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DIFFERENTIAL RATES OF RETURN AND RACIAL WEALTH INEQUALITY

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ABSTRACT

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Differential Rates of Return and Racial Wealth Inequality

Luke Petach[*], Daniele Tavani[†]

June 19, 2020

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Keywords: Rates of Return, Racial Wealth Inequality
JEL Codes: Z13, D31, G51

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1 Introduction

A large literature documents a significant, persistent gap in median networth between White and Black households in the United States (Blau and Graham, 1990; Altonji and Doraszelski, 2005; Hamilton and Darity, 2010; Williams, 2017; Darity and Mullen, 2020). In 2016, the median networth of White households was roughly 6 times the median networth of non-White households (Authors' Calculations, Survey of Consumer Finances, 2016). The racial wealth gap has important welfare implications: a lack of liquid wealth holdings translates to a large loss of consumption for Black and Hispanic households in response to negative income shocks (Ganong et al., 2020).

Despite the welfare implications of the racial wealth gap, racial wealth inequality poses a puzzle for economic researchers, because racial differences in median wealth are much larger than those implied by racial differences in median income. In 2016, the median income of White households was only 1.5 times the median income of non-White households. Various behavioral explanations for the racial wealth gap have been examined, including differences in the receipt of inheritances (Blau and Graham, 1990; Menchick and Jianakoplos, 1997; Gittleman and Wolff, 2004), permanent income (Altonji and Doraszelski, 2005), saving behavior (Altonji and Doraszelski, 2005; Gittleman and Wolff, 2004), and cultural differences in attitudes toward risk, financial decision making, time preference, or expectations of family support (Chiteji and Hamilton, 2002; Scholz and Levine, 2004; Boshara, Emmons, and Noeth, 2015). With the exception of inheritances—which Menchick and Jianakoplos (1997) estimate explain 10%-20% of the racial wealth gap— and differences in parental and sibling need—which Chiteji and Hamilton (2002) find explains up to 27% of the racial wealth gap—the aforementioned behavioral explanations are only weakly supported by the data. Differences in savings behavior cannot explain the racial wealth gap: conditional on income, Blacks save slightly *more* than Whites (Hamilton and Darity, 2010; Dal Borgo, 2019; Darity and Mullen, 2020).

One possible explanation for the racial wealth gap not mentioned above lies in differences

in the rate of return on investment across race. Variation in rates of return may arise due to differences in portfolio composition, educational attainment, financial literacy, or overt discrimination. For much of the 20th century discriminatory treatment in Federal mortgage lending (redlining) and the use of restrictive covenants prevented Black households from accumulating housing wealth in desirable neighborhoods (Katznelson, 2005; Oliver and Shapiro, 2006; Rothstein, 2017), thus forcibly reducing the rate of return those households could achieve. Black assets were often intentionally destroyed by White rioters, as in Wilmington, North Carolina, in 1898, Tulsa, Oklahoma, in 1921, and Rosewood, Florida in 1923 (Darity and Frank, 2003; Darity, 2008; Darity and Mullen, 2020). Estimates indicate that Black landowners had 24,000 acres of farms and timberland stolen from them in the first three decades of the 20th century (Darity and Frank, 2003). Importantly, racial differences in access to sources of wealth are not limited to the past: Black and Latino mortgage applicants are rejected more frequently than Whites (Munnell et al., 1996; Charles and Hurst, 2002), and Black-owned firms are more than twice as likely to be denied loans as Whites with similar credit scores (Blanchflower, Levine, and Zimmerman, 2003). Given these and other considerations, Darity and Mullen (2020) argue that "[W]ealth is the best single indicator of the cumulative impact of White racism over time" (p.31). Differential access to high rates of return are therefore a potentially important explanatory component of the racial wealth gap.

In this paper, we explore racial differences in rates of return in the United States from 1989 to 2016. Using the Survey of Consumer Finances (SCF) we calculate household rates of return using both a direct approach and a matched balance sheet approach using data on macroeconomic rates of return from Jordà et al. (2019). We document a persistent 1-to-6 percentage-point gap in average rates of return between White and Black households. The gap in rates of return remains even after conditioning on educational attainment, portfolio composition, financial background, financial literacy, and income—suggesting that racial differences in rates of return may be driven by discrimination. Oaxaca-Blinder decompositions

show that differences in rates of return explain between 28% and 51% of the racial wealth gap. For comparison, differences in personal credit history and inheritance each explain approximately 10% of the gap. Finally, we use the new series on rates of return to simulate a standard lifecycle model. Given observed rates of return, the model suggests that non-White households must discount the future *less* than White households in order to match observed patterns of consumption across race in the Consumer Expenditure Survey (CEX), effectively ruling out explanations of the racial wealth gap based on myopia or excessive time preference. A simple welfare exercise suggests that policies aiming to equalize rates of return—such as Hamilton and Darity (2010)'s Baby Bonds proposal—are welfare improving.

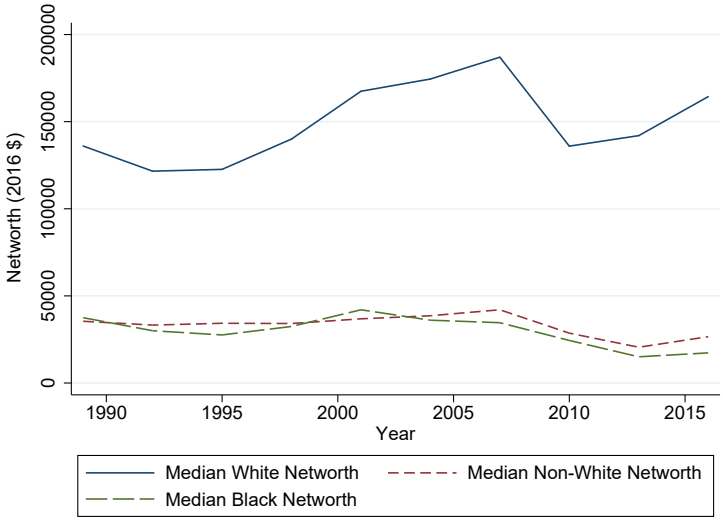
2 The Racial Wealth Gap: Stylized Facts

Fact 1 *The racial wealth gap is large and persistent.*

Figure (1) presents series for median networth for White, non-White, and Black households from 1989 to 2016, in constant 2016 dollars. In 1989 the median real networth of White households was approximately $136,021, the median real networth of all non-White households was approximately $35,451, and the median real networth of Black households was $37,485. In 2016, the median real networth of each group was $164,370, $26,600, and $17,300, respectively. Not only has there been no tendency for the racial wealth gap to decline, but the gap in wealth holdings between Whites and Blacks has increased over the sample period. From 1989 to 2016 median White wealth increased from 4-times median Black wealth to nearly 10-times median Black wealth.

The expansion of the racial wealth gap over this period is driven largely by the differential response by race of wealth to the Great Recession. Although White households faced a steeper initial decline in wealth over the 2007-2010 period, networth for White households has since recovered. In contrast, neither the networth of non-Whites as a whole, nor Blacks in particular, has recovered from the damage done by the recession.

