What Drives the Concentration of Households' Investments in Bank Bonds?

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Abstract

Using unique panel data on Italian households, the article examines the drivers of bank bond concentration for retail investors when consulting with bank financial advisors. The regression analysis based on the Fractional Response Model (FRM) shows three main results. First, familiarity tends to substantially increase investors' portfolio exposure towards bank bonds. A similar effect, although to a lesser extent, is also observed for overconfidence. Second, investor attributes such as age, education and experience explain a small but significant variation in bank bond share. Third, weaker banks in terms of funding structure and profitability seem to exert substantial pressure on clients' bond allocation through bank advisors. Overall, the research contributes to the understanding of the reasons why households disproportionally concentrate investments in bank bonds, casting doubt on the effectiveness of current investor protection policies.

Keywords: Portfolio concentration, Bank bonds, Household portfolios

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1. Introduction

This paper investigates concentration of households' investments in bank bonds when investors receive tailored-cut recommendations by bank advisors. While there is widespread evidence on the impact of retail investor behaviour and financial advisors on equity portfolio concentration (Hackethal, et al., 2012; Foerster, et al., 2016), there is no empirical research focusing on bank bondholder concentration. This is partly due to the fact that bank bond risk has been misleadingly underestimated in the past. However, following the outbreak of the recent financial crisis, several countries (USA, Denmark, Portugal, Cyprus, Greece, Italy) imposed losses on the retail bondholders of their failed banks[1], questioning the risk of such instruments excluded from deposit guarantee schemes in Europe. In addition, very limited data on households' asset allocation are available.

Understanding the drivers of bank bond concentration is therefore particularly important, considering that bank bonds are one of the major sources of financing for banks and in view of the new European bail-in mechanisms that put bondholders (and shareholders) on the hook for losses. Over the years, financial institutions have widely issued bonds for retail investors who often concentrate their investments in the bonds of their reference bank. Although bonds have long been regarded as risk-free investments and the question of diversification in this market has been mainly ignored by the academic literature (Dbouk & Kryzanowski, 2009; Liu, 2016), concentrating portfolio holdings in one individual bond can significantly increase portfolio volatility and reduce its risk-adjusted performance as compared to a well-diversified bond portfolio, leading to inefficient asset allocation. Retail bank bonds are particularly interesting in the study of portfolio

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[1] E.g., USA: Lehman Brothers; Denmark: Amagerbanken A/S and Fjordbank Mors A/S. Portugal: Banco Espirito Santo. Cyprus: Bank of Cyprus. Greece: Bank of Greece: Italy: Banca Marche, Banca Popolare dell'Etruria, Cassa di risparmio di Ferrara, Cassa di risparmio di Chieti.

concentration because of their extremely illiquid market and negatively skewed returns (i.e., high probably of small gains and low probably of big losses), whereas these characteristics are, on average, much less pronounced for common stocks[2]. Moreover, as demonstrated by McEnally & Boardman (1979), benefits of bond portfolio diversification are (especially for low rated bonds) of approximately the same magnitude as those of common stocks.

There are three main reasons why households receiving advisors' recommendations might hold extremely poorly diversified bank bond portfolios. First, this phenomenon could be prompted by investor behavioural biases and related attributes, e.g. households tend to invest towards geographically proximate companies because they prefer to invest in the familiar (Huberman, 2001; Ivković, et al., 2008; Ivković & Weisbenner, 2005). Second, investors might hold concentrated portfolios due to external pressures. In our case, banks act as both issuer and advisor for investors. This phenomenon may lead to principal-agent problems in the provision of financial information (Bolton, et al., 2007; Inderst, 2009): banks (principal) want to raise funds and investors (agents) want to minimize portfolio risk exposure (conflict of interests) but cannot always ensure that bank financial advisors act in their own interests (information asymmetries). Although possible, such behaviour is highly discouraged by the MiFID regulation in Europe (Del Giudice, 2016). Third, investors might be able to pick up bonds with the highest expected returns due to analytical skills and better access to business-related information. However, since prior research has shown households' low level of financial literacy (Guiso & Jappelli, 2008), the latter reason is hardly more than a purely hypothetical conjecture and it barely explains one-bond portfolio concentration.

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[2] In our dataset, bank bonds are bought at the time of issuance and, therefore, at the face value.

This research aims at examining households' portfolio concentration towards bonds of a nearby bank, where diversification failure occurs both across firms and geographically. Specifically, we claim that bank bond concentration is driven by investor biases (familiarity and overconfidence-bias hypothesis), individual attributes (related-attributes hypothesis) and external pressures (conflict-of-interest hypothesis).

To that end, we use unique Italian data over the 2011-2015 period. Italy offers a natural experiment for evaluating households' bond portfolio concentration. It has been largely documented that bonds constitute, on average, the primary asset choice of individual investors within this country. Among bonds, as Linciano et al. (2016) reported in a 2016 survey, bank bonds are the most frequently held assets by Italian households.

