



Black/white differences in the relationship between debt and risk of heart attack across cohorts[☆]

Jenifer Hamil-Luker^{*}, Angela M. O'Rand

Department of Sociology, Duke University, Durham, NC, USA

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ABSTRACT

Background: Numerous studies show that increasing levels of education, income, assets, and occupational status are linked to greater improvements in White adults' health than Black adults'. Research has yet to determine, however, whether there are racial differences in the relationship between health and debt and whether this relationship varies across cohorts.

Methods: Using data from the 1992–2018 Health and Retirement Study, we use survival analyses to examine the link between debt and heart attack risk among the Prewar Cohort, born 1931–1941, and Baby Boomers, born 1948–1959.

Results: Higher unsecured debt is associated with increased heart attack risk for Black adults, especially among Baby Boomers and during economic recessions. Higher mortgage debt is associated with lower risk of heart attack for White but not Black Baby Boomers. The relationship between debt and heart attack risk remains after controlling for health behaviors, depressive symptoms, and other economic resources that are concentrated among respondents with high levels of debt.

Conclusion: Debt is predictive of heart attack risk, but the direction and strength of the relationship varies by type of debt, debtors' racial identity, and economic context.

1. Introduction

In 2022, U.S. household debt reached an unprecedented \$16 trillion (Federal Reserve Bank of New York Center for Microeconomic Data, 2022). Approximately three-quarters of Black- and White-headed families have debt, but the median debt-to-asset ratio is 50% higher among Black than White families (Copeland, 2020), with Black borrowers less likely to fully repay loans (Brevoort et al., 2021). What this enormous debt burden means for people's health is unclear. A growing body of research links debt to poor health outcomes, such as depression (Sun & Houle, 2020), pain (Frech et al., 2021), and poor self-reported health (Sweet et al., 2013). However, the relationship between debt and health is complex, contingent on the amount and form of debt, health measure, and context in which people accrue debt (O'Rand & Hamil-Luker, 2020).

The link between debt and health may also vary by racial identity. Mounting evidence finds that increasing levels of education, income, occupational status, and assets provide greater health benefits to White than Black people (Ciciurkaite, 2021). According to the “diminishing

returns hypothesis” (Farmer & Ferraro, 2005), people of color face different systems of opportunities and constraints than White people and are less able to translate socioeconomic achievements into health benefits. Past and present racial discrimination, segregation, and ostensibly color-blind policies asymmetrically distribute the advantages of social class across racial groups. Although less often studied than traditional indicators of socioeconomic status (SES), debt is a measure of access to resources and position in the social hierarchy whose health correlates may vary by race.

This paper explores whether and how the relationship between debt and cardiovascular health varies by race, form of debt, and cohort. We focus on heart attack risk because heart disease is the leading cause of death in the U.S. (CDC, 2021) and there is a documented relationship between debt and cardiovascular diseases (Lippert et al., 2022; Savu et al., 2015; Sommer et al., 2015; Wolfe et al., 2022). Survival analyses of two cohorts surveyed in the Health and Retirement Study (1992–2018) test whether secured and unsecured debt differentially predict heart attack risk for White and Black respondents across different economic contexts. Although household debt has increased for

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^{*} Corresponding author.

E-mail address: jenifer.hamil@duke.edu (J. Hamil-Luker).

all age groups since the 1980s (Li, 2019), the consequences of debt are contingent on the political and economic environments in which individuals accrue debt. Borrowers from different cohorts are exposed to different lending markets, sales tactics, product availability, and risk-based pricing which could have varying health implications.

1.1. *Conflicting meanings and experiences of debt*

Debt is commonly defined by undesirable financial problems that can result in housing foreclosures (Dwyer, 2018), poverty (Kim et al., 2017), reduced educational achievement (Houle & Warner, 2017), food insecurity (Brewer, 2020), and difficulty meeting other basic needs. Over-indebtedness can act as a stressor that induces physiological changes and limits access to psychosocial and economic resources (Sweet, 2021). Managing and worrying about financial debt can impair cognitive processing and increase anxiety (Ong et al., 2019), leading to depression (Sweet, 2018), suicidal thoughts and attempts (Elbogen et al., 2020). Debt can be a financial burden that creates barriers to necessary medical care, prevents spending on necessities, promotes health-depleting coping behaviors, and exerts wear-and-tear on the body (Khera et al., 2020). Researchers have linked high levels of household debt to worse self-reported health and more chronic health problems, work limitations, and physical health symptoms (Boen et al., 2020; Sweet et al., 2013).

Not all debt, however, leads to harmful consequences. In fact, the most indebted households also have the greatest assets (Bhutta et al., 2020), with the top 25% of income earners owing more than 50% of household debt (Kuhn et al., 2017). Debt allows people to purchase homes, start businesses, and finance education, resulting in wealth accumulation and upward social mobility (Seamster, 2019). Debt can reduce income taxes, give access to financial tools, and indicate credit worthiness and incorporation into the economy (Seamster, 2019). Approved borrowers can use debt to survive economic hardships (Maroto, 2021). Debt can contribute to physical and mental health by providing residential stability in safe neighborhoods (Acolin, 2020) and paying for healthcare and health-promoting activities (Dalton & LaFave, 2017). Accordingly, debt can be a risky liability carried into an uncertain future, an investment resource that opens opportunities, or a safety net during difficult times.

The subjective meaning and health correlates of debt depend on the type of debt people hold. Student loan debt, for example, is strongly associated with lower life satisfaction, but mortgage debt is not (Greenberg & Mogilner, 2021). Unsecured debt that is not backed by assets is more stressful and anxiety-provoking than collateralized debt (Dunn & Mirzaie, 2016; Richardson et al., 2013; Sweet et al., 2018), especially when borrowed from money lenders with high interest rates (Turunen & Hiilamo, 2014). Predatory debt mechanisms, such as car title and payday loans, charge exploitative interest rates on debts that cannot be leveraged to create more wealth (Seamster, 2019) and are associated with poor self-rated health (Eisenberg-Guyot et al., 2018). Debt in the form of unpaid fines, court costs, bail, and other criminal justice fees can contribute to mental health problems and incarceration, which further increase the risk of poor health (Harper et al., 2021).

Some forms of debt have a positive relationship with health. In their investigation of household debt across 17 countries, Clayton et al. (2015) find that short- and medium-term debt is associated with increased life expectancy and reduced premature mortality, perhaps by allowing households to survive unexpected financial shocks. Mortgage debt is not predictive of poor self-reported health (Leung & Lau, 2017), depressive symptoms, nor psychological well-being (Berger et al., 2016). Mortgage debt evokes less financial stress than unsecured consumer debt (Loibl et al., 2022), so is potentially less health-depleting. In fact, O’Rand and Hamil-Luker (2020) find that debt used to purchase homes is linked to reduced risk of heart attack among Baby Boomers. They hypothesize that high levels of mortgage debt, which are correlated with high income and assets, allow more advantaged homeowners to leverage

secured debt to survive volatile economies. Rich households have a greater capacity to carry debt as a resource in their financial portfolios (Kuhn et al., 2017).