Figure 1: Median Networth by Race, 1989-2016



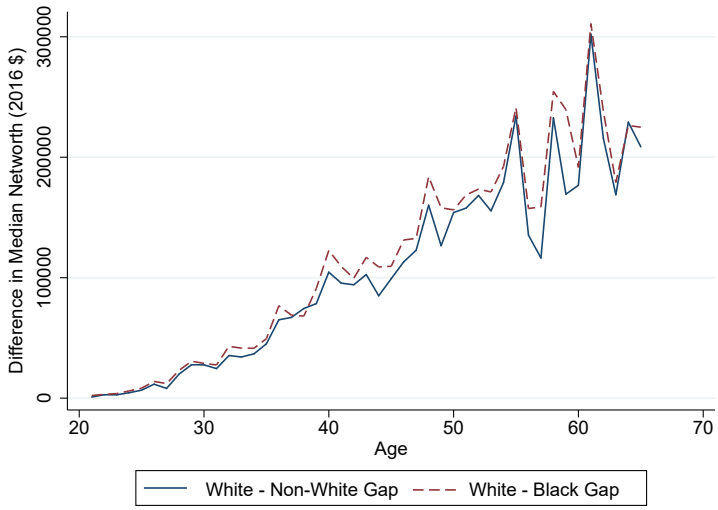
Notes: Authors' calculations, Survey of Consumer Finances. Estimates in constant 2016 dollars, constructed using sample weights. Excludes households reporting zero or negative income. Excludes households reporting zero or negative assets.

The persistence of the racial wealth gap over time matches the persistence in racial differences in earnings observed in the literature (albeit with racial differences in wealth holdings far exceeding racial differences in income). Bayer and Charles (2018) show that—after narrowing between 1940 and the mid-1970's—the median Black-White earnings gap has since grown as large as it was in 1950.

Fact 2 *The racial wealth gap increases over the lifecycle.*

Figure (2) presents estimates of the difference in median networth across race over the lifecycle, using all SCF sample years from 1989-2016, again in constant 2016 dollars. The racial gap in median networth increases from $0 at age 21 to approximately $200,000 by retirement (age 65). The combination of Figures (1) and (2) indicate that any explanation of the racial wealth gap must be able to account for the fact that the racial wealth gap is both persistent over time and increasing with age.

Figure 2: Racial Wealth Gap by Age



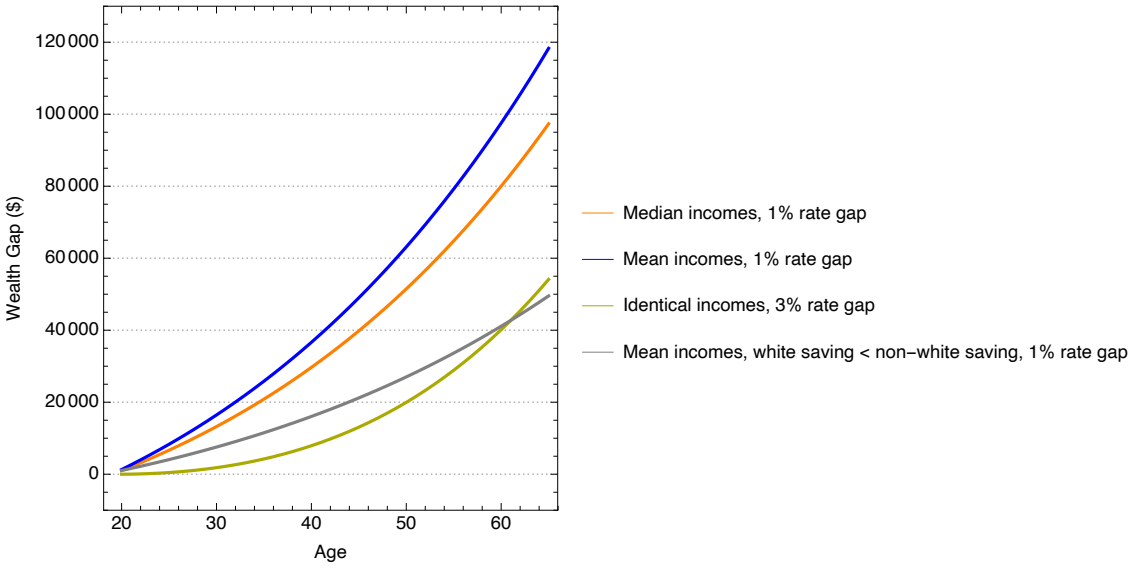
Notes: Authors' calculations, Survey of Consumer Finances (1989-2016). Estimates in constant 2016 dollars, constructed using sample weights. Excludes households reporting zero or negative income. Excludes households reporting zero or negative assets.

Fact 3 *At observed income levels, small differences in rates of return can explain lifecyle variation in the racial wealth gap—even with equal savings rates.*

Consider a basic accumulation equation for household wealth: $W_{t+1} = s(Y_t + rW_t) + W_t$, where W_t is wealth in period t, Y_t is labor income, r is the rate of return on wealth, and s is the household savings rate. Figure (3) presents simulations of the racial wealth gap over the lifecycle under alternative assumptions about income, rates of return, and savings. The figure is suggestive about the possibility of rates of return to explain the racial wealth gap. Assuming that at age 20 each race earns the average income of individuals less than 30 in the SCF ($47,879 for Whites, $37,454 for Blacks), that all incomes grow at 2% per year, and that each race saves at a constant rate of 10% out of both labor and capital income, a 1 percentage-point difference in rates of return is sufficient to generate $118,298 racial wealth gap at retirement. The median income simulation (starting at the SCF values of $26,123 for Blacks and $39,184 for Whites), with the same assumptions about wage growth and differences in rates of return, delivers a wealth gap of $97,334 at retirement. Finally, with identical starting incomes (equal to $100,000) and savings rates (10%), a 3 percentage-point

difference in rates of return generates a $54,105 racial wealth gap at retirement. Reducing the White saving rate by 1% relative to Blacks, a 3 percentage-point difference in rates of return nonetheless delivers a positive wealth gap of $49,526 at retirement age, as the gray line shows. Thus, if the the gap in rates of return is persistent, the existence of differential rates of return can potentially explain both variation in the racial wealth gap by age and the endurance of the racial wealth gap over time. The estimates of the racial wealth gap under the above alternative assumptions should be taken as conservative, given the assumption of income growth at 2% per year for all races.

Figure 3: Racial Wealth Gap Simulations



Notes: The figure presents simulations of the racial wealth gap over the lifecycle, using the accumulation equation $W_{t+1} = s(Y_t + rW_t) + W_t$, where W_t is wealth at time t, Y_t is labor income, s is the savings rate, and r is the rate of return. Savings rates are assumed to be equal to 10% in equal savings simulations. We assume labor income grows at 2% per-year in all simulations. Initial income values are set equal to either the mean or median income by race for individuals under thirty. Mean income for Whites under thirty is $47,879. Mean income for Blacks under thirty is $37,454. Median income for Whites under thirty is $39,184. Median income for Blacks under thirty is $26,123. In the simulation with lower White savings, the savings rate of White households is set to 9%. In the "Identical Incomes" simulation, income of both groups is set to $100,000. Rates of return are assumed to be 0.08 for Blacks and 0.09 for Whites in the 1 percentage-point gap simulation. In the 3 percentage-point gap simulation, the White rate of return is increased to 0.11.