The data, which were obtained by eight *banche di credito cooperativo* (hereinafter cooperative credit banks, or CCBs), include investment choices of roughly 25,000[3] households and investors' responses to the MiFID questionnaire[4], together with demographic information. Moreover, accounting data on banks, the number of advisors operating at branches and the amount of fund raised by the latter are collected.

Italy's CCBs are characterised for being local, mutual, not-for-profit cooperatives. Contrary to US credit cooperatives, which are generally government-sponsored, Italy's CCBs are private enterprises whose stated objectives are the "*wellbeing of their stakeholders and the development of the local economy*"[5] (article 2 of the Standard CCB Corporate Statute*)*. They represent a big portion of the Italian banking system, thanks to a widespread distribution all over the country.

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[3] It is referred to the number of retail investors who have a securities account that in active in at least one year of the sample period.
[4] Further information on the MiFID questionnaire is provided in paragraph 3.2.
[5] http://www.creditocooperativo.com/template/default.asp?i_menuID=42125.

The cooperative nature of CCBs makes them particularly suitable to establish trust-based investor-advisor relationships, highlighting the important role played by bank advisors in these institutions (Monti, et al., 2014).

The main findings of this article can be summarized as follows. First, we show that investors with a longer banking relationship hold a considerably greater portion of their portfolio in bank bonds, which provides support to the familiarity-bias hypothesis. Despite gender is barely significant, self-employed individuals, which are generally prone to overestimate their skills and abilities (Koellinger, et al., 2007)[6], exhibit significant bank bond exposure, providing some evidence for the overconfidence-bias hypothesis. Second, bond concentration risk is greater among younger, less educated and less experienced investors. Difference in investor attributes thus contribute to explain bank bond share, coherently with the related-attributes hypothesis. Third, we document that bank and branch-level advisor characteristics explain considerable more variation in bank bond share than investors characteristics. After controlling for clients' attributes and bank/branch fixed effects, bank bond concentration increases when the issuer bank is less profitable, with a weaker funding structure and its advisors exert influence over households' bond allocation. These findings support the conflict-of-interest hypothesis.

The contributions of our paper to prior literature are manifolds. First, this research is important for retail investors. Bondholders should be fully aware of the risk they take in disproportionally investing in bank bonds. Since they might enjoy either small gains (with high probability) or big losses (with low probability), they should accurately bear risks. Second, the analysis carried out in this study has meaningful implications for bank advisory services to retail clientele. Due to the

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[6] The paper by Koellinger et al. (2007) focuses on entrepreneurs. Although different, we believe there are many similarities between entrepreneurs and self-employed individuals.

increasing reliance and dependence of investors on advisor recommendations[7], it is crucial for banks to provide customized and impartial investment advice by professional and highly qualified individuals to ensure that clients' specific needs are addressed. Finally, the research questions the effectiveness of current investor protection mechanisms. Although this research does not aim at estimating agency costs, it suggests that agency problems may drive bank bond concentration. If this is the case, tougher enforcement rules should be introduced to ensure that bank debt does not end up in the hands of unsophisticated and vulnerable households.

The article is organized as follows. Section 2 briefly reviews major studies on this topic. Thereafter, section 3 describes the data and methodology used for the empirical analyses. Section 4 presents the findings. Finally, section 5 presents the conclusions.

2. Background literature

The issue of diversification has received considerable attention in the finance literature and has provided several studies focusing on equity. Among researchers, it is commonly agreed that household portfolios are poorly diversified (Blume & Friend, 1975; Kelly, 1995; Polkovnichenko, 2005). Though such behaviour appears inefficient from a modern portfolio theory standpoint and financial advisors could in principle ensure greater risk diversification, academics has attempted to explain it providing different explanations: behavioural biases (Huberman, 2001; Zhu, 2002), investor attributes (Guiso & Jappelli, 2008) and principal-agent conflicts (Starks, 2009).

Concerning research on investor biases, Huberman (2001) shows that shareholders of a Regional Bell Operating Company (RBOC) tend to live in the area in which it operates. Using US brokerage data, Zhu (2002) finds substantial local bias among individual investors that is neither

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[7] Households are often uncertain about which financial product best suits their need due to limited cognitive ability and low financial literacy.

explained by asymmetric information nor firms' accounting numbers but by familiarity-based preferences, even though such familiarity bias does not turn into benefits for equity portfolios. Similarly, Seasholes & Zhu (2010) document that investors have a preference towards nearby stocks. In related studies, Odean (1999) and Barber and Odean (2000), (2001) show that individual investors, on average, trade excessively and that this behaviour is related to overconfidence. The cognitive bias of overconfidence has been also associated to occupation type. Arabsheibani et al. (2000) show that self-employed are, on average, over-optimistic compared to employed.

Overall, these results are consistent with the hypothesis that households tend to invest disproportionally in familiar assets and overestimate their abilities.

In addition to behavioural biases, studies show that economic and demographic variables -such as gender, age, income, occupation, risk-tolerance, financial knowledge and experience -ought to be of first-order importance to explain portfolio asset allocation. It is well documented that, on average, risk attitude decreases with age, education, income and is lower for female investors (Hallahan, et al., 2004; Barber & Odean, 2001). Moreover, financial literacy and trading experience should reduce investment mistakes.

