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## Abstract

Borrowing for education has increased rapidly in the past several decades, such that the majority of non-housing debt on US households' balance sheets is now student loan debt. This paper analyzes the implications of student loan borrowing for later-life economic well-being, with a focus on retirement preparation. We demonstrate that families holding student loan debt later in life have less savings than their similarly educated peers without such debt. However, these comparisons are misleading if the goal is to characterize the experience of the typical student borrower, as they fail to account for student borrowers who already paid off their debt. We develop strategies to locate families that ever financed their education with student loans in two large datasets which enables us to draw more meaningful comparisons. We find that student loan borrowers roughly follow the earnings, saving, and wealth trajectories of other college-educated families into late-career ages and are much better off financially than those that did not attend college.

## Keywords

student loan debt, retirement, savings

## Disciplines

Economics

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## Abstract

Borrowing for education has increased rapidly in the past several decades, such that the majority of non-housing debt on US households' balance sheets is now student loan debt. This paper analyzes the implications of student loan borrowing for later-life economic well-being, with a focus on retirement preparation. We demonstrate that families holding student loan debt later in life have less savings than their similarly educated peers without such debt. However, these comparisons are misleading if the goal is to characterize the experience of the typical student borrower, as they fail to account for student borrowers who already paid off their debt. We develop strategies to locate families that ever financed their education with student loans in two large datasets which enables us to draw more meaningful comparisons. We find that student loan borrowers roughly follow the earnings, saving, and wealth trajectories of other college-educated families into late-career ages and are much better off financially than those that did not attend college.

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Over the past several decades, student debt has become a large component of US household balance sheets. The implications of this increase for life-cycle wealth accumulation and retirement preparation are ambiguous. Theoretically, the underlying borrowing should support valuable but costly educational investments that potential students otherwise lack the liquidity to make. Even as postsecondary education has increasingly become the norm, the college wage premium has remained substantial and, on average, college graduates enter retirement with more wealth. Still, there are channels through which student borrowers may be left worse off financially. First, there is considerable uncertainty in the labor market return that a given student will see, and the realized return may be insufficient to cover the cost of servicing the debt. Second, the presence of student debt on borrowers' balance sheets could constrain other investments, such as purchasing a home or starting a business. This paper describes the savings of student borrowers over their working years to shed light on whether and where each of these mechanisms dominates, with emphasis on the measurement challenges that must be overcome.

## **Overview**

A nascent student loan literature examines early life-cycle outcomes and illustrates the tension over whether borrowing for education is ultimately helpful or harmful for economic well-being. Increased borrowing that results from expanded loan access appears to improve human capital outcomes; for example, Black et al. (2020) found positive effects on educational attainment, earnings, and loan repayment, with little effect on other financial indicators, including homeownership.<sup>1</sup> That said, increased borrowing to buffer rising college prices appears to generate some negative downstream effects, such as reduced graduate school enrollment (Chakrabarti et al. 2020) and homeownership (Mezza et al. 2020).

Linking student borrowing to later-life savings and wealth accumulation is difficult, largely due to a lack of data well organized to do so. To date, the best evidence relies on a comparison between otherwise similar young adults around 30 years old based on their student loan borrowing history (Rutledge et al. 2016). The study found that, for those that had borrowed, retirement plan participation was about equal to that of non-borrowers, but balances were lower. Still, early wealth differences need not extend through the life cycle (e.g., Bottazzi et al. 2015); in particular, at younger ages, retirement contributions are typically low, annual earnings are not well-correlated with lifetime income, and borrowers are still paying down their education debt.

We begin to fill this gap by carefully tracing out student borrowers' life-cycle income and wealth profiles. We analyze two well-known, nationally representative datasets, the Federal Reserve Board's Survey of Consumer Finances (SCF) and the Federal Reserve Bank of New York Consumer Credit Panel/Equifax (CCP/Equifax). The SCF is a triennial survey of US families with rich detail on their current balance sheet, financial characteristics, and demographics. The CCP/Equifax is an administrative panel drawn from the universe of consumer credit records with rich detail on interactions with credit markets and borrowers' age and geography. Both datasets amply cover the increased prevalence of student debt over the past couple decades; the SCF's core questionnaire has been relatively stable since 1989, with the most recent survey conducted in 2019, and the CCP/Equifax covers student loan debt since the early 2000s.

Our analysis uses the SCF to describe student debt's life-cycle pattern.<sup>2</sup> About half of young families have such debt. This share declines gradually with age, starting when families are in their mid-30s when standard repayment terms typically end. There is some leveling off among families in their 40s and 50s, but at typical retirement ages, a much smaller fraction—no more than

5 percent—hold debt. This general pattern holds when restricting attention to families that have attended college.

Guided by these findings, we compare families with student debt to the general population in four phases of the life cycle: ages 25-34, 35-44, 45-59, and 60-70. Relative to the population, 60-70-year-olds with student debt display much greater disadvantage than other age groups on measures of education, financial literacy, and family background, and the discrepancy grows when restricting attention to families that attended college. Thus, it appears that families that still have student loan debt at older ages appear to be negatively selected from the population of borrowers. Middle-aged families are not nearly as disadvantaged, but their student loans are much more likely to have financed their children's education rather than their own. Indeed, removing families that are primarily holding others' debt from the life-cycle picture steepens the decline in debt-holding among middle-aged families.

These patterns indicate that families with student loan debt may not be representative of the typical family that financed its education with loans, particularly when families have reached ages at which saving and wealth are more meaningful concepts. To illustrate the central issue, we construct 'naïve' life-cycle wealth profiles, differentiating families in each age group only by their education and whether they currently hold student debt (not whether they *ever* borrowed for education). This analysis indicates that the median wealth of college-educated families with student debt rises anemically with age—well below the trajectory of college-educated families without debt and in lockstep with those that did not attend college.<sup>3</sup> But factoring into this pattern are relatively well-off families paying off their loans earlier in their careers and exiting the population of families with student debt. This compositional shift implies that we cannot reliably measure student borrowers' economic outcomes beyond early-career ages from current student

loan debt. That said, one can surmise that families that still have such debt at older ages appear to be no better off financially than those who never went to college.

The remainder of the analysis seeks to understand the long-run economic position of the typical family that financed its education with loans, drawing upon complementary information in each of our datasets. In the SCF, since we cannot observe whether families that lack debt financed their education with loans, we develop a strategy to impute borrowing histories, which we calibrate to cohort-level borrowing rates in historical SCFs. In the CCP/Equifax, we draw on the panel nature of the data and follow individuals who took out loans in their early 20s as they age. Our findings indicate that student loan borrowers follow the earnings, saving, and wealth accumulation trajectories of other college attendees on average. They are also similarly likely to participate in a retirement plan, have similar levels of resources in those plans, and report feeling prepared for retirement. If the alternative for these borrowers was no college, they appear to be much better off financially having borrowed.

## **Prior Literature**

Much public discussion of student debt has centered on its potential harmful impacts on borrowers' future economic well-being, due to imperfect information in the higher education market, the ease with which the loans are obtained, and the relative financial naïveté of young adults. This conversation is rarely framed in terms of how student borrowers might have fared in a counterfactual state where they could not borrow at all or could not borrow as much as they did.

Many academic studies have made headway on these questions, and the myriad findings highlight that the circumstances under which borrowing occurs are relevant for its effects on student outcomes, both within and beyond school. Where borrowing is driven by increased access



to loans, students generally acquire valuable human capital, which would generally imply improvements in measures of future economic well-being, including savings. The best evidence to date for four-year students, who hold the majority of debt, indicates such borrowing leads to increased college completion and higher earnings, with little, if any, negative effects on financial well-being later in life (Black et al. 2020).<sup>4</sup> Student borrowers at community colleges experience analogous benefits, although most of the literature has only examined shorter-run educational outcomes (Marx and Turner 2019, Barr et al. 2019, Dunlop 2013, Wiederspan 2016, Denning 2019).<sup>5</sup> Further, when students who have already completed most of college experience increased loan access, they apply the funds toward graduating earlier, housing, and other important life-cycle investments (Denning 2019, Goodman et al. 2021).

Nevertheless, student loan borrowing has been associated with worse outcomes in some contexts, which suggests it could weigh on economic well-being. For one, borrowing to buffer price increases appears to negatively affect job choice (Rothstein and Rouse 2011), graduate education (Chakrabarti et al. 2020), entrepreneurship (Krishnan and Wang 2019), and homeownership (Mezza et al. 2020), suggestive of repayment difficulties or credit constraints that might affect saving and investment. Further, students induced to attend for-profit colleges—which tend to serve nontraditional students and offer notoriously low labor market returns (e.g., Cellini and Turner 2019; Darolia et al. 2016; Deming et al. 2012, 2016)—borrow more and see marked increases in default (Armona et al. 2020, Cellini et al. 2020, Goodman and Volz 2020).<sup>6</sup>

A comprehensive review of the student loan literature leaves considerable uncertainty about the implications of the rise in aggregate student debt for longer-term savings and preparation for retirement, with only a handful of studies endeavoring to draw a direct connection. One reason is a lack of data with broad coverage of the population and student loan borrowing histories that

extend beyond young adulthood. To a lesser extent, it also reflects the issue that those who borrowed in the past several decades are still relatively young. Studies that have approached this question find evidence of poorer outcomes (e.g., Rutledge et al. 2016, Gicheva and Thompson 2015, Cooper and Wang 2014), but such studies usually suffer from at least one of two measurement issues. The first is that they cannot measure outcomes late enough in a person's life, when the temporary pressure of student debt payments on spending and saving would likely have resolved, and when annual earned income is a better predictor of lifetime earnings. The second is that when analyzing older persons, they condition on the presence of student debt, thereby excluding the experiences of those that have already repaid their student loans. Our analysis attempts to overcome these two issues.

There is also a small but growing literature on the nexus between consumer debt and retirement preparation. Brown et al. (2020) document that the likelihood that older families hold debt has been increasing in recent decades, suggesting understanding this connection could grow in importance. Lusardi et al. (2018) show that holding debt at older ages is related to behavioral biases and a lack of financial literacy, which they argue are likely to be correlated with inadequate retirement preparation. Still, Butrica and Karamcheva (2013, 2018) examine how holding debt at older ages affects the timing of retirement and benefit-claiming behavior, and they find that those with debt work longer and claim social security later, which could offset any negative effects of debt on income during retirement. To our knowledge, this literature does not directly engage on whether debt-financed investments—including, of course, education but also home, business, or vehicle purchases—which could help build wealth or improve labor market opportunities ultimately aid or detract from retirement preparation.<sup>7</sup>

## Background

**Key facts about student loans.** At \$1.6T, US federal student loan debt is the largest source of non-housing debt on households' balance sheets. A majority of these loans were originated under one of two federal lending programs established under Title IV of the Higher Education Act of 1965—the Federal Direct Loan (DL) Program and the (now-defunct) Federal Family Education Loan (FFEL) Program—which grew markedly over time.<sup>8</sup> Adjusting for inflation, the Federal programs lent \$7.5B in 1970-1971 and \$94.1B in 2018-2019 (Ma and Pender 2021).

