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 receiving tailor-cut recommendations from bank financial advisors. The regression analysis documents three key results. First, investor attributes such as age, education, knowledge, experience, and risk aversion explain a small variation in bank bond share. Second, familiarity with the issuer tends to substantially increase investors' portfolio exposure towards bank bonds. Third, weaker banks, in terms of funding structure and profitability, whose advisors exert high fundraising skills in bank bonds, seem to strongly and positively predict clients' bond concentration. This effect retains importance even when controlling for unobserved heterogeneity through bank and branch fixed effects. Furthermore, results do not change when including bank bond average risk premium in the model. This 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 bank financial advisors provide them tailor-cut recommendations. While there is widespread evidence on the impact of retail investor behaviour and financial advice on equity portfolio concentration (Hackethal, et al., 2012; Foerster, et al., 2017), there is no empirical research focusing on bondholder concentration. This is despite the relatively high participation rates in this market among households in countries such as Italy, UK and, to a lesser extent, the USA (Badarinza, et al., 2016), and the important source of financing that bonds represent for many banks. The lack of research is partially due to the fact that bank bonds have been misleadingly assumed to have a minor impact on portfolio risk. 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 riskiness of such instruments excluded from deposit guarantee schemes in Europe. In addition, concerns further strengthened with the introduction of new European bail-in mechanisms that put bondholders (and shareholders) on the hook for losses.

Understanding the drivers of bank bond concentration, and the role played by bank financial advisors in shaping it, thus constitutes an important but still unexplored area of study.

Over the years, financial institutions have widely issued bonds for retail investors who often allocate savings in the bonds of their reference bank. Although apparently safe, concentrating portfolio holdings in one-issuer bonds can significantly increase portfolio volatility and reduce its risk-adjusted performance as compared to a well-diversified bond portfolio, leading to inefficient

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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.

asset allocation. Retail bank bonds are particularly interesting in the study of portfolio concentration because of their extremely illiquid market and negatively skewed returns[2][3], whereas these characteristics are, on average, much less pronounced for common stocks. 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.

Drawing from prior research, there are three main reasons explaining why households receiving advisors' recommendations might hold extremely poorly diversified bond portfolios. First, this phenomenon could be prompted by investor related attributes and behavioural biases, 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. 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 they 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 widely show households' low level of financial literacy (Guiso & Jappelli, 2008), this latter reason barely explains one-issuer bond portfolio concentration and hardly adapt to the context of this research.

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[2] I.e., high probably of small gains and low probably of big losses.

[3] Note that over the past years the market has been characterized by low interest rates. Furthermore, bank bonds are generally bought by investors at the time of issuance (i.e., at par value), have short term maturity and are illiquid. Under such circumstances, I can reasonable talk about negatively skewed returns.

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

To that end, I 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[4] households, together with demographic information. Moreover, accounting data on banks, the number of advisors operating in 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-funded, 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 large portion of the Italian banking system, thanks to a widespread distribution all over the country.

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).

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[4] It is referred to the number of retail investors who have an active investment account in at least one year of the sample period.
[5] http://www.creditocooperativo.com/template/default.asp?i_menuID=42125.

The main findings of this article can be summarized as follows. First, bank bond concentration 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. Nevertheless, investors' characteristics jointly explain only 6% of the variation in bank bond holdings. Second, I 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. Third, I document that bank bond concentration increases when the issuer bank is less profitable and has a weaker funding structure. However, the most interesting finding from the analysis is that advisors with high capabilities to promote bank bonds among their clients, but low capabilities to raise other funds, strongly increase the cross-sectional variation in bank bond share. Interestingly, bank and branch-level fixed effects explain much more variation in bank bond share than investor observable attributes. Furthermore, when including in the model a representative bond spread for each bank, to capture average bank bond yield, results do not change and seem to suggest, to some extent, that bank bond concentration is not due to higher bond returns. Overall, these findings support the conflict-of-interest hypothesis.

The contributions of the 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 pay attentions to risks borne. Second, the analysis carried out in this study has meaningful implications for bank advisory services to retail clientele. Due to the increasing reliance of investors on advisor recommendations[6], it is crucial for banks to provide customized and impartial investment advice by professional and highly qualified individuals to

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

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 drive bank bond concentration. If this is the case, tougher enforcement rules should be introduced to ensure that unsophisticated and vulnerable households do not excessively concentrate their savings. Despite progress has been made with the introduction of new MiFID II to protect investors, which will be adopted by January 2018, the legislation mainly focuses on investment products not providing the same legislative importance to service provision. Whether such guidelines are sufficient to ensure investor protection, limiting banks' incentives to invent tricks to circumvent the regulation, it is an empirical question for further research.

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 discussion and 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 diversification, academics has attempted to explain it providing different explanations: investor attributes (Guiso & Jappelli, 2008), behavioural biases (Huberman, 2001; Zhu, 2002) and principal-agent conflicts (Starks, 2009).

Prior 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.

Concerning research on investor biases, Huberman (2001) documents 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 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 and Zhu (2010) show that investors have a preference towards nearby stocks. Overall, these results are consistent with the hypothesis that households tend to invest disproportionally in familiar assets.

