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ORIGINAL ARTICLE

The racial/ethnic gap in financial literacy in the population and by income

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Abstract

We investigate the determinants of the racial/ethnic gap in financial literacy in the general population and within income classes, with a focus on childhood family circumstances and neighborhood socioeconomic characteristics. Our model explains 48% and 57% of the observed gap for Blacks and Hispanics, respectively. For both groups, differences in individual characteristics and neighborhood socioeconomic status contribute the most to the explained gap. The White–Minority gap narrows when moving from low- to high-income classes, but the ability of the model to explain it decreases monotonically. Identifying which additional barriers put minorities at a disadvantage is key to improve financial literacy.

KEYWORDS

financial knowledge, racial/ethnic disparities

JEL CLASSIFICATION

G5; J15; Z13

1 | INTRODUCTION

The level of financial literacy in both developed and developing economies is generally low. The National Financial Education Council (NFEC) notes that there is a “financial illiteracy epidemic” in the United States in its recent 2019 report (NFEC, 2019). In 2018, the NFEC administered the National Financial Literacy Test to over 5,500 individuals between 15 and 18 years of age. On average, the fraction of correct answers was 66%, only a few points higher than the average score in 2017 and 2016 (62% and 60%, respectively). Financial illiteracy is a global phenomenon, as revealed by cross-country comparisons. Lusardi (2019, 3) points out that “financial literacy is low across the world and higher national income levels do not equate to a more financially literate population.”

The problem of widespread financial illiteracy is alarming given the close link between financial knowledge and actual financial outcomes. Higher levels of financial literacy are often associated with a lower probability of being

Abbreviations: ACS, American Community Survey; AFS, alternative financial services; BO, Blinder-Oaxaca; FRB, Federal Reserve Board; NFCS, National Financial Capability Study; NFEC, National Financial Education Council; NSES, neighborhood socioeconomic status; OLS, ordinary least squares; SHED, Survey of Household and Economic Decision-making.

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unbanked (Barcellos & Zamarro, 2019) and using alternative financial services (AFS), such as payday loans (Kim & Lee, 2018). Financial literate individuals are also more likely to invest in stocks and exhibit a higher propensity to plan for retirement (Lusardi & Mitchell, 2011a; Van Rooij et al., 2012). In contrast, individuals with low levels of financial knowledge are more likely to pay higher fees and incur high cost borrowing, such as carrying balance on credit cards (Lusardi & Tufano, 2015), borrowing against pension accounts (Utkus & Young, 2011), and using suboptimal refinancing strategies (J. Y. Campbell, 2006). The importance of financial literacy is evident from efforts to incorporate it in k-12 curriculum, community outreach, and the large number of studies on the subject.

The lack of financial literacy tends to be heterogeneous within the population. Such heterogeneity may be partly responsible for the observed growing inequalities between groups characterized by different access to opportunity and available financial resources. A racial/ethnic gap in financial literacy has been well documented for the United States, where Blacks and Hispanics tend to score substantially worse than Whites (Al-Bahrani et al., 2019; Lusardi & Mitchell, 2011a, 2011b). In turn, these minority groups are also more likely to be observed in the lower half of the income distribution, be unbanked/underbanked (Barcellos & Zamarro, 2019; Blanco et al., 2018; Goodstein & Rhine, 2017), and exhibit lower levels of financial health (Financial Health Network, 2018). While the existing literature has documented racial/ethnic disparities in financial literacy, we still know relatively little about the determinants of such disparities and their relative importance for financial outcomes. Identifying the factors and mechanisms behind the racial/ethnic gap in financial knowledge is a critical step towards promoting financial inclusion and more widespread economic wellbeing in the United States.

We take on this task and investigate the drivers of the racial/ethnic gap in financial literacy. For this purpose, we use data from the restricted version of the Survey of Household and Economic Decision-making (SHED) of 2017, conducted by the Federal Reserve Board. Exploiting this rich dataset, we comprehensively model financial literacy as a function of individual, family background, and neighborhood characteristics.

Our original contribution is twofold. First, we adopt a very comprehensive model to identify the determinants of the observed racial/ethnic disparities in financial literacy. To the best of our knowledge, there are only two papers focusing specifically on the determinants of the racial/ethnic gap in financial literacy within the United States (Al-Bahrani et al., 2019; Kim & Xiao, 2020). We broaden the scope of this existing work by examining the extent to which financial literacy correlates with childhood family circumstances and neighborhood socioeconomic characteristics, conditional on a rich set of individual characteristics. We also assess the robustness of previous findings to using a different source of data.

Second, we investigate whether the determinants of the observed gaps in financial literacy between Blacks and Whites and between Hispanics and Whites differ along the income distribution. We draw particular attention to the middle-income class, where the presence of minorities has increased in recent years. Focusing on the middle class is also important, given that this group faces a different financial planning problem than other income classes. Specifically, as noted by J. R. Campbell and Hercowitz (2019, 152), “anticipated liquidity constraints are salient for most middle-income households consumption and saving choices.” Hence, removing barriers to financial literacy among middle-income households can greatly improve the management of their available financial resources and help promote financial inclusion and, in turn, economic wellbeing of a substantial fraction of the population. This is crucial given the observed trend of rising inequality and declining economic mobility in the United States (Engel & Oral, 2019), a phenomenon adversely affecting the middle class and especially minority groups within it.¹

The remainder of this paper is as follows. In Section 2, we review the literature on the determinants of financial literacy as well as on the drivers of the racial/ethnic gap in financial literacy. In Section 3, we discuss the data, and in Section 4 our methodology. Section 5 presents the results of our analysis. Section 6 concludes.

2 | LITERATURE REVIEW

2.1 | Determinants of financial literacy

The literature has recently focused on understanding what drives the accumulation of financial knowledge. Lusardi and Mitchell (2014) argue that financial literacy is an investment decision separate from education, and that, as all investment choices, it entails costs and benefits. For some individuals, the time and cognitive costs of acquiring knowledge about available financial products may outweigh the benefits resulting from higher levels of financial literacy. This way of rationalizing observed differences in financial sophistication across segments of the population also calls for a

deeper understanding of what the costs and benefits of investing in the acquisition of financial knowledge are for different groups.