Cognitive phycology researchers suggest that individuals have limited abilities to process information and to conduct more than a limited number of activities at a time, which hamper their problem-solving abilities (Miller, 1956; Kahneman, 1973). Considering that relevant information on financial markets is hard to obtain and that investors have limited skills, households may decide to invest in few securities for which they can obtain favourable information or rely on advisor recommendations. Ivković & Weisbenner (2005) and Massa and Simonov (2006) find that local portfolios outperform those composed of non-local stocks, suggesting that individuals successfully

collect and exploit value-relevant information about nearby stocks[8]. Nevertheless, prior studies also show lack of financial literacy among retail investors, who often seek investment advice. The advisory service has been object of several discussions due to the potential agency costs resulting from the conflict of interest between investors and investment advisors (Golec, 1992). When financial advisors suggest the stocks, bonds or funds managed by their companies, instead of providing tailored recommendations and protecting their customers from investments mistakes, principal-agent problems may arise. Under such circumstances, households may end up with suboptimally diversified portfolios. Due to their double role, both as an intermediary and issuer, banks are particularly exposed to this conflict of interest (Bolton, et al., 2007). On one side, they provide investment advice to their clients and, on the other side, they issue financial instruments. In this framework, agency conflicts are more likely to emerge when issuer banks exhibit fundraising needs. This latter could be transmitted (e.g. through contract incentives) to their advisors, which in turn may exert influence on investors' portfolio allocation, significantly raising clients' share of bank issued securities.

The above argument provides support for the conflict-of-interest hypothesis to explain households' lack of diversification.

Despite the existing literature provides widespread evidence on shareholders, relatively little is known about how bondholders' shape their portfolio and the role played by bank financial advisors.

By examining bond portfolio diversification, McEnally & Boardman (1979) document that one-bond portfolios are extremely inefficient. The variance reduction gained by increasing portfolio size is substantially high, especially for low rated bonds. Since the bank bond market is

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[8] Coval and Moskowitz (1999) reach similar conclusions for institutional investors.

illiquid and characterised by negatively skewed returns, concentrate investments towards a single security is a risky practice. Yet surprisingly, empirical evidence shows that households tend to disproportionally invest in few bank bonds (Linciano, et al., 2016).

Prior research on bond holdings has focused on country (Schoenmaker & Bosch, 2008; De Moor & Vanpée, 2013) and firm-level data (Francis, et al., 2007) to explore diversification issues, whereas, to the best of our knowledge, no research has focused on individual investors. This is despite the fact households are among major holders of bank bonds in the market.

The present study fills this gap and examines the main determinants of households' portfolio concentration towards bonds of a nearby bank when investors receive advisor recommendations. According to the literature, we posit that such behaviour is affected by investor biases (familiarity and overconfidence-bias hypothesis), individual attributes (related-attributes hypothesis) and external pressures (conflict-of-interest hypothesis).

3. Data and Methodology

3.1. Data sources

The primary data source used in this study includes year-end observations on households' asset allocation choices and responses to the MiFID questionnaire over the period 2011-2015. The data captures portfolio composition of all households receiving tailored-cut recommendations by bank financial advice that have an active and individual securities account held at one of the eight CCBs that provided data. We exclude jointly held accounts from the final dataset because investment choices may depend on different investors' attributes (Foerster, et al., 2016). Portfolios include the following assets: CCB-issued bonds, other bonds[9], government bonds, stocks, depository

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[9] It excludes CCB-issued bonds and government bonds.

certificates, repos, insurance policies and derivatives. Moreover, banks provided account balance, account age[10], demographic information and investors' responses to questions about their financial knowledge, experience, investment goals, risk tolerance, income and investment horizon. To be included in the final database, each household's portfolio value must be greater than € 1,000[11].

The rationale for focusing on bank advisors as providers of investment recommendations is related to the fact that they constitute an important source of financial information for households not only in Italy but also in other European countries and in the United Stated[12], as reported by Calcagno e Monticone (2014).

Table 1 displays summary statistics for households.

As a second step, we obtain bank and branch- level data for the period under examination. At the bank level, we collect data on profitability and liquidity. It is important to point out that credit rating agencies as Moody's and Standard &Poor's do no assign any rating to Italian CCBs, which explain the lack of data on bank credit quality.

At the branch level, we gather data on the total number of employers, the numbers of investment advisors and year-end direct funding.

Table 2 shows summary statistics for the eight banks and their branches.

Although heterogeneous in terms of operating policies, CCBs are characterised by a similar business structure, which provides a homogeneous data set on financial institutions for the analysis.

<div align="center">[insert Table 1 here]</div>

<div align="center">[insert Table 2 here]</div>

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[10] Account age is the number of years a household has been registered by the bank.
[11] It is an arbitrary threshold.
[12] As survey representative of American households, i.e. the Survey on Consumer Finances, documents that American households rely substantially on financial intermediaries when deciding about investing: almost 40 per cent of the respondents reported bankers and brokers as sources of financial information (the data refers to the 2010-2013 period).

