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An empirical analysis of differences in Black and White asset and liability combinations☆

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Abstract

This study analyzes data from the 1992 Survey of Consumer Finances and finds significant differences in asset and liability combinations between Black and White households. In addition, White households are identified as having significantly greater net worth and financial assets relative to Black households. We are unable to show that the net worth of Black households is constrained by barriers in financial markets. Our study investigates how this difference in net worth could engender different financing decisions. We find that Black households are significantly more risk averse in their choice of assets. Further, we find that Black households typically pay higher rates for several types of credit instruments, even though they self identify as conducting significantly more extensive searches in the financial markets.

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1. Introduction

There is substantial evidence showing that Blacks have made substantial economic gains during the past three decades. However, economic parity seems not to have been achieved

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and gross inequities between the races still exist. The fact is that Blacks have made relatively significant economic gains if income is used as the measure of economic well-being. Reports of income gains and a narrowing of the gap between Blacks and Whites seem, however, overshadowed by the deep-seated wealth inequity between the two races. Indeed, Browne (1993) questions the over-reliance on income as an index of economic well-being of American ethnic minorities. Racial differences in net worth not only engender identifiable differences in financing decisions, but have long-term impacts on future wealth accumulation and the relative economic status of Blacks and Whites.

Using the 1992 Survey of Consumer Finances data we attempt to reverify that there are significant differences in wealth as measured by net worth between the races. Utilizing canonical correlation analysis we also examine the portfolio choice behavior of Black and White households. It is hypothesized that households choose assets in an attempt to maximize the value of their portfolio and then attempt to finance these assets. The ability to maximize the value of the portfolio may be constrained for a number of reasons including the inability to finance chosen assets because of capital market imperfections, incomplete information, and inertia on the part of the households. In addition, as alluded to by Brimmer (1991) there may exist a significant difference in the level of risk aversion between the two subgroups. Taking all of these items into consideration the structure of a household portfolio is then determined by selecting those assets that can be financed in an ascending order of perceived contribution to wealth. Using measures of risk aversion and yield differentials in the set of financial liabilities we attempt to determine if financial market constraints and inertia exist.

The rest of the paper is organized as follows. Section 2 provides a framework for factors that may affect the asset and liability combinations of households. Section 3 discusses the data and methodologies. Section 4 summarizes the empirical results. Section 5 summarizes the main ideas of the paper along with some general remarks on public policy.

2. Factors that affect asset and liability composition

Recent studies such as Browne (1993), Blau and Graham (1990), Oliver and Shapiro (1995), and Wolff (1994), have confirmed the existence of a considerable wealth gap between Blacks and Whites. According to Brimmer (1991), Blacks in 1988 represented 11.23% of US households, received 7.25% of money income, but held only 2.89% of household net wealth. Oliver and Shapiro report that the ratio of Black-to-White median household income reached 0.62 in 1988 whereas the median net worth ratio stood at 0.08 and that White households possess nearly 10× as much mean net financial assets as Black households. Census data released recently also indicate that in 1993 White households had a median net worth of \$45, 740 compared to \$4, 418 for Black households, a Black-White ratio of 0.10. Wolff's study further shows that even among nonWhite and White families of the same income level, White families held considerably more wealth. Racial differences in net worth not only engender identifiable differences in financing decisions, but have long-term impacts on future wealth accumulation and the relative economic status of Blacks and

Whites. Brimmer (1991) alluded to these differences when (he observed that Black wealth was concentrated more heavily in property than in other households and that Black investors stressed safety over more risky types of investments. Oliver and Shapiro argue that the different decision patterns may explain why the wealth gap between Blacks and Whites is likely to increase.

We attempt to provide a framework for factors that affect the portfolio decisions, and therefore the asset and liability combinations of households. We find in the literature a patchwork of compelling arguments that identify key factors that affect the asset and liability combinations of households. Recently, Gutter, Fox and Montalto (1999) incorporated socioeconomic, financial, and attitudinal factors into the life-cycle savings model to determine portfolio choice. Their findings are that the socioeconomic factors have a greater effect than race in observed differences in portfolio choices.

Household portfolio decisions are made such that households attempt to maximize the value of their portfolio subject to market financing constraints. Households do not have the flexibility of financing that is afforded the corporate sector, that is, many assets are only capable of being financed by particular types of liabilities. Thus, if a particular type of liability is not provided to the household, the asset that it sought to finance cannot be obtained, or it must be financed with the next, probably more costly liability. For example, one would expect that cars would be financed with installment loans, given the relatively favorable rate of the installment loan to comparable alternatives, and the tendency of the installment loan maturity to match the life of the asset, which reduces interest rate risk. However, it is not uncommon in the US to find households that finance cars on credit with interest rates as high as 36%. TranSouth Financial is a US financial corporation that has taken advantage of this market condition (TLPJ, 1999). The flexibility of financing afforded the household is only one factor that may be impacting these types of financing decisions. Other factors include transaction costs, tax considerations, incomplete information, liquidity constraints, heterogeneous risk aversion, and household inertia.

Asymmetric information problems play a much larger role in this scenario than in the corporate setting. The availability of financing in the household sector is subject to the provider's ability to correctly process costly obtained information submitted by the household that most certainly involves the problem of moral hazard and adverse selection. In this context, households applying for funding may overstate their ability to meet the repayment schedule of the liability in their applications for financing (moral hazard). In addition, the problem of adverse selection may also be observed in certain types of liability acquisition processes. Rates charged high default risk households may be such that households on the low end of this risk category may opt out of this type of financing causing average risk to increase. From the financing providers point of view it is the least desirable customers who apply for this type of liability. This may cause the availability of particular asset and liability combinations to be correlated with the demographics of the households. For example, housing assets and mortgage financing may only be available to households whose head is relatively older with an established credit history attempting to purchase housing in particular areas.