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[7]. Nevertheless, prior studies

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

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, principal-agent problems may arise undermining the quality of recommendations. 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 sell and issue financial instruments. In this framework, agency conflicts are more likely to emerge when issuer banks are less profitable and exhibit fundraising needs. This latter could be transmitted (e.g. through contract incentives) to their advisors, which in turn may significantly raise 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 illiquid and characterised by negatively skewed returns, concentrate investments towards a single security is a risky investment 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. The present study fills this gap examining the drivers of portfolio concentration towards bonds of a nearby bank when households receive tailor-cut recommendations from bank financial advisors. Consistently with the above-mentioned literature, I posit that such behaviour is affected by individual attributes (related-attributes hypothesis), investor biases (familiarity-bias 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 2011-2015 period. The data capture portfolio composition of all households receiving tailor-cut recommendations by bank financial advisors. I consider only individual investment accounts, excluding jointly held accounts because investment choices may be related to multiple investors' characteristics (Foerster, et al., 2017). Portfolios include the following data concerning investments: account cash balance, CCB-issued bonds, other bonds[8], government bonds, stocks, depository certificates, repos, insurance policies and derivatives. In regards to investor features, data include: account balance, years of bank-customer relationship, 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, the value of each household's portfolio must be greater than bond minimum denomination which corresponds to € 1,000.

Table 1 displays summary statistics for households.

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

As a second step, I obtain bank and branch- level data for the period under examination. At the bank level, I collect data on profitability and liquidity. At the branch level, I gather data on the total number of employers, the numbers of investment advisors, year-end CCB bond funding and year-end total funding. I further drop bank branches with less than 5 clients[9].

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

Although heterogeneous in terms of operating policies, CCBs are characterised by a similar business structure, which provides a homogeneous dataset on financial institutions for the analysis. Therefore, there is no potential self-selection bias in banks (investors) addressing investors (banks) with specific characteristics.

[insert Table 1 here]

[insert Table 2 here]

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.*"[10]

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

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[9] Setting the threshold to 10 clients, results of paragraph 4 do not change.
[10] http://ec.europa.eu/finance/securities/isd/index_en.htm.

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 bank advisors to verify the suitability and appropriateness of investment products. Most 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, I estimate the following panel regression model:

$$y_{i,a,b,t} = \alpha + \beta INVESTOR_{i,t} + \gamma FAMILIARITY_{i,t} + \rho BANK_{a,t} + \delta ADVISOR_{b,t} + Controls +$$

$$\mu_a + \mu_c + \varepsilon_{i,a,b,t} \tag{1}$$

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 test the related-attributes hypothesis, I introduce the $INVESTOR_{i,t}$ vector, which includes the following variables for households: gender, age, occupation, education, risk tolerance, financial knowledge, experience, investment horizon, income, total debt and assets held. With respect to the familiarity-bias hypothesis, I construct the $FAMILIARITY_{i,t}$ variable as the number of years a household has been registered by the bank[11]. To test the conflict-of-interest hypothesis, I use bank characteristics and branch advisor information. With reference to the former, (i.e., the $BANK_{a,t}$, vector), I consider a set of variables on bank operating policies: return on average assets (ROA)

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[11] It refers to the number of years a household has started any relationship with the banks. It may or may not correspond to the number of years it has opened its investment account.

and total loans over direct funding from customers (Loans/Fund). Financial institutions with weaker funding structure and lower profitability are more likely to pressure their employees into raising funds than banks with stronger balance sheet. With reference to the latter (i.e., $ADVISOR_{b,t}$), I include the ratio between the numerator, computed as bank issued bonds held by retail investors of branch *b* divided by the total number of advisors operating at branch *b*, and the denominator, computed as bank issued bonds held by retail investors of bank *a* divided by the total number of advisors operating at bank *a* (*Bondfund_Advisor*), which captures fundraising ability in bank bonds of branch advisors with respect to advisors operating in other branches. To disentangle advisor fundraising capabilities in bank bonds with their fundraising capabilities in other instruments, I compute the same previous ratio replacing bank issued bonds with all other sources of bank direct and indirect funding[12] [13](*Otherfund_Advisor*).

As for control variables, I include account balance, total portfolio value[14] and a dummy variable that indicates whether the portfolio has value over € 100'000, since these investment accounts are generally managed by senior financial advisors and receive advanced investment advice (*Advanced*).

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.

I estimate regression (1) using Panel Data Random Effects Models with Mundlak (1978) corrections and standard errors clustered at the individual level. These models allow to consistently estimate both time invariant (i.e., gender) and time variant regressors, controlling for possible correlation between the unobserved individual effects and time varying variables. Mundlak (1978)

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[12]All other sources of direct and indirect funding include: account cash balance, other bonds (CCB-issued bonds are excluded), government bonds, stocks, depository certificates, repos, insurance policies and derivatives.

[13] As a robustness check, I also construct the *Otherfund_Advisor* variable without including account cash balance.

[14] Total portfolio includes: CCB-issued bonds, other bonds (CCB-issued bonds are excluded), government bonds, stocks, depository certificates, repos, insurance policies and derivatives.

has indeed proven that fixed effect estimates equal random effect estimates when including time averages for the time variant regressors.

4. Results

4.1. Analysis of bank bond share

Table 3 reports results from regression using random effects with Mundlak corrections to explain households' portfolio concentration towards bank bonds. The first model (i.e., model (1)), includes only investor attributes as independent variables. Investor age is important to explain variation in concentration risk and suggests that older investors reduce more 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 significant variable: investors who report to have an education level above high school (relatively to investors with high school education level) 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 (relatively to investors with high school education level) concentrate more their portfolio towards these securities, as expressed by a positive coefficient sign. Investors with longer investment horizons assume less bank bond risk than those with shorter investment horizons, which is probably explained by the fact these securities are short term investments[15].

