

Racial/Ethnic Disparities in Stock Ownership: A Decomposition Analysis

There is a large disparity in stock ownership between racial/ethnic groups in the United States. A logistic regression model shows that there are significant differences between these groups even after controlling for net worth, income, risk tolerance levels and other factors. This study presents the first application of the Oaxaca (1973) decomposition technique to racial/ethnic differences in stock ownership, and provides estimates of the relative importance of these factors in accounting for the gaps. Differences in net worth, income, risk tolerance, education, and homeownership account for almost all of the disparity in stock ownership between Black and White households and a substantial portion of the disparity between Hispanics and White households.

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Introduction

A number of studies examine household disparities in wealth distribution among different racial/ethnic groups in U.S., with most studies examining the gap between Blacks and Whites (Altonji, Doraszelski, & Segal, 2000; Barsky, Bound, Kervin, & Lupton, 2002; Blau & Graham, 1990; Smith, 1995; Choudhury, 2002; Wolff, 1998). Investment in stocks is an important factor in future economic well-being of households, especially in terms of potential retirement adequacy. White households have much higher stock ownership rates than minority groups, even after controlling for income and other factors (Zhong & Xiao, 1995; Schooley & Worden, 1996; Wang & Hanna, 2006). Using the 1992 Health and Retirement Survey, Choudhury (2002) demonstrates that Whites, Blacks and Hispanics are different in saving behavior, and minority households are notably less inclined to invest in riskier, higher-yielding financial assets.

Although there is rich literature documenting the gap between White households and Black and Hispanic households in terms of holding stocks, little is known about the relative contribution of income, household characteristics, risk tolerance, or discrimination in provision of financial services and information to racial/ethnic gaps. Using Oaxaca's (1973) technique, the most popular method for decomposing the mean difference between groups, as well as its extension by Fairlie (2005), this is the first study to estimate the relative contribution of different factors to the racial/ethnic gaps between Blacks and Whites and between Hispanics and Whites in stock ownership.

Literature Review

Overview

A household's investment allocation is crucial for its wealth accumulation, especially for retirement adequacy. However, households with similar demographic and financial resources behave quite differently in the allocation of investment portfolios. For financial investments for long-term goals, the relationship between risk and return means that portfolio allocation in risky assets makes a substantial difference in projected wealth accumulation. In the sections below, some important literature relevant to the racial/ethnic differences in terms of stock and other risky asset holdings and wealth accumulation is summarized, and then literature related to factors affecting the choice of holding stocks is discussed.

Investment behavior can be influenced by preferences. Ogden, Ogden and Schau (2004) suggest that a person's race or ethnicity may be related to a subculture, which might impact preferences. One important preference related to investment behavior is risk tolerance. Harihan, Chapman and Domian (2000) note that modern portfolio theory predicts that a household's allocation of investments to risky assets is affected by its risk tolerance, and provide empirical evidence of the relationship. Schooley and Worden (1996) also find a relationship between risk tolerance and risky asset allocation.

Most studies find that Blacks and Hispanics are less willing to take investment risk than Whites, as Yao, Gutter, and Hanna (2005) note in their review of empirical studies. Yao, et al. (2005) analyze a combination of the 1983 to 2001 Survey of Consumer Finances (SCF) datasets, and report that Blacks and Hispanics are less willing to take some investment risk than otherwise similar White households, although more willing to take substantial investment risk than Whites.

Coleman (2003) analyzes the 1998 SCF models to compare the risk tolerance levels of Whites, Blacks, and Hispanics. In a logistic regression controlling for racial/ethnic group, gender, marital status, education, age, and family size, she finds that Blacks and Hispanics are less likely to be willing to take any risk compared to otherwise similar Whites. However, when she also controls for net worth, the predicted risk tolerance difference between Blacks and Whites is not significant.

Gutter and Fontes (2006) find that risky asset ownership is the key to racial differences in portfolio choices, as Black and Hispanic households that own any risky asset are not significantly different from similar White households in risky asset proportions. Coleman (2003) finds that Blacks and Hispanics have a significantly lower risky asset proportion than otherwise similar Whites when net worth is not controlled, but when net worth controlled, the predicted difference between Blacks and Whites is not significant. Wang and Hanna (2006) find that households with Black or Hispanic respondents are significantly less likely to hold stocks directly and/or indirectly than are otherwise similar households with White respondents.

Despite the preponderance of studies finding that Blacks and Hispanics are less willing to take investment risk than Whites, it seems possible that minority groups may be less risk tolerant because of limited familiarity with financial investments, rather than because of a lower level of true risk tolerance. Barsky, Juster, Kimball, and Shapiro (1997), using an income gamble measure on the Health and Retirement Study (HRS) dataset, report that Blacks and Hispanics have average risk tolerance levels higher than Whites. The Barsky et al. (1997) risk tolerance measure is designed to be a pure measure of risk tolerance and is unrelated to financial investments, so it might be closer to the economic concept of risk tolerance than the SCF measure.

A consumer's access to information and related services in financial markets might also affect its financial behavior. If consumers can obtain more information and service for financial investment, they probably will be more willing to participate in financial markets. For example, more educated households may be more willing to participate in financial market than less educated people. Haurin and Morrow-Jones (2007) conclude that differences in knowledge of markets might contribute to lower homeownership rates of Black households, so it is plausible that similar factors may contribute to lower stock ownership rates.

Wealth, Investment and Race

The wealth gap between non-Hispanic White households and households with respondents in other racial/ethnic groups narrowed between 1995 and 2001 (Aizcorbe, Kennickell, & Moore, 2003; Bucks, Kennickell, Starr-McCluer, & Sundén, 1997; Kennickell, Starr-McCluer, & Surette, 2000), but then became much wider in 2004 (Kennickell, & Moore, 2006).