Paxson (1990) shows that borrowing constraints in personal loan markets may affect

portfolio choices as well. In this analysis exogenous and endogenous borrowing ceilings exist. Exogenous borrowing ceilings are unaffected by individual portfolio choices and unambiguously lead to more liquid portfolios. Endogenous borrowing ceilings allow for maximum loanable amounts that are positively correlated to illiquid assets (collateral) held by the household. Thus, a household facing stricter borrowing ceilings may be less likely to put assets into such things as housing and other assets that cannot be easily converted to finance consumption in case of an income shortfall.

The amount of risk a household is willing to face will affect the choice of assets made by that household. Friend and Blume (1975) provided an expected utility based model that shows that an investor's portfolio decision is a function of the dollar amount of wealth, individual risk preferences and the allocation of wealth among risky assets. Schooley and Worden (1995) use this expected utility based model to show that portfolio allocations are a reliable indicator of a household's relative level of risk taking and attitudes toward risk. They also find investment in risky assets is significantly related to the household's demographic profile. In a related study, Bajtelsmit, Bernasek, and Jianakoplos (1999) find that women exhibit a greater relative risk aversion in their asset allocation that affects the allocation of household wealth to defined contribution pensions. If particular population subgroups tend to be more risk averse in their asset and liability choices, their long-term wealth will be expected to be less than households who choose to be less risk averse. For instance, households that preclude stocks from their portfolio will undoubtedly have less wealth over the long run, because the long term return on common stock investments are higher than the long term return on less volatile investment opportunities.

Cultural influences associated with race, gender or life-cycle stage may also influence portfolio decisions after controlling for economic characteristics (Haliassos and Bertaut 1995; Bajtelsmit, Bernasek, and Jianakoplos 1999). This market imperfection or friction caused by inertial factors is usually ignored in most portfolio selection models. A cultural fear of being in debt may inhibit certain population groups from seeking and accepting a mortgage contract or undertaking student loans. The acquisition costs of information (in both monetary and temporal terms) for certain types of investment opportunities may preclude portions of the population from considering them. Tendencies toward more visceral based investments, that is, property, and avoidance of financial investments are explained by inertia as well. Blau and Graham (1990) infer that a significant wealth gap remains between households headed by Whites and Blacks due to constraints placed on the equity accumulation of Black households. If differences in net worth and the constraints faced by households exist, Blacks and Whites will tend to make significantly different financial decisions. In this scenario each household uses different sources of costly information and processes this information against different financial constraints. This may cause the availability of particular assets and liability combinations to be correlated with the race of the household. For example, as found in Brimmer (1991), Black households tend to prefer liquidity and tend to concentrate in investment property, whereas White households tend to prefer financial assets and concentrate in single family dwellings.

3. Data and methodologies

The source of data for the current study is the 1992 Survey of Consumer Finances (SCF). The SCF database is a comprehensive survey investigating household demographics and financial information. The results of this survey provide a unique opportunity for an in depth analysis of contemporary household portfolio selection practices of a large cross-section of consumers (households). Along with the 2, 456 households selected by standard methods to achieve a sample including responses from all 48 contiguous states, 1, 450 households were "oversampled" (added) from tax data to insure a representative income distribution. The resulting sample of 3, 906 respondents thus reduced the skewed distribution of having only a few wealthy families with a 'disproportionately large share of income and wealth' in the first group of 2, 456. Also, nonresponse errors arising from some interviewees' failure to answer specific questions were imputed. The imputation process increased the number of observations to 19, 530. We reduced this total amount to 17, 528 observations after eliminating all households whose head is neither White or Black. The data set provides a vast array of household balance sheet items for the respondents (Survey of Consumer Finances 1992 Manual).

Descriptive statistics are examined for statistically significant differences between mean and median values across groups to determine if differences exist between the races in net worth and components of net worth. In addition, net worth and income distributions are examined across quartiles for each income group. We incorporate techniques similar to Wang (1995) in our investigation of differences in income and net worth across the races. First, the log of actual income is regressed on a set of demographic variables using Eq. (1). Next, expected income is estimated as an instrumental variable.

$$\begin{aligned}\ln(INC_t) = {} & \beta_1 + \beta_2(AGE) + \beta_3(AGE)^2 + \beta_4(EDUC) + \beta_5(SEMPLOY) \\ & + \beta_6(RACE) + \beta_1(MARITAL) + \beta_8(SEX) + \beta_9(WORK) \\ & + \beta_{10}(CHILDREN) + \beta_{11}(HEALTH) + \beta_{12}(PENSION) + \nu_t \qquad (1)\end{aligned}$$

Where INCt, is actual income, equal to the observed annual income of all household members from all sources. AGE is the age of the head of households rounded to the nearest year, EDUC is a dummy variable equal to one if the education level is equal to twelve years or more. SEMPLOY is a dummy variable equal to one if the household head is self employed, RACE is a dummy variable equal to one if the head of household identifies as White and zero otherwise. MARITAL is a dummy variable equal to one if the respondent identified as being married, PENSION is a dummy variable equal to one if the respondent belonged to a pension plan, SEX is a dummy variable equal to one if male. CHILDREN is the number of dependent children the respondent identified, HEALTH is a dummy variable equal to one if the respondent identified themselves as having excellent, good, or fair health and zero otherwise. WORK is a dummy variable equal to one if the head of household has five or more years of work. The expected income of each household, XINC, is calculated based on their set of demographic variables by Eq. (2):

$$\ln(XINC_t) = \beta_1 + \beta_2(AGE) + \beta_3(AGE)^2 + \beta_4(EDUC) + \beta_5(SEMPLOY) + \beta_6(RACE) + \beta_1(MARITAL) + \beta_8(SEX) + \beta_9(WORK) + \beta_{10}(CHILDREN) + \beta_{11}(HEALTH) + \beta_{12}(PENSION) \quad (2)$$

A statistically significant coefficient on the race variable can be interpreted as evidence of a racial difference in magnitudes of expected incomes. However, as pointed out by Gutter, Fox, and Montalto (1990), this may be too simplistic an approach. We address this problem below by using the Jackson and Lindley (1989) techniques.