Households with high-risk tolerance invest less, on average, 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

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[15] CCB-issued bonds have an average maturity of 3 years.

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 prior research showing a positive relation between financial literacy and portfolio diversification (Guiso & Jappelli, 2008). 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.

I find marginal variation in bank bond share across occupations. The retired variable has a negative estimated coefficient, while all other categories are not statistically significant. This finding is coherent with the result on age, indicating that retired (and thus older) investors hold lower bank bond share as compared to unemployed investors.

Variables related to households' welfare, i.e. total portfolio value and income, document a positive and statistically significant sign, indicating that investors with higher levels of these categories allocate higher portfolio share towards bank bonds than investors with lower levels of these variables. After controlling for observable attributes, account balance and total debt do not explain bank bond holdings, while total assets is marginally significant with a negative coefficient sign.

Despite using a comprehensive set of observable characteristics on households, the model surprisingly explains only 6 per cent of the cross-sectional variation in bank bond share, leaving a remarkable amount of variation unexplained.

With reference to behavioural bias (i.e., model (2)), I find that households with longer banking relationship invest more in bank-issued bonds than households with shorter banking relationship. Longer bank-customer relationships elicit indeed feelings of familiarity and trust on investors,

which in turn perceive bank-issued instruments as trustworthily and safe, resulting in higher bank bond holdings. This finding provides support for the familiarity-bias hypothesis.

In the following models, I introduce a set of bank-specific characteristics that act as indicators of bank operating policies (i.e., model (3)) and control for unobserved bank heterogeneity through bank fixed effects (i.e., model (4)). I 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 bank-issued bonds to their own clientele. Consistently with my expectations, when issuer banks are less profitable (lower *ROA*) and experience a higher funding gap (higher *Loan/Fund*), investors hold on average relatively more share of bank bonds in their portfolio. As a streaking result, the adjusted R-squared substantially increases from 6 per cent in model (1) to almost 16 per cent in model (3)[16].

In an attempt to (more) directly capture bank fundraising pressures by means of financial advisors, I include in model (5) the *Bondfund_Advisor* and *Otherfund_Advisor* variables, and in model (6) branch fix-effects[17] to control for unobserved heterogeneity. Results shows that investors from branches with relatively more productive financial advisors, in terms of fundraising ability in bank bonds, take higher concentration risk as compared to investors from branches with relatively less productive financial advisors. On the other hand, if advisors exhibit fundraising capabilities in other channels, an opposing result emerges[18] [19].

Overall, it seems that variation in bank bond share is marginally explained by observable investor attributes but mostly determined by bank and branch-level advisor information that

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[16] Since I add a restricted number of variables, the increase in the adjusted R-squared is not mechanically related to the higher number of regressors.

[17] I do not include bank fix effects due to collinearity issues with branch fixed effects.

[18] The *Bondfund_Advisor* and *Otherfund_Advisor* variables exhibit low VIF (3.01 and 3.02, respectively) but relatively high positive correlation (0.8). For this reason, I also estimate the regression model including one variable at a time and results do not change.

[19] Results do not change when including the *Otherfund_Advisor* variable constructed without including account cash balance.

provide evidence of the bank-advisor role in shaping households' bond allocation, supporting the conflict-of-interest hypothesis.

[insert Table 3 here]

4.2. Robustness check

As a robustness check, I construct an alternative fundraising skill measure to account for the fact that advisors' ability to raise funds also depends on the number of clients to which they provide tailor-cut recommendations. From this perspective, I compute bank issued bonds held by retail investors of branch b divided by the product between total number of clients and advisors operating at branch b. From this latter, I than subtract its mean value across all branches to obtain the *Client_Bondfund_Advisor* variable. Assuming equal amount of raised funds and number of advisors, the variable assigns higher values to branches with less clients compared to those with more clients, as average raised funds per client are higher for the former. Analogously, I then compute the *Client_Otherfund_Advisor* variable replacing bank bonds with all other source of direct and indirect funding for banks. Table 4 contains results from regression (1) substituting the advisor variables for their alternative specifications. Controlling for branch-fixed effects, I observe that investors at relatively more productive branches, in terms of bank bond funding, have significantly higher share of bank bonds, which confirms previous results from Table 3.

[insert Table 4 here]

4.3. Do average bank risk premium crowds out the effect of branch advisors?

To provide further evidence for the impact of advisors' fundraising skills on clients' bank bond holdings, I include in regression (1) the average risk premium on bank bonds.

To this purpose, I collect data on all unsecured CCB-issued bonds[20] that are outstanding during the period under examination to construct a representative bond spread per each bank and year, using Bloomberg as a source for the data collection. I exclude bonds with mixed coupon type[21] or complex floating rates due to data limitations. Overall, I obtain 370 bond issues by 8 CCB over the 2004-2015 period: of which 150 are fixed-rate, 136 are variable-rate (i.e., step up and step down bonds) and the remaining floating-rate coupons (i.e., bonds with coupon expressed as fixed margin over index) [22]. For each fixed and variable rate issue, I then compute the spread at issuance defined as the difference between the yield to maturity and that of the corresponding maturity-match Interest Rate Swap (IRS). For each floating rate issue instead, I measure the spread at issuance using the fixed spread over the reference index. To get the average risk premium, I calculate for each bank at year-end the weighted average of bond spreads on the amount issued.