Debt’s impact on individuals also depends on the economic, cultural, and political conditions at the time of indebtedness (Rona-Tas & Guseva, 2018). Borrowers are particularly vulnerable to negative consequences of debt in times of stagnant incomes, high unemployment, and aggressive lending practices; under these conditions, debt increases vulnerability to job loss, health crises, housing instability, and family problems (Boen & Yang, 2016; Hodson et al., 2014). While debt during times of economic prosperity can lead to increased wealth, economic crises tend to worsen consumer debt stress and the health risks of indebtedness (Dunn & Mirzaie, 2016; Dwyer, 2018).

Birth cohorts’ encounters over the life course with varying economic and political conditions shape their experiences of indebtedness. For example, young adult Baby Boomers in the early 1980s faced escalating interest rates and two recessions that delayed first homeownership for many (Devaney, 1994). Deregulation of housing loan markets meant Boomers carried significantly more mortgage debt across their lives than cohorts born before World War II (Kuhn et al., 2017). Proliferation of credit cards since the 1970s and growing social acceptance of debt contributed to increasing debt-to-income ratios among succeeding cohorts (Kuhn et al., 2017).

Finally, the meaning and consequences of debt are shaped by debtors’ characteristics, with more marginalized groups at higher risk of worse outcomes. Debt, for example, is most strongly predictive of depressive symptoms for people with a high school education or less (Berger et al., 2016; Sun & Houle, 2020). For children, the negative impact of unsecured debt on well-being is greatest in disadvantaged households (Berger & Houle, 2019). Among the bottom 75% of earners, difficulty paying the mortgage is linked to declining self-reported health; this is not the case for top-quartile earners (Clair et al., 2016). Credit card debt among affluent borrowers is only weakly related to mental health; however, middle-class debtors are likely to experience significant increases in anxiety and depression with increasing credit card debt (Hodson et al., 2014). For low-income adults, having any credit card debt increases their risk of anxiety.

1.2. *Diminishing returns hypothesis and debt*

We build on studies that find debt as more health-depleting for the economically disadvantaged by exploring how race interacts with socioeconomic status to shape the association between debt and cardiovascular health. Numerous findings support the diminishing returns hypothesis: Black people’s health is less likely to benefit from their cumulative socioeconomic resources than White people’s. For example, inflammation levels are lower among upwardly mobile and high SES White Americans, but no such SES differences appear among Black Americans (Surachman et al., 2021). Higher income and education are associated with lower body mass index among White but not Black adults (Ciciurkaite, 2021). Black people receive fewer health protections from savings (Boen et al., 2020), as well as lower health returns to their college degrees and high incomes than White people (Boen, 2016). In short, racial inequalities in health increase in magnitude as socioeconomic status increases (Bell et al., 2020; Wilson et al., 2017).

Why might members of the Black middle- and upper-class receive fewer health returns to SES than their White counterparts? Having college degrees, owning houses, or managing successful companies may not benefit Black people’s health as much as White people’s because the protective benefits of socioeconomic resources are smaller in the presence of segregation and discrimination (Assari, 2018). Racism embedded in social institutions and daily life can diminish health benefits otherwise derived from economic and psychological assets. For high SES Black people, daily experiences of racial discrimination are reminders of status incongruence that can create chronic stress that depletes physical health despite socioeconomic resources (Forde et al.,

2019). The diminishing returns hypothesis views middle- and upper-class Black Americans' higher rates of illness, disability, and mortality as a physiological response to structural barriers and cultural conditions, not as results of lifestyle choices. Excellent health insurance, for example, may not reduce high SES Black adults' risk of cardiovascular problems when medical institutions offer reduced or lower quality healthcare to people of color regardless of social class (Hill, 2016).

The same may be the case for debt, with the beneficial health correlates of wealth-promoting debt smaller for Black than White debtors. This could be due to the well-documented racial differences in access to and financial benefits of debt. Historically, government policies and private institutions legally blocked Black people's access to credit, denying loans to Black farmers, potential home buyers, college students, business owners, and other prospective borrowers (Daniel, 2013; Hunter, 2015; Rothstein, 2017; Steil et al., 2018). For example, the 1944 GI Bill provided White soldiers returning from service after World War II low interest business loans, free college tuition, and loan guaranties for new homes or farms; legislation and local practices, however, limited these opportunities for Black veterans (Hunter, 2015). From the 1930s through the 1960s, federal authorities color-coded Black neighborhoods red to indicate they were too "risky" and thus ineligible for federally insured housing loans (Massey et al., 2016).

Although civil rights legislation of the 1960s and 1970s banned these overt forms of discrimination, Black and White Americans still experience a separate and unequal banking system (Baradaran, 2017). Black people today have increased access to financing, but are channeled into predatory credit markets on less favorable terms than Whites (Rothstein, 2017). In a practice known as reverse redlining, subprime lenders, payday loan companies, and other predatory lending organizations target minority neighborhoods and people of color with risky and costly loans (Hwang et al., 2015; Taylor, 2019). During the housing boom of the early 2000s, for example, the nation's largest mortgage lenders gave loans with higher fees and interest rates to Black borrowers with the same risk profiles as White borrowers (Cheng et al., 2015; Massey et al., 2016; Taylor, 2019). Expensive, for-profit colleges also target economically vulnerable students of color and charge them high interest loans (Womack, 2018).

"Fringe" financial services, such as check cashers and payday lenders, are concentrated in Black and Brown communities while "mainstream" commercial banks are more likely located in White communities (Faber, 2019). Even after controlling for market competition and neighborhood demographics, costs of financial services are higher in banks in largely Black and Latinx neighborhoods (Faber & Friedline, 2020). Black Americans are four times more likely than White Americans to not have bank accounts; they are three times more likely to rely on alternative financial products, such as auto title and pawnshop loans (Brevoort et al., 2021).

Racial differences in access to and characteristics of debt mean that "good debt" as a valued economic resource aligns closely with "White debt" and "bad debt" as a detrimental economic burden typifies "Black debt" (Seamster, 2019). White people, on average, are more likely to have mortgage debt than Black people, but Black people are more likely to have credit card debt (Dettling et al., 2017). Debt for White adults is often an indicator of financial stability, a tool to survive economic downturns, and a means to move up the socioeconomic ladder (Charron-Chénier & Seamster, 2020). Debt for Black adults, however, is rarely an asset; instead it is a negative balance sheet with high interest rates and low returns (Seamster, 2019).

Studies indicate that debt more often leads to negative consequences for Black than White borrowers. Black people with unpaid medical debt are more likely to lose their homes to foreclosures than White people with medical debt (Lichtenstein & Weber, 2016). Black households are disproportionately negatively impacted by the health-consequences of debt from criminal justice fines and fees (Harper et al., 2021). Black people with student loans report significantly more debt-related stress than White borrowers (Martin & Dwyer, 2021), which in turn is linked

to increased symptoms of depression and worse self-rated health (Tran et al., 2018). Even when controlling for the amount of mortgage debt, Black people experience higher risks of delinquency, foreclosure, and default than Whites (Dwyer, 2018; Kim et al., 2017; Perry, 2019). It is unknown, however, whether there are racial differences in the relationship between debt and heart attacks.

We view debt as an underexamined, unique indicator of SES whose health correlates likely vary by race, cohort, and economic context. Building on the diminishing returns hypothesis, we predict:

- H1 Debt is correlated with heart attacks, in part, because of its link to other economic resources, health behaviors, and psychological distress; the strength and direction of those relationships vary by race and cohort.
- H2 Higher education, occupational status, income, and assets are associated with greater reductions in heart attack risk for White than Black adults.
- H3 Increases in unsecured debt are associated with elevated risk of heart attack, especially during economic recessions and for Black borrowers and Baby Boomers.
- H4 Increases in housing debt are positively associated with heart attack risk, especially for Black borrowers and Baby Boomers.