Smith (1995) compares the racial and ethnic differences in wealth through 1992 HRS and concludes that income is an important reason for racial and ethnic deficits, but that income-conditioned wealth disparities in asset remain large. Differences in stock ownership may contribute to the wealth differences. Previous researchers all find a racial wealth gap, using a variety of data sets, but have inconsistent results about the influence of various demographic and financial characteristics on the gap. Altonji, et al. (2000) use a decomposition method and find that most or all of the race gap in the wealth level for single men and single women and a substantial portion of the gap for married couples would disappear if Blacks and Whites have the same distribution of income and demographic variables and if the slope coefficients of the White wealth equation hold for Blacks. For instance, they find that single Black men would have 108% of the wealth of single White men if they have the same income and demographics as White men when using the estimated coefficients of the wealth model for Whites. Kaufman (1983) uses a structural decomposition of Black-White earning differentials based on a regression standardization approach and concludes that eliminating all Black-White differences within labor market divisions would still leave a significant earnings gap between Blacks and Whites due to the structure of the labor market. Blau and Graham (1990), using data from the 1976 and 1978 National Longitudinal Surveys of young men and young women (NLSY) to examine the Black-White differences in wealth and asset composition among younger families, find that as much as 75% of racial differences remain unexplained by income and other demographic and locational characteristics. Barsky et al. (2002) use a non-parametric approach to analyze racial differences in earnings and compares the result with the traditional decomposition method. After re-weighting observations to give a sample of Whites a similar earnings distribution as that for Blacks, they find that differences in characteristics explain only 64% of the wealth gap by using a nonparametric approach, compared with 97% when the standard (linear) regression decomposition approach is used (with White coefficients).

Given the importance of investments in the risky assets in contributing to wealth differences between different racial/ethnic groups, many studies focus on the ownership of risky assets and its relationship with race (Haliassos & Bertaut, 1995; Plath & Stevenson, 2000; Coleman, 2003). For instance, using the 1992 HRS, Choudhury (2002) demonstrates that Whites, Blacks and Hispanics are different in saving behavior, and minority

households are notably less inclined to invest in riskier, higher-yielding financial assets. Gutter, Fox and Montalto (1999) analyze Black/ White racial difference in the likelihood of owing risky assets and conclude that differences in risky asset ownership between Black households and White households are due to racial characteristics in the individual determinants of risky asset ownership. Stevenson and Plath (2006) compare financial service consumption patterns of Hispanics with those of non-Hispanic whites, using the 1998 SCF, and find that Hispanics differ markedly from their non-Hispanic White counterparts in terms of financial product preferences and investment asset portfolio composition. Further, Hispanics trail their non-Hispanic White counterparts in terms of breadth and depth of financial holdings, particularly in the area of more risky but historically higher return asset categories.

An important part of racial/ethnic differences in risky asset holdings is stock holdings. While previous researchers' methods vary in analyzing the distribution of wealth, there is agreement that the distribution of wealth in the United States is very unequal and that inequality has worsened in recent decades. Keister and Moller (2000) note that participation in stock and real estate investments markets have very important influences on the unequal distribution of wealth. Wang and Hanna (2006) report that even after controlling for risk tolerance levels and other variables, Blacks and Hispanics are less likely to directly or indirectly hold stock investments than Whites. Hurst, Ming and Stafford (1998) find that the lower rate of stock ownership among Black families prevent them from benefiting as much as White families from the economic boom of the 1990s. Therefore, it is important to explore the causes of low stock ownership by minority households.

Decomposition Method

The typical approach to decomposing racial differences in wages, employment, and wealth is to use an extension of the Blinder-Oaxaca technique, developed by Oaxaca (1973) and Blinder (1973). The Blinder-Oaxaca decomposition technique is widely used to identify and quantify the separate contributions of group differences in measurable characteristics. Fairlie (1999) and Fairlie (2005) note that a linear regression implies that the slope of an racial effect with respect to all other covariates is the same for all races, and only the intercept of the function is shifted up or down. Given this restriction, it is more appropriate to employ non-linear decomposition to give a robust estimate of the contribution of racial effects. Fairlie (1999) and Fairlie (2005) propose an extended non-linear decomposition technique which uses the coefficients directly from a logit or probit model when the outcome is binary. In this study a variation of the Blinder-Oaxaca decomposition method as described by Fairlie (2005) is used to examine how racial/ethnic groups are different in terms of the stock ownership and how much of these disparities are due to the observed differences in household characteristics.

Oaxaca and Ransom (1994) suggest a way to circumvent the index number problem, whereby the pooled coefficient vector-pooled for the two races being compared-is taken as the non-discriminatory unemployment structure. The process of decomposition of the Black-White gap in stock ownership is illustrated below. In general, the disparity of stock ownership rate between Blacks and Whites can be expressed as below:

$$\bar{Y}^W - \bar{Y}^B = \left[\sum_{i=1}^{N^W} \frac{F\left(X_i^W \beta^{\hat{w}}\right)}{N^W} - \sum_{i=1}^{N^B} \frac{F\left(X_i^B \beta^{\hat{w}}\right)}{N^B} \right] + \left[\sum_{i=1}^{N^B} \frac{F\left(X_i^B \beta^{\hat{w}}\right)}{N^B} - \sum_{i=1}^{N^B} \frac{F\left(X_i^B \beta^{\hat{B}}\right)}{N^B} \right]$$

\bar{Y}^W and \bar{Y}^B represent the average predicted probability of stockownership for White and Black groups respectively. $F(.)$ is the cumulative distribution function from the logistic distribution and N represents the sample size in different groups. X^W and X^B are row vectors of average value for the individual characteristics of Whites and Blacks respectively. $\hat{\beta}^W$ and $\hat{\beta}^B$ are the vector of coefficient estimates for Whites and Blacks respectively. For a linear regression, the standard Blinder-Oaxaca decomposition of the White/Black gap in the average of the dependent variable, Y is expressed as: $\bar{Y}^W - \bar{Y}^B = \left[\left(\bar{X}^W - \bar{X}^B \right) \hat{\beta}^W \right] + \left[\bar{X}^B \left(\hat{\beta}^W - \hat{\beta}^B \right) \right]$. As Fairlie (2005)

illustrates, this equation is a special case of the equation used in this study.