Regression estimates, which are reported in Table 5, show two key results in support of the conflict-of-interest hypothesis. First, controlling for bank funding policy (i.e., model (1)) and unobserved bank characteristics (i.e., model (2)), the effect of branch advisors' fundraising skills retains strong importance. Second, *ceteris paribus*, higher average risk premium leads to lower bank bond holdings. Although this is an indirect measure of investors' skills in bond selection, when they receive tailor-cut recommendations, result suggests to some extent that bank bond concentration is not driven by higher bond yields.

[insert Table 5 here]

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[20] Unsecured bonds stand for 99.7 % of outstanding bonds in the period under investigation.
[21] I.e., bonds with the following coupon type: fix then floating and vice versa.
[22] CCBs do not issue callable, puttable and convertible bonds.

4.4. Relevance for the total portfolio

The research focuses on investor bond portfolio. However, to examine whether the effect of investor attributes, bank and branch advisor variables changes according to the share of bank bonds in the total portfolio[23], I estimate regression (1) for three sub-datasets of comparable sizes. As cut-offs for the subsets construction, I use the first and third quartile of the distribution of the share of bank bonds in the total portfolio. Regression estimates are reported in Table 6. The first and third model includes investors with a relatively low and high share of bank bonds in the total portfolio, respectively. The second model instead includes investors with a significant, but neither substantially high nor low, share of bank bonds in the total portfolio.

Despite a drop in the explanatory power of some regressors, investor attributes predict variation in bank bond holdings in the same direction as in Table 3, but with some minor exceptions. Investor age has a positive coefficient sign in model (1) but a negative coefficient sign in model (2), which seems to suggest that the effect might be non-linear. Investors with longer investment horizons assume relatively more bank bonds as compared to investors with shorter investment horizons only if their bank bond share is relatively low in the total portfolio. High experience surprisingly has a positive coefficient sign in model (1).

The remaining regressors in Table 6 show consistent results with Table 3. More specifically, retired investors reduce more bank bond holdings as compared to unemployed investors, independently of the bank bond exposure on the total portfolio. Education level above high school is negative and statistically significant in almost all models, whereas education level below high school does not seem to explain bank bond share.

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[23] The whole portfolio is composed by either bonds and other instruments. More specifically, it includes: CCB-issued bonds, other bonds (CCB-issued bonds are excluded), government bonds, stocks, depository certificates, repos, insurance policies and derivatives.

The familiarity variable, expressed as years of bank-customer relationship, retains strong importance in all models. Similarly, bank characteristics contribute to explain bank bond concentration and have expected coefficient signs. Branch advisors that exhibit high fundraising skills in bank bonds are associated to higher bank bonds holdings. Remarkably, this effect is significant only for portfolios having a medium to high concentration level in the total portfolio.

[insert Table 6 here]

5. Conclusions

Though bond portfolio concentration is a risky investment activity, relatively little is known about why households concentrate their bond portfolio and the role played by bank advisors in shaping it.

Using Italian data on 8 banks, their branches and their clients, I examine the main determinants of bank bond concentration for retail investors receiving tailor-cut recommendations from bank financial advisors. I show three key findings. First, investor attributes such as age, education and experience contribute to explain a small variation in bank bond share. Second, familiarity with the issuer, proxied by years of bank-client relationship, substantially increase bank bond holdings. This result is consistent with prior literature showing investor tendency to allocate savings in familiar assets (Huberman, 2001). Third, bank characteristics and branch advisors' fundraising skills are the strongest predictors of the cross-sectional variation in bank bond share. More specifically, investors tend to concentrate much more when banks are characterized by low profitability, higher funding gap, and branch advisors exhibit high fundraising capability in bank

bonds but not in other bank funding sources. Importantly, the regression analysis takes into account unobserved investor, bank and branch information.

Results are robust to alternative specifications of advisors' fundraising ability, to the inclusion of the average risk premium paid by banks on bonds, and bank bond exposure in the total portfolio.

This research provides relevant implications for both scholars and practitioners. It contributes to the discussion about the determinants of investors' lack of diversification in a context characterised by potential conflict of interests between clients and bank financial advisors. Furthermore, this research addresses timely policy issues on investor protection mechanisms. Given that empirical evidence shows investors' low level of financial literacy and high reliance on advisors' recommendations, the research findings question the effectiveness of current policies to safeguard investors. Theoretically, advisors could act as an important complement in the provision of financial information, informing households of the risk they take when investing. However, this study shows that this might not always be the case. Therefore, greater attention by policy makers is necessary to reduce conflict of interest when banks supply investment advice.

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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
Familiarity	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	67.90	11.03	74.19	126.39
Account balance	18.080	1.747	17.480	65.858
Advanced	0.233	0.000	1.000	0.42271
Income	28800	10000	30000	19947.82
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	0.0697644
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 and account balance are scaled by dividing each value by 1000 and winsorized at the 1st and 99th percentiles.