2. Methods

We test these hypotheses with data from the Health and Retirement Study (HRS), a national panel of face-to-face interviews that began in 1992 with people aged 51–61 (Fisher & Ryan, 2018). Every six years, respondents aged 51–56 are added to the sample to replenish older cohorts as they age, with follow-ups conducted every second year. To examine health correlates of debt across historic context, we compare two cohorts. The Prewar Cohort (N = 8698 in 1992) was born between 1931 and 1941 and aged into their 80s over the survey period. Since the average age of first-time home buyers for this cohort was 24–25 (Berson & Neely, 1997), they were purchasing first homes in the 1950s and 60s when the federal government was providing financial support for home ownership, primarily to White borrowers, and interest rates were low (Devaney, 1994). Racial differences in borrowing and home ownership were stark; 64% of White Americans owned their home in 1960 compared to only 38% of Black Americans (Devaney, 1994). Most homeowners paid off their mortgages after 30 years, although people without college degrees were less likely to do so (Kuhn et al., 2017).

The debt environment for Baby Boomers, our second cohort born 1948–1959 (N = 6792 in 2010), presents a starkly different picture. With the average age of first homeownership increasing to 29, Baby Boomers purchased their starter homes during the unprecedentedly high mortgage interest rates of the late 1970s and 1980s (Devaney, 1994). Interest rates declined rapidly afterwards, although racial differences in home ownership did not (Baradaran, 2017). Boomers would have been at the height of their earnings histories during the Great Recession of 2007–2009, with homeowners potentially leveraging housing equity to survive the economic downturn (Garriga & Hedlund, 2020). By 2018, they were aged 59–69 and less likely than previous cohorts to have paid off their mortgages, in part because of their higher debt-to-income ratios (Kuhn et al., 2017). Both cohorts experienced a dramatic rise in unsecured debt (Ebrahimi, 2020) and increasing concentration of housing debt among top income earners (Kuhn et al., 2017).

Our sample includes self-identified White and Black respondents from both cohorts who entered the survey aged 51–61 and were followed through 2018, the last released survey year, or until their death, heart attack, or survey dropout. When respondents die, the HRS conducts exit interviews with knowledgeable proxy respondents, giving us information about the cause and timing of death, as well as other measures in our analyses. Key economic measures come from the RAND HRS Longitudinal File, which reduces missing values by using data from all waves in model-based imputations. We analyze weighted data that

adjusts variance estimates and corrects for clustering in the multi-stage probability surveys that oversample Black people and Florida residents. Results of sensitivity analyses without imputed data and proxy interviews produce no substantive differences in results.

We first present descriptive statistics by race and cohort. Next, we explore the common assumption that people with limited means accrue debt that depletes health by increasing stress and unhealthy behaviors. To do so, we present adjusted odds ratios with 95% confidence intervals from a series of logistic regressions run separately by race and cohort at survey entry. Odds ratios predict whether respondents are in the upper quartile of the housing and unsecured debt distributions if they have high incomes (top 25% of earners) vs. lower incomes, college degrees vs. no college degrees, and upper-white collar occupations vs. other or no occupation. Models also control for age, sex, employment status, and assets. Similarly, we present adjusted odds ratios by cohort and race for high housing and unsecured debt predicting poor health behaviors and depressive symptoms.

Finally, we use survival analysis to examine how debt, SES, and health behaviors are linked to the occurrence and timing of heart attacks. Survival analyses study time-to-event data that involves censoring that occurs when time-to-event is known for only some sample members (Guo, 2010). In this case, we know the date of heart attack for some respondents, but others have yet to experience heart attacks and others never will. More specifically, we specify distribution-free Cox regression models with partial likelihood estimation to examine how measured factors influence the rate of heart attack happening at particular time points (Guo, 2010). To compare groups’ hazard rates, we use the hazard ratio, or $exp(\beta_k)$, which is the ratio of the total number of observed to expected events in two independent comparison groups. Hazard ratios greater than one indicate an increased risk of event as the value of the covariates increase. Hazard ratios less than one indicate covariates are associated with decreasing hazard of the event.

The dependent variable is a measure of whether and when respondents had a *first heart attack*. In every survey, respondents or their proxies report whether a doctor had ever (or since the last interview) told them they had a heart attack. Respondents who answer yes report the date of heart attack; we subtract their birthdate from the date of first heart attack to calculate duration. For respondents who did not report heart attacks, duration equals age at last interview.

Baseline characteristics include respondents’ self-reported *gender*, *age*, completed years of *education*, and self-reported *race* as Black or White. The remaining variables are measured at every survey year. Our key predictors are measures of debt owed during the survey year, measured in constant 2018 dollars and transformed by the inverse hyperbolic sine (IHS) transformation to adjust for the highly skewed distribution that includes zero values. We measure *housing debt* as the total amount of money respondents owe on mortgages and home equity loans. *Unsecured debt* includes the amount of debt respondents owe on credit cards, medical bills, personal loans, or other debt that does not have collateral. In descriptive statistics, we use categorical measures of secured and unsecured debt, comparing those with *no debt* and *high debt*. For each cohort, we calculate the unsecured debt distribution by race each year among respondents who owe unsecured debt. Those in the upper 25% of the distribution are identified as having high unsecured debt. We repeat this process to identify high housing debtors as respondents in the top quartile of the housing debt distribution.

Time-varying indicators of SES include IHS transformed *household income* and *assets* in inflation-adjusted 2018 dollars. We compare *currently employed* and *never employed* respondents to those who are not currently in the labor market. We measure ever-employed respondents’ longest occupation as *blue-collar* (crafts, labor, farm, and operative occupations), *lower white-collar* (clerical and sales occupations), or *upper white-collar* (managerial, professional, and executive occupations). In figures presenting results from hazard analyses, we model *high SES* as respondents with college degrees, upper white-collar occupations, and in the top quartile of the income and asset distributions. *Low SES*

Table 1
Variable means and median values in parentheses by race and cohort at ages 51–61; HRS 1992 and 2010.

