., 2023). Therefore, it can be used in longitudinal analysis even when it is measured only at one point and time.

Net Worth/Wealth. Household net worth in the PSID is calculated by summing various types of assets held each year, including business assets, checking or savings accounts, real estate, stocks, and other assets, and then subtracting all outstanding debt. This provides a time-varying measure of net worth. Throughout the study, the terms "*net worth*" and "*wealth*" are used interchangeably. Each year's net worth values were inflation-adjusted to 2021 levels using the Consumer Price Index (CPI).

From the net worth variable, we derive several asset-related variables:

1) Birth Wealth: This is the 1984 household net worth when individuals were between the ages of 0 and 4.

2) Enrollment Wealth: This represents the 2001 household net worth when individuals typically enroll in college, between the ages of 17 and 22.

3) Graduation Wealth: This is the 2009 household net worth when individuals

would have typically already graduated from college, between the ages of 25 and 30.

These variables are particularly important for the study's main objectives, which is aimed at identifying critical stages in an American child's life where building financial assets is most effective in enhancing long-term financial stability.

3.3. Control Variables

Total household income was measured as a continuous variable in the PSID, calculated as the sum of total household income from the previous tax year, including all taxable income, transfer income, and Social Security income for everyone in the family. We collected data on household income for the following years: 1984, 89, 94, 2001, 2003, 2005, 2009, 2011, 2013, 2015, 2017, 2019, and 2021. Negative income values were trimmed to zero. Household income was highly skewed, which could pose potential issues in our analysis. To address this, we transformed this variable using the Inverse Hyperbolic Sine (IHS) transformation (Pence, 2006). The transformation can be expressed as:

$$\mathrm{Sin}h^{-1}(\theta w) = \theta^{-1} \ln(\theta w + (\theta^2 w^2 + 1)^{1/2})$$

In which θ is a scaling parameter and w is net worth. This approach allowed us to include households with zero student loans without excluding them from the analysis (Pence, 2006).

In addition, a comprehensive set of covariates are controlled for in 1984 when assessing the influence of various wealth variables on different return on degree outcome variables. Key demographic differences were accounted for such as family size and characteristics of the household head such as race, marital status, education level, and employment status.

Family size was quantified as the number of individuals in the household. The household head's age was measured by years. Marital status was recoded as a binary indicator for whether the household head was married. The education level of the household head was categorized based on the years of schooling completed: those with 12 years or less were classified as having "high school or less" education; those with more than 12 years but fewer than 16 years were categorized as having "some college"; and those with 16 years or more were classified as having "four-year college or more" education. Employment status was also considered, with the unemployed being the reference group. Additionally, the sex of the individuals was controlled for as a dichotomous variable, with male serving as the reference group.

4. Analysis Plan

4.1. Panel Logistic Models

The longitudinal structure of the PSID data provides a valuable opportunity to analyze the relationships between various asset variables and the probability of achieving the median net worth of U.S. households, median income, and being asset empowered over time. This is particularly relevant for the years 2009, 2014,

2017, 2019, and 2021. To account for the correlations within subjects that arise from repeated measurements, we employ a logistic model using Generalized Estimating Equations (GEE) (Liang & Zeger, 1986).

GEE is specifically designed to handle correlated data typical in longitudinal studies, where the outcome variable is binary (e.g., rich/poor, success/failure). Unlike traditional regression models that assume independence of observations, GEE allows us to specify a working correlation structure, which models the relationship between repeated measures or clustered data. This approach is preferred to alternatives such as mixed models because GEE coefficients represent the average population effect of predictors on the response variable, which aligns with our study's focus on population-level inference rather than individual-specific effects.

Moreover, GEE offers robust standard errors that remain consistent even if the working correlation structure is misspecified, making it a reliable method for analyzing correlated data. In our analysis, we use the quasi-likelihood information criterion (QIC) to select the most appropriate working correlation structure (e.g., exchangeable, autoregressive, unstructured).

The impact of asset variables on the probability of the response variables (reaching the median net worth of U.S. households) while controlling for other variables can be modeled as:

$$\log it\left(P\left(Y_{ij}=1\right)\right)=\beta_0+\beta_1 X_{1ij}+\beta_2 X_{2ij}+\cdots+\beta_{pij}X_{pij}$$

where Y_{ij} is the binary outcome for the *i-th* individual in the *j-th* year, $\log it\left(P\left(Y_{ij}=1\right)\right)$ represents the log-odds of the outcome, $X_{1ij}, X_{2ij}, \cdots, X_{pij}$ are the predictor variables for the *i-th* observation in the *j-th* year, and $\beta_1, \beta_2, \cdots, \beta_p$ are the coefficients for the predictor variables.

This comprehensive modeling approach allows us to rigorously evaluate the impact of asset variables on financial outcomes across the study period.

4.2. Survival Models

We use survival analysis (Elandt-Johnson & Johnson, 1999) to model the time it takes for college graduates to reach the midpoint of wealth. We begin by visually comparing the survival probabilities among different groups. Here, "survival" refers to those who have not yet reached the median net worth of U.S. households at a given time, while "failure" indicates those who have. We utilize the Kaplan-Meier estimator (Kaplan & Meier, 1958) to inspect survival functions across various groups, specifically examining how the probability of reaching the median net worth of U.S. households differs among Black and White college graduates and based on student loan class (with households having cumulative loans less than $10,000 in 2011 classified as low debt, and those above as high debt). These comparisons are tested using the log-rank test, which evaluates the null hypothesis that survival probabilities for reaching the median net worth of U.S. households do not significantly differ among the groups.

Another key objective of our study is to model the impact of wealth variables on the time it takes for a college graduate to reach the midpoint wealth, while controlling for various covariates. For this purpose, we employ the Cox Proportional Hazards (Cox PH) model (Kelly & Lim, 2000), a widely used semi-parametric model in survival analysis that assesses the influence of explanatory variables (covariates) on the hazard function. The Cox model is advantageous because it does not assume a specific distribution for survival times, offering greater flexibility compared to fully parametric models. It allows us to identify risk factors affecting the likelihood of survival (i.e., not reaching the median net worth of U.S. households) while adjusting for potential confounders.

The Cox model is mathematically expressed as:

$$h\left(t|X\right)=h_o\left(t\right)\times\exp\left(\beta_1X_1+\beta_2X_2+\cdots+\beta_pX_p\right)$$

where:

- $h\left(t|X\right)$ is the hazard function at time t given the covariates $X_1,X_2,\cdots,X_p$.
- $h_o\left(t\right)$ is the baseline hazard function, representing the hazard when all covariates are zero.
- $\beta_1,\beta_2,\cdots,\beta_p$ are the coefficients corresponding to the covariates.
- $\exp\left(\beta_i\right)$ represents the hazard ratio associated with a one-unit increase in the covariate X_i.

The Cox model's key assumption is that of proportional hazards, which posits that hazard ratios between groups remain constant over time. This implies that the effect of covariates on the hazard is multiplicative and does not change with time. This assumption can be tested using statistical methods based on Schoenfeld residuals. If the assumption fails (indicating that the hazard ratio is time-dependent), adjustments such as incorporating time-varying covariates can be made, allowing the effect of the covariate to vary over time.

In all survival models, college graduates are tracked from their completion year (2009) and followed up in 2014, 2017, 2019, and 2021. Graduates who reach the median net worth of U.S. households in any of the follow-up years are considered censored from the risk pool. All analyses are conducted using R version 4.4.1.

5. Results

5.1. Descriptives

Table 1 presents the baseline statistics for the categorical variables in the study. As we follow the sample from 1984 through 2021, the baseline statistics mostly refer to 1984, except for the financial capability variable, which was collected in 2016 only.

The sample includes 576 individuals, with a gender distribution of 60% female (n = 345) and 40% male (n = 231). Regarding racial composition, 65% of the respondents identify as White (n = 377), while 35% identify as Black (n = 199).[2] In

[2]Poor families were oversampled in the PSID which resulted in a higher number of Blacks being included in the PSID base sample then would be seen in the national population (Beaule et al., 2023).

terms of marital status, a majority of the sample, 82% (n = 471), are married, whereas 18% (n = 105) are not married. The education level of the householders shows that 53% have a high school diploma or less (n = 304), 22% have attended some college (n = 126), and 25% have completed four years of college or more (n = 143). For the unemployment status, 84% of the householders are employed (n = 481), while 16% are unemployed (n = 95). Regarding financial literacy, 39% of the respondents demonstrate their financial capability (n = 212), compared to 61% (n = 329) who do not.

Table 1. Descriptive statistics for control variables (PSID).

	N	%
Household (Parent/Head's Information)		
Race		
White	377	65
Black	199	35
Marital Status		
Married	471	82
Not Married	105	18
Education Level		
High School or Less	304	53
Some College	126	22
Four-Year Degree or More	143	25
Employment Status		
Employed	481	84
Unemployed	95	16
College Graduates' Information		
Gender		
Male	231	40
Female	345	60
Financial Literacy		
Literate	212	39
Not Literate	329	61

Variable Name	Mean	Median	SD	Min	Max
Household Income	$27,600	$24,600	$21,500	$1.00	$167,000
Household Size	4.12	4.00	1.15	1.00	9.0
Student Loan Amount	$20,300	$1810	$38,700	$0.00	$331,000

PSID = Panel Study of Income Dynamics.