About one half of US undergraduates rely on loans to help finance their education.<sup>9</sup> Undergraduate Stafford Loans, the main loan type offered through the DL and FFEL programs, feature standardized terms and a congressionally-set interest rate.<sup>10</sup> Unlike other forms of credit, Stafford Loans can be made to any student who meets the basic eligibility criteria for federal financial aid, even those with thin or adverse credit histories.<sup>11</sup>

Federal student loan programs also exist for graduate and parent borrowers, with the principal differences being that they are not subsidized, they are not subject to the statutory limits, and credit history is relevant for eligibility. These programs have grown in importance over time, with each accounting for around 5 percent of non-consolidated federal student debt in 2021.<sup>12</sup> Our analysis attempts to distinguish borrowing under the parent program. Much of the increase in graduate debt, which we cannot distinguish, is held by students taking out both graduate and undergraduate loans (Looney and Yannelis 2015).

The standard repayment period for a federal student loan is 10 years, beginning in the year after a borrower graduates or leaves college. Thus, a traditional student who begins college immediately after high school and earns a degree in four (six) years is expected to fully repay the loan at around 33 (35) years old. Federal student loan borrowers may enter into alternative

repayment plans under certain conditions, in which case the repayment period can be longer. For example, low-income borrowers may be eligible for an income-driven repayment (IDR) plan with either a 20- or 25-year term, reduced payments, and potential loan forgiveness for the remaining balance at the end of the term.

Reflecting the fact that human capital cannot serve as collateral, nonpayment of student loan debt entails different consequences than other types of consumer debt. After 270 days of nonpayment, a federal student loan is in default, and overdue payments can be withheld from tax refunds, federal benefits, and/or wages. It is also relatively difficult to discharge federal student loans in bankruptcy, as it requires a separate proceeding with more stringent hardship rules.

Figure 1 plots average college attendance and borrowing rates by birth year in the 1989-2019 SCFs. Although borrowing for college has become more prevalent over time, college students in older cohorts often took student loans as well. Indeed, 17 percent of all families born between 1958-1962 borrowed, compared with 43 percent of those born from 1991-1995. A large share of the increase—30 percent—reflects increased college attendance; nonetheless, the majority is due to increased reliance on loans to pay for college.

*Figure 1 here*

**Individual saving and the US retirement system.** Over the past 40 years, the US retirement system has changed markedly, with the burden and risk of retirement saving moving from the employer to the individual.<sup>13</sup> Following the introduction of the 401(k) plan in 1978, employers have increasingly replaced traditional defined benefit (DB) pensions with defined contribution (DC) plans (Jacobs et al. 2020).<sup>14</sup> DC plans allow the employee to accumulate tax-advantaged retirement savings in an individual account, typically funded by a combination of employee and employer contributions.<sup>15</sup> With DC plans it is generally the employee's responsibility to choose

the level of contributions and the investment mix which will determine the level of benefits the employee will be able to access in retirement and how long those benefits will last. By contrast, DB plans provided a steady stream of guaranteed benefits in retirement, and it was the employer's responsibility to ensure the plan is sufficiently funded to pay the employee some promised benefit.<sup>16</sup> In addition to DC plans, individuals can save in tax-preferred individual retirement accounts (IRAs).<sup>17</sup> IRAs are generally not connected to a job like a DC plan, but most IRAs are funded by assets rolled over from DC plans when individuals change jobs or retire. As with a DC plan, the individual is responsible for determining contribution levels and how funds are invested.

In addition to savings held in tax-preferred, quasi-liquid retirement accounts (e.g., DC plans, IRAs), many families also plan to support their retirement consumption with other types of assets. Financial assets include those that are highly liquid such as checking and savings accounts, as well as those held in investment accounts, directly-held stocks, bonds, and mutual funds. Nonfinancial assets—such as real estate or closely-held business—are generally illiquid but may still generate income or can otherwise be sold or borrowed against. Of note, the most commonly held nonfinancial asset and largest component of most Americans' net worth is a primary residence. In addition to direct channels through which owning a house might support retirement consumption—for instance, via its sale (if a family downsizes), or a reverse mortgage—it also enables families to divert spending that would otherwise go toward housing to other areas.

## **Data and Measurement**

**The Survey of Consumer Finances.** Our primary data source is the SCF, a nationally representative, cross-sectional survey of US families produced triennially by the Federal Reserve Board that collects detailed information on their balance sheets, pensions, income, and

demographic characteristics.<sup>18</sup> The SCF provides highly reliable statistics on debt and assets broadly distributed in the population, as well as those concentrated in the high end of the wealth distribution. To accomplish this, it employs a two-part sample design—a geographically-based random sample and an oversample of higher wealth families—with weights that combine the two samples to describe the full population (Bhutta et al. 2020). Consistent questionnaire design and methodology from 1989-2019 allow meaningful analysis over time.

Central to our analysis, the SCF asks respondents their educational attainment and whether their family has student loan debt. Regarding student loan debt, the SCF collects information on balance, age, and repayment status (on schedule, behind schedule, forbearance, etc.), among other details. The 2016 and 2019 waves of the SCF also included several key questions, including for whose education the debt was obtained, allowing for a distinction between debt that financed one's own or one's partner's education ('own student debt') and debt that financed someone else's education, including children's. They also added questions on parental education, which we use as a proxy for childhood circumstances. Due to the importance of these questions, the analysis here mainly draws from the 2016 and 2019 surveys. Where possible, we supplement the analysis with the larger history and greater statistical power afforded by the 1989-2019 surveys. All dollar values are expressed in 2019 dollars.

The SCF contains a number of quantitative and qualitative measures of saving behavior, wealth accumulation, and overall financial well-being which allow for a broad perspective on retirement preparation.<sup>19</sup> To measure wealth, we use SCF's measure of net worth: the difference between a family's gross assets and their liabilities. Due to their importance for retirement, we examine participation in employer-sponsored retirement plans, including both DB and DC plans. We also examine other measures of financial well-being and saving behavior, including wage and

salary earnings. To study savings in assets earmarked for retirement, we examine the balances of quasi-liquid retirement accounts, including IRAs and employer-sponsored defined contribution (DC) retirement accounts (e.g., 401(k)-type accounts).<sup>20</sup> We also consider other asset classes of interest, such as housing equity.

While these features of the SCF make it well-suited to analyze how the presence of student loan debt interacts with retirement preparedness, the survey is not without shortcomings. Most importantly for this analysis, the SCF does not measure student loan borrowing history for families that do not currently have student loan debt, which we will show is an important impediment to understanding whether the later-life economic well-being of families that borrowed for education differs from those that did not. Also, the SCF does not capture the entirety of aggregate student loan balances (Dettling et al. 2015; appendix table 1).<sup>21</sup> Because its sampling frame is household-based, it omits student loan debt held by those in institutional settings (e.g., dormitories). In addition, the SCF does not collect detailed balance sheet information for roommates or live-in relatives, including children, who are financially independent of the respondent, so any student loan debt held by such individuals will be omitted. As a result, our analysis will understate the prevalence of student loan debt, especially among younger families, and it will likely also somewhat overstate the financial well-being of those that borrowed for college.<sup>22</sup>

Our analytical choices strive for consistency in the unit of observation, but several key questions—such as race, ethnicity, and financial literacy—are asked only of the respondent, while others—such as employment, pensions, and educational attainment—are asked only of the respondent and spouse or partner. Further, for simplicity, our analysis differentiates families by age and educational attainment using characteristics of the family reference person.<sup>23</sup> Any family

in which the reference person attended college, even if they did not obtain a degree, is considered college-educated.

**Description of CCP/Equifax data.** We supplement the SCF findings with an extract of consumer credit records from the Federal Reserve Bank of New York Consumer Credit Panel/Equifax (CCP/Equifax). The CCP/Equifax is an individual-level panel dataset of consumer credit reports obtained from Equifax—one of the three main credit bureaus in the United States—formed from a 5 percent random sample of all US consumers with credit histories. The data are reported quarterly and include detailed information drawn from credit reports, including loan balances and payment status on mortgages, credit cards, student loans, auto loans, and other miscellaneous debt, as well as year of birth.<sup>24</sup> We exploit the panel nature of the CCP/Equifax to follow student loan borrowers and non-borrowers over time. We treat June 2003-June 2007 as the origin and start by restricting the sample to individuals who established a credit record in that period and were between 17 and 20 years old.<sup>25</sup> Our final sample includes over 180,000 borrowers.

We classify these borrowers according to their educational borrowing. In particular, we distinguish between individuals who originated a student loan around the time they established their record and those who did not.<sup>26</sup> We refer to the former group as student borrowers, and the latter as non-student borrowers.<sup>27</sup> Because the dataset does not have information on educational attainment or enrollment, our non-borrower sample will include those who did not attend college and those who attended college but did not borrow. Thus, we further partition the student borrower sample into two groups based on initial borrowing, specifically, whether a student borrower's first academic year of student borrowing was above or below the median for that year. Following analogous logic to our choice to compare college attendees who did and did not borrow in the SCF, this focus helps us draw comparisons between types of people who are similar except for their



level of borrowing. Within-cohort differences in borrowing primarily reflect unmet financial need to cover educational expenses (accounting for grants and own resources), the cost of the school, and individual preferences over borrowing and working during school, and thus offer insight into distributional differences.

We follow these cohorts for up to 16 years from when they are first observed in the data—when they would be between 33 and 36 years old—and analyze credit attributes that measure financial well-being, including student loan balances, combined credit card limit (a proxy for income), and presence of a mortgage (a proxy for homeownership).<sup>28</sup>

## **Analysis**

**General trends.** Figure 2, panel A plots student debt's implied life-cycle profile, both for all families (unconditional) and restricting to those that have attended college. The figure includes averages computed from the 2016 and 2019 SCFs, as well as from those spanning the 1989-2019 period.

*Figure 2 here*

There is a clear pattern. Among all households, younger families are much more likely to have student debt, and there is a relatively steady decline as families age, such that only a small fraction of families—less than 5 percent—have student debt during typical retirement ages. This pattern remains after restricting to families that have attended college, but unsurprisingly, such families are more likely to have debt. That said, differences based on education disappear when families are in their 60s, suggesting that the debt held by older families largely finances someone else's education.

