

Risk Tolerance: Cause or Effect?

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Abstract

We analyzed the 1992 through 2007 Surveys of Consumer Finances to explore the question of whether changes in risk tolerance precede or follow changes in equity ownership rates. The proportion of households holding equity assets increased substantially from 1992 to 1998, increased slightly from 1998 to 2001, decreased slightly between 2001 and 2004, and remained about the same in 2007. The proportion of households willing to take some investment risk increased between 1992 and 1998, decreased slightly between 1998 and 2001, decreased between 2001 and 2004, and remained about the same between 2004 and 2007. Controlling for household characteristics and expectations, the changes in risk tolerance seem more consistent with reactions to stock market changes than the cause of stock market changes.

It is commonly thought that investor portfolio choices are strongly influenced by investor risk tolerance. Therefore, when portfolio choices change, presumably changes in risk tolerance contribute to those changes. However, the question remains: do changes in risk tolerance lead to changes in investment behavior, or do perceptions of investment returns influence the investment risk tolerance of individuals? For example, did increases in risk tolerance lead to the stock market gains in 2007 and the real estate bubble?

This paper uses the Survey of Consumer Finances (SCF) measure of investment risk tolerance to examine patterns of the risk tolerance from 1992 to 2007. In its present form, the Survey of Consumer Finances (SCF) has been conducted every three years since 1983, with most interviews conducted between May and December of the survey year (Bucks, Kennickell, Mach, & Moore, 2009). Hanna, Waller, and Finke (2008) discussed measures of risk tolerance and concluded that the SCF investment risk tolerance measure might not be a good measure of stable risk aversion preference, but the measure has been frequently used in research. Yao, Hanna and Lindamood (2004) discussed the origins of the SCF investment risk tolerance measure, and presented patterns of the responses to that question from 1983 to 2001. They suggested that because of the tendency of individuals to be strongly influenced by recent events, stock market trends in the period just before a survey should influence responses to the SCF measure. They found that willingness to take some investment risk decreased from 1983 to 1989, did not change from 1989 to 1992, increased from 1992 to 1995, and increased from 1995 to 1998, then decreased from 1998 to 2001. Their multivariate analyses showed that even after controlling for

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household characteristics, the hypotheses about stock market patterns influencing risk tolerance are largely supported.

Assuming that people do change their investment risk tolerance in response to stock market patterns, it is not clear what the lag in response might be, and the SCF measure will not necessarily provide clear evidence as to the lag, as the survey is conducted every three years. Figure 1 shows one salient indicator of stock market patterns, the Dow-Jones Industrial Index from January 1986 to December 31, 2007. In the 1990s, the general pattern for the index was increasing, so it is not surprising that Yao et al. (2004) found that risk tolerance increased through 1998. The decreases in the index during 2001 make the decrease in risk tolerance between 1998 and 2001 understandable. Figure 2 shows the level of the Dow-Jones Equity REIT index for May 14, 2001 through February 27, 2009 (we include the period since 2007 period as it is less familiar than the Industrial index.) The REIT index generally increased from 2001 to February 2007, then dropped substantially, to less than a third of its peak level by the end of February 2009. If changes in risk tolerance contributed to changes in investment behavior, we would expect that changes in investor risk tolerance would come before changes in behavior. Figures 1 and 2 show aggregate measures of investor behavior, by individual and institutional investors. In this paper we will present descriptive patterns of household investment choices and risk tolerance for the 1992 to 2007 period, and also multivariate analyses to ascertain whether changes in investment risk tolerance were influenced by changes in household characteristics and expectations.

In this paper, we update the analyses presented by Yao et al. (2004) to 2007. The SCF question on investment risk tolerance is:

Which of the statements on this page comes closest to the amount of financial risk that you are willing to take when you save or make investments?

1. Take substantial financial risks expecting to earn substantial returns.
2. Take above average financial risks expecting to earn above average returns.
3. Take average financial risks expecting to earn average returns.
4. Not willing to take any financial risks.