The racial gap in this respect can be divided into two parts: one part of explained difference (expressed as the first term in the equation) due to the differences in household characteristics included in the model, and another part of unexplained difference due to the inability to include unmeasurable variables (expressed as the second term

in the equation). The contribution of each variable to the gap is equal to the change in the average predicted probability from replacing the Black distribution with the White distribution of that variable while holding the distributions of the other variable constant.

Given that the White sample size is much larger than that of the Hispanic and Black samples, the average prediction decomposition method is implemented by following the suggestion of Fairlie (2005) to randomly select a White sample to match the Black sample size for the analysis. The Blacks and sampled Whites are then ranked by race and matched based on their predicted stockownership outcomes. This sampling process is repeated 1,000 times, and calculated statistics that are computed with the alternative weights are averaged. In this way, selection bias from sample differences between different racial groups can be substantially reduced.

In this study, the sample weights are used to estimate the mean outcomes but not the logit regressions. There is no reason to prefer the Black or White estimates in this equation, therefore, the common approach of presenting both sets of estimates is used, as well as also adding another set of overall sample estimates as Oaxaca and Ransom (1994) suggest. In this way, the sensitivity and consistency of decomposition specifications from estimates can be tested. Therefore, in this study models are estimated separately—overall sample with racial/ethnic controlled, White sample only, Black sample only, and Hispanic sample only. These estimates include the same explanatory variables, with the exception that the racial/ethnic coefficients are dropped when they are applied in decomposition specification (1) as shown in Table 4 and Table 5. By incorporating the coefficients from logistic results, decomposition results can show the relative contribution to differences in stock ownership from household characteristics such as age, education, and health status.

Data and Variables

The 2004 Survey of Consumer Finances (SCF) dataset is used to study the White-Black and White-Hispanic gap in stock ownership because the SCF is the best source of information on the wealth or financial assets holdings and characteristics of American households (Bucks, et al., 2006). The SCF is a triennial interview survey of U.S families sponsored by the Board of Governors of the Federal Reserve System with the cooperation of the U.S. Department of the Treasury. The race and ethnicity of a household in the SCF are classified according to the respondent to the SCF interview. The surveys before 2004 include one racial/ethnic question, with White and Hispanic presented as different categories (Yao, et al., 2005). A few respondents also indicate a second category of racial/ethnic identity, but in the public use datasets before 2004, it is impossible to identify respondents who choose Hispanic as a second category. Starting from the 2004 SCF, there is now a separate question about Hispanic status: whether respondents consider themselves to be Hispanic or Latino in culture or origin. Combining that answer with the primary question gives a slightly higher proportion of Hispanics. However, the results are similar when using the one-question racial/ethnic variable, so for consistency with research using previous SCF datasets, the one-question categorization is used.

The 2004 SCF survey includes 4,519 households, with five implicates for each household (Kennickel, 2006). The coding for the racial/ethnic status variable (X6809) is different across implicates for 13 households, so those households are excluded from the analyses. Of the remaining 4,506 households, there are 3,511 households with White respondents, 482 with Black respondents, 347 with Hispanic respondents, and 166 with respondents choosing some other racial/ethnic group. (The SCF does not provide detailed breakdowns of this last group in the public dataset.) In analyses of all households, the “other” households are included, but separate analyses of this group are not presented. Using the SCF population weight, 73.6% of the households have White respondents, 13.6% have Black respondents, 9.2% have Hispanic respondents, and 3.7% have “other” respondents.

For some households, unfamiliarity with the stock market and stock investments may result in using other high return investments such as real estate or a private business as a substitute for stock investments. However, preliminary analyses do not yield any suggestion that Black and Hispanic households substituted these alternate investments for stock investments. Furthermore, a focus on stock investments is of particular interest because of the decisions of workers to invest in retirement accounts.

Our basic models for the multivariate analysis are:

For the full sample:

$$\text{Choice of holding any stock investments} = f(\text{racial/ethnic group, } X) \quad (1)$$

Where X is a vector of household characteristics and risk tolerance.

For each of the individual subsamples (White, Black and Hispanic):

$$\text{Choice of holding any stock investments} = f(X) \quad (2)$$

Where X is a vector of household characteristics and risk tolerance.

The dependent variable is dichotomous, and equals 1 if the household holds any stock investments, including in mutual funds inside of defined contribution retirement accounts.

The multivariate analyses are based on previous research and on the idea that a household's decision to hold stock investments is related to its risk tolerance, its investment horizon, and its desire to invest for future goals, especially retirement. The appropriateness of stock investments for savings goals is strongly related to the investment horizon, given the volatility of stocks compared to alternate investments such as cash equivalents and shorter term government bonds. Campbell and Viceira (2002) show that the optimal stock proportion of a portfolio should be related to age, for each level of risk aversion. Lower income households may decide to not save much for retirement because of the higher replacement rate for Social Security pensions, so putting funds in any higher return investment should be strongly related to household income. Liquidity concerns may lead some households with low net worth to avoid putting money in high return investments. The focus on much research and normative analysis in finance is on the ratio of risky assets to the total portfolio (e.g., Coleman, 2003). However, most Black and Hispanic households hold no risky assets, so a direct comparison of the risky asset ratios of minority households to the ratios of White households does not provide much insight, because most of the racial/ethnic differences in asset allocation are due to differences in ownership of risky assets (Gutter & Fontes, 2006).

The explanatory variables are chosen based on normative models of portfolio choice and previous empirical results. Risk tolerance should influence portfolio decisions, and age should have an effect based on life cycle savings considerations, e.g., young households might not have any savings, and the investment horizon may initially increase after short-term goals have been reached, and decrease as retirement approaches. The combination of possible influences of age on portfolio decisions makes it reasonable to include both age and age squared to account for non-linear effects of age. Education may have an impact on the financial knowledge of the household, and therefore its choices. Health status may have an impact because of perceived need for funds to cover uninsured medical expenses in the future. Business ownership may be an alternative to stock investments. Homeownership may provide a diversification in terms of the household's overall portfolio, perhaps making stock ownership more acceptable. Married couples may make different choices than unmarried persons, and generally may have more potential resources than single people. Having a dependent child under the age of 19 may make the investment horizon shorter and also reduce the amount available for investing. The SCF attempts to have the more financially knowledgeable partner be the respondent in couple households (Lindamood & Hanna, 2005). Because of different socialization and educational experiences, it is plausible that households with male respondents may make different investment choices than households with female respondents, even after controlling for whether it is a couple households. Therefore, the gender of the respondent can be male or female in both married households and non-married households.