3.2. A brief description of the MiFID questionnaire

MiFID is the Markets in Financial Instruments Directive (Directive 2004/39/EC). Since 2007, year in which the regulation came into force in Europe, "*this directive governs the provision of investment services in financial instruments by banks and investment firms and the operation of traditional stock exchanges and alternative trading venues.*"[13]

With the purpose to protect investors, banks are required to provide investment advice to a client in relation to his "*knowledge and experience in the investment field relevant to the specific type of product or service, his financial situation and his investment*" (Directive 2004/39/EC). In accordance with the obligation to obtain customer-related information, investors fill out a questionnaire addressing investment experience, financial knowledge, risk profile, financial situation and investment goals. The information provided by the questionnaire are then reviewed by the bank advisors to verify the suitability and appropriateness of investment products. CCBs require their clients to update their questionnaire every three years. Importantly, failure to fill out the questionnaire would prohibit investors from executing any transaction.

3.3. Methodology

To investigate the drivers of households' bank bond portfolio concentration, we estimate the following regression model:

$$y_{i,a,b,t} = \alpha + \beta INVESTOR_{i,t} + \gamma BANK_{a,t} + \delta ADVISOR_{b,t} + \mu_a + \mu_b + \mu_t + \varepsilon_{i,a,b,t} \quad (1)$$

in which the dependent variable is the bond portfolio share invested in bonds issued by bank *a* of investor *i*, who relies on recommendations of advisors operating in branch *b* of the bank *a*. To

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[13] < http://ec.europa.eu/finance/securities/isd/index_en.htm>.

test the familiarity/overconfidence-bias hypothesis and the related-attributes hypothesis, we introduce the $INVESTOR_{i,t}$ vector, which includes the following variables for households: age, gender, occupation, education, risk tolerance, financial knowledge, experience, investment horizon, income, account age, total debt and assets held. To test the conflict-of-interest hypothesis, we use bank characteristics and branch-level advisor information. With reference to the former, (i.e., the $BANK_{a,t}$, vector), we consider a set of variables on bank operating policies: return on average assets (ROA), total debt securities in issue over direct funding from customers[14] (Debt_Sec/Fund) and total loans over direct funding from customers (Loans/Fund). Financial institutions with a weaker funding structure might increase pressures to raise funds. With reference to the latter (i.e., $ADVISOR_{b,t}$), we include the ratio between the number of financial advisors and the total numbers of employers operating in each bank branch (Advisor_ratio), which captures to some extent advisors' influence over households' portfolio choices. As an alternative measure, we also define the ratio of direct funding from retail investors of branch *b* divided by the number of advisors operating at branch *b*, as numerator, and direct funding from retail investors of bank *a* divided by the total number of advisors operating at bank *a*, as denominator (Advisor_fundraised).

The bank and branch fixed effects (μ_a and μ_b) capture common variation in portfolios among investors of the same bank and branch, respectively. We also include year fixed effects (μ_t) to absorb within-group variation over time.

We estimate the model (1) using Fractional Logit Response Regressions with robust standard errors. The Fractional Response Model (FRM) was first developed by Papke and Woolridge (1996, 2008) and provides a robust approach to deal with bounded, non-binary data, overcoming many limitations of previously-used linear and non-linear models. Standard estimation models, such as

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[14] Direct funding from customers includes deposits and securities.

OLS, allow predicted value outside the unit internal. Therefore, they are not suitable in settings where a considerable portion of the dependent variable stands at one or both boundaries (Galliani, et al., 2017). The fractional nature of our response variable, which is continuous and bounded between zero and one, and the positive probability mass at both corners provides an ideal setting for the application of FRM.

4. Results

Table 3 reports results from regressions using the FRM and from the analysis of the average partial effects (APE) to explain households' portfolio concentration towards bank bonds. Since the FRM are non-linear models, the APE is informative for the interpretation of the economic impact of the variables of interest. The first model (i.e., model (1)), includes only investor attributes as independent variables and controls for both bank and year fix-effects. Investor age is important to explain variation in risk-taking and suggests that older investors reduce more the bank bond exposure as compared to younger investors. This result is consistent with most lifecycle models, which implicitly recommend to older individuals to take less investment risk. Education is also a statistically and economically relevant variable: investors who report to have an education level above high school concentrate less their portfolio towards bank bonds, as expressed by a negative coefficient sign, whereas investors who report to have an education level below high school concentrate more their portfolio towards these securities, as expressed by a positive coefficient sign.

Households with a high-risk tolerance invest, on average, -0.7 per cent less in bank bonds. This result could be explained by the fact that, being more prone to losses, these households prefer to invest in asset categories that are risker in terms of market volatility (e.g., equity and derivatives).

Experience has a negative and statistically significant sign, which is coherent with the concept of learning through experience and with a lower likelihood among experienced households to make investment mistakes. Surprisingly, all financial knowledge categories document negative and statistically significant signs, which contradict studies showing a positive relation between financial literacy and portfolio diversification (Guiso & Jappelli, 2008). However, this counterintuitive result could be driven by the self-evaluative nature of this variable, which is constructed based on what investors report to know about financial instruments and not what they actually know.