Yao et al. (2004) presented the patterns of responses to that question for the 1983, 1989, 1992, 1995, 1998, and 2001 Surveys of Consumer Finances, and asserted that for multivariate analyses, creating two cumulative categories is reasonable. They created “Some Risk” representing any response other than “No Risk” and “High Risk” representing “Substantial” and “Above Average” responses.

We combined the 1992, 1995, 1998, 2001, 2004, and 2007 Surveys of Consumer Finances. Table 1 shows the patterns for the original responses plus the cumulative categories Some and High. Table 1 also shows the pattern for the percent of households owning a stock asset, including direct and indirect holdings of equity assets. The general patterns for each of the original and cumulative measures are similar to each other. For each response level of risk tolerance, the highest level was in 1998, with 2007 levels being significantly lower than 1998. Figure 3 shows that willingness to take some investment risk increased each period from 1992 to 1998, decreased slightly by 2001, decreased further by 2004, and remained about the same by 2007. (“Remained the same” means that the change was not statistically significant at the 5%

level using a 2-tail test.) The proportion of households holding equity investments increased each period until 2001, then decreased slightly by 2004, and remained the same in 2007.

Figure 4 shows the patterns for the two cumulative levels of risk tolerance, for Substantial risk tolerance, and for equity ownership proportions, standardized to 1998 as 100. All three of the levels of risk tolerance were lower in 2004 and 2007 than in 1998, with the largest relative decrease being for Substantial risk. In contrast, the proportion of households owning equity investments was higher in 2007 than in 1998.

In order to investigate whether changes in risk tolerance might have been caused by changes in household characteristics such as age, we ran three cumulative logistic regressions similar to those presented by Yao et al. (2004). Table 2 shows the results. For each of the three risk tolerance levels, 2007 has a significant negative effect compared to 1998, similar to the results shown in Table 1. Many of the other patterns are similar to those reported by Yao et al. (2004).

Conclusions

It seems unlikely that changes in individual risk tolerance could have led to the stock market gains in 2007 or the real estate bubble, as household risk tolerance levels remained lower in 2004 and 2007 than the levels in 1998. Both in the description analyses (Table 1) and the multivariate analyses (Table 2), risk tolerance levels in 2007 were significantly lower than the levels in 1998, yet both aggregate measures on investment behavior (Figures 1 and 2) and household measures of investment behavior (Figure 3) show that households were more likely to have risky investments in 2007 than in 1998. It seems plausible to conclude that the SCF risk tolerance measure is not a stable measure related to risk aversion (Hanna, et al., 2008) but instead is an attitude reflecting expectations.

References

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Table 1
 Percent of Households Owning Equity Investments, and of Respondents Choosing Risk Tolerance Levels, Surveys of Consumer Finances, 1992-2007

| | 1992 | 1995 | 1998 | 2001 | 2004 | 2007 |
|-------------------|------|-------|-------|-------|-------|-------|
| Own equity assets | 36.7 | 40.4* | 48.9* | 52.3* | 50.2* | 51.1 |
| Substantial | 3.2 | 3.5 | 4.9* | 4.5* | 3.4* | 3.4 |
| Above average | 11.0 | 13.6* | 17.9* | 18.2 | 15.9* | 16.8* |
| Average | 35.9 | 37.2* | 38.5* | 37.4* | 38.4* | 38.1 |
| No risk | 49.8 | 45.7* | 38.7* | 39.8* | 42.3* | 41.8 |
| High‡ | 14.3 | 17.1* | 22.8* | 22.8 | 19.3* | 20.1* |
| Some‡ | 50.2 | 54.3* | 61.3* | 60.2* | 57.7* | 58.2 |
| Sample Size | 3906 | 4299 | 4305 | 4442 | 4519 | 4418 |

*Difference from previous year significant at the 5% level based on 2-tail t-test using repeated-imputation inference method combining five implicates of each dataset.

Each 2007 level is significantly different from the corresponding 1998 level at $p < 0.001$.

