International Review of Financial Analysis 40 (2015) 122–131

Contents lists available at ScienceDirect

International Review of Financial Analysis

Stock market expectations and risk aversion of individual investors ☆

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ARTICLE INFO

Article history:
Received 22 October 2014
Received in revised form 10 March 2015
Accepted 13 May 2015
Available online 24 May 2015

JEL classification:
G10
G11
G12

Keywords:
Portfolio allocation
Stock market expectation
Risk aversion
Individual investor

ABSTRACT

We study the relationship between stock market return expectations and risk aversion of individuals and test whether the joint effects arising from the interaction of these two variables affect investment decisions. Using data from the Dutch National Bank Household Survey, we find that higher risk aversion is associated with lower stock market expectations. We identify significant and negative effects on the probability that individuals invest in stocks arising from the interaction between stock market expectations and risk aversion. These effects are in addition to a significant and positive impact from stock market return expectations as well as a significant and negative effect from risk aversion separately. However, once individuals participate in the stock market, their stock market expectations alone remain significant in determining their portfolio allocation decisions.

1. Introduction

There is a consensus amongst economists that virtually all households should have some investment in common stocks. However, the reality is different. Looking at cross-country data, Guiso, Haliassos, and Jappelli (2003) find that the percentage of households investing in the stock market ranges from 15% to 25% in the Netherlands, Italy, France, and Germany to about 50% for the U.S. and Sweden. These results persist after controlling for differences in household wealth, income, age, and education. A large number of studies try to explain this stock market participation puzzle and have come up with different explanations. Dominitz and Manski (2007) and Hurd, Van Rooij, and Winter (2011) argue that the heterogeneous stock market expectations of individuals may provide an answer to the puzzle. Another factor that has been considered in this context is the negative effect of risk aversion of individuals on their investment decisions. The objective of this paper is to look at the interaction between return expectations and risk aversion and to investigate how these two factors, both individually and combined, influence stock market participation.

The Capital Asset Pricing Model assumes that all investors apply the same theoretical economic model to form the same expectations of market return and risk. Hong and Stein (2007) argue that even though investors use the same publicly available information, they use different economic models, which causes their interpretation of information to diverge from each other. Similarly, Hurd (2009) argues that heterogeneous beliefs are likely to be caused by deviations in the manner that investors access and process publicly available information. Vissing-Jørgensen (2003) finds that the heterogeneous beliefs of American investors are correlated with their investment choices, with those who expect higher stock returns holding higher proportions of equity in their portfolios. Dominitz and Manski (2007) also argue that heterogeneity in expected returns is reflected in individuals' stock holdings, with the probability of holding stocks increasing as U.S. households' perceive a likelihood of positive equity returns increases. Both Vissing-Jørgensen (2003) and Dominitz and Manski (2007) find that substantial heterogeneity in beliefs reflects demographical and financial characteristics.

Hurd et al. (2011) find, consistent with previous U.S.-based studies such as Dominitz and Manski (2007), that substantial heterogeneity in

☆ The authors thank David Ashton, Chris Browning, Alan Goodacre, Wenguang Lin, Jared Linna, Alper Odabasioglu, Thomas Post, Su Hyundai Shin, and participants at the Scottish BAFA conference in Glasgow, the Fifth Economics, Psychology and Policy workshop at the Stirling Behavioural Science Centre, the 2013 Conference of the Academy of Financial Services in Chicago, the 2013 AIDEA Annual Meeting in Lecce (Italy), and the 2014 FMA Meeting in Nashville for their helpful comments and suggestions. Special thanks go to an anonymous referee and to the editor, Brian Lucey, for their most helpful comments. Part of the research for this paper was completed when Chris Veld and Yulia Veld-Merkoulova were visiting the University of Tampa in Florida. The hospitality of Marcus Ingram during that visit is greatly appreciated. Chris Veld and Yulia Veld-Merkoulova thank the Carnegie Trust for Universities of Scotland for financial support during that trip.

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http://dx.doi.org/10.1016/j.irfa.2015.05.011
1057-5219/

the stock market expectations of Dutch households is a significant influence on their stock ownership. They argue that those households with expectations of higher future returns are more likely to own stocks, and those with expectations as to higher volatility in returns are less likely to do so.

Dominitz and Manski (2007) find that many investors are not as convinced as are economists about the existence of an equity premium, as they observe that nearly two-thirds of U.S. households believe that the probability of positive nominal equity returns is less than 50%. Assuming that all individuals face the same risk-free rate and perceive the same level of uncertainty as to equity returns, Dominitz and Manski (2007) argue that the subjective probability of perceived positive nominal returns on equity determines the probability of equity holding.

Barsky, Juster, Kimball, and Shapiro (1997), Donkers and Van Soest (1999), and Kapteyn and Teppa (2011) argue that different types of individuals are characterised by varying levels of risk aversion related to their background and wealth characteristics. Subsequently, Hurd et al. (2011) address individuals' risk aversion as an influential factor on stock market expectations. However, they find that risk aversion has only a limited effect on both individuals' expected stock market returns and volatility, and on their stockholding decisions. Thus, they conclude that stock market expectations of individuals alone explain the stock holding puzzle adequately, without a need to invoke very high levels of risk aversion.

Adopting different measures for both stock market returns expectations and the risk aversion of individuals from those used by Hurd et al. (2011), we disentangle the effect of risk aversion from that of individuals' expectations.