We also find some variation in bank bond share across occupations. Self-employed and employed investors hold a slightly higher share of bank bonds, while the retired category is not statistically significant. The finding for self-employed runs counter to standard conclusions of portfolio theory that investors whose labour income is riskier – such as self-employed individuals that are more exposed to exogenous risks – should take less investment risk. However, prior research has also point out that individuals who run their own business activity tend to be more overconfident, which could explain the positive coefficient sign.

All variables related to households' welfare, i.e. total portfolio value, account balance, income and total assets (this latter variable to a lesser extent), document a negative and statistically significant sign, indicating that investors with higher levels of these categories allocate less portfolio share towards bank bonds than investors with lower levels of these variables. After controlling for all other investor attributes, total debt does not explain cross-sectional variation in bank bond share.

With reference to behavioural biases, we find that investors with a longer banking relationship, captured by the account age variable, invest much more in bank-issued bonds. This result provides

support for the familiarity-bias hypothesis. On the contrary, the gender variable, a proxy for overconfidence, does not explain variation in bank bond share.

In the following models (i.e., model (2), (3) and (4)), we introduce a set of bank-specific characteristics that act as indicators of bank operating policies. We expect financial institutions with weaker funding structure and lower profitability to be more exposed to principal-agent issues and, therefore, to attempt to allocate a greater amount of bonds to their own clientele. Consistently with our expectations, when issuer banks are less profitable (lower ROA) and experience a high funding gap (higher Loan/Fund), investors hold on average relatively more bank bonds in their portfolio. Since clients' pressure by banks occurs through financial advisors, we include in model (5) branch fix-effects and the Advisor_ratio variable, while in model (6) branch fix-effects and the Advisor_fundraised variable. The results reveal remarkably powerful branch/advisor effects. The adjusted R-squared substantially increases from 14 per cent in model (1) to almost 25 per cent in model (5). These findings indicate common variation in portfolios among investors of the same branch. Importantly, investors from branches with higher number of financial advisors concentrate more their portfolio towards bank bonds as compared to investors from branches with a lower number of financial advisors. Similar results emerge also for the Advisor_fundraised variable that captures the extent to which advisors raise funds from retail clientele with respect to all retail funds raised by the bank.

This finding supports the conflict-of-interest hypothesis and provides some evidence of the influence of advisor' recommendations over households' bond allocation.

[insert Table 3 here]

5. Conclusions

Though bond portfolio concentration is a risky investment activity, many households receiving tailored-cut recommendations invest excessively in bank bonds. Nevertheless, relatively little is known about bond concentration risk and the role played by the bank advisor as a provider of financial information.

Using unique Italian data on eight CCBs, their branches and their clients, we examine the main determinants of bank bond concentration for retail investors. We present three key findings. First, familiarity plays an important role in explaining variation in bank bond share. This result is consistent with the literature on investor preferences for familiar securities (Huberman, 2001). Although to a lesser extent, a similar finding emerges from overconfidence: self-employed individuals appear to be more exposed to such risky behaviour. Second, investor characteristics such as age, education and experience are important determinants of portfolio concentration in the bank bond market. Third, bank and branch-level advisor characteristics are the strongest predictors of bank bond concentration risk taken by households, providing some support for the problem of conflict of interest between banks and investors.

This research has some important theoretical and practical implications. From a theoretical perspective, it contributes to a relatively scarce literature on bond allocation, increasing understanding on how bondholders shape their portfolios.

From a managerial point of view, this research provides important policy implications, supporting the effectiveness of current investor protection mechanisms.

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Appendix

Table 1. Descriptive statistics for investors

Variable	Mean	Percentiles		Standard Deviation
		25th	75th	
Female	0.471	0.000	1.000	0.499
Age	51.22	41.00	61.00	15.047
Account age (years)	15.15	8.00	22.00	8.251
Portfolio allocation				
CCB-issued Bonds (% of total portfolio)	0.3098	0.0000	0.6287	0.4092
CCB-issued Bond (% of total bonds)	0.694	0.297	1.000	0.405
Equity (% of total portfolio)	0.4422	0.0000	1.000	0.423
Total portfolio value	503.50	110.20	741.80	491.21
Account balance	121.400	17.470	175.00	138.77
Income	288.3	100.0	300.0	199.69
Education				
Below high school	0.363	0.000	1.000	0.4854996
High school	0.5102	0.000	1.000	0.4999928
Above high school	0.1253	0.000	1.000	0.3258715
Occupation				
Self-employed	0.238	0.000	1.000	0.4284675
Employed	0.4907	0.000	1.000	0.4998134
Unemployed	0.09318	0.000	1.000	0.2851904
Retired	0.1781	0.000	1.000	0.3860072
Risk tolerance				
Low	0.06476	0.000	1.000	0.2805259
Moderate	0.8189	0.000	1.000	0.3864553
High	0.1163	0.000	1.000	0.2954183
Financial knowledge				
Low	0.00560	0.000	1.000	0.1030392
Low to Moderate	0.08405	0.000	1.000	0.3199911
Moderate	0.2335	0.000	1.000	0.4192561
Moderate to High	0.5732	0.000	1.000	0.4973815
High	0.1036	0.000	1.000	0.2928635
Experience				