The determinants of financial literacy span individual and family characteristics, as well as neighborhood and institutional factors. Not surprisingly, individuals' education and availability of financial resources correlate positively and strongly with the level of financial literacy (Stolper & Walter, 2017). Early-life socioeconomic circumstances are bound to affect one's financial knowledge in adulthood, yet empirical evidence on this matter is limited since comprehensive measures of family background are often unavailable (Lusardi et al., 2010).

Socioeconomic characteristics of the neighborhood in which individuals reside have been indicated as additional factors shaping financial literacy. La Chance (2014) finds that the level of education in an individual's ZIP code has a significant effect on financial knowledge, above and beyond the effect of individual-level sociodemographic characteristics. Arguing that the ZIP code's education level may proxy for the level of financial knowledge in an individual's social network, she interprets this finding as evidence of "peer effects" on financial literacy.

Another channel through which neighborhood characteristics may affect financial literacy is differential access to economic opportunities, financial institutions, services, and information. Ellen and Turner (1997, 853) point out that "the impact of neighborhood is more likely to occur through the influence on residents' access to services, information, and economic opportunities." Access to financial institutions could be an important determinant of financial literacy. There is extensive work looking at how access to financial institutions in the neighborhood influences choices over being banked, underbanked, or unbanked (Goodstein & Rhine, 2017). This may also explain why minorities, who might have limited access to financial services in their neighborhood, are also at a disadvantage in terms of financial knowledge.

Aiming to improve financial knowledge, states have moved towards mandating personal finance and economics coverage as part of the high school curricula since the 1970s. While this may help close the gap in financial literacy across segments of the population, especially across racial/ethnic groups, it is debatable whether these programs have made a contribution in such direction. Some analyses have found that exposure to personal finance courses is associated with higher financial literacy and a lower probability and frequency of using AFS (Harvey, 2019; Kaiser et al., 2020; Modestino et al., 2019; Urban et al., 2015; Xiao & O'Neill, 2016). Other studies (Fernandes et al., 2014; Kassman et al., 2018) offer a more skeptical view about the effectiveness of state mandates. The emergence of contradicting findings has been linked to heterogeneity in the rigor of the requirements as well as in teacher training and curriculum design across states (Lusardi & Mitchell, 2014).

2.2 | Racial and ethnic disparities on financial literacy

Racial and ethnic disparities on financial knowledge are well documented. Blacks and Hispanics tend to score low in financial literacy in the National Capability Study (Lusardi & Mitchell, 2011a), the National Longitudinal Survey of Youth (Anong, 2016), and the Health and Retirement Study (Lusardi & Mitchell, 2011b). Low levels of financial literacy among Blacks and Hispanics seem to correspond with significant barriers to acquiring financial knowledge (Anong, 2016; Porto, 2016), with the gap in financial sophistication largely driven by initial conditions. Black and Hispanics are more likely to grow up in poorer households, send their children to schools in poorer neighborhoods, and experience low inter-generational income mobility (Chetty & Hendren, 2018). In such economic environments, the benefits of acquiring financial knowledge may be too low to justify the investment.

Hamilton and Darity (2017) stress that, while the discussion on the racial/ethnic gap in financial literacy and behavior is centered around the lack of education among minorities, availability of financial resources as well as formal and informal institutional factors should really be the focus. This is because, as they state, "financial behavior and financial literacy are practically limited for households and race groups with little to no finances to manage" (Hamilton & Darity, 2017, 61). They go a step further and interpret existing intergroup differences as serving "a functional role in maintaining social hierarchy and promoting privileged group's relative class status" (Hamilton & Darity, 2017, 70).

To the best of our knowledge, there are only two papers that empirically analyze the determinants of the racial/ethnic gap in financial literacy: Al-Bahrani et al. (2019) and Kim and Xiao (2020). Both studies use regression and Blinder-Oaxaca (BO) decomposition analyses and data from the National Financial Capability Study (NFCS). Al-Bahrani et al. (2019) focus on racial/ethnic differences in the returns to financial education using data from the 2015 NFCS. They find that financial education increases financial literacy, but returns to financial education are higher for Whites than for minorities and could potentially exacerbate racial/ethnic disparities in financial literacy.

Kim and Xiao (2020) rely on data from the 2018 NFCS to study whether resource factors contribute more than knowledge factors to explain the Black–White and Hispanic–White gaps in financial capability. In their analysis, financial capability is a composite measure of both financial knowledge and financial behavior. They find that age, income, negative income shocks, and banking status explain most of the observed racial/ethnic differences in financial capability. While education is associated with higher levels of financial capability, it appears to be a contributing factor for the gap between Whites and Blacks, but not for the disparities between Whites and Hispanics.

Our analysis expands on Al-Bahrani et al. (2019) and Kim and Xiao (2020) in the following ways. First, we use a different dataset, which allows us to check the robustness of the associations between financial literacy and individual characteristics found by these two studies. Second, we investigate the role of parental education as well as of family financial strain as determinants of financial literacy. Hence, we evaluate how much the association between poor family background and low financial literacy stems from parental inputs and resource scarcity, while controlling for a rich set of other individual-level variables. Third, we explicitly consider neighborhood characteristics as potential driving factors of the racial/ethnic gap in financial knowledge. Compared to La Chance (2014), we move beyond just ZIP code-level education and include in our analysis a composite socioeconomic index of the Census tract where individuals live (Diez-Roux et al., 2001), as well as the number of formal financial institutions in that location. Fourth, we dedicate particular attention to the middle-income class and to what shapes racial/ethnic disparities in financial literacy within this large and increasingly more vulnerable group. Our analysis provides specific insights that can help reduce the racial/ethnic gap in financial literacy while promoting financial wellbeing and economic mobility of minorities within this segment of the population.

