



## Decomposing the age effect on risk tolerance

Rui Yao<sup>a,\*</sup>, Deanna L. Sharpe<sup>b,1</sup>, Feifei Wang<sup>c</sup>

<sup>a</sup> Department of Personal Financial Planning, University of Missouri, 239B Stanley Hall, Columbia, MO 65211, United States

<sup>b</sup> Department of Personal Financial Planning, University of Missouri, 239A Stanley Hall, Columbia, MO 65211, United States

<sup>c</sup> Department of Personal Financial Planning, University of Missouri, 240 Stanley Hall, Columbia, MO 65211, United States

### ARTICLE INFO

#### Article history:

Received 21 June 2010

Received in revised form 20 July 2011

Accepted 29 August 2011

#### JEL classification:

D12

D14

G11

#### Keywords:

Attitudes

Generation

Period effect

Risk tolerance

Survey of Consumer Finances

### ABSTRACT

The importance of investment portfolio allocation has become more apparent since the onset of the late 2000s Great Recession. Individual willingness to take financial risks affects portfolio decisions and investment returns among other factors. Previous research found that people of different ages have dissimilar levels of risk tolerance but the effects of generation, period, and aging were confounded. Using the 1998–2007 Survey of Consumer Finances cross-sectional datasets, this study uses an analytical method to separate such effects on financial risk tolerance. Aging and period effects on financial risk tolerance were statistically significant. Implications for researchers and financial planning practitioners and educators are provided.

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### 1. Introduction

Several researchers have concluded that Americans are not saving enough to fund their retirement (Warshawsky and Ameriks, 2000), especially members of the baby boomer generation (VanDerhei and Copeland, 2011). Although it is without argument that investments have an important place in retirement planning, selection of appropriate investments and investment strategies can be challenging for consumers.

The emergent sub-prime mortgage crisis in the 2000s and the consequent rapid decline in equity value made many investors painfully aware of the importance of having a realistic understanding of financial risks and their own investment risk tolerance. Even seasoned investors saw substantial decreases in their portfolio value. Some decided to take the loss and move to cash. Others, fearing further decline in equity prices as well as weakening currency values moved to gold as a safe haven (Frangos, 2011), driving up the price of gold almost 475% between 2001 and 2010 (Gold, 2011). Whether moves such as these are prudent resolutions depends on individual situations. It is clear, however, that the

deep and prolonged recession that has occurred in the wake of the financial crisis has decreased job security and increased the potential for job loss or salary cutbacks, further increasing financial vulnerability (Bricker et al., 2011; Keen, 2009).

Retirement safety nets exist in the United States. Nine out of ten retired individuals receive Social Security. For over half of those individuals, Social Security provides 50% or more of their retirement income (Social Security Administration, 2010). Many retirees also receive monthly payments from a defined benefit plan. These retirement safety nets are shrinking, however. By year 2036, the combined assets of the Social Security Trust Funds will be exhausted (Social Security Board of Trustees, 2011), which implies that future retirees may receive less benefit from Social Security. Defined benefit plans are becoming less common today since many employers are switching to defined contribution plans. Consequently, wealth accumulation via market investment has become an essential source of retirement income and retirement planning has become more important than ever.

Research has identified several key factors that can affect wealth accumulation. These factors are broad in scope, ranging from the effect of economic cycles to societal trends, social policies, and individual characteristics. For example, economic conditions change over time, moving from expansion to recession and back again. A tightened credit market can force consumers to save to achieve important financial goals (Bunting, 2009). On an individual level, behavioral economists have identified a number of heuristics and

\* Corresponding author. Tel.: +1 573 882 9343; fax: +1 573 884 8389.

E-mail addresses: YaoR@missouri.edu (R. Yao), SharpeD@missouri.edu (D.L. Sharpe), fwfff@mail.missouri.edu (F. Wang).

<sup>1</sup> Tel.: +1 573 882 9652; fax: +1 573 884 8389.

cognitive biases that can adversely influence investment choice and behavior (Tversky and Kahneman, 1974; Pompian, 2006). Desire to spend on conspicuous consumption can slow wealth accumulation (Yamada, 2008).

Generational effects also exist. Each generation experiences a unique demographic, political, and socioeconomic environment during their formative years. Differing experiences shared by a generation may contribute to dissimilar attitudes toward financial risks between those in different generations. For instance, many of those who experienced the Great Depression tended to remain risk averse for the remainder of their lives (Malmendier and Nagel, 2009). In contrast, due to sustained government intervention in U.S. financial markets, many members of Generation X had never experienced a down market until the recent Great Recession (Keen, 2009).

Variations in risk preferences may also lead to differences in portfolio allocations that eventually result in wealth inequality. Accurate assessment of risk tolerance is another important element in helping to prevent over participation in the market that may result in unnecessary losses, or inadequate market participation that may lead to high opportunity costs, or other financial mistakes such as cashing out when market returns decline and investing when market returns are high.

According to the theory of reasoned action (Fishbein and Ajzen, 1975), attitudes affect behavior. Investment returns are directly influenced by an individual's portfolio allocation (behavior), which, in turn, should be affected by their willingness to take financial risks (attitudes). Therefore, whether investors are willing to take financial risks; who are more likely to take these risks; how much risk are they willing to take; and what factors affect individuals' willingness to take financial risks become important issues for researchers to investigate.

