

Investment goals and mental accounting in French retail clients

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ABSTRACT

Mental accounting is a cognitive process that guides individuals' personal financial decisions. Although well-documented, the investigation into how individuals form and select mental accounts, how these accounts evolve over time and are affected by environmental factors, has yet to be undertaken. In this paper, we identify how an external force, the MiFID questionnaire, may strengthen mental accounting. Based on a sample of more than 60,000 retail clients' questionnaire answers and banking records, we identify the determinants of the number of investment goals. We build a typology of retail clients' mental goals and show that the actual investment decisions of retail clients, fit their mental goals.

KEYWORDS: Budgeting, mental accounting, MiFID questionnaire, investment goals

1. Introduction

Introduced by Thaler (1985), mental accounting is a set of cognitive operations used by individuals and households to organize, evaluate and keep track of financial activities (Thaler, 1999). Mental accounting is an anomaly to traditional economic theory because it violates the economic principle of fungibility (Shefrin and Thaler, 1988, Thaler, 1990, 1999 and Abeler and Marklein, 2017). Three components of mental accounting are defined (Thaler, 1999). The first component captures the different ways that outcomes are perceived and evaluated (Shefrin and Thaler, 1988, Shefrin and Statman, 2000, Rockenbach, 2004, Cheema and Soman, 2006, Helion and Gilovich, 2014 and Statman, 2014). The second component is funds categorization: individuals assign money to specific categories or mental

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accounts (Henderson and Peterson, 1992). The third component focuses on choice bracketing/budgeting (Read et al., 1999), i.e. mental accounts could be either narrowly or broadly balanced and are evaluated at different frequencies. Therefore, mental accounting is a cognitive process that guides individuals' personal financial decisions, such as spending, investment decisions and also portfolio composition (Alexander and Baptista, 2011, Baptista, 2012 and Alexander et al., 2017).

Although mental accounting is well-documented⁴, an investigation into how individuals form and select mental accounts, how accounts evolve over time and, more importantly, how environmental factors support individuals to achieve their investment goals, has not yet been undertaken. In this paper, we fill this gap by studying the relationships that exist between investment goals, mental accounts and investment decisions. We aim to identify how some external forces (here the mandatory Markets in Financial Instrument Directive or MiFID questionnaire⁵) may strengthen the categorization of funds and align investment goals with investment decisions.

Knowing individual investment goals is an important issue. If investment advisers are fully aware of their clients' investment goals, they may help them to develop a discipline around savings and investment decisions. For example, Soman and Cheema (2011) find that a visual reminder of the savings goal (a picture of the household's children) and segregating savings into sealed envelopes, significantly increases the rate of savings. Other examples of investment servicing tools such as automatic deposits or using different labels for savings accounts, may contribute to a better matching between investment goals and investment decisions.

In this paper, investment goals are assessed through the MiFID questionnaire. Our data combines MiFID questionnaire answers of a large number of retail clients with their banking records. Therefore, our data provides the unique opportunity to directly observe investment goals and to compare them with the actual investment decisions made by retail clients. The use of MiFID questionnaire answers is an alternative approach for analyzing mental accounting, whereas other studies use lab

4 See Zhang and Sussman (2018) for an extensive literature about mental accounting.

5 Implemented in 2007, MiFID I (2004/39/EC) includes 31 member states of the European Economic area (28 European member states and three other states: Iceland, Norway and Liechtenstein). It replaces the Investment Services Directive (ISD) adopted in 1993. From January 2018, MiFID II (2014/65/UE) replaces MiFID I that we consider in our paper. MiFID II aims to strengthen the transparency, the efficiency of financial markets but also the protection of investors. The MiFID questionnaire does not differ between MiFID I and II and is only imposed on the MiFID member states.

experiment choices (Heath, 1995 and Soman, 2001). Specifically, in the MiFID questionnaire, retail clients select their investment goals from a list provided by the bank. As response options are presented, however, an acquiescence phenomenon (Toppino and Brochin, 1989 and Roediger and Marsh, 2005) can bias the answers. Moreover, MiFID requires investment service providers to collect detailed information on retail clients in order to offer them advice and financial products suited to their financial situation. Therefore, retail clients are expected to give relevant and honest answers. Many studies have shown, however, that wording and/or framing have an impact on responses to survey decision problems (for example, Tversky and Kahneman, 1981). For these reasons, we investigate whether retail clients' actual investment decisions are consistent with the mental goals they assessed in their MiFID questionnaire. Moreover, if finding that this is true, we would be contributing to an academic justification for the use of the MiFID questionnaire.