Table 2. Descriptive statistics for banks and their branches

Panel B: Banks (N=8)

Variable	Mean	Percentiles		Standard Deviation
		25th	75th	
ROA (%)	0.136	0.100	0.270	0.264
Loans/Fund (%)	0.9801	0.9291	1.020	0.1084
Panel C: Bank branches (N= [10, 36])				
Employers	6.153	4.000	7.000	2.726382
Branch financial advisors	3.74	3.74	5.0	1.551
Bondfund_ advisor	1.4760	0.7605	1.8410	1.1451
Otherfund_ advisor	1.4420	0.7618	1.8360	0.9257

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)	(4)	(5)	(6)
Intercept	3.2948e-01***	3.1657e-01***	-6.0071e-01***	8.6271e-01***	-4.7466e-01***	8.7608e-01***
	[3.0326e-02]	[3.0682e-02]	[4.4471e-02]	[1.3240e-01]	[4.5038e-02]	[1.3951e-01]
Age	-3.2237e-03***	-4.5688e-03***	-4.8357e-04	-9.3637e-05	-3.6079e-04	1.2867e-04
	[1.1017e-03]	[1.1517e-03]	[2.9538e-04]	[2.7876e-04]	[2.9112e-04]	[2.7138e-04]
Female	1.0177e-02*	1.0948e-02**	8.6885e-03	5.5347e-03	9.8829e-03*	7.7320e-03
	[5.2561e-0]	[5.2557e-03]	[5.4322e-03]	[5.1066e-03]	[5.3521e-03]	[4.9086e-03]
Familiarity		1.3392e-03***	5.4612e-03***	5.6601e-03***	5.3109e-03***	6.0439e-03***
		[3.4311e-04]	[1.1746e-03]	[1.1700e-03]	[.2038e-03]	[1.2004e-03]
Account balance	-2.0431e-05	-2.0492e-05	-3.3118e-05	-3.0836e-05	-1.7624e-05	-1.0399e-05
	[4.0504e-05]	[4.0507e-05]	[4.1744e-05]	[4.1627e-05]	[4.1402e-05]	[4.1702e-05]
Total portfolio value	8.8957e-05**	8.9645e-05**	6.0188e-05	6.5525e-05*	6.5474e-05*	7.6644e-05*
	[3.8146e-05]	[3.8139e-05]	[3.9269e-05]	[3.9195e-05]	[3.9494e-05]	[3.9771e-05]
Income	5.2763e-07***	5.3616e-07***	4.8101e-07***	-2.9617e-08	5.1065e-07***	-1.6642e-07
	[1.4869e-07]	[1.4874e-07]	[1.4835e-07]	[1.4696e-07]	[1.4727e-07]	[1.4675e-07]
Education						
Below high school	1.8820e-02***	1.7679e-02**	2.0883e-02***	1.7424e-02***	1.6771e-02**	1.5492e-02***
	[6.4989e-03]	[6.5112e-03]	[6.6404e-03]	[6.3191e-03]	[6.5489e-03]	[6.2017e-03]
Above high school	-5.4587e-02***	-5.2568e-02***	-4.4026e-02***	-3.3717e-02***	-3.6705e-02***	-2.9749e-02**
	[8.9418e-03]	[8.9488e-03]	[9.1964e-03]	[8.6882e-03]	[9.0413e-03]	[8.4245e-03]
Occupation						
Self-employed	6.0788e-03	5.6380e-03	9.8144e-03	1.3741e-02	2.6249e-03	1.1889e-02
	[1.0639e-02]	[1.0632e-02]	[8.6655e-03]	[1.3741e-02]	[1.0691e-02]	[1.0028e-02]
Employed	9.7628e-03	8.8474e-03	1.1293e-02	4.1697e-03	8.7415e-03	6.0569e-03
	[9.2796e-03]	[9.2737e-03]	[7.8143e-03]	[9.1645e-03]	[9.4053e-03]	[8.8355e-03]
Retired	-5.6824e-02***	-5.5034e-02***	-4.8528e-02***	-1.4353e-02	-4.8174e-02***	-1.1556e-02
	[1.1716e-02]	[1.1736e-02]	[1.2224e-02]	[1.1846e-02]	[1.2066e-02]	[1.1443e-02]
Risk tolerance						
Moderate	1.5382e-02	1.5714e-02	2.1226e-02	3.1524e-03	2.9190e-02**	1.9235e-02
	[1.2767e-02]	[1.2765e-02]	[1.4352e-02]	[1.3776e-02]	[1.4030e-02]	[1.3356e-02]
High	-2.6691e-02**	-2.3561e-02	-1.9942e-02	-4.0412e-02**	-1.0071e-02	-2.5503e-02
	[1.2506e-02]	[1.5155e-02]	[1.6617e-02]	[1.6037e-02]	[1.6339e-02]	[1.5681e-02]
Financial knowledge						
Low to Moderate	4.0834e-01***	4.0642e-01***	4.0044e-01***	3.8830e-01***	3.7068e-01***	3.0948e-01***
	[2.6676e-02]	[2.6662e-02]	[2.7122e-02]	[2.6057e-02]	[2.6626e-02]	[2.5428e-02]
Moderate	4.5048e-01***	4.4899e-01***	4.4017e-01***	4.1015e-01***	4.0619e-01***	3.1877e-01***
	[2.6535e-02]	[2.6511e-02]	[2.6947e-02]	[2.5975e-02]	[2.6384e-02]	[2.5496e-02]
Moderate to High	4.5336e-01***	4.5259e-01***	4.3592e-01***	3.9083e-01***	4.0501e-01***	2.9360e-01***
	[2.6649e-02]	[2.6621e-02]	[2.7036e-02]	[2.6102e-02]	[2.6485e-02]	[2.5723e-02]