Figure 1 indicates that between early wealth, enrollment wealth, and graduation wealth, wealth disparities are largest when children reach college age, and they are smallest about the time they graduate college. The median net worth for parents of college graduates when the college graduate is college age (i.e., enrollment wealth) and their parents are middle age is about $7652 if they are Black; it is about $161,602 if they are White (racial wealth gap of $153,950). Conversely, median wealth shortly after graduating college if they are Black is about $0; it is about $15,788 if they are White (racial wealth gap of $15,788). Similarly, a college graduate's wealth shortly after graduating college is less than when they are middle aged. For Black graduates, their graduation wealth is about $0, while their middle age wealth is about $3200. For White graduates, their graduation wealth is about $15,788 and their middle age wealth is about $185,000. This aligns with the life cycle hypothesis; as college graduates age, they build more wealth (Modigliani & Brumberg, 1954). Similar trends are observed when means are used.

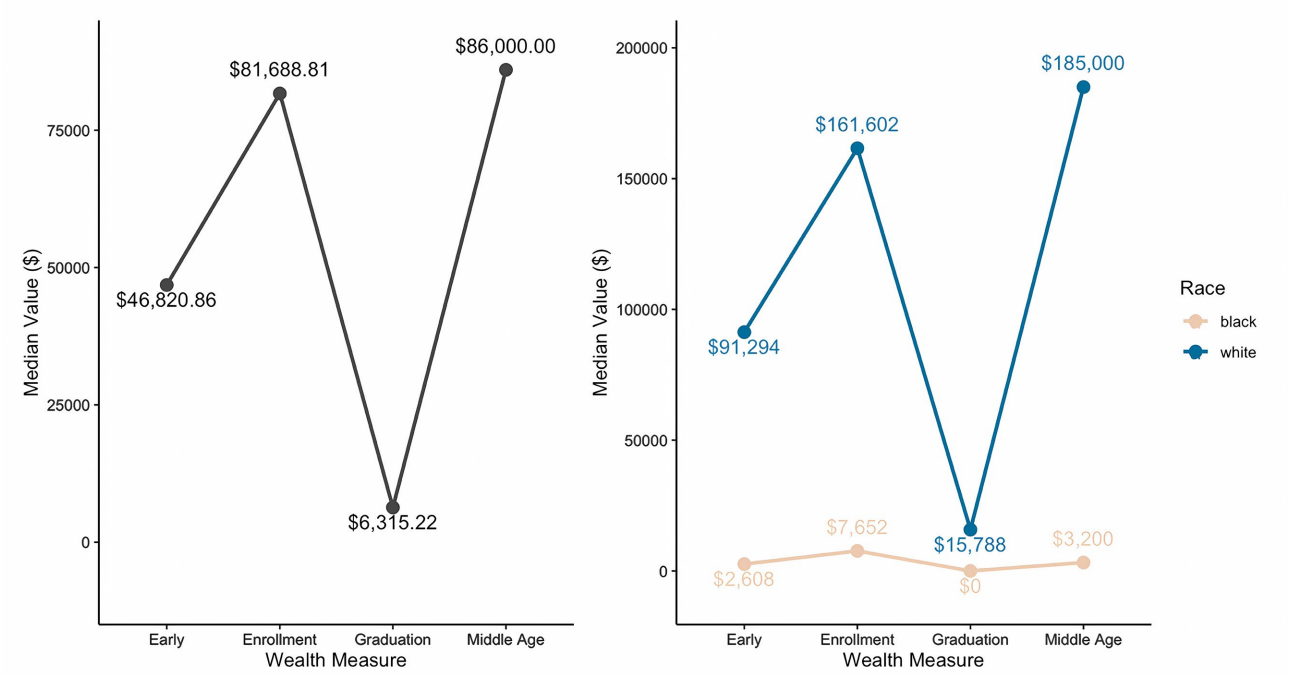

Figure 1. Median dollar values of wealth with aggregate (left) and by race (right), measured at four stages: early, college enrollment, college graduation, and middle age.

5.2. Median Net Worth Logistic Regression Results

In this section, odds ratios will be used to compare the odds of an event occurring between two groups. So, for example, what are the odds that White graduates are more likely to reach median net U.S. worth than Black graduates.

Race. White college graduates have nearly 3 times higher the odds than Black college graduates to have a net worth at or above the median (OR = 2.90, 95% CI [1.52, 5.53]; see Table 2).

Table 2. Logistic regression results for the Median Net Worth of U.S. Households (Panel Study of Income Dynamics).

Covariates	*B*	OR	LCI	UCI
(Intercept)	−4.176	0.015*	0.000	0.638
Household (Parent/Head's Information)				
Education Level				
High School or Less	0.092	1.096	0.649	1.851
Some College	0.130	1.139	0.717	1.809
Not Married	0.010	1.010	0.439	2.325
Unemployed	−0.576	0.562	0.295	1.073
Income	0.145	1.156	0.848	1.575
Household Size	0.068	1.070	0.890	1.287
College Graduate				
Male	0.004	1.004	0.664	1.517
Variables of Interest (College Graduate's Information)				
White	1.064	2.899**	1.519	5.532
Financial Literacy	0.150	1.162	0.758	1.781
Household's Amount of Student Loans	0.000	1.000	1.000	1.000
Wealth Variables				
Birth Wealth (Parents' Household Wealth)	0.016	1.016	0.979	1.055
Enrollment Wealth (Parents' Household Wealth)	0.050	1.052***	1.021	1.083
Graduation Wealth (Graduates' Household Wealth)	0.061	1.063***	1.044	1.081

PSID = Panel Study of Income Dynamics; OR = Odds Ratio; LCI = Lower Confidence Limit; UCI = Upper Confidence Limit. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Enrollment Wealth. For every unit increase in IHS transformed enrollment wealth a graduate has, the odds of their net worth being at or above the median net worth of U.S. households increases. Thus, holding other covariates constant, every additional $1 in enrollment wealth a graduate has is associated with a 5% increase in the odds of having their net worth being at or above the median net worth of U.S. households. So, as little as a $1 (5%), $500 (42%), $1000 (47%) $5000 (60%), or $10,000 (65%) increase in enrollment wealth increases the odds college age graduates reach median net worth by middle age. To understand how rapid a change this is from giving someone $1 to $500, it is 37% odds increase; from $500 to $5000, it is 18% odds increase. So, even having $500 put aside for when a graduate reaches college age can greatly impact on the odds that they reach the median net worth of U.S. households by the time they are early middle age.

A visual representation of the impact of having enrollment wealth (i.e., around the time a graduate reaches college age) can be seen in how sharp the rise in the odds curve is in Figure 2.

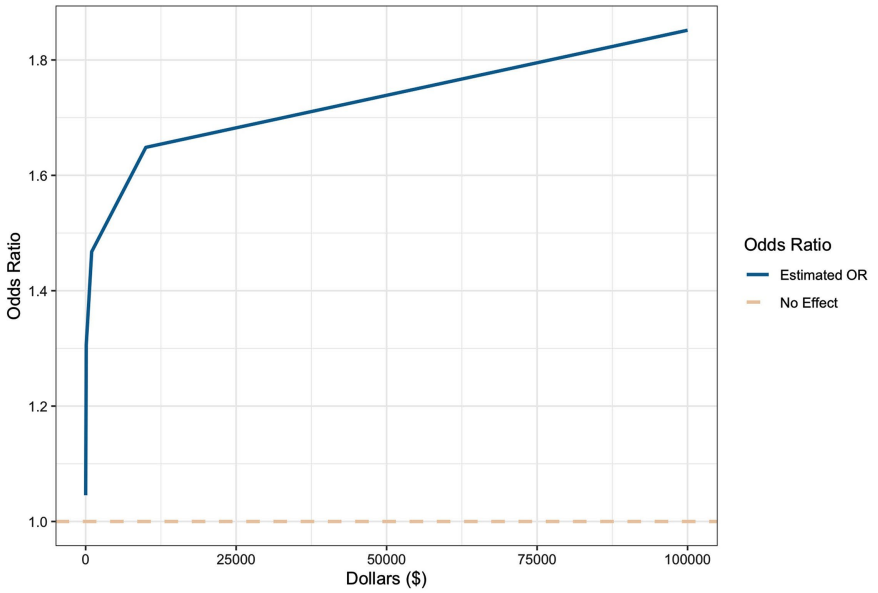

Figure 2. Impact of college enrollment wealth by dollar value on the odds of attaining median or higher net worth among U.S. households.

Graduation Wealth. For every unit increase in IHS transformed graduation wealth, a graduate increases the odds of net worth being at or above the median net worth of U.S. households. Thus, holding other covariates constant, for every additional $1 in post-college wealth a graduate has is associated with over 6% increase in the odds of having their net worth being at or above the median net worth of U.S. households. However, as little as a $1 (about 6%), $500 (52%), $1000 (59%), $5000 (75%), or $10,000 (82%) increase in graduation wealth is very important for increasing the odds a college graduate reaches the median net worth of U.S. households by middle age. To understand how rapid a change this is from giving someone $1 to $500, it is 46% odds increase; from $500 to $5000, it is 23% odds increase.

Like enrollment wealth, the importance of having graduation wealth (at the time of or shortly after graduating from college) can be seen in how sharp the rise in the odds curve is in Figure 3.

Controls. No controls are significant in this model apart from race and the variables of interest already discussed.

Marginal Effect Results for Enrollment Wealth by Race:

In the previous section, we presented results using odds ratios. These quantify the relative likelihood that, for example, a Black individual compared to a White individual is at or above the median net worth of U.S. households, but they do not directly represent probabilities. In this section we provide information on the marginal effects of enrollment wealth. Marginal effects tell us what percent change

in the probability of being at or above the median net worth of U.S. households occurs for every one dollar increase in enrollment wealth.

