

Age and cohort effects on stock holdings after the Great Recession

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Introduction

The U.S. Stock market experienced a tremendous decrease from September 2007 to October 2009. In November 2008, the median of self-reported losses reached 20% in the stock market (Hurd & Rohwedder, 2010). The overall U.S. household stock market participation rates dropped 2.6 percentage during the Great Recession (Zhou, 2015). The changes of the stock market participation appeared more obvious for the direct stockholders, 31.3 percentage of direct stock owners in 2007 dropped out the stock market in 2009 (Zhou, 2015).

Stocks are commonly regarded as high return assets by U.S. households (Hanna, Wang & Yuh, 2010). From 2010 to 2016, the annual return of stock market was at a stable pace of 11% (Blanchard et al., 2018). Compared with the stock market, bond would generate an annual return of 5%. Stock equity holdings varied from 30% in 1960s to a low point of 13% in 1980s, and the U.S. household stock equity increased to a high point of 48% in 2000 (Mahmudova, 2017).

Since 2010, the U.S. households net worth has increased together with the recovery of the stock market. Both the households at the bottom and the top income levels experienced large gains between 2010 and 2013 for the mean and median net worth (Bricker et al., 2017). Similarly, the median retirement account balance increased 27.2% between 2010 and 2013 and 15% between 2012 and 2013. However, Tracy and Schneider (2005) stated that households responded to the market development quite sluggishly. The sharp decrease of the stock market, the huge financial disaster, and the frightening atmosphere of investment in stock market during the Great Recession inspired us to investigate the association of risk tolerance and the direct and indirect stock holdings since the Great Recession.

Pfeffer, Danziger, and Schoeni (2013) indicated that the Great Recession enlarged the wealth disparities among low-income and minority households. In this study, we want to explore whether disparities exist in household stock holdings among different cohort groups after the Great Recession.

We use five cross-sectional datasets of 2004, 2007, 2010, 2013, and 2016 Survey of Consumer Finances (SCF) to investigate our research question. We hypothesize stock holdings for each cohort group recovered as with the recovery of stock market after the Great Recession and the stock holdings overtime for each cohort group are consistent with the suggested stock investment based on the life cycle saving hypothesis.

Data and Methodology

2.1 Data

In this study, we used the 2004, 2007, 2010, 2013, and 2016 Survey of Consumer Finance (SCF) to investigate the age and cohort effects on stock holdings after the Great Recession. The SCF dataset is sponsored by the Federal Reserve Board in cooperation with the U.S. Treasury department. The SCF has collected the U.S. households' detailed financial information every three years since 1983 and provides a national representative data by appropriate weights.

We combined 2004, 2007, 2010, 2013 and 2016 SCF and created a pooled dataset with the total sample size of 27,682. In 2004 SCF data, there are 4,519 "Primary Economic Unit" (PEU). In the SCF data, the Primary Economic Unit refers to the household consists of an economically dominant and other financially interdependent member in this household.³ PEU and household are identical in most cases for the SCF data. 2007 SCF has 4,418 PEUs, 2010 SCF has 6,482 PEUs, 2013 SCF has 6,015 PEUs, and 2016 SCF has 6,248 PEUs. We used the respondents' demographic information and the respondent assumed to be the more financially knowledgeable member in this household.

The samples of SCF data include both an area probability sample of the general populations and the samples from Internal Revenue Service, which makes the weighting of analysis is more important when

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using SCF data (Hanna, et al., 2018). We utilized X42001 weights in our descriptive analysis. Since 1989 SCF has imputed missing data by using the multiple imputation. The “repeated-imputation inference” (RII) more closely represents the true estimated variances (Lindamood et al., 2007). In this study, an unweighted RII method is used in our regressions to obtain the estimated variances from the five cross-sectional SCF datasets (Shin and Hanna, 2017).

2.2 Variables

Stock ownerships outside retirement accounts is the dependent variable. Stock ownership includes the stocks in direct holdings, mutual fund, annuity, trust, bonds/CD, and 529 saving accounts and other saving accounts. The households with stock holdings outside retirement accounts are coded as 1, and 0 refers to the households who do not have stock holdings outside retirement accounts.

Eight cohort groups, survey year, and the interaction terms of cohort group with survey year are our explanatory variables in this study. Cohort groups is categorized into eight groups by respondents’ birth year.

We also controlled respondents’ risk tolerance, educational levels, gender and marital status, and work status. Wilshire stock index at the interviewed day, household income, and household financial assets were controlled in the regression model.