	Prewar Cohort in 1992		Baby Boomers in 2010	
	White (N = 7019)	Black (N = 1679)	White (N = 4568)	Black (N = 2224)
Socioeconomic Resources:				
Unsecured debt in 2018 dollars	6100 (0)	5100 (0)	10,400 (0)	9300 (0)
Housing debt for homeowners	56,000** (26,900)	40,500** (17,800)	113,500** (67,700)	79,500** (28,700)
Household income	94,300** (75,000)	55,500** (41,100)	111,000** (80,300)	57,900** (35,300)
Total assets	532,100** (265,600)	146,500** (79,300)	613,100** (296,200)	147,100** (42,300)
Education	12.70**	11.24**	13.85**	12.94*
Currently employed	.71**	.63**	.70**	.57**
Never employed	.03**	.05**	.03**	.08**
Formerly employed	.26**	.32**	.27**	.35**
Upper white-collar occupation	.31**	.15**	.48**	.23**
Lower white-collar occupation	.28**	.38**	.34**	.51*
Blue-collar occupation	.38**	.42**	.15**	.18**
Health:				
Heart attack by age 51-61	.05*	.07*	.04*	.06*
Heart attack by 2018	.19*	.20*	.07*	.09*
Takes blood pressure meds	.36*	.57*	.42*	.65*
Number doctor visits	3.74	3.52	8.61	8.10
Current smoker	.28	.30	.21**	.31**
Heavy drinker	.05	.05	.15	.14
Moderate drinker	.59**	.47**	.56**	.45**
Non-drinker	.36**	.48**	.29**	.41**
Frequently exercises	.19	.19	.31**	.24**
Body mass index	26.75**	28.75**	28.94**	30.86*
Depressive symptoms	1.36**	2.09**	1.44**	2.16**

**Mean Black/White differences are statistically significant at $p < .01$.

respondents lack college degrees and white-collar occupations and are in the bottom quartile of the income and asset distribution. To test whether the relationship between heart attack and debt varies by economic conditions, we include a dummy variable that equals one if data collection occurred during a *recession*, as designated by the Federal Reserve (2001, 2007–2009).

Finally, we include time-varying measures of health behaviors and mental well-being. Respondents report the number of times they *visited a doctor* in the past year and whether they are taking medicine for *high blood pressure*. We compare *current smokers* to former and non-smokers. As defined by the Centers for Disease Control, we identify *heavy drinkers* as men who consume at least 15 drinks per week and women who consume at least eight. *Moderate drinkers* consume less than heavy drinkers. Respondents who *frequently exercise* engage in vigorous activities like swimming or jogging at least three times per week. Respondents report their weight and height, which we use to calculate their *body mass index*. *Obesity* is a dichotomous measure of whether or not respondents’ BMI is 30 or higher. Finally, respondents report whether they experienced eight *depressive symptoms* for much of the past week, such as “I felt depressed” and “everything I did was an effort.” We

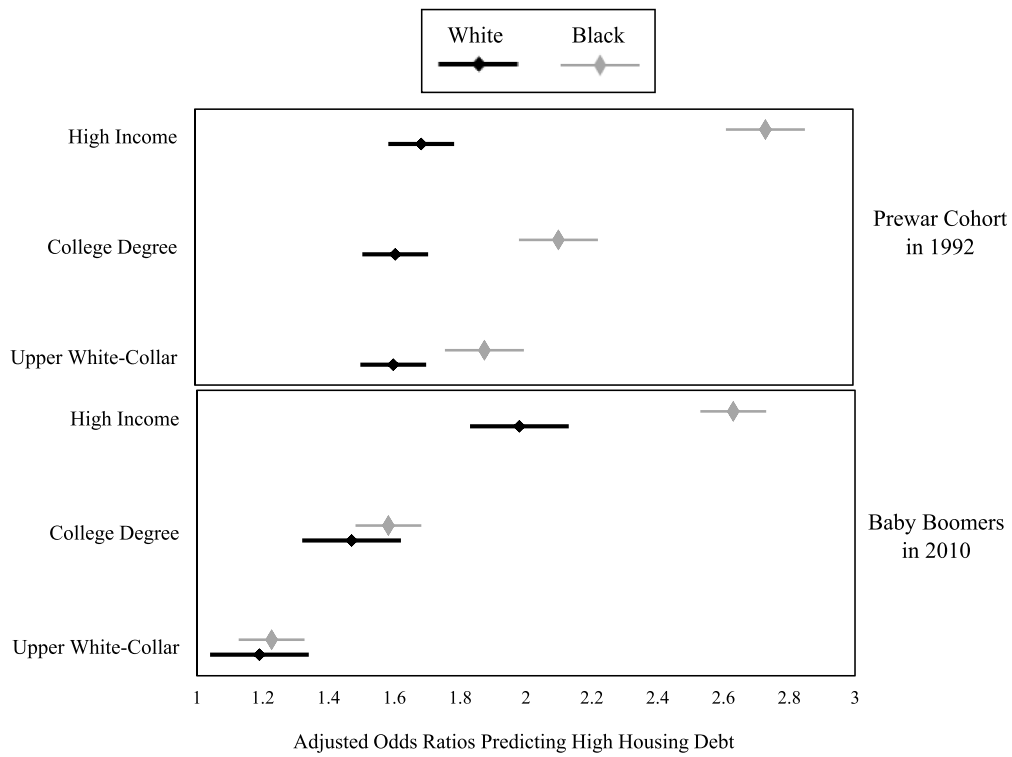


Fig. 1. Adjusted Odds Ratios with 95% Confidence Intervals Predicting High Housing Debt among Homeowners by SES, Cohort, and Race at Ages 51–61; Health and Retirement Study 1992 (N = 7585) and 2010 (N = 5186)
 Note: Logistic regression models are run separately by cohort and race; they also control for age, sex, employment, and assets.

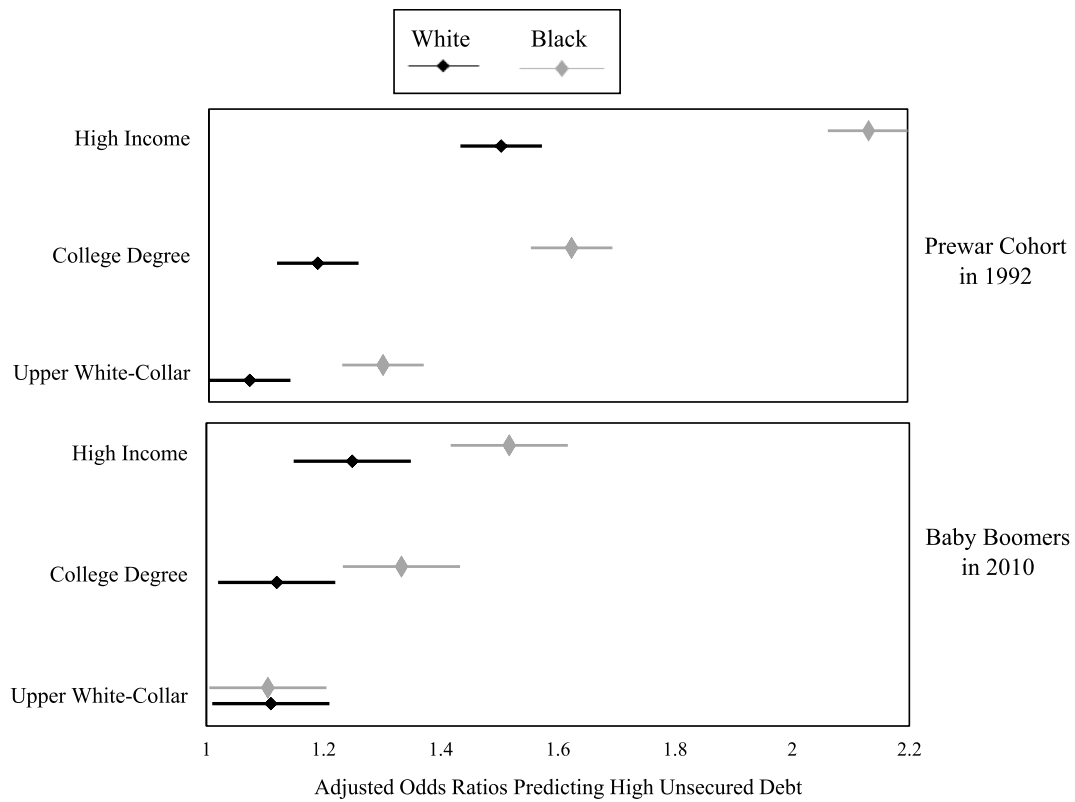


Fig. 2. Adjusted Odds Ratios with 95% Confidence Intervals Predicting High Unsecured Debt by SES, Cohort, and Race at Ages 51–61; Health and Retirement Study 1992 (N = 8698) and 2010 (N = 6792)
 Note: Logistic regression models are run separately by cohort and race; they also control for age, sex, employment, and assets.