Researchers have long been aware of the differences in financial risk tolerance of individuals of various ages. These differences have typically been labeled as "the age effect". But this "age effect" is really a combination of three effects: aging, generation, and period. The collective analyses of age, cohort/generation, and period have been employed in marketing research (e.g. Chen et al., 2001; Rentz and Reynolds, 1991). The studies that focused on financial risk tolerance have failed to separate these effects, however (e.g. Chaulk et al., 2003; Grable, 2000). What was attributed to an "age effect" may be due to: (1) the decrease of investment horizons and depreciation of human capital as people age (the aging effect); (2) socioeconomic environments that influence different generations and do not change with age (the generation effect); or (3) socioeconomic environments that influence individuals of all ages over time (the period effect). The purpose of this study is to examine the true age effect by decomposing it into these three effects. The following is a review of literature on "the age effect" on risk tolerance and a discussion of the limitations of this prior work.

## 2. Literature review

### 2.1. The age effect on risk tolerance

Much has been written about the effect of age on financial risk tolerance. These studies have adopted different measures of financial risk tolerance. Several studies have used objective measures such as the proportion of risky assets to overall wealth (Ameriks and Zeldes, 2004; Bertaut, 1998; Bertaut and Starr-McCluer, 2000; Guiso et al., 1996; Hui and Hanna, 1997), whereas other studies used subjective or situational measures such as self-reported risk tolerance level (Chaulk et al., 2003; Grable, 2000; Hallahan et al., 2003; Yao et al., 2005). Despite the vast amount of research on the effect of age on financial risk tolerance, no consensus has emerged regarding the strength or sign of the relationship.

Most prior research shows that risk tolerance decreases with age (Grable and Lytton, 1998; Morin and Suarez, 1983; Yao et al., 2004, 2005). Morin and Suarez (1983) used the 1970 Canadian Survey of Consumer Finances dataset to study household demand for risky assets. Age was included as a categorical variable (35–44, 45–54, 55–64, and over 65). They concluded that risk tolerance decreased uniformly with age. Yao et al. (2004) combined the 1983–2001 Survey of Consumer Finances (SCF) cross-sectional datasets and investigated changes in self-perceived financial risk tolerance over time. Similar to Morin and Suarez, age was measured as a series of categorical variables and was found to be negatively related to risk tolerance.

Grable and Lytton (1998) used age as continuous variable and found that self-perceived risk tolerance is negatively related to age. Using the 1983–2001 SCF datasets, Yao et al. (2005) also analyzed the effect of race and ethnicity on subjective financial risk tolerance, measuring age as a continuous variable. The authors concluded that, on average, each additional year increase in age decreased the probability of taking some, high, or substantial risk by 2%. Conversely, some studies discovered that age was positively related to risk tolerance (Bertaut, 1998; Grable, 2000; Guiso et al., 1996; Hui and Hanna, 1997; Zhong and Xiao, 1995). Using the 1989 SCF, Zhong and Xiao (1995) studied factors that were related to household bond and stock holdings. Age was used as a continuous variable in their Tobit regression. They concluded that age had a positive effect on the dollar value of stock holdings. Guiso et al. (1996) used the dataset from the 1989 Bank of Italy Survey of Household Income and Wealth and investigated the proportion of risky assets in total financial wealth. They included age and age-squared as independent variables and found that younger people held smaller proportions of risky assets in their portfolio (i.e. risk tolerance increases with age). Wang and Hanna (1997) used ratio of risky assets to total wealth in the 1983–1989 SCF panel to examine the effect of age on risk tolerance. They found age had a positive effect on risk tolerance. In her 1998 work, Bertaut also used the 1983–1989 SCF panel data to study the probability of holding stocks. Age, measured as a categorical variable, was found to have a positive relationship with risky behavior so defined.

Using discriminant analysis, Grable (2000) examined whether households were willing to accept above average or below average risk. In his work, data came from a random sample of 1075 faculty and staff working at southeastern university in 1997. A financial risk-tolerance assessment questionnaire was used to determine respondents' risk tolerance. He found that age had a positive influence on household financial risk tolerance.

Still other studies have shown that risk tolerance had a non-linear pattern with a peak in risk tolerance level occurring around 55 years old (Ameriks and Zeldes, 2004; Bertaut and Starr-McCluer, 2000; Chambers and Schlagenhauf, 2002; Riley and Chow, 1992). Riley and Chow (1992) found that age had a non-linear effect on the ratio of risky assets to total wealth, that is, risk tolerance increased with age until age 65 and then decreased thereafter. Using data from the 1989 to 1998 SCF datasets, Bertaut and Starr-McCluer (2000) examined ownership of risky assets and found that the holding of risky assets had a humped shape with a peak occurring in the 45–54 age group using the 1989 and 1992 SCF data and in the 55–64 age group using the 1995 and 1998 SCF data, which suggested a possible cohort effect. Chambers and Schlagenhauf (2002) analyzed various Wealth Supplements of PSID data and discovered a humped pattern in the amount of stock-holding over the life cycle with the peak occurring in mid-fifties. Ameriks and Zeldes (2004) investigated effect of age and cohort on asset allocation and concluded that the pattern of equity holding was humped-shaped with the highest point occurring between 49 to 58 years old. Grable et al. (2009) found that older working adults were more

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