Results

3.1 Descriptive analysis

The summary statistics of key variables are presented in Table 1. Stock ownerships decreased from 30% in 2004 to 22.6% in 2016. However, the financial assets ownerships increased from 93.3% in 2004 to 98.2% in 2016. Additionally, the dollar value of stock holdings increased from \$61,555.53 in 2004 to \$115,208.55 in 2016. Even though the household financial assets and stock holdings suffered losses because of the financial crisis, both the household financial assets and stock holdings recovered in 2016.

3.2 Linear probability model

We used linear probability model to test our hypothesis. Our aim is to test the age effects and cohort effects on stock ownerships after the Great Recession. The age effect on estimated stock ownerships are presented in Figure 1. Estimated stock ownerships were controlled for households with average risk tolerance, some college education, married male salary workers, and 15,000 Wilshire stocks index, \$80,000 income, \$140,000 financial assets were used to calculate the estimated stock ownerships.

As shown in figure 1, stock ownerships of all eight cohort groups decreased after 2007. Except for the oldest cohort group, the stock ownerships decreased for the other seven cohort groups since 2004. After controlling for the demographic characteristics, stock index, income, and financial assets, the age effects on the estimated stock ownership appeared to have obvious negative effects on stock ownership compared with the summary statistics of stock ownerships without control.

We compared the estimated stock ownerships of the same age cohort at different year in figure 2 and figure 3. We selected 2004 to 2013 and 2007 to 2016 two-time periods to explore the cohort effects on stock ownerships. Similarly, we found the negative cohort effects on stock ownerships after the Great Recession for all the cohort groups.

Discussion

We conclude that the stock ownerships decreased for every cohort groups after the Great Recession. The negative age effects and cohort effects on stock ownerships had more influential effects on the younger cohorts. After the Great Recession, all the cohort group appeared to drop out the stock market. However, the younger generation experienced larger negative age and cohort effects on stock ownerships.

This study contributed the empirical evidence of the disparities of age effects and cohort effects on stock ownership among different cohort groups. More importantly, this study also provided the insights of the different behavior from life cycle saving hypothesis of stock investment for young generations. Additionally, this study also contributed to the literatures on household stock holdings after the Great recession.