‡High = Substantial + Above Average (Combined)

Some = Substantial + Above Average + Average (Combined)

Computed by author based on 1992, 1995, 1998, 2001, 2004, and 2007 Surveys of Consumer Finances, weighted

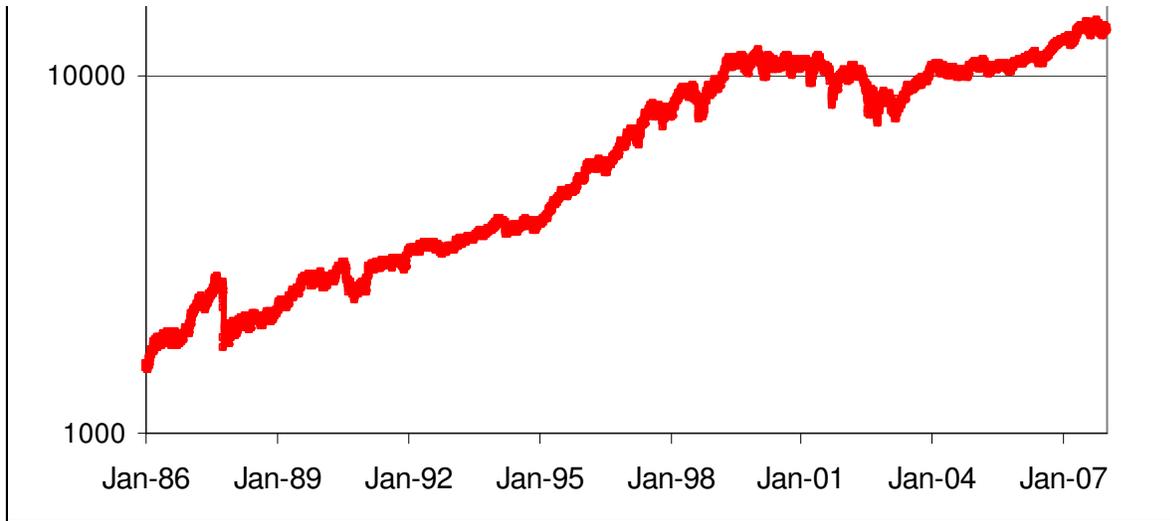
Table 2

Logistic Regressions of Willingness to Take Some, High, or Substantial Investment Risk, 1992 – 2007 Surveys of Consumer Finances