3 Data

3.1 Data Description

Survey of Consumer Finances. To obtain information on household wealth, we use the summary extract public data from the Survey of Consumer Finances (SCF) for sample years 1989 to 2016[1]. The SCF is a triennial cross-sectional survey of U.S. families, including information on families' balance sheets, pensions, income, and demographic characteristics. It is well known that high income, high wealth households are over represented in the SCF. Despite this shortcoming, the SCF nonetheless remains an important source of information on household wealth, as there exists no comparably detailed public data enabling a breakdown of wealth holdings by race over time. Futher, recent work by Saez and Zucman (2016) suggests that the SCF understates inequality in both wealth and capital income (as measured by the top 0.1% share), relative to estimates obtained from tax data. To the extent that the SCF oversamples both wealthy White and non-White households, estimates of the racial wealth gap are unlikely to be overstated.[2]

Table (1) presents sample means for several key variables from the SCF. To arrive at our final sample, we drop observations reporting negative assets (for which we cannot calculate a rate of return) and observations reporting negative income. Our final sample consists of 46,411 family-year observations, spanning the 1989-2016 period. We report sample means for the full sample, as well as separately for non-White and White respondents. Networth is measured as the difference between household assets and liabilities. "Financial Share" measures the share of household assets in the form of financial assets—such as stocks, bonds, mutual funds, retirement accounts, or checking accounts. "Equity Share" measures the value of equity directly held in stocks, stock mutual funds, and combination mutual funds as a

[1]Because data on inheritances are not included in the summary extract public data, we make use of the full public survey data to construct inheritance estimates.

[2]Racial differences in networth may in-fact be understated in the SCF. Steinbaum (2019) points out that individuals experiencing housing instability, incarceration, cohabitation without economic dependence, or any number of "non-traditional" living arrangements are excluded from SCF households, and therefore absent from estimates of the racial wealth gap.

share of total household assets. "Housing Share" measures the value of the respondent's primary residence as a share of total assets. The "Financial Literacy" variable—available only in the 2016 wave of the SCF—records the number of correct answers to three common financial literacy questions.[3] The SCF separates respondents into four different race/ethnicity categories: White non-Hispanic, Black, Hispanic, and other. A description of how our rate of return estimates are constructed is contained in Subsection (3.2).

Jordà-Schularik-Taylor Macrohistory Database. We obtain data on macroeconomic rates of return for different asset classes from Jordà et al. (2019). The Jordà-Schularik-Taylor Macrohistory Database (JST) provides information on three major classes of return on investment: equity total return, housing total return, and bond total return, on an annual basis for a panel of 17 countries since 1870. JST data on equity returns are constructed from a broad range of sources including articles in economic and financial journals, stock exchange listings, newspapers, yearbooks of statistical offices and central banks, and company reports. For a majority of the JST sample, estimated equity returns rely on indices weighted by market capitalization of individual stocks, selected so as to be representative of the entire market. For the US, the equity return is calculated as capital gains plus the dividend return from Shiller (2000). To calculate the bond rate, JST use the total return on US long-term bonds from Barclays (2016). Finally, to calculate housing returns JST make use of data from Knoll, Schularick, and Steger (2017) and Knoll (2017). Housing returns are computed as the sum of the rental yield and capital gains (measured as the growth of a country-specific house price index). To avoid large variation in average rates of return caused by aberrational movements in a single year, we take 5-year rolling averages of the equity, bond, and housing rates.

[3]The questions are: (1) "Do you think that the following statement is true or false: Buying a single company's stock usually provides a safer return than a stock mutual fund?" (2) "Suppose you had $100 in a savings account and the interest rate was 2 percent per year. After five years, how much do you think you would have in the account if you left the money to grow?" and (3) "Imagine that the interest rate on your savings account was 1 percent per year and inflation was 2 percent per year. After one year, would you be able to buy." The first question is true/false, the second and third question are multiple choice with options more than/exactly/less than a given amount.

Table 1: Sample Means, 1989-2016

	(1) Full Sample	(2) Non-White	(3) White
Rate of Return (Matched Balance Sheet)	0.0643	0.0492	0.0694
	(0.0450)	(0.0461)	(0.0435)
Rate of Return (Direct)	0.164	0.114	0.181
	(0.996)	(0.517)	(1.111)
Networth (2016 $)	518,932.9	194,601.1	627,558.6
	(3,404,297.8)	(1,307,760.5)	(3,853,704.5)
Income (2016 $)	88,330.2	57,929.7	98,512.0
	(352,696.3)	(141,285.1)	(398,697.7)
Inheritance Value (2016 $)	35,123.1	10,889.7	43,239.3
	(575,877.2)	(203,642.1)	(654,643.4)
White	0.749	—	—
	(0.434)	—	—
Black	0.125	0.499	—
	(0.331)	(0.500)	—
Hispanic	0.0846	0.337	—
	(0.278)	(0.473)	—
Other Race	0.0410	0.163	—
	(0.198)	(0.370)	—
Age	49.85	45.55	51.29
	(17.29)	(15.73)	(17.54)
Bachelor's Degree	0.297	0.216	0.324
	(0.457)	(0.411)	(0.468)
Fear Being Denied Credit	0.155	0.274	0.116
	(0.362)	(0.446)	(0.320)
Denied Credit	0.171	0.227	0.152
	(0.376)	(0.419)	(0.359)
Financial Share	0.317	0.305	0.321
	(0.310)	(0.349)	(0.296)
Equity Share	0.0300	0.0115	0.0362
	(0.0950)	(0.0614)	(0.103)
Housing Share	0.394	0.349	0.409
	(0.346)	(0.384)	(0.331)
N (Full Sample)	46,411	9,918	36,493
Financial Literacy	2.18	1.95	2.28
	(0.86)	(0.89)	(0.83)
N (2016)	6,162	1,740	4,422

Notes: Sample means calculated using SCF sample weights. Standard deviations in parentheses.

3.2 Constructing Rates of Return

We construct household rates of return using two alternative methods. First, we calculate rates of return as the weighted average of macroeconomic rates of return from JST, where the weights are given by the shares of various assets in the household's portfolio:

$$R_{it}^{Matched} = \sum_{j} \phi_{ijt} R_{jt} \tag{1}$$

Where i denotes households, j denotes asset type, and t denotes time period. ϕ_{ijt} are the weights, given by the share of asset type j in household i's portfolio at time t. We refer to this as the "matched balance sheet approach." The crosswalk between JST rates of return and SCF asset types is presented in Appendix (A).[4] One disadvantage of this method is that all household-level variation in rates of return is driven by differences in portfolio composition, rather than differences in the return on specific assets. Thus, we also implement a "direct" approach for calculating rates of return for each household, based on observed capital income and asset holdings in the SCF:

$$R_{it}^{Direct} = \frac{\text{Interest Income + Dividend Income + Capital Gains Income + Unrealized Capital Gains}}{\text{Assets}} \tag{2}$$

One downside of this approach is that estimated rates of return are large, relative to the matched JST-SCF estimate, due to the inclusion of unrealized capital gains on a larger variety of assets and individual heterogeneity in housing capital gains that is otherwise suppressed by the use of a country-wide price index in the JST data[5].

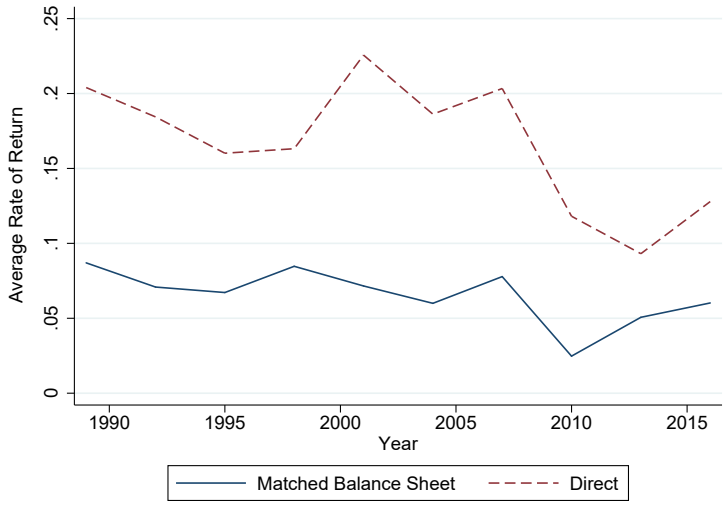
Figure (4) presents a time-series plot of average rates of return using both the matched

[4]For a similar application, see Ederer, Mayerhofer, and Rehm (2019), who use the JST data to construct estimates of rates of return across the wealth distribution for a cross-section of European countries.