References

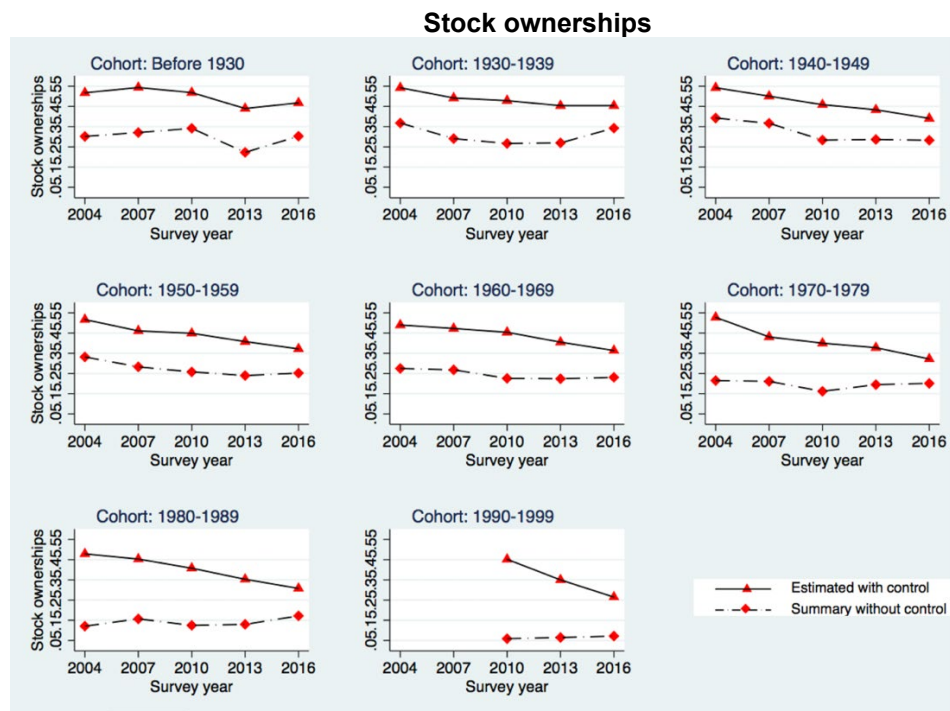
- Bricker, J., Detting, L. J., Henriques, A., Hsu, J. W., Jacobs, L., Moore, K. B., ... & Windle, R. A. (2017). Changes in U.S. family finances from 2013 to 2016: evidence from the survey of consumer finances. *Federal Reserve Bulletin*, 103, 1.
- Brunnermeier, M. K., & Nagel, S. (2008). Do wealth fluctuations generate time-varying risk aversion? Micro-evidence on individuals. *American Economic Review*, 98(3), 713-36.
- Christelis, D., Georgarakos, D., & Haliassos, M. (2011). Stockholding: Participation, location, and spillovers. *Journal of Banking & Finance*, 35(8), 1918-1930.
- Cong, W., & Hanna, S. D. (2007). The risk tolerance and stock ownership of business owning households. *Journal of Financial Counseling and Planning*, 18(2).
- Finke, M. S., & Huston, S. J. (2003). The brighter side of financial risk: Financial risk tolerance and wealth. *Journal of Family and Economic Issues*, 24(3), 233-256.
- Hanna, S. D., & Lindamood, S. (2008). The decrease in stock ownership by minority households. *Journal of Financial Counseling and Planning*, 19(2).
- Hanna, S. D., Kim, K. T., & Lindamood, S. (2018). Behind the Numbers: Understanding the Survey of Consumer Finances. *Journal of Financial Counseling and Planning*, 29(2), 410-418.
- Hanna, S. D., Wang, C., & Yuh, Y. (2010). Racial/ethnic differences in high return investment ownership: A decomposition analysis. *Journal of Financial Counseling and Planning*, 21(2), 44-59.
- Harrison, G. W., Johnson, E., McInnes, M. M., & Rutström, E. E. (2005). Temporal stability of estimates of risk aversion. *Applied Financial Economics Letters*, 1(1), 31-35.
- Hurd, M. D., & Rohwedder, S. (2010). Effects of the financial crisis and Great Recession on American households (No. w16407). *National Bureau of Economic Research*.
- Lindamood, S., Hanna, S. D., & Bi, L. (2007). Using the Survey of Consumer Finances: Methodological considerations and issues. *Journal of Consumer Affairs*, 41(2), 195-214.
- Mahmudova, A. (2017). Why rising stock ownership by U.S. households be a bad omen. Retrieved from <https://www.marketwatch.com/story/why-rising-stock-ownership-by-us-households-may-be-a-bad-omen-2017-03-16>.
- Pfeffer, F. T., Danziger, S., & Schoeni, R. F. (2013). Wealth disparities before and after the Great Recession. *The ANNALS of the American Academy of Political and Social Science*, 650(1), 98-123.
- Shin, S. H. & Hanna, S.D. (2017). Accounting for complex sample designs in analyses of the Survey of Consumer Finances. *Journal of Consumer Affairs*, 51 (2), 255-283.
- Shum, P., & Faig, M. (2006). What explains household stock holdings? *Journal of Banking & Finance*, 30(9), 2579-2597.
- Stone, M., & Rasp, J. (1991). Tradeoffs in the choice between logit and OLS for accounting choice studies. *Accounting Review*, 170-187.
- Sung, J., & Hanna, S. (1998). The spouse effect on participation and investment decisions for retirement funds. *Journal of Financial Counseling and Planning*, 9(2), 47.
- Zhong, L. X., & Xiao, J. J. (1995). Determinants of family bond and stock holdings. *Financial Counseling and Planning*, 6, 107-114.
- Zhou, J. (2015). Household Stockholding Behavior During the Great Financial Crisis (No. 2015-15). *Bank of Canada, Working Paper*.

Table 1: Summary statistics

	2004	2007	2010	2013	2016
Own stocks (=1)	0.300	0.273	0.226	0.215	0.226
Stock holdings	\$61,555	\$73,978	\$60,623	\$75,992	\$115,208
Median of stock holdings (exclude zeros)	\$25,000	\$25,000	\$30,000	\$40,000	\$50,500
Own financial assets (=1)	0.933	0.933	0.936	0.941	0.982
Financial assets holdings	\$126,363	\$143,317	\$136,127	\$151,715	\$213,192
Median of financial assets	\$7,320	\$8,300	\$5,520.00	\$6,000.00	\$7,500
Sample size	4,519	4,418	6,482	6,015	6,248

