financial Well Being Analysis*

Xinxiang Gao

November 26, 2024

This should be an abstract. The report is still being finalized.

1 Introduction

1.1 Significance

1.2 Estimand

2 Data

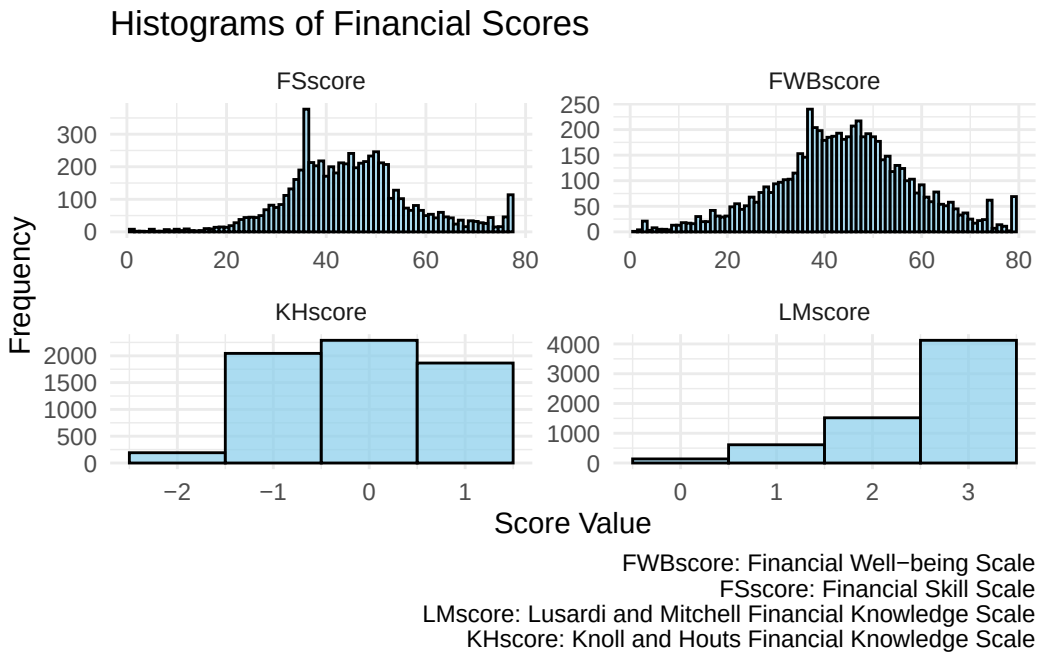
2.1 Overview

2.2 Measurement

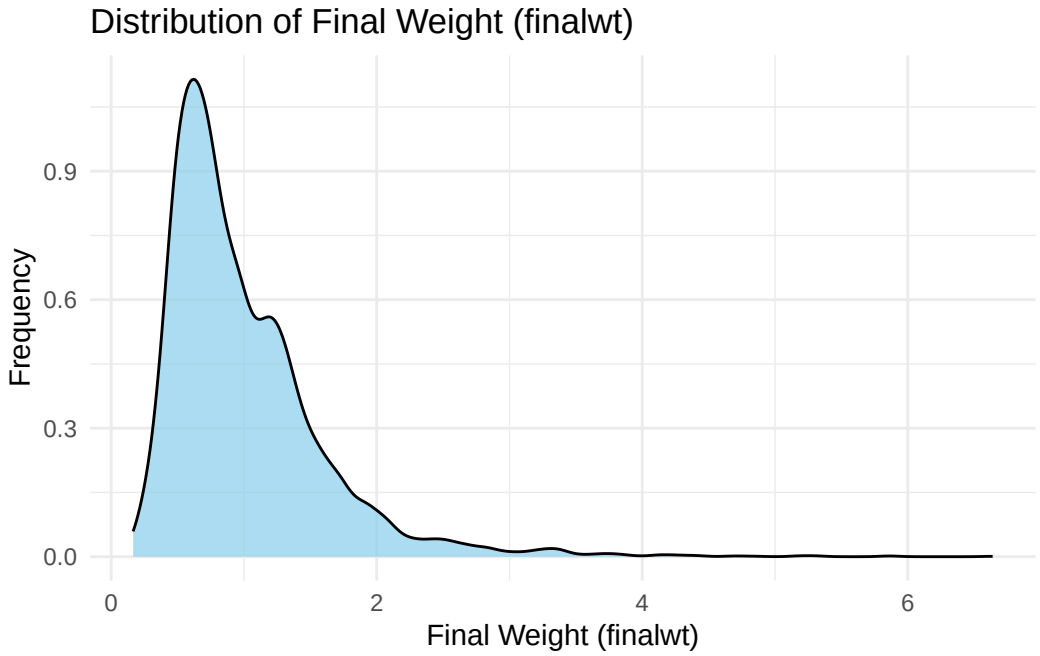
```
-- Data Summary ------------------------
                           Values
Name                       Piped data
Number of rows             6394
Number of columns          6
-----------------------
Column type frequency:
  numeric                  6
-----------------------
Group variables            None

-- Variable type: numeric -------------------------------------------------------
  skim_variable      mean       sd       p0      p25       p50       p75
```

*Code and data are available at: https://github.com/xgao28/financial_well_being_analysis.

```
1 PUF_ID        10892.    1968.    7123     9235.    10902.    12571.
2 FWBscore         44.0     14.0       1       36        44        53
3 FSscore          44.7     12.5       1       36        44        51
4 LMscore           2.51     0.755     0        2         3         3
5 KHscore          -0.057    0.815    -2.05    -0.57     -0.188    0.712
6 finalwt           1        0.585     0.166    0.601     0.845     1.25
     p100
1 14400
2    79
3    77
4     3
5     1.27
6     6.64
```



The composition of finalwt remains on investigation.