3 | DATA

We use data from the Federal Reserve Board's 2017 SHED. SHED collects extensive data about demographic, socioeconomic, and financial wellbeing, knowledge, and behavior at the individual level. Since 2013, the SHED questionnaire has been administered annually through the Internet Panel *KnowledgePanel*, run by the market research company GfK Custom Research of North America. *KnowledgePanel* is a probability-based sample, representative of the US population.

In our analysis, we focus on racial/ethnic differences between Whites (non-Hispanic), Blacks (non-Hispanic), and Hispanics. We consider these three groups because they are the largest groups in the United States and have the largest representation in SHED. We exclude from our analysis other racial/ethnic groups.²

We construct a financial literacy score using the five questions on financial literacy available on SHED and commonly used in the literature (Lusardi & Mitchell, 2014):

1. Risk: Do you think the following statement is true or false? "Buying a single company's stock usually provides a safer return than a stock mutual fund." Answers: 1. True, 2. False, 3. Don't know. Correct answer: false.
2. Interest: Suppose you had \$100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow? Answers: 1. More than \$102, 2. Exactly \$102, 3. Less than \$102, 4. Don't know. Correct answer: more than \$102.
3. Inflation: Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account? Answers: 1. More than today, 2. Exactly the same, 3. Less than today, 4. Don't know. Correct answer: less than today.
4. Housing prices: Do you think the following statement is true or false? "Housing prices in the US can never go down." Answers: 1. True, 2. False, 3. Don't know. Correct answer: false.
5. Long term investment: Considering a long time period (for example 10 or 20 years), which asset described below normally gives the highest returns? Answers: 1. Stocks, 2. Bonds, 3. Savings accounts, 4. Precious metals, 5. Don't know. Correct answer: stocks.

We assign 1 point to each correct answer and 0 to incorrect and "don't know" answers (if an answer to one of the questions is missing, we eliminate that observation from the sample). Our dependent variable is a composite financial literacy score, ranging between 0 and 5. Our explanatory variables are chosen to mimic model specifications adopted by existing studies on this topic (Al-Bahrani et al., 2019; Kim & Xiao, 2020; La Chance, 2014; Xiao & O'Neill, 2016, 2018; among others) with the addition of variables related to family background and neighborhood characteristics.³ As far as

the latter are concerned, we use data at the census tract level to account for socioeconomic characteristics of individuals' place of residence, identified via restricted geocodes.⁴ Specifically, we construct a neighborhood socioeconomic status (NSES) score similar to Diez-Roux et al. (2001), and used by Blanco et al. (2018).⁵ We consider additional neighborhood level variables such as number of banks weighted by population (these are entered in our model as natural logarithms).⁶ Data used to construct the NSES score come from the American Community Survey (ACS) from the US Census Bureau. To obtain the number of banks weighted by population at the census tract level, we rely on data from the ACS (population) and the Federal Deposit Insurance Corporation (number of banks). Given that we use data from the 2017 SHED, we consider neighborhood data in 2016 (lag value).

Table A1 (Supporting information) provides a more detailed description and data sources of all variables used in this study.

4 | METHODOLOGY

We assess racial/ethnic differences in financial literacy using the following linear regression model:

$$FL_i = \alpha + \beta Race_i + \gamma X_i + \delta N_Z_i + \varepsilon_i \quad (1)$$

Our dependent variable, FL_i , is the financial literacy score for individual i . Mutually exclusive indicators for Blacks and Hispanics are denoted with $Race_i$ and capture differences of minority groups compared to Whites. Individual characteristics and family background variables are in the vector X_i . Neighborhood characteristics at the Census tract-level are denoted by N_Z_i ; ε_i is the error term. Following common practice in the literature, we treat the financial literacy score as a continuous outcome and estimate Equation (1) by ordinary least squares (OLS) with standard errors clustered at the census tract level.⁷

We adopt four different specifications by progressively adding explanatory variables to the regression equation. We first estimate a baseline regression that only features the race/ethnicity indicators and individual characteristics, such as gender, age, educational attainment, whether the individual is the household head, working status, household income (dummy variables for income terciles), presence of a spouse/partner and children, indicators for whether the household receives welfare, social security, or supplemental security income. In our second specification, we add two family background variables, the educational attainment of the individual's mother and whether the individual worried about the family's finances growing up (equal to 1 if the individual worried regularly or sometimes, equal to zero if it worried rarely or zero). Adding family background variables is one of the original contributions of our study, as their association with financial knowledge has not been well established yet due to data limitations. In our third specification, we add the NSES index as a further control, while in the fourth and preferred specification, we also include the number of banks in the census tract (weighted by population).⁸

We conduct a BO decomposition analysis to evaluate the relative contribution of different variables in explaining the racial/ethnic gap in financial literacy and assess how much of this gap remains unexplained (also in this case, we cluster standard errors at the census tract level).

We carry out our estimation for the entire sample and, separately, for three income groups: low income (below or equal to \$39,999), middle income (income between \$40,000 and \$99,999), and high income (income equal or greater than \$100,000).⁹ Hence, we explore heterogeneity in both racial/ethnic differences in financial literacy and the determinants of such differences across different income classes. We will focus our discussion on the results for the middle-income group and highlight similarities and differences with respect to the low- and high-income groups.

5 | RESULTS

Table 1 presents the summary statistics of the variables used in the analysis. The financial literacy index sums the number of correct answers to the five financial literacy questions discussed above. On average, individuals answer 3.16 questions correctly. Half the sample are male, the fractions of Blacks and Hispanics are 9% and 11%, respectively. Average age is 54, 60% of the sample have at least some college education, 87% of individuals are household heads, 62% are in a couple household, and 23% have children. Our income classification into low, middle, and high income, roughly divides the sample into terciles. Close to 60% of the sample are working, about 40% receive Social Security benefits, and less

than a quarter receive government assistance. Mean NSES is 0.86 (recall that this is a sum of five z-scores, with higher values representing better neighborhood SES), and average number of banks per 1,000 individuals in the census tract is 0.41.¹⁰

There exist stark racial/ethnic disparities in financial literacy. Table 2 shows that, on average, Blacks and Hispanics have scores that are 1.2 and 1 below that of Whites, respectively. Interestingly, the financial literacy score of Blacks and Hispanics is significantly below that of Whites at each income level. The minority gap narrows when moving from low to high income, and more markedly so for Hispanics than for Blacks.