High	4.8456e-01*** [2.8242e-02]	4.8406e-01*** [2.8212e-02]	4.6207e-01*** [2.8767e-02]	4.1223e-01*** [2.7804e-02]	4.2689e-01*** [2.8248e-02]	3.0684e-01*** [2.7461e-02]
Experience						
Moderate	-5.1887e-02*** [8.0715e-03]	-5.2136e-02*** [8.0754e-03]	-5.1607e-02*** [8.1394e-03]	-3.1160e-02*** [8.0481e-03]	-4.9761e-02*** [7.9868e-03]	-2.7275e-02*** [7.9622e-03]
High	-6.5464e-02*** [1.2231e-02]	-6.5520e-02*** [1.2233e-02]	-7.0517e-02*** [1.2669e-02]	-5.4742e-02*** [1.2418e-02]	-6.7374e-02*** [1.2514e-02]	-5.0614e-02*** [1.2462e-02]
Time horizon	-4.7657e-03*** [1.1165e-03]	-4.9060e-03*** [1.1175e-03]	-5.4667e-03*** [1.1628e-03]	-5.3619e-03*** [1.1578e-03]	-6.0475e-03*** [1.1443e-03]	-6.5144e-03*** [1.1784e-03]
Total assets	-1.3708e-05* [7.6317e-06]	-1.3239e-05* [7.6391e-06]	-9.9621e-06 [7.8233e-06]	-8.1416e-06 [7.5165e-06]	-1.0632e-05 [7.8609e-06]	-1.0642e-05 [7.4773e-06]
Total debt (> 3 years)	-6.4715e-05 [2.3478e-04]	-3.6979e-05 [2.3499e-04]	-6.8258e-05 [2.4547e-04]	3.2264e-06 [2.3021e-04]	-8.1561e-05 [2.3975e-04]	-1.6079e-05 [2.2056e-04]
Advanced	-1.8775e-03 [5.9133e-03]	-2.2331e-03 [5.9171e-03]	-5.0173e-03 [6.2046e-03]	-5.8080e-03 [6.0722e-03]	-6.1937e-03 [6.1371e-03]	-5.7733e-03 [5.9566e-03]
Loans/Fund			4.1397e-01*** [3.6296e-02]	4.2444e-01*** [4.1731e-02]	3.9176e-01*** [4.1775e-02]	4.0573e-01*** [4.1748e-02]
ROA			-1.2767e-01*** [3.7802e-03]	-1.2810e-01*** [4.5227e-03]	-1.3008e-01*** [4.4693e-03]	-1.3043e-01*** [4.4668e-03]
Bondfund_ Advisor					4.5519e-02*** [4.0019e-03]	4.6074e-02*** [4.0178e-03]
Otherfund_ Advisor					-3.6725e-02*** [4.9955e-03]	-3.6941e-02*** [5.0295e-03]
Bank FEs	(No)	(No)	(No)	(Yes)	(No)	(No)
Branch FEs	(No)	(No)	(No)	(No)	(No)	(Yes)
Mundlak's corretion	(Yes)	(Yes)	(Yes)	(Yes)	(Yes)	(Yes)
F-test of Mundlak corrected coefficients (p-value)	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
# investors	23501	23501	20709	20709	20709	20709
# observations	64666	64666	56729	56729	56729	56729
Adjusted R-squared	0.056	0.057	0.109	0.154	0.125	0.190

Table 3 reports results from Mundlak (1978) corrected random effects estimators 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 clustered at the investor level 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 I assume a value of €4,000,000 and €10,000 respectively. These variables are then scaled by dividing each value by 100.

Table 4. Robustness check of branch-level advisor information

Variables	(1)	(2)
Constant	-5.7704e-01*** [4.3821e-02]	8.6417e-01*** [1.3859e-01]
Age	-1.9076e-04*** [2.9031e-04]	1.4592e-04 [2.7113e-04]
Female	1.0242e-02* [5.3463e-03]	7.6365e-03 [4.9039e-03]
Familiarity	5.9647e-03*** [1.1793e-03]	6.7863e-03*** [1.1749e-03]
Account balance	-3.6296e-05 [4.1989e-05]	-2.9136e-05 [4.2318e-05]
Total portfolio value	5.7213e-05 [3.8588e-05]	6.8113e-05* [3.8824e-05]
Income	4.6196e-07*** [1.4584e-07]	-1.9584e-07 [1.4514e-07]
Education		
Below high school	1.9409e-02*** [6.4917e-03]	1.7106e-02*** [6.1553e-03]
Above high school	-3.8559e-02*** [9.0207e-03]	-2.9586e-02*** [8.4065e-03]
Occupation		
Self-employed	3.5806e-03 [1.0594e-02]	1.0537e-02 [9.9612e-03]
Employed	8.6982e-03 [9.3521e-03]	5.9991e-03 [8.7931e-03]
Retired	-4.9742e-02*** [1.1898e-02]	-8.6978e-03 [1.1305e-02]
Risk tolerance		
Moderate	2.7671e-02* [1.4178e-02]	1.7139e-02 [1.3478e-02]
High	-1.2914e-02 [1.6436e-02]	-2.7203e-02* [1.5758e-02]
Financial knowledge		
Low to Moderate	3.6736e-01*** [2.6642e-02]	3.1143e-0*** [2.5411e-02]
Moderate	4.0686e-01*** [2.6453e-02]	3.2472e-01*** [2.5502e-02]
Moderate to High	4.0278e-01*** [2.6550e-02]	2.9912e-01*** [2.5707e-02]
High	4.2769e-01*** [2.8288e-02]	3.1458e-01*** [2.7445e-02]