[5]In Appendix (B) we present additional estimates of conditional differences in rates of return which exclude extreme values of R^{Direct} driven by very large (positive or negative) unrealized capital gains. The results are similar to those presented in the body of the paper, suggesting the conditional differences found in Section (4) are not driven primarily by outliers.

balance sheet approach and the direct approach, from 1989 to 2016. Although there are differences in levels across the two approaches—driven by the way that differences in the treatment of capital gains produce larger estimated returns in the direct approach—both series nonetheless display similar trends. Rates of return were roughly constant from 1989 to 2007, underwent a large decline during the Great Recession, and have since recovered slightly.

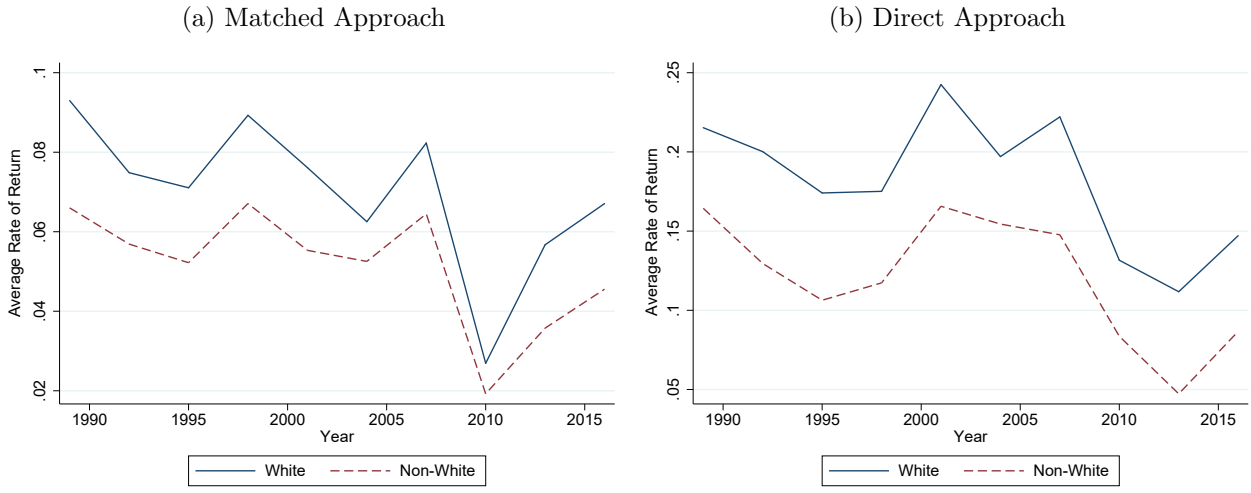
Figure 4: Average Rates of Return, 1989-2016



Notes: The figure presents averages of our estimates of household rates of return, using both the matched balance sheet approach with SCF and JST data, and the direct approach from just SCF data.

Figure (5) presents time-series plots of average rates of return across White and non-White households separately for each of our constructed series for rates of return. In line with the differences in means presented in Table (1), both methods of constructing rates of return are indicative of persistent differences in the return on investment across race. For both series, the White/non-White gap in rates of return is roughly constant during the period prior to the Great Recession, falls slightly during the Great Recession, and increases in the post-recession period. The mean difference in average returns in the matched balance sheet series is approximately 1.8 percentage points. The mean difference in average returns in the direct series is approximately 6 percentage points.

Figure 5: Racial Differences in Rates of Return, 1989-2016



Notes: The figure presents averages of our estimates of household rates of return, across White and non-White households, using both the matched balance sheet approach and the direct approach.

4 Rates of Return and the Racial Wealth Gap

4.1 Conditional Differences in the Rate of Return

While the unconditional differences in rates of return presented in Figure (5) are striking, the policy implications of racial differences in rates of return invariably depend on the source of such differences. Differences in rates of return may arise for a variety of reasons including differences in portfolio composition, financial literacy, credit history, education or, as already suggested above, discrimination. In this section, we run OLS regressions to estimate conditional differences in rates of return across race, controlling for factors other than race which may influence household rates of return. We note that the results of this exercise should be interpreted with caution: because racial differences in variables such as portfolio composition, credit history, financial literacy, and education may also be driven by discrimination—and are thus outcomes of the notional experiment—it would be a mistake to rule out discrimination based on a statistically insignificant regression coefficient on race in

the following exercise.[6] On the other hand, the persistence of economically and statistically significant differences in rates of return across race after conditioning on other factors—while not conclusive—would be strongly suggestive of a role for discrimination. Additionally, if the racial wealth gap is influenced by historical differences in rates of return due to discrimination, e.g., due to redlining—an undeniable fact (Small and Pager, 2020)—our study of relatively recent data will necessarily miss such differences, thereby *understating* the impact of historical discrimination.

Table 2: Conditional Differences in Rates of Return, Matched Balance Sheet Series

	(1) $R_{it}^{Matched}$	(2) $R_{it}^{Matched}$	(3) $R_{it}^{Matched}$	(4) $R_{it}^{Matched}$	(5) $R_{it}^{Matched}$
Black	-0.0203***	-0.0139***	-0.0103***	-0.00619***	-0.00972***
	(0.000790)	(0.000782)	(0.000765)	(0.000722)	(0.00138)
Hispanic	-0.0249***	-0.0198***	-0.0154***	-0.00992***	-0.0101***
	(0.000931)	(0.000922)	(0.000893)	(0.000864)	(0.00156)
Other	-0.0100***	-0.00950***	-0.00689***	-0.00411***	-0.00277
	(0.00132)	(0.00127)	(0.00120)	(0.00108)	(0.00202)
N	46,411	46,411	46,411	46,411	6,162
R^2	0.0408	0.110	0.177	0.194	0.380
Demographic Controls	N	Y	Y	Y	Y
Labor Market Controls	N	N	Y	Y	Y
Credit History Controls	N	N	N	Y	Y
Savings Attitude Controls	N	N	N	Y	Y
Year Fixed Effects	N	N	N	Y	N
Financial Literacy Controls	N	N	N	N	Y

Notes: Heteroskedasticity robust standard errors in parenthesis, * $p < 0.1$, ** $p < 0.05$, **** $p < 0.01$. Estimates obtained using SCF sample weights. Column (1) excludes all controls. Column (2) adds demographic controls including age, sex, marital status, number of kids, and educational attainment. Column (3) adds labor market controls including (log) income, employment status, and industry. Column (4) adds controls for credit history—including whether the individual was turned down for credit in the last five years and whether the individual has feared being turned down for credit in the last five years—the value of inheritances received, a variable capturing whether the respondent believes it is important to leave a bequest, as well as whether the respondent indicated they intend to leave a bequest. Finally, Column (5) presents results from only the 2016 sample, including a control for financial literacy.