Table 3 presents the results of the analysis concerning the determinants of the racial/ethnic gap in financial literacy. As can be seen in column 1, accounting for individual characteristics decreases the unconditional financial literacy gap with respect to Whites by 43% for Blacks and 53% for Hispanics. Adding family background variables reduces the gap only slightly for both minority groups (column 2). The estimates in column 2 indicate that, as expected, higher levels of

TABLE 1 Summary statistics

Variables	Mean	SD	Min	Max
Financial literacy score	3.16	1.61	0	5
White	0.81	0.39	0	1
Black	0.09	0.28	0	1
Hispanic	0.11	0.31	0	1
Male	0.50	0.50	0	1
Household head	0.87	0.34	0	1
Household couple	0.62	0.49	0	1
Household children	0.23	0.42	0	1
Working	0.58	0.49	0	1
Age	54	17	18	94
Household income, low (<\$40,000)	0.36	0.48	0	1
Household income, middle (\$40,000–\$100,000)	0.34	0.48	0	1
Household income, high (>\$100,000)	0.30	0.46	0	1
Educ. attain. (high school or less)	0.23	0.42	0	1
Educ. attain. (some college or associate degree)	0.35	0.48	0	1
Educ. attain. (college degree)	0.24	0.43	0	1
Educ. attain. (masters or higher)	0.18	0.38	0	1
Gov. assistance	0.18	0.38	0	1
Social security	0.38	0.49	0	1
Supp. security	0.04	0.20	0	1
Educ. attain. mother (high school or less)	0.60	0.49	0	1
Educ. attain. mother (college or associate degree)	0.23	0.42	0	1
Educ. attain. mother (masters or higher)	0.12	0.32	0	1
Financial strain during childhood	0.36	0.48	0	1
NSES indicator ^a	0.86	3.44	−10.42	14.02
Ln(number of banks) ^b	−0.89	0.74	−3.19	3.14

Notes: $N = 9,714$. Individual-level data obtained from public version of the Survey of Household and Economic Decision-making (SHED), 2017. NSES score is a neighborhood socioeconomic status index constructed as the standardized sum of median household income (natural log), median household value (natural log), percentage of households with interest income, percentage of residents with high school, percentage of residents with college, and percentage of residents in managerial positions (see Diez-Roux et al., 2001). All neighborhood variables correspond to the census tract where individuals reside at the time of the survey. Data on neighborhood characteristics are obtained from the Census American Community Survey (ACS 2016 5-year average, denoted with a superscript a), Federal Deposit Insurance Corporation Directory (FDIC 2016, denoted with a superscript b). The last variable is the natural logarithm of the number of banks weighted by population in the census tract.

financial literacy are associated with mother's education attainment. Experiencing family financial issues growing up correlates positively and significantly with the level of financial literacy. This may suggest greater awareness of the importance of managing personal finances and acquiring financial knowledge among individuals who witnessed financial strain.

In column 3 of Table 3 we observe that the estimated coefficient for the NSES score is positive and statistically significant. This is in line with the hypothesis that a better socioeconomic environment raises financial knowledge independently of individual characteristics (La Chance, 2014), but is also consistent with a selection story, by which individuals with similar demographics and levels of financial literacy tend to live in the same neighborhoods. When adding the NSES score index to the regression, the Black and Hispanic coefficients are further reduced by 8% and 6%, respectively (comparing race/ethnicity coefficients in column 3 with those in column 2). Controlling for the number of banks in the neighborhood, decreases the racial/ethnic gap by another 1%, with the number of banks itself exhibiting a positive and marginally statistically significant (10% level) association with individuals' financial literacy (column 4).

TABLE 2 Racial/ethnic disparities in the financial literacy score

	(1) All		(2) Low income, <\$40,000		(2) Middle income, \$40,000–\$100,000		(3) High income, >\$100,000	
	Mean	Difference	Mean	Difference	Mean	Difference	Mean	Difference
Black	2.136	–1.243***	1.615	–1.094***	2.555	–0.838***	3.372	–0.778***
Hispanic	2.382	–0.997***	1.862	–0.847***	2.610	–0.783***	3.580	–0.570***
White	3.379	Reference	2.709	Reference	3.393	Reference	4.150	Reference

Notes: Unweighted means. *t* tests are conducted for two pair-wise comparisons. Statistical significance denoted as **p* < .10; ***p* < .05; ****p* < .01.

TABLE 3 OLS regressions for full sample

	(1)	(2)	(3)	(4)
Black	–0.7028*** (0.0497)	–0.7016*** (0.0497)	–0.6483*** (0.0504)	–0.6441*** (0.0504)
Hispanic	–0.4721*** (0.0453)	–0.4667*** (0.0455)	–0.4401*** (0.0456)	–0.4335*** (0.0459)
Educ. attain. mother (high school or less)		0.0217 (0.0346)	0.0144 (0.0345)	0.0153 (0.0345)
Educ. attain. mother (college or associate degree)		0.1800*** (0.0435)	0.1625*** (0.0433)	0.1627*** (0.0433)
Educ. attain. mother (masters or higher)		0.0626 (0.0605)	0.0457 (0.0604)	0.0461 (0.0604)
Financial strain during childhood		0.0807*** (0.0275)	0.0827*** (0.0275)	0.0830*** (0.0275)
NSES indicator			0.0277*** (0.0045)	0.0276*** (0.0045)
Number of banks, weighted				0.0294* (0.0175)
<i>R</i> ²	0.3567	0.3582	0.3609	0.3610

Notes: *N* = 9,714 (full sample). Dependent variable is the financial literacy score (0–5 range). Standard errors clustered at the census tract level are in parentheses. All models include individual's gender, age, educational attainment and whether the individual is the household head and working, indicators for household income brackets, indicators for whether there is a spouse/partner and children in household, indicators for whether the individual or her spouse receives government assistance, social security, or supplemental security. The estimated coefficients of these variables are omitted in the interest of space. The full set of estimated coefficients for model specified in column 4 is provided in Table A3. Statistical significance denoted as **p* < .10; ***p* < .05; ****p* < .01.