Economic theory provides a well-developed framework for modeling net worth accumulation based on the life cycle hypothesis (Ando and Modigliani, 1963; Wolff, 1994; Wang, 1995). This body of work determines that net worth is a function of expected income, age, and a set of households demographic variables. Following Wang (1995) we have developed a model to explain household nonhuman wealth, where W_t is defined as household nonhuman wealth and it equals the summation of past savings, S_t. We use the net worth of each household as a proxy for the nonhuman wealth and therefore assume that past savings includes financial and physical assets. Based on this theoretical work we model net worth using the following equation:

$$\ln(W_t) = \gamma_1 + \gamma_2 \ln(XINC) + \gamma_3\ln(XINC)^2 + \gamma_4 \ln(TINC) + \gamma_5(AGE) + \gamma_6(AGE)^2 + \gamma_7(EDUC) + \gamma_8(SEMPLOY) + \gamma_9(RACE) + \gamma_{10}(MARITAL) + \gamma_{11}(SEX) + \gamma_{12}(WORK) + \gamma_{13}(CHILDREN) + \gamma_{14}(HEALTH) + \gamma_{15}(PENSION) + \mu_t \quad (3)$$

Where TINC is transitory income, equal to the difference between actual income and expected income. Similar to Bajtelsmit, Bernasek and Jianakoplos (1999) we limit our sample to those households with positive net worth. We correct for this possible sample selection bias using Heckman's procedure (Heckman, 1979). Once again if a significant coefficient for the race variable is found this provides weak support for racial differences in net worth.

We attempt to determine the source of these differences in net worth accumulation between the races. One possible reason why these differences are found is that barriers may exists in financial markets. In an effort to determine if the net worth of Black households is constrained by barriers in the financial markets, we employ a technique very similar to that developed by Jackson and Lindley (1989) and recently utilized by Gutter, Fox, and Montalto (1999). We create a pooled data set by combining the Black and White samples. Also, several interaction variables are created with the race dummy variable by multiplying each explanatory variable by this dummy variable. The pooled data set then includes the k explanatory variables and k dummy interaction variables. This methodology is a behavioral model that estimates the net worth of various groups in the study. A set of coefficients for the White and Black populations are estimated. The expected net worth for Blacks (W^B) is estimated using the 'Black' coefficients and 'Black' explanatory variables. Then expected net worth in the absence of constraints (W^H) is estimated for Blacks using 'White' coefficients and 'Black'

explanatory variables. The extent of the constraints experienced by Black households is measured by (W^H-W^B) which is decomposed into the constant and coefficient effects. The constant effect is that portion of the residual or difference that cannot be accounted for by differential endowments or differential responses. The coefficient effect is a measure of the differential between group response in the dependent variable to unit changes in the independent variables. This testing method is really a joint test of the two components of the residual differences, that is, the constant and the coefficient effects that are easily determined from the pooled model. If the net worth of the Black households is constrained due to barriers in the financial markets, the constant and coefficient effects must be statistically significant and have the proper sign.

Given that differences exist across the races in levels of net worth we should observe different combinations of assets and liabilities used by the races in household portfolio construction. Ranking of asset and liability combinations can be done naturally by employing canonical correlation analysis. Canonical correlation analysis can find linear combinations of variables from both sides of the balance sheet such that they are maximally correlated. The canonical variates derived from the canonical correlation analysis are ranked according to significance and are linearly independent from each other. The ranking of the canonical variates allows the ordering preference of the household sector to be revealed because the analysis identifies, in an ascending order, the asset and liability combinations that maximize the value of the household portfolio.

Canonical correlation analysis is not a new statistical technique but it has not received a great deal of attention in the finance literature. There are however, a few studies that employ canonical correlation analysis to analyze balance sheet data across different financial entities. Two of the most recent studies in this vein are Van Auken, Doran, and Yoon (1993) who compare Korean management techniques to their American counterparts for 45 small-to-medium-sized Korean firms and Adams (1995) that investigates the balance sheet structure and tests the managerial-discretion hypothesis using data on a cross-section of 33 New Zealand life insurance companies.

Canonical correlation analysis is performed on two subsamples consisting of households whose head identified as White and heads who identified as Black in an effort to investigate whether particular demographic characteristics have an effect on household portfolios. The number of observations in these samples is 15,738 and 1,790, respectively. For each sample of households, six asset variables, five liability variables and the age of the head of households are used in the canonical correlation analysis. Furthermore, to standardize for size differences all of the asset and liability variables are divided by the households net worth in the canonical correlation analysis.

Different asset and liability combinations may be caused by individual choices. A driving force in an individual's choice is that individual's level of risk aversion. Classic financial theory predicts that the higher the level of systematic risk accepted the higher the expected return. Friend and Blume (1975) and more recently Schooley and Worden (1996) use a measure of risky assets to net worth to obtain a measure of risk aversion for households.