Almost all of the explanatory variables used (Appendix 1) have been found to have significant effects in previous empirical studies. For instance, in an analysis using the combined 1992-2004 SCF, Wang and Hanna (2006) find that risk tolerance, age, age squared, racial/ethnic group dummy variables, education, household composition, business ownership, home ownership, and income have significant effects. In the logistic regressions, age and age squared are scaled so that estimated coefficients can be presented in a fixed decimal format, as otherwise the estimated coefficients for age squared are very small. The natural log of income and net worth are used to reduce possible effects of heteroskedascity. Some variables, such as income and net worth, are correlated, but even with multicollinearity, regression estimates are unbiased, and the potential problem is that an estimate may be insignificant when its effect really is significant (Kennedy, 1998, 183-189). If estimated effects for variables that theoretically should have an effect are significant, then multicollinearity is not a problem. The logistic regressions were tried without net worth, and the results are similar to those presented in this article, except that income has a larger effect.

Results

Descriptive Results

Racial/ethnic Differences in Risky Asset Holdings. Table 1 shows the risky asset ownership rates in 2004 of Whites, Blacks and Hispanics. (To simplify discussion, results for the other group, which includes Asians and Native Americans, are not presented.) Most Whites (64%) have at least some type of risky asset investment, but only 33% of Blacks and 27% of Hispanics have some type of risky asset. The proportions of Blacks and Hispanics owning any risky asset are so low that any analysis of the ratio of risky assets to total investment assets is dominated by the investment ownership status. Therefore this study has a focus on ownership status rather than the ratio. Furthermore, stock investments are the primary high return investment used by workers for retirement accounts,

whereas some real estate investments represent undiversified choices, for instance, in renting out an apartment. Therefore, this research has a focus on stock ownership.

Table 1

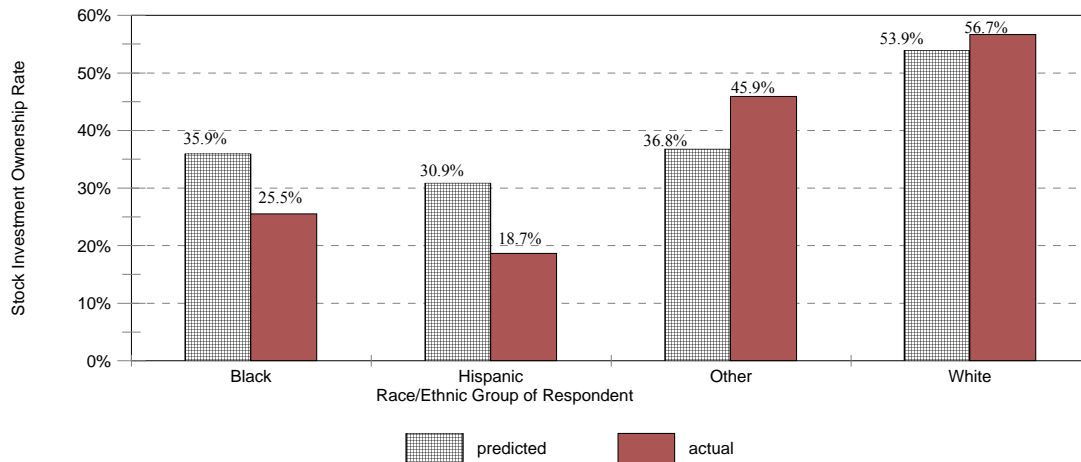
Investment in Risky Assets and in Stocks among Racial/Ethnic Groups, 2004

Variable	White		Black		Hispanics	
Composition of Risky assets						
Have stock investments	56.73%		25.52%		18.66%	
Own investment real estate	19.88%		12.34%		11.97%	
Own a business	14.52%		5.79%		4.53%	
Have any risky investments	63.71%		32.67%		26.76%	
Composition of stock holdings						
	mean	median	mean	median	mean	median
Directly held stocks \$	43,783	0	926	0	3,025	0
Stock mutual funds \$	27,568	0	2,157	0	1,525	0
IRS/Keoughs invested in stocks \$	23,053	0	1,285	0	1,020	0
Other managed assets \$	18,200	0	3,457	0	3,516	0
Thrift-type retirement accounts invested in stocks \$	2,738	0	920	0	110	0
Total stock holdings \$	115,342	1,625	8,745	0	9,197	0

Calculated by authors, weighted analysis of the 2004 SCF, with 13 households deleted that had different responses to racial/ethnic group in different implicates, resulting in an overall sample of 4,506 households. Households with respondents coded as “Other racial/ethnic group” were included in the overall analyses but the results are not presented here. Stock investments include any ownership of stocks directly or in mutual funds, including defined contribution retirement accounts. Risky assets include stock investments, investment real estate (not counting primary residence) and business ownership.

The proportion of the households that own stocks directly and indirectly is much higher for White households (57%) than for Black households (25%) and Hispanic households (19%) (Table 1; Figure 1). White households hold far more stocks in any form than Black and Hispanic households, with a mean value of \$115,342, compared with \$8,745 for Black households and \$9,197 for Hispanic households.

Figure 1
Predicted and Actual Stock ownership Rates for Blacks, Whites, Hispanics, and Others, 2004 Survey of Consumer Finances



Actual rates from Table 1, calculated by authors, weighted analysis of the 2004 Survey of Consumer Finances. Predicted rates, based on full sample logit shown in Table 3, at mean values of all other variables in the logit, and adjusted so that at the mean value of all variables, predicted probability of stock ownership equal to the sample mean.