Comparing statistics generated from the more recent surveys to those from the full series produces several insights into the time series of student loan borrowing. One, focusing on the youngest families, the propensity to have student debt is quite similar whether one considers the shorter or longer horizon, especially among those that attended college, suggesting conditional borrowing rates are somewhat stable over the full 30-year time series. Second, in the longer time series, the decline in the propensity to have debt begins at younger ages, and there is a more obvious plateau over the 40s and 50s. This likely reflects several interacting phenomena occurring in more recent years (e.g., longer repayment terms owing to expanded availability of and enrollment in alternative repayment programs; increased amount of debt, conditional on borrowing; increased borrowing by graduate students; and increased repayment difficulties). The wedge between the two different time horizons becomes almost negligible once families are in their mid-50s and is, on average, smaller for families who have attended college. Finally, the key takeaway is that the reduced propensity to have debt with age is not exclusively an artifact of cohort differences, as the pattern holds over the full time series. A considerable share of student borrowers paid off these loans by their mid-40s, and most did by their mid-50s.

Driven by these findings, we describe characteristics of families with student debt over different phases of the life cycle using the 2016 and 2019 surveys. We group families into four age groups: early-career (25-34-year-olds), mid-career (35-44-year-olds), late-career (45-59-year-olds), and near- (or at) retirement (60-70-year-olds). Table 1 describes the prevalence of student debt and college attendance among families in these groups and illustrates some unsurprising patterns. About half of early-career families have student debt, and families who went to college are more likely to have student debt. Both college attendance and student debt rates are lower for older segments of the sample, but the decline in student debt is much more marked.

*Table 1 here*

Table 2, Panel A characterizes families with student debt in each of these age groups. About one-fifth of families with student debt are Black (non-Hispanic), and just under one-third received or expect an inheritance. These figures are fairly stable across phases of the life cycle. Older families with debt are more likely than younger families to have served in the military and to come from a less-educated family. They are less likely to have a graduate degree, but a greater share are financially literate.<sup>29</sup>

*Table 2 here*

These comparisons mask cohort differences and/or natural life-cycle progressions. For example, financial literacy improves with experience. To adjust for these factors, Table 2, Panel B characterizes the different age groups in the general population and Table 2, Panel D characterizes different age groups of college-educated families. The differences between the corresponding rows in panels A versus B and panels C versus D indicate the degree to which families with debt in each age group are differentially selected from each population, and whether selection varies by age.

Through this lens, we see financial literacy improves more over the life cycle for the overall population than among families with student debt, leading to a wider gap in financial literacy between the indebted population and the general population for the near-retirement families than early-career families. We see similar differences for each of the characteristics considered, with near-retirement families who have debt appearing to be a particularly disadvantaged group with respect to family background when we restrict the sample to college attendees. These findings echo those in Lusardi et al. (2018), which found that those experiencing financial distress near retirement have similar traits. This is relevant for policy in that families still holding student debt as they approach retirement are measurably worse off along observable dimensions than the typical

family who relied on student loans to finance education. Older families with student debt may benefit from targeted policies, but their experience is not generalizable to the entirety of student borrowers, many of whom will no longer have debt at retirement.

Table 1 also reveals that the gap in the likelihood that a family's student debt was for its their own education widens with age. Among the young-career families, nearly all families with student loan debt acquired it for their own education, whereas many of the late-career families with student loan debt acquired it for another person's education (e.g., their children). Figure 1, panel B plots the life-cycle profile of 'own' student debt and of any student debt for families who have attended college. The decline in student debt with age is steeper when restricting attention to one's own debt, indicating that in Figure 2, panel A, new parent borrowing masks families continuing to steadily pay off their own student loans, particularly at late-career ages. The remainder of the analysis aims to compare saving and student loan debt between those that financed their own education with loans and those that did not.

Descriptions of the economic positions of those with student debt at various segments of the life cycle, including older ages, can be useful, yet they do not necessarily inform the broader debate about whether financing education with loans is ultimately helpful or harmful. To illustrate the central issue, Figure 2 plots median income and median wealth by age for families with student debt who went to college, families without student debt who went to college, and families who did not go to college. Annual earned income for the typical college-educated family with student debt tracks that for the typical college-educated family without student debt until families are in their late 30s. This is precisely the same age where we start to see a drop-off in the share of families with student debt. Without accounting for the notable share of families that have paid off their debt, we might erroneously conclude that at early-saving ages (i.e., mid-30s), wages of student

loan borrowers are not keeping up with those of their peers. This gap grows with age, as more families pay off their debt, so those who do not are increasingly negatively selected. By late-career ages, the wages of the typical college-educated family with student debt are essentially the same as families who did not go to college.

The conclusion is even more striking when considering wealth, as families who went to college and do not have debt have increasingly more wealth with age than families with debt and families that did not go to college. In fact, the naïve wealth profile is essentially the same for those with debt and those who did not go to college. An erroneous interpretation of this picture, without considering the dynamics behind it, is that families who borrowed for college accumulate wealth anemically relative to their college-educated peers who did not borrow, and from a wealth perspective, they are no better off than those who never went to college.

What generates this pattern? We already have insight from the companion discussion of earnings that student loan borrowers paying off their loans distort comparisons beyond mid-career ages, but what is happening at early-career ages when the share of families with loans is stable? First, wealth, by definition, nets any student debt the family has, so all else equal, early-career student debtors will mechanically have less wealth than those who attended college without borrowing, even if they have similar earnings (as they do). Indeed, the dotted line in Figure 2, Panel B plots median wealth for those with debt, excluding student loan debt, and the line better tracks college-educated families without debt through the early-career phase. Further, families with student loan debt must spend some of their earned income servicing their debt and are thus less able to save, which likely exacerbates early differences in wealth. It is quite possible that once the student loan debt is paid off, those who borrowed can save more of their earnings, and their

wealth accumulation will rise. In Figure 2, such families would be included in the calculation of median wealth for those who went to college and do not have debt.

This exercise tells us two things. First, college attendees who still hold student loan debt around retirement are no better off than their peers who did not go to college. The small share of families in this category appear not to have experienced the typical wage boost associated with a college education that would enable them to repay their debt and save, leaving them relatively ill-prepared for retirement. Second, it illustrates the importance of properly accounting for the many borrowers who successfully pay off their student loans in understanding the implications of student loan borrowing for economic well-being. The attrition of these borrowers from the set of families with student loan debt, coupled with the increased negative selection with age evidenced in Table 2, distorts comparisons that rely on the observation of current debt alone.

**Imputing student loan borrowing history from the SCF.** Key indicators of economic well-being and retirement preparation, such as wealth, lifetime income, and saving behavior, are best measured at ages when many families who borrowed to finance their education would have already paid off their loans. Thus, to be able to examine how the typical family who took student loans fares on these dimensions within the SCF, we need to identify families who paid off their loans.

To do this systematically, we develop an algorithm that imputes families' student loan borrowing histories from their observable characteristics. We first predict the likelihood that families in the 2016 and 2019 SCFs borrowed for college,  $\hat{p}$ , using the observed relationship between own student loan debt and family characteristics among 24-30-year-old families. Families in this age range are unlikely to have paid off their debt or to have acquired debt for others, as their student debt rates are stable, high, and coincide with own student debt rates. The family characteristics in the prediction equation are either fully predetermined or at least minimally likely

to change beyond 24 years old.<sup>30</sup> Families with  $\hat{\rho}$  above some threshold,  $\bar{\rho}$ , are classified as student loan borrowers and those below it as non-borrowers.

We calibrate the threshold,  $\bar{\rho}$ , to cohort borrowing rates derived from the longer 1989-2019 SCF time series, focusing on college-educated families for maximum comparability. These ‘true’ rates are obtained by stacking 24-30-year-old, college-educated families—an age range over which, if the family had borrowed for college, they would still likely have student loan debt—from these 11 surveys and calculating the share with student debt by birth year. The oldest cohort in the calibration is 57 years old in the 2019 SCF; thus, the imputation cannot accommodate older age groups.<sup>31</sup> Beginning with 0.500, we increment by 0.025 and select the threshold that minimizes the mean squared difference between the imputed rates and truth, which is 0.550.

Figure 3 graphs the correspondence between the imputed cohort borrowing rates and those implied by the 1989-2019 SCFs, expressed in 2019 age. For comparison, the figure also includes imputed rates using neighboring thresholds. The imputation does reasonably well approximating truth, especially for younger cohorts. That said, while both series trend downward with age, the imputation does so more gradually and, as a result, modestly overstates borrowing rates for older cohorts. Importantly, the steep decline with age that emerged when relying exclusively on the observation of debt is not visible in the imputation.

*Figure 3 here*

While the calibration reduces concerns that our imputation is far from the truth, we note two less-desirable properties. First, our prediction equation does not explain all of the variation in own student loan debt among 24–30-year-old families—just over 13 percent. Second, the imputation assumes that the relationship between a family’s observed characteristics and borrowing history is roughly stable across cohorts. This assumption may not hold if, for example,

our prediction equation is missing important independently-predictive characteristics (e.g., parental wealth) or if families, conditional on these characteristics, have become more reliant on student loans over time, which based on the calibration appears likely to be at least somewhat true.

**Comparisons between student loan borrowers and non-borrowers.** Figures 4 plots various economic indicators of interest for college-educated families based on their imputed borrowing histories, grouped in three-year age bins. In each case, we plot both the mean or median of the variable and accompanying 95 percent confidence intervals, where the standard errors were adjusted to account for both multiple imputation and sampling variability (Bricker et al. 2015).<sup>32</sup>

*Figure 4 here*

Annual income from wages and salaries for the typical student loan borrower roughly coincides with that for the typical non-student loan borrower for all ages and is modestly higher in most instances (Figure 4, panel A). Importantly, there is no meaningful divergence with age.

What we see for wealth reflects the similar patterns for income (Figure 4, panel B). In general, wealth accumulates at similar rates for the typical borrower and the typical non-borrower. At younger ages, median wealth among borrowers is slightly lower than for non-borrowers, which at least partially reflects differences in student loan debt.<sup>33</sup> These differences accumulate somewhat over the life cycle, with the gap between borrowers and non-borrowers growing over mid-career ages; nonetheless, the gap disappears by late-career ages. At all ages, the confidence intervals between the two groups overlap.

If we include an estimate for the value of DB pension assets, it raises wealth and steepens implied accumulation over the life cycle for both groups (Dettling et al. 2022). That said, the gap at mid-career ages widens, which is consistent with findings that student borrowers are less likely to enter public sector jobs (Rothstein and Rouse 2011), where DB plans are more commonly



offered, and indicates that retirement consequences of student loan borrowing can emerge through features of jobs beyond earnings.

Focusing on retirement plans, there is little distinction between borrower and non-borrower families in the likelihood they participate in an employer-sponsored retirement plan (Figure 4, panel C).<sup>34</sup> Thus the findings from Rutledge et al. (2016) appear to extend to later ages. There is some evidence that borrowers have more savings in quasi-liquid retirement account like a 401(k) or IRA (Figure 4, panel D), but the differences are tiny and confidence intervals overlap.