This is consistent with the results of Goodstein and Rhine (2017), who find that availability of financial services at the local level is related to higher rates of financial inclusion.

Table 4 shows the results of the BO decomposition based on our richest specification. We present the observed gap in financial literacy between racial/ethnic groups, the percent of this gap explained by our model, and the contribution of each variable to the explained gap in percent. About 48% of the unconditional White–Black gap is explained by the model, with basic demographics such as gender, age, educational attainment, and household income contributing 15%, 15%, 22%, and 22% to the explained gap, respectively. Other individual-level factors together contribute 16%, while the remaining 11% is attributable to NSES characteristics. Our model explains about 57% of the unconditional difference in financial literacy between Whites and Hispanics (column 2, Table 4). Similarly, to the White–Black gap, the main contributors to the White–Hispanic gap are age, educational attainment, and household income (28%, 27%, and 15%, respectively). Other individual-level factors together contribute 19% to the explained gap and NSES characteristics contribute another 9%.

Next, we investigate the determinants of racial/ethnic disparities in financial literacy by income. For this purpose, we divide the sample into three income classes: low income (<\$40,000), middle income (\$40,000–\$100,000), and high income (>\$100,000). We then estimate our preferred specification separately for each of these three groups. The results of this exercise are shown in Table 5. Confirming the unconditional gaps by income presented in Table 2, conditional racial/ethnic disparities between Whites and minority groups are observed within each income class. Yet, there exist important differences in terms of which key variables contribute to explaining these gaps. We observe that the size of the residual White–Black gap in financial literacy is very similar within low and middle-income classes (a 0.6 difference in the composite financial literacy score) and is the highest among high-income households (reaching a 0.8 difference in the composite financial literacy score). The White–Hispanic gap in financial literacy is the highest among the middle class, with an estimated residual difference of 0.5. While mother's educational attainment is positively associated with

TABLE 4 Blinder-Oaxaca decomposition for full sample

	(1) White (G1) vs. Black (G2)	(2) White (G1) vs. Hispanic (G2)
Gap	1.243***	0.997***
% of gap explained by difference in variables	48.29***	57.34***
% contribution to the explained gap by...		
Male	14.56***	5.54***
Age	14.65***	28.34***
Educational attainment	22.08***	26.80***
Household head	3.88***	6.31***
Working	−0.20	−0.82
Household income	21.76***	15.04***
Household couple	−0.58	−0.02
Household child	0.17	1.03
Government assistance	9.30***	8.47***
Social security	−0.82	−3.11**
Supplemental security	3.03***	1.96***
Educ. attain. mother	0.75*	1.91***
Financial strain during childhood	−0.67**	−1.77***
NSES indicator	11.46***	9.17***
Number of banks, weighted	0.63	1.17
Observations (total)	8,663	8,858
Observations (G1)	7,807	7,807
Observations (G2)	856	1,051

Notes: Standard errors are clustered at the census tract level. Statistical significance denoted as * $p < .10$; ** $p < .05$; *** $p < .01$.

financial literacy across all income groups, its role seems substantially more important for low- and middle-income individuals than for those with high income. Having witnessed family financial issues during childhood is associated with higher financial literacy only within the middle class. If, as alluded to in Section 2, financial literacy is ultimately an investment decision, the middle class is arguably the group that can benefit the most from learning from past adverse experiences and acquiring higher levels of financial sophistication. These benefits may be less apparent for low-income individuals dealing with resource scarcity, and for those with high income who are less likely to face binding budget constraints.

As far as neighborhood characteristics are concerned, the estimated coefficients of the NSES index are similar and equally significant across income groups. On the other hand, the number of banks exhibits a sizeable positive and statistically significant association with financial literacy only for the middle class. This likely indicates that the availability of financial services, as proxied by the number of banks in the neighborhood, correlates with higher levels of financial knowledge among those who can benefit the most from higher participation in the financial sector. Again, these are middle-income individuals.

Table 6 shows the results of the BO decomposition analysis by income class. Two main patterns emerge. First, the percent of the White–Minority gap explained by differences in observables decreases monotonically as the level of income increases. For Blacks it goes from 47% within the low-income class to 18% within the high-income class. For Hispanics it passes from about 62% within the low-income class to 29% within the high-income class. Second, the residual gap is lower for Hispanics than for Blacks in the low- and high-income groups, but is the same in the middle-income group.

As for the entire sample, basic demographic characteristics, such as gender, age, and education, are mostly responsible for the explained part of the gap in each of the three income classes. Yet, there are important differences in the

TABLE 5 OLS regressions by income groups

	(1) Low income	(2) Middle income	(3) High income
Black	−0.5984*** (0.0719)	−0.6079*** (0.0901)	−0.7848*** (0.1236)
Hispanic	−0.3809*** (0.0742)	−0.4967*** (0.0797)	−0.4294*** (0.0921)
Educ. attain. mother (high school or less)	0.5832*** (0.0588)	0.5224*** (0.0638)	0.3802*** (0.1001)
Educ. attain. mother (college or associate degree)	1.0013*** (0.0734)	1.0471*** (0.0738)	0.7916*** (0.0966)
Educ. attain. mother (masters or higher)	1.1261*** (0.0979)	1.0810*** (0.0829)	0.9192*** (0.0973)
Financial strain during childhood	0.0698 (0.0475)	0.1323*** (0.0488)	0.0494 (0.0446)
NSES indicator	0.0278*** (0.0083)	0.0308*** (0.0082)	0.0265*** (0.0069)
Number of banks, weighted	−0.0046 (0.0312)	0.0816** (0.0329)	0.0173 (0.0277)
Observations	3,441	3,346	2,927
R ²	0.2848	0.2482	0.2333