Schooley and Worden (1996) demonstrate that household portfolio allocations are reliable indicators of attitudes toward risk. This implies that household asset allocations can be utilized to reveal the households relative level of risk taking. We employ a similar analysis

to determine the 'risk aversion' coefficient for the households in our sample. Several different risk aversion coefficients are investigated. First, the least restrictive measure uses a household's assets in common stock, real estate other than primary and secondary residents, business investments, mutual fund investments and quasi-liquid retirement funds as a ratio of net worth. The second measure excludes the quasi-liquid retirement funds from the risky portfolio. The reason this asset is excluded is that with the data set utilized here it is impossible to determine the composition of these funds and their liquidity lowers their relative risk. The third, and most restrictive measure of risk tolerance includes only common stock, real estate and business investments in the risky asset portfolio. These risk tolerance measures are then calculated for each racial group and compared.

Other possible sources of differences in portfolio formation strategies and net worth accumulation are a household's self-imposed liquidity constraints (attitudes toward debt), level of inertia in financial market activity, and level and utilization of information concerning the financial markets. The SCF's structure lends it self to several types of investigations into these particular areas. Standard nonparametric statistical tests are applied to several different categories of data. We examine whether a yield differential exists between the races for similar liabilities. We compare percentage yields for first mortgages and a list of installment credits available to households in this survey. We attempt to determine the households attitude toward debt by examining household responses to specific questions posed by the survey. These questions ask the head of the households: "How do you feel about credit?;" and "Do you think it is a good idea to borrow for vacations, living expenses, fur coats, cars or educational expenses?" We then investigate whether a household has been turned down for a loan in the past five years and whether the household conducted an active search of the financial markets for the best rate available.

4. Empirical results

Definitions of all variables appear in Table 1. Descriptive statistics of all the portfolio variables for the two race subsamples are presented in Table 2. The data show that households headed by Whites had significantly larger mean asset and liability values than do households headed by Blacks for every category. Indeed, these inequalities are much more dramatic in the asset categories, with the mean value for vehicles for Blacks is 18.9% of the mean value for Whites and home sites for Blacks is 14.5% of the mean value for Whites. All other assets comparisons show that Blacks have less than 3% of the asset totals of Whites. The comparisons of mean liabilities show that Blacks have 45% of the mean value of credit card balances, 32% of the mean value of installment credit other than mortgages, and 26% of the mean value of mortgages using principal residence as collateral. It is interesting to note credit card balances and installment credit other than mortgages are typically the more expensive methods of incurring liabilities that households face.

This may indicate that not only do Black households have smaller asset portfolios but have less access to liability markets than households headed by Whites. The head of households are significantly older for White households than for the Black households surveyed with mean ages of 51.5 years and 45.9 years, respectively. Table 3 presents distributions of net

Table 1
Variable definitions

LIQ: Includes any dollar amount in checking accounts, money markets and, savings accounts and any non-realized capital loss of stock value.
FIN: Includes any dollar amount in checking accounts, money markets and, savings accounts and any non-realized capital loss of stock value plus dollar value of certificates of deposit, market value of common stock, quasi-liquid retirement accounts that can be borrowed against, directly owed mutual funds, directly held bonds, managed assets such as trusts, annuities and managed investment accounts, cash value of whole life insurance, savings bonds and other financial assets such as money owed to the family, cash held or deferred compensation.
VEHIC: Dollar value of all vehicles, including motor homes, RV's, boats and airplanes, owned by the household.
HOUSES: Dollar value of home site only, mobile home, both site and mobile home, home and land, apartment or property, and farm or ranch property unrelated to business.
REALEST: Dollar value of real estate sold for which the seller provided the loan, including accepting a note, land contract or mortgage plus the percentage owned of such properties as time share, apartment building any business property.
BUS: Net worth of any privately-held business, farm, professional practice or partnership owned by the household plus the dollar amount owed to the household by the business minus any amount owed to the business by the household plus the amount of the business guaranteed or collateralized.
MRTHEL: Dollar value of the amount owed by the households for any mortgage/land contract ect., which uses the principle dwelling as collateral plus any amount borrowed against home equity credit lines.
REALDBT: Dollar amount still owed by the household for real estate sold and financed by the household plus any dollar amount still owed for any real estate such as lots, vacation homes, time shares, apartment buildings, commercial property or other investment property.
CCBAL: Dollar value of the balance owed on credit cards (bank type, store cards, gasoline cards etc.)
INSTALL: Dollar value owed in installments for such items as household appliances, furniture, hobby or recreational equipment, educational expenses, medical expenses, home improvements, and vehicles plus any debts owed to friends or relatives.
ODEBT: Dollar value of amount borrowed against financial assets such as life insurance policies and pension plans.
AGE: 1992 minus the year of the head of households birth.
NETWORTH: (FIN+HOUSE+VEHIC+REALEST+BUS+other non-financial assets such as antiques, rare books jewelry, etc.) minus (MRTHEL+REALDBT+CCBAL+INSTALL+ODEBT plus amounts owed on credit line accounts)

worth and income by quartiles across racial groups. The results for the net worth distribution is very similar to those of Brimmer (1991), Wolff (1994), and Oliver and Shapiro (1995). Panel A shows that although Blacks make up only eleven percentage of the sample, they are over represented in the lower quartiles of net worth. Approximately twenty-three percentage of the lowest quartile of net worth is made up of households whose heads are Black. Panel B present similar finding for income, although Blacks have a slightly higher representation in the top two income quartiles than the group had for net worth. In Panel C, the data show that slightly more than 56% of the households headed by Blacks are in the lowest quartile of net worth. Indeed, over 86% of all Black households are found in the two lowest quartiles of net worth. Panel D present findings for income earned in the last year by heads of households, a slightly larger percentage of Black households are in the top two quartiles of incomes.