Turning to other types of assets and portfolio allocation decisions, median financial assets are similar between borrowers and non-borrowers (Figure 4, panel E).<sup>35</sup> Homeownership rates are also similar between borrowers and non-borrowers (Figure 4, Panel F). Similar homeownership between borrowers and non-borrowers is consistent with findings in Black et al. (2020) and from the CCP/Equifax (shown in the next section). All in all, the imputed life-cycle comparisons imply that income and wealth follow similar trajectories for college-educated borrowers and non-borrowers, and differences in any given indicator are quite minimal. Together with evidence from Figure 4, the analysis suggests borrowers would be financially worse off forgoing the education that borrowing afforded them.

**Evidence from the CCP/Equifax.** An important limitation in using the SCF to study life-cycle outcomes is that the time series is formed from repeated cross-sections rather than observing the same individuals over time. To try to disentangle cohort differences from true life-cycle differences, we turn to the CCP/Equifax, which offers a shorter time series but allows us to corroborate our earlier findings for several key outcomes as well as offer insight into distributional considerations. Figure 5 graphs a) average student loan balances, b) average credit card limits, and c) proportion with a mortgage by years since college entry.<sup>36</sup> These outcomes are plotted for three

groups based on their initial level of student loan borrowing: those with above-median borrowing, those with below-median borrowing, and those with no borrowing.

*Figure 5 here*

Figure 5, panel A plots average student loan balances.<sup>37</sup> By construction, the non-borrowers have an average balance of zero throughout, while above-median borrowers initially have a higher average balance than below-median borrowers. Throughout the analysis horizon, these initial differences persist, but the slopes change over time. Average balances among above-median borrowers grow quickly over the first decade and decline thereafter (at about age 27-30), whereas average balances among below-median borrowers grow less quickly over the first decade and stabilize thereafter. In other words, above-median borrowers eventually start to pay off their debt at a faster rate than below-median borrowers, suggesting that increased borrowing is associated with higher returns to education that better permit borrowers to pay down their principals. This interpretation is consistent with Black et al. (2020).

Panel B of Figure 5 plots average credit card limits, a proxy for income. Initially, average limits exhibit similar levels and growth rates for all three groups, reflecting lengthening credit records. Over time, average limits among above-median borrowers exhibit more growth than the other two groups, so that by 15 years out, their average limits are well above those of the other two groups, which remain fairly similar to one another. Consistent with panel A, this pattern suggests that above-median borrowers see increased returns. Finally, panel C plots the share of each group that has a mortgage, a proxy for homeownership. Homeownership rates grow over time for all groups, but initially, non-borrowers are more likely to be homeowners than borrowers, and below-median borrowers are more likely to be homeowners than above-median borrowers. Then, about eight years out (about age 25-28), the pattern reverses and above-median borrowers become more

likely to own homes. Through the remainder of the analysis horizon, their homeownership rates grow faster than the other two groups. This suggests that above-median borrowers are less likely to purchase a home as they complete their schooling and begin to service their debt, but they quickly catch up and ultimately surpass their peers that borrowed less, likely reflecting the higher labor market returns suggested by our other metrics. Overall, our analysis of the CCP/Equifax corroborates the pattern of results from the SCF and provides evidence that borrowing for education is associated with improved financial positions.

## **Conclusions**

The accumulation of wealth over the life-cycle feeds into retirement well-being along several important dimensions, including the resources available in retirement, retirement age, and health. In the US, the retirement system currently places much of the burden and risk of saving and planning for retirement on the individual, a shift from an earlier era in which the government and employers bore most of this responsibility. Against this backdrop, this paper examines whether the rise in student loan borrowing over the past several decades may have impinged on families' ability to save and accumulate wealth over the life cycle and to prepare for retirement.

Our analysis documents several findings which may be useful for setting policy in this area. We find that student loan borrowers tend to follow the life-cycle earnings and savings trajectories of other similarly-educated families into late-career ages. Both groups are wealthier entering retirement than those who did not attend college at all. If the appropriate counterfactual is that in the absence of the student loan program, student loan borrowers would have lacked the resources to attend college, they are better off having borrowed on nearly all dimensions. Student loans appear to finance valuable human capital investments that translate into long-run improvements in

families' economic well-being on average, suggesting that the program is largely having its intended effect. Given this, policies aimed at improving retirement preparation that target resources toward reducing student loan balances or increasing saving among student borrowers are likely to be regressive.

We also show that the small subset of borrowers who carry student debt into near-retirement ages are observably worse off than the full population of student loan borrowers and much less prepared for retirement than their peers on average. Such families likely have other problems contributing to lower saving and wealth accumulation and they are ultimately not comparable to those with similar education that have repaid their student loan debt. Highly targeted support for this small subgroup—for example, loan forgiveness at a certain age threshold—could be a cost-effective policy to improve retirement security for this subset.

From a methodological perspective, our analysis is instructive about the pitfalls of statistics that derive from observed student debt beyond early-career ages. We demonstrate that such statistics do not generalize to the experience of the typical student loan borrower and could lead to misleading conclusions about the role of student debt in financial well-being.

Our analysis demonstrates that one should not judge the efficacy of the federal student loan program by considering only the financial positions of older households with student loan debt, as it excludes a large share of households who take student loans and repay them earlier in the life cycle. While it also implies that after adjusting for these households in the data, wealth accumulation among student loan borrowers largely resembles non-borrowers at each stage of the life cycle, there are several limitations to the analysis that should be addressed in future work. First, the majority of the analysis relies on implied life-cycle profiles from the SCF, constructed by deriving either a mean or median value of various indicators within the relevant age group,

rather than repeated observations of the same households over time. These pictures do not necessarily forecast future financial positions of younger borrowing cohorts or future differences between younger borrowers and their non-borrowing peers because differences between age groups reflect a combination of life-cycle patterns and circumstances specific to each cohort, including with respect to educational, borrowing, and retirement regimes.<sup>38</sup> Further, all of our findings are predicated on conditions today that may change as younger cohorts who borrowed in different conditions age toward retirement. Thus, inferences regarding the overall posture of more recent cohorts of student loan borrowers as they enter retirement are limited to the extent to which they follow a similar trajectory as their older peers. In particular, the analysis cannot rule out whether the vulnerable group of households with student loan debt entering retirement will grow in size, especially as parents have increasingly acquired student loan debt on behalf of their children.

A second, related limitation is that the paper primarily focuses on the extensive margin of student loan borrowing and largely leaves intensive margin considerations, such as the implications of rising student loan debt loads over time as well as distributional differences among those that borrowed, for future work. That said, some groundwork is laid. Per the former, the similarities in wealth between borrowers and non-borrowers in each age group, including those who would have attended school within the last 10-20 years, is suggestive that larger student loan balances have not come at the expense of wealth building. Per the latter, the longitudinal analysis of credit records considers borrowing intensity and suggests those with greater initial borrowing experience improved financial well-being along several dimensions. Indeed, within the more recent cohorts, borrowers with smaller debt loads, who often have less or lower quality education, appear to struggle the most (Mezza and Sommer 2016).

Finally, our statements concerning retirement preparedness and economic well-being more generally reflect student loan borrowers' relative positions rather than their absolute positions. It is possible that the different groups that drive our comparisons, even on average, have different expectations for their retirement consumption and/or realization of consumption needs in retirement.

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## Endnotes

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<sup>1</sup> Expanded loan access also increases household formation (Goodman et al. 2021). A possible exception is borrowing to finance a for-profit education, which primarily serves nontraditional students but is highly debt-financed and has notoriously low returns (e.g., Looney and Yannelis 2015, Cellini and Turner 2019).

<sup>2</sup> We primarily analyze the 2016 and 2019 SCFs which added several valuable questions, although the 1989-2019 surveys produce similar student debt curves. These SCF ‘life-cycle’ pictures reflect age-specific averages across multiple cross-sections and thus may be influenced by cohort differences. In particular, the decrease in the fraction of families with student debt that coincides with age likely reflects a combination of paydowns over the life-cycle and reduced educational attainment and borrowing rates for earlier cohorts (Looney and Yannelis 2019). Government-backed student loans were first available to select students in 1958 (an 18-year-old then would be 79 years old in 2019) under the National Defense Education Act and available broadly in 1965 (an 18-year-old then would be 72 years old in 2019).

<sup>3</sup> Median wages of college-educated families with student debt track those of college-educated families without debt and remain well above families that did not attend college until their mid-to-late 30s; thereafter, they move toward the wages of those that did not attend college.

<sup>4</sup> Gervais and Ziebarth (2019) also provide suggestive evidence that borrowing leads to higher wages. In related work, Solis (2017) finds access to education loans in Chile improves academic outcomes.

<sup>5</sup> Even though this sector is large, it is relatively inexpensive and students tend to be less reliant on loans for financing. Calculations that include all students who began their borrowing careers at

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community colleges—many of whom continue on to a four-year college—imply the sector accounts for only a little over one-tenth of outstanding debt (Looney and Yannelis 2015).

<sup>6</sup> This sector constitutes a small fraction of enrollment but one-fifth of outstanding student debt (Looney and Yannelis 2015).

<sup>7</sup> See for example, Baum (2009) and Herbert et al. (2013) on the importance of a vehicle or home for labor market advancement and wealth accumulation.

<sup>8</sup> There is also a small private student loan market, representing less than 10 percent of outstanding student debt. Private student loans do not entail standardized terms and rates and often require an established credit record or a cosigner. Our analysis will not distinguish private student loan borrowing, but the vast majority of students who finance their education with private loans also use federal loans (Department of Education, *Digest of Education Statistics 2020*: Table 331.60). Thus, our discussion here will focus on federal loans.

<sup>9</sup> See [https://nces.ed.gov/programs/digest/d19/tables/dt19\\_331.20.asp](https://nces.ed.gov/programs/digest/d19/tables/dt19_331.20.asp)

<sup>10</sup> Most student borrowers receive a more favorable interest rate than the market would offer them. Stafford Loans come in two varieties: subsidized loans, which are need-based, and unsubsidized loans, which are not. For subsidized loans, interest that accrues early in the life of the loan is paid by the government. Annual Stafford Loan borrowing is subject to a statutory limit that varies with academic level and student dependency status

<sup>11</sup> To receive financial assistance through these programs, students must complete the Free Application for Federal Student Aid (FAFSA), which collects demographic, asset, and income information for students and their households for the calendar year prior to enrollment and computes a student's Expected Family Contribution (EFC) for college, a key factor in addition to

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the statutory limit and the cost of college that determines the amount of subsidized loan a student may receive. Continuing students must reapply each year.