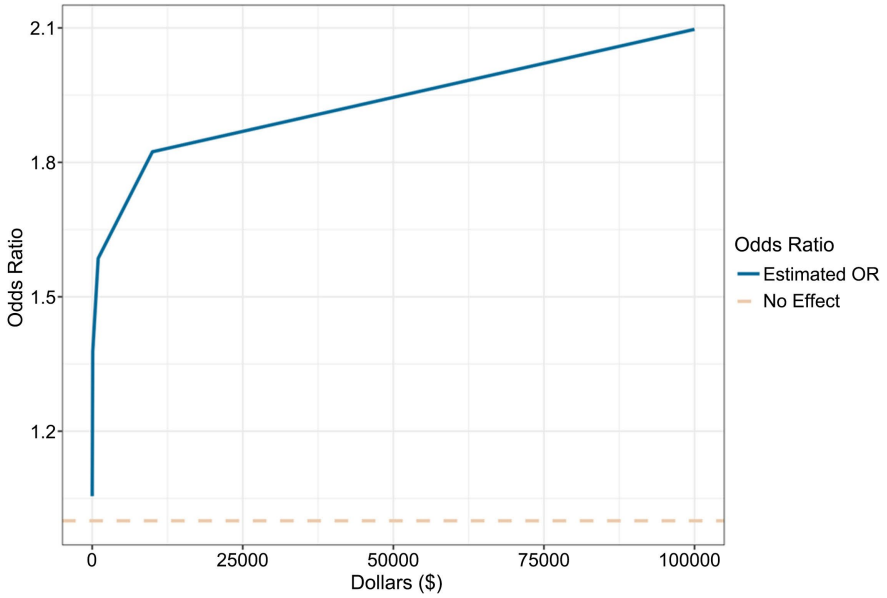

Figure 3. Impact of college graduation wealth by dollar value on the odds of attaining median or higher net worth among U.S. households.

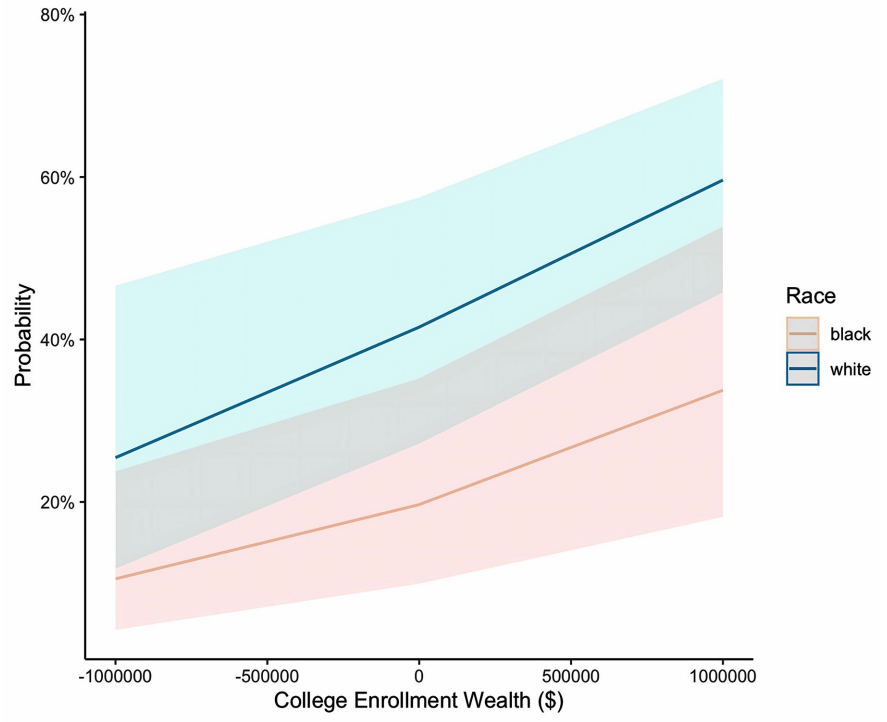

Figure 4. Estimated probability of having net worth at or above the U.S. median as a function of college enrollment wealth, stratified by race. The probabilities shown are based on estimates from a generalized estimating equation (GEE) model.

The marginal effects plot from **Figure 4** shows that for Black individuals, the

probability of having a net worth at or above the U.S. median initially rises from approximately 0.08 to 0.19—a notable increase of 11 percentage points—as enrollment wealth increases from –$1,000,000 to around $0. This probability then climbs more steeply, reaching approximately 0.37 as enrollment wealth increases from $0 to about $1,000,000.

So, for Black individuals' the probability of their net worth being at or above the median net worth of U.S. households increases at a slower rate when they have negative wealth (11% increase) than compared to when they have positive wealth (0.19 to 0.37; 18% increase). This is about a 7% difference. Overall, Black graduates experience an increase of about 29%. For White graduates, however, this probability increases at almost the same linear rate from approximately 0.25 to 0.61 as enrollment wealth progresses from –$1,000,000 to $1,000,000. A total increase of about 36%.

These findings suggest a Black college graduate whose family is in debt (i.e., has negative net worth) when they reach college age has a larger negative impact on the probability that they will be at or above the median net worth of U.S. households than it does a similarly situated White graduate. The evidence also indicates that having positive enrollment wealth is more important for Black graduates than their White counterparts. More specifically, findings show that, moving from negative to having positive enrollment wealth, White college age students have the same linear rate of impact on the probability; that is, it looks much more like a straight positive line upward. However, for Blacks, there is a different rate from negative to zero. But a different positive and steep upward line moving from zero to more positive enrollment wealth.

Moreover, there is about a 24% gap in the probability that a White graduate (0.61) with high enrollment wealth and a Black graduate (0.37) with high enrollment wealth is at or above the median net worth of U.S. households. Therefore, even when enrollment wealth is controlled for, there is still a sizable gap in the return on degree that White graduates receive when compared to Black graduates. This gap is erased when comparing a Black graduate (0.37) with high enrollment wealth and a White graduate (0.25) with low enrollment wealth; about a 12% gap.

Marginal Effect Results for Graduation Wealth by Race

Similarly, **Figure 5** shows the estimated probability of having net worth at or above the U.S. median as a function of college graduation wealth. For Black graduates, the probability of having a net worth at or above the median significantly increases from approximately 0.16 to 0.34. This reflects an 18% increase in the likelihood of graduation wealth progressing from –$25,000 to $25,000. After this wealth range, the probability nearly levels off. A similar pattern is observed for White graduates, where the probability of having a net worth at or above the median rises from about 0.28 to 0.60 (32% increase) under the same conditions.

Findings once again indicate that the floor is much lower for Black graduates (0.16) than it is for White graduates (0.28); a gap of about 12%. There is about a 26% gap in the probability that a high graduation wealth White graduate (0.60) and a high graduation wealth Black graduate (0.34) are at or above the median net

worth of U.S. households. Like enrollment wealth, even when graduation wealth is controlled for, there is still a sizable gap in the return on degree that White graduates receive when compared to Black graduates.

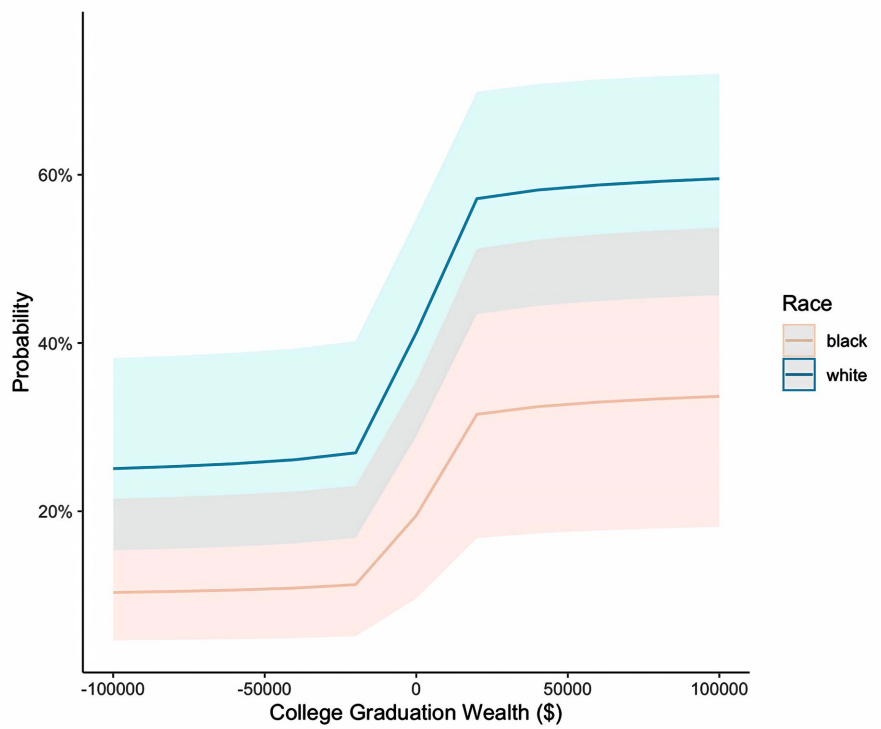

Figure 5. Estimated probability of having net worth at or above the U.S. median as a function of college graduation wealth, stratified by race. The probabilities shown are based on estimates from a generalized estimating equation (GEE) model.