| | Some | | High | | Substantial | |
|---|---------|--------|---------|--------|-------------|--------|
| | Coeff. | Sig. | Coeff. | Sig. | Coeff. | Sig. |
| Survey year (reference category = 1998) | | | | | | |
| 1992 | -0.5148 | <.0001 | -0.5128 | <.0001 | -0.2292 | 0.0200 |
| 1995 | -0.2431 | <.0001 | -0.2899 | <.0001 | -0.1427 | 0.1353 |
| 2001 | -0.0820 | 0.1309 | -0.0536 | 0.2901 | -0.0751 | 0.4145 |
| 2004 | -0.2379 | <.0001 | -0.3024 | <.0001 | -0.2694 | 0.0044 |
| 2007 | -0.1319 | 0.0156 | -0.2184 | <.0001 | -0.2355 | 0.0133 |
| Age of respondent | -0.0262 | <.0001 | 0.0275 | <.0001 | 0.0169 | <.0001 |
| Racial/ethnic status (reference category=White) | | | | | | |
| Black | -0.3623 | <.0001 | -0.1704 | 0.0070 | 0.2174 | 0.0440 |
| Hispanic | -0.7679 | <.0001 | -0.1448 | 0.0564 | 0.3429 | 0.0054 |
| Other/Asian | -0.5386 | <.0001 | -0.1934 | 0.0174 | -0.0089 | 0.9512 |
| Household status (reference category=couple) | | | | | | |
| Single head | -0.1614 | <.0001 | 0.0946 | 0.0162 | 0.3250 | <.0001 |
| Respondent female | -0.5660 | <.0001 | -0.5919 | <.0001 | -0.4965 | <.0001 |
| Highest education level of respondent (reference category= less than high school diploma) | | | | | | |
| High school diploma | 0.6044 | <.0001 | 0.3677 | <.0001 | 0.2814 | 0.0285 |
| Some college | 1.1400 | <.0001 | 0.7417 | <.0001 | 0.3558 | 0.0083 |
| College degree | 1.5407 | <.0001 | 0.9186 | <.0001 | 0.3949 | 0.0021 |
| Have related child under 19 at home | -0.1607 | <.0001 | -0.0459 | 0.1865 | 0.0075 | 0.9078 |
| Log (income) (If income \leq 0, log(0.01)) | 0.1514 | <.0001 | 0.1093 | <.0001 | 0.0683 | 0.0003 |
| Log (net worth) (If net worth \leq 0, log(0.01)) | 0.0627 | <.0001 | 0.0586 | <.0001 | 0.0547 | <.0001 |
| Own home | 0.2870 | <.0001 | 0.2074 | <.0001 | -0.0301 | 0.7240 |
| Head self-employed | 0.4260 | <.0001 | 0.2950 | <.0001 | 0.4928 | <.0001 |
| Head retired | -0.1614 | 0.0030 | -0.1208 | 0.0487 | -0.1819 | 0.1433 |
| Income relative to normal income (reference category = current income is about normal) | | | | | | |
| Higher than normal | 0.2626 | <.0001 | 0.0745 | 0.1108 | 0.1565 | 0.0526 |
| Lower than normal | 0.0274 | 0.5218 | 0.0896 | 0.0451 | 0.1371 | 0.0774 |
| Expectations of income in future (reference category = sure that it will grow faster than prices) | | | | | | |
| Sure that it will grow about same as prices | -0.3080 | <.0001 | -0.3059 | <.0001 | -0.6368 | <.0001 |
| Sure that it will grow less than prices | -0.4787 | <.0001 | -0.4209 | <.0001 | -0.4853 | <.0001 |
| Not sure about income growth | -0.5508 | <.0001 | -0.2624 | <.0001 | -0.1182 | 0.1043 |
| Intercept | -0.4587 | 0.0009 | -1.8319 | <.0001 | -3.4742 | <.0001 |
| Concordance | 80.8% | | 73.0% | | 68.1% | |

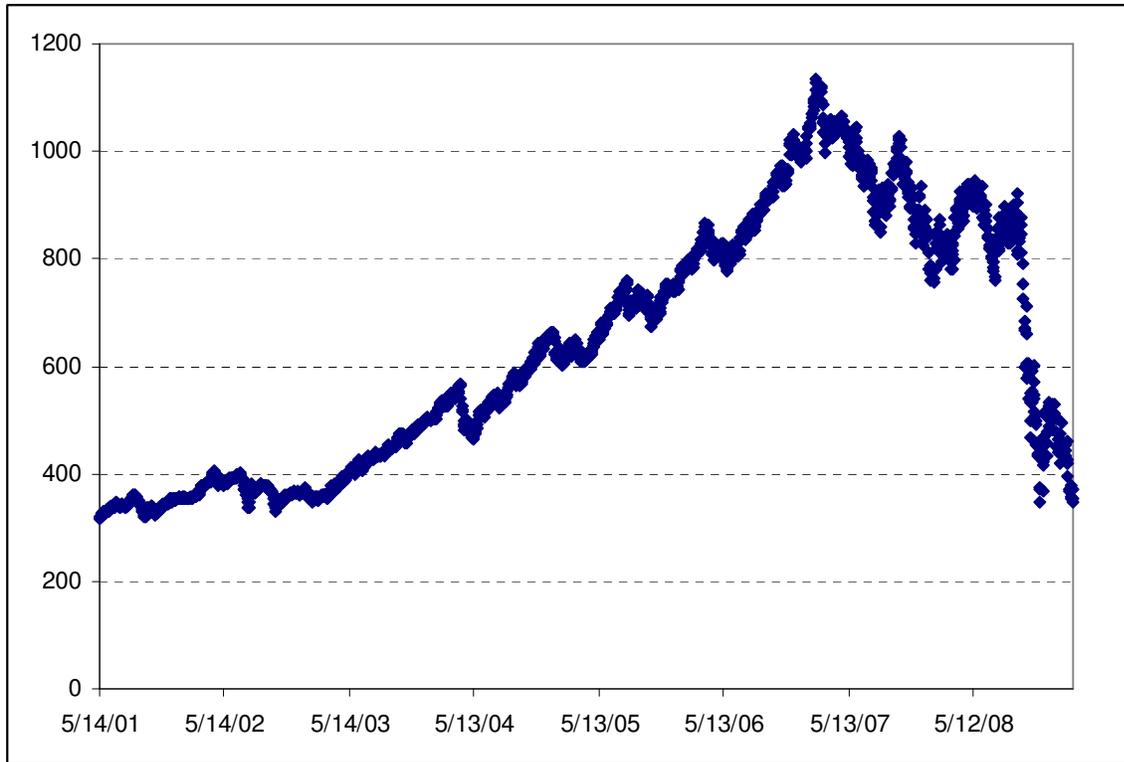
Estimated by authors based on combination of 1992, 1995, 1998, 2001, 2004, and 2007 Surveys of Consumer Finances datasets, RII unweighted estimates. (Income and net worth amounts are in 2007 dollars.)