Low	0.1786	0.000	1.000	0.3934632
Moderate	0.7092	0.000	1.000	0.4587392
High	0.1122	0.000	1.000	0.3123912
Time horizon				
1 year	0.005653	0.000	1.000	0.09973245
1- 3 years	0.08827	0.000	1.000	0.3235973
3- 5 years	0.3209	0.000	1.000	0.4758991
5+ years	0.5852	0.000	1.000	0.4994034
Total assets				
< €200,000	0.5935	0.000	1.000	0.4932092
€200,000- €500,000	0.3100	0.000	1.000	0.4669867
€500,000- €1,000,000	0.0690	0.000	1.000	0.2535103
€1,000,000- €3,000,000	0.0223	0.000	1.000	0.1486579
> €3,000,000	0.0051	0.000	1.000	0.06976445
Total debt (medium and long-term)				
< €30,000	0.8967	0.000	1.000	0.3045663
€30,000- €50,000	0.0372	0.000	1.000	0.1889084
€50,000- €80,000	0.0232	0.000	1.000	0.1514562
> €80,000	0.0428	0.000	1.000	0.2026656

The table reports summary statistics for investors (Panel A). All variables are measured as of December 2015. Total portfolio value, account balance and income are scaled by dividing each value by 100 and winsorized at the 1st and 99th percentiles.

Table 2. Descriptive statistics for banks and their branches

Variable	Mean	Percentiles		Standard Deviation
		25th	*75th*	
Panel B: Banks (N=8)				
ROA	0.002088	0.001600	0.002400	0.0006624921
Debt_Sec/Fund	0.2081	0.1905	0.2758	0.06435593
Loans/Fund	1.0045	0.9291	0.9907	0.1418565
Panel C: Bank branches (N=36)				
Employers	5.797	4.000	7.000	2.726382
Investment advisors	3.8	3.0	4.0	1.64258
Advisor_ratio	0.7044	0.5000	1.0000	0.227269
Advisor_fundraised	265.7	120.9	322.0	260.1205

The table reports summary statistics for banks (Panel B) and bank branches (Panel C). All variables are measured as of December 2015.

Table 3. Regressions of bank bond share on investor attributes, bank characteristics and branch-level advisor information

Variables	(1)		(2)		(3)	
	FRM	APE	FRM	APE	FRM	APE
Constant	-0.981695*** [0.128896]		-5.845213*** [0.192754]		-5.193267*** [0.252811]	
Age	-0.002540*** [0.000866]	-0.0005*** [0.0002]	-0.003424*** [0.001017]	-0.0006*** [0.0002]	-0.003490*** [0.001085]	-0.0006*** [0.0002]
Female	0.016266 [0.016456]	0.0030 [0.0031]	0.015135 [0.019665]	0.0027 [0.0035]	0.022900 [0.021062]	0.0041 [0.0036]
Account age (years)	0.012605*** [0.001117]	0.0024*** [0.0002]	0.009176*** [0.001294]	0.0016*** [0.0002]	0.007683*** [0.001373]	0.0013*** [0.0002]
Account balance	-0.000403*** [0.000059]	-0.0001*** [0.0000]	-0.000366*** [0.000000]	-0.0000*** [0.0000]	-0.000375*** [0.000062]	-0.0000*** [0.0000]
Total portfolio value	-0.000096*** [0.000017]	-0.0000*** [0.0000]	-0.000126*** [0.000018]	-0.0000*** [0.0000]	-0.000157*** [0.000018]	-0.0000*** [0.0000]
Income	-0.000177*** [0.000001]	-0.0033*** [0.0009]	-0.023773*** [0.004838]	-0.0043** [0.0009]	-0.018368*** [0.004999]	-0.0033*** [0.0009]
Education						
Below high school	0.198780*** [0.019351]	0.0371*** [0.0036]	0.218993*** [0.019488]	0.0326*** [0.0042]	0.223616*** [0.020402]	0.0400*** [0.0036]
Above high school	-0.234688*** [0.025905]	-0.0441*** [0.0048]	-0.242861*** [0.026183]	-0.0530*** [0.0054]	-0.306853*** [0.027194]	-0.0441*** [0.0049]
Occupation						
Self-employed	0.156516*** [0.033608]	0.0293*** [0.0063]	0.150179*** [0.033822]	0.0274*** [0.0062]	0.169520*** [0.035342]	0.0201*** [0.0074]
Employed	0.096521*** [0.030556]	0.0181*** [0.0057]	0.086280*** [0.036034]	0.0158*** [0.0056]	0.109044*** [0.032114]	0.0195*** [0.0057]
Retired	-0.011268 [0.035504]	-0.0021 [0.0066]	-0.002698 [0.035666]	-0.0005 [0.0065]	0.004582 [0.037600]	0.0008 [0.0067]
Risk tolerance						
Moderate	0.007354 [0.036265]	0.0014 [0.0068]	0.001337 [0.040789]	0.0002 [0.0073]	0.072510* [0.038870]	0.0130* [0.0070]
High	-0.348699*** [0.046587]	-0.0652*** [0.0087]	-0.312458*** [0.046485]	-0.0689*** [0.0099]	-0.381323*** [0.059720]	-0.0654*** [0.0103]
Financial knowledge						
Low to Moderate	2.869544*** [0.116722]	0.5636*** [0.0255]	2.932052*** [0.139593]	0.5240*** [0.0245]	2.929862*** [0.145819]	0.5067*** [0.0247]
Moderate	3.042489*** [0.116182]	0.5996*** [0.0254]	3.105850*** [0.139015]	0.5550*** [0.0243]	3.102840*** [0.145210]	0.5365*** [0.0246]
Moderate to High	3.014109*** [0.116312]	0.5957*** [0.0254]	3.069090*** [0.139075]	0.5485*** [0.0243]	3.045226*** [0.145201]	0.5266*** [0.0246]

