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Systematic review of racial/ethnic and gender differences in financial knowledge in the United States

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(Received 27 April 2023; revised 18 May 2024; accepted 14 September 2024)

Abstract

We review journal publications from 2007 to 2023 that specifically study or consider racial/ethnic and gender differences in financial knowledge. Of the 32 papers we review, 12 focus on racial/ethnic differences, 7 focus on gender differences, and 13 consider racial/ethnic and gender differences. From these studies, we estimate that, on average White adults score 17 percentage points higher than Black adults on objective financial knowledge, 14 percentage points higher than Hispanic adults, and 2 percentage points lower than Asian adults. We also estimate that, on average, men score 13 percentage points higher than women on objective financial knowledge. We also provide average racial/ethnic and gender differences in subjective financial, knowledge, and these differences across groups seem much smaller. We provide an overview of possible determinants for these racial/ethnic and gender gaps in financial knowledge. We discuss how stakeholders should leverage research on financial knowledge and directions for future research with the purpose to address racial/ethnic and gender gaps in financial knowledge in the United States.

Keywords: financial literacy; financial knowledge; racial; ethnic and gender disparities; financial Knowledge; racial/ethnic disparities; gender disparities

1. Introduction

Financial literacy, which has been defined by the President’s Advisory Council on Financial Literacy as “the ability to use knowledge and skills to manage financial resources effectively for a lifetime of financial wellbeing”, has been associated with financial behavior (Knoll and Houts (2012, p. 383). Financial knowledge and financial skills are the two dimensions of financial literacy.¹ Individuals who have higher levels of financial knowledge are more likely to have desirable money management skills, particularly in banking, budgeting, borrowing, saving, and investing (Kim and Lee, 2018, Lusardi and Messy, 2023; Lusardi and Mitchell, 2011a; Lusardi, 2019; Van Rooij et al., 2012). In fact, the latest meta-analysis of the impact of financial education programs (Kaiser et al., 2022) shows a causal link between financial education programs and improved financial knowledge and behavior.

¹ This systematic review focuses on financial knowledge, but also provides insights related to financial skills.

Low levels of financial knowledge have been prevalent in the United States. Data from the 2018 National Financial Capability Study (NFCS) show that the proportion of individuals who answered four of six financial knowledge questions correctly decreased from 44 percent in 2015 to 40 percent in 2018 (Lin *et al.*, 2019). The NFCS also shows that women lag behind men and Black and Hispanic adults lag behind White adults in financial knowledge.² The NFCS shows similar racial/ethnic and gender differences in day-to-day financial decisions, such as overdrawing a checking account and having \$2,000 available for an emergency. Women and racial/ethnic minority groups are at a disadvantage when making financial decisions not only due to lower levels of financial knowledge, but also due to prevalent racial/ethnic and gender wealth gaps (England *et al.*, 2020; Derenoncourt *et al.*, 2021; Wolff 2018).

Addressing the financial information needs of women and racial/ethnic minorities can help reduce racial/ethnic and gender gaps in financial wellbeing. The 2020 Survey of Household Economic Decision-making (SHED) shows White adults had higher levels of financial wellbeing than Black and Hispanic adults, and that this difference increased since 2017 (Board of Governors of the Federal Reserve System, 2021). More recent research from the Consumer Financial Protection Bureau (CFPB, 2022) shows important racial/ethnic and gender differences in financial wellbeing. Black and Hispanic adults have lower financial wellbeing scores than White adults, and women have lower scores than men. The CFPB study also shows that, from 2017 to 2020, financial wellbeing increased for men and White adults but not for women, and Black and Hispanic adults. However, the CFPB study finds that racial/ethnic differences in financial wellbeing were insignificant when controlling for income.

We conduct a systematic review of research published from 2007 to 2023 on racial/ethnic and gender differences in objective financial knowledge in the United States. We contribute to previous research in several ways. First, we provide evidence of progress in better understanding the magnitude of these differences and factors explaining these differences. Second, we estimate the average racial/ethnic and gender gaps in financial knowledge, a necessary step for addressing them. Third, we identify important insights on how to address the racial/ethnic and gender differences in financial knowledge and provide recommendations for future research.

We include in this review 32 papers that use quantitative data to assess objective financial knowledge, where 12 papers focused on racial/ethnic differences, seven papers focused on gender differences, and 13 papers considered but did not focus on racial/ethnic or gender differences. Through this systematic review we estimate racial/ethnic and gender gaps in financial knowledge in the United States. We also provide information on the measures of financial knowledge and factors considered in previous analyses as determinants of financial knowledge.

Using estimates from the papers included in this systematic review on racial/ethnic and gender gaps on financial knowledge, we estimate that White adults score 17 percentage points higher than Black adults, 14 percentage points higher than Hispanic adults, and 2 percentage points lower than Asian adults on measures of objective financial knowledge. From estimates provided in the reviewed analyses, we also find that men score 13 percentage points higher than women on objective financial knowledge.

We also estimate the average racial/ethnic and gender differences for those studies that consider young adults or collect data among college students. We find that the differences in objective financial knowledge are 12 percentage points between White and Black young adults and 8 percentage points between White and Hispanic young adults. These

² We refer in this manuscript to non-Hispanic White adults as “White adults” and non-Hispanic Black adults as “Black adults” for brevity.

differences are smaller in comparison to studies that use data from samples with adults 18 years and older.

Interestingly, when looking at measures of subjective financial knowledge among the studies reviewed here, the racial/ethnic and gender differences are much smaller in comparison to differences in objective financial knowledge. While there is no difference on average subjective financial knowledge between White and Black adults, White adults show 2 percentage points higher than Hispanic adults, and 1 percentage points lower than Asian adults. We also find that men score 6 percentage points higher than women on subjective financial knowledge in average.

When studying what factors explain financial knowledge outcomes, most papers consider individual socio-economic and demographic characteristics as determinants of financial knowledge, some consider access and participation on financial education programs, and fewer consider an individual's environment. We discuss insights from previous research on how stakeholders should leverage research on financial knowledge to address racial/ethnic and gender differences and recommendations for future research.

We organize our paper as follows. In Section 2, we provide our Methods, including our search strategy, systematic review process and data extraction approach. In Section 3, we present the results of our systematic review. In Section 4, we discuss the implications of our review. In Section 5, we provide a conclusion.

2. Methods

We conducted a systematic review of research published from 2007 to 2023 on racial/ethnic and gender differences in financial knowledge. Our work expands on the seminal work of Lusardi and Mitchell (2011b), which provides an overview of financial illiteracy around the world. They find that women, the young, the old, and the less educated are less financially literate. Lusardi and Mitchell (2014, p.5), in discussing how to measure financial literacy, show the importance of “financial knowledge as a form of investment in human capital” as well as “the impact of financial literacy on economic decision making.” Lusardi's (2019) review on financial literacy focuses on measuring financial knowledge, why it matters, and how to increase it. Lusardi's (2019) review also elaborates on the importance of measuring financial knowledge using the “Big Three” questions that assess knowledge about interest rate, inflation, and risk diversification.

In a more recent review of the field of financial literacy and its importance, Lusardi and Mitchell (2023), provide guidance on how to measure objective financial knowledge, focusing on the “Big Three” questions. They note that these questions were in the field for the first time in 2004 and are useful to assess financial knowledge for every day financial decisions. They also elaborate on how financial knowledge is closely related to financial decisions, and they show an association between financial knowledge and wealth.

Other recent reviews include a bibliometric analysis of papers related to financial literacy (Goyal and Kumar, 2021) and a meta-analysis of the factors explaining financial literacy and its impact on financial behavior (De Oliveira et al., 2019). The reviews of Gonçalves et al. (2021) and Furrebøe and Nyhus (2022), taking a global approach, focus on financial knowledge and wellbeing of women. Gonçalves et al. (2021) conduct a bibliometric analysis of peer-reviewed articles published from 1990 to 2020 on women's financial wellbeing, with 33 percent of the articles focusing on the United States. Furrebøe and Nyhus (2022) review research on financial literacy and self-efficacy in the context of gender differences around the world. Of the 35 papers they review, 23 include gender as a control variable, 12 focus on gender differences, and 20 are specific to the United States. Our review differs from Furrebøe and Nyhus (2022) review in its inclusion criteria.

In a systematic review of the literature on financial capability, Xiao *et al.* (2022) identified themes and trends of research in this area. They find that there is a cluster of 51 articles that focus on the impact of financial literacy and financial education on financial capability. They note that the terms of financial literacy and financial capability are used interchangeable because individuals with high levels of financial knowledge show also high levels of financial capability.

Based on our assessment of the reviews noted here and the importance of financial knowledge, we decided to include studies that consider objective measures of financial knowledge as an outcome variable. One of our main inclusion criteria for this systematic review was that a study included a quantitative analysis on racial/ethnic or gender differences in financial knowledge, measured objectively. We cover in this review estimates on racial/ethnic and gender differences of objective financial knowledge, but also differences in subjective financial knowledge when they are also provided in the studies selected using our inclusion criteria. We discuss next our search strategy, systematic review process and data extraction approach. Through our systematic review we intend to provide an organized and objective analysis of studies that provide quantitative evidence on racial/ethnic and gender differences in financial knowledge within the United States.