In this study, we first derive a typology of retail client mental goals based on their investment goals. Here, we categorize self-assessed investment goals into mental goals, following the literature on funds categorization. It is important to get a quantitative picture of investment goals before deriving mental goals that, in turn, may drive investment decisions. For that reason, we then show that the number of self-assessed investment goals is determined by socio-demographics, wealth and patrimony indicators. Finally, we demonstrate that the actual investment decisions of retail clients are consistent with their mental goals, while controlling for the same indicators. Mental goals increase by approximately 10% to 20%, the likelihood of investing in the corresponding investment vehicles, whereas classical drivers of investment decisions such as gender, age and income, increase it by less than 1%. We also show that new variables, such as geographic origin and matrimonial regime choice, which are rarely or have not yet been studied, are also important drivers of investment decisions.

This paper is organized as follows. Section 2 documents the literature related to mental accounting and funds categorization. Section 3 describes our data. Section 4 presents the typology of retail client mental goals that we build from the assessed investment goals. Section 5 derives the determinants of the number of investment goals and presents our main empirical results on the relationships between mental goals and actual investment decisions. Section 6 is dedicated to robustness checks. Section 7 concludes.

2. Related literature

Several studies demonstrate that mental accounting influences individuals' wealth perception (Zhang and Sussman, 2018). Mental accounting is an important anomaly to traditional economic theories, which was introduced by Thaler (1985). He describes an example, which shows that after a winning bet of \$300, according to the life cycle theory (Modigliani and Brumberg, 1954 and Friedman, 1957), an individual should save this amount for consumption in future years instead of using it for dining in a restaurant or for another additional expense. Mental accounting components violate the principle of fungibility (Shefrin and Thaler, 1988, Thaler, 1990, 1999 and Abeler and Marklein, 2017). According to this principle, the way wealth increases, either from a regular salary, savings revenues or winning bets, should have no effect on subsequent expenditure behavior. In practice, however, an increase in wealth is perceived and evaluated differently, and is then assigned to a specific account or category that could be narrowly or broadly balanced. In other words, mental accounting components are outcomes of perception and evaluation, funds categorization and choice bracketing/budgeting. In this paper, we focus on mental accounting as it relates to financial decision-making and, therefore, exclude consumption/spending decisions. Specifically, we present mental accounting components and examine how funds categorization influences savings and investment decisions.

The first component of mental accounting is the way money is perceived and evaluated. According to Thaler (1999), money is assigned to one of three levels. The first level is devoted to expenditures that are allocated into budgets, such as housing, food, etc. The second level corresponds to wealth that is allocated into accounts (checking, pension). The third level is represented by income that is divided into categories such as regular income or exceptional income.

The second component of mental accounting is funds categorization into mental accounts. Funds categorization is the cognitive process that eases financial decision-making and affects how people choose to spend and save their money⁶.

6 Soman and Ahn (2011) provide a review of mental accounting research in which the relationship between mental accounting and framing effects is documented.

The third component of mental accounting is budgeting. Budgeting⁷ is defined as the process used to segregate and track the allocation and use of funds against different accounts with implicit or explicit spending limits or “budgets” (Galperti, 2017). Thaler (1985), Heath and Soll (1996) and Hastings and Shapiro (2013) note that households set budgets for various expenses (e.g. food budget or gas budget) and treat funds between the accounts tagged for each purpose, as distinct and imperfectly substitutable.

In this paper, we focus on the second component of mental accounting. We examine the relationships between investment goals, which are organized into mental goals, and actual investment decisions. By organizing information into groups based on commonalities, categorization can reduce the cognitive effort required to make decisions (Henderson and Peterson, 1992). For example, mental accounts may explain why any salary increase is set aside for the future or why people primarily use loans in order to be able to afford long-term and durable goods or why they choose illiquid savings accounts to limit the temptation to spend their money.

To study the categorization process involved in our data, we need to review the two funds categorization methods: i) categorizing the sources/origin and uses of funds and, ii) grouping a set of choices or outcomes together, i.e. bracketing (Read et al., 1999). We detail the first method, which is used in the paper to derive a typology of retail client mental goals. By focusing on the sources and uses of funds, Shefrin and Thaler (1988) and Thaler (1990, 1994 and 1999) document three categories: current assets (e.g. cash on hand or checking accounts), current wealth (e.g. liquid asset accounts such as savings accounts, stocks or mutual funds and home equity) and future income (e.g. retirement savings accounts).