Table (2) presents results using the matched balance sheet series on returns. In each regression the dependent variable is the rate of return for household i in sample year t. We include a dummy variable for each non-White racial category in the SCF—Black, His-

[6] Angrist and Pischke (2009) refer to these as "bad controls." A common example is the inclusion of occupational controls in attempts to estimate the gender wage gap, despite the fact that occupational choice is also an outcome of gender discrimination.

panic, and other—such that White respondents constitute the reference group. Column (1) excludes all controls. Column (2) adds demographic controls including age, sex, marital status, number of kids, and educational attainment. Column (3) adds labor market controls including (log) income, employment status, and industry. Column (4) adds controls for credit history—including whether the individual was turned down for credit in the last five years and whether the individual has feared being turned down for credit in the last five years—the value of inheritances received, a variable capturing whether the respondent believes it is important to leave a bequest, as well as whether the respondent indicated they intend to leave a bequest. Finally, Column (5) presents results from only the 2016 sample, including a control for financial literacy.

In every specification there remain statistically and economically significant racial differences in rates of return. For both Black and Hispanic households the rate of return on investment is one to two percentage points lower than the rate of return earned by White households, even after conditioning on demographics, education, labor market factors, financial history, attitudes toward saving, and financial literacy. The regression coefficient on the dummy variable for other races becomes statistically insignificant in Column (5), although it is possible this is due to the small number of respondents in this category in the 2016 wave of the SCF ($n = 316$).

Table (3) presents results from repeating the same exercise using the direct series for rates of return. This series has the advantage of allowing controls for portfolio composition, which are absent from Table (2) due to the fact that differences in rates of return across households in the matched balance sheet series are driven solely by differences in portfolio composition, such that portfolio composition variables would be mechanically correlated with $R^{Matched}$. Although the magnitude of the estimates across Tables (2) and (3) are not directly comparable, we note that that both measures suggest that rates of return remain statistically significantly different across race.

Column (1) once again excludes all controls. Column (2) adds demographic controls

Table 3: Conditional Differences in Rates of Return, Direct Series

	(1) R_{it}^{Direct}	(2) R_{it}^{Direct}	(3) R_{it}^{Direct}	(4) R_{it}^{Direct}	(5) R_{it}^{Direct}	(6) R_{it}^{Direct}
Black	-0.0635***	-0.0403***	-0.0348**	-0.0235*	-0.0182	-0.0347**
	(0.0115)	(0.0127)	(0.0142)	(0.0129)	(0.0129)	(0.0160)
Hispanic	-0.0696***	-0.0369***	-0.0293**	-0.0252**	-0.0149	-0.0133
	(0.00900)	(0.0110)	(0.0134)	(0.0108)	(0.0105)	(0.00997)
Other	-0.0670***	-0.0415*	-0.0373	-0.0320	-0.0256	0.00260
	(0.0231)	(0.0236)	(0.0236)	(0.0239)	(0.0233)	(0.0175)
N	46,411	46,411	46,411	46,411	46,411	6,162
R^2	0.000831	0.00607	0.00643	0.0114	0.0133	0.0363
Demographic Controls	N	Y	Y	Y	Y	Y
Labor Market Controls	N	N	Y	Y	Y	Y
Credit History Controls	N	N	N	Y	Y	Y
Saving Attitude Controls	N	N	N	Y	Y	Y
Year Fixed Effects	N	N	N	N	Y	N
Portfolio Composition Controls	N	N	N	Y	Y	Y
Financial Literacy Controls	N	N	N	N	N	Y

Notes: Heteroskedasticity robust standard errors in parenthesis, * $p < 0.1$, ** $p < 0.05$, **** $p < 0.01$. Estimates obtained using SCF sample weights. Column (1) excludes all controls. Column (2) adds demographic controls including age, sex, marital status, number of kids, and educational attainment. Column (3) adds labor market controls including (log) income, employment status, and industry. Column (4) adds controls for credit history—including whether the individual was turned down for credit in the last five years and whether the individual has feared being turned down for credit in the last five years—the value of inheritances received, a variable capturing whether the respondent believes it is important to leave a bequest, as well as whether the respondent indicated they intend to leave a bequest. Column (4) also adds controls for portfolio composition, which includes the share of household assets in financial assets, the share specifically in equities, and the share in the household's primary residence. Column (5) adds year-fixed effects. Finally, Column (6) presents results from only the 2016 sample, including a control for financial literacy.

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Table (3) suggests the rate of return on investment obtained by Black households is statistically significantly lower than the return obtained by Whites in every column except (5). The differences range from an unconditional difference of six percentage points to a conditional difference of two percentage points. Importantly, Columns (4) and (6) indicate that the conditional difference in rates of return remains even after including controls for portfolio composition in the form of the financial asset share, the equity share, and the housing asset share. Economically meaningful differences in rates of return also remain for Hispanic households, although the difference appears statistically insignificant in Columns (5) and (6). Taken together, Tables (2) and (3) provide evidence suggestive of a role for discrimination in explaining differential rates of return across race.

4.2 Assessing the Contribution of Differential Rates of Return to the Racial Wealth Gap

To assess the contribution of differential rates of return to the racial wealth gap we adopt a technique common in the literature on racial wealth inequality: the regression-based Oaxaca-Blinder decomposition (Menchick and Jianakoplos, 1997; Altonji and Doraszelski, 2005;

Williams, 2017). If the wealth of Whites and Non-Whites (W_w, W_{nw}) can each be expressed as a function of individual characteristics (X_w, X_{nw}) and the returns to those characteristics (β_w, β_{nw}), the difference in the observed averages of White and non-White wealth can be expressed as either:

$$\begin{aligned} \overline{W_w} - \overline{W_{nw}} = &\sum \beta_w (\overline{X_w} - \overline{X_{nw}}) \\ &+ \sum (\beta_w - \beta_{nw}) \overline{X_{nw}} \end{aligned} \tag{3}$$

or

$$\begin{aligned} \overline{W_w} - \overline{W_{nw}} = &\sum \beta_{nw} (\overline{X_w} - \overline{X_{nw}}) \\ &+ \sum (\beta_w - \beta_{nw}) \overline{X_w} \end{aligned} \tag{4}$$

Depending on whether the difference is evaluated at the β_w coefficients—obtained from a regression of wealth on individual characteristics in the White sample—or the β_{nw} coefficients—obtained from a regression of wealth on individual characteristics in the non-White sample. This method decomposes differences in average wealth into a portion explained by differences in observables—the first term in equations (3) and (4)—and an unexplained portion—the second term in equations (3) and (4), due to differences in the estimated regression coefficients. Following Neumark (1988), we use β coefficients from a pooled regression over both groups as an estimate for the return to individual characteristics, such that the decomposition can be alternatively expressed as:

$$\begin{aligned} \overline{W_w} - \overline{W_{nw}} = &\sum \beta_{pooled} (\overline{X_w} - \overline{X_{nw}}) \\ &+ \left[\sum (\beta_w - \beta_{pooled}) \overline{X_w} + \sum (\beta_{pooled} - \beta_{nw}) \overline{X_{nw}} \right] \end{aligned} \tag{5}$$

Where the first term is again the portion of the racial wealth gap explained by observed characteristics, and the second term is the unexplained portion of the racial wealth gap. In

each decomposition we measure wealth with the inverse hyperbolic sine transformation of household networth (commonly used in the literature on wealth inequality, e.g., Thompson and Suarez, 2015; Kakar, Daniels, and Petrovska, 2019). The inverse hyperbolic sine transformation is similar to a logarithmic transformation, but admits negative values, therefore allowing the inclusion of households reporting negative networth.