2.1. Search strategy

A team of researchers collaborated to identify and screen publications for this review. Two researchers systematically searched in February of 2024 for peer-reviewed manuscripts published in peer reviewed academic journals from 2007 to 2023. We focused our systematic review on the period from 2007 to 2023 for two reasons. Our search period started in 2007 because, as noted in Xiao's *et al.* (2022) systematic review, that was the first year that papers using the concept of financial literacy were published in academic journals. We ended our search period in 2023 to provide the latest update given the growing interest in this area of research.

We searched for publications in Academic Search Complete (EBSCOhost Research Databases) using the search terms shown in Table A1 in the Appendix. We were interested in publications that specifically study financial knowledge, but used also the terms "financial literacy" and "financial skills" given that manuscripts use these terms interchangeably. By using this inclusive approach for the term of financial knowledge in the title we were able to capture more relevant papers than if we only use the term "financial knowledge" by itself. Because we were interested on racial/ethnic and gender differences, we also added the terms in Table A1 as search terms for the manuscript abstracts. We restricted our search to publications in peer reviewed journals during the period 2007–2023. Using these terms and restriction criteria, we identified 473 publications in Academic Search Complete. We organized all these records in Zotero.³

2.2. Systematic review process

Figure A1 in the Appendix shows our study selection flow. We started with 473 records for publications related to financial knowledge from Academic Search Complete. As we reviewed papers, we excluded duplicates ($n = 47$) and papers that were not specific to the United States ($n = 307$). We reviewed carefully 119 papers, and excluded 95 papers due to any of the following reasons: (1) study uses non-nationally representative samples, (2) study focused on the impact of financial education programs, (3) study did not provide an analysis of an objective measure of financial knowledge, (4) there were no extractable

³ Zotero database including these records is available upon request.

racial/ethnic or gender difference in financial knowledge in the study (or no coefficient that denotes differences across groups), or (5) study did not use quantitative data.⁴ We also found studies through reference mining and google search that meet our inclusion criteria ($n = 8$). Specifically, we include here those studies that used measures related to Objective Financial Knowledge (OFK). Most studies included here used the *Big Three* or *Big Five* questions noted by Lusardi (2019) or other questions of this nature. We also focus this systematic review on studies that are specific to the adult population in the United States (18 and older).

We classify the 32 selected studies for this review in three categories: (1) Studies Focused on Racial/Ethnic Differences in Financial Knowledge (might consider gender differences as well, $n = 12$), (2) Studies Focused on Gender Differences in Financial Knowledge ($n = 7$), and (3) Studies that Consider Racial/Ethnic/Gender Differences in Financial Knowledge ($n = 13$). Table A2 in Appendix shows the study classification in these three categories. Please note that we consider those studies that focus on racial/ethnic or gender differences in financial knowledge that include clear estimates of these differences and devote a section of their manuscript to elaborate on these differences. Those studies that consider racial/ethnic and gender differences included in this review in Group 3 are those that provide differences on coefficients but do not have a specific section of the paper devoted to analyze these differences.

2.3. Data extraction approach

For the publications that quantitatively analyzed racial/ethnic or gender differences in financial knowledge we extracted the following data (column name denoted with description):

- Dataset: dataset used for the analysis.
- Age group: age group of study population.
- Group R/E/G: race/ethnicity and gender groups of study population.
- FK/FL measures: measures of objective and subjective financial knowledge, and other financial literacy and financial skill measures.⁵
- Sample size: sample size for data analysis.
- Analysis method: method of data analysis.
- FK Racial/Ethnic diff.: estimations of the racial/ethnic difference in financial knowledge between White and Black adults (W-B), White and Hispanic adults (W-H), and White and Asian adults or Others (W-A, W-A/O, W-O).
- FK Gender diff.: estimations of the gender differences in financial knowledge and behavior between men and women (M-W).

Table 1 shows the information extracted from papers that focused on racial/ethnic differences in financial knowledge, Table 2 from papers that focused on gender differences, and Table 3 from papers that consider racial/ethnic and gender differences. The

⁴ We excluded papers that analyzed the impact of financial education programs given that Kaiser et al. (2022) recently conducted a meta-analysis of 76 randomized experiments on this topic. We excluded papers that use qualitative data because they use small sample sizes and it was difficult to gather objective measures of financial knowledge from them. We also excluded those studies that did not use a nationally representative samples given the importance of using estimates in financial knowledge levels that are representative for the different population groups at the national level, similarly to the approach taken by meta-analyses in this area (like Goyal's et al., 2022, for example).

⁵ Note that in our tables we clarify whether the paper uses a measure of OFK from the Big 3/Big 5 questions of financial literacy and denote in parenthesis the total number of questions used to calculate the OFK score.

Table 1. Studies Focused on Racial/Ethnic Differences in Financial Knowledge

Author	Dataset	Group Age	Group R/E/G	FK Measures	Sample Size	Analysis Method	Racial/Ethnic gap	Gender gap
1. Al-Bahrani et al. (2019)	NFCS-2015	Adults, 18+	White & non-White; men & women	OFK-Big5	24,729	Reg. & BOD	OFK W-M: 11-12pp	OFK M-W: 8 pp
2. Angrisani et al. (2021)	SHED-2017	Adults, 18+	White, Black, & Hispanic; men & women	OFK-Big5	9,714	Reg. & BOD	OFK W-B: 25 pp W-H: 20 pp	Not Available
3. Clark et al. (2021)*	NFCS-2018	Adults (prime age) 22-60	White, Blacks, & Hispanic; only women in sample	OFK-Big3, FWB	17,868	Reg.	OFK WW-BW: 12pp WW-HW: 8pp (all correct)	Not available, only women
4. Harris et al. (2023)	SCFW-2017	Adults, 18+ (college)	White, Black & Hispanic	OFK-6Q-Montalto study	28,539	Desc.**	OFK: W-B: 8 pp W-H: 7 pp W-A: 4 pp	Not Available
5. Kim & Xiao (2020)	NFCS-2018	Adults, 18+	White, Black & Hispanic; men & women	OFK-Big 5 (6Q), SFK, FC, PFC	19,449	Reg. & BOD	OFK W-B: 16 pp W-H: 11 pp SFK W-B: 0 pp W-H: 3 pp	Women score lower than men in OFK & FC (women var. neg. sig. coeff.)
6. Kim et al. (2019)	NFCS-2015	Adults, 18+	White, Black, Hispanic, & Asian/other; men & women	OFK-Big5, SFK, FKO, AFS	24,001	Reg.	OFK W-B: 15 pp W-H: 11 pp W-A/O: 3 pp SFK W-B: 0 pp W-H: 1 pp W-A/O: 0 pp	Women score lower than men in OFK & FC (women var. neg. sig. coeff.)
7. Lee & Kim (2022)	NFCS-2018	Adults, 18+	White, Black, Hispanic, & Asian/other; men & women	OFK-Big 5 (6Q), SFK, & FKO	21,038	Reg. & BOD	OFK W-B: 16 pp W-H: 10 pp W-A/O: 0 pp SFK W-B: 0 pp W-H: 3 pp W-O: 1 pp	Women score lower than men in OFK & FC (women var. neg. sig. coeff.)

(Continued)

Table 1. (Continued)

Author	Dataset	Group Age	Group R/E/G	FK Measures	Sample Size	Analysis Method	Racial/Ethnic gap	Gender gap
8. Lusardi & Streeeter (2023)	NFCS-2021	Adults, 18+	White, Black, Hispanic, & Asian, other; men & women	OFK-Big 3	27,118	Reg.	OFK W-B: 21 pp W-H: 12 pp W-A: -12 pp W-O: 6 pp (all correct) SFK W-B: 1 pp W-H: 3 pp W-A: 0 pp W-O: 3 pp	OFK M-W: 18 pp (all correct) SFK M-W: 4 pp
9. Nejad & O'Connor (2016)*	National panel of U.S. consumers (year NA)	Adults, 18+	White, Black & Hispanic; men & women	OFK-Big 3	1,057	Desc.**	OFK W-B: 22 pp W-H 18 pp	OFK M-W: 12 pp
10. O'Connor (2019)*	Online Internet panel-2015 Not specif.	Adults, 18+	White, Black, Hispanic, Asian, & other; men & women	OFK-Big3 & SFK (1-5 scale)	817	Reg.	OFK W-B: 24 pp W-H: 20 pp W-A: 8 pp W-O: 13 pp SFK W-B: -2 pp W-H: 0 pp W-A: 0 pp W-O: -4 pp	OFK M-W: 6 pp SFK M-W: 9 pp
11. White et al. (2021)	NSFWS-2014	Adults, 18+ (college)	Black & non-Black; men & women	OFK-Big5, FSE, FM	860	Reg.	OFK W-B: 10 pp	Not Available
12. Yakoboski et al. (2020)	Online Internet panel-2019 Ipsos' Know.	Adults, 18+	White & Black; men & women	OFK-PFI	2,023	Desc.	OFK-PFI W-B: 17 pp	OFK M-W: 7 pp

*Denotes analysis on the intersection of race/ethnicity and gender. **Denotes a method that use a descriptive or regression approach and do not estimate a model with OFK as dependent variable.