And while the gap is smaller compared to enrollment wealth, it still persists. Specifically, the probability of being at or above the median net worth of U.S. households is approximately 0.28 for White graduates with low graduation wealth, compared to 0.34 for Black graduates with high graduation wealth. This suggests that even Black individuals with relatively high wealth at college graduation face a disadvantage, as their probability only slightly exceeds that of White individuals with low graduation wealth. The remaining gap reflects persistent disparities in the returns to college completion by race.

5.3. Survival Analysis

Kaplan-Meier Curves

Median wealth by race.

Figure 6 shows the Kaplan-Meier survival estimates of the time it takes black and white college graduates to reach the median net worth of U.S. households, over the study period. The year 2009 marks the beginning of the study (time = 0 years). The median survival time for White individuals is approximately 6 years, whereas Black individuals do not reach the median survival time at the end of the study period when they should be entering the established adulthood stage (ages

37 to 42). This indicates a substantial survival advantage for White individuals. Specifically, only 50% of White individuals are at risk of not having wealth at or above the median net worth of U.S. households 6 years after college graduation. In contrast, at the end of the study (13 years post-graduation), about 63% of Black individuals remain at risk, compared to 29% for White individuals at the end of 13 years.

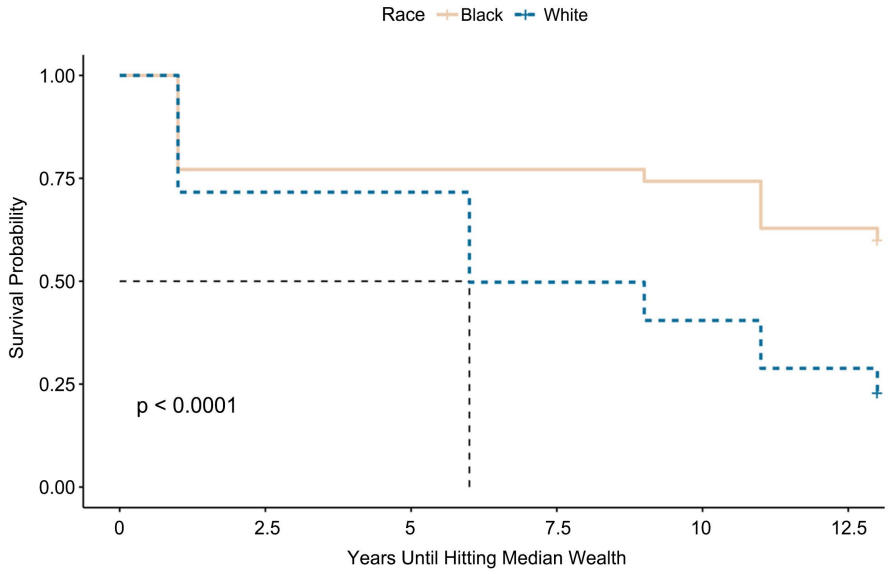

Figure 6. Kaplan-Meier survival curve estimates of time to reaching the median net worth of U.S. households, over the study period from 2009 to 2021 stratified by race. The year 2009 marks the beginning of the study (time = 0 years).

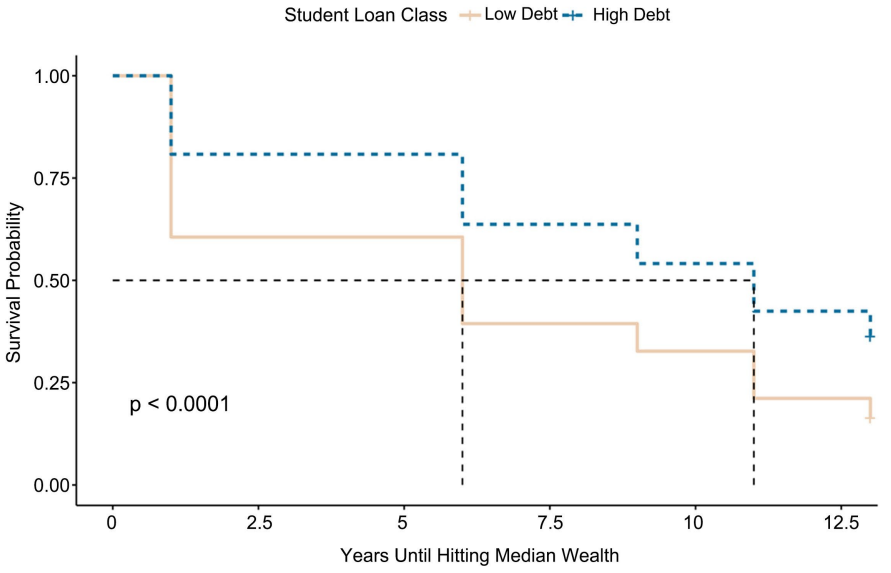

Figure 7. Kaplan-Meier survival curve estimates of the time to reaching the median net worth of U.S. households over the study period from 2009 to 2021, stratified by loan class. Households are categorized based on their 2011 student loan amounts: those with debt less than $10,000 are classified as low debt, and those with debt $10,000 or more as high debt. The year 2009 marks the start of the observation period (time = 0 years).

Median wealth by student loan class (less than 10k ~ low debt and vice versa).

Figure 7 shows Kaplan-Meier survival estimates for the time it takes college graduates to reach the median net worth of U.S. households, stratified by student loan burden. Households are categorized based on their 2011 student loan amounts: those with less than $10,000 are classified as low debt, and those with $10,000 or more as high debt. The survival curves indicate that individuals with lower student debt attain the median net worth more rapidly than their high-debt counterparts. By six years post-graduation, 50% of low-debt individuals have reached the median net worth, whereas it takes approximately eleven years for the same proportion of high-debt individuals to do so. By the end of the study period—twelve and a half years after graduation—only 21% of low-debt individuals remain at risk of not reaching the median net worth, compared to 42% among the high-debt group.

Cox-Proportional Hazard Model

Hazard Ratio Results

We discuss the results from our Cox-PH models from Table 3 as follows:

Table 3. Survival analysis, cox-proportional hazard model for the median net worth of U.S. households (panel study of income dynamics).

Covariates	*B*	HR	LCI	UCI
Household (Parent/Head's Information)				
Education Level				
High School or Less	0.077	1.080	0.717	1.627
Some College	0.048	1.049	0.725	1.517
Not Married	−0.241	0.785	0.322	1.919
Unemployed	−0.165	0.848	0.477	1.507
Income	0.062	1.064	0.837	1.351
Household Size	−0.029	0.971	0.822	1.148
College Graduate				
Male	0.045	1.046	0.753	1.454
Variables of Interest (College Graduate's Information)				
White	0.684	1.981*	1.046	3.752
Financial Literacy	0.043	1.044	0.746	1.461
Household's Amount of Student Loans	0.000	1.000	1.000	1.000
Wealth Variables				
Birth Wealth (Parents' Household Wealth)	0.005	1.005	0.975	1.036
Enrollment Wealth (Parents' Household Wealth)	0.017	1.017	0.982	1.055
Graduation Wealth (Graduates' Household Wealth)	0.468	1.597***	1.407	1.812

PSID = Panel Study of Income Dynamics; HR = Hazard Ratio; LCI = Lower Confidence Limit; UCI = Upper Confidence Limit. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Race. Being a White college graduate is associated with nearly double the rate of reaching the median net worth of U.S. households compared to Black college graduates. The estimated hazard ratio (HR = 1.98, 95% CI [1.05, 3.75]) suggests that, at any point in time, White graduates have approximately twice the hazard—or instantaneous rate—of attaining the median net worth, indicating a significantly faster progression toward economic security relative to their Black counterparts.

Graduation Wealth. IHS transformed graduation wealth is associated with an increased hazard of reaching the median net worth of U.S. households. However, this covariate fails the Cox proportional hazards assumption, necessitating the incorporation of time-varying measures to allow its association with the likelihood of reaching the median net worth of U.S. households to vary over time. With this adjustment, graduation wealth still shows a strong relationship with an increased risk of reaching the median net worth of U.S. households. A higher value of IHS transformed graduation wealth significantly increases the rate of reaching the median net worth of U.S. households shortly after college graduation, with over a 60% increase in the rate right after college. However, this effect diminishes over time and reverses towards the end of the study (see Figure 8).

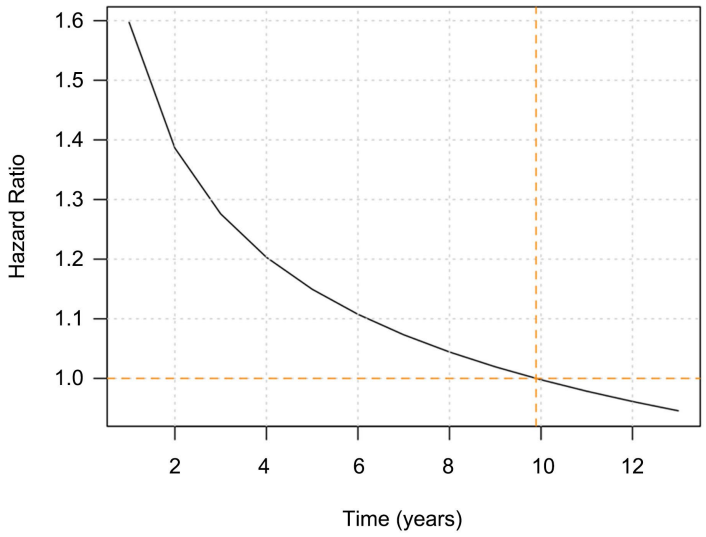

Figure 8. Time-varying hazard ratio estimates for IHS-transformed graduation wealth, showing its changing effect on reaching the median net worth of U.S. households over time.