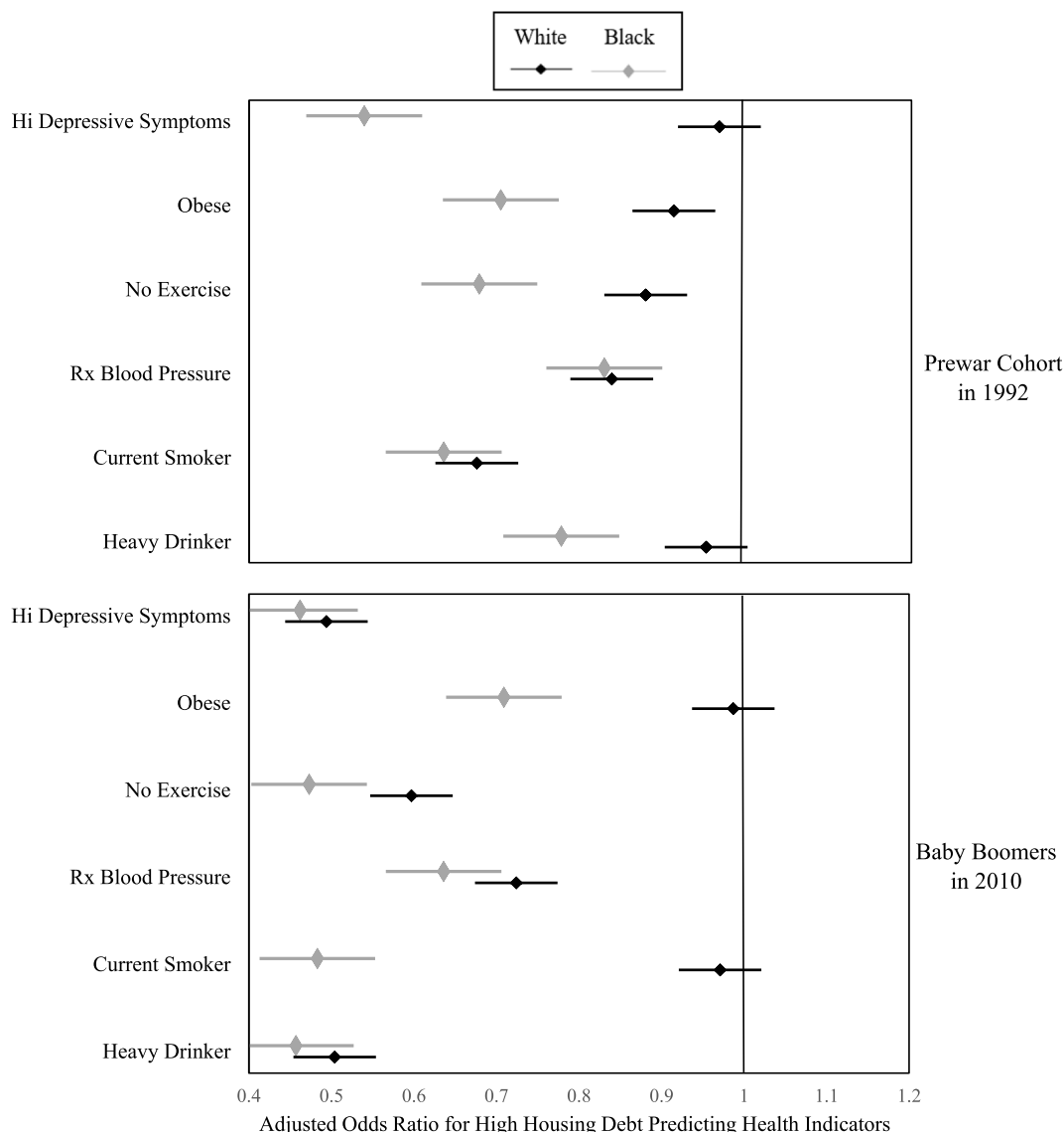


Fig. 3. Adjusted Odds Ratios with 95% Confidence Intervals for High Housing Debt Predicting Health Indicators among Home Owners at Ages 51–61 by Cohort and Race; 1992 HRS (N = 7585) and 2010 HRS (N = 5186)
 Note: Logistic regression models are run separately by cohort and race; models also control for age, sex, education and income.

use items from this Center for Epidemiological Studies-Depression scale, ranging from 0 = low levels of depressive symptoms to 8 = high levels, to measure psychological well-being. Following Briggs and colleagues (2018), respondents who score 9 or more are coded as having clinically significant symptoms of depression.

3. Results

Table 1 reports descriptive statistics separately by race and cohort at the time of survey entry when respondents were aged 51–61. There are statistically significant racial differences in socioeconomic resources for both cohorts, with White respondents, on average, holding more debt, income, and assets. The majority of respondents did not have unsecured debt (median = 0), but most homeowners had mortgages. Table 1 mirrors national trends of increasing household debt over time. In 1992, the mean debt for White respondents was \$62,100 (\$6100 unsecured + \$56,000 housing). Their age-mates in 2010, on average, owed almost twice as much debt in constant dollars (\$10,400 unsecured + \$113,500 housing). The pattern is similar for Black respondents (\$45,600 in 1992 vs. \$88,800 in 2010), but the debt amounts are lower. In both cohorts,

White respondents’ incomes in late middle-age, on average, are 1.7–1.9 times higher than Black respondents; their assets are 3.6–4.2 times greater. Mean education is higher for Baby Boomers than Prewar Cohort members, with employment shifting away from blue-collar occupations in 1992 to upper-white collar for White Boomers and lower white-collar for Black Boomers in 2010.

The second panel in Table 1 reports race and cohort differences in health measures. Black respondents in both cohorts are more likely to report having a heart attack, with heart attacks more common in the Prewar Cohort, due in part to their longer observation period. Taking medication for blood pressure, abstaining from alcohol, depressive symptoms, and high body mass index are more common among Black respondents in both cohorts. White and Black Boomers, on average, go to the doctor more frequently than Prewar Cohort members. Among Boomers, Black respondents are more likely to smoke, but less likely to exercise frequently.