Table 2. Studies Focused on Gender Differences in Financial Knowledge

Author	Dataset	Group Age	Group R/E/G	FK Measures	Sample Size	Analysis Method	Racial/Ethnic gap	Gender gap
1. Chen & Garand (2018)	NFCS-2012	Adults, 18+	White & non-White; men & women	OFK-Big5, SFK	24,209	Reg.	Not available	OFK M-W: 13 pp SFK: M-W: 4 pp
2. Fonseca et al. (2012)	ALP-2009	Adults, 36+	White, Black, & other; men & women	OFK-Big 5 (23Q)	1,504	Reg. & BOD	OFK: White respondents score higher than other groups (White var. pos. sig. coeff.)	OFK M-W: 0.7 SD
3. Kim et al. (2021)	HRS-2016, SCF-2016	Older adults, 51+	Men & women	OFK-Big 3 (4Q), SFK	741	Reg., BOD, & PSM	Not available	OFK: M-W: 20 pp SFK: M-W: 1 pp
4. Mottola (2013)	NFCS-2009	Adults, 18+	White, Black, Hispanic, Asian & other; men & women	OFK-Big5, SFK, credit card behavior, numeracy	28,146	Reg.	Not available	OFK M-W: 13 pp SFK M-W: 6 pp
5. Nitani et al. (2020)	NFCS-2015	Adults, 18+	White & non-White; men & women	OFK-Big 5 (6Q), SFK, AFS	12,308	Reg.	Not available	OFK M-W: 9 pp (all) 7 pp (self-emp.) 11 pp (employ.) SFK M-W: 5 pp (all) 4 pp (self-emp.) 6 pp (employ.)
6. Tang et al. (2015)	NLSY97-2007	Young adults, 23-30	White, Black, Asian, American Indian, & other; men & women	OFK-Big3, RFB	2,712	Reg.	RFB Blacks score lower in comparison to Whites (Black var. sig. neg. coeff.)	OFK M-W: 8pp
7. Yao et al. (2023)	SCFW-2020	Adults, 18+ (college)	Men & women	OFK-6Q	18,107	Reg. & BOD	Not available	OFK: M-W 14 pp

Table 3. Studies Consider Racial/Ethnic and Gender Differences in Financial Knowledge

Author	Dataset	Group Age	Group R/E/G	FK Measures	Sample Size	Analysis Method	Racial/ethnic & FK diff./rel.	Gender & FK diff./rel.
1. Balasubramnian & Sargent (2020)	NFCS-2015	Adults, 18+	White & non-White; men & women	OFK-Big5, PFK(SFK), FKO	27,564	Reg.	OFK W-NW: 16 pp (high score) SFK W-NW: 2 pp (high score)	OFK M-W: 19 pp (high score) SFK M-W: 11 pp (high score)
2. De Bassa (2013)	NFCS-2009	Young adults, 25-34	White, Black & Hispanic; men & women	OFK-Big 3, SFK	4,468	Desc.**	OFK W-B: 17 pp W-H: 8 pp W-A: -9 pp (all correct) SFK W-B: -3 pp W-H: 0 pp W-A: -3 pp	OFK M-W: 23 pp (all correct) SFK M-W: 4 pp
3. Hasler et al. (2023)	Online Internet panel-2021 Ipsos' Knowledge	Adults, 18+	White, Black & Hispanic; men & women	OFK-PFI	3,035	Desc.**	OFK W-B: 18 pp W-H: 14 pp	OFK M-W: 9 pp
4. Kim & Mountain (2019)	NFCS-2015	Young adults, 18-34	White, non-White; men & women	OFK-6Q-Big6	5,951	Reg.	OFK W-M: 7 pp	OFK M-W: 5 pp
5. Knoll & Houts (2012)	ALP-2006, HRS-2004 & 2008, NS-NFCS-2009	Adults, 18+	Men & women	OFK-Big 5 (20Q)	ALP: 2,539 HRS: 1,974 NFCS: 1,488	Reg.	Not Available	(+) Male & OFK (pos. sig. correlation)
6. Li et al. (2019)	HRS-2010	Older adults, 51+	White, Black, Hispanic, & other; men & women	OFK-Big 3 (6Q)	1,281	Reg.	Minorities score lower in OFK than White respondents (Black & Hisp. var. sig. neg. coeff.)	Women score lower than men in OFK (women sig. neg. coeff.)
7. Liao & Chen (2020)	NCFS-2015 & 2018	Adults, 18+	Men & women	OFK-Big5 (6Q)	21,374	Reg.	Non-white score higher on OFK (non-white var. sig. pos. coeff.)	Women score lower than men in OFK (women sig. neg. coeff.)

(Continued)

Table 3. (Continued)

Author	Dataset	Group Age	Group R/E/G	FK Measures	Sample Size	Analysis Method	Racial/ethnic & FK diff./rel.	Gender & FK diff./rel.
8. Lusardi (2012)	NFCS-2009	Older adults, 50+	Men & women	OFK-Big3	27,091	Desc.	Not available	OFK M-W: 12pp
9. Lusardi & Mitchell (2011)	NFCS-2009	Adults, 18+	White, Black & Hispanic; men & women	OFK-Big 3, SFK	1,200	Desc.**	OFK W-B: 14 pp W-H: 22 pp (all correct) SFK W-B: 4 W-H 6	OFK M-W: 16 pp (all correct) SFK M-W: 0 pp
10. Lusardi & Mitchell (2023)	SCF-2019	Adults, 18+	White, Black & Hispanic; men & women	OFK-Big3	5,777	Desc.	OFK W-B: 24 pp W-H: 28 pp (all correct)	OFK M-W: 19 pp (all correct)
11. Lusardi et al. (2010)	NLSY97-2007	Young adults, 23-28	White, Black & Hispanic; men & women	OFK-Big3	7,417	Desc. & Reg.	OFK W-B: 11 pp W-H: 10 pp	OFK M-W: 9 pp
12. Lusardi et al. (2014)	HRS-2008	Older adults, 51+	White, Black & Hispanic; men & women	OFK-10Q-Finc. Sop. Index	1,331	Reg.	Minorities score lower in OFK than White respondents (Black & Hisp. var. sig. neg. coeff.)	Women score lower than men in OFK (women sig. neg. coeff.)
13. Robb & Woodyard (2011)	NFCS-2009	Adults, 18+	White, Black, Hispanic & Asian/other; men & women	OFK-Big5, SAFC, FM, FSAT	1,466	Reg.	Minority respondents score lower in FM than White respondents (Black & Hisp. var. sig. neg. coeff.)	Not Available

**Denotes a method that use a descriptive or regression approach and do not estimate a model with OFK as dependent variable.

publications included in Tables 1–3 provide evidence on differences in financial knowledge across groups at least by one of these methodological approaches: (1) descriptive analysis (Desc.) with estimates of the differences across groups, (2) regression analysis (Reg.) showing evidence with coefficients that account for racial/ethnic/gender differences, or (3) Blinder-Oaxaca Decomposition (BOD) analysis. Using a BOD analysis allows the evaluation of the relative contribution of different variables in explaining the racial/ethnic or gender gaps in financial knowledge and of how much of this gap is unexplained. Table A3 in Appendix provides a summary of the main findings for each study included in Tables 1–3.

We seek to have comparable measures of the racial/ethnic and gender differences in financial knowledge from the different publications to help us estimate the average of these differences and provide a quantifiable measure. We provide estimates of the differences in financial knowledge in percentage points, either as we or the author calculated. In some instances (denoted in the tables), we use standardized scores of financial knowledge on a 0-to-100 scale to calculate differences. We usually express gaps as the difference between the group with the highest score (men and White adults) and that with the lowest score (women and Black, Hispanic, and Asian adults). We added notes in Tables 1–3 on how we estimate the differences across racial/ethnic and gender groups. We provide differences in percentage points either using the difference in percentage point provided by the authors or the one we calculated using the scores for the measures of financial knowledge provided by the authors on the paper.⁶

For the studies that only provide a regression analysis or correlations with variables that account for racial/ethnic or gender differences, we discuss the racial/ethnic and gender differences in relation to the direction of the relationship (positive or negative) between race/ethnicity and gender variables and financial knowledge in a regression analysis. For example, when we note in Table 3 “minority negative significant coefficient” we mean that minority group shows lower levels of financial knowledge in relation to the comparison group. If a study uses a dummy for women, and the coefficient is negative, then we note in tables “women significant negative coefficient” and provide also an explanation of the direction of the relationship between financial knowledge and race/ethnicity and gender in the discussion of findings in the Appendix Table A3.

We note in Tables 1 and 3 if the studies provided a difference in financial knowledge between White and Asian adults (6 out of 32 studies, a 19 percent of all studies reviewed here). We do not elaborate on the differences in financial knowledge between White and Asian adults because the limited number of studies that use nationally representative samples for Asians. As shown in Tables 1 and 3 the magnitude of the differences in financial knowledge between White and Asian adults is smaller than the differences we observe between White and Black and Hispanic adults. We also find that only four studies out of six use the category of Asians by itself, while the other two combine Asian adults with other racial/ethnic adults that are not Hispanic or Black adults. This approach can be

⁶ For example, Lusardi and Mitchell (2023) provide in Figure 4, the percentage of White, Black, Hispanic, and other adults that score all three questions correctly. The figure shows 50% and 26% of White and Black adults answered all questions correctly, respectively. In our database for the estimation of the mean difference between White and Black adults in objective financial knowledge we have 24 as the percentage point difference between these two groups. Another example of the differences across groups recorded for calculation of average differences across groups is our estimated difference in subjective financial knowledge provided by Mottola (2013) between men and women. Mottola (2013) shows in Table 3 that the scores on SFK for men and for women are 5.79 and 5.36, respectively. We estimate the differences between these scores and divide by 7 (highest score), which gives us a difference in SFK between men and women of 6 percentage points (difference in percentage points is equal to 5.79 minus 5.36, and then divided by seven).

problematic when trying to estimate average differences between White and Asian adults. Therefore, we focus our discussion on the racial/ethnic minority groups that show the larger gaps in financial knowledge, Black and Hispanic adults, and for which there is a larger set of estimates on the differences between groups. We provide estimates of the average difference in financial knowledge outcomes between White and Asian adults, but given the small number of studies that provide data for this group, we should be cautious interpreting these estimates.