Figure 1
Adjusted Closing Level of Dow Jones Industrial Average, Jan. 2, 1986 – Dec. 31, 2007



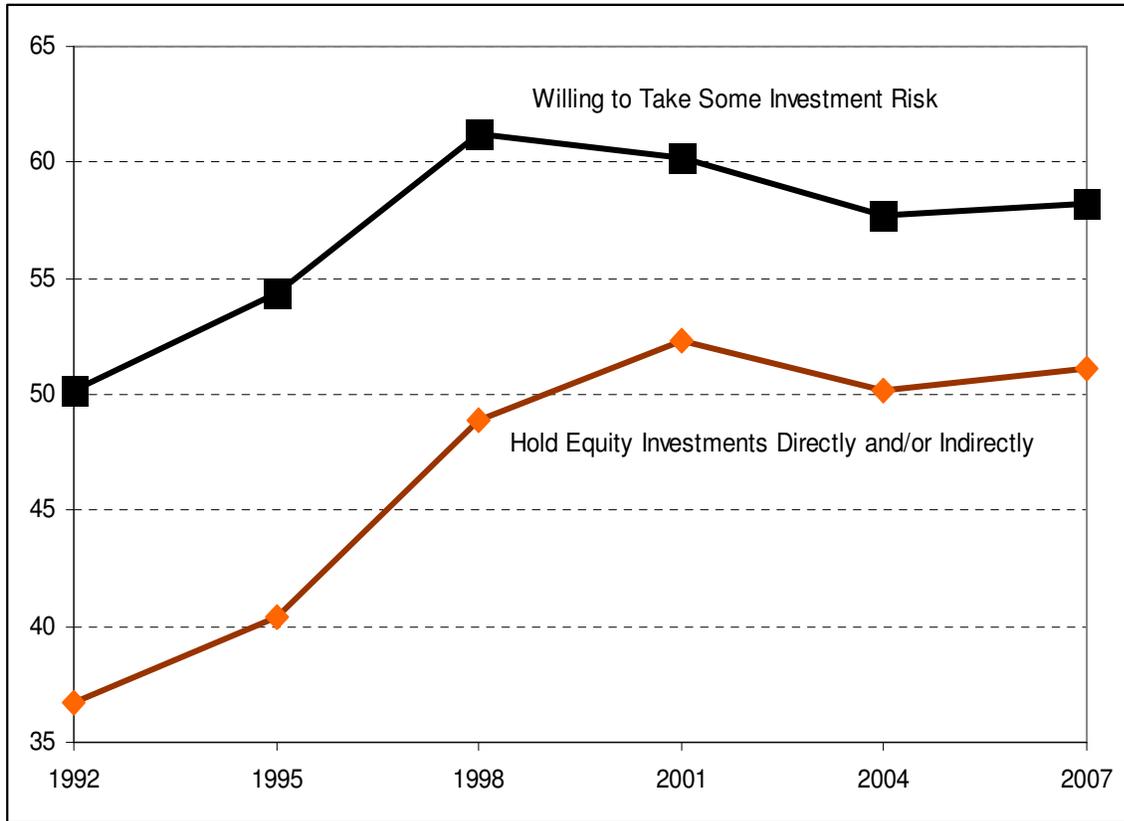
Created by authors based on data on Yahoo Finance, Feb. 20, 2009. Vertical axis is on logarithmic scale.