Figs. 1 and 2 test H1, which predicts that the positive relationship between debt and SES varies by race and cohort. Results show that high SES respondents are more likely to be in the top quartile of the unsecured and secured debt distributions than those without high incomes,

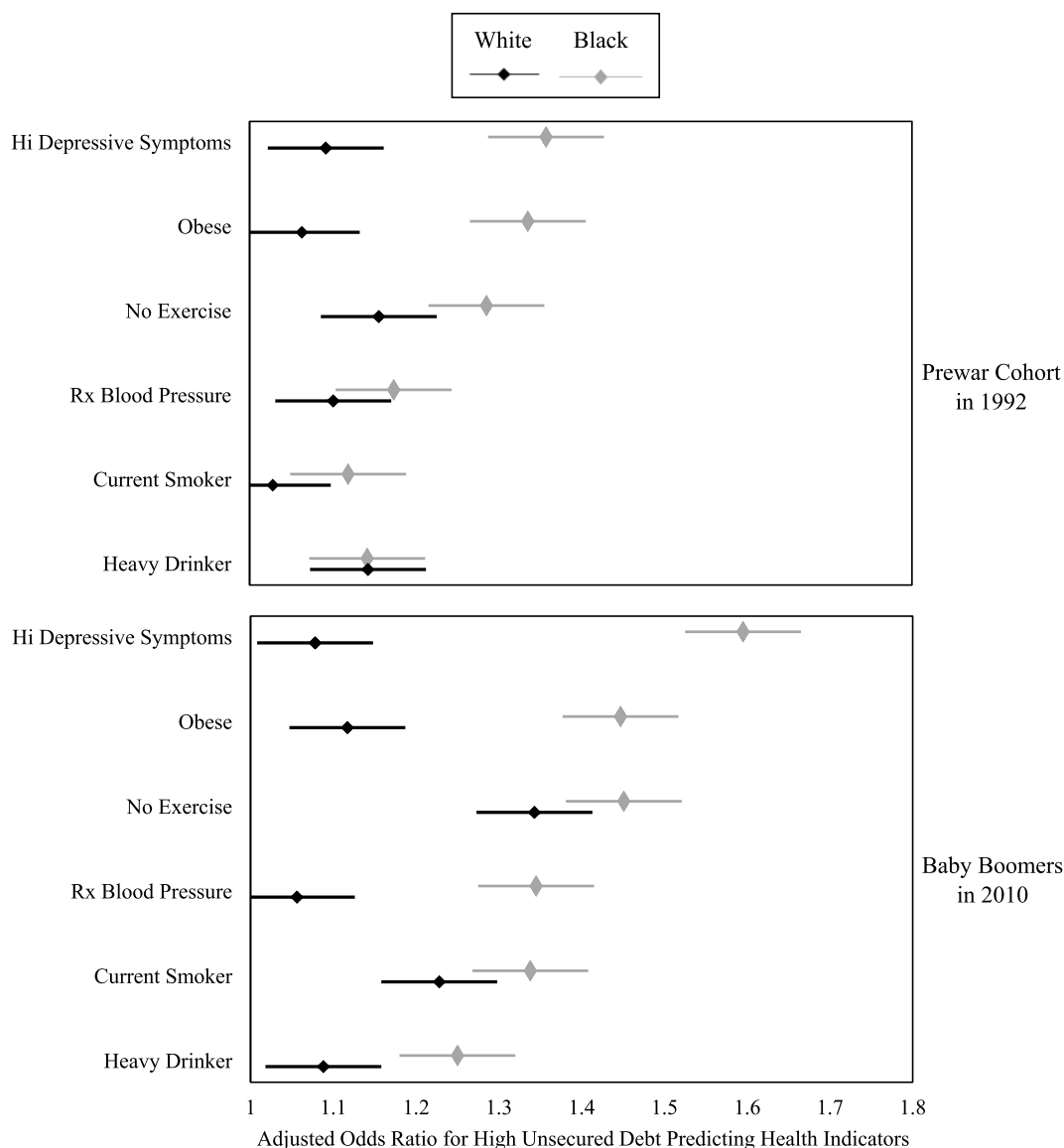


Fig. 4. Adjusted Odds Ratios with 95% Confidence Intervals for High Unsecured Debt Predicting Health Indicators at Ages 51–61 by Cohort and Race; 1992 HRS (N = 8698) and 2010 HRS (N = 6792)

Note: Logistic regression models are run separately by cohort and race; models also control for age, sex, education and income.

college degrees, or upper-white collar occupations. This is especially true for Black compared to White respondents and Prewar Cohort members compared to Baby Boomers. For example, Fig. 1 shows that high-income Black Prewar respondents are 2.8 times as likely and high-income White respondents are 1.7 times as likely to be in the top quartile of the housing distribution in 1992 than their peers with lower incomes. Among Boomers, racial differences in the odds of high debt are smaller, but higher SES remains predictive of high housing and unsecured debt. In contrast to widely held notions that unsecured debt is most common among people with limited economic resources, high unsecured debt is concentrated among those with high incomes, college degrees, and upper white-collar occupations, especially in the older cohort.

Fig. 3 explores racial and cohort differences in the relationship between housing debt, depressive symptoms, and health behaviors, which are hypothesized mechanisms linking debt to poor health. Black homeowners, especially Boomers, with the most housing debt are less likely to report high depressive symptoms, obesity, lack of exercise, taking blood pressure medication, smoking, and heavy drinking than their peers with less or no housing debt. Among White respondents in both cohorts, the general link between high housing debt and reduced

risk of unhealthy behaviors is apparent, but less consistent.

Fig. 4 presents a sharply different picture of the relationship between unsecured debt, depressive symptoms, and health behaviors. Regardless of race or cohort, being in the top quartile of the unsecured debt distribution is predictive of increased likelihood of heavy drinking, smoking, taking medicine for high blood pressure, not exercising, obesity, and high depressive symptoms. High unsecured debt is most strongly predictive of poor outcomes among Black Baby Boomers.

Table 2 presents hazard ratios from survival analyses predicting heart attack risk for Prewar Cohort members. Model 1 shows higher risk of heart attack for older, Black, and male respondents. Increases in unsecured debt predict elevated heart attack risk, but housing debt is predictive of lower risk. However, when socioeconomic resources are added in Model 2, the hazard ratio for housing debt becomes greater than 1. The negative bi-variate correlation between high levels of housing debt and heart attack risk is explained by debt’s positive relationship with SES. Respondents with higher unsecured debt, however, have elevated risk of heart attack regardless of their other economic resources.

Model 2 provides support for H2, the diminishing returns hypothesis.

Table 2

Hazards Ratios from Cox Proportional Hazards Model Predicting Risk of Heart Attack in Prewar Cohort; HRS 1992–2018 (N = 84,376 cases).

	Model 1	Model 2	Model 3
Demographic Characteristics			
Age	1.04**	1.03**	1.01**
Age squared	.99*	.99**	.99**
Black	1.06*	.25**	.22**
Male	2.03*	2.21**	2.29**
Socioeconomic Resources:			
Unsecured debt	1.02**	1.03**	ns
Housing debt	.94**	1.02**	1.02**
Household income		.98**	ns
Total assets		.96**	.95**
Education		.95**	.95**
Currently employed		.77**	.89**
Never employed		.95**	.98**
Upper white-collar occupation		.88**	.91**
Race by Socioeconomic Resources			
Black * Unsecured debt		1.08**	1.02**
Black * Housing debt		1.01**	ns
Black * Household income		ns	ns
Black * Assets		1.03**	1.01**
Black * Education		1.07**	1.09**
Black * Upper white-collar		1.13**	1.07**
Debt During Recession			
Recession		1.01**	1.01**
Unsecured debt * Recession		1.05**	1.05**
Housing debt * Recession		ns	ns
Health Behaviors			
Frequency visits doctor			1.02**
Blood pressure medicine			1.53**
Current smoker			1.35**
Moderate drinker			.90**
Depressive symptoms			1.09**
Body mass index			1.02**
Exercises 3x/week			.87**
–2 Log Likelihood	376026.02	374011.28	369511.15
Chi-square	2194.27**	4503.32**	4500.13**

**p < .001.

Interactions between SES and race show that White respondents with upper-white collar occupations, higher education and assets have lower risk of heart attack, but these benefits do not accrue to their Black peers. In partial support of H3 and H4, increasing debt elevates Black borrowers’ heart attack risk more than White borrowers. Model 2 also shows that heart attacks are more likely during recessions, especially among high unsecured debt holders.

