Research Report

The Effect of Robo-Advice on Stock Market Participation

DESPITE A RECENT SLIGHT RECOVERY FROM CRISIS LOW LEVELS, STOCK MARKET PARTICIPATION IN GERMANY IS STILL AT ONLY 14% OF ADULT POPULATION. PREVIOUS RESEARCH SHOWED THAT TRADITIONAL PERSONAL ADVICE – DUE TO HIGH COSTS AND MISALIGNED INCENTIVES – CAN HARDLY ALLEVIATE PRIVATE INVESTORS' INVESTMENT MISTAKES, OF WHICH STOCK MARKET NON-PARTICIPATION IS ONE. ROBO-ADVICE IS A "HOT TOPIC" IN REGULATORY AND INDUSTRY DISCUSSIONS. THE RESULTS OF THIS STUDY SHOW EMPIRICAL EVIDENCE THAT INVITATIONS TO ROBO-ADVICE INCREASE STOCK MARKET PARTICIPATION.

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What Is Robo-Advice?

Robo-advice refers to online services and tools that provide guidance on investment decisions based on the users' data and investment preferences (European Joint Committee, 2015). In essence, robo-advice aims to match people with sound portfolios. The recent emergence of robo-advice has been vividly discussed by the industry and regulators. The European Joint Committee (2015) identified three main advantages over traditional personal advice:

- better accessibility, especially to people from lower wealth bands through transparent and inexpensive price schemes and very low minimum investment amounts;
- comprehensible investment guidance that is

- reproducible and that is continuously updated against new data; and
- open architecture design with access to products from a wide range of issuers.

Along the same lines, the FCA (Financial Conduct Authority, 2016) states that demand for professional financial advice is often inhibited by high total cost relative to available funds-to-invest and limited financial confidence of clients. Against this background, the FCA recommends mass-market automated advice.

The Case of Stock Market Participation

Stock market non-participation is one of the major puzzles in household finance (Campbell, 2006) and has been estimated to account for a welfare loss of up to 2% of annual consumption (Cocco et al., 2005). Participation levels vary considerably between households from different social groups and also between countries. One strand of literature points at heterogeneity in investor attributes such as cognitive skills and lack of trust as an explanation. Other studies emphasize participation and information search cost as participation barriers especially for lower-wealth individuals (Kim et al., 2016).

Compared with such large body of evidence concerning inhibiting factors, there exists only relatively little evidence on how barriers to participation, such as high perceived cost of participation, low financial literacy, and ignorance, can be effectively surmounted in practice. One factor that has been documented to spur stock market participation is social interaction. While advertisements by listed firms have been found to increase their stock returns and marketing for funds increases fund flows, respectively, it remains unclear whether the effect is driven by existing or new investors.

Financial advice seems to be an intuitive solution. However, at least for traditional personal advice, evidence shows that individuals are largely reluctant to use advice as a means to improve their investment decisions. In a field study where individuals that already invested in the stock market were invited to use un-biased personal advice, Bhattacharya et al. (2012) found that only 5% of treated investors accepted the offer, even though the advice was offered free of charge. Among those who did accept the offer, only 20-25% followed the recommendations.

Field Study: Invitation to Robo-Advice

The research design builds on a large field study in cooperation with a large German online bank. The launch of a robo-advice tool at that bank was followed by a series of marketing campaigns between August 2014 and December 2015 inviting almost 60,000 preselected clients to use the service. The selection was made according to low levels of assets under management or income, thus exhibiting only very weak discrimination. The invitations, which were extended to clients via electronic message, letter, or phone, are the treatments in the field study. Invitees were randomly assigned to groups that received the treatments in different points in time. This allows for "within-subject" controls. Plus, the bank pulled separate groups of clients who matched the selection criteria, but did not obtain any invitation to use advice. Some of the clients also received an invitation to use the bank's personal advice services. Both allows for "between subjects" controls over the entire observation period.