No study included here provides differences in financial knowledge between White adults and Native American adults due to the lack of studies that use nationally representative samples. We also note that our focus in this review is on gender differences in financial knowledge, specifically between men and women. We cannot elaborate on other gender/sex related groups differences in financial knowledge due to the lack of studies with nationally representative samples for these groups. We elaborate in our discussion section on the need to study financial knowledge taking into consideration other racial/ethnic and gender groups and the need for nationally representative surveys that sample these groups.

In Table 4 we will provide an average of the estimated differences in objective and subjective financial knowledge from our data extraction approach. We will elaborate in our result sections on these average differences. Furthermore, to develop a better understanding of the factors explaining racial/ethnic and gender differences on financial knowledge, we further review the studies denoted in Tables 1 and 2 that have focused on the racial/ethnic and gender differences and have elaborated on what factors explain differences in financial knowledge among different groups. Tables 4 and 5 provide an overview of the different factors that these studies consider to explain racial/ethnic and gender differences in financial knowledge. In Appendix Table A4, we also include the set of dependent and independent variables used by these studies, which will help us to better understand what factors are accounted for in these studies. Tables 1–3 list articles in alphabetical order of authorship. Table A5 in the Appendix lists all acronyms we use.

We note here that the extraction of data for the information included in Tables 1–3 was done manually by the research team. We also used Artificial Intelligence (AI, ChatGPT 4) to extract information to double check our work. AI did a relatively good job extracting information from the manuscripts related to the dataset, measures of financial knowledge, sample size, and methodology used in the analysis. Interestingly, AI was not able to extract differences in financial knowledge across groups for most papers. In AI output, there were many instances where differences on financial knowledge across groups were “not specified”. We noticed that AI was able to extract these differences only in few cases, and only when the differences were mentioned in the text. AI had not ability to interpret differences shown in tables in the manuscripts.

The exercise of using AI here shows that AI can be a useful tool for future systematic reviews and meta-analysis for extraction of information, but researchers should be cautious using AI as there are limitations on the ability to replicate human tasks extracting relevant information. Table A6 in Appendix shows the data extracted with AI for three papers to provide an example of what output can be obtained with this tool and its limitations.⁷ While we did not experiment using AI for the search of studies, AI could be a useful tool in that stage. Given AI limitations on being able to distinguish sources, using AI during the search strategy should also be used with caution. As AI improves its accuracy extracting data from manuscripts, it is likely to become a very useful tool for systematic reviews given that it will make this work more efficient and help researchers become more productive.

⁷ Database on extracted information created with AI available upon request.

3. Results

In this section we provide an overview of the studies in each category denoted in Table A2 in appendix. We include here a subsection to elaborate average racial/ethnic and gender differences in financial knowledge estimated from the data extracted from the reviewed studies. We include also a section on the factors explaining racial/ethnic and gender differences in financial knowledge and a discussion of the limitations of our systematic review.

3.1. Studies focused on racial/ethnic differences in financial knowledge

Table 1 presents information on twelve journal publications that focused on racial and ethnic differences on financial knowledge. This table summarizes information about the dataset, sample, racial and ethnic groups, measures of financial knowledge and behavior, sample size, method of analysis, magnitude of the racial, ethnic and gender gaps.⁸

Most studies in Table 1 have been published since 2019, with only one paper published in 2016. The most popular dataset for these analyses is the NFCS, where six publications use this dataset. The studies reviewed here use data from NFCS in 2015 and 2018, with one study using data from 2021. These analyses also use data from SHED, National Student Financial Wellness Study (NSFWS), Study on Collegiate Financial Wellbeing (SCFW), two online internet panels, and one national panel of U.S. consumers. Data from the SHED and SCFW was from 2017, and data from NSFWS was from 2014.

Three publications compared White adults with Black adults or White adults with non-White adults. Of the other nine that compare White, Black, and Hispanic adults, five also consider Asian adults and other groups. Most of the publications in this group consider differences between men and women. Among the papers in Table 1, all studies use data for the adult population in all age groups, where one study focused on prime age adults (22–60 years old, Clark et al. 2021), and two focused on adults in college (Harris et al., 2023; White et al., 2021). In relation to the type of analysis conducted by the studies in Table 1, nine of the twelve papers on racial/ethnic gaps in financial knowledge use a regression analysis. Four publications conduct a BOD analysis to better understand what factors are associated with racial/ethnic differences in financial knowledge outcomes.

Ten of the twelve publications in Table 1 use an OFK measure related to the Big Three and Big Five questions. As measures of objective financial knowledge, Yakoboski et al. (2020) use the Personal Finance Index (P-Fin Index), and Harris et al. (2023) use 6 questions on financial knowledge from the Montalto et al. (2019) study. Five studies include estimates of Subjective Financial Knowledge (SFK) by racial/ethnic groups. We provide in Table 1 estimates of the racial/ethnic differences in objective and subjective financial knowledge. Other variables related to financial knowledge and behavior included in these studies are: Financial Knowledge Overconfidence (FKO), Financial Self-Efficacy (FSE), Financial Management (FM), Financial Capability (FC), Perceived Financial Capability (PFC), and Financial Wellbeing (FWB). One paper in this group considers the use of Alternative Financial Services (AFS) to measure financial behavior. All studies in Table 1 show that racial/ethnic minority adults score lower in objective measures of financial knowledge in comparison to White adults. We will discuss in more detail later in the results section the racial/ethnic average differences in financial knowledge we estimated using data from all studies reviewed and also on the factors that researchers have evaluated as determinants of financial knowledge.

⁸ Please note that the discussion on gender differences from these papers will be in the next section where we review all papers that focus on such differences.

It is also important to note that from the papers reviewed in Table 1, only three papers focused on the intersection of race/ethnicity and gender (Nejad and O'Connor, 2016; O'Connor, 2019; Clark *et al.*, 2021). Nejad and O'Connor (2016) analysis shows that the most vulnerable when it comes to financial knowledge are minority women. O'Connor (2019) analysis elaborates on how racial/ethnic and gender intersectionality and cognitive style influence objective and subjective financial knowledge. Clark *et al.* (2021) included only women in their study, and find that Black and Hispanic women score lower on OFK than White women do, respectively. They also find that Black and Hispanic women are less likely than White women to own assets, homes, and retirement accounts.

3.2. Studies focused on gender differences in financial knowledge

Table 2 presents the summary of the publications that focus on gender differences in financial knowledge. All seven studies in this group use the Big Three/Big Five questions to measure objective financial knowledge, and three also consider SFK in their analysis. The financial knowledge and behavior measures these studies use are similar to those used in the studies in Table 1. One addition to other measures noted in Table 1, is Tang's *et al.* (2015) measure of Responsible Financial Behavior (RFB) which is related to cash flow management, credit, and saving.

Three studies focus on adults 18 years and older and use the NFCS for years 2009, 2012, and 2015 (Chen and Garand 2018, Mottola, 2013; and Nitani *et al.*, 2020). Two studies focus on younger adults, where Yao *et al.* (2023) study uses data from the SCFW that is collected among college students, and Tang *et al.* (2015) study uses data from the National Longitudinal Survey of Youth (NLSY). Fonseca's *et al.* (2012) analysis focus on adults 36 years and older from the American Life Panel (ALP), and Kim *et al.* (2021) use data on adults 51 years and older from the Health and Retirement Study (HRS) and Survey of Consumer Finance (SCF).

All studies that focus on gender differences use a regression approach, where three of them also provide a BOD analysis to elaborate on the factors explaining these differences (Fonseca *et al.*, 2012; Kim *et al.*, 2021; Yao *et al.*, 2023). Kim *et al.* (2021) also provided an evaluation of gender differences in financial knowledge using a Propensity Score Matching (PSM) analysis. All studies in Table 2 show that women underperform in comparison to men in relation objective measures of financial knowledge, and we will elaborate on this later in the results section.

Tang *et al.* (2015) study, which focuses on young adults, finds that women score lower on financial knowledge and behavior but that there is a positive relationship between OFK and RFB. Specifically, a one-unit increase on OFK leads to a 6.4 percent increase in RFB for women but only 1.5 percent for men. Several studies show that women are more likely than men to be overconfident (Kim *et al.*, 2021) or answer "Do not know" (Chen and Garand, 2018). Some studies also find that women portray lower self-assessment of financial knowledge and mathematical ability scores (Mottola, 2013; Nitani *et al.*, 2020) in comparison to men. It is interesting to note that these findings seem contradictory.

3.3. Studies consider racial/ethnic and gender differences in financial knowledge

Here we discuss quantitative analyses that consider racial/ethnic and/or gender differences but do not focus their analysis on evaluating these differences (do not have a specific section of paper that elaborates on this). These papers are useful as they provide some relevant insights on the differences of financial knowledge across groups and how these differences are related to other factors.