Aligned with these considerations is the Behavioral Portfolio Theory (BPT) of Shefrin and Statman (2000), which depicts the investors’ portfolio as a pyramid with multiple layers. Each layer, i.e. mental account, corresponds to a specific objective. The first layer of the pyramid includes risk-free investments, such as savings accounts, treasury bonds and monetary funds, for the purpose of preserving wealth level. Conversely, the top of the

⁷ Mental budgeting has been analyzed in various specific contexts. In marketing, Stillee et al. (2010) examine the relationship between budgeting, promotions and spending behaviour. Bricla and Tokarchuk (2015) study mental budgeting regarding tourists’ spending at a Christmas market in Merano (Italy). LaBarge and Stinson (2014) show that donors in the U.S. and Canada have mental budgets for philanthropy. Bao et al. (2015) introduce mental budgeting into travelers’ route choice and show that travelers with low or moderate travel budgets perceive there to be a higher cost than their actual cost on roads with tolls.

pyramid is devoted to risky investments, such as foreign stocks, options and high-risk securities, for the purpose of becoming richer. Therefore, the BPT refers to under-diversified portfolios, which are non-optimal, in contrast to the predictions of Markowitz's theory.

The identification of mental accounts has many implications for the study of households' savings and investment decisions. According to Thaler (1999), the sources and uses of money are categorized both in real and mental accounting systems. The impact of the number of savings goals in separate envelopes on savings behavior has been documented by Soman and Cheema (2011). They show that when funds earmarked as savings are presented in two savings accounts, the global savings amount is higher than when they are grouped in only one account⁸. Costs associated with transfer between accounts include both psychological costs and potential banking fees (Shefrin and Thaler, 1988). Yet, multiple savings accounts may enhance long-term savings behaviors (Thaler, 1999). Other academic studies have shown that setting savings goals is important in savings effectiveness (Hogarth and Anguelov, 2003 and Ülkümen and Cheema, 2011). Further, whether households have specific savings goals, this impacts savings behavior (Wärneryd, 1989, Zhong and Xiao, 1995, Wärneryd, 1999, Rha et al., 2006, Fisher and Montalto, 2010, Soman and Zhao, 2011 and Fisher and Anong, 2012), particularly if they are hierarchically ordered (Xiao and Noring, 1994, Canova et al., 2005 and Devaney et al., 2007). Moreover, household characteristics such as age, family size, income, gender, race, education, health and risk tolerance, have significant effects on savings and investment behaviors (Xiao and Anderson, 1997, Xiao and Fan, 2002 and Devaney et al., 2007).

3. Data description

The data we use in this paper was provided by a large European retail bank. It consists of MiFID questionnaire answers and banking records of a sample of 68,190 retail clients during the period 2007-2015. In this bank, retail clients answered the MiFID questionnaire at least once (and at most, three times) during the period 2007-2015. The questionnaire was administered for the first time to any retail client who subscribed to any

8 De Giorgi (2011) documents the relationship between loss aversion and multiple investment goals.

financial product after 2007. A second questionnaire was then completed three years after the first one. A third questionnaire was completed after having subscribed to any financial product after the second questionnaire, or, three years after the second one. In this paper, the most recent MiFID questionnaire answers are used for retail clients having completed it at least twice. Of the 68,190 retail clients, 37,458 completed only one questionnaire, 19,140 completed two and 11,592 completed three successive questionnaires. Note that the questionnaire was developed for, and focused on, retail clients by the bank and remained unchanged during the period 2007-2015. We observe that retail clients' answers are stable over time⁹. Moreover, for each MiFID question, the unreported answers rate decreases between two successive questionnaires. Therefore, taking the most recent questionnaire answers enables us to gather more useful data. Finally, we check for any sample selection bias by comparing retail clients' average net monthly income and bank loan amounts, over successive questionnaires (see Section 3.2).

The use of the MiFID questionnaire provides useful insights, as retail clients' financial decision-making is captured within the bank in the presence of a financial adviser and not online through survey participation (Crossley et al., 2017). According to Duffy et al. (2005), respondent fatigue leads to more noticeable consequences for online surveys. They argue that the absence of an interviewer does not encourage respondents to answer questions because respondents may often click down. A low response-rate may be mitigated, however, by high quality data obtained from online surveys (Evans and Mathur, 2005). In the context of the MiFID questionnaire, retail clients may give more honest answers, because they expect to get more tailored advice from their financial adviser.