Notes: $N = 9,714$ (full sample). Dependent variable is the financial literacy score (0–5 range). Standard errors clustered at the census tract level are in parentheses. Low income is defined as household income below or equal to \$39,999; middle income is defined as household income between \$40,000 and \$99,999; high income is defined as household income greater or equal to \$100,000. All models include individual's gender, age, educational attainment and whether the individual is the household head and working, indicators for whether there is a spouse/partner and children in household, indicators for whether the individual or her spouse receives government assistance, social security, or supplemental security. The estimated coefficients of these variables are omitted in the interest of space. The full set of estimated coefficients is provided in Table A4. Statistical significance denoted as * $p < .10$; ** $p < .05$; *** $p < .01$.

contributions of these variables across racial/ethnic and income groups, which are particularly pronounced within the middle-income class. For instance, had the fraction of male respondents be the same for Whites and Blacks within the middle-income class, the observed White–Black gap in financial literacy would decrease by 31%. However, had the gender composition of middle-income Whites and Hispanics be the same, the existing disparities in financial literacy between these two racial/ethnic groups would remain unchanged. Conversely, while a large share of the gap between middle-income Whites and Hispanics can be attributed to differences in the age and education composition of these two groups, such differences are by far less important to explain the gap between Whites and Blacks.

Consistently with the OLS estimates in Table 5, the NSES index contributes to the explained gap significantly across income and racial/ethnic groups, but, again, some relevant differences in these associations are worth noticing. Specifically, the contribution of neighborhood socioeconomic characteristics account for 12%–9% of the White–Black and White–Hispanic gap within the low-income class. As income increases, this contribution becomes larger, and substantially more for Blacks than for Hispanics. For instance, within the middle- and high-income classes had the NSES characteristics be the same between Whites and Blacks, the observed White–Black gap in financial literacy would be reduced by 24%–25%. Instead, had the NSES characteristics be the same between Whites and Hispanics, the observed White–Hispanic gap in financial literacy would be reduced by 12% within the middle-income group and 15% among the high-income group. The number of banks in the neighborhood has a similar effect for both Blacks and Hispanics and is only relevant for the middle-income class, where it accounts for 5% of the explained gap in financial literacy with respect to Whites.

TABLE 6 Blinder-Oaxaca decomposition by income groups

	Low income		Middle income		High income	
	(1) White vs. Black	(2) White vs. Hispanic	(3) White vs. Black	(4) White vs. Hispanic	(5) White vs. Black	(6) White vs. Hispanic
Gap	1.117***	0.936***	0.839***	0.839***	0.968***	0.615***
% of gap explained by difference in variables	46.59***	61.59***	28.63***	40.78***	18.16***	29.50***
% contribution to the explained gap by...						
Male	17.20***	10.88***	30.92***	4.44	12.86	–26.31**
Age	33.93***	46.57***	9.40*	33.71***	12.58	42.91***
Educational attainment	25.05***	22.41***	9.86	29.74***	17.47	52.34***
Household head	2.73**	3.57	6.99*	11.35***	19.12**	13.51**
Working	–0.60	–0.68	0.21	–0.58	–2.39	–10.54*
Household couple	–0.79	0.12	–0.87	–0.29	3.81	0.72
Household child	2.92	2.88	0.21	5.26	–0.85	–0.50
Government assistance	9.45***	7.42***	14.61***	8.86**	7.97	12.63**
Social security	–4.03	–6.33*	–0.54	–4.44	–0.17	–1.60
Supplemental security	3.65**	2.71**	3.41	0.64	3.36	1.32
Educ. attain. mother	–0.38	2.60**	1.08	0.79	2.68	0.88
Financial strain during childhood	–0.17	–1.35	–3.91*	–5.70**	–3.24	–2.15
NSES indicator	11.70***	9.14***	23.85***	11.64***	25.33***	15.11***
Number of banks, weighted	–0.65	0.07	4.79*	4.59**	1.54	1.54
Observations (total)	2,980	2,992	2,968	3,083	2,715	2,783
Observations (G1)	2,531	2,531	2,705	2,705	2,571	2,571
Observations (G2)	449	461	263	378	144	212

Notes: Standard errors are clustered at the census tract level. Statistical significance denoted as * $p < .10$; ** $p < 0.05$; *** $p < .01$.

6 | CONCLUSION

The level of financial literacy is heterogeneous across races and income classes. Given the fundamental role of financial literacy in informing financial decisions, differences in financial literacy are likely to be reflected in differences in financial outcomes, thereby contributing to growing inequalities across segments of the population. Interventions aimed at improving financial knowledge, and, therefore, financial wellbeing among minorities and more disadvantaged segments of the population require a better understanding of what determines financial literacy disparities across groups. The goal of this paper is to provide further insights on the determinants of financial literacy differences by race/ethnicity and income.

For this purpose, we use the restricted version of the SHED of 2017, conducted by the Federal Reserve Board, to explore how financial literacy correlates with individual, family background, neighborhood, and institutional characteristics. We underscore the role of family circumstances during childhood and neighborhood characteristics in shaping racial/ethnic disparities in financial literacy. Moreover, we investigate the extent to which the determinants of the observed White–Minority gap in financial literacy differ within low-, middle-, and high-income classes.

As documented by the existing literature, we find that Blacks and Hispanics are at a clear disadvantage compared to Whites as far as financial knowledge is concerned. Our model explains 48% of the unconditional gap between Whites and Blacks, and 57% of the unconditional gap between Whites and Hispanics. For both minority groups, basic demographics, such as gender, age, educational attainment, and household income, provide the largest contribution to the explained gap. Family circumstances during childhood account for only 1%–2% of the explained gap. Neighborhood socioeconomic characteristics and availability of financial services are significantly associated with the level of financial literacy and, at the same, time, are responsible for nearly 9%–11% of the explained gap.