Table 3 lists 13 quantitative analyses that provide insights on the relationship of the variables of interest. These studies suggest that there are racial/ethnic and gender gaps

when it comes to the survey participants' financial knowledge. Most of the studies reviewed in this group used data from adults 18 years and older (seven studies), while three studies used data collected among young adults (De Bassa, 2013; Kim & Mountain, 2019; Lusardi et al., 2010) and three among older adults (Li et al., 2019; Lusardi, 2012; Lusardi et al., 2014). Seven studies use data from the NCFs (from the years 2009, 2015 and 2018), three from the HRS (2004, 2008, and 2010), two from online internet panels (ALP and Ipsos Knowledge), one from the SCF (from 2009), and one from the NLSY (from 2007).⁹

Most of these studies find a gap in financial knowledge by race/ethnicity or gender, where it is expressed as difference in percentage points or as negative relationship between race/ethnicity and gender variables with OFK variables (negative coefficient for minority related variables, or positive coefficient for non-minority related variables).¹⁰ Four studies in this group report that minority respondents score lower in FM than White respondents (non-White, Black and Hispanic variable show a significant negative coefficient). Seven studies in this group provide estimates of racial/ethnic differences in financial knowledge using an objective measure. Among these seven studies, three studies also provide estimates of these differences using a subjective measure of financial knowledge.

Four studies find that men score higher in objective measures of financial knowledge in comparison to women (gender coefficient significant in regression, positive for male variable or negative for women variable, or significant correlations). Among these studies, two also show men score higher than women in subjective financial knowledge measures but differences are of smaller magnitude in comparison to objective measures. Most studies here focus on differences in financial knowledge between White and non-White adults, or between White and Black adults and White and Hispanic adults. Only one study provides estimates of the differences in financial knowledge measures between White and Asian adults (De Bassa, 2013)

3.4. Average racial/ethnic and gender differences in financial knowledge

Using the estimates from the studies included in Tables 1–3 of the levels of financial knowledge for the different racial/ethnic and gender groups, we provide here a discussion of the average gaps in financial knowledge using objective and subjective measures we estimated. We also provide here a discussion on how the average difference of measures of financial knowledge across racial/ethnic and gender groups vary by age groups. Table 4 presents the average of the racial/ethnic and gender gaps estimated using extracted data from the studies included in this systematic review.¹¹

Table 4 shows the estimated average differences in objective and subjective financial knowledge among racial/ethnic and gender groups for all studies that use data from surveys collected among adults from all age groups (Panel A). In Table 4 (Panel B), we also provide estimates of the average racial/ethnic and gender differences when we separate studies that use data collected among young adults (De Bassa, 2013; Kim and Mountain, 2019; Lusardi et al., 2010; Tang et al., 2015) or that were collected among students in college (Harris et al., 2023; White et al., 2021; Yao et al., 2023). Table 4 (Panel C) also shows estimates of the average differences when we exclude those studies that focus on young adults or collect data among college students.

⁹ Please note the Knoll and Houts (2012) use two datasets, HRS and ALP.

¹⁰ Just to clarify that we mean a negative relationship when showing a negative coefficient for minority related variables. In few studies they use dummy variables for the non-minority group (White adults and men), and here it is a positive coefficient. We provide in tables a clarification of these relationship depending on the variables used in the study for racial/ethnic and gender groups.

¹¹ Stata dataset and program files available upon request.

Table 4. Average Differences in Financial Knowledge Measures among Racial/Ethnic and Gender Groups

	Mean	SD	Min	Max	N
Panel A: All adults sample					
OFK White-Black	16.88	5.23	8	25	16
OFK White-Hispanic	14.21	6.34	7	28	14
OFK White-Asian	-2.25	9.74	-12	8	4
OFK Men-Women	12.63	5.28	5	23	19
SFK White-Black	0.00	2.24	-3	4	7
SFK White-Hispanic	2.29	2.14	0	6	7
SFK White-Asian	-1.00	1.73	-3	0	3
SFK Men-Women	5.50	3.81	0	11	10
Panel B: Young adults/college sample					
OFK White-Black	11.50	3.87	8	17	4
OFK White-Hispanic	8.33	1.53	7	10	3
OFK White-Asian	-2.50	9.19	-9	4	2
OFK Men-Women	11.80	7.05	5	23	5
SFK White-Black	-3.00	.	-3	-3	1
SFK White-Hispanic	0.00	.	0	0	1
SFK White-Asian	-3.00	.	-3	-3	1
SFK Men-Women	4.00	.	4	4	1
Panel C: Other adult sample					
OFK White-Black	18.67	4.38	12	25	12
OFK White-Hispanic	15.82	6.21	8	28	11
OFK White-Asian	-2.00	14.14	-12	8	2
OFK Men-Women	12.93	4.80	6	20	14
SFK White-Black	0.50	1.97	-2	4	6
SFK White-Hispanic	2.67	2.07	0	6	6
SFK White-Asian	0.00	0.00	0	0	2
SFK Men-Women	5.67	4.00	0	11	9

Differences expressed in percentage points. N represents the number of studies included in the calculation of differences across racial/ethnic and gender groups on Objective Financial Knowledge (OFK) and Subjective Financial Knowledge (SFK).

OFK White-Black difference between young adults/college and other adult samples is statistically significantly different at the 1 percent level.

OFK White-Hispanic difference between young adults/college and other adult samples is statistically significantly different at the 10 percent level.

Using estimates on the differences available from all studies, the average difference in objective financial knowledge among White and Black adults is 17 percentage points, among White and Hispanic adults is 14 percentage points, and among White and Asian adults is -2 percentage points. We estimate that the average difference between men and women in objective financial knowledge is 13 percentage points.

We also estimated the racial/ethnic and gender average differences in subjective financial knowledge for the studies included here that provided data on that. The average

difference in subjective financial knowledge among White and Black adults is 0 percentage points, among White and Hispanic adults is 2 percentage points, and among White and Asian adults is -1 percentage points. We estimate that the average difference between men and women in subjective financial knowledge is 6 percentage points.

When we estimate average racial/ethnic and gender differences separating studies by age groups, it seems that these differences are smaller for the studies using young/college adult samples for most measures of objective financial knowledge. While the difference in objective financial knowledge between White and Black adults for the young/college sample is 12 percentage points, the difference with the other adult sample is 19 percentage points. White-Black difference between young adults/college and other adult samples is statistically significantly different at the 1 percent level. We also observe a difference between White and Hispanic adults in objective financial knowledge when we split up sample by age groups, but this difference is only marginally significant at the 10 percent level (8 percentage points versus 16 percentage points). For all other differences between the young/college adults and other adults, we do not observe any statistically significant difference.

We are aware that some studies make comparisons across groups using the average scores when answering financial knowledge questions, but others make comparisons by looking at the share of a specific racial/ethnic or gender group that answered all questions correctly. Thus, we estimate the racial/ethnic and gender differences using only studies that provide average scores to make comparisons across groups and include these estimates in Appendix Table A7. The estimated differences in Table A7 are very similar to those shown in Table 4.

3.5. Factors explaining racial/ethnic and gender differences in financial knowledge

In this systematic review of the literature, we also seek to identify how previous studies analyzed the determinants of financial knowledge and how these determinants explain racial/ethnic and gender differences. Here we follow the framework from Evidence & Gap Maps (EGM) developed by Snilstveit et al. (2016) to identify the gaps in the literature and suggest future research to provide a better understanding of the determinants of the racial/ethnic and gender gaps on financial knowledge.

For this section we focus on papers reviewed in Tables 1 and 2, and we find that determinants of OFK considered in previous studies can be organized in three groups: (1) individual socio-economic and demographic characteristics, (2) access and participation in financial education programs, and (3) environment characteristics. We denote in Tables 5 and 6 if the papers consider these factors as determinants of financial knowledge (columns 2, 3, and 4), and whether their analyses provide insights on how these factors explain racial/ethnic and gender differences on financial knowledge. Table 5 focuses on the determinants of racial and ethnic differences, and Table 6 focuses on the determinants of gender differences. To develop a better understanding of the determinants of financial knowledge and how they explain racial/ethnic and gender differences we also provide in Appendix in Table A3 the set of independent variables used in the studies that focused on racial/ethnic and gender differences (studies in Tables 1 and 2).