To better understand the impact of investing real dollar amounts in graduation wealth, we present corresponding dollar-based hazard ratios in Figure 9. For example, providing a college graduate with an additional $1000 in graduation wealth increases their hazard of reaching the median net worth of U.S. households by a factor of 35 within the first year after graduation. By year six, this effect declines to a factor of 2. This suggests that not only is college completion wealth important in increasing the rate of reaching the median net worth of U.S. households for college graduates (or launching into established adulthood), but also that provid-

ing this wealth early matters significantly more than doing so later. Figure 9 also illustrates the effects of $1, $500, $5000, and $10,000 increases in graduation wealth on a college graduate's rate of reaching the U.S. median net worth.

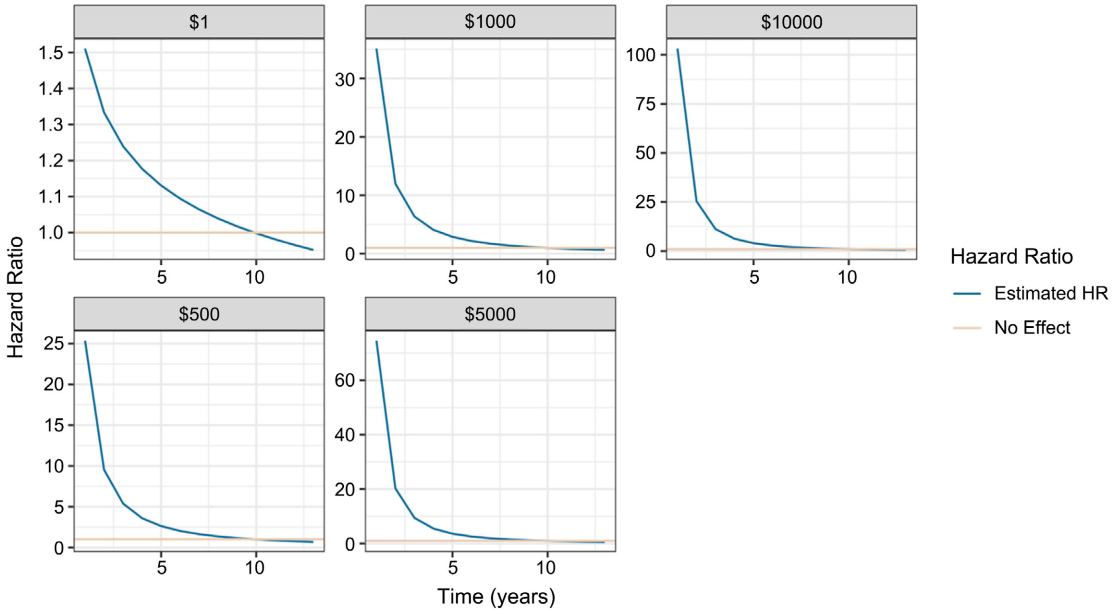

Figure 9. Time-varying hazard ratios associated with different dollar amounts of graduation wealth, showing how early graduation wealth influences the likelihood of reaching the median net worth of U.S. households.

Study 2: National Longitudinal Youth Study 1979—Robust Test

Study 2 provides a test of robustness of the results from Study 1. Robust tests determine whether findings remain similar when using a similar data set with a different distribution (Huber & Ronchetti, 2009).

Research Questions

The NLYS79 only has the wealth of adult child after they graduate college (age 25), they do not have their parent's household wealth. As in Study 1, the research questions examine whether a college graduate launches into the pre-retirement stage of their life (late middle age, 55 - 64) when they are paying off mortgages and other debts, and beginning to plan for retirement. The main way in this study, whether a college graduate launches into pre-retirement is operationalized as whether they are at or above the median net worth of U.S. households by late middle age.

Logistic Analysis Questions: Odds Ratios

1) Does being Black decrease the odds a college graduate launches into the pre-retirement stage of their life, between ages 55 - 64?

2) Does having a higher financial literacy score increase the odds a college graduate launches into the pre-retirement stage of their life, between ages 55 - 64?

3) Does the college graduate's own household wealth (graduation wealth) around the time they graduate (age 25) increase the odds they launch into pre-retirement stage of their life (late middle age 55 - 64)?

Survival Analysis Questions: Cox-Proportional Hazard Model

In Study 2 Kaplan-Meier Curves cannot be estimated in the NLSY79 sample because it is not supported in analyses using multiple imputations.

1) Does being Black increase the time it takes to launch into the pre-retirement stage of their life?

2) Does being financially literate reduce the time it takes to launch into the pre-retirement stage of their life?

3) Does having higher amounts of birth wealth, enrollment wealth, or adult wealth reduce the time it takes to launch into the pre-retirement stage of their life?

6. Data, Methods and Analysis Plan

6.1. Data

This study extends the analysis conducted with the PSID by incorporating data from another nationally representative source, the National Longitudinal Survey of Youth 1979 (NLSY79). The NLSY79, administered by the Bureau of Labor Statistics, is part of the broader National Longitudinal Surveys (NLS) program, which tracks the labor market trajectories and other key life experiences of American individuals over time. This longitudinal dataset follows a cohort of 12,686 individuals who were between the ages of 14 and 22 in 1979, capturing information on education, employment, family structure, and financial well-being. Periodic follow-ups have been conducted since the study's inception. By 2020, respondents were between 55 and 64 years old. Given the study's focus on wealth accumulation and economic mobility, we specifically utilize net worth and income data from the NLSY79. The dataset is publicly accessible, and further details regarding its structure and methodology can be found on the NLS program's official website.

6.2. Sample

For this analysis, we restrict the sample to individuals who attained a four-year college degree by the age of 25, as this age range aligns with typical undergraduate completion. Additionally, we include individuals who pursued postgraduate education, recognizing that graduate degrees are a common pathway for college graduates and may influence wealth accumulation. To better align with Study 1, we restrict race to Black and White college graduates. The longitudinal structure of the dataset enables us to track economic outcomes over a 35-year period, using the year in which each respondent turned 25 as the baseline. After applying these criteria, the final analytical sample consists of 1385 respondents.

7. Measures

7.1. Outcomes: Measuring the Return on Degree

Reaching the Median Net Worth in U.S. Households. As in Study 1, to assess the return on degree, we measure whether an individual's household net worth surpasses the U.S. median in a given year.

7.2. Variables of Interest

From the net worth data, like Study 1, we derive a measure termed "Graduation Wealth", which corresponds to the net worth level attained by the age typically associated with college graduation (i.e., by age 25). However, the NLSY79 does not provide parent wealth data, so we cannot examine early wealth or enrollment wealth in Study 2.

In the NLSY79, net worth is defined as the total value of an individual's assets minus their outstanding liabilities. In the NLSY79, detailed information on various asset classes and debts was collected during multiple periods (1985-1990, 1992-1994, 1996, 1998, 2000, 2004, and 2008) (Bureau of Labor Statistics, 2025). It should be noted that asset data were not collected in 1991, 2002, 2006, or 2010, resulting in missing net worth observations for those years.

In each relevant survey wave, respondents provided estimates for the value of key assets—including homes, savings, business interests, and automobiles—as well as for any mortgages or other forms of debt. Consequently, for the survey years in which asset data are available (1985-1990, 1992-2000, 2004, 2008, 2012, 2016, and 2020), net worth is computed as the difference between total assets and total liabilities (Bureau of Labor Statistics, 2025). To protect the respondent's anonymity, survey administrators applied top-coding procedures beginning in 1996; values above the 98th percentile were replaced by the average value of observations exceeding that threshold. Furthermore, net worth figures are adjusted for inflation, with values converted to 2020 dollars using the Consumer Price Index (CPI).

Financial Literacy. Financial literacy is measured differently in Study 2 than it was in Study 1. In 2012, a new module comprising eight questions on financial literacy and practices was introduced to all respondents. These questions assess respondents' preparedness for financial emergencies, their ability to monitor and manage financial matters, and their understanding of fundamental financial concepts. Originally developed for the Health and Retirement Study (2006) and the Financial Capability Study, this module complements existing questions on wills and estates. Its inclusion aligns with broader research efforts to monitor financial literacy and preparedness, particularly as individuals begin to plan for retirement during their 50s and 60s. For respondents who did not complete the module in 2012, these items were subsequently administered in 2014, 2016, and 2018, ensuring that nearly all participants had an opportunity to provide responses. Importantly, for conducting longitudinal analysis, research shows that financial literacy is relatively stable over time (Angrisani et al., 2023). Therefore, it can be used in longitudinal analysis even if it is not measured every year.

To quantify financial literacy, we employ a two-parameter logistic (2-PL) item response theory (IRT) model to derive a single latent factor score from the eight questions (Vieira et al., 2020). The 2-PL IRT model allows us to account for both the difficulty of each question and its discrimination power, thereby providing a more nuanced and reliable measure of the underlying financial literacy construct.

This approach not only adjusts for potential measurement error but also ensures that variations in individual responses are appropriately weighted in the estimation process. Model fit statistics and sensitivity analyses further support the robustness and validity of this latent score, making it a valuable predictor of subsequent financial outcomes.

7.3. Control Variables

Household income is recorded annually from 1979 to 1994 and biennially thereafter. In each instance, the income reported reflects earnings from the preceding year. These income figures are similarly adjusted for inflation; for example, income reported in 1979, representing earnings from 1978, is converted to 2020 dollars using the appropriate CPI-based adjustment. From this measure, we also extract "Graduation Income", defined as the initial income recorded following college graduation. To address the skewed distributions observed in both wealth and income—and to appropriately handle instances of negative wealth—both Graduation Wealth and Graduation Income are transformed using the inverse hyperbolic sine (IHS) function.