<sup>12</sup> See <https://studentaid.gov/sites/default/files/fsawg/datacenter/library/PortfoliobyLoanType.xls>.

<sup>13</sup> This section omits a discussion of an important component of the US retirement system – government-sponsored social security retirement benefits. We will generally omit social security from our analysis because expected benefits are difficult to estimate (especially at younger ages) and because on average social security only covers about 40 percent of pre-retirement income so that most families will also need to save to plan for retirement.

<sup>14</sup> In 1975, 11.2 million private sector workers actively participated in DC plans and 27.2 million participated in DB plans; by 2019, there were over 85 million DC plan participants, compared to just 12.6 million DB plan participants (Myers and Topoleski 2021).

<sup>15</sup> Examples of DC plans include 401(k) plans, 403(b) plans, 457 plans, and Employee Stock Ownership Plans (ESOPs).

<sup>16</sup> Some DB plans allow the participant to take the benefits as a lump sum amount at retirement.

<sup>17</sup> IRAs were initially introduced in 1974 to encourage retirement savings among individuals without pensions, but eligibility was expanded in 1981. Keoghs, SEP-IRAs, and other qualified retirement plans are similar to IRAs, except they are used by self-employed individuals as an alternative to employer-sponsored DC plans.

<sup>18</sup> Detailed information is collected for the household's primary economic unit (PEU)—the economically dominant single person or couple and all other persons in the household who are financially interdependent with that economically dominant person or couple—and limited information is collected for financially independent adults in the household.

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<sup>19</sup> Our paper will not attempt to quantify whether an individual's retirement income is adequate. For a discussion of retirement adequacy, see, for example, Jacobs et al. (2020).

<sup>20</sup> The SCF collects the asset value of DC plans but does not collect an analogous measure for traditional defined benefit (DB) pensions, as their market value is less salient to the respondent. Dettling et al. (2022) considers an alternative measure of retirement assets that adds imputed DB plan values based on earnings and employment histories from Sabelhaus and Volz (forthcoming). These calculations require stronger assumptions for younger families who will have typically completed a smaller portion of their employment and earnings history.

<sup>21</sup> Student debt growth over time in the SCF matches other aggregates (Bricker et al. 2015).

<sup>22</sup> Young adults not captured in the data tend to be less well-off (Dettling and Hsu 2014), and student borrowers are more likely to live with their parents and thus will be omitted from the sample of SCF borrowers (Dettling and Hsu 2018, Bleemer et al. 2017).

<sup>23</sup> The reference person is the male in a mixed-sex couple or the older person in a same-sex couple, who need not be the survey respondent.

<sup>24</sup> For more information on the CCP/Equifax, see Lee and van der Klaauw (2010).

<sup>25</sup> Following our work in Black et al. (2021), we restrict the set of student loan borrowers to individuals whose initial student loans did not exceed the statutory first-year federal borrowing limit to try to isolate traditional students that began borrowing at entry. We also restrict the sample to those that maintained a credit report for at least 10 years. This process removes any incorrectly duplicated records, which can appear (typically for a limited period) when new accounts are opened and have not yet been linked to an existing credit record. That said, because the CCP/Equifax sampling is based on Social Security numbers, it will also remove individuals who



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pass away over this period or whose credit file is too thin to populate. We focus on cohorts that began borrowing in mid-2003, because that is the first cohort for whom we can reliably observe first-year borrowing in the CCP/Equifax.

<sup>26</sup> The CCP/Equifax tends to slightly undercount younger individuals because it takes time to establish a credit record and enter the sample. Lee and van der Klaauw (2010) find that by age 25, population estimates from the CCP/Equifax are similar to those from other sources.

<sup>27</sup> We exclude individuals that first take a student loan in subsequent years.

<sup>28</sup> Credit card companies determine credit card limits partly based on borrowers' incomes and credit scores, which reflect their overall financial well-being. Few young people purchase their homes outright, making the presence of a mortgage a good proxy for homeownership.

<sup>29</sup> Following the literature, a financially literate respondent answers all of the 'big three' financial literacy questions correctly (Lusardi and Mitchell 2011).

<sup>30</sup> Specifically, the equation includes indicators for whether a family receives or expects an inheritance, whether at least one of the respondent's parents completed college, whether the respondent's mother completed high school, whether the respondent believes borrowing for education is okay, and whether the respondent has served in the military, as well as a set of indicators for the respondent's race or ethnicity and the reference person's educational attainment (whereby potential categories are less than high school, high school, some college, or college degree).

<sup>31</sup> For a cohort to be included in the calibration, its borrowing rate must derive from more than 150 observations.

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<sup>32</sup> These standard errors were calculated using 200 bootstrap replications and the SCF replicate weights. They do not account for additional error introduced by the imputation of borrowing status, and thus, they could be viewed as a lower bound.

<sup>33</sup> This gap narrows upon excluding student debt from the calculation of wealth, but some remains, potentially owing to income diverted from savings toward servicing the debt (Dettling et al. 2022).

<sup>34</sup> Dettling et al. (2022) also analyzes retirement expectations. The question probing expectations for retirement income yields a noisy picture, although closer to retirement age, it seems borrower families, on average, feel more financially prepared. That said, the average borrower family plans to retire later than the average non-borrower family, which is consistent with Butrica and Karamcheva (2013, 2018). Finally, differences in wealth accumulation are well reflected in savings behavior reported by borrower and non-borrower families. Non-borrower families are much more likely to report saving through mid-career ages, on average, which is a phase over which the wealth gap widens. Borrower families are more likely to do so in late-career ages, when the gap disappears.

<sup>35</sup> Stock ownership—including stocks that are either directly-held or held in a retirement or investment account—is somewhat higher for borrowers, as are balances, which could suggest a preference among borrowers toward holding their wealth in riskier assets (Dettling et al. 2022).

<sup>36</sup> Technically, we use the year the credit record was established, which is a proxy for college entry within our sample of individuals whose credit record was established at traditional college entry ages.

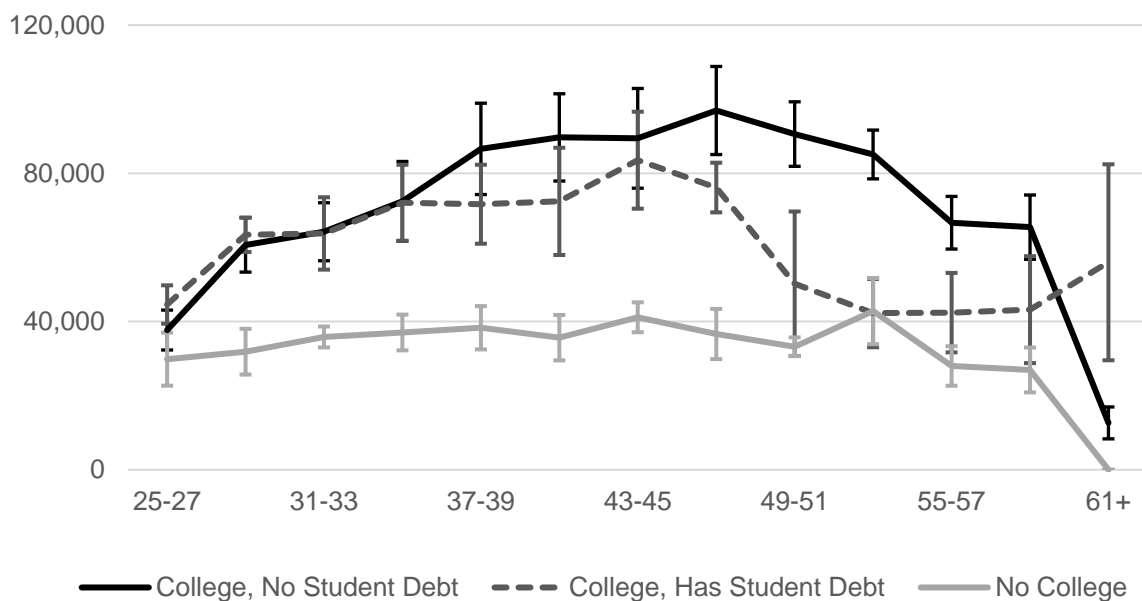
<sup>37</sup> We also examined the propensity to have a positive student loan balance. The results are similar to the mean balances: the higher balance sample has more debt throughout, but the two groups

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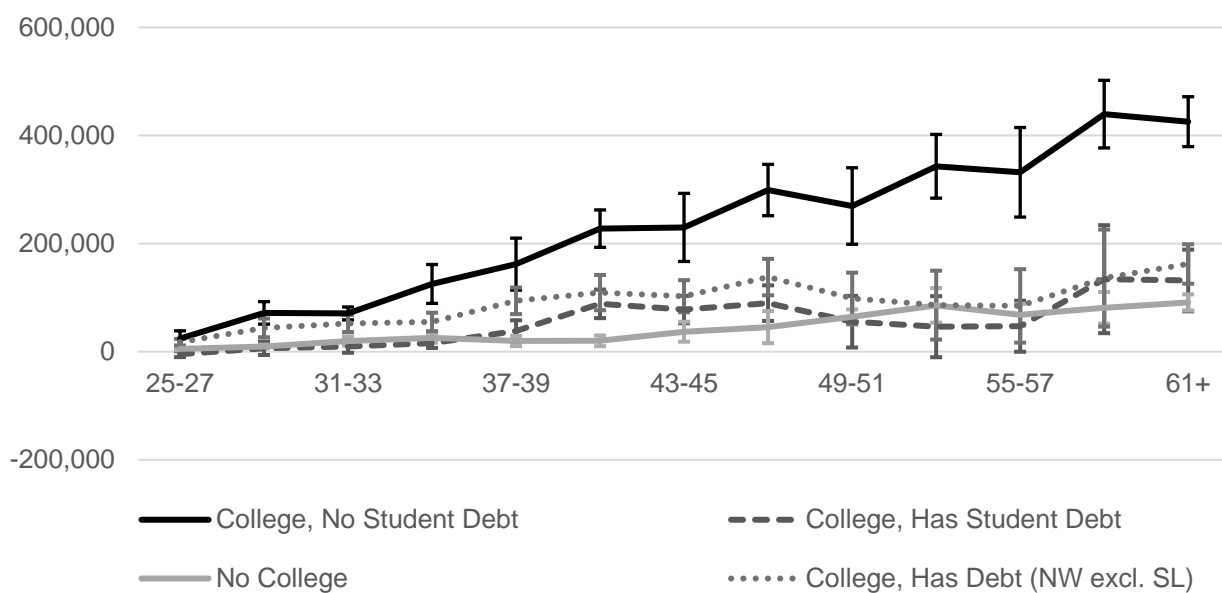
appear to be converging and by 16 years out, are about equally as likely to have paid off their loans completely.