When evaluating the role of individual socio-economic and demographic characteristics on financial knowledge, studies consider age, gender, income, highest level of education, among other individual characteristics. When evaluating the role of financial education explaining financial knowledge, most papers consider whether individuals have been offered or participated in financial education programs. In relation to the environment, some papers consider neighborhood socio-economic status characteristics where the individual resides (Angrisani et al., 2021), financial knowledge at the state level (Lee and Kim, 2022), messages different groups receive in relation to financial behaviors (White

Table 5. Factors Explaining Racial and Ethnic Differences in Financial Knowledge

Author(s)	Ind.	Fin.Ed.	Env.	BOD.	Role of factors explaining racial/ethnic differences in financial knowledge
1. Al-Bahrani et al. (2019)	1	1	0	1	The gap is explained by observable Individual socio-economic status and financial education. They find that financial education benefits White respondents more than non-White respondents. They argue that the reason why financial education is less beneficial to non-White respondents is that financial education curricula design does not include minorities-and does not consider demographic groups that need it the most. They also find that attrition in financial education is higher among marginalized groups, but minorities are offered financial education at a higher rate than White respondents.
2. Angrisani et al. (2021)	1	0	1	1	They find that Individual and neighborhood characteristics explain 48–57% of the gap in financial knowledge for Black respondents and Hispanic respondents, respectively. Neighborhood Socio-Economic Status characteristics (NSES) explains 11% and 9% of the gap in financial knowledge for Black respondents and Hispanic respondents, respectively.
3. Clark et al. (2021)*	1	1	0	0	Study focuses on the intersection of race, ethnicity and gender, where they look at differences in financial wellbeing and knowledge between White, Black, and Hispanic women. Study shows differences related to participation in financial education across racial/ethnic groups. Authors also show how individual characteristics and financial knowledge explain financial wellbeing for the different racial/ethnic groups.
4. Harris et al. (2023)	1	0	0	0	Study focuses on college students' financial wellbeing with a focus on differences with racial and ethnic disparities. White students found higher levels of financial self-efficacy, but is also the largest group to report having difficulty finding a solution to any financial difficulties. More Black students feel confident (76%) making financial decisions compared to their Hispanic/Latino(a) peers. Yet, Hispanic/Latino(a) students report they can make good financial decisions (81%) and are in control of their finances (65%) than their Black peers.
5. Kim & Xiao (2020)	1	1	0	1	Study focuses on the role of financial education explaining the financial knowledge gap. They explore how the different sources or financial education explain racial and ethnic differences in financial knowledge (financial education in high school, college, and through an employer). They find that financial education explains the gap between Black respondents and White respondents only, but not between Hispanic respondents and White respondents.
6. Kim et al. (2019)	1	1	0	0	Study also shows how financial knowledge affects the use of Alternative Financial Services (AFS) among different racial/ethnic groups. They find that the impact of financial knowledge on the use of AFS has a stronger moderating effect for Black respondents and Hispanic respondents in comparison to White respondents.
7. Lee & Kim (2022)	1	1	1	1	Study considers how individual, neighborhood characteristics, and financial education explain differences in financial knowledge across groups. They control for individual characteristics, past financial education experience through school or workplace, and state average financial knowledge levels. They also study racial/ethnic differences in overconfidence. Study shows that individual characteristics explain racial/ethnic differences in financial knowledge.

(Continued)

Table 5. (Continued)

Author(s)	Ind.	Fin.Ed.	Env.	BOD.	Role of factors explaining racial/ethnic differences in financial knowledge
8. Lusardi and Streeter (2023)	1	1	0	0	Study considers how individual and financial education explain differences in financial behavior, and how financial knowledge has an influence on financial behavior as well. The study evaluates the impact of individual characteristics, financial education, and financial knowledge on financial behaviors related to planning for retirement, financial fragility and having too much debt.
9. Nejad & O'Connor (2016)*	1	0	0	0	Study shows that Baby Boomer generations has highest financial literacy as they have had more exposure to financial literacy programs and lived through financial crisis, thus were forced to better prepare for retirement to survive. Generation Y is the first generation to earn less than their parents and lack the financial literacy skills to make effective decisions. This may be due to their external environment, such as reliance on their parents for financial support. Generation X lies somewhere in the middle of Gen Y and Boomers. Gender differences show women answer fewer questions correctly. Likewise, racial/ethnic differences for African American and Hispanic respondents on average answer fewer correct answers compared to participants who are Caucasian and "other" ethnic groups.
10. O'Connor (2019)*	1	0	0	0	Study shows how the effect of cognitive style on financial knowledge varies by race, ethnicity, and gender. Study does not control for access to financial education, but argues that the impact of cognition style on OFK could be helpful for the design of financial education messages.
11. White et al. (2021)	1	1	0	0	Study looks at differences between African Americans and non-African Americans in financial knowledge and control for individual and financial education variables. In this study, financial education indicates whether respondents attended any personal finance classes/workshops when they were in high school or in college.
12. Yakoboski et al. (2020)	1	1	0	0	Authors describe how individual characteristics and whether individual received financial education explain the gap between African Americans and White respondents in OFK. They find that the racial and ethnic difference in financial knowledge remains even after controlling for socio-economic individual characteristics.
Total	12	8	2	4	All 12 papers reviewed in Table 1 consider as determinants of financial knowledge individual socioeconomic status characteristics, 8 papers consider financial education and 2 consider environmental factors. From the papers reviewed here, 5 papers are able to show how the different factors explain racial and ethnic differences in financial knowledge using a Blinder-Oaxaca decomposition approach.

In this table we denote 1 = yes and 0 = no, where Columns 2, 3, & 4 denote whether the study consider individual socioeconomic status and demographic characteristics, financial education, and environment factors explaining financial knowledge, respectively. Column 5 denotes whether paper evaluates how the different factors explain racial ethnic differences in financial knowledge using the Blinder-Oaxaca decomposition approach.

*Denotes analysis on the intersection of race/ethnicity and gender or that consider racial/ethnic and gender differences in their analysis.

Table 6. Factors Explaining Gender Differences in Financial Knowledge

Author(s)	Ind.	Fin.Ed.	Env.	BOD	Role of factors explaining gender differences in financial knowledge
1. Chen & Garand (2018)	1	0	0	0	Study focuses on looking at gender differences on answering do not know and providing correct answers. Study finds that men are more likely to offer correct answers and women more likely to answer do not know. Paper controls for individual characteristics when studying gender differences in financial knowledge. List of Variables:
2. Fonseca et al. (2012)	1	0	0	1	Study shows how gender differences in financial knowledge are explained by individual characteristics. They show how financial decision making and level of responsibility explain gender differences in financial knowledge.
3. Kim et al. (2021)	1	0	0	1	Study looks at gender difference in financial knowledge and considers only individual characteristics. Study also takes into consideration overconfidence and health status.
4. Mottola (2013)	1	0	0	0	Study considers individual characteristics as a determinant of financial knowledge and behavior. In this analysis, gender had a significant impact on credit usage, where women were more likely to engage in risky credit card behavior.
5. Nitani et al. (2020)	1	0	1	0	Their analysis considers individual characteristics and environmental factors such as whether individual is self-employed, employment sector, occupational role, and use of Alternative Financial Services (AFS). They also consider the role of confidence explaining financial knowledge. They show gender differences in financial knowledge for self-employed and employed individuals (based on occupational roles). They find that differences between men and women are statistically significant for employed and self-employed individuals.
6. Tang et al. (2015)	1	0	1	0	Study considers individual socio-economic and sociological (self-discipline and thoroughness) characteristics as determinants of financial behavior. The study also considers environmental factors explaining financial behavior related to the role of parental influence, such as parent monitoring, parent investment experience, in addition to considering parents income and education. Study finds that parental monitoring has a greater effect on positive financial behavior for women. Study does not evaluate how different factors explain gender differences in financial knowledge, but focuses on financial behavior.
7. Yao et al. (2023)	1	1	1	1	Study provides an update on gender gap between current college age students' financial knowledge attending a U.S. 4-year public institution. The BOD results in explained portion show gender differences in financial education, financial self-efficacy, and college GPA are factors that contribute the greatest to gaps in general knowledge of the prediction. It is noted that gender differences in current financial behaviors do not contribute to gender knowledge gap in BOD. The multivariate analysis shows interaction model with a positive financial management behaviors and financial knowledge between female students. Family financial socialization is not associated with students' current financial knowledge or gender gaps.

(Continued)

Table 6. (Continued)

Author(s)	Ind.	Fin.Ed.	Env.	BOD	Role of factors explaining gender differences in financial knowledge
Total	7	1	3	3	From the studies that focused on explaining gender differences in financial knowledge in Table 2, 7 papers consider individual socioeconomic status characteristics as determinants of financial knowledge, 1 paper considers financial education and 3 consider environmental and neighborhood factors. From the papers reviewed here, 3 papers are able to show how the different factors explain gender differences in financial knowledge using the Blinder-Oaxaca decomposition approach.

In this table we denote 1 = yes and 0 = no, where Columns 2, 3, & 4 denote whether the study consider individual socioeconomic status and demographic characteristics, financial education, and environment factors explaining financial knowledge, respectively. Column 5 denotes whether paper evaluates how the different factors explain gender differences in financial knowledge using the Blinder-Oaxaca decomposition approach.

et al., 2021), parental influence (Tang et al., 2015; Yao et al., 2023), and occupational role (Nitani et al., 2020).

We find that most papers consider individual socioeconomic and demographic characteristics. All papers in Tables 1 and 2 (19 papers) consider individual characteristics in their analyses. We also find 67 percent of the papers in Table 1 and 14 percent of those in Table 2 consider the role of financial education. We find only 16 percent on the papers in Table 1 and 43 percent of those in Table 2 consider the environment characteristics as determinants of financial knowledge. We find that 33 percent and 43 percent of papers in Tables 1 and 2, respectively, evaluate how factors explain racial/ethnic and gender differences in financial knowledge using a Blinder-Oaxaca decomposition approach.

Four publications use the BOD approach to identify the determinants of the racial/ethnic difference in objective financial knowledge and how much of the gap cannot be explained by factors considered in their analyses. Al-Bahrani et al. (2019) find that observable Socio-Economic Status (SES) characteristics explain around 40 percent of the gap in OFK between Whites and non-Whites. Kim et al. (2019) and Lee & Kim (2022) find that observable SES characteristics explain 40–44 percent of the gap in OFK between Whites and Blacks. Angrisani et al. (2021) find that individual and neighborhood SES characteristics explain between 48 and 57 percent of the gap in financial knowledge for Blacks and Hispanics, respectively.