High	3.101238*** [0.120755]	0.6131*** [0.0264]	3.131253*** [0.144640]	0.5596*** [0.0253]	3.069179*** [0.151134]	0.5307*** [0.0256]
Experience						
Moderate	-0.304482*** [0.026339]	-0.0560*** [0.0055]	-0.276569*** [0.030228]	-0.0494*** [0.0054]	-0.274702*** [0.032226]	-0.0472*** [0.0056]
High	-0.527249*** [0.042607]	-0.0822*** [0.0092]	-0.413303*** [0.051137]	-0.0739*** [0.0091]	-0.391835*** [0.054408]	-0.0672*** [0.0094]
Time horizon	-0.018091*** [0.003515]	-0.0068*** [0.0008]	-0.028241*** [0.004225]	-0.0050*** [0.0008]	-0.025573*** [0.004595]	-0.0044*** [0.0008]
Total assets	0.000000 [0.000000]	0.0000* [0.0000]	-0.000004*** [0.000000]	-0.0000* [0.0095]	-0.000004* [0.000002]	-0.0000 [0.0000]
Total debt (> 3 years)	0.000007 [0.000063]	-0.0000 [0.0000]	0.000012 [0.000063]	0.0000 [0.0000]	-0.000029 [0.000001]	-0.0000 [0.0000]
Debt_Sec/Fund			8.763956*** [0.201409]	1.6010*** [0.0354]	6.121932*** [0.329929]	1.0955*** [0.0586]
Loans/Fund						
ROA					-0.809185*** [0.053379]	-0.1448*** [0.0095]
Advisor_ratio						
Advisor_fundraised						
Year FEs	(Yes)		(Yes)		(Yes)	
Bank FEs	(Yes)		(Yes)		(Yes)	
Branch FEs	(No)		(No)		(No)	
# observations	64,865		64,865		60,523	
Adjusted R-squared	0.143		0.174		0.190	

Table 3 reports results from regressions using the fractional response model (FRM) and from the analysis of the average partial effects (APE) to explain households' portfolio concentration towards bank bonds. The dependent variable is constructed as the ratio between BCC-issued bonds and the sum of BCC-issued bonds, other bonds, government bonds and deposit certificates. Robust standard errors are reported in parenthesis. ***,**,* denote that estimates are statistically significant at the 1, 5 and 10% level. Total assets and total debt are obtained by taking the mean of each category except for the > €3,000,000 and > €80,000 category, for which we assume a value of €4,000,000 and €10,000 respectively. These variables are then scaled by dividing each value by 100.