Health behaviors and depressive symptoms added in Model 3 are correlated with heart attack risk in predictable directions. In support of H1, only Black respondents experience elevated heart attack risk as their unsecured debt increases after controlling for health behaviors and distress. These do not explain, however, the positive relationship between housing debt and heart attack risk among Black and White respondents nor the heightened deleterious impact of unsecured debt during recessions.

Table 3 presents hazard ratios for heart attack among Boomers. Like the Prewar Cohort, the full model shows that housing and unsecured debt are associated only with increases in the risk of heart attack among Black Boomers. In fact, White Boomers’ risk of heart attack declines with increasing housing debt, even when controlling for other socioeconomic resources, depressive symptoms, and health behaviors. Adding support to the diminishing returns hypothesis, higher assets, education, and occupational status predict greater reductions in heart attack risk for White compared to Black Boomers. As in Table 2, heart attacks are more common during recessions, especially among respondents with high unsecured debt. Results support H1, H2, and H3, but not H4.

Fig. 5 depicts results of full survival models for the Prewar Cohort and Fig. 6 for Baby Boomers. Results show that regardless of race, cohort, or type of debt, low SES respondents have higher heart attack

Table 3

Hazards Ratios from Cox Proportional Hazards Model Predicting Risk of Heart Attack in Baby Boomers; HRS 2010–2018 (N = 37,726 cases).

	Model 1	Model 2	Model 3
Demographic Characteristics			
Age	1.06**	1.05**	1.03**
Age squared	.99**	.99**	.99**
Black	1.15**	.45**	.50**
Male	1.90**	2.20**	2.24**
Socioeconomic Resources:			
Unsecured debt	1.06**	1.04**	ns
Housing debt	.75**	.96**	.97**
Household income		.98**	.96**
Total assets		.92**	.95**
Education		.92**	.94**
Currently employed		.51**	.66**
Never employed		.84**	.81**
Upper white-collar occupation		.96**	.97**
Race by Socioeconomic Resources			
Black * Unsecured debt		1.16**	1.11**
Black * Housing debt		1.13**	1.13**
Black * Household income		1.02**	ns
Black * Assets		1.05**	1.03**
Black * Education		1.10**	1.01**
Black * Upper white-collar		1.15**	1.11**
Debt During Recession			
Recession		1.15**	1.13**
Unsecured debt * Recession		1.20**	1.05**
Housing debt * Recession		.92**	ns
Health Behaviors			
Frequency visits doctor			1.02**
Blood pressure medicine			1.93**
Current smoker			1.39**
Moderate drinker			.82**
Depressive symptoms			1.05**
Body mass index			1.07**
Exercises 3x/week			.84**
–2 Log Likelihood	68165.50	67087.02	65854.90
Chi-square	524.74**	1078.48**	1232.12**

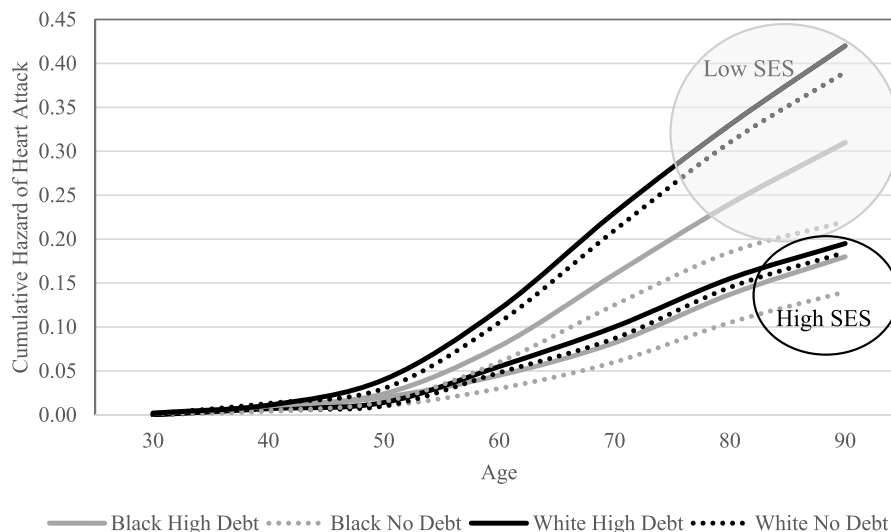
**p < .001.

hazard, but the SES disparity in heart attack risk is larger for White than Black respondents. For the older cohort, high housing debt is correlated with elevated heart attack risk for Black and White aging adults, even when controlling for other economic resources, depressive symptoms, and health-depleting behaviors. In contrast, White Boomers with high housing debt experience lower hazard of heart attack than those with no housing debt; the opposite is true for Black Boomers. Unsecured debt is significantly positively related to heart attack risk only for Black members of both cohorts.

4. Discussion and conclusions

This study contributes new findings about racial and cohort differences in the association between debt and heart attack risk. We find that whether and how debt is linked to health behaviors, depressive symptoms, SES, and heart attack depends on debtors’ racial identity and the amount, type and timing of debt. For example, health-depleting behaviors and depressive symptoms are most common among respondents with high unsecured debt, especially Baby Boomers and Black adults. In contrast, high housing debtors are less likely than non-mortgage holders to smoke, drink heavily, be obese, or experience depression. Respondents with the greatest debt also have the highest education, income, assets, and occupational status, especially Black and Prewar Cohort respondents. Debt’s relationship to depressive symptoms, health behaviors, and other socioeconomic resources, however, does not explain Black respondents’ elevated heart attack risk with increasing unsecured and housing debt nor why heart attack risk is more strongly linked to high unsecured debt during economic recessions. Racial differences in heart attack risk are not merely due to individual

Panel A: Unsecured Debt



Panel B: Housing Debt

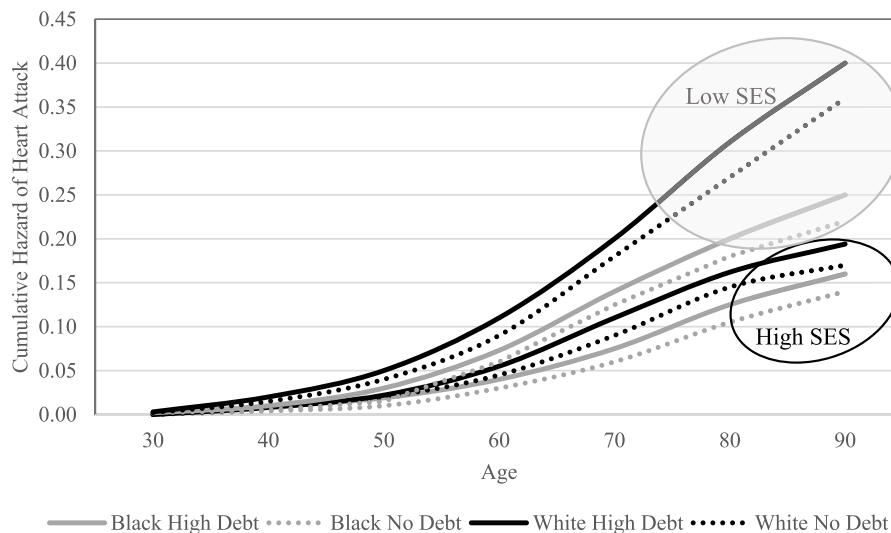


Fig. 5. Prewar Cohort’s cumulative hazard of heart attack by race, debt, and SES, controlling for health behaviors; HRS 1992–2018.

characteristics and actions.