As previously argued by Barsky et al. (1997), Donkers and Van Soest (1999), and Kapteyn and Teppa (2011), there are systematic variations in individual's risk aversion levels that determine their portfolio allocation decisions. It is crucial to identify whether the effect of stock market expectations on portfolio allocation decisions is the same for individuals with varying levels of risk aversion.

In this study, we account for the negative effect of risk aversion on the stock market return expectations of individual investors. Furthermore, we investigate the interactions between stock market expectations and risk aversion on the portfolio allocation decisions of individuals. In order to disentangle the effect of risk aversion from that of individuals' stock market expectations, we first consider whether individuals' stock market expectations depend on their risk aversion. Second, we investigate whether individuals' stock market expectations and their risk aversion jointly determine their stock market participation decisions. Third, we test whether the expectations and risk aversion of stock market investors jointly determine their portfolio allocation decisions, i.e. the proportion of risky financial assets held in their financial portfolios.

We obtain both individuals' stock market expectations and risk aversion levels from the Dutch National Bank Household Survey (DHS) over the period 2004–2006. We measure individuals' stock market expectations by a question that elicits their expectations as to stock price changes 1 year ahead on the basis of point forecasts in a similar fashion to Vissing-Jørgensen (2003). Our risk aversion measure is obtained from three questions evaluating individuals' risk preferences in terms of investment strategy. We use the approach suggested by Kapteyn and Teppa (2011) to obtain the risk aversion measure of individuals by applying factor analysis to survey responses. Our analysis is based on detailed information on individuals' financial, demographical, and behavioural characteristics available from the covariate-rich DHS.

In accounting for the effect of individuals' stock market expectations on their stock market participation decisions, the expectations variable gives rise to a clear endogeneity issue, given that individuals' expectations are also affected by their stock ownership status. In order to account for the issue of causality, we apply instrumental variables (IV) estimations.

Our paper contributes to the literature by addressing the effect of risk aversion in linking individuals' stock market expectations to their stock market participation decisions. Additionally, we consider the problem of endogeneity more rigorously than in prior works. Our empirical analysis shows that risk aversion of individuals affect their stock market expectations, significantly and negatively. We also find that there are significant and negative interactions between stock market expectations and risk aversion on stock market participation decisions, in addition to their significant separate effects. Finally, we find that only stock market expectations exhibit significant and positive effects on portfolio allocation decisions, while the effect of risk aversion and of the interactions between stock market expectations and risk aversion are not significant. These findings confirm that once individuals participate in the stock market, risk aversion becomes irrelevant; thus we observe no significant interactions between stock market expectations and risk aversion. Nevertheless, individuals' stock market participation decisions are significantly influenced by both their expectations and their risk aversion.

In the remainder of this paper, we discuss our data and constructions of variables in Section 2; we develop our empirical models and present the results and robustness checks in Section 3; and finally, we summarise and discuss our findings in Section 4.

2. Data description and construction of the variables

2.1. Data and sample selection

This study uses the Dutch National Bank Household Survey (DHS), which is an online survey conducted by the CentERpanel of CentERdata, an affiliate of Tilburg University in the Netherlands. Since 1993, this survey has been completed annually by approximately 3000 panel members over 16 years old from about 2000 households. The panel is representative of the Dutch population.[1] On average, the DHS takes 7 to 8 months to obtain data covering the entire survey.

The DHS included a supplementary question on stock market expectations of individuals only during the period from 2004 to 2006. This period includes a market rebound and modest recovery, with a revival starting in 2003 after 3 years of declining stock market prices worldwide following the dot-com crash of 2002. Fig. 1 presents the historical performance of both the Dutch (AEX) Stock Market Index and the MSCI World Total Return Index from 2000 to 2009. This figure shows the recovery of both indices over the period 2004–2006.[2]

The panel questions are only asked during the weekend, and most respondents answer during the first weekend that the questions are available. The stock market return question was released around late spring, and the majority of members answered on the 16th, 19th and 16th weekend of the years 2004, 2005, and 2006, respectively. We indicate the response dates for the majority of individuals each year through vertical lines in the graph in Fig. 1.

Our sample selection process is presented in Panel A of Table 1.

The participation rate is 74% on average and includes 13% '*I don't know*' responses. We exclude missing values as well as '*I don't know*' responses. We then construct our panel dataset by merging the expectation question with the datasets of the *General Information*

[1] Previous studies that have used the CentERpanel for finance topics include Guiso, Sapienza, and Zingales (2008) who investigate trust in the stock market, Van Rooij et al. (2011, 2012) who study the effect of financial literacy on stock market participation, retirement planning, and household wealth, Bonaparte et al. (2014) who study income hedging and portfolio decisions, and Georgarakos, Haliassos, and Pasini (2014) who study household debt and social interactions. Kaplanski, G., Levy, H., Veld, C., & Veld-Merkoulova, Y. V. (2015) use the LISS panel; a similar panel conducted by CentERdata, to study the effect of sentiment-creating factors on predictions of individual investors on stock market return and risk.

[2] According to the Statistical Bulletin (June 2006, pp. 21–25) of the Dutch National Bank, Dutch private investors, on average, hold about 35% of their portfolios in foreign securities, indicating that the remainder is invested in the Netherlands. For that reason we also include the MSCI World Total Return Index in Fig. 1.