<sup>38</sup> Restricting attention to families with a college education helps minimize the extent to which increased borrowing rates among more recent cohorts reflect broader access to college over time; however, the analysis does not disentangle increased borrowing rates among attendees or borrowing volumes among borrowers.

## 1a. Median wage and salary income



## 1b. Median net worth



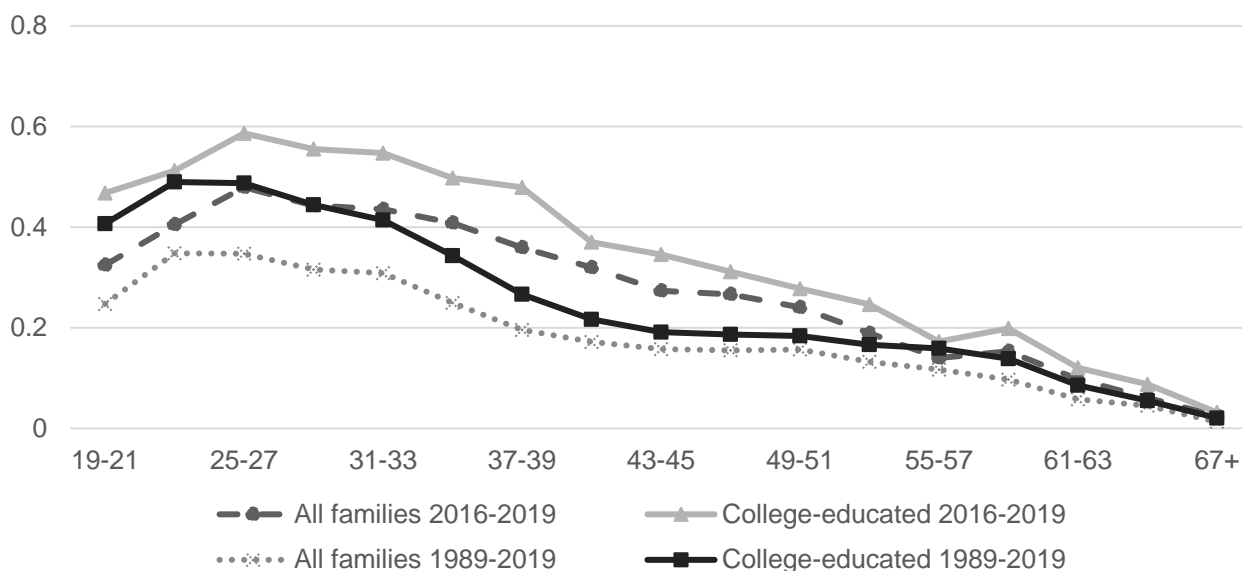
**Figure 1.** Income and wealth by current student debt-holding status and education

*Note:* This figure plots (a) the median annual salary and wage income and (b) the median net worth of families based on their education and own student loan debt status by age of the household reference person. College-educated refers to families in which the reference person attended at least some college, and own student debt refers to families with student loan debt whose largest

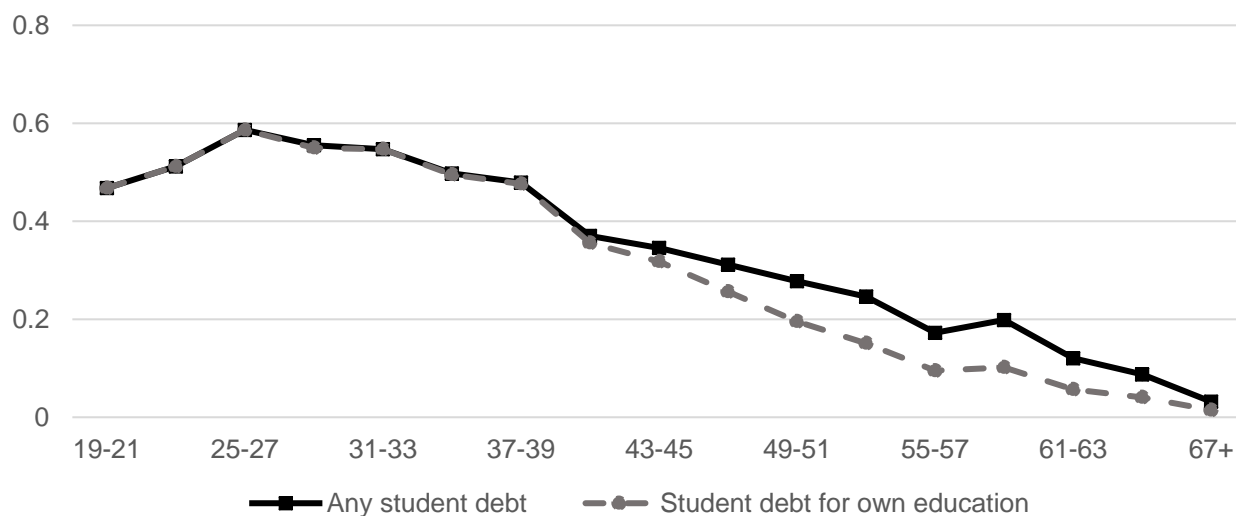
student loan financed the respondent's (or their partner's) education. The dotted line in figure b excludes student loan debt from net worth.

*Source:* Authors' calculations from 2016 and 2019 SCF.

## 2a. By education and survey wave



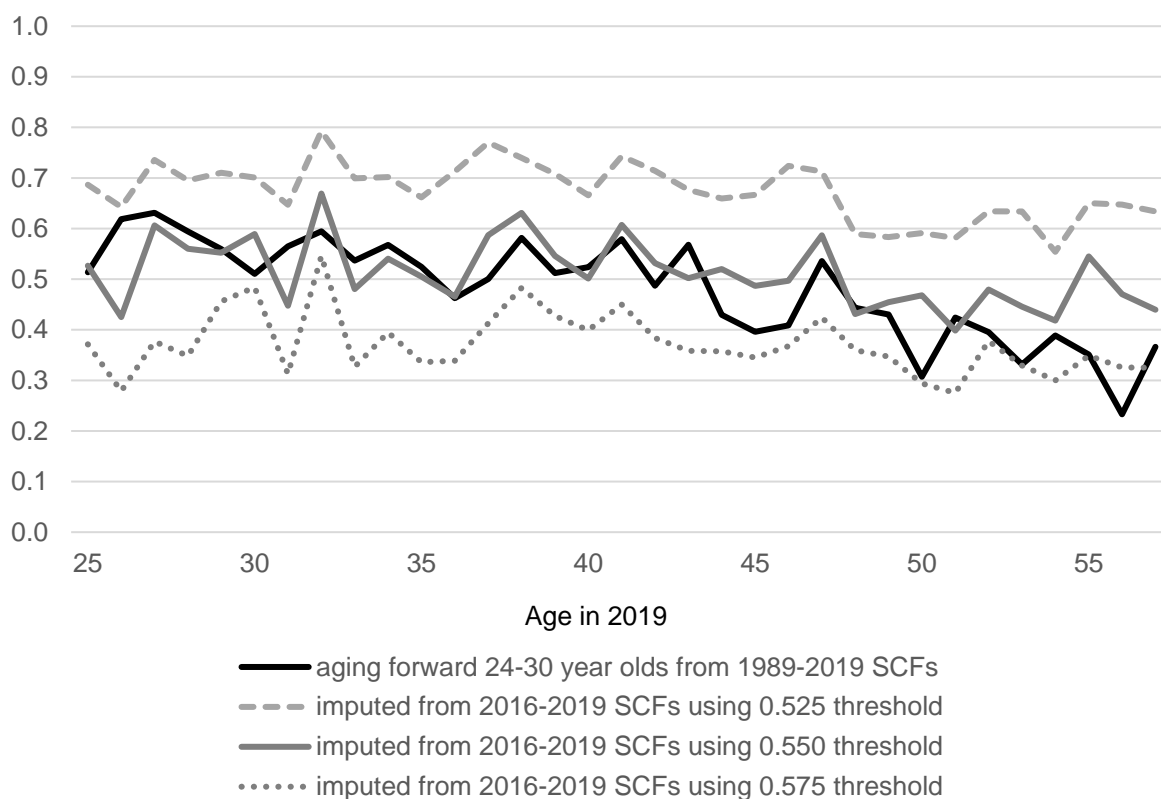
## 2b. College-educated families, by whose education the debt financed



**Figure 2.** Share of families with student debt by age

*Note:* Figures plots the share of families with student loan debt by age-group of the reference person. Panel A plots the share of families with student loan debt by their level of education, where college-educated refers to families in which the reference person attended at least some college. Panel B plots the share of college-educated families with student loan debt, according to whether the largest loan financed the respondent (or partner's) education or anyone in the household.