Empirical Findings

In this study, a Cox proportional hazard model has been used to measure the treatment effect of robo-advice invitations on first-time market participation by sample clients. Hazard models combine one separate binary outcome analysis per observation-day. In the given setting, a hazard model has three major advan-

Cox Proportional Hazards Regression
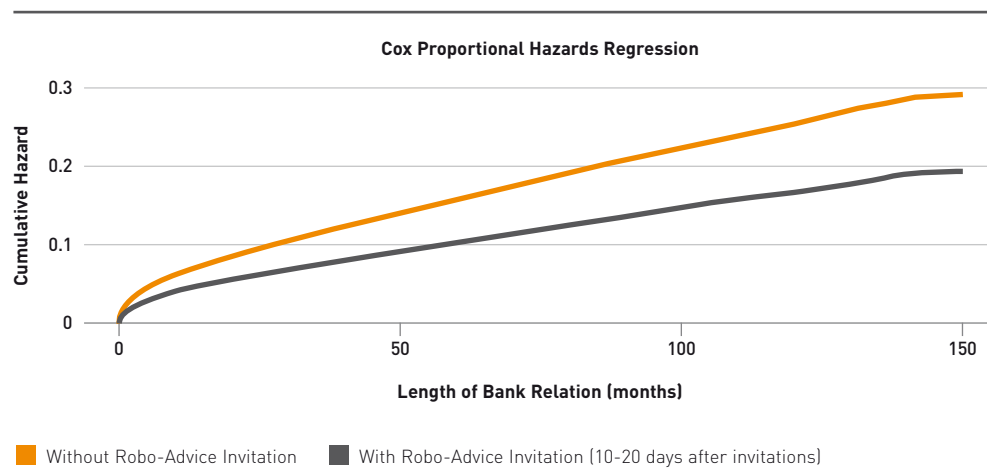
Figure 1: Predicted Cumulative Hazards for Stock-Market Participation 10-20 Days post Robo-Advice Invitation for Invited and Non-Invited Customers

tages over a single binary-outcome analysis: First, it accounts for right-censoring. Second, person-day-observations are not treated as independent. Third, the interpretation of hazard rates is straightforward as they can be treated like factors on baseline probabilities.

Results suggest that invitations to use robo-advice increase the average propensity of clients to participate over the ten day period post invitation by a factor of 2.34 (t-statistic = 12.27) reducing to 1.86 (t-statistic = 7.80) over the ten to twenty days period. These factors do not yet tell anything about the actual probability to participate. Figure 1 plots the cumulative probability to participate in the stock market across the lifetime of a bank customer relationship showing economic significance. Results are robust controlling for a battery of customer and account activity characteristics, all treatment selection criteria, time- and cohort-effects, and past stock market return as well as volatility. Finally, other types of marketing campaigns for investment opportunities are controlled for to obtain the effect of robo-advice that goes beyond a potential effect of general awareness for the stock market.

What are the mechanisms behind this effect? It is unlikely that the invitation to use the robo-advice service directly augments a client's level of financial literacy, his social interaction activity, or his general trust into the bank institution. Instead, it can be conjectured that robo-advice reduces the cost of stock-market participation as perceived by invitees. To test this conjecture, we exploit the fact that the bank also reached out to a subset of treated clients and to other clients to invite them to use the personal advice service. As part of that personal advice service, bank advisors navigate through an investment process that is very similar to the process built into the robo-advice tool, but personal advice carries an explicit fee and requires sign-up through a personal call. The model does not predict a positive influence of the personal advice treatment on participation (e.g., for the ten days post treatment: hazard ratio = 0.79, t-statistic = –1.20), while the positive effect for robo-advice remains (hazard ratio = 2.42, t-statistic = 13.22).

Moreover, the interaction of invitation treatments and client wealth is consistent with the conjecture on participation cost. In the case of robo-advice, the propensity to participate increases especially in the group of less wealthy clients (e.g., for the lowest wealth band: hazard ratio = 1.75, t-statistic = 11.70). In contrast, for personal advice the highest factor is observed for the highest wealth bands, although not statistically significant (hazard ratio = 1.87, t-statistic = 1.25).

Conclusion

The results of this study (Scheurle, 2016) are consistent with the conjecture that robo-advice promotes market participation through a reduction in perceived participation cost. This result resonates well with the viewpoints on robo-advice voiced by the European Joint Committee (2015) and the FCA (2016). We continue our research in order to test further conjectures on the longterm effect of robo-advice.

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