In addition to household income, to rigorously assess the influence of wealth variables on wealth accumulation, this study integrates an extensive set of covariates measured at the time of college graduation. Specifically, race/ethnicity is classified as Black or White, and gender is categorized as male or female. Geographic location is represented by indicators for the Northeast, North Central, West, and South regions. Educational attainment is differentiated by designating 16 years of schooling as college graduate status, with postgraduate education defined as more than 16 years. Marital status is simplified into a binary variable (married versus not married), while urbanity is captured by classifying the residence as rural or urban. Family size, measured by the number of individuals in the household, is also included. Collectively, these variables establish a comprehensive baseline for analyzing the pathways to reaching median net worth, income, and overall asset empowerment over time.

Occupational categories, collected at each interview and recoded into six distinct groups, are defined as follows: "Managerial/Professional" (managerial and professional specialties); "Technical/Clerical & Sales" (technical, sales, and administrative support/clerk positions); "Service" (service occupations); "Agricultural/Resource-based" (farming, forestry, and fishing); "Skilled Trades" (precision production, craft, and repair roles); and "Production/Manual Labor" (machine operation, assembly, inspection, transportation, material moving, and related labor-intensive positions).

7.4. Missing Data and Imputation

The NLSY79 dataset comprises 23 measurement years; however, the extent of available data varies considerably among respondents, particularly for key variables such as net worth, net income, and financial literacy. Notably, 423 out of the

1385 respondents provided no responses to the eight financial literacy items, and 360 respondents exhibited missing values for more than half of their income and wealth measurements. Considering these data quality concerns, we excluded respondents meeting these criteria, which reduced our analytical sample to 841 individuals. To address the remaining missing values, we generated 10 multiply imputed datasets using a bootstrap expectation-maximization (EM) algorithm implemented via the Amelia package under the assumption that the data are missing at random (MAR) (Honaker et al., 2011). This approach enhances our analysis by capturing both the inherent parameter variability and the additional uncertainty introduced by the imputation process. For all subsequent analyses, parameter estimates, and standard errors were computed in accordance with Rubin's rules (Rubin, 2018). Similar to Study 1, we fit the panel logistic regression using the GEE and cox-PH models and discuss the results below.

Contrary to Study 1, in Study 2 marginal effects and Kaplan-Meier Curves cannot be estimated in the NLSY79 sample because it is not supported in analyses using multiple imputations.

8. Results

Descriptive Results

Table 4 contains descriptive results for sample. To save space they are not discussed in detail here.

Table 4. Baseline descriptive statistics for control variables (NLSY79).

	N	%
Gender		
Male	416	50
Female	425	50
Race		
White	673	80
Black	168	20
Marital Status		
Married	299	36
Not Married	542	64
Education Level		
College Graduate	623	74
More than 4-years	218	26
Occupational Category		
Managerial/Professional	405	48
Technical/Clerical & Sales	308	37
Service	66	8

Continued

Agricultural		5		1	
Skilled Trades		19		2	
Production/Manual Labor		29		4	
Geographic Region					
North		253		30	
East		173		21	
South		285		33	
West		130		16	
Urban					
Urban		729		87	
Rural		105		13	
Variable Name	**Mean**	**Median**	**SD**	**Min**	**Max**
Household Income (across all years)	$101,000	$63,400	$135,000	$0	$1,060,000
Household Size	2	2	0.661	25	27
Financial Literacy	0	0.024		−2.715	1.700

NLSY79 = National Longitudinal Survey of Youth 1979.

Logistic Regression Results: Median Net Worth

We discuss the results for the logistic model from Table 5 as follows:

Table 5. Logistic regression results for the Median Net Worth of U.S. Households (NLSY79).

Covariates	*B*	OR	LCI	UCI
(Intercept)	−1.111	0.329***	0.179	0.604
Household (Adult Child Information)				
4-year Degree (vs more than 4-years)	0.063	---	0.951	1.187
Not married (vs married)	0.311	1.365***	1.163	1.601
Income	0.042	---	0.996	1.091
Household Size	−0.061	0.941*	0.888	0.997
Geographic Region (East)				
North	−0.264**	0.768**	0.629	0.938
South	−0.234	0.792*	0.645	0.971
West	−0.318	0.728*	0.571	0.927
Urban (vs Rural)	0.074	---	0.877	1.323
Male (vs Female)	0.023	---	0.885	1.183

Continued

Occupational Category (vs Managerial/ Professional)				
Technical/Clerical & Sales	−0.152	---	0.737	1.000
Service	−0.224	---	0.607	1.053
Agricultural	−0.221	---	0.286	2.247
Skilled Trades	0.034	---	0.648	1.651
Production/Manual Labor	0.289	---	0.942	1.891
Variables of Interest (College Graduate's Information)				
White (vs Black)	0.860	2.363***	1.950	2.862
Financial Literacy	0.349	1.418***	1.307	1.540
Wealth Variable				
Graduation Wealth (Graduates' Household Wealth)	0.032	1.033***	1.023	1.043

NLSY79 = National Longitudinal Survey of Youth 1979; OR = Odds Ratio; LCI = Lower Confidence Limit; UCI = Upper Confidence Limit. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Race. White college graduates have about 2.4 times higher odds to have their net worth being at or above the median net worth than Black college graduates (OR = 2.36, 95% CI [1.95, 2.86]).

Financial Literacy. For every unit increase in financial literacy is associated with about a 42% increase in the odds of reaching the median net worth of U.S. households (OR = 1.418, 95% CI [1.307, 1.540]).

Graduation Wealth. Graduation wealth also has a positive association with reaching the median net worth of U.S. households. For every unit increase in his transformed graduation wealth a graduate has, their odds of being at or above the median U.S. net worth increases by about 3% (OR = 1.033, 95% CI [1.023, 1.043]). However, as little as a $1 (about 3%), $500 (25%), $1000 (28%), $5000 (35%), or $10,000 (38%) increase in graduation wealth is very important for increasing the odds a college graduate reaches the median net worth of U.S. households by middle age. To understand how rapid a change this is from giving someone $1 to $500, it is 22% odds increase; from $500 to $5000, it is 10% odds increase. A visual representation of the impact of having graduation wealth (i.e., around the time a graduate reaches college age) can be seen in the sharp rise in the odds curve in Figure 10.

Controls. In addition, several control variables are significant. For every additional member of a family the odds of reaching the median net worth of U.S. households decreases by about 6% (OR = 0.941, 95% CI [0.888, 0.997]). College graduates residing outside the northeastern region of the country face significantly lower odds of reaching the median net worth of U.S. households. In addition, those who marry shortly after college are about 1.4 times more likely to

achieve the median U.S. net worth (OR = 1.365, 95% CI [1.163, 1.601]).

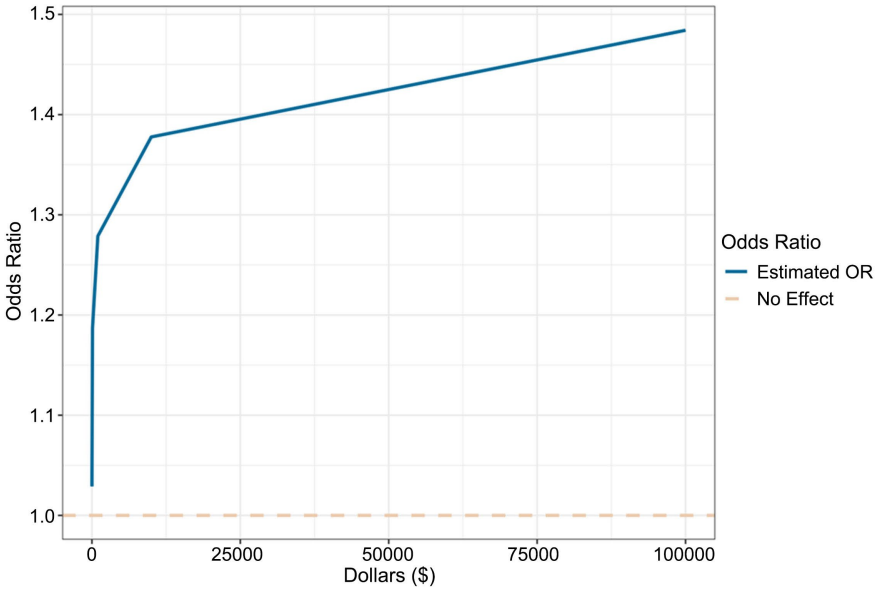

Figure 10. Impact of college graduation wealth by dollar value on the odds of attaining median or higher net worth among U.S. households.

Hazard Ratio Results. The IHS-transformed graduation wealth is positively associated with an increased hazard of reaching the median net worth of U.S. households (see Table 6).

Table 6. Survival analysis, cox-proportional hazard model for the median net worth of U.S. households (NLSY79).