The three studies that use the BOD approach to analyze what factors explain gender differences in objective financial knowledge seem to coincide that individual demographic characteristics do not explain gender differences. In Fonseca's et al. (2012) analysis, gender differences are most explained by how individuals acquire financial knowledge in the household, and differences in production processes for financial literacy. Their analysis shows that men specialize in acquiring financial knowledge and women specialize in other household functions. In their analysis, individual characteristics do not seem to explain gender gaps.

Similarly, Lee and Kim (2022), using data from the HRS, find that individual demographic characteristics do not seem to explain gender differences in objective financial knowledge. They find that crystallized intelligence, fluid intelligence, college education, and financial assets explain gender differences. Yao et al. (2023) study finds that gender differences are explained by access to financial knowledge in high school though formal financial courses and in college through majoring in business and STEM fields.

3.6. Limitations

There are some limitations to our review. First, most publications we consider have been published very recently, and a few authors appear to dominate this area. Figure A2 shows the distribution of publications by year, where only 12 manuscripts were published before 2019, while five were published in 2019, five in 2020, four in 2021, one in 2022, and five in 2023. This suggests researchers may not have been able to publish on these topics earlier, there was less interest on this work before, or data was not available. Most of studies that focus on racial/ethnic differences in financial knowledge (Table 1) were published between 2019 and 2023, with at least one paper from each year, and one paper published in 2016. This suggests this specific topic is novel. Likewise, studies that focused on gender differences in financial knowledge (Table 2) were published as early as 2012, with one article published in the years of 2012, 2013, 2015, 2018, 2020, 2021 and 2023.

Publications that consider racial/ethnic differences in financial knowledge (Table 3) were published as early as 2010, and again there is an increase in publications in this category after 2019. While there were seven publications total during the period 2010–2014, we do not see any publication in this group until 2019. Then we observe two publications per year in 2019, 2020, and 2023. Interestingly, as noted before the objective measure of financial knowledge was fielded in the United States for the first time in 2004, and here we observe that it took until 2010 to see publications that specifically focus or consider racial/ethnic and gender differences in financial knowledge. Research on racial/ethnic and gender differences in financial knowledge is expanding into the first half of the 2020's decade.

Table A8 in Appendix shows a list of all authors from the 32 manuscripts reviewed here, and notes for each author whether the author was a first author, the number of publications per author, and the article number in the reference list. Please note that we should be cautious about the first author statistics given that some disciplines, such as economics, list authors in alphabetical order. We found a total of 62 authors, 18 percent of whom have published at least two papers in the topic and 40 percent of whom are first authors. The authors with the most papers are A. Lusardi with nine papers (six first author publications), O. Mitchell with five papers (no first author), and K.T. Kim (three first author publications) with four. The following authors have two publications: V. Curto, A. Hasler, S. Lee, M. McCoy, G. O'Connor, K. White, and P. Yakoboski. The rest of authors have only one publication.

Second, our focus was on papers that use an objective measure of financial knowledge, such as the Big 3 and Big 5 measures. We did not make using the Big 3/Big 5 questions of financial knowledge an inclusion criteria, but most papers we reviewed here use that measure. These questions include the “don't know” response in some studies, with most studies considering this answer as incorrect. Al-Bahrani *et al.* (2020) paper is one of the few papers that consider the “don't know” as missing instead of considering it as incorrect. Because the differences in financial knowledge depend greatly on gaps in “don't know” responses, and because women are much more likely to respond “don't know,” our estimates of the differences in financial knowledge might be biased upward (Chen and Garand, 2018). Few papers reviewed here investigate how different racial, ethnic, and gender groups compare in providing “don't know” answers. Chen and Garand (2018) and Lusardi (2012) look into differences between men and women when answering “don't know”, but there are no papers reviewed here looking into this for different racial and ethnic groups. Future work should deal with this issue more carefully.

Third, the research reviewed here does not allow us to measure to which degree societal pressures and expectations shape differences between men and women in financial knowledge. We observe that men and women have different experiences when it comes to dealing with financial knowledge, which might be shaped by societal pressures and

expectations and the division of labor in the household (Fonseca et al., 2012). Because women are more likely to delegate financial decision to their spouse, the division of labor in the household might explain why women are more likely to answer do not know to financial knowledge questions (Chen and Garand, 2018, Fonseca et al., 2012). Thus, social norms are likely to influence how men and women answer the questions on OFK, and we cannot account for that in the studies reviewed here and in our estimation of the gender differences in financial knowledge.

Fourth, please note that in our systematic we cannot not claim any causality. All studies reviewed here used either a descriptive or regression analysis, where some included a BOD analysis. While it is possible to study how financial education impacts financial knowledge and behavior (Kaiser et al., 2022), race, ethnicity and gender are inherent individual characteristics that cannot be modified in an experimental way.

4. Discussion

We elaborate in this section on the implications of our systematic review, where we focus our discussion on how stakeholders should leverage research on financial knowledge with the purpose to address racial, ethnic and gender differences in financial knowledge. We also suggest directions for future research.¹²

4.1. Use findings on the financial knowledge gap to guide policy goals

We provide an average estimation of the racial, ethnic, and gender differences on financial knowledge. Stakeholders can use this information to establish goals for reducing these differences and to tie specific efforts to those goals. We find that the mean difference in financial knowledge is 17 percentage points for White and Black adults and 14 percentage points for White and Hispanic adults. We also find that the average difference between men and women in financial knowledge is 13 percentage points. Determining a target for reducing such gaps in a given time period with specific actions could provide a useful framework for setting and measuring policy goals.

Our review provides a baseline for assessing progress in reducing racial, ethnic and gender differences in financial knowledge. Reducing these differences is important given Angrisani et al. (2023) show using longitudinal data that OFK predicts financial behavior after controlling for demographic characteristics. They find that the relationship between financial knowledge and financial behavior is stronger for older individuals, women, and lower-income households. Given the evidence that financial knowledge is linked to financial behavior, stakeholders can measure the impact of specific efforts and actions on both, financial knowledge and financial behavior.

There appears to be a common approach to measuring and analyzing financial knowledge levels in the United States. Among the papers we review, all studies reviewed here use some form of OFK measure related to financial literacy questions. In fact, 85 percent of the papers included in this review use the Big 3 or Big 5 questions on financial literacy developed by Lusardi and Mitchell (2014). Continuing to use these measures on financial literacy to evaluate progress is necessary. Considering how to improve these measures can also be useful for addressing racial/ethnic and gender disparities in financial knowledge.

Using financial knowledge as a measure of progress in addressing racial, ethnic and gender differences in financial wellbeing could be useful for several reasons. First, financial

¹² Please note that we might refer to other papers that are relevant to our discussion, but were not included in our systematic review because they did not meet our inclusion criteria. We provide two references lists to distinguish between papers included and excluded in our systematic review.

knowledge can be measured objectively. Second, there are well established and developed measures of financial knowledge. Third, research shows that financial knowledge is linked to financial behavior, and consequently can influence financial wellbeing. Fourth, measuring financial knowledge before and after participation in financial education programs should be one dimension to consider, in addition to measuring program impacts on financial behavior.

Our findings here also show the importance of using measures of objective and subjective financial knowledge together. Interestingly, in our review we observe that the differences in objective financial knowledge across racial/ethnic and gender groups are wider than the differences in subjective financial knowledge. For addressing gaps in financial wellbeing is important to recognize that “you don’t know what you don’t know.” Thus, this fact should inform the design of financial education programs that meet the needs of the target population. This fact should also inform policymakers and stakeholder approaches to make financial education accessible and attractive to all racial/ethnic and gender groups.

4.2. Consider how social and environmental factors influence acquisition of financial knowledge

We find a large proportion of the White-Black (60–56 percent) and White-Hispanic (43–32 percent) gaps in financial knowledge cannot be explained by measurable factors. Stakeholders could seek to reduce the “unexplained” portion of the racial and ethnic gap in financial knowledge and tie measurement to specific efforts. We hypothesize that the unexplained gap on financial knowledge may be partly due to social determinants that previous research could not account for. Specific policies that address social and environmental factors could help diminish the gap.

For example, previous work shows that neighborhood characteristics matter for financial knowledge and behavior. Residents of neighborhoods with higher education and socioeconomic status have higher levels of financial knowledge (Angrisani *et al.*, 2021; La Chance, 2014). Other work also shows that neighborhood characteristics can explain why alternative financial institutions are more prevalent in neighborhoods with racial and ethnic minorities (Small *et al.*, 2021). Physical location and geographic proximity of financial institutions play a key role in the decision, especially by small businesses, to own a bank account. Nguyen (2019) finds bank closing is associated with a decline in local small business lending. Thus, considering the social determinants for financial knowledge is relevant as we move forward addressing racial, ethnic and gender differences in this area.

We should build more knowledge on the social determinants of financial wellbeing (SDFW) to address racial/ethnic and gender gaps in financial knowledge and wellbeing. The framework on the social determinants of health (SDOH) can be helpful in this context because it is widely used when addressing health disparities (Brennan Ramirez *et al.*, 2008). According to the SDOH framework, societal conditions related to social, economic, and physical environment, and psychological and social factors influence health outcomes. The decision to have a bank account depends on the availability of financial institutions in one’s neighborhood. Policies that improve access to financial institutions can improve financial wellbeing outcomes. Economic conditions related to job opportunities also have a direct impact on financial behavior and wellbeing. Developing a strong framework for the SDFW will be important for addressing disparities in this area. Creating an interdisciplinary group that helps improve the framework of the SDFW, similar to the approach for improving the SDOH, can help address racial, ethnic, and gender gaps in financial knowledge and behaviors.