Table (4) presents the results of our decompositions. In addition to the rate of return, each decomposition of the racial wealth gap controls for (1) **portfolio composition**: the share of financial assets in the household's portfolio, the share of the household's primary residence in its portfolio, the share of equities in the household's portfolio, the share of debt holdings in credit card debt, the share of debt holdings in mortgage debt, (2) **credit history**: whether the household was turned down for credit in the past five years, whether the household feared being turned down for credit in the past five years, (3) **saving behavior**: whether the household saved at all in the last year,[7] whether the household rates giving a bequest as important, (4) **inheritances**: the amount of any inheritances received, whether the household expects to receive future inheritances, (5) **income**, (6) **labor market**: employment status, industry of employment, and (7) **demographics**: age, number of kids, marital status, educational attainment. We also implement a separate decomposition on only the 2016 SCF wave, to allow for the inclusion of a financial literacy control. Lastly, because single-year rates of return may be over- or under-stated relative to long-run trends when the direct approach to constructing rates of return is applied (thereby potentially overstating the contribution of rates of return to the racial wealth gap as a result of large single-year movements in capital gains) we take a conservative approach and drop observations reporting rates of return over 100% or less than 0% when R^{Direct} is used.

The decomposition results suggest that when rates of return are included the racial wealth gap is almost entirely explained by observable household characteristics. A significant portion

[7]The savings indicator variable is not available in the 1989 wave of the SCF. The results presented here are therefore for 1992 onward. Dropping the savings variable and including the 1989 wave in the decomposition makes little difference to our results.

Table 4: Racial Wealth Gap Decompositions, 1992-2016

	(1) $R^{Matched}$	(2) $R^{Matched}$	(3) R^{Direct}	(4) R^{Direct}	(5) $R^{Matched} + R^{Direct}$	(6) $R^{Matched} + R^{Direct}$
$\overline{W_{nw}} - \overline{W_w}$	-2.300***	-2.711***	-2.354***	-2.746***	-2.354***	-2.746***
	(0.0872)	(0.229)	(0.0898)	(0.242)	(0.0899)	(0.242)
Total Explained	-2.305***	-2.883***	-2.280***	-2.660***	-2.438***	-3.025***
	(0.0537)	(0.154)	(0.0565)	(0.159)	(0.0587)	(0.168)
Fraction Explained						
Rate of Return	-0.650***	-1.373***	-0.300***	-0.229***	-0.779***	-1.475***
	(0.0251)	(0.0998)	(0.0173)	(0.0394)	(0.0292)	(0.111)
Portfolio Composition	-0.221***	-0.195***	-0.464***	-0.602***	-0.302***	-0.281***
	(0.0158)	(0.0400)	(0.0217)	(0.0623)	(0.0174)	(0.0455)
Credit History	-0.267***	-0.292***	-0.264***	-0.284***	-0.250***	-0.265***
	(0.0217)	(0.0546)	(0.0225)	(0.0569)	(0.0222)	(0.0557)
Savings Behavior	-0.101***	-0.108***	-0.109***	-0.113***	-0.0999***	-0.103***
	(0.0126)	(0.0332)	(0.0131)	(0.0353)	(0.0127)	(0.0333)
Inheritances	-0.191***	-0.196***	-0.201***	-0.250***	-0.171***	-0.169***
	(0.0121)	(0.0363)	(0.0128)	(0.0414)	(0.0123)	(0.0384)
Income	-0.410***	-0.336***	-0.498***	-0.619***	-0.414***	-0.346***
	(0.0209)	(0.0552)	(0.0238)	(0.0685)	(0.0219)	(0.0588)
Labor Market	-0.00533	-0.00565	0.0117	0.0219	0.00359	-0.00293
	(0.00856)	(0.0255)	(0.00948)	(0.0286)	(0.00888)	(0.0266)
Demographics	-0.459***	-0.418***	-0.457***	-0.578***	-0.426***	-0.411***
	(0.0281)	(0.0795)	(0.0290)	(0.0900)	(0.0281)	(0.0827)
Financial Literacy		0.0407		-0.00643		0.0276
		(0.0353)		(0.0367)		(0.0358)
N	43,374	6,162	39,422	5,567	39,422	5,567

Notes: Heteroskedasticity robust standard errors in parenthesis, calculated using the delta method. * $p < 0.1$, ** $p < 0.05$, **** $p < 0.01$. Table presents results from Oaxaca-Blinder decompositions of the racial wealth gap (measured as the difference between average non-White and White wealth). Estimates obtained using SCF sample weights. Columns (1) and (2) assess the contribution of differential rates of return using the matched balance sheet approach. Columns (3) and (4) assess the contribution of differential rates of return using the direct approach. Columns (5) and (6) include both estimates of household rates of return. Because single-year rates of return may be over- or under-stated relative to long-run trends when the direct approach to constructing rates of return is applied (thereby overstating the contribution of rates of return to the racial wealth gap as a result of large single-year movements in capital gains) we drop observations reporting rates of return over 100% or less than 0% in decompositions when R^{Direct} is used.

of explained variation in racial wealth holdings is due to differences in rates of return. Using just the matched-balance sheet estimates of household rates of return, Columns (1) and (2) suggest that differential rates of return explain between 28% and 51% of the racial wealth gap. Using just the direct estimates of household rates of return, Columns (3) and (4) suggest a more modest (albeit nonetheless significant) contribution of differential rates of return to the racial wealth gap between 8% and 13%. Finally, using both estimates of the rate of return, Columns (5) and (6) suggest rates of return explain between 33% and 54% of the racial wealth gap.

Consistent with earlier literature, our results also suggest a role for differences in the receipt of inheritances (between 7% and 10%), demographics—including education, age, and family structure (15% to 20%), and credit history (10.6% to 11.7%, also a function of discrimination). Second, we note that because portfolio composition on the asset side of the balance sheet will be correlated with either measure of rate of return (in a mechanical sense with $R^{Matched}$, in an indirect sense with R^{Direct}) it is likely difficult to completely separate the effects of rates of return and portfolio composition in the above analysis. Columns (3) and (4) are the most conservative in this respect, suggesting a larger relative role for portfolio composition (between 19.7% and 21.9%, inclusive of effects stemming from the debt side of the balance sheet). The results in Columns (3) and (4) hardly rule out a role for rates of return however, because at least one obvious channel through which differences in portfolio composition contribute to racial wealth inequality is via their impact on the rate of return earned by the household over the long run—a featured missed in our analysis because the SCF is a repeated cross-section, presenting only a snapshot of household rates of return at a given point in time, rather than following the rate of return earned by a given household over time. In contrast, when either $R^{Matched}$ or both $R^{Matched}$ and R^{Direct} are used, rates of return appear to be the single largest explanatory component of the racial wealth gap. Finally we note that savings behavior and attitudes toward future bequests appear to explain only a tiny fraction of the racial wealth gap (between 3.9% and 4.3%), while financial literacy scores

have essentially no explanatory power. In Section (6), we provide further evidence ruling out a major role for differential savings behavior as an explanation for racial wealth inequality.