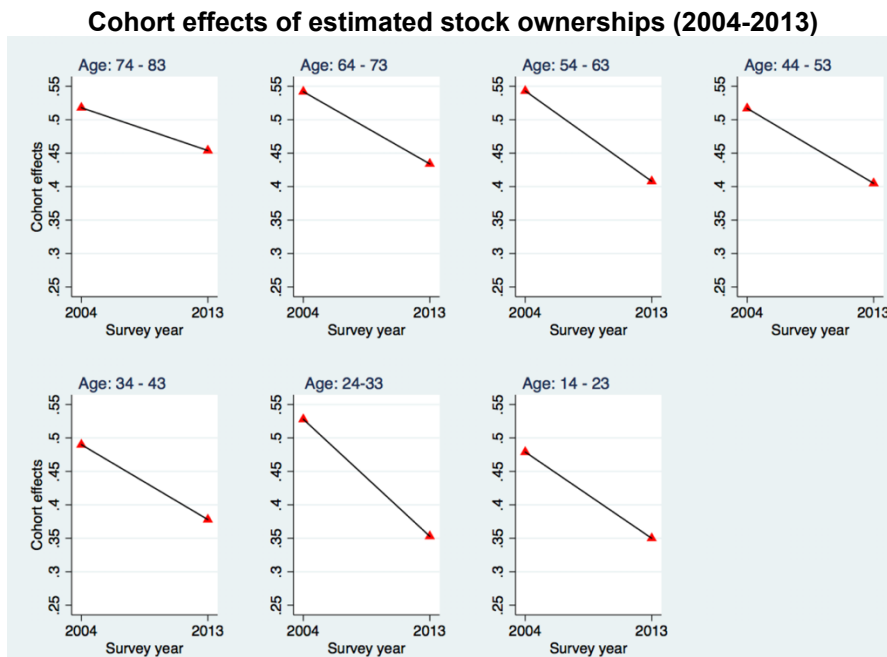
Note: Sample is weighted. The data are taken from 2004, 2007, 2010, 2013, 2016 Survey of Consumer Finances (SCF). Stock ownership includes stock in direct holdings, mutual fund, annuity, trust, bonds/CD, and 529 saving accounts and other saving accounts. Financial assets include liquidity assets, CDs, directly held mutual funds, directly held stocks, bonds, saving bonds, cash value of life insurance, and other managed (trust, annuities).

Figure 1:



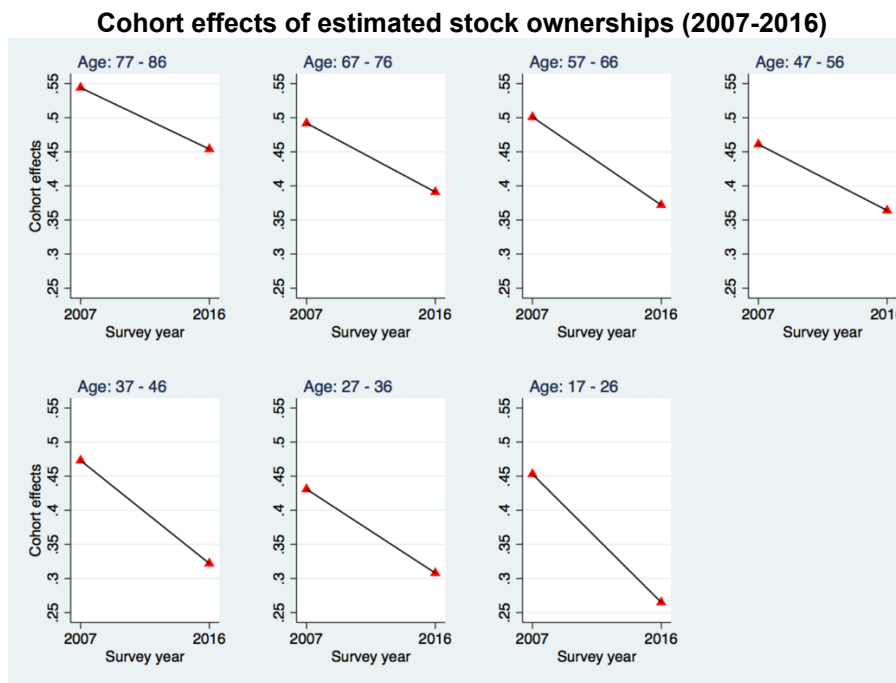
Source: The data are taken from 2004, 2007, 2010, 2013, 2016 Survey of Consumer Finances (SCF).

Figure 2:



Source: The data are taken from 2004, 2007, 2010, 2013, 2016 Survey of Consumer Finances (SCF).

Figure 3:



Source: The data are taken from 2004, 2007, 2010, 2013, 2016 Survey of Consumer Finances (SCF).