The analysis by income reveals interesting patterns. The financial literacy score of Blacks and Hispanics is significantly below that of Whites at each income level. This unconditional gap in financial literacy narrows when moving from low to high income levels, but more markedly so for Hispanics than for Blacks. After accounting for individual and neighborhood characteristics, the residual unexplained gap for Blacks is the largest within the high-income class and the lowest within the low-income class. For Hispanics the residual unexplained gap is the largest within the middle-income class and the lowest among the low-income class. The association between adverse family financial circumstances during childhood and financial literacy is stronger for the middle class than the other two income classes. Similarly, neighborhood socioeconomic status and number of banks are more notably correlated with individuals' financial literacy within the middle-income group than the low- and high-income groups. This suggests that the middle-income class is more likely to invest in financial sophistication in response to experienced financial strain in the past and to improve their financial literacy in environments where availability of financial services is higher.

The BO decomposition by income groups shows that our model explains a larger proportion of the racial/ethnic gap among low-income individuals than among their more affluent counterparts. Within each income group, our model explains a substantially larger share of the White–Hispanic gap than of the White–Black gap. We detect substantial heterogeneity in the extent to which different variables contribute to explain the White–Hispanic and White–Black gaps, especially among the middle class. In particular, had the neighborhood socioeconomic characteristics be the same between Whites and Blacks and between Whites and Hispanics within the middle-income class, the observed White–Black and White–Hispanic gaps in financial literacy would be reduced by 24% and 12%, respectively. Also, the number of banks in the neighborhood has a similar effect for both Blacks and Hispanics and is only relevant for the middle-income class, where it accounts for 5% of the explained gap in financial literacy with respect to Whites.

In summary, our study shows that a substantial share of the existing racial/ethnic gap in financial literacy can be explained by differences in various individual characteristics and environmental factors. Yet, a relatively large part of this gap remains unexplained and its size varies significantly across income classes. This points to the existence of different, relevant barriers towards availability, acquisition, and retention of financial knowledge faced by minorities at different levels of income. Future research should identify what such barriers are and quantify their role in determining racial/ethnic disparities in financial literacy across income classes.

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ENDNOTES

- ¹ Engel and Oral (2019) provided the framing document for the Federal Reserve System Community Development Research Conference Renewing the Promise of the Middle Class. An earlier version of this paper was presented at this conference.
- ² We exclude from our analysis individuals who identify themselves as other (non-White, non-Black, or non-Hispanic), and who belong to more than two races and are non-Hispanic. The excluded individuals represent 5.6% of individuals in the public version of SHED. From here on out we refer to Whites (non-Hispanic) as Whites and Blacks (non-Hispanic) as Blacks for simplicity.
- ³ We do not include measures of financial behaviors/outcomes (e.g., home ownership, stockholding, etc.) as explanatory variables in our model to reduce endogeneity issues stemming from the mutual influence of financial knowledge and financial behavior/outcomes.
- ⁴ Given that access to the geo codes from SHED is restricted, FRB staff merged the our working version of the public version of SHED with our constructed neighborhood level datasets, ran our codes, and returned to us the output results. Our project received approval by the Institutional Review Board at Pepperdine University (Protocol #18-10-874).
- ⁵ The NSES score is constructed as the sum of the z-score of the median household income (natural log), median household value (natural log), percentage of households with interest income, percentage of residents with high school, percentage of residents with college, and percentage of residents in managerial positions.
- ⁶ When computing the natural logarithm of a variable x that can take the value of zero, we use $\ln(x + 1)$.
- ⁷ We estimate separate linear probability models using as dependent variables indicators for answering each of the financial literacy questions correctly. We also estimate a Poisson model treating the composite financial literacy score as a count variable. The main findings reported below are qualitatively similar across alternative estimation approaches. The linear probability model and Poisson estimation results are available upon request.
- ⁸ We have considered additional neighborhood-level variables such as racial/ethnic composition of the census tract, number of credit unions (census tract level) and AFS providers (zip code level) weighted by population. These variables are highly correlated with either the NSES or the number of banks and their estimated coefficients are never statistically significant.
- ⁹ The classification adopted at the Federal Reserve Board Conference defines as middle class those households falling between the 40th and 70th percentiles of the income distribution. In the public version of the SHED dataset, household income is a categorical variable. The thresholds of \$39,999 and \$99,999 are as close as possible to the 40th and 70th percentile, respectively.
- ¹⁰ Correlations among explanatory variables are reported in Table A2.

REFERENCES

- Al-Bahrani, A., Weathers, J. & Patel, D. (2019) Racial differences in the returns to financial literacy education. *Journal of Consumer Affairs*, 53(2), 572–599. <https://doi.org/10.1111/joca.12205>.
- Anong, S. (2016) Financial issues of African Americans. In: Xiao, J.J. (Ed.) *Handbook of consumer finance research*, 2nd edition. Switzerland: Springer, pp. 215–224.
- Barcellos, S.H. & Zamarro, G. (2019) Unbanked status and use of alternative financial services among minority populations. *Journal of Pension Economics and Finance*, 1–14. <https://doi.org/10.1017/S1474747219000052>
- Blanco, L.R., Angrisani, M., Aguila, E. & Leng, M. (2018) Understanding the racial/ethnic gap in bank account ownership among older adults. *Journal of Consumer Affairs*, 53, 324–354.
- Campbell, J.Y. (2006) Household finance. *The Journal of Finance*, 61, 1553–1604. <https://doi.org/10.1111/j.1540-6261.2006.00883.x>.
- Campbell, J.R. & Hercowitz, Z. (2019) Liquidity constraints of the middle class. *American Economic Journal: Economic Policy*, 11(3), 130–155 <https://doi.org/10.1257/pol.20180070>.
- Chetty, R. & Hendren, N. (2018) The impacts of neighborhoods on intergenerational mobility I: childhood exposure effects. *The Quarterly Journal of Economics*, 133(3), 1107–1162. <https://doi.org/10.1093/qje/qjy007>.
- Diez-Roux, A.V., Merkin, S.S., Arnett, D., Chambless, L., Massing, M.F., Nieto, J., et al. (2001) Neighborhood of residence and incidence of coronary heart disease. *The New England Journal of Medicine*, 345(2), 99–106. <https://doi.org/10.1056/NEJM200107123450205>.
- Ellen, I.G. & Turner, M.A. (1997) Does neighborhood matter? Assessing recent evidence. *Housing Policy Debate*, 8(4), 833–866.
- Engel, E. & Oral, T. (2019) *Renewing the promise of the middle class: evidence and insights from research*. Federal Reserve Bank of Chicago. Available at: <https://www.chicagofed.org/region/community-development/renewing-the-promise-of-the-middle-class>.
- Fernandes, D., Lynch, J.G. & Netemeyer, R.G. (2014) Financial literacy, financial education, and downstream financial behaviors. *Management Science*, 60(8), 1861–1883.