We investigate further the significant differences across race for income and net worth

Table 2
Descriptive statistics (values are shown in dollars, except for AGE which is in years)

	Variables											
	FIN	LIQ	VEHIC	HOUSES	REALEST	BUS	MRTHEL	REALDBT	CCBAL	INSTALL	ODEBT	AGE
Panel A: White only (n = 15738)												
Mean	1364622	127600.1	29841.4	267063.4	1242505	2468921	51675.5	313627	1637.5	8676.4	10036.3	51.5
Median	48585	6300	9900	95000	0	0	0	0	500	0	0	50
Standard Deviation	6839954	660441.7	181111.2	68430.9	26300000	17700000	126507.2	6851124	3831.3	100817.6	117511.5	16.7
Panel B: Black only (N = 1790)												
Mean	24990.9	3614.3	5643.6	38848.9	33639.5	21055.2	13506.3	8092.4	741.9	2778.2	440.8	45.9
Median	1235	200	2500	0	0	0	0	0	0	0	0	43
Standard deviation	144017.7	12914.19	8260.9	81150.6	283233.1	133147.4	35153.6	113094.3	1962.9	5617.4	2502.9	16.3
Difference of means t-test	$t = -24.52$	$t = -23.51$	$t = -16.6$	$t = -39.5$	$t = -5.77$	$t = -17.3$	$t = -29.2$	$t = 5.59$	$t = -16.1$	$t = -7.24$	$t = -10.2$	$t = -13.74$
Wilcoxon rank-sum test	$z = -41.07$	$z = -42.2$	$z = -32.5$	$z = -32.5$	$z = -20.7$	$z = -15.7$	$z = 13.7$	$z = -11.3$	$z = -22.9$	$z = 0.69$	$z = -0.43$	$z = -13.66$
Black/White ratio means	0.018	0.028	0.189	0.145	0.027	0.009	0.261	0.026	0.453	0.32	0.044	−0.43

Table 3
Net worth and income distribution by race

	Total	White	Black
Panel A: Number of households in each quartile of net worth. Numbers in parenthesis indicates the percentage of the net worth quartile made up of that racial group.			
Net Worth < $21 290	4 382	3 379	1 003
		(0.7711)	(0.2289)
$21 290 ≤ Net Worth < $133 900	4 377	3 833	544
		(0.8757)	(0.1243)
$133 900 ≤ Net Worth < $944 125	4 387	4 178	209
		(0.9545)	(0.0478)
Net Worth ≥ $944 125	4 382	4 348	34
		(0.9922)	(0.0078)
Total	17 528	15 738	1 790
Panel B: Number of households in each quartile of income. Numbers in parenthesis indicates the percentage of the income quartile made up of that racial group.			
Income ≤ $19 000	4 288	3 337	951
		(0.7782)	(0.2218)
$19 000 ≤ Income < $42 000	4 304	3 780	516
		(0.8801)	(0.1199)
$42 000 ≤ Income < $114 000	4 540	4 259	281
		(0.9381)	(0.0619)
Income ≥ $114 000	4 396	4 354	42
		(0.9909)	(0.0096)
Total	17 578	15 738	1 790
Panel C: Percentage of total population (17 578) or racial group in a particular net worth quartile.			
Net Worth < $21 290	0.2500	0.2147	0.5603
$21 290 ≤ Net Worth < $133 900	0.2497	0.2435	0.3039
$133 900 ≤ Net Worth < $944 125	0.2503	0.2655	0.1168
Net Worth ≥ $944 125	0.2500	0.2762	0.0190
Panel D: Percentage of total population (17,578) or racial group in a particular income quartile.			
Income < $19 000	0.2446	0.2120	0.5313
$19 000 ≤ Income < $42 000	0.2456	0.2407	0.2883
$42 000 ≤ Income < $114 000	0.2490	0.2706	0.1570
Income ≥ $114 000	0.2508	0.2767	0.0234

using a two-step procedure. First expected income is estimated and then used as an instrumental variable in the net worth regression. Table 4 presents the results of the income and net worth regressions. All significant coefficients have the expected sign. We find that the income is significantly and positively related to age, education, work experience, marital status, pension status, self-employment status, race, and the health condition of the respondent. The race dummy variable impacts income and net worth in a significant and positive manner, which indicates that there is a significant difference between the races. However, this does not provide a formal test for significant differences between the net worth of the two groups. By using the Jackson and Lindley (1989) approach we estimate five separate net worth regressions using the White sample, the Black sample, the pooled data sample with no