Racial/Ethnic Differences in Other Household Characteristics. This section describes the differences between households with White, Black and Hispanic respondents by comparing their households' demographic and economic characteristics (Table 2). On the average, White respondents are older than Blacks and Hispanics, with Hispanics have the youngest respondents. Households with White respondents have much higher mean income and net worth than households with Black and Hispanic respondents. Half of Hispanics have less than a high school diploma, compared to 17% of White respondents and 26% of Black respondents. Whites are less likely to be unwilling to take any investment risk than are Blacks and Hispanics, but are also less likely to say they are willing to take substantial risk. Among the three types of households, Blacks are more likely than Whites and Hispanics to have female respondents.

Table 2

Means and Proportions of Household Characteristics by Racial/Ethnic Groups, 2004

Variable	White	Black	Hispanic
Age	50.39	47.2	41.82
Income (\$)	76,958	37,781	38,395
Net worth (\$)	553,363	109,718	126,129
Education of respondent			
Less than high school degree	0.1733	0.2551	0.5027
High school degree	0.1979	0.2431	0.2034
>12 years education without degree	0.2240	0.2506	0.1791
2 years degree	0.0642	0.0552	0.0235
Bachelor degree	0.2080	0.1161	0.0590
Post bachelor degree	0.1325	0.0785	0.0321
Health of respondent			
Poor health	0.0556	0.1022	0.0860
Fair health	0.1618	0.2054	0.2767
Good health	0.4790	0.4277	0.4118
Excellent health	0.3035	0.2674	0.2255
Risk tolerance level			
Not willing to take risk	0.3655	0.5732	0.6517
Average risk tolerance	0.4294	0.2815	0.1959
Above average risk tolerance	0.1787	0.0919	0.0984
Substantial risk tolerance	0.0264	0.0534	0.0540
Married household	0.5454	0.2566	0.5006
Own home	0.7578	0.5009	0.4776
Presence of child aged under 19 at home	0.4016	0.4777	0.6184
Female respondent	0.5352	0.6769	0.5247
Actual (unweighted) number of households	3,511	482	347
Weighted percent of sample	73.61%	13.56%	9.18%

Calculated by authors, weighted analysis of the 2004 SCF, with 13 households deleted that had different responses to racial/ethnic group in different implicates. Households with respondents coded as “Other racial/ethnic group” are included in the overall analyses but the results are not presented here.

Logit Results

Four different logistic regressions are conducted separately by using different samples: full sample which includes and controls for the four racial/ethnic categories, White only subsample, Black only subsample, and Hispanic only subsample. Table 3 displays the determinants of stock ownership in the logit regressions. The coefficient estimates from these logit regressions are used to determine whether there are racial/ethnic differences in stock ownership and also to calculate the contribution of racial/ethnic differences in individual characteristics to the differences in stock ownership (as shown in Table 4 and Table 5). Based on the regression results for the full sample, Blacks and Hispanics are significantly less likely than otherwise similar Whites to have stock ownership. Figure 1 shows the predicted stock ownership rate for each racial/ethnic group, along with the actual rate for each group. If

Whites, Blacks, Hispanics, and those of other groups have the full sample mean levels of income, net worth, risk tolerance, and other characteristics, then the predicted stock ownership rates of Blacks and Hispanics are closer to the White rate, but there are still large differences. The predicted stock ownership rate for Black households is 35.9%, compared to 30.9% for Hispanic households, 36.8% for other households, and 53.9% for White households.

Table 3
Logistic Results of Racial/Ethnic Difference in Stock Ownership

Parameters	Samples							
	Full		Black		White		Hispanic	
	coefficient	p-value	coefficient	p-value	coefficient	p-value	coefficient	p-value
Intercept	-7.9275	.000	-8.5300	.000	-7.8075	.000	-19.4501	.000
Racial/ethnic groups: reference category= White								
Black	-0.7513	.000						
Hispanic	-1.0208	.000						
Asian/other groups	-0.7031	.001						
Age of respondent/100	6.2719	.000	9.3485	.107	6.3298	.000	13.1338	.234
Age squared/10000	-6.1547	.000	-8.5275	.152	-6.3113	.000	-17.3005	.178
Education of respondent: reference category=less than high school								
High school degree	0.6033	.000	0.7845	.132	0.5258	.003	1.3883	.022
>12 years, no degree	0.8152	.000	1.4751	.002	0.6536	.000	1.7090	.001
2 year degree	1.0881	.000	2.2209	.001	0.8982	.000	2.0839	.050
Bachelor degree	1.5498	.000	1.7262	.001	1.6287	.000	1.1591	.110
Post BS	1.7335	.000	2.6860	.000	1.6331	.000	1.0628	.212
Health condition of the respondent: reference category=poor health								
Excellent health	0.7024	.003	0.0996	.884	0.7297	.006	1.2869	.451
Good health	0.8742	.000	0.6415	.321	0.8597	.001	1.6481	.327
Fair health	0.3405	.163	-0.1405	.844	0.3934	.150	1.3019	.448
Own business	-0.2740	.019	0.0723	.884	-0.2994	.020	-0.1350	.818
Risk tolerance: reference category=not willing to take any risk								
Average	1.3126	.000	1.2671	.000	1.2084	.000	2.0306	.000
Above average	1.7140	.000	1.0377	.015	1.7449	.000	2.1628	.000
Substantial	1.4116	.000	1.3845	.013	1.3693	.000	1.2729	.053
Log of income	0.2285	.000	0.1308	.212	0.2122	.000	1.1241	.001
Log of net worth	0.1541	.000	0.1659	.000	0.1649	.000	-0.00744	.884
Married couple	0.2736	.006	0.0986	.753	0.3061	.007	0.3278	.467
Homeowner	0.2709	.021	-0.0683	.834	0.3514	.011	0.9427	.067
Child<19	-0.2201	.025	0.2919	.313	-0.2778	.015	-1.1122	.015
Gender of respondent: reference category=male respondent								
Female respondent	0.1405	.137	-0.0517	.858	0.1405	.196	0.9163	.041
Likelihood ratio	2543.5548	.000	186.3489	.000	1642.7446	.000	159.0941	.000
Concordance	89.9		86.5		88.4		91.4	

Calculated by authors, unweighted analysis of the 2004 SCF using RII method, with 13 households deleted that had different responses to racial/ethnic group in different implicates.