Table 3. Continued

Variables	(4)		(5)		(6)	
	FRM	APE	FRM	APE	FRM	APE
Constant	-9.489796*** [0.543881]		-5.344701*** [0.333682]		-3.744012*** [0.256675]	
Age	-0.003376*** [0.001105]	-0.0006*** [0.0002]	-0.001225 [0.000944]	-0.0002 [0.0002]	-0.001713* [0.000947]	-0.0003* [0.0002]
Female	0.019083 [0.021491]	0.0033 [0.0037]	0.031071* [0.021979]	0.0053* [0.0030]	0.026763 [0.017784]	0.0046 [0.0030]
Account age (years)	0.008000*** [0.001393]	0.0014*** [0.0002]	0.008480*** [0.022136]	0.0013*** [0.0036]	0.008896*** [0.001446]	0.0015*** [0.0002]
Account balance	-0.000393*** [0.000062]	-0.0001*** [0.0000]	-0.000378*** [0.000064]	-0.0000 [0.0000]	-0.000404*** [0.000064]	-0.0001*** [0.0000]
Total portfolio value	-0.000154*** [0.000018]	-0.0000*** [0.0000]	-0.000125*** [0.000019]	-0.0000*** [0.0000]	-0.000121*** [0.000019]	-0.0000*** [0.0000]
Income	-0.014532*** [0.004969]	-0.0026*** [0.0009]	-0.028176*** [0.005303]	-0.0000*** [0.0000]	-0.024494*** [0.005291]	-0.0042*** [0.0009]
Education						
Below high school	0.174499*** [0.025572]	0.0301*** [0.0044]	0.196602*** [0.026455]	0.0317*** [0.0043]	0.231372*** [0.021154]	0.0394*** [0.0036]
Above high school	-0.298170*** [0.032633]	-0.0513*** [0.0056]	-0.247970*** [0.035073]	-0.0400*** [0.0056]	-0.219867*** [0.028390]	-0.0374*** [0.0048]
Occupation						
Self-employed	0.172695** [0.035311]	0.0310** [0.0063]	0.135909*** [0.036499]	0.0232*** [0.0062]	0.130378*** [0.036482]	0.0222*** [0.0062]
Employed	0.111408*** [0.032118]	0.0200 [0.0058]	0.103862*** [0.033047]	0.0177*** [0.0056]	0.104251 [0.033064]	0.0177*** [0.0056]
Retired	-0.070153 [0.046952]	-0.0121 [0.0081]	0.020065 [0.038385]	0.0034 [0.0066]	-0.006797 [0.038532]	-0.0012 [0.0066]
Risk tolerance						
Moderate	0.053015 [0.047664]	0.0091 [0.0082]	0.179861*** [0.038897]	0.0307*** [0.0066]	0.191030*** [0.039052]	0.0325 [0.0066]
High	-0.346026*** [0.061526]	-0.0596*** [0.0106]	-0.236541*** [0.050563]	-0.0404*** [0.0086]	-0.208013*** [0.050697]	-0.0354 [0.0086]
Financial knowledge						
Low to Moderate	2.861967*** [0.144161]	0.4929*** [0.0243]	2.317539*** [0.160965]	0.3909*** [0.0258]	2.117873*** [0.115352]	0.3603*** [0.0195]
Moderate	3.060245*** [0.143462]	0.5270*** [0.0242]	2.318494*** [0.158164]	0.3957*** [0.0259]	2.177430*** [0.115389]	0.3705*** [0.0195]
Moderate to High	3.013745*** [0.143571]	0.5190*** [0.0242]	2.208692*** [0.162341]	0.3803*** 0.0260]	2.066303*** [0.116074]	0.3516*** [0.0196]

High	3.023121*** [0.149786]	0.5206*** [0.0253]	2.261000*** [0.169247]	0.3977*** [0.0272]	2.061321*** [0.122094]	0.3507*** [0.0206]
Experience						
Moderate	-0.263272*** [0.033178]	-0.0453*** [0.0057]	-0.266394*** [0.034207]	-0.0429*** [0.0055]	-0.232583*** [0.028645]	-0.0396*** [0.0049]
High	-0.375578*** [0.055164]	-0.0647*** [0.0095]	-0.408894*** [0.060683]	-0.0659*** [0.0098]	-0.411972*** [0.047956]	-0.0701*** [0.0081]
Time horizon	-0.020482*** [0.004686]	-0.0035*** [0.0008]	-0.053805*** [0.005113]	-0.0087*** [0.0008]	-0.016158*** [0.003969]	-0.0027*** [0.0007]
Total assets	-0.000004* [0.000000]	-0.0000* [0.0000]	-0.000003 [0.000002]	-0.0000** [0.0000]	-0.000004* [0.000002]	-0.0000* [0.0000]
Total debt (> 3 years)	-0.000025 [0.000066]	-0.0000 [0.0000]	-0.000018 [0.000069]	-0.0000 [0.0000]	-0.000009 [0.000069]	-0.0000 [0.0000]
Debt_Sec/Fund			6.023330*** [0.278537]	1.6799*** [0.0530]	5.896164*** [0.267514]	1.0031*** [0.0450]
Loans/Fund	3.009562*** [0.382387]	1.2749*** [0.0861]	2.062805*** [0.267521]	0.3520*** [0.0456]	0.468033** [0.217921]	0.0796** [0.0371]
ROA	-0.980081*** [0.054185]	-0.1688*** [0.0092]	-0.705106*** [0.046640]	-0.1203*** [0.0079]	-0.652269*** [0.045742]	-0.1110*** [0.0078]
Advisor_ratio			0.006392*** [0.001209]	0.0011*** [0.0002]		
Advisor_fundraised					0.000812*** [0.000050]	0.0001*** [0.0000]
Year FEs	(Yes)		(Yes)		(Yes)	
Bank FEs	(Yes)		(No)		(No)	
Branch FEs	(No)		(Yes)		(Yes)	
# observations	60,523		60,523		60,523	
Adjusted R-squared	0.185		0.240		0.244	

Table 3 reports results from regressions using the fractional response model (FRM) and from the analysis of the average partial effects (APE) to explain households' portfolio concentration towards bank bonds. The dependent variable is constructed as the ratio between BCC-issued bonds and the sum of BCC-issued bonds, other bonds, government bonds and deposit certificates. Robust standard errors are reported in parenthesis. ***,**,* denote that estimates are statistically significant at the 1, 5 and 10% level. Total assets and total debt are obtained by taking the mean of each category except for the > €3,000,000 and > €80,000 category, for which we assume a value of €4,000,000 and €10,000 respectively. These variables are then scaled by dividing each value by 100.