4.3. Design financial education programs that meet the specific needs of the target groups

While increasing access to financial education may help diminish the gap in financial knowledge between White and racial/ethnic minority adults, Al-Bahrani et al. (2019) found that White adults benefit more by participating in financial education programs than non-White adults. They also find racial/ethnic minority adults are more likely to participate in financial education programs than White adults. In fact, Al-Bahrani et al. (2019, p. 594) notes that they speculate that the reason why White adults benefit more from financial education than non-White adults is because “financial literacy curriculum is administered without considering the education and resources available to the students being served.”

Differences in the impact of financial education programs among White and non-White adults might also related to the fact that having financial wealth generates a greater incentive to acquire financial knowledge. Hamilton and Darity (2017) argue the racial/ethnic wealth gap has important implications for financial knowledge and behavior. Financial education effects may be limited to the specific experiences of households. As Hamilton and Darity (2017, p. 61) write, “Financial behavior and financial literacy are practically limited for households and race groups with little to no finances to manage.”

Previous research shows Black adults have significantly higher levels of financial overconfidence (Lee and Kim, 2021). While “intuitive” White adults have the highest scores of subjective financial knowledge, “intuitive” minorities show the lowest (O’Connor, 2019).¹³ Yakoboski et al. (2020) find that Black adults show the lowest level of knowledge in the functional area of insurance but the highest level of knowledge on borrowing and debt management.¹⁴ Kim and Xiao (2020) find that financial education can reduce the White-Black gap in financial capability but not in knowledge. Previous work shows that the White-Minority gap diminishes monotonically as income increases (Angrisani et al., 2021). Hence, by itself, more access to financial education programs will not help reduce racial/ethnic and gender gaps in financial knowledge.

Our review underscores the need for a tailored approach to financial education for addressing the racial/ethnic and gender gaps in financial knowledge. The educational programs that Blanco et al. (2020) suggest, promoting retirement saving among Hispanic adults in Los Angeles, is an example of a linguistically and culturally tailored program. This program accounts for the cultural reality that many Hispanic adults struggle to learn about retirement because their parents did not planned for retirement. Previous research has also shown that Hispanic immigrants might need to develop a better understanding of the U.S. financial sector given their mistrust of financial institutions in their countries of origin (Barcellos et al., 2016, Paulson et al., 2006). Future work might consider evaluating whether culturally tailored financial education programs have a different impact than financial education programs that do not tailor material for a target population. We hypothesize that culturally and linguistically tailored financial education programs that provide information in a way that racial/ethnic and gender minorities can relate to is likely to lead to positive impacts on financial knowledge and behavior.

4.4. Suggested directions for future research

More work on the intersectionality of race, ethnicity and gender is warranted. Only three papers in our systematic review consider the intersectionality of race, ethnicity, and

¹³ In this context, intuitive refers to preconscious associations, where “intuitive individuals make judgments based on feeling and apply a global open-ended approach” (O’Connor, 2018, p. 388).

¹⁴ The P-Fin Index has 28 questions that measure personal finance knowledge in eight areas: earning, consuming, saving, investing, borrowing/managing debt, insuring, comprehending risk, and go-to information sources. For more information on this index, see Yakoboski et al. (2019).

gender. Furthermore, the papers discussed here do not consider the intersectionality of race, ethnicity, gender, and age. Previous work emphasizes the need to better understand differences in financial knowledge not only by racial and ethnic groups but also by age groups. Financial education programs should consider such differences as well.

For example, in retirement preparedness, it is likely that middle-aged White adults have higher levels of knowledge about retirement saving than Black and Hispanic adults in that age range, but knowledge differences might be less prevalent among other age groups, such as younger cohorts. It is likely that older generations of women and racial/ethnic minorities might have faced greater discrimination or might show lower levels of acculturation, and this leads to larger financial knowledge gaps in comparison to younger generations. Research that explores the intersectionality of race, ethnicity, gender, and age can contribute to the design of more targeted financial education programs that are more effective at reducing the gaps.

Future research should study in more detail the experiences of Asian and Native American adults. Future studies should include larger sample sizes of Asian respondents, not only to better understand the differences with White respondents, but also to identify possible differences among Asian subgroups. Similarly, we need more studies that look at the financial knowledge gap between White respondents and Native American respondents. More work collecting data among large Asian and Native American participants can help document financial knowledge and behavior among such populations, as well as differences with other racial groups. The 2021 NFCS collected an additional sample of 1,001 Asian American and Pacific Islander (AI-PI) respondents. This will be helpful for future efforts to better understand the financial needs and how to address racial/ethnic differences for these minority groups.

We also find a need for research to better understand the experiences of Lesbian, Gay, Bisexual, Transgender, and Queer (LGBTQ) populations. All studies we reviewed focus on differences between men and women. Future work should collect more data on financial knowledge and behaviors of LGBTQ individuals. Work on LGBTQ populations would also provide the opportunity to revisit earlier work (Fonseca *et al.*, 2012; Lusardi 2012) on household division of labor and financial decisions to include gay couples and couples with non-traditional family roles. Researchers might consider oversampling LGBTQ individuals or conducting work specific to this group. There is also the need to consider revisiting the gender and sex related questions in nationally representative surveys related to financial behavior and knowledge better address the financial needs of LGBTQ individuals.

To address gender gaps on financial knowledge, we need to develop more knowledge on how the division of labor in the household might influence women's interaction with financial knowledge. Previous work argues that married women have lower levels of financial knowledge because they delegate financial decisions to their spouse. Thus, future research should try to isolate married women living in a two-income earning household from divorced women or single mothers, who are likely to have a greater incentive to acquire financial knowledge.

Further work on the SDFW can help provide a fuller understanding of how social and environmental characteristics can support the development of financial knowledge and influence financial behavior. The initiative by the National Endowment for Financial Education (NEFE) about introducing the Personal Financial Ecosystem notes that socioeconomic and geography shape the SDFW. NEFE (2022, p.2) defines the socioeconomic and geography factors as "overarching factors like the state of the economy, socioeconomic and systematic inequality, and issues specific to a particular region and locale." This initiative recognizes that structural policy changes are needed to increase financial access and promote economic inclusion.

5. Conclusion

Our systematic review can guide efforts to address the racial/ethnic and gender gaps in financial knowledge in the United States and, consequently, improve the wellbeing of racial/ethnic and gender minorities. Our estimation of the average racial/ethnic and gender gaps on financial knowledge provides a yardstick for measuring current efforts in financial education. Our work here also provides an overview of the datasets and measures of financial knowledge previously used that should be considered when designing surveys, quantitative analyses and programs in this space.

Our review also suggests that objective measures of financial knowledge can help establish specific targets to address racial/ethnic and gender gaps in financial knowledge and financial wellbeing. For example, universities can allocate or seek funding from foundations for financial education programs to address the gaps studied here, as well as to measure gaps before and after such programs. Policymakers whose work focuses on addressing wealth and income gender gaps could use our findings to create and measure specific programmatic goals.

Recognizing the social determinants of financial knowledge, behavior, and wellbeing is also necessary for addressing racial/ethnic and gender disparities in the finance domain. Financial education alone cannot address all inequities. Our review of the literature indicates that social factors and surrounding environments play a role for the acquisition of financial knowledge and financial practices. Working towards better understanding how someone's environment influences financial wellbeing can provide policymakers and stakeholders a clearer path on what specific efforts and legislation are needed to improve the financial wellbeing of low- and moderate-income minorities.

Previous work here indicates that a "one size fits all" approach to financial education can increase rather than decrease racial/ethnic and gender gaps in financial knowledge, and that there is the need for targeted financial education programs that are linguistically and culturally tailored to minorities. Assessing the informational gaps for different minority groups, designing specific education programs that address these gaps, and providing opportunities for experiential learning are all necessary to reduce racial/ethnic and gender gaps in financial knowledge and, consequently, improve financial behavior and financial wellbeing of minorities in the United States.

Supplementary material. The supplementary material for this article can be found at <https://doi.org/10.1017/flw.2024.10>

Acknowledgements. This work was supported by the Consumer Financial Protection Bureau (CFPB) through the support given to Luisa Blanco during the academic year 2021–2022, when she was a visiting scholar for the CFPB under the Intergovernmental Personnel Act Mobility Program. We are thankful to Susan Kerbel (CFPB) for providing excellent guidance and feedback on all stages of this project. Pepperdine School of Public Policy provided funding to support the work of Cruz Garcia, Baely Gulbins, and Rosemary Gutierrez. We are also thankful to comments from two anonymous reviewers and the Journal Editor, which helped us improve the quality of our work. The views expressed are those of the authors and do not necessarily reflect those of the Consumer Financial Protection Bureau, the United States, or Pepperdine University.

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Cite this article: Blanco, Luisa R., Cruz Garcia, Baely Gulbins, & Rosemary Gutierrez (2024). Systematic review of racial/ethnic and gender differences in financial knowledge in the United States. *Journal of Financial Literacy and Wellbeing*. <https://doi.org/10.1017/flw.2024.10>