5 Welfare Considerations in a Simple Lifecycle Model

Consider a bare-bone canonical lifecycle model. The economy is populated by $j = \{1, \ldots, N\}$ types of households. Households live for two periods: in the first period, household j inelastically supplies labor services and earns a wage w_j that can be allocated between consumption and savings for retirement. In the second period, the household retires and consumes its entire first-period savings. The total population is constant. With log-utility $u_j(c^1_{j,t}, c^2_{j,t+1}) = \ln c^1_{j,t} + \beta \ln c^2_{j,t+1}$ for household-type j, equal discount factors $\beta \in (0,1)$ and household-specific rate of return r_j, the choice of consumption in the two periods is:

$$c^{*1}_{j,t} = \frac{1}{1+\beta} w_j \tag{6}$$

$$c^{*2}_{j,t+1} = \frac{\beta}{1+\beta}(1 + r_{j,t+1}) w_j \tag{7}$$

Let $\alpha_j \in (0,1)$ be the share of type-j households in the population such that $\sum_j \alpha_j = 1$, and consider a social planner choosing rates of returns $\{r_{j,t+1}\}_{j=1}^N$ so as to maximize the weighted average of the population's indirect utilities

$$\begin{aligned} \Omega &= \textstyle\sum_j \alpha_j u^*_j(c^{*1}_{j,t}, c^{*2}_{j,t+1}) \\ &= \textstyle\sum_j \alpha_j \left[(1+\beta)\ln w_j + \beta \ln(1 + r_{j,t+1})\right] + \Gamma \end{aligned}$$

(where $\Gamma \equiv \ln[1/(1+\beta)] + \beta \ln[\beta/(1+\beta)]$) subject to the adding-up constraint $\sum_j \alpha_j r_{j,t+1} = \bar{r}_{t+1}$, the average rate of return in the economy at time $t+1$. It is straightforward to show that the welfare-maximizing choice involves equal rates of return $r_{j,t+1} = \bar{r}_{t+1} \, \forall j$, with the implication that any difference in rates of returns in the economy is welfare-reducing.[8]

[8] In a model explicitly including production with intensive production function $y = f(k)$ with the usual properties, the planner would choose an allocation of capital across households $\{k_j\}_{j=1}^N$ taking into account

Suppose next that—as argued by Hamilton and Darity (2017); Dal Borgo (2019); Darity and Mullen (2020)—Black households tend to save more than White households all else equal. In the simple life-cycle model above, this consideration can be embedded as follows. Take any two household types $\{i, j\}$ such that $0 < \beta_i < \cdots < \beta_j < 1$, consistent with the parameter restrictions implied by Section (6). In this case, welfare maximization requires

$$\frac{1 + r_{j,t+1}}{1 + r_{i,t+1}} = \frac{\beta_j}{\beta_i} > 1 \tag{8}$$

which implies a welfare-maximizing ranking of the rate of returns $r_{j,t+1} > r_{i,t+1}$.

6 Simulating Euler Equations

In a simple log-utility model, the Euler equation

$$\frac{c_{j,t+1}}{c_{j,t}} = \beta_j(1 + r_{j,t+1}) \tag{9}$$

with discount factor $\beta_j = \frac{1}{1+\rho_j}$, where ρ_j is household j's rate of time preference, is sufficient to characterize household j's utility-maximizing saving path. To examine the implications of our series for household rates of return in an infinite-horizon setting, we use the observed data on rates of return, along with data on the relative consumption of White and non-White households from the Consumer Expenditure Survey (CEX), to simulate alternate paths for household consumption. In particular, we consider what rate of time preference would be required to match the actual trend in relative (White/non-White) consumption, given the observed series in rates of return. To do this, we set initial values for consumption to match the ratio of average White to average non-White consumption in an initial period (either 1989 or 1995) and iterate on separate consumption Euler equations for White and non-White households using our observed series on rates of return, under various assumptions about the

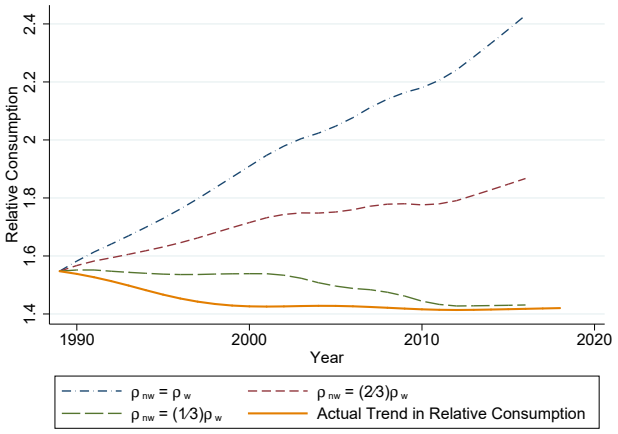
that $r_j = f'(k_j)$ and $w_j = f(k_j) - f'(k_j)k_j$, which delivers equal amounts of capital for every household $k_j = \bar{k}\ \forall j$, equal rates of return, and equal wages.

rate of time preference. In this exercise we use the matched balance sheet series for returns. Because the SCF is triennial, we interpolate values for White and non-White rates of return in missing years by assuming a linear annual trend in the interval[9]. We obtain the trend series in relative consumption by applying a Hodrick-Prescott filter to the annual ratio of White to non-White consumption in the CEX.[10]

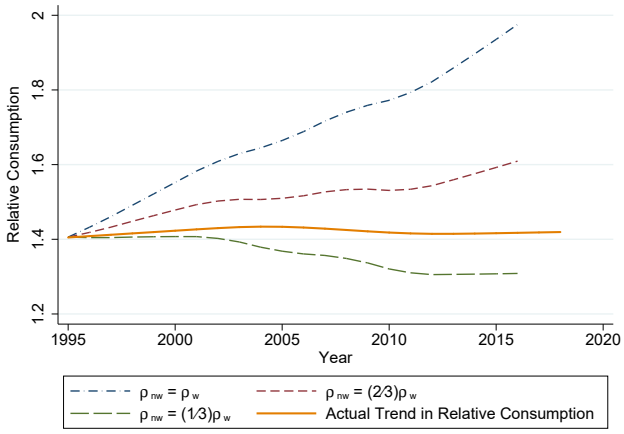
Figure (6) presents the results of our simulations. We present two alternate series: a simulation beginning in 1989, and a simulation beginning in 1995. We present these two series because the CEX data displays a sizable decline in White/non-White relative consumption between 1989 and 1995, therefore making the 1995 starting point more conservative. We assume that the rate of time preference for White households is $\rho_w = 0.03$, and simulate several alternative series for relative consumption under differing assumptions about the size of the non-White rate of time preference, ρ_{nw}, relative to the White rate.

Figure 6: Relative Consumption Simulations

(a) 1989 Initial Values



(b) 1995 Initial Values



Given our series on rates of return, to match observed data on relative consumption the average rate of time preference among non-White households must be *less* than the rate of time preference in White households. In particular, our results suggest that if the rate of

[9]E.g., for the years 1990 and 1991 we assume a linear trend between the rates of return observed in 1989 and 1992.

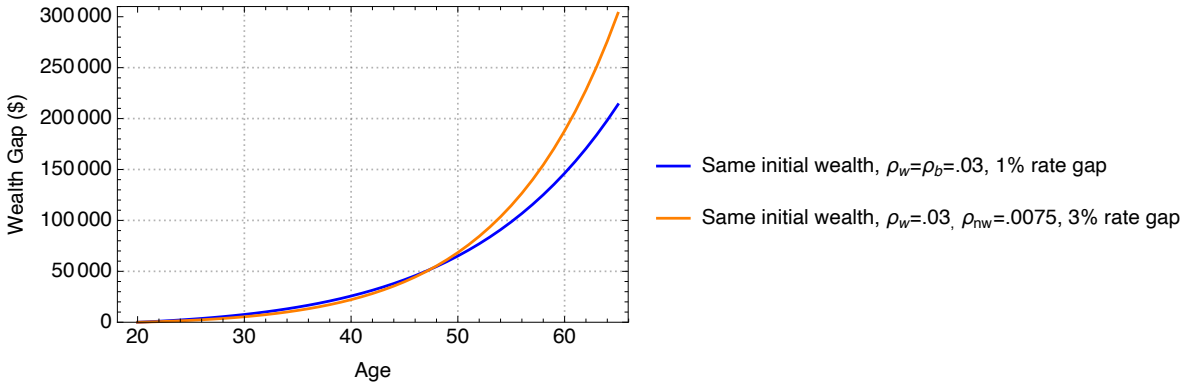
[10]We adopt a smoothing parameter of 100, commonly used in annual data.

time preference of White households is $\rho_w = 0.03$, the non-White rate of time preference, ρ_{nw}, must be somewhere between 0.01 and 0.02 if our simulations are to match the data on relative consumption. This finding effectively rules out explanations of the racial wealth gap rooted in myopia or excessive time preference.