Table 4
Income and net worth regression analysis

Income regression eq. (1)		Net worth regression eq. (3)	
Independent variables	Coefficient (*t*-statistics)	Independent variables	Coefficient (*t*-statistics)
Intercept	6.12 (59.35)[a]	Intercept	−53.68 (−11.69)[a]
AGE	0.05 (13.09)[a]	ln(XINC)	10.31 (10.63)[a]
$(AGE)^2$	−0.0003 (−7.02)[a]	$\ln(XINC)_t)^2$	−0.53 (−11.29)[a]
EDUC	0.91 (31.16)[a]	$\ln(TINC_t)$	0.92 (48.28)[a]
SEMPLOY	0.90 (35.63)[a]	AGE	0.25 (13.46)[a]
RACE	0.29 (11.48)[a]	$(AGE)^2$	−0.001 (−9.66)[a]
MARITAL	0.59 (21.23)[a]	EDUC	1.73 (20.46)[a]
SEX	0.43 (13.18)[a]	SEMPLOY	2.34 (11.09)[a]
WORK	0.31 (11.59)[a]	RACE	1.30 (12.20)[a]
CHILDREN	0.001 (0.18)	MARITAL	0.64 (6.29)[a]
HEALTH	0.56 (12.00)	SEX	0.82 (9.52)[a]
PENSION	0.44 (17.92)[a]	WORK	0.46 (4.07)[a]
		CHILDREN	−0.07 (−4.27)[a]
		HEALTH	0.52 (2.70)[b]
		PENSION	1.01 (7.53)[a]
$'R^{2\prime}$ = 0.372		$'R^{2\prime}$ = 0.481	
F-value = 1048.95		*F*-value = 1290.78	

[a] Indicates significantly different from zero at the 5% level.
[b] Indicates significantly different from zero at the 10% level.

dummy or interaction terms, the pooled data set with a race dummy and finally the pooled data set with a race dummy and interaction terms. Table 5 presents the result of the Jackson and Lindley analysis. We have not reported all of the results of the net worth regressions but they are available upon request from the authors. The finding of particular interest is the constant effect, which is equal to −5.1142. We interpret the significant negative constant term as an indicator of lower mean net worth for Whites due to the effect of the race dummy variable. We cannot confirm that the net worth of Black households is constrained because the constant effect has the wrong sign. The coefficient effect of 5.75872 is the primary reason why the significant residual difference exists. However, this result implies that Black

Table 5
Jackson and Lindley Analysis

	White model	Black model	Pooled no race dummy	Pooled race dummy	Pooled race and interaction
R^2	0.5298	0.3611	0.6289	0.6303	0.6320
SE	1.09	1.5147	0.7264	0.7251	0.7233
SSE	18514.73	4077.0396	8699.397	8666.65	8619.53
N	15045	1454	16499	16499	16499
Mean log Net Worth					
$W^W = 5.329295$		Total Effect = 1.54692		Constant Effect = −5.1142	
$W^H = 4.426896$		Endowment Effect = 0.90240		Coefficient Effect = 0.64452	
$W^B = 3.782373$		Residual Effect = 0.64452			
F-Value for Residual effect = 13.8799			*F*-Value for Coefficient Effect = 9.00851		

households have significantly lower net worth due to their response to the independent variables.

We believe that the significant differences in net worth across races should engender different portfolio decisions, which we investigate with canonical correlation analysis. The expected different portfolio decisions must be evident in their impacts on the respective balance sheets and composition. We use six possible canonical roots given the representation of the problem presented in this study. In general, subjective judgment must be exercised to determine which of the canonical loadings warrant interpretation. However, in this particular analysis we keep only the roots whose correlation is at least 63% and in most cases above 90%. The second column of Table 6 provides the significant roots for each subsample. The first four roots of the White-only samples and the first three roots of the Black-only sample provide a correlation of at least 95%, all other correlation's are well below 50%. Thus, the parameters for the first four roots of the White-only sample and the first three roots of the Black-only sample will be analyzed and are detailed in Panels A, and B of Table 6.

The results of the first loading set for the White only sample reveal that the strongest and therefore most prominent relationship exists between the asset vehicles and the liability installment credit other then mortgages. In addition, the holdings of financial assets are significant in the first loading and independent of any liabilities indicating that a significant portion of the net worth of the White only sample is concentrated in this asset. The significance of the independence of these financial assets from any liabilities is that households headed by Whites have tangible net worth that provides a wealth effect in their use of financial assets and liabilities, as well as their spending on real assets. The most prominent relationship found in the second loading set occurs between liquid assets and credit card balances. This indicates that White households place a high value on liquidity and use that liquidity to support their credit card balances. The next significant asset and liability combinations are home sites and mortgages with primary residences as collateral followed by the dollar value of investment real estate sold and dollars still owed for real estate sold and financed by the households, respectively, for the White households. This indicates that principal residence is seen as the third most important portfolio asset for households headed by Whites and that it is financed with mortgages. The fourth loading show the asset and

Table 6
Canonical analysis results[a]