Covariates	*B*	HR	LCI	UCI
Household (Adult Child Information)				
Education Level (vs 4 year or more)	0.109	---	0.978	1.272
Not Married (vs Married)	0189	1.207*	1.002	1.455
Income	0.012	---	0.958	1.069
Household Size	−0.053	---	0.889	1.011
Geographic Region (East)				
North	−0.297	0.743*	0.582	0.949
South	−0.259	0.772*	0.616	0.967
West	−0.411	0.663**	0.506	0.869
Urban (vs Rural)	0.012	---	0.787	1.302
Male (vs Female)	0.054	---	0.869	1.281
Occupational Category (vs Managerial/Professional)				
Technical/Clerical & Sales	−0.109	---	0.747	1.076
Service	−0.058	---	0.703	1.268

Continued

Agricultural	−0.384	---	0.210	2.209
Skilled Trades	−0.010	---	0.597	1.641
Production/Manual Labor	0.275	---	0.840	2.064
Variables of Interest (College Graduate's Information)				
White (vs Black)	0526	1.692***	1.342	2.213
Financial Literacy	0.172	1.188***	1.077	1.310
Wealth Variable				
Graduation Wealth (Graduates' Household Wealth)	0.218	1.243***	1.185	1.304

NLSY79 = National Longitudinal Survey of Youth 1979; HR = Hazard Ratio; LCI = Lower Confidence Limit; UCI = Upper Confidence Limit. HR = Hazard Ratio; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Race. Being a White college graduate increases the hazard by a factor of about 1.7, indicating a higher rate of reaching the median net worth of U.S. households faster compared to Black college graduates. Specifically, being a White college graduate is associated with a significantly higher chance of reaching the median US net worth (HR = 1.692, 95% CI [1.342, 2.134]).

Financial Literacy. Higher financial literacy is linked to an increased rate of reaching the median U.S. net worth. Specifically, each unit increase in financial literacy is associated with a 19% higher hazard of reaching the median net worth (HR = 1.188, 95% CI [1.077, 1.310]).

Graduation Wealth. The IHS-transformed college completion wealth is positively associated with an increased hazard of reaching the median U.S. net worth. However, this covariate violates the Cox proportional hazards assumption across all 10 imputed datasets. To address this, time-varying measures are incorporated, allowing its association with the hazard of reaching the median U.S. net worth to change over time. Even with this adjustment, graduation wealth remains strongly linked to an increased hazard of reaching the median net worth of U.S. households. For example, an additional $1000 in graduation wealth just one year after graduation significantly increases this rate by a factor of 5.23 (exp (0.22 * arcsinh (1000))).

Control Variables. Individuals residing outside the northeastern region face significantly lower hazards of reaching the median net worth of U.S. households. Consistent with previous findings from the logistic model, those who marry shortly after college are about 1.2 times faster to achieve the median U.S. net worth (HR = 1.207, 95% CI [1.002, 1.454]), potentially due to the additional base assets contributed by a spouse.

9. Discussion

This study focuses on America's return on degree problem. Increasingly, Ameri-

cans have begun to question whether college still pays off; that is, whether the return on degree is high enough to outweigh the cost of college (Tough, 2023). We use data from the Panel Study of Income Dynamics (PSID) for the main analysis. We use data from the National Longitudinal Survey of Youth 1979 (NLSY79) to conduct a robust check of the findings to further determine the stability and generalizability of the findings. We refer to this as Study 2. The main analysis examines whether college graduates are able to successfully launch into financially established adulthood by the time they reach middle age (37 - 42). Study 2 uses NLSY79 data to examine whether college graduates are able to successfully launch into the pre-retirement stage of their lives (55 - 64). These two stages of adult development provide context for understanding the importance of the return on degree for college graduates and how it can have impacts that extend beyond graduation to their children and parents as they age. In this way, this study may help illuminate how education can become the "great equalizer" society hoped it would be.

In addition to examining the effect that wealth has on strengthening the return on degree, this study also examines whether wealth at different stages of a child's development has a stronger association with the return on degree than do other stages of development. We use birth wealth (ages 0 - 3), enrollment wealth (age 18), and graduation wealth (age 25) to represent three key stages of transitions children undergo. Among the three wealth variables of interest, birth wealth is not significant in any of the models and thus is not discussed here. The effects of birth wealth might be more important for predicting pre-college and college outcomes than it is for post-graduation wealth outcomes at least when controlling for the other wealth variables. There is a sizable body of research that examines the impact that birth wealth has on pre-college (e.g., Loke & Sacco, 2011) and college outcomes of children (e.g., Pfeffer, 2018). Moreover, the findings from Study 1 largely mirror those from Study 2 with the exception of financial literacy findings. So, we will only discuss Study 2's financial literacy findings and focus on discussing Study 1's findings generally.

9.1. College Enrollment Wealth

College enrollment wealth refers to the amount of wealth a graduate's parents had about the time they were entering college age. We find that as little as a $1 (5%), $500 (42%), $1000 (47%) $5000 (60%), or $10,000 (65%) increase in enrollment wealth is significantly associated with increasing the odds a college graduate reaches median net worth of U.S. households by middle age. There is a rapid change that occurs between a graduate having a $1 to $500 of enrollment wealth. The odds of launching into the financially established adulthood stage increase by 37%, from $500 to $5000, an increase of 18%. So, even having $500 put aside for when a graduate reaches college age can have a large impact on the odds that they reach the median net worth of U.S. households by the time they are middle age. These small-dollar findings are like findings that show even relatively small

amounts of parental financial support for their child's education have a positive effect on a graduate's wealth. For example, Rauscher (2016) finds that parents' education support just had to exceed $600 to have a positive impact on the adult children's income, and about $2200 to have a positive impact on their wealth.

9.2. Graduate Wealth

College graduate wealth in this study is the amount of wealth graduates themselves have shortly after graduating from college. We posit that this wealth can be used to help graduates leverage their college degree to produce additional wealth. In support of this theory, like college enrollment wealth, findings on graduation wealth indicate that even small amounts are positively associated with a graduate's return on degree. That is, the more wealth graduates have shortly after completing college, the more wealth they produce from their degree.

The Cox Proportional Hazards (Cox PH) model allows the researcher to, for example, examine the relationship between graduate wealth and the risk of failing to launch while controlling for multiple of other factors (Kelly & Lim, 2000). Graduation wealth is the only wealth variable that was significant in the Cox-Proportional model; neither birth wealth nor enrollment wealth are significant. Findings indicate that giving a college graduate an additional $1000 increases the likelihood they will reach the median net worth of U.S. households by 35 times within a year after college. After 6 years, giving a graduate an additional $1000 increases the likelihood they will reach the median net worth of U.S. households by only two times and by ten years there are no more positive effects. More specifically, findings indicate that the most impactful time for college graduates to receive wealth that will reduce the risk of failing to launch while maximizing their return on degree might be between ages 25 to 30. Findings from Study 2 support Study 1's findings on graduate wealth.

9.3. The Racial Return on Degree Wealth Gap

Black college graduates' parents have an average (SD) of $21,500 (107,000) in net worth at the time they graduated from college (age 25) compared to their White counterparts who have a $102,000 (370,000). The Black/White wealth gap is well documented (e.g., Oliver & Shapiro, 1995). Further, findings from this study indicate that college graduates who are Black have a much lower probability than their White counterparts to launch into the financially established adult stage (early middle 37 - 42). Failure to launch indicates that graduates are receiving a low return on degree. At the end of the study (13 years post-graduation), about 63% of Black individuals remain at risk, compared to 29% for White individuals at the end of 13 years of not launching in the financially established adult stage of their lives. The finding that there is a Black/White gap in reaching median household net worth by middle age is consistent with general research findings that show there is a large Black/White wealth gap (Emmons & Noeth, 2015; Hamilton et al., 2015; Oliver & Shapiro, 1995).

9.4. Student Loan Debt

Kaplan-Meier Curve results indicate that college graduates with low household college debt (i.e., below $10,000) achieve the median net worth of U.S. households more quickly than those with high debt. By 6 years after graduation, half of graduates with less than $10,000 in student loans left to pay have reached the median net worth of U.S. households, while those with high college debt take approximately 11 years to reach the same level. At the end of the study, 13 years post-graduation, only 21% of college graduates with less than $10,000 in student loan debt remain at risk of not launching into the financially established adult stage of their lives, compared to 42% of those with high debt who are still at risk. This is also consistent with existing research on the negative effects of student loans on wealth accumulation of college graduates (Elliott & Nam, 2013; Elliott & Rauscher, 2018; Hiltonsmith, 2013). For example, Elliott and Rauscher (2018) find that having $10,000 in student loan debt results in an 18% decrease in the rate of achieving median net worth.

9.5. Financial Literacy

Financial Literacy is measured differently in Study 1 and 2 because of available data. In study one, using the PSID, financial literacy is a binary variable created from three commonly used questions for measuring financial literacy (Lusardi & Mitchell, 2007; Schmeiser & Seligman, 2013). Using this variable, we find that financial literacy is not a significant predictor of return on degree when graduate wealth is included in the model. However, when graduate wealth is not included, it is a significant predictor.

In Study 2, financial literacy is measured as a continuous variable consisting of eight questions. A two-parameter logistic (2-PL) item response theory (IRT) model was used to derive a single latent factor score from the eight questions (Vieira et al., 2020). Using this measure, financial literacy emerges as a significant predictor of the return on a college degree in terms of reaching the U.S. household median net worth, in both the logistic and Cox models. For example, findings indicate for every unit increase in financial literacy the odds of reaching the median net worth of U.S. households increase by about a 42%. This is also consistent with past research that shows financial literacy is an important predictor of positive economic outcomes. For example, Van Rooij, Lusardi, and Alessie (2012) find that lack of financial knowledge is negatively associated with wealth accumulation.

9.6. Implications for Policy

Findings from this study indicate that enrollment wealth may play an important role in whether college graduates receive a substantial enough return on degree to allow them to launch into becoming a financially established adult. The timing of enrollment wealth mimics the timing of many popular wealth building policies. In this study we have talked about both Children's Savings Accounts and Baby

Bonds. In as much as enrollment wealth can be considered a proxy for CSAs or Baby Bond like disbursements, we suggest, an implication of this finding is that policies that help parents build wealth for their children when they turn age 18 can strengthen the return on degree and help college graduates launch into being financially established adults in their early middle age.