Next, we simulate the wealth gap implied by differential rates of return, taking into account our findings above on relative rates of time preference and the fact that the racial wealth gap at age 20 is basically zero. We start with equal rates of time preference ($\rho = .03$ for both groups) and identical initial networth. Since the initial number is arbitrary, we take the average between median Black and median White networth in 1989, i.e. \$49,268, to start the simulation. In this scenario, a 1% rate of return differential as in Figure (3) implies a racial wealth gap of \$213,754 at retirement. This result is presented in Figure (7).

Finally, we look at differences in the rate of time preference across races in the presence of a higher difference (3%) in rates of return. Our consumption simulations show that, with a White rate of time preference of .03, the corresponding time-preference rate for non-White households should be lower. We also know from Figure (2) that the racial wealth gap at age 65 approaches \$300,000. With values $\rho_w = 0.03$ and $\rho_{nw} = 0.015$, Figure (7) shows that a 3% gap in rates of return generates a racial wealth gap at retirement close to \$300,000. Additionally, we can use the Euler equation above to back out the implied rate of time preference for non-White households, implying a value of approximately .0075. Other scenarios can also be thought of: a lower difference in rates of return and a higher non-White rate of time preference will deliver similar results, for instance. Regardless, the main takeaway is that our analysis rules out higher time impatience of non-White households as compared to White households as a main cause of consumption and wealth differentials across races.

Figure 7: Euler Equation Simulations



Simulations of the wealth accumulation equation $W_{t+1} = \beta(1 + r_{t+1})W_t$ for the two groups with log utility and identical initial wealth.

7 Conclusion

Differential rates of return are an important explanatory component of the racial wealth gap. Using data on household balance sheets from the Survey of Consumer Finances (SCF) and data on macroeconomic rates of return from Jordà et al. (2019) we construct two alternate series for household rates of return by race from 1989 to 2016. Our estimates suggest a persistent gap in the rate of return on investment between 1 and 6 percentage points. The gap in returns remains even after conditioning on demographic factors, labor market factors, credit history, portfolio composition, household attitudes toward savings, financial literacy, and inheritance—suggestive of a role for discrimination. Oaxaca-Blinder decompositions indicate that differential rates of return may explain up to 50% of the racial wealth gap. Finally, our data on differential rates of return allow us to effectively rule out explanations for the racial wealth gap based on myopia or excessive time preference on behalf of non-White households. Given observed series for consumption and rates of return, a standard lifecyle model requires non-White households to discount the future *less* than White households in order to match the data.

Two questions remain: What is the source of differential returns? And what—if any—are the policy implications of our findings? To the first, we have suggested a role for discrimina-

tion. The United States has a long history of discrimination against Blacks and Hispanics: asset markets are no exception. If discrimination prevents Blacks and Hispanics from purchasing homes in desirable neighborhoods, from obtaining funding to start a business, or from being hired by employers offering retirement plans with generous returns, then the rate of return on investment received by Black and Hispanic households will inevitably fall. Although exploring the myriad ways that discrimination leads to lower returns is outside the scope of this paper, we note that the large and growing literature on stratification economics speaks in some detail on these issues (Stewart, 2010; Darity, Hamilton, and Stewart, 2015; Williams, 2017).

To the second question, our exercise in Section (5) suggests that any policy which aims to equalize rates of return will be welfare enhancing. Policies such as Hamilton and Darity (2010)'s Baby Bonds proposal—a progressive system (conditional on networth) of trust funds granted upon birth, deposited in federally managed investment accounts with guaranteed returns, accessible once the child turns 18 years of age—fit this bill. In addition to directly reducing the racial wealth gap, by helping to equalize returns across race Baby Bonds have the added benefit of preventing the re-emergence of the racial wealth gap in the future.

This suggestion comes with a caveat. Although the results in this paper indicate that there may be efficiency reasons to address racial differences in wealth accumulation and rates of return, these should not limit the scope of policy action on racial disparities. Justice, not efficiency, should be the litmus test for economic action on racial inequality. We echo Darity and Hamilton (2010)'s call for bold policies for economic justice to address structural racial inequality—including the gap in household rates of return.

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A JST-SCF Crosswalk

Table (5) presents the crosswalk between the JST and SCF data for the main asset categories in the SCF. For other assets, including vehicles, life insurance, transaction accounts (including checking accounts, savings accounts, and money market mutual funds), gold, silver, jewelry, antiques, future proceeds from lawsuits, mineral investments, and other miscellaneous sources of financial and non-financial wealth we assign a zero rate of return.

Table 5: JST-SCF Crosswalk

	JST Return		
SCF Wealth Category	Equity Return	Bond Return	Housing Return
Certificates of Deposit		X	
Mutual Funds		X	
Directly Held Stocks	X		
Directly Held Bonds		X	
IRAs, Keoghs, Thrift-Type Accounts	X		
Savings Bonds		X	
Other Trusts, Annuities, and Managed Accounts	X		
Primary Residence			X
Other Residential Real Estate			X
Nonresidential Real Estate			X
Owned Businesses	X		

B Additional Estimates of Conditional Differences in Returns

Table (6) presents additional estimates of conditional differences in the rate of return using the direct series. These results differ from those presented in the body of the paper by excluding all observations which report a value of R^{Direct} greater than 1 or less than 0, addressing potential concerns about the influence of outliers on our results.

Table 6: Conditional Differences in Rates of Return, Direct Series, Excluding Potential Outliers

	(1) R_{it}^{Direct}	(2) R_{it}^{Direct}	(3) R_{it}^{Direct}	(4) R_{it}^{Direct}	(5) R_{it}^{Direct}	(6) R_{it}^{Direct}
Black	-0.0597***	-0.0316***	-0.0256***	-0.00727**	-0.000771	-0.00138
	(0.00441)	(0.00410)	(0.00413)	(0.00344)	(0.00345)	(0.00782)
Hispanic	-0.0773***	-0.0411***	-0.0338***	-0.0225***	-0.0145***	-0.00487
	(0.00453)	(0.00437)	(0.00437)	(0.00369)	(0.00368)	(0.00800)
Other	-0.0444***	-0.0142**	-0.00951	0.00195	0.00559	0.0195*
	(0.00638)	(0.00598)	(0.00592)	(0.00527)	(0.00518)	(0.0117)
N	42,245	42,245	42,245	42,245	42,245	5,567
R^2	0.0154	0.162	0.168	0.370	0.396	0.360
Demographic Controls	N	Y	Y	Y	Y	Y
Labor Market Controls	N	N	Y	Y	Y	Y
Portfolio Composition	N	N	N	Y	Y	Y
Credit History Controls	N	N	N	N	Y	Y
Year Fixed Effects	N	N	N	N	Y	N
Financial Literacy Controls	N	N	N	N	N	Y

The results in Table (6) are largely consistent with those in the body of the paper, suggesting our findings on conditional differences in rates of return across race using R^{Direct} are not driven primarily by outliers.

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