Figure 2
Adjusted Closing Level of Dow Jones Equity REIT index, May 14, 2001 – Feb. 27, 2009



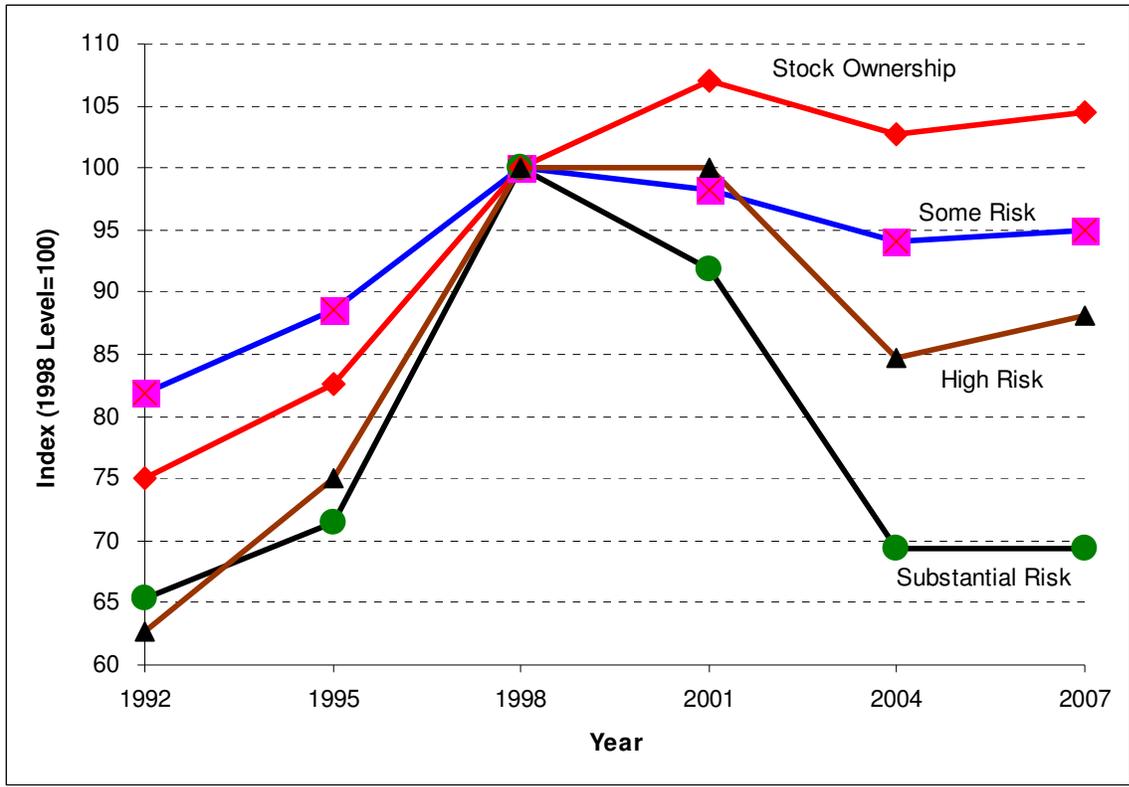
Created by authors based on data on Yahoo Finance, March 1, 2009. DJ EQTY REIT TR IND (REIT).

Figure 3
Percent of Households Holding Equity Investments, and Percent of Respondents Willing to Take Some Investment Risk, 1992-2007



Created by author, weighted analysis of 1992 to 2007 Surveys of Consumer Finances

Figure 4
 Index of Percent of Households Owning Stock Assets, and of Respondents Willing to Take Investment Risk, With 1998 Levels = 100, 1992-2007



Created by author, weighted analysis of 1992 to 2007 Surveys of Consumer Finances