Households willing to take some level of risk are much more likely to have stock ownership than those who are not willing to take any risk, though there is not a monotonic relationship between the level of risk tolerance and the predicted probability of stock ownership. The small proportion of those willing to take substantial risk are not significantly more likely to own stocks than those willing to take average or above average risk.

Age is an important factor affecting the likelihood of stock ownership in the full sample and in the White sample, but not in the Black or Hispanic sample. In the full sample, the combined effect of age and age squared is that predicted stock ownership increases with age until age 51, then decreases with age. Education level is a powerful determinant in all samples except in the Hispanic sample. Respondents' health condition is also

significantly related to the households' probability of stock ownership in the full sample and White sample, but not in the Black or Hispanic sample. All other things equal, in the full sample and the White sample, households that own a business are less likely to have stock ownership than those that do not own a business. Income is significantly related to stock ownership in all samples except the Black sample, whereas net worth is significantly related to stock ownership in all samples except the Hispanic sample.

For the full and White samples, married couples are more likely than other household types to have stock investments. Other factors such as homeownership, presence of a child under 19 and having a female respondent do not show very strong or consistent effects across the logistic regressions for the four samples.

Decomposition Results

Based on the logit empirical analysis, many household characteristics are related to households' stock holding status with some consistent significant factors across the logits for the four samples. In the next sections, the fraction of the gap that can be explained by those characteristics and the key characteristics that drive the portion of the gap that can be attributed to group differences in characteristics are presented.

Black-White Disparity in Stock Ownership. The actual White stock ownership rate of 56.7% is 31 percentage points higher than the Black stock ownership rate of 25.5%. Table 4 shows the relative contributions of different variables to the White-Black gap based on decomposition analyses in three specifications of three different samples: full sample, White sample, and Black sample. Household net worth is the biggest contributor to the racial disparity in the stock ownership, accounting for 37.3% to 41.6% of the White-Black gap among the three specifications. Respondent's risk tolerance is the second most important factor for the full sample and the White sample and the third most important factor for the Black sample, accounting for 17.6% to 22.1% of the Black-White disparity in this regard. The stock ownership of Blacks would be much higher if they had the same net worth or the same risk tolerance as Whites.

Table 4

Decompositions of Black-White Stock Ownership Differences Using Estimates from Three Samples

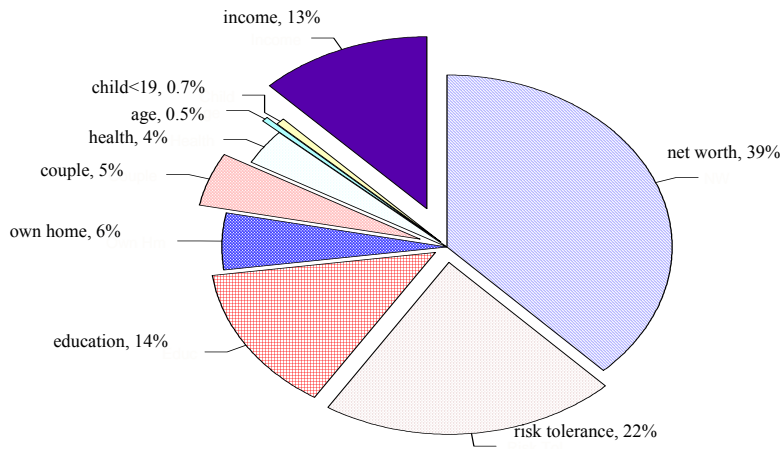
	Specifications based on three types of samples		
	(1) Full sample	(2) White	(3) Black
White stock ownership	0.5673	0.5673	0.5673
Black stock ownership	0.2552	0.2552	0.2552
Black-White gap	0.3121	0.3121	0.3121
Contributions of individual variable			
age	0.0015	0.0010	0.0098
percentage	0.47%	0.31%	3.13%
Standard error	0.0023	0.0027	0.0120
Education of respondent	0.0449	0.0464	0.0702
percentage	14.39%	14.88%	22.48%
Standard error	0.0039	0.0044	0.0159
Health condition of respondent	0.0110	0.0103	0.0051
percentage	3.53%	3.29%	1.64%
Standard error	0.0025	0.0028	0.0077
Business ownership	-0.0081	-0.0091	0.0029
percentage	-2.59%	-2.92%	0.94%
Standard error	0.0035	0.0039	0.0201
Risk tolerance	0.0690	0.0642	0.0548
percentage	22.12%	20.56%	17.55%

Specifications based on three types of samples			
	(1) Full sample	(2) White	(3) Black
Standard error	0.0048	0.0054	0.0143
Income	0.0399	0.0371	0.0281
percentage	12.80%	11.89%	9.01%
Standard error	0.0059	0.0062	0.0218
Net worth	0.1226	0.1298	0.1164
percentage	39.27%	41.60%	37.30%
Standard error	0.0096	0.0110	0.0218
Married couple	0.0163	0.0182	0.0050
percentage	5.22%	5.84%	1.62%
Standard error	0.0060	0.0068	0.0161
Home ownership	0.0173	0.0222	-0.0033
percentage	5.53%	7.10%	-1.06%
Standard error	0.0076	0.0089	0.0156
Presence of child aged under 19	0.0021	0.0026	-0.0019
percentage	0.67%	0.85%	-0.61%
Standard error	0.0009	0.0011	0.0019
Female respondent	-0.0050	-0.0050	0.0019
percentage	-1.62%	-1.61%	0.61%
Standard error	0.0034	0.0039	0.0106
Overall explained difference	0.3114	0.3176	0.2890
percentage	99.79%	101.79%	92.61%
Unexplained difference	0.0006	0.0055	0.0230
percentage	0.03%	-1.79%	7.39%

The respondent's education level is the third most important factor for the full sample and the White sample and the second most important factor for the Black sample, accounting for 14.4% to 22.5% of the gap (Table 4). Household income is the fourth most important factor in all three samples, accounting for 9.0% to 12.8% of the gap. Based on the full and White samples, almost 89% of the gap between Black and White stock ownership is accounted for by education, income, net worth and risk tolerance. In the full and White samples, homeownership, married status, health of the respondent, and age contribute to the White-Black gap. In those samples, business ownership and having a female respondent have small negative effects, indicating that all other things equal, if Black households were the same as White households in business ownership and having a female respondent, the stock ownership gap would be slightly larger.

