Can self-assessed financial risk measures explain and predict bank customers’ objective financial risk?

Cecilia Hermansson

Division for Banking and Finance, Department for Real Estate and Construction Management, ABE School, KTH, Royal Institute of Technology, Box 100 44 Stockholm, Sweden

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ABSTRACT

This paper evaluates risk preference measures by contrasting subjective or self-assessed risk with objective risk, as implicated by bank customers’ actual portfolio allocation. Using a detailed data set of 7,234 bank customers, we find that subjective risk measures can explain and predict objective risk, but that the relationship is relatively weak. Subjective measures that use survey questions about the customers’ trade-off between risk and return is a better measure than the hypothetical lottery for explaining objective risk. Both measures are relatively weak at predicting objective risk, but perform better than using a naive model. We also find that multiple-item variables are somewhat better than single-item variables for explaining objective risk.

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1. Introduction

Risk preference is an important factor in financial decision making. In what way and to what extent investors avoid or seek risk have crucial implications for their decisions on, e.g., investment, pensions, and insurances. Financial institutions need to understand their customers’ risk preferences in order to give well-targeted advice. This also applies to the expanding market of robo-advisors, in which customers’ risk preferences need to be correctly determined in order to ensure that a suitable equity portfolio is provided (Tertilt and Scholz, 2017). A major challenge is to measure customers’ risk preferences effectively. A number of studies discuss trade-offs when choosing methods to measure risk preference (Dohmen et al., 2011; Loomes and Pogrebna, 2014; Dave et al., 2010; Charness et al., 2013; Eckel and Grossman, 2008; Menkhoff and Sakha, 2017), e.g., in terms of the measures’ explanatory and predictive power, overall validity, simplicity, and cost-effectiveness.

The overall objective of this paper is to evaluate risk preference measures by contrasting subjective or self-assessed risk with objective risk, as implicated by bank customers’ actual portfolio allocation. Nosic and Weber (2007), Chang et al. (2004), and Schooley and Worden (1996) find consistency between subjective and objective risk. Households allocate their assets

E-mail address: cecilia.hermansson@abe.kth.se

1 Is PhD researcher at the Division for Banking and Finance, ABE-School, Royal Institute of Technology. Her research focuses on bank-customer relationships, financial advisory services, and behavioral finance.

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according to their attitudes toward risk. Park and Yao (2016) find that those who have financial planners more often have risk attitudes that are in line with their behavior. Other studies come to different conclusions, and results are mixed. Marinelli et al. (2017) find inconsistencies between subjective and objective risk tolerance. They analyze the characteristics of those who either undervalue or overvalue their self-assessed risk, and those who overexpose or underexpose their objective risk according to their portfolio composition. Also, Jianakoplos (2002) and Ehm et al. (2014) conclude that there is a gap between reported customers’ willingness to take risk and their actual portfolio allocation of risk. Thus, there is a need to study this research question further, e.g., by using new and extended data.

Considerations when deciding on suitable risk preference methods include whether to 1) use surveys with one-dimensional or multi-dimensional questions (MacCrimmon and Wehrung, 1986; Menkhoff and Sakha, 2017), 2) use subjective or objective measures from register data (Schooley and Worden, 1996), 3) ask context-related questions or more general questions (Dohmen et al., 2011), or 4) arrange experiments in laboratories or in the field (see, e.g., Smith, 2008, for background). Methods could include choice dilemmas (Stoner, 1961), heuristic judgements often used by practitioners (discussed in Grable and Lytton, 1999), utility theory (von Neumann and Morgenstern, 1944), or prospect theory (Kahneman and Tversky, 1979). If lotteries are used, one needs to decide if they are hypothetical or real, and if small or large stakes should be used (Holt and Laury, 2002).

When using self-assessed risk measures, researchers often use the answers from the American Survey of Consumer Finances (SCF). Respondents answer one question to rate their willingness to take risk when saving or investing. Loomes and Pogrebna (2014) argue that it is not safe to expect that one or two questions can provide a reliable measure at the individual level, since most individuals show extensive variability in their responses to questions intended to measure their risk attitudes. Therefore, several different questions should be used, or at least two different procedures, to check the sensitivity of the risk attitude parameters. In order to reduce noise in measures, Menkhoff and Sakha (2017) find that it is better to combine single-item risk measures to form multiple-item risk measures. They, and Dohmen et al. (2011), conclude that survey items perform just as well as incentivized experimental items in explaining risky behavior.

The main contribution of this paper is to explore the possibility of using and comparing bank customers’ self-assessed risk preference with their objective risk preference, as shown by their actual allocation of risky and risk-free assets. Two types of subjective measures – survey questions on hypothetical lottery choices, and survey questions on risk preferences regarding the trade-off between risk and return – are compared. The questions are related to the investment and saving context. Also, building upon recent findings from Menkhoff and Sakha (2017), we compare separate single-item measures with a combination of measures. The paper uses a unique dataset of 7,234 customers in a Swedish retail bank.

Another contribution of the paper is its use of extensive multiple controls. In addition to socioeconomic and demographic characteristics, data on customers’ use of, and trust in, financial advisors, customers’ subjective knowledge of, and interest in, finances, and their objective financial literacy, as determined by a test, are included in the analysis. We are also able to analyze the consistency between subjective and objective measures, using a finer division of the objective risk measure. Customers’ allocation of total assets, mutual fund assets, and equity assets are analyzed and compared with subjective risk measures.

Our main findings are as follows. We find that subjective risk measures can explain and predict objective risk, but that the relationship is relatively weak. We also find that the subjective measure that uses survey questions about the customers’ trade-off between risk and return is a better measure than the hypothetical lottery for explaining objective risk. Both measures are relatively weak at predicting objective risk according to the root mean of the squared standard errors (RMSE), but better than a naïve model. Finally, we find that combined measures are somewhat better than single-item questions for explaining objective risk.

The rest of the paper is structured as follows. In the next section, we describe our research design, i.e., the setup of the study, the data set, and the methodology used. Regarding the construction of key variables, we discuss the characteristics of the subjective and objective risk measures. In Section 3, we analyze the results, including robustness checks and the study’s limitations. Section 4 concludes with a discussion about implications for researchers and practitioners.

2. Research design

2.1. Set up of the study

The two subjective risk measures are analyzed in three ways: 1) individually, 2) combined, and 3) as an average of these two standardized risk measures. These are compared with objective risk, which is defined as the actual allocation of risk-free assets and risky assets in bank customers’ portfolios. Three types of assets are analyzed: 1) total assets, 2) mutual fund assets, and 3) equity assets. Eight models of combinations of subjective risk preferences are discussed and compared for each of the three asset types, i.e., a total of 24 models are presented and discussed.

In line with Shmueli (2010), we discuss both the explanatory and predictive qualities of these models – even if the main objective is to find out how the subjective measures predict the objective measure of risk taking. Whereas academic research is more focused on explaining, practice – not least, within finance – is more focused on prediction.

From an explanatory point of view, our first hypothesis is that subjective risk measures can explain and predict objective risk. In line with extensive and often-cited research by Ajzen and Fishbein (see, e.g., Ajzen and Fishbein, 2005; Ajzen, 2008),
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