Experience

Moderate	-4.6767e-02*** [7.9628e-03]	-2.3256e-02*** [7.9477e-03]
High	-6.5296e-02*** [1.2502e-02]	-4.6588e-02*** [1.2452e-02]
Time horizon	-5.2678e-03*** [1.1456e-03]	-6.5426e-03*** [1.1822e-03]
Total assets	-9.8439e-06 7.6687e-06	-1.0064e-05 [7.2906e-06]
Total debt (> 3 years)	-4.3384e-05 [2.3882e-04]	-1.4285e-05 [2.1991e-04]
Advanced	-6.0575e-03 [6.1651e-03]	-5.3605e-03 [5.9502e-03]
Loans/Fund	4.3352e-01*** [4.1873e-02]	4.4667e-01*** [4.1773e-02]
ROA	-1.2484e-01*** [4.5010e-03]	-1.2483e-01*** [4.4975e-03]
Client_Bondfund_ Advisor	3.7717e-06*** [5.1092e-07]	3.9409e-06*** [5.3841e-07]
Client_Otherfund_ Advisor	-1.0632e-06*** [4.0729e-07]	-9.0856e-07** [4.3606e-07]
Bank FEs	(No)	(No)
Branch FEs	(No)	(Yes)
Mundlak's corretion	(Yes)	(Yes)
F-test of Mundlak corrected coefficients (p-value)	0.000***	0.000***
# investors	20709	20709
# observations	56729	56729
Adjusted R-squared	0.123	0.187

Table 4 reports results from Mundlak (1978) corrected random effects estimators 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 clustered at the investor level 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 I assume a value of €4,000,000 and €10,000 respectively. These variables are then scaled by dividing each value by 100.

Table 5. Regressions of bank bond share including average bank bond risk premium

Variables	(1)	(2)
Constant	3.6660e-01*** [3.2513e-02]	3.6162e-01*** [3.7213e-02]
Age	-3.5942e-04 [2.7412e-04]	1.0841e-04 [2.6842e-04]
Female	8.5537e-03* [5.0794e-03]	9.3886e-03* [4.9704e-03]
Familiarity	1.2571e-02*** [1.1294e-03]	1.2369e-02*** [1.1294e-03]
Account balance	-7.8481e-05* [4.4679e-05]	-7.8881e-05* [4.4515e-05]
Total portfolio value	6.3340e-06 [3.7662e-05]	6.6322e-06 [3.7666e-05]
Income	2.9732e-07** [1.3812e-07]	-2.8270e-07** [1.3826e-07]
Education		
Below high school	1.7400e-02*** [5.9930e-03]	1.1683e-02** [5.8893e-03]
Above high school	-3.6063e-02*** [8.6969e-03]	-2.9781e-02*** [8.4676e-03]
Occupation		
Self-employed	4.9354e-03 [9.5380e-03]	5.0282e-03 [9.3344e-03]
Employed	8.4665e-03 [8.5083e-03]	7.6372e-04 [8.3419e-03]
Retired	-3.1347e-02*** [1.0742e-02]	-6.3571e-03 [1.0630e-02]
Risk tolerance		
Moderate	5.5688e-02*** [1.1479e-02]	4.2453e-02*** [1.1346e-02]
High	6.1723e-03 [1.3999e-02]	-1.5573e-03 [1.3850e-02]
Financial knowledge		
Low to Moderate	3.4324e-01*** [2.8038e-02]	3.5527e-01*** [2.7597e-02]
Moderate	3.6890e-01*** [2.7748e-02]	3.7921e-01*** [2.7304e-02]
Moderate to High	3.4595e-01*** [2.7774e-02]	3.5294e-01*** [2.7330e-02]

High	3.6762e-01*** [2.9238e-02]	3.7061e-01*** [2.8789e-02]
Experience		
Moderate	-4.3684e-02*** [7.0412e-03]	-2.1356e-02*** [7.1639e-03]
High	-5.7521e-02*** [1.1400e-02]	-4.1404e-02*** [1.1423e-02]
Time horizon	3.8399e-03*** [1.0036e-03]	9.7094e-04 [1.0206e-03]
Total assets	-1.6505e-05** [7.4962e-06]	-1.4771e-05** [7.3795e-06]
Total debt (> 3 years)	5.4461e-05 [1.9688e-04]	1.1807e-04 [1.9228e-04]
Advanced	-1.1859e-02** [5.6764e-03]	-1.1188e-02** [5.6143e-03]
Bondfund_ Advisor	5.1458e-02*** [4.4792e-03]	5.2147e-02*** [4.4832e-03]
Otherfund_ Advisor	-3.6909e-02*** [5.1525e-03]	-3.7637e-02*** [5.1499e-03]
Av. Risk Premium	-2.9815e-02*** [4.3500e-03]	-2.9307e-02*** [4.3486e-03]
Bank FEs	(No)	(Yes)
Branch FEs	(No)	(No)
Mundlak's corretion	(Yes)	(Yes)
F-test of Mundlak corrected coefficients (p-value)	0.000***	0.000***
# investors	22121	22121
# observations	60307	60307
Adjusted R-squared	0.082	0.100

Table 4 reports results from Mundlak (1978) corrected random effects estimators 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 clustered at the investor level 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 I assume a value of €4,000,000 and €10,000 respectively. These variables are then scaled by dividing each value by 100.