- Financial Health Network. (2018) *U.S. financial health pulse: 2018 baseline survey*. Available at: https://s3.amazonaws.com/cfsi-innovation-files-2018/wp-content/uploads/2019/05/07151007/FHN-Pulse_Baseline_SurveyResults-web.pdf.
- Goodstein, R.M. & Rhine, S.L.W. (2017) The effects of bank and nonbank provider locations on household use of financial transaction services. *Journal of Banking and Finance*, 78, 91–107.
- Hamilton, D. & Darity, W.A. (2017) The political economy of education, financial literacy, and the racial wealth gap. *Federal Reserve Bank of St. Louis Review*, 99(1), 59–76.
- Harvey, M. (2019) Impact of financial education mandates on younger consumers' use of alternative financial services. *Journal of Consumer Affairs*, 53, 731–769.
- Kaiser, T., Lusardi, A., Menkhoff, L. & Urban, C. (2020) *Financial education affects financial knowledge and downstream behaviors*. NBER Working Paper No. 27057.
- Kassman, M., Heuberger, B. & Hammond, R. (2018) *A review of large-scale youth financial literacy education policies and programs*. The Brookings Institution. Available at: https://www.brookings.edu/wp-content/uploads/2018/10/ES_20181001_Financial-Literacy-Review.pdf [Accessed 24th April 2019].
- Kim, K.T. & Lee, J. (2018) Financial literacy and use of payday loans in the United States. *Applied Economics Letters*, 25(11), 781–784.
- Kim, K.T. & Xiao, J.J. (2020) *Racial/ethnic differences in consumer financial capability: the role of financial education*. Working Paper.
- La Chance, M. (2014) Financial literacy and neighborhood effects. *The Journal of Consumer Affairs*, 48(2), 251–273.
- Lusardi, A.M. (2019) Financial literacy and the need for financial education: evidence and implications. *Swiss Journal of Economics and Statistics*, 155(1), 1–8.
- Lusardi, A.M. & Mitchell, O.S. (2011a) Financial literacy and retirement planning in the United States. *Journal of Pension Economics and Finance*, 10(4), 509–525.
- Lusardi, A.M. & Mitchell, O.S. (2011b) *Financial literacy and planning: implications for retirement wellbeing*. Working Paper No. 17078, National Bureau of Economic Research.
- Lusardi, A.M. & Mitchell, O.S. (2014) The economic importance of financial literacy: theory and evidence. *Journal of Economic Literature*, 52(1), 5–44.
- Lusardi, A.M. & Tufano, P. (2015) Debt literacy, financial experiences, and overindebtedness. *Journal of Pension Economics and Finance*, 14(4), 332–368. <https://doi.org/10.1017/S1474747215000232>.
- Lusardi, A.M., Mitchell, O.S. & Curto, V. (2010) Financial literacy among the young. *Journal of Consumer Affairs*, 44(2), 358–380.
- Modestino, A.S., Sederberg, R. & Tuller, L. (2019) Assessing the effectiveness of financial coaching: evidence from the Boston youth credit building initiative. *Journal of Consumer Affairs*, 53(4), 1825–1873 <https://doi.org/10.1111/joca.12265>.
- National Financial Educators Council. (2019) *National financial literacy test results*. Available at: <https://www.financialeducatorsCouncil.org/national-financial-literacy-test/#details> [Accessed 23rd April 2019].
- Porto, N. (2016) Financial issues of Hispanic Americans. In: Xiao, J.J. (Ed.) *Handbook of consumer finance research*, 2nd edition. Switzerland: Springer, pp. 205–214.
- Stolper, O.A. & Walter, A. (2017) Financial literacy, financial advice, and financial behavior. *Journal of Business Economics*, 87(5), 581–643.
- Urban, C., Schmeiser, M., Collins, M. & Brown A. (2015) *State financial education mandates: it's all in the implementation*. FINRA Investor Education Foundation Insights: Financial Capability, January.
- Utkus, S.P. & Young, J.A. (2011) Financial literacy and 401(k) loans. In: Mitchell, O.S. & Lusardi, A.M. (Eds.) *Financial literacy: implications for retirement security and the financial marketplace*. Oxford and New York: Oxford University Press, pp. 59–75.
- Van Rooij, M., Lusardi, A. & Alessie, R.J. (2012) Financial literacy, retirement planning, and household wealth. *The Economic Journal*, 122(560), 449–478.
- Xiao, J.J. & O'Neill, B. (2016) Consumer financial education and financial capability. *International Journal of Consumer Studies*, 40(6), 712–721. <https://doi.org/10.1111/ijcs.12285>.
- Xiao, J.J. & O'Neill, B. (2018) Propensity to plan, financial capability, and financial satisfaction. *International Journal of Consumer Studies*, 42, 501–512. <https://doi.org/10.1111/ijcs.12285>.

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