	Root (canonical correlation)	Assets		Liabilities	
Panel A:	1st	VEHIC	FIN	INSTALL	
	(0.999)	(0.993)	(0.987)	(0.993)	
White only sample	2nd	LIQ		CCBAL	
	(0.997)	(0.706)		(0.915)	
(N = 15738)	3rd	HOUSES		MRTHEL	
	(0.992)	(0.843)		(0.848)	
	4th	REALEST		REALDBT	
	(0.990)	(0.838)		(0.836)	
Panel B:	1st	VEHIC	LIQ	INSTALL	CCBAL
Black only sample	(0.999)	(0.921	(0.913)	(0.995)	(0.918)
(N = 1790)	2nd	REALEST		REALDBT	
	(0.985)	(0.976)		(0.975)	
	3rd	HOUSES		MRTHEL	
	(0.956)	(0.949)		(0.943)	
Panel C:	1st	HOUSES		MRTHEL	
White	(0.997)	(0.967)		(0.965)	
35 and under	2nd	LIQ		INSTALL	
(N = 3298)	(0.977)	(0.823)		(0.906)	
	3rd	REALEST		REALDBT	
	(0.941)	(0.940)		(0.939)	
Panel D:	1st	VEHIC	LIQ	INSTALL	CCBAL
	(0.999)	(0.925)	(0.919)	(0.998)	(0.942)
Black	2nd	REALEST		REALDBT	
35 and under	(0.996)	(0.989)		(0.989)	
(N = 550)	3rd	HOUSES		MRTHEL	
	(0.940)	(0.938)		(0.936)	
	4th	FIN		CCBAL	
	(0.710)	(0.285)		(−0.227)	
Panel E:	1st	VEHIC	FIN	INSTALL	
	(0.999)	(0.996)	(0.955)	(0.996)	
White	2nd	LIQ		CCBAL	
36 to 55 years old	(0.999)	(0.714)		(0.920)	
(N = 6221)	3rd	REALEST		REALDBT	
	(0.996)	(0.960)		(0.962)	
	4th	HOUSES		MRTHEL	
	(0.989)	(0.919)		(0.907)	
Panel F:	1st	HOUSES		MRTHEL	
Black	(0.993)	(0.891)		(0.903)	
36 to 55 years old	2nd	VEHIC		INSTALL	
(N = 775)	(0.923)	(0.687)		(0.628)	
	3rd	REALEST		REALDBT	
	(0.634)	(0.626)		(0.630)	
Panel G:	1st	HOUSES	VEHIC	MRTHEL	INSTALL
	(0.999)	(0.964)	(0.841)	(0.911)	(0.895)
White	2nd	REALEST		REALDBT	
55 or older	(0.933)	(0.912)		(0.916)	
(N = 6219)	3rd	LIQ		INSTALL	
	(0.736)	(0.3941)		(0.295)	

Table 6 *(Continued)*

	Root (canonical correlation)	Assets	Liabilities
Panel H:	1st	HOUSES	MRTHEL
Black	(0.983)	(0.927)	(0.905)
55 or older	2nd	REALEST	REALDBT
(N = 465)	(0.745)	(0.683)	(0.662)
	3rd	VEHIC	INSTALL
	(0.652)	(0.558)	(0.464)

[a] The most prominent asset and liability combination are presented for each significant root. In addition, any loading for asset and/or liability greater than 0.8 is also presented.

liability pairs of the dollar value of investment real estate sold and dollars still owed for real estate sold and financed by the households as the next most important portfolio items for the White households.

Panel B of Table 6 presents the results of the Black-only households. Like the first sample the most prominent asset and liability combination exists among vehicles and installment credit other than mortgages. Also significant in the first root is the asset and liability combination between liquid assets and credit card balances. This finding indicates a heavy reliance on the use of credit cards by Black households, which denotes the different usage of the financial system when compared to the White households. The second most prominent loading was between the dollar value of investment real estate sold and dollars still owed for real estate sold and financed by the households, this despite the fact that fewer than ten percent of Black households possess positive amounts of investment real estate. The third most prominent combination is between home sites and mortgages using primary residences as collateral. In addition, it is important to note that Black households, on average, do not have any assets that are independent of any liabilities, which supports the claim that Black households have lower net worth when compared to White households. This finding is supported by the work of Wolff (1994), who studied the accumulation of household wealth over the life-cycle by race. Wolff concluded from his study that the life-cycle hypothesis is relevant for educated, White, urban, middle-class households only. We believe that our results follow this general pattern. In order to infer the role that life-cycle plays in the balance sheet composition of Black and White households, we divided each race subsample by three age profiles. The three age profiles are 35 and under, 36 to 55 years, and 55 and over.

Table 6 panels C through H presents the results of the canonical analysis conducted on the various age and race subsamples. Among some of the results, Panel E clearly shows that the White-only 36 to 55 years subsample, has accumulated significantly different net worth than the 35 and under age group or the 55 and over age group. This group's primary asset and liability combination is vehicles and installment credit other than mortgages, respectively. Further, this group has financial assets that are unencumbered by liabilities. This pattern differs from the other White age groups in that these other groups exhibit primary asset and liability combinations in primary residence and mortgages. This primacy of the residence and mortgage as asset and liability combination is also found in the Black subgroups except for the youngest group. Similarly, the Black-only households for ages 35 and under clearly

Table 7
Descriptive statistics for various risk aversion coefficients[b] and age by race for the total sample

	RiskAvz1		RiskAvz2		RiskAvz3		Age	
	White	Black	White	Black	White	Black	White	Black
Mean	0.535	0.169	0.267	0.084	0.245	0.081	51.538	45.936
Median	0.351	0.000	0.164	0.000	0.011	0.000	50	43
SD	32.01	0.793	21.18	0.605	21.18	0.603	16.68	16.30
Number of observations	15738	1790	15738	1790	15738	1790	15738	1790
Difference of mean *t*-test	*t*-statistic = −1.43		*t*-statistic = −1.08		*t*-statistic = −0.97		*t*-statistic = −13.74[a]	
Wilcoxin rank-sum test[c]	*z*-statistic = −28.49[a]		*z*-statistic = −28.87[a]		*z*-statistic = −27.75[a]		*z*-statistic = −13.66[a]	

[a] Indicates a level of significance at least at the 1% level.
[b] RiskAzv1 is equal to (STOCKS + REALEST + BUS + NMMF + RETQLIZ) divided by net worth. RiskAvz2 is equal to (STOCKS + REALEST + BUS + NMMF) divided by net worth. RiskAvz3 is equal to (STOCKS + REALEST + BUS) divided by net worth. If net worth is equal to 0 it was set to $1.00 for these calculations.
[c] Tests the hypothesis that the two samples are from populations with the same medians.

display a heavy reliance on credit card debt, whereas the other two Black subsamples do not display significant credit card usage at all. Clearly age has an impact on the balance sheet composition of the household. This may also demonstrate that liability choices of the youngest Black households are constrained to the more expensive alternatives. In addition, when we compare the 36 to 55 year subsample for each race, we identify two significantly different groups. Although, the Black-only households in the 36 to 55 year subsample have a healthy balance sheet structure, the lack of any independent financial assets, that is, assets unaccompanied by matching liabilities demonstrates a marked difference in asset accumulation between the races. The healthy balance sheet structure coupled with independent financial assets of the White-only households in the 36 to 55 subsample may indicate that White households engage in selection of riskier investment vehicles that over time offer a higher expected return. It is clear that there are significant portfolio differences across the racial groups.