Table 6. Relevance for the total portfolio

Variables	(1) 25th percentile	(2) 25-75th percentile	(3) 75th percentile
Constant	-5.4163e-01*** [3.7402e-02]	2.4918e-01*** [4.8497e-02]	9.8600e-01*** [6.5626e-03]
Age	8.3491e-04 ** [3.5367e-04]	-1.2688e-03*** [2.4338e-04]	1.3615e-05 [3.1250e-05]
Female	-8.3832e-03 [7.4323e-03]	-4.0661e-03 [4.6390e-03]	-2.3818e-04 [6.7358e-04]
Familiarity	9.9394e-03*** [1.8421e-03]	2.2383e-02*** [1.2580e-03]	6.5242e-04*** [2.1543e-04]
Account balance	-9.2444e-06 [2.9265e-05]	9.9033e-05** [4.6235e-05]	7.4915e-06 [1.0340e-05]
Total portfolio value	8.1027e-05 [4.5175e-05]	-1.9864e-05 [4.5499e-05]	-7.6081e-05*** [1.4459e-05]
Income	1.8949e-07 [1.8901e-07]	4.4590e-07*** [1.2247e-07]	4.3317e-08** [1.6887e-08]
Education			
Below high school	-8.4117e-04 [9.0493e-03]	5.1091e-03 [5.3184e-03]	1.1823e-03 [8.0546e-04]
Above high school	-2.4192e-02** [1.1856e-02]	-1.6297e-02** [7.5190e-03]	7.4548e-04 [1.0507e-03]
Occupation			
Self-employed	-1.0333e-02 [1.4241e-02]	2.6277e-02*** [9.1479e-03]	3.5975e-04 [1.2536e-03]
Employed	-3.5312e-03 [1.1888e-02]	1.6911e-02** [8.3618e-03]	9.5944e-04 [1.0762e-03]
Retired	-5.2186e-02*** [1.3283e-02]	-1.7749e-02* [1.0403e-02]	-2.4457e-03* [1.4593e-03]
Risk tolerance			
Moderate	1.9692e-02** [7.9070e-03]	2.1385e-02* [1.2807e-02]	-3.8112e-03*** [1.0714e-03]
High	1.7708e-02 [1.2566e-02]	1.4513e-02 [1.4486e-02]	-5.2907e-03** [2.3056e-03]
Financial knowledge			
Low to Moderate	8.4572e-03 [9.2778e-03]	-2.6762e-02 [3.8162e-02]	-5.1885e-04 [5.2509e-03]
Moderate	2.2202e-02** [1.1149e-02]	3.9224e-02 [5.4565e-02]	2.1628e-03 [5.1514e-03]
Moderate to High	7.1277e-02*** [1.1096e-02]	6.1293e-02 [5.4454e-02]	1.9527e-03 [5.1794e-03]

High	5.1947e-02*** [1.7966e-02]	6.9600e-02 [5.5079e-02]	3.7647e-03 [5.5265e-03]
Experience			
Moderate	6.9448e-03 [8.3376e-03]	-3.2409e-02*** [6.8723e-03]	-2.6837e-03*** [7.8505e-04]
High	3.3064e-02** [1.5653e-02]	-3.7908e-02*** [1.0798e-02]	-3.7290e-03* [2.0806e-03]
Time horizon	5.2722e-03*** [1.2743e-03]	4.3554e-04 [9.5734e-04]	-5.1681e-05 [1.3032e-04]
Total assets	-2.8602e-05** [1.1114e-05]	5.5463e-06 [6.2609e-06]	7.8484e-07 [1.2701e-06]
Total debt (> 3 years)	-3.4567e-04 [2.9853e-04]	2.9954e-04 [1.8467e-04]	4.3317e-08* [1.6887e-08]
Advanced	5.7972e-02*** [9.7056e-03]	-3.6187e-02*** [5.4833e-03]	-7.3824e-03*** [1.7598e-03]
Loans/Fund	1.9288e-01*** [4.2027e-02]	1.0554e-01** [4.3309e-02]	7.7170e-04 [8.2473e-03]
ROA	-2.2911e-02*** [4.4085e-03]	-2.8207e-02*** [4.5213e-03]	-2.0114e-03** [7.6617e-04]
Bondfund_ Advisor	5.6502e-04 [1.2925e-03]	2.4486e-02*** [4.7171e-03]	1.7092e-03* [8.8109e-04]
Otherfund_ Advisor	2.2440e-03 [4.0434e-03]	-3.1921e-03 [5.8345e-03]	-1.2908e-03 [8.7081e-04]
Mundlak's corretion	(Yes)	(Yes)	(Yes)
F-test of Mundlak corrected coefficients (p-value)	0.000***	0.000***	0.000***
# investors	7082	9508	9596
# observations	14075	20581	22073
Adjusted R-squared	0.102	0.308	0.942

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