*Source:* Authors' calculations from 1989-2019 SCF

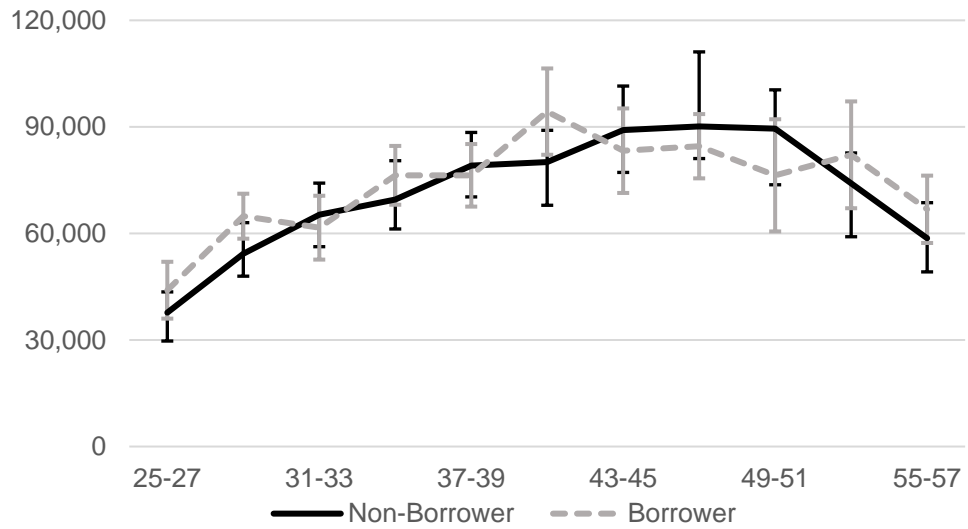


**Figure 3.** Borrowing by college educated families: imputed versus actual share

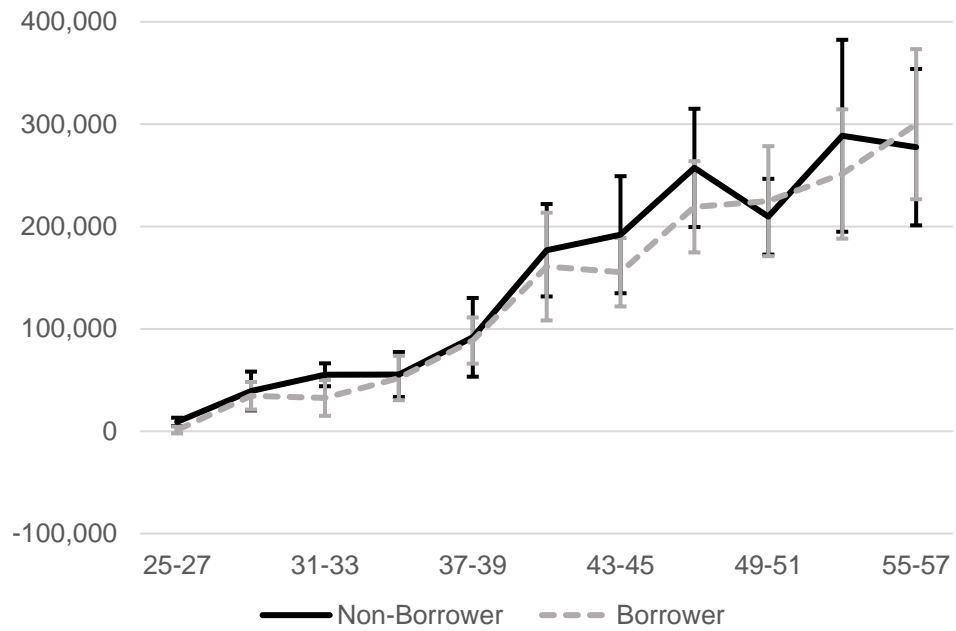
*Notes:* This figure plots student loan borrowing rates for college-educated families in the SCF by 2019 age, derived by averaging borrowing rates by cohort among 24-30-year-old families in the 1989-2019 SCFs or by the imputation described in the text. For the imputation, the solid line denotes the best-fit threshold used in the analysis and the dashed and dotted lines denote the two next-best-fit thresholds. College-educated refers to families in which the reference person attended at least some college.

*Source:* Authors' calculations, 1989-2019 SCF.

4a. Median wage and salary income

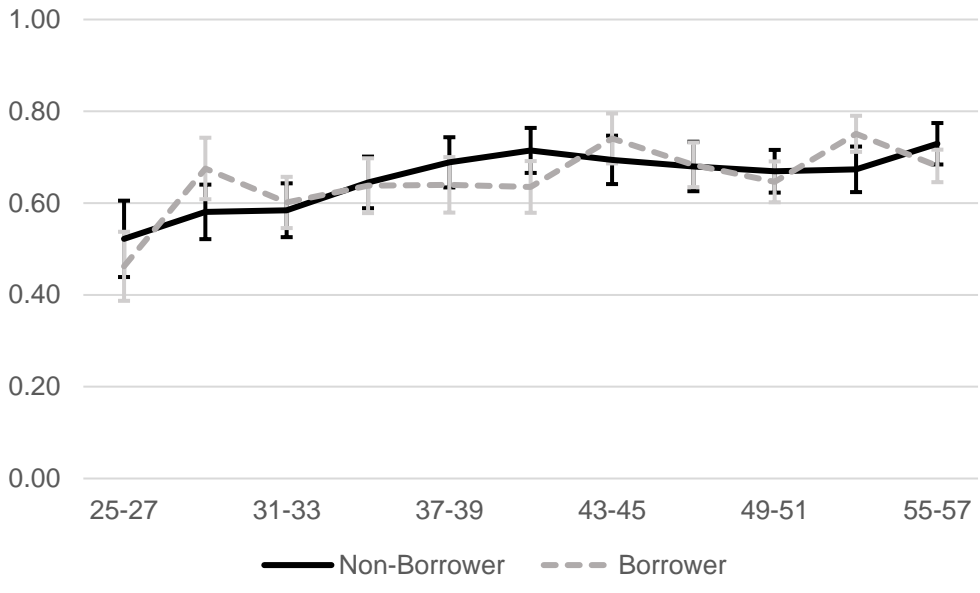


4b. Median net worth

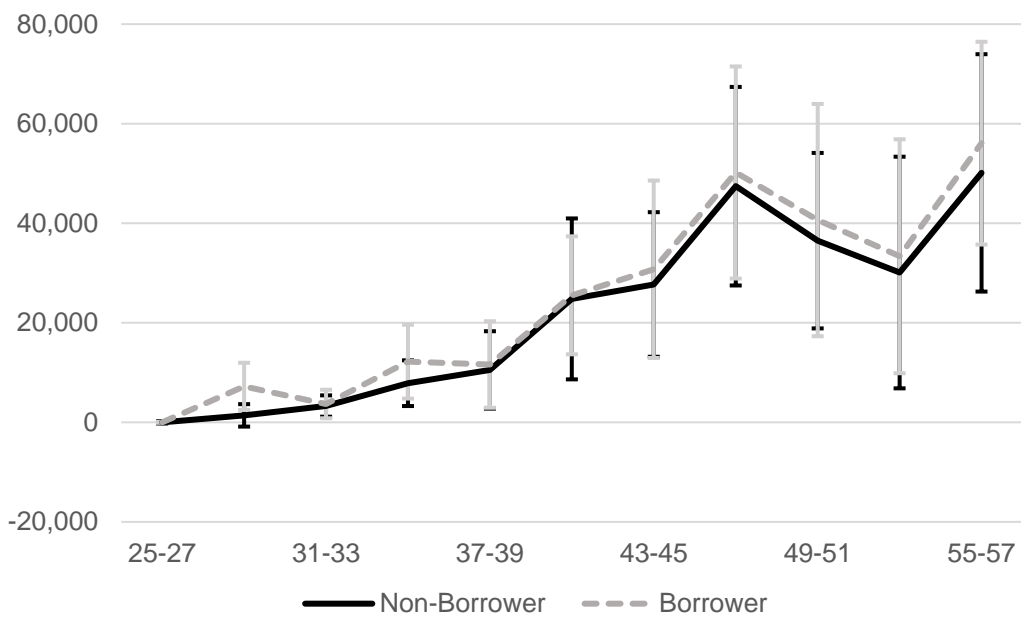




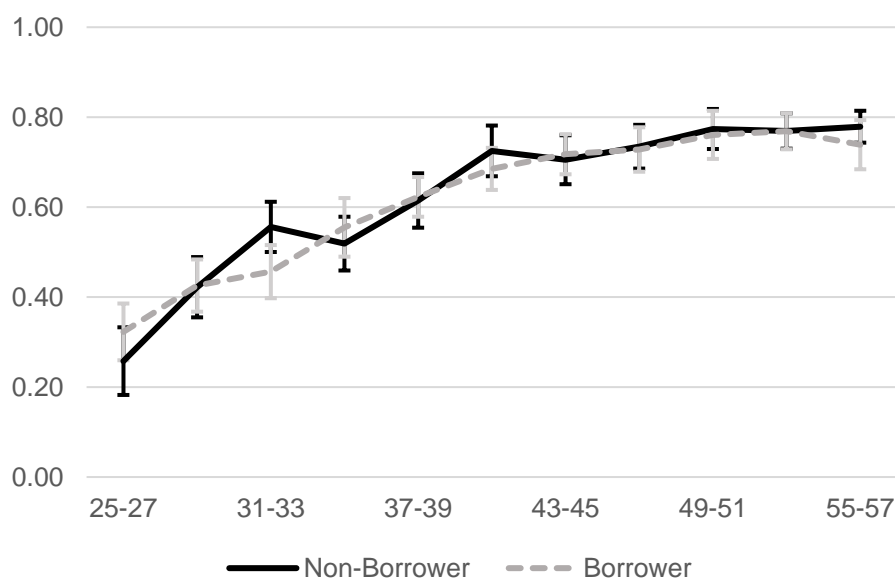
4c. Participates in a retirement plan



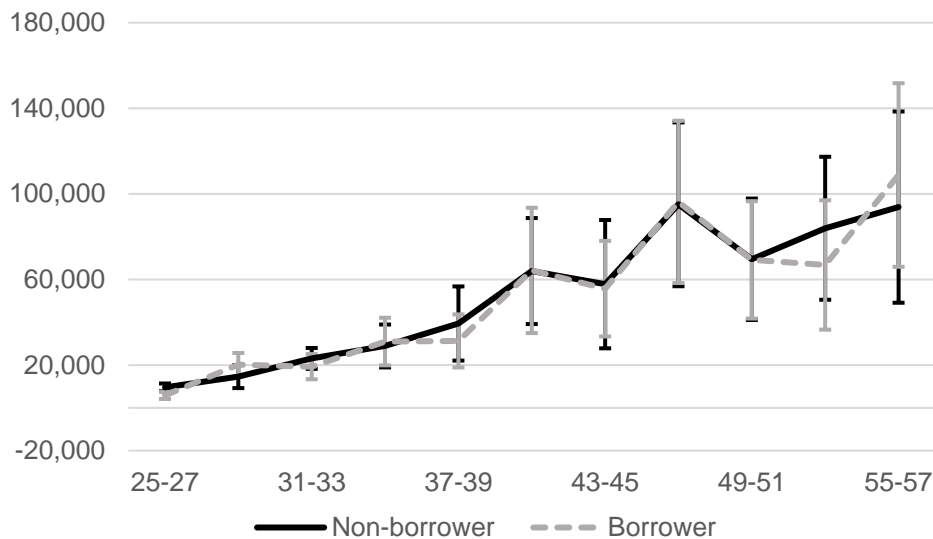
4d. Median savings in quasi-liquid retirement accounts