Figure 2 is a graphical representation of the decomposition of Black-White stock ownership differences based on the full sample, with the percentage contribution from each variable with a positive contribution to the explained variation. Obviously income and net worth contribute a large proportion, but it may take many years to bring Black and White households closer together in income and net worth. However, risk tolerance also plays an important role in accounting for Black-White differences in stock ownership.

Figure 2
 Decomposition of Black-White Stock Ownership Differences in 2004 Based on Full Sample. Factors Related to Lower Stock Ownership Rate of Blacks.



Calculated by authors, based on Table 4, full sample

Taking all variables together, based on the full and White samples, about 100% of the White-Black stock investment gap is accounted for by the factors in the logits. The overall explained difference of 101.8% based on the White sample indicates that if Black households have the same characteristics as White households, they would have slightly higher stock ownership rates than White households. The explained difference of 92.6% for the Black sample indicates that if Black households have the same characteristics as White households, they would have almost the same stock ownership rates as White households. The decomposition results based on the three samples' coefficients are reasonably consistent.

Hispanic-White Disparity. The White stock ownership rate of 56.7% is 38 percentage points higher than the Hispanic stock ownership rate of 18.7%. Table 5 shows the relative contributions of different variables to the White-Hispanic gap based on decomposition analyses in three different samples: full sample, White sample, and Hispanic sample. For the full sample and the White sample, household net worth is the biggest contributor to the stock ownership disparity, accounting for 23.3% to 25.0% of the gap. For the Hispanic sample, income accounts for 38.6% of the gap. For the full and White samples, the respondent's education is the second most important factor for the full sample and the White sample and the third most important factor for the Hispanic sample, accounting for 14.1% to 21.9% of the White-Hispanic gap.

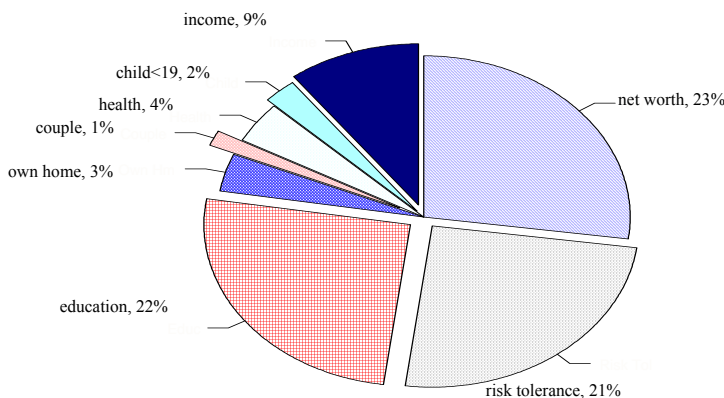
Table 5
Decompositions of Hispanic-White Stock Ownership Differences Using Estimates from Three Samples

	Specifications based on three types of samples		
	(1)	(2)	(3)
	Full sample	White	Hispanic
White stock ownership	0.5673	0.5673	0.5673
Hispanic stock ownership	0.1867	0.1866	0.1866
Hispanic-White gap	0.3806	0.3806	0.3806
Contributions of individual variable			
Age	-0.0005	-0.0012	-0.0532
Percentage	-0.12%	-0.32%	-13.97%
Standard error	0.0042	0.0049	0.0321
Education of respondent	0.0834	0.0796	0.0537
Percentage	21.91%	20.92%	14.11%
Standard error	0.0081	0.0092	0.0269
Health condition of respondent	0.0137	0.0124	0.0046
Percentage	3.60%	3.26%	1.22%
Standard error	0.0035	0.0041	0.0096
Business ownership	-0.0090	-0.0099	-0.0029
Percentage	-2.36%	-2.59%	-0.77%
Standard error	0.0038	0.0043	0.0128
Risk tolerance	0.0816	0.0775	0.0949
Percentage	21.43%	20.36%	24.94%
Standard error	0.0056	0.0064	0.0193
Income	0.0337	0.0311	0.1469
Percentage	8.86%	8.17%	38.58%
Standard error	0.0052	0.0054	0.0326
Net worth	0.0889	0.0952	-0.0033
Percentage	23.34%	25.00%	-0.86%
Standard error	0.0074	0.0085	0.0225
Married couple	0.0051	0.0056	0.0054
Percentage	1.33%	1.46%	1.42%
Standard error	0.0019	0.0021	0.0074
Home ownership	0.0124	0.0161	0.0312
percentage	3.25%	4.23%	8.19%
Standard error	0.0054	0.0064	0.0183
Presence of child aged under 19	0.0085	0.0108	0.0251
percentage	2.23%	2.83%	6.60%
Standard error	0.0038	0.0044	0.0104
Female respondent	-0.0020	-0.0019	-0.0051

Specifications based on three types of samples			
	(1) Full sample	(2) White	(3) Hispanic
percentage	-0.53%	-0.51%	-1.34%
Standard error	0.0013	0.0015	0.0024
Overall explained difference	0.3157	0.3115	0.2972
percentage	82.94%	82.81%	78.12%
Unexplained difference	0.0649	0.0689	0.0834
percentage	17.06%	17.19%	21.88%

The respondent's risk tolerance level is the third most important factor for the full sample and the White sample and the second most important factor for the Hispanic sample, accounting for 20.4% to 24.9% of the gap (Table 5). Household income is the fourth most important factor in the full and White samples, accounting for 8.2% to 8.9% of the gap. For the Hispanic specification, homeownership is the fourth most important factor, accounting for 8.2% of the gap. In the full and White specifications, homeownership, married status, health of the respondent, and whether there is a related child aged under 19 also contribute to the White-Hispanic gap. In the Hispanic specification, married status, health of the respondent, and whether there is a related child under 19 also contribute to the White-Hispanic gap, with the whether there is a child aged under 19 having a relatively large effect. In the full and White specifications, age, business ownership, and having a female respondent have negative effects, indicating that all other things equal, if Hispanic households were the same as White households in these characteristics, the stock ownership gap would have been slightly larger. Based on the estimates from the Hispanic sample, the effect of age is negative and substantial, so that if Hispanic households were to have the same age distribution as White households, the predicted stock ownership would be much lower. Based on the Hispanic specification, business ownership and net worth have small negative contributions to the stock ownership gap. Figure 3 is a graphical representation of the decomposition of Hispanic-White stock ownership differences based on the full sample, with the percentage contribution from each variable with a positive contribution to the explained variation. As with the Black-White differences, risk tolerance plays an important role in accounting for Hispanic-White differences in risk tolerance.