9.6.1. Even Small Amounts Can Have a Big Impact

An important finding of this study that has policy implications is that even small amounts (e.g., $1, $500, $1000) of enrollment wealth is associated with higher odds of college graduates successfully launching into the financially established adult stage of life. A policy implication of this is, wealth building programs like CSAs, even though they start out with small initial deposits, have the potential to have financial impacts that go beyond college, extending well into early middle age. And so, even the small-dollar version of CSAs has the potential to be an effective part of a policy strategy for reducing wealth inequality.

Further, findings that show participants in CSA programs like SEED for Oklahoma (SEED OK), a statewide experiment, will have improved odds of becoming a financially established adult by early middle age. Total SEED OK 529 assets for the average treatment child are about $4373 at age 14, the latest age we have data for. Among savers (i.e., contributed at least once), the total SEED OK 529 assets are about $14,133. Using the average amount saved in SEED OK, if they are non-savers who graduate from college, we can speculate that the odds of a successful launch will increase by 74%; if they are a saver, by 81% according to the findings in this study. Given this, CSAs should not only be seen by policymakers as a tool for improving college outcomes (e.g., Elliott et al., 2024), and strengthening the return on degree, but also a tool for potentially reducing wealth inequality in America.

9.6.2. Graduation Wealth Maybe Key to Reducing Wealth Inequality

Findings from Study 1 and 2 suggest that the timing of wealth payouts is also important for strengthening the return on degree and giving college graduates the best opportunity to successfully make important developmental transitions in adulthood. Typical well known wealth building programs such as CSAs and Baby Bonds often restrict children from using money until they turn 18. However, findings from this study indicate that the amount of wealth college graduates leave college with (i.e. graduation wealth) is a strong predictor of whether college graduates fail to launch. More specifically, findings from this study indicate that giving a college graduate an additional $1000 increases the hazard they will reach the median net worth of U.S. households by 35 times within a year after college. After 6 years, giving a graduate an additional $1000 increases the hazard they will reach the median net worth by only two times, and by 10 years there are no more positive effects.

A reason for smaller amounts and why a transfer soon after graduating from college (25 - 30) may have an outsized impact, is because the graduation wealth

gap is much smaller than it is during other developmental stages. Between early wealth, enrollment wealth, and graduation wealth, wealth disparities are largest (Black/White wealth gap: mean $493,600; median $154,350) when children reach college age, and they are at their smallest about the time they graduate college (Black/White wealth gap: mean $80,500; median $15,800). This aligns with a life cycle theory of wealth building (Modigliani & Brumberg, 1954). The life cycle theory suggests that young parents will have less wealth when they are early in their careers, their incomes are low, they are getting married, starting a family, buying a home and so forth. However, as they age, their income increases, and they rely less on credit and begin to build wealth. This is like what we know about the return on degree as well.

Further, according to the U.S. Bureau of Labor Statistics (2014) the time when most young adults move out of their parents' home is between the ages of 24 and 27. Further, most students earning a bachelor's degree in the U.S. graduate by age 24 (Finn, 2023). In line with this timing of a second disbursement, Baum (2014) finds that the "earnings premium for a college education grows as workers age. Full-time workers ages 25 to 34 with bachelor's degrees have a 53 percent earnings premium over high school graduates. That premium grows to 72 percent for those ages 35 to 44, and to 79 percent for workers ages 45 to 54" (para 5). Given that the premium on a bachelor's degree is at its least from age 25 to 34, about the time most children are setting out to become independent from their families, a wealth infusion at this time might be most efficient and effective at strengthening the return on a degree. Together, this suggests that shortly after graduation, between the ages of 25 and 30, might be the cheapest and most effective time to strengthen the return on a degree and ultimately reduce the wealth gap.

Therefore, the potentially cheapest and most effective time to provide a wealth transfer that will maximize the return on degree, and reduce wealth inequality, might be between ages 25 to 30. This suggests that wealth-building policies whose goal is to strengthen the return on degree and help children successfully launch into becoming financially established adults might want to strongly consider targeting not only providing wealth at age 18 but again around the ages of 25 to 30.

9.6.3. Financial Literacy

In 2022, about 23% of high school students (or nearly 1 in 4) had guaranteed access to personal finance courses (Next Gen Personal Finance, 2022). In states where it is not mandated (in 38 out of the 50 states it is not required), 1 in 10 students take a standalone personal finance course prior to graduation (Next Gen Personal Finance, 2022). While only a small percentage of students overall take a standalone personal finance course prior to graduating, it is even more bleak for students attending low-income schools or predominately Black and Brown schools. Next Gen Personal Finance (2022) reports that 1 in 20 students attending schools where more than 75% of the students are eligible for free and reduced lunch take a standalone personal finance course. They find a similar ratio for schools where

more than 75% of students are Black and Brown. Not surprisingly then, a nationally representative sample of college students reports that only 53% report feeling prepared to manage their money while in college (Zapp, 2019).

Findings from this study suggest that financial literacy is an important predictor of return on degree and successfully launching into adulthood. A policy implication of this finding is that providing financial literacy training may be an effective tool for strengthening the return on degree when combined with wealth building policies. Further, Behrman, Mitchell, Soo, and Bravo (2012) find evidence that financial literacy is a stronger predictor of wealth accumulation than school attainment. While Lusardi, Michaud, and Mitchell (2013) show that up to half of wealth inequality may be associated with financial literacy. However, financial literacy is often lower in low-income and minority communities, and barriers to education can restrict access to key financial information and strategies (Angrisani et al., 2023; Lusardi & Mitchell, 2007).

9.6.4. The Racial Return on Degree Wealth Gap

Emmons & Ricketts (2017) conclude that the black-white wealth gap "may lie beyond the scope of individual actions or marginal policy changes directed at educational attainment, family structure, financial decision making, or even wealth distribution" (p. 7). Their conclusion aligns with the findings by Weller (2024). Weller ran a simulation of five proposals that are designed to reduce the Black-White wealth gap (Baby Bonds, retirement savings plan, student loan debt cancellation, fully enforce civil rights statutes prohibit housing discrimination, strengthening the Consumer Financial Protection Breau) all of which but potentially the retirement savings plan seem out of step with the current presidential administration. He found that Baby Bonds would reduce the racial wealth gap the most, but none of them would fully eliminate the racial wealth gap. He concludes, "that only large-scale, immediate targeted financial transfers to Black families would fully eliminate the Black-white wealth gap" (p. 5). However, from a capability perspective, the goal might not have to be to eliminate the racial wealth gap through government transfers in one fail swoop. Certainly, the government must play a substantial financial role. This is the role it has forsaken but was always meant to play. That is the role of creating the economic conditions that support America being a meritocracy. Where all people have financial independence, and the capability to pursue their own happiness, a right under the Constitution.

9.6.5. Student Loans

Although student loans are often what comes to mind when we think of financial aid, Children Savings Accounts (CSAs) are a form of financial aid that can be used to provide graduates with access to the asset development arm of financial institutions. CSAs are wealth building vehicles, most commonly designed for paying higher education costs. While they have specifically designed features (incentives and explicit structures) to encourage asset building among disadvantaged youth and families, they are meant to universally serve all young people. Unlike basic

savings accounts, CSAs leverage investments by individuals, families, communities, employers, local, state, and federal governments, philanthropists, foundations, and others as a way of building assets (Elliott et al., 2023).

CSAs were designed with the understanding that low-income and minority graduates often start off behind economically, a key feature of CSAs is targeted ongoing deposits. For a financial aid strategy to ensure that education truly catalyzes equitable outcomes, it must provide more resources to the economically disadvantaged. Unlike in the case of student loans, where increasing the amount low-income graduates can take out can have a negative economic impact on them post-graduation, thereby increasing economic inequality, giving low-income graduates more assets does not pose the same dangers. In fact, giving low-income graduates more assets can have the opposite effect, reducing inequality. For example, policy simulations show that if a universal CSA program had been established in 1979 with a progressive initial deposit of $7500 for low-wealth households (less than $5000 net worth) with incremental declines to $1250 for the highest-wealth households ($25,000 net worth or more), the Black/White wealth gap would be decreased by 23% (Sullivan et al., 2016).

10. Conclusion

While European nations have relied on the "direct redistributive role of the welfare state to reconcile citizenship and markets", in part because of our choices not to directly redistribute, the United States has chosen to use education as a lever for ensuring equitable outcomes (Carnevale & Strohl, 2010: p. 83). This distinctly American belief—that economic disparity can be narrowed through individual effort in school, the pursuit of education (early on a high school degree in more recent decades some form of postsecondary schooling) and calculated public investments in educational opportunities—has been around almost from its conception. It is inextricably tied to the American Dream. Americans have shown that they are willing to accept a lot of inequality, if there is observed fairness—that there is commensurate return on their own contributions. However, the allure of the American dream can become diluted if enough people have grounds for questioning whether effort and ability invested in education is rewarded equally. Increasingly, there is evidence that shows that not everyone is receiving the same return on their degree. Findings from this study suggest that ensuring all college graduates—especially those from low-wealth backgrounds—receive targeted wealth transfers at the optimal age (25 - 30) can significantly improve their ability to successively launch into adulthood and reduce long-standing racial wealth gaps. This approach, combined with efforts to reduce student indebtedness and boosting financial literacy, is critical to restoring the promise of higher education as a path to economic mobility and equity.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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