## 4e. Homeownership rate



## 4f. Median financial assets

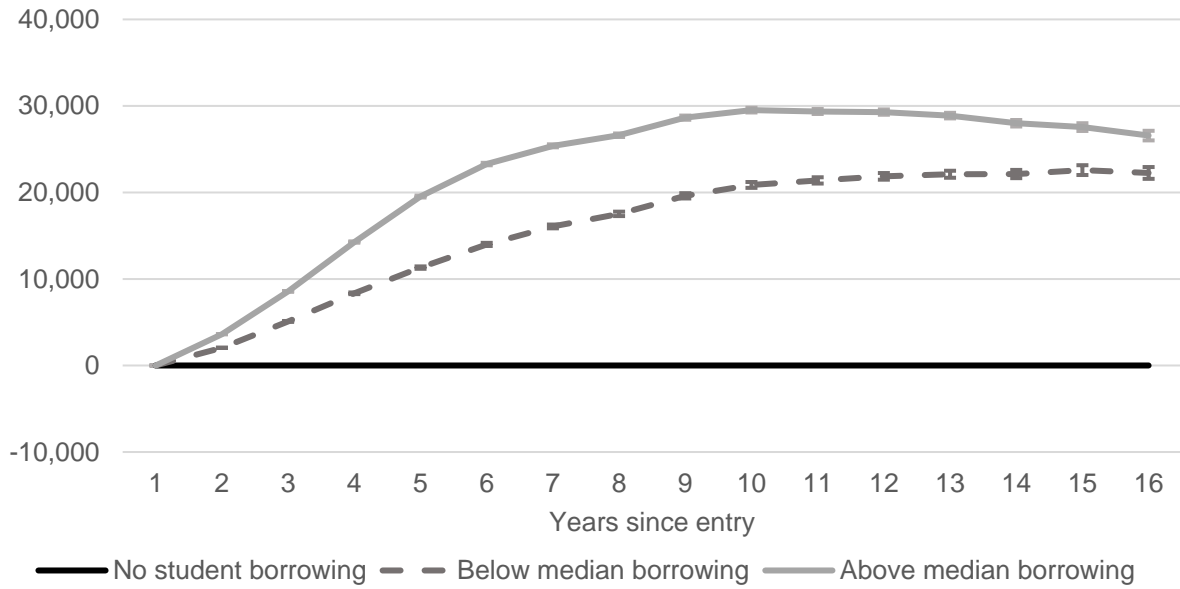


**Figure 4.** Wealth and retirement preparation for college educated families, by imputed student borrower status

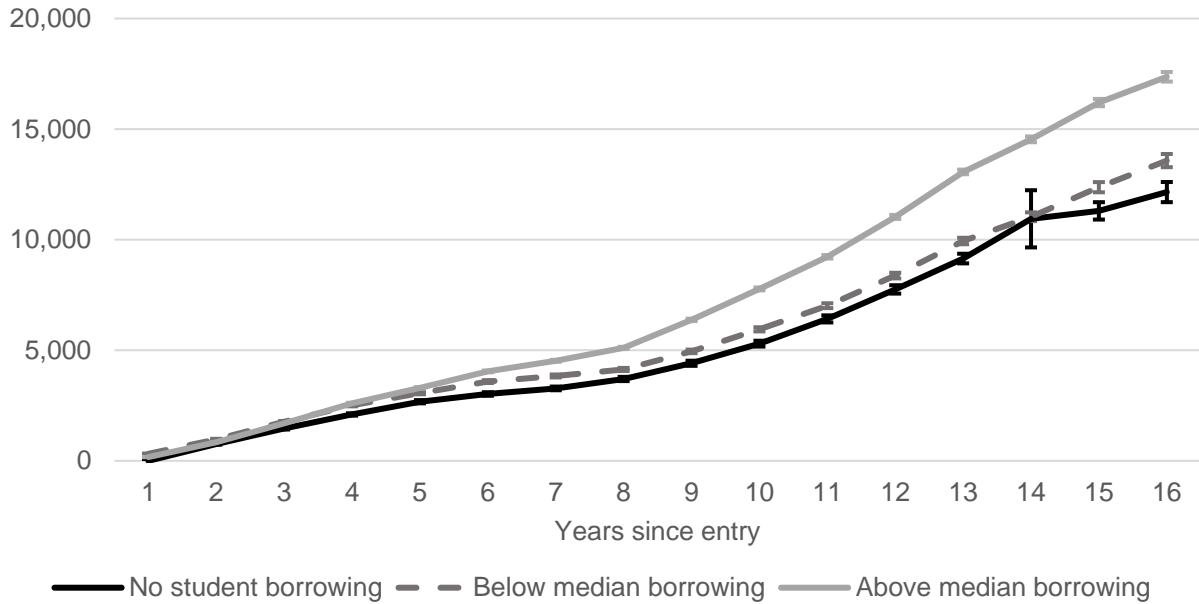
*Notes:* This figure plots various economic indicators for college-educated families by imputed student loan borrowing history and age of the household reference person in three-year age bins. College-educated refers to families in which the reference person attended at least some college. Bars indicate 95 percent confidence intervals.

*Source:* Authors' calculations from 2016 and 2019 SCF.

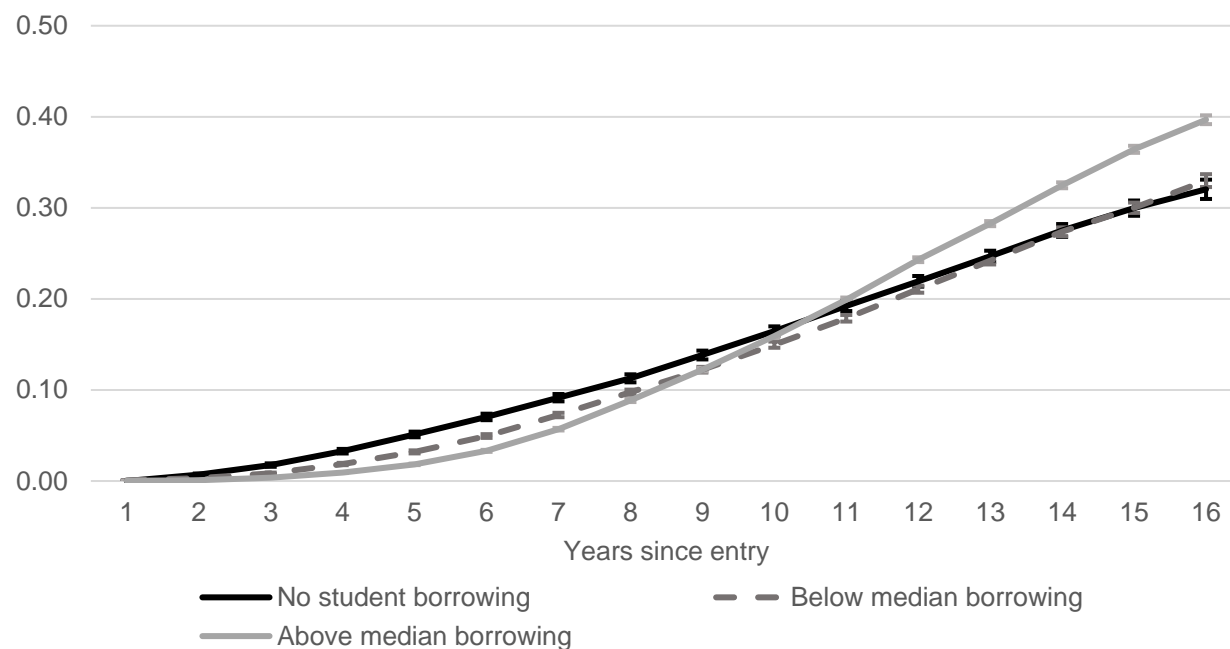
5a. Student loan balance



5b. Credit card limit



## 5c. Has a mortgage



**Figure 5.** Credit report characteristics by student borrower status

*Notes:* Panels display means and 95 percent confidence intervals of each outcome across the three groups (above-median first year student borrowing, below-median first year student borrowing, and no student borrowing) by year since entry into the sample.

*Source:* Authors' calculations from CCP/Equifax.

**Table 1.** Student debt and college attendance by age group

	Has student debt	Has student debt for own education	Attended college
<u>All families</u>			
25-34	0.45	0.45	0.69
35-44	0.34	0.33	0.66
45-59	0.20	0.13	0.63
60-70	0.07	0.03	0.62
<u>Families that attended college</u>			
25-34	0.55	0.55	
35-44	0.42	0.41	
45-59	0.25	0.17	
60-70	0.09	0.04	

*Notes:* Table displays means rates of student debt-holding and college attendance by age group. College attendance refers to families in which the reference person attended at least some college, and own student debt refers to families with student loan debt whose largest student loan financed the respondent's (or their partner's) education.

*Source:* Authors' calculations, 2016 and 2019 SCF.

**Table 2.** Characteristics of families, by presence of student debt

	Received or expects an inheritance	Military service	Black (non- Hispanic)	White (non- Hispanic)	Financial literacy	Graduate degree receipt	Mother high school dropout
All families							
<u>A. With student debt</u>							
25-34	0.26	0.07	0.20	0.58	0.40	0.04	0.12
35-44	0.29	0.10	0.21	0.61	0.44	0.06	0.13
45-59	0.26	0.17	0.22	0.58	0.48	0.04	0.22
60-70	0.38	0.18	0.23	0.57	0.54	0.07	0.29
<u>B. All</u>							
25-34	0.26	0.08	0.17	0.55	0.37	0.02	0.16
35-44	0.25	0.09	0.16	0.56	0.42	0.04	0.20
45-59	0.30	0.14	0.15	0.63	0.47	0.04	0.26
60-70	0.39	0.21	0.14	0.71	0.48	0.05	0.33
College educated families							
<u>C. With student debt</u>							
25-34	0.27	0.07	0.19	0.59	0.43	0.04	0.10
35-44	0.30	0.11	0.22	0.62	0.47	0.07	0.11
45-59	0.30	0.18	0.21	0.61	0.54	0.05	0.18
60-70	0.41	0.21	0.22	0.60	0.57	0.09	0.25
<u>D. All</u>							
25-34	0.29	0.09	0.15	0.60	0.45	0.03	0.10
35-44	0.29	0.11	0.16	0.62	0.51	0.07	0.12
45-59	0.36	0.15	0.14	0.69	0.57	0.06	0.18
60-70	0.47	0.23	0.11	0.77	0.60	0.08	0.22

Notes: Table displays means of various characteristics of SCF respondents.

*Source:* Authors' calculations, 2016-2019 SCF.



**Appendix Table 1.** Student loan aggregates by age (\$T)

	18- 29	30- 39	40- 49	50- 59	60- 69	70+	TOTAL
FRBNY Household Debt and Credit Report (2019:Q1)	0.35	0.5	0.32	0.21	0.09	0.02	1.49
SCF (2019)	0.24	0.43	0.21	0.15	0.07	0.01	1.11
difference	0.11	0.07	0.11	0.06	0.02	0.01	0.38
	<=24	25- 34	35- 49	50- 61	62+	Non- report	All
Federal Student Loan Portfolio (FY2019:Q2)	0.12	0.50	0.56	0.23	0.07	0.00	1.48
SCF (2019)	0.05	0.41	0.41	0.17	0.06	#N/A	1.11
Difference	0.08	0.08	0.14	0.06	0.01	#N/A	0.37

*Sources:* Authors' calculations, 2019 SCF; page 21 of the supplemental data file from the FRBNY Household Debt and Credit Report 2019:Q1 publication; the US Department of Education Federal Student Loan 'Portfolio by Age' file accessible at: <https://studentaid.gov/sites/default/files/fsawg/datacenter/library/Portfolio-by-Age.xls>.