Figure 3
Decomposition of Hispanic-White Stock Ownership Differences Based on Full Sample. Factors Related to Lower Stock Ownership Rate of Hispanics



Calculated by authors, based on Table 5, full sample

Taking all variables together, based on the three specifications, 78.1% to 82.9% of the White-Hispanic stock investment gap is accounted for by the factors in the logits. The decomposition results based on the three samples are somewhat consistent, except that income plays a much larger role in the estimates based in the Hispanic sample than in the estimates based on the other samples. Risk tolerance's contribution is similar in the three specifications, accounting for 20.4% to 24.9% of the White-Hispanic stock ownership disparity. Education of the respondent is the next important contributor of the gap, accounting for 14.1% to 21.9%.

Conclusions

This is the first use of the Oaxaca (1973) decomposition technique to estimate relative contributions of different factors to racial/ethnic differences in stock ownership. White-Black differences in risk tolerance and household demographic and economic characteristics account for almost the entire White-Black stock ownership gap, and these factors account for more than 80% of the White-Hispanic stock ownership gap. If Black household characteristics were the same as White household characteristics, they would be almost equally likely to have stock investments. For Hispanic households, some other factors not included in the analyses seem to affect their disparity with White households in terms of stock ownership, although the factors of income, risk tolerance and education account for much of the disparity.

By applying the decomposition method, the relative importance of net worth, income, risk tolerance and other characteristics in causing those disparities can be obtained. The logistic regression and decomposition results also confirm the important contributions of net worth and income differences to racial/ethnic gaps in stock ownership between both Blacks and Whites and between Hispanics and Whites. Regardless of the estimate used, risk tolerance plays an important role in disparities in stock ownership both between Black and White households and Hispanic and White households.

Implications

Reducing the disparity in income between Whites and disadvantaged minority groups will take a long time, given the slow progress during the past 30 years. There has been substantial progress in narrowing the education gaps between Whites and Blacks and Whites and Hispanics, but it will take many years to achieve parity between Whites and these minority groups among the adult population. Risk tolerance differences, however, may be more amenable to change through education, as Blacks and Hispanics do not seem to have less risk tolerance than Whites in terms of an economic risk tolerance measure (Barsky et al., 1997). The differences observed in the SCF risk tolerance measure may be related to knowledge and familiarity with financial investments. Therefore, financial information and education targeted at Blacks and Hispanics may change their risk tolerance as measured by the SCF risk tolerance question. For both Blacks and Hispanics, more financial education related to risk tolerance, aimed at increasing awareness of the characteristics of higher returns for long-term investments in diversified stock investments, should substantially increase the likelihood of having stock investments among middle income minority households. Increased stock ownership should help decrease wealth disparities in the long run.

Appendix 1

Description of Explanatory Variables

Variables	Description
Demographic variables	
Age/100	Age of respondent
Age-squared/10000	Squared age of respondent
Racial/ethnic self-identification of the respondent* (based on variable X6809)	
White	
Black	
Hispanic	
Other (including Asian)	
Respondent's education	
Less than high school	1 if years of education <12, 0 otherwise
High school	1 if years of education =12, 0 otherwise
More than 12 years' education without degree	1 if years of education >12 and no degree
2 year degree	1 if get a 2 year's degree
Bachelor degree	1 if get a bachelor degree
Post bachelor degree	1 if get a degree higher than bachelor
Respondent self-assessment of health	
Poor health	1 if the respondent said she or he had a generally poor health; 0 otherwise
Fair health	1 if the respondent said she or he had a generally fair health; 0 otherwise
Good health	1 if the respondent said she or he had a generally good health; 0 otherwise
Excellent health	1 if the respondent said she or he had a generally excellent health; 0 otherwise
Respondent's investment risk tolerance	
Not willing	1 if not willing to take any risk, 0 otherwise
Average risk tolerance	1 if not willing to take average risk, 0 otherwise
Above average risk tolerance	1 if not willing to take above average risk, 0 otherwise
Substantial risk tolerance	1 if not willing to take substantial risk, 0 otherwise
Business ownership	1 if the respondent said the household owned business, 0 otherwise
Home ownership	1 if the respondent said the household owned home, 0 otherwise
Married couple	1 if the respondent is married to household member, 0 otherwise
Female respondent	1 if the sex of the respondent is female, 0 otherwise
Presence of child aged under 19	1 if there is a child aged under 19 living in the household, 0 otherwise
Economic variables	
Log of Income	Log of household' annual income (if income ≤ 0 , use $\ln(0.01)$)
Log of Net worth	Log of household's net worth (if net worth ≤ 0 , use $\ln(0.01)$)

*For convenience, rather than referring to "households with a Black respondent, etc.", the terms "Blacks" or "Black households" are used even though some households might have partners/spouses of different racial ethnic groups. In the 2000 Census, 92% of opposite sex couple households with Black male spouse/partners have a Black female spouse/partner, 97% of couple households with a White male spouse partner have a White female spouse/partner, and 83% of households with an Hispanic male spouse/partner have an Hispanic female spouse/partner (U.S. Census, 2000). The SCF provides no information about the racial/ethnic identify of the spouse/partner of the respondent. In couple households, the respondent is the more financially knowledgeable person, so it seems reasonable to discuss households in terms of the racial/ethnic identify of the respondent.

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Endnotes

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