3 Model

The linear regression model can be expressed mathematically as:

$$y_i = \beta_0 + \beta_1 \cdot \text{LMscore}_i + \beta_2 \cdot \text{KHscore}_i + \beta_3 \cdot \text{FWBscore}_i + \beta_4 \cdot \text{FSscore}_i + \epsilon_i, \quad \epsilon_i \sim \mathcal{N}(0, \sigma^2)$$

3.0.1 Model Components

- y_i: The dependent variable, finalwt_i, for observation i.
- β_0: The intercept term (constant in the model).
- $\beta_1, \beta_2, \beta_3, \beta_4$: The slopes (coefficients) of the respective predictor variables:
  - LMscore_i: Lusardi and Mitchell financial knowledge scale score.
  - KHscore_i: Knoll and Houts financial knowledge scale score.
  - FWBscore_i: Financial well-being scale score.
  - FSscore_i: Financial skill scale score.

4 Results

Table 1: Summary of Linear Regression Model

	Term	Estimate	Std_Error	t_value	p_value
(Intercept)	(Intercept)	1.335	0.042	32.138	0.000
LMscore	LMscore	-0.024	0.012	-2.061	0.039
KHscore	KHscore	-0.135	0.011	-12.094	0.000
FWBscore	FWBscore	-0.006	0.001	-10.547	0.000
FSscore	FSscore	0.000	0.001	-0.151	0.880

5 Discussion

6 Appendix

6.1 Data cleaning

6.2 Surveys, sampling, and observational data

6.3 Acknowledgements

We would like to express our gratitude to the developers and contributors of R (R Core Team 2023) as well as several R packages that were essential for the analysis and visualization of the data in this report. The following R packages provided indispensable tools and functionalities:

- `tidyverse` (Wickham et al. 2019): A collection of R packages designed for data science, including dplyr, ggplot2, readr, purrr, and others, which greatly facilitated data manipulation, analysis, and visualization.
- `ggplot2` (Wickham 2016): An implementation of the Grammar of Graphics, which allowed us to create complex and aesthetically pleasing visualizations with ease.
- `knitr` (Xie 2023): This package enabled us to perform data demonstration with tables.
- `styler` (Müller and Walthert 2023): This package is helpful for styling the code.
- `arrow` (Richardson et al. 2024): This package provides a convenient and efficient way to work with parquet format.
- `validate` (van der Loo and de Jonge 2021): This package provide useful functions for data tests.

We are grateful to the Consumer Financial Protection Bureau (CFPB) for conducting the Financial Well-Being Survey (Consumer Financial Protection Bureau 2017) and making the data publicly available. Their dedication to collecting and sharing such vital information significantly contributes to research on financial well-being.

Finally, we would like to thank all those who contributed to the development and maintenance of the R programming language and its ecosystem, as well as the broader open-source community, whose efforts make such research possible.

References

Consumer Financial Protection Bureau. 2017. "Financial Well-Being Survey Data." https://www.consumerfinance.gov/data-research/financial-well-being-survey-data/.

Müller, Kirill, and Lorenz Walthert. 2023. *Styler: Non-Invasive Pretty Printing of r Code*. https://CRAN.R-project.org/package=styler.

R Core Team. 2023. *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing. https://www.R-project.org/.

Richardson, Neal, Ian Cook, Nic Crane, Dewey Dunnington, Romain François, Jonathan Keane, Dragoș Moldovan-Grünfeld, Jeroen Ooms, Jacob Wujciak-Jens, and Apache Arrow. 2024. *Arrow: Integration to 'Apache' 'Arrow'*. https://CRAN.R-project.org/package=arrow.

van der Loo, Mark P. J., and Edwin de Jonge. 2021. "Data Validation Infrastructure for R." *Journal of Statistical Software* 97 (10): 1–31. https://doi.org/10.18637/jss.v097.i10.

Wickham, Hadley. 2016. *Ggplot2: Elegant Graphics for Data Analysis*. Springer-Verlag New York. https://ggplot2.tidyverse.org.

Wickham, Hadley, Mara Averick, Jennifer Bryan, Winston Chang, Lucy D'Agostino McGowan, Romain François, Garrett Grolemund, et al. 2019. "Welcome to the tidyverse." *Journal of Open Source Software* 4 (43): 1686. https://doi.org/10.21105/joss.01686.

Xie, Yihui. 2023. *Knitr: A General-Purpose Package for Dynamic Report Generation in r*. https://yihui.org/knitr/.