Our findings across cohorts support the diminishing returns hypothesis; as SES increases, White respondents experience greater reductions in heart attack risk than Black respondents. Similarly, the negative cardiovascular health correlates of unsecured debt are greater for Black than White borrowers; housing debt predicts lower heart attack risk only among White Boomers.

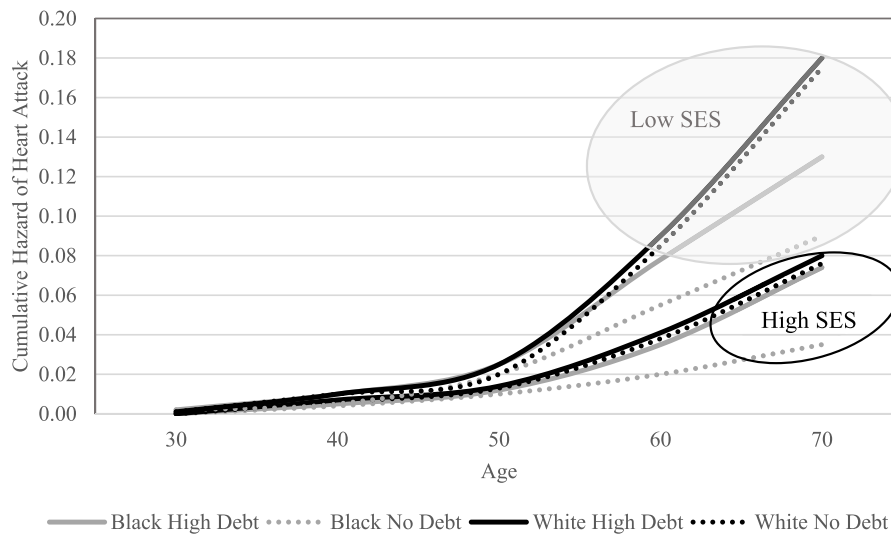
We suggest these findings reflect historic and contemporary racial differences in access to and use of debt that generate qualitatively different experiences for White than Black adults. As detailed above, Black applicants are rejected for mortgages, business loans, credit cards, and student loans at much higher rates than White applicants (Ards et al., 2015; Bates & Robb, 2016). When Black applicants seek credit, lending agencies have higher standards for their credit-worthiness than White applicants (Perry, 2019). This helps explain the concentration of college degrees, high status occupations, and high income we find among Black respondents in the top quartile of debt distributions. When Black applicants do receive loans, they are usually on less favorable terms than equally credit-worthy White applicants (Hanifa, 2021), which could amplify Black debtors’ likelihood

of anxiety, harmful coping behaviors, and heart attack risk.

Cohort differences in heart attack risk highlight the need to situate empirical findings in historic context. The Prewar Cohort experienced more favorable debt conditions during their young adult years of household formation and wealth accumulation, allowing many homeowners to pay off their mortgages before retirement. Those in their 70s and 80s who still had housing debt during the Great Recession may have refinanced their homes to pay for healthcare or other essential expenses. Holding mortgage debt when age-peers had paid off housing loans could contribute to the positive association between heart attack risk and housing debt we observe for Black and White members of this older cohort. Boomers, in contrast, were in their 50s during the Great Recession, many at the peak of their earnings careers when debt was common. At that time, financial institutions’ predatory lending practices that targeted people of color with unfavorable debt terms likely contributed to Black Boomers’ elevated heart attack risk with increasing debt.

There are limitations to this study. We examine the link between debt and heart attacks among Black and White people born 1931–1941 and 1948–1959, but research should investigate additional health measures in samples that include other racial/ethnic identities, age groups, and

Panel A: Unsecured Debt



Panel B: Housing Debt

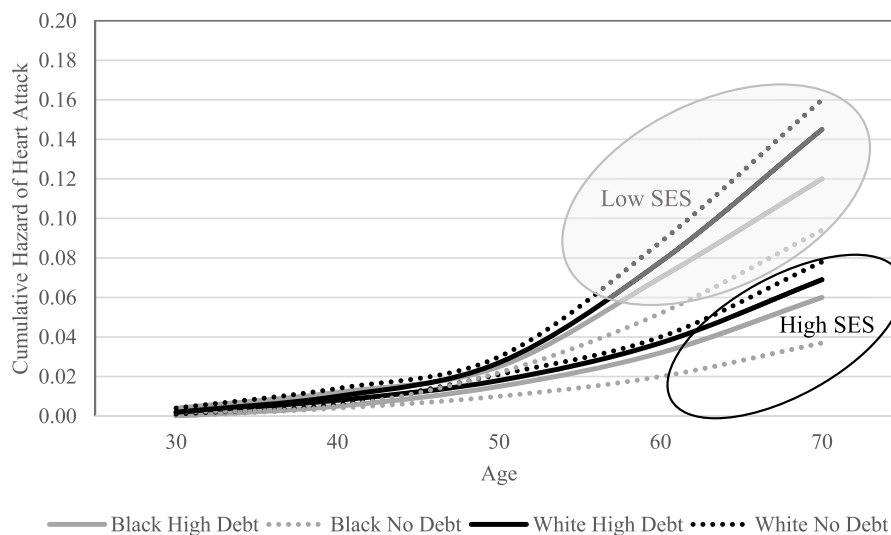


Fig. 6. Baby Boomers’ cumulative hazard of heart attack by race, debt, and SES, controlling for health behaviors; HRS 2010–2018.

time periods. Future studies should explore whether the link between debt and health operates differently for women and men. Including measures of neighborhood characteristics, such as racial segregation and lender locations, would allow a more fine-grained analysis. While HRS data cannot accommodate closer study of institutional mechanisms, future models should also examine the roles financial markets play in household debt accumulation through lax regulatory policies, risky loan incentives, earnings stagnation, and the effects of debt terms, such as interest rates, time to maturity, and repayment schedules. Finally, data and models that incorporate measures of discrimination could help us understand why the health returns to debt, income, education, and occupational status are unequal for Black and White debtors.

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Author statement

Jenifer Hamil-Luker: Methodology, Formal Analysis, Writing-original draft preparation, **Angela M. O’Rand** Conceptualization, Writing - review & editing.

Angela M. O’Rand contributed to the study concept and design. Data preparation and analyses were performed by Jenifer Hamil-Luker with feedback from O’Rand. The first draft of the manuscript was drafted by Hamil-Luker. Both authors edited subsequent versions and approved the final manuscript.

Declaration of competing interest

The authors have no competing interests to declare.

Data availability

Data will be made available on request.

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