We focus our attention on individual choices as the reason for portfolio differences between Black and White houesholds. Table 7 presents the results for the risk tolerance measure calculations. Employing several different measures, which vary in degree of restrictiveness, for risk tolerance we find that significant differences exist between the two groups. In all measures the White group was found to be more risk tolerant than the Black group. In addition, as stated before we find the Black group to be significantly younger than the White group on average. Morin and Suarez (1983) find that all other things equal risk tolerance decreases with age. Thus, in spite of the fact that the Black group is younger it is significantly less risk tolerant in its choice of assets and liabilities. The data indicate that households headed by Blacks acquire less risky asset combinations and therefore according to classical financial theory should be expected to have lower net worth in the long term.

Table 8
Some liability costs and household attitudes toward debt responses

Panel A:	First mortgage		Loan 4[b]		Rates charged Loan 5[b]	
	White	Black	White	Black	White	Black
Mean	8.862	9.523	12.618	14.027	13.660	15.322
Std dev	1.716	2.669	5.107	4.570	6.364	5.379
Observations	6814	514	1380	205	31	56
Wilcoxin rank-sum test	z-statistic = 5.53[a]		z-statistic = 4.05[a]		z-statistic = 2.07[a]	

Panel B:	Household attitudes toward debt					
How do you feel about credit?			Have you been turned down or not received as much credit as asked for?		Did you shop around for the best deal?	
	White	Black		White	Black		White	Black
Good idea	5066	796	Turned down	0.1629	0.3235			
	(0.3219)	(0.4447)				A great deal of shopping	0.3772	0.4648
Bad idea	4462	522	Not as much credit	0.0221	0.0447			
	(0.285)	(0.2916)						
Good/bad idea	6210	472	Not turned down	0.8150	0.6319			
	(0.3914)	0.2637)				Almost no Shopping	0.1524	0.1737
Observations	15738	1790	Observations	15738	1790			
Wilcoxin rank-sum test	z-statistic = −10.01[a]			z-statistic = −12.71[a]			z-statistic = 2.90[a]	

[a] Indicates a level of significance at least at the 5% level.
[b] The SCF asks households "not counting credit cards or loans you have already told me about do you any money on loans for household appliances, furniture, hobby or recreational equipment," these are the rates list for the types of loans. There are at least 12 categories for these types of loans, those presented represented only the loans whose rates are significantly different across races.

So far our investigation of the differences in net worth between households headed by Whites and Blacks has centered on the asset side of the balance sheet. We would now like to examine the liability side of the balance sheet. These differences if they exist would manifest themselves in the attitudes of the head of the households. Data pertaining to these issues appear in Table 8. The SCF survey asks respondents to indicate the rate on various loans, including mortgages. We examined all of the loan types and find that first mortgage rates and a set of loan rates for appliances, furniture, hobby or recreational equipment are significantly higher for households headed by Blacks. These results are found in Panel A. All other mortgage and loan rates were not significantly different across households. Attitudes of the households toward debt also seem to be different. Significantly more households headed

by Blacks seem to think that credit is a good idea, that is, a good way to finance assets. Further, significantly more households headed by Blacks have been either turned down for a loan or did not receive as much as was asked for in a loan application. Finally, Black households self-identify as conducting significantly more thorough searches for the best rate available. To summarize, Black households have a more favorable attitude toward credit as a means of financing assets. These households' requests for credit are turned down or not fully met by the market more often than for White households and, in several classes of important loan types, Black households pay a significantly higher rate. All of this despite the fact that households headed by Blacks say they conduct extensive market searches for the best rates.

5. Conclusion

The evidence presented indicates that there is a significant difference in the net worth of households headed by those who identify themselves as White and Black. We are unable to show that the net worth of Black households is constrained by barriers in the financial markets, although we find that Black households typically pay higher rates for several important types of credit instruments and these higher rates are obtained even though the Black households self-identify that they conduct extensive searches in the markets for the best rate available. Further, we find that White and Black households hold different asset and liability combinations in their portfolios and determine that Black households are significantly more risk averse (less risk tolerant) in their choice of assets.

We think there are some alarming potential patterns. One disconcerting finding in our results is the heavy reliance on credit cards by the under-35 Black households. The higher cost of credit cards, coupled with the tendency for most credit card balances to linger as revolving balances, almost certainly adversely affects future net worth of these households. On average Black and White households have a heavy reliance on credit cards and public policy should persuade credit card companies to reveal the necessary monthly payment needed to pay the average outstanding credit card balance off over a responsible time period.

Another distressing finding is the insignificant net worth of Black households on average. When this outcome is coupled with the conservative risk tolerance behavior of Black households and the unhealthy balance sheet structure of younger Black households, we question whether Black households, on average, will be able to 'catch up' to the net worth of White households. It is not our position that public policy should have equivalent net worth between the races as a goal. However, public policy and future research should address the usage of the financial system as a means of wealth creation. Additionally, the impact of intergenerational transfers of wealth on the risk tolerance behavior of households is another important area of study.

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