For each retail client who held a current account within the bank, we match MiFID questionnaire answers at the date the questionnaire was administered, which is the closest to and occurred before 07/31/2015, to the banking records (extracted on 07/31/2015). Specifically, the MiFID questionnaire answers refer to retail clients' investment goals (defined in Table 1). As for the banking records (defined in Table 3), they refer both to socio-demographic indicators (Panel A) and to wealth and patrimony

⁹ To check the answers' stability, agreement rates were calculated between two successive questionnaires. We find that, on average, 91.46% of retail clients made the same investment goal choice over time.

indicators (Panel B). Accounts of minors, i.e. those aged under 18 years old, are excluded as in Bauer et al. (2009) and Hoffmann et al. (2013, 2015).

3.1. Investment goals

The MiFID questionnaire of the bank is composed of six sections dealing with socio-demographic characteristics, income, patrimony, bank loans, savings capacity and investment goals, respectively. In this questionnaire, we focus on the subsection dealing with the main investment goals. Specifically, the bank asks retail clients to indicate their main investment goals. Seven proposals are given: building precautionary savings, preparing a real estate project, getting additional income, preparing for retirement, appreciating capital, preparing for patrimony transmission and no goal (Table 1). Retail clients have to choose at least one investment goal or none of them (“No goal”).

Table 1. Investment goals

Table 1 defines investment goal choices extracted from the MiFID questionnaire answers of 68,190 retail clients.

Variables	Definitions
Saving	Dummy variable coded 1 if the client aims to build precautionary savings and 0 otherwise.
Real estate project	Dummy variable coded 1 if the client aims to prepare a real estate project and 0 otherwise.
Additional income	Dummy variable coded 1 if the client aims to get additional income and 0 otherwise.
Preparing retirement	Dummy variable coded 1 if the client aims to prepare his/her retirement and 0 otherwise.
Capital appreciation	Dummy variable coded 1 if the client aims to appreciate his/her capital and 0 otherwise.
Patrimony transmission	Dummy variable coded 1 if the client aims to prepare his/her patrimony transmission and 0 otherwise.
No goal	Dummy variable coded 1 if the client has no investment goal and 0 otherwise.
Nber of goals	Number of investment goals chosen by the client (from 0 to 6).

Assessing investment goals allows retail clients to project themselves into the future. Indeed, the main investment goals of retail clients may impact the decision to invest in bank savings accounts (Sub-panel B1) and in financial products (Sub-panel B2). Table 3 presents both Sub-panels.

Setting investment goals, however, is a cognitive process that should occur prior to making investment decisions. In the questionnaire answers, we cannot distinguish whether investment goals were assessed before or after investment decisions were made. Therefore, in this paper, we only look at the consistency between actual investment decisions and investment goals, which are organized into mental goals (defined in Section 4.1).

Table 2 displays descriptive statistics of investment goals. A large proportion of retail clients (58.41%) aim to build precautionary savings. Covering unexpected costs, this “primary” investment goal represents a safety mattress, which is typically the preferred investment type chosen by French retail clients, according to the French national statistics bureau (INSEE, 2015). A second reported goal (about 23% of retail clients) is capital appreciation. Precautionary savings and capital appreciation aim to preserve and increase wealth levels. They allow retail clients to prepare for both short-term and long-term expenditures. A third goal is preparing patrimony transmission, which represents 16.59% of retail clients’ goals. Patrimony transmission is a family concern involving long-term inheritance. The remaining investment goals are preparing a real estate project (13%) and preparing for retirement (12.62%). These are specific long-term investment goals. A small proportion of retail clients (6.36%) wish to obtain additional income. Furthermore, we notice that retail clients have, on average, 1.30 investment goals and 18.49% of them declared that they have no investment goal.

Table 2. Descriptive statistics of investment goals

Table 2 displays descriptive statistics of investment goals. The first column reports variable names. The second column indicates the proportion (%) of retail clients for which the corresponding variable is coded 1 for binary variables and the mean (\bar{X}) for continuous variables. The third, fourth and fifth columns report the standard deviation, the minimum and maximum values respectively.

Variables	%/ \bar{X}	std	min	max
Saving	58.41%	-	-	-
Real estate project	13%	-	-	-
Additional income	6.36%	-	-	-
Preparing retirement	12.62%	-	-	-
Capital appreciation	22.96%	-	-	-
Patrimony transmission	16.59%	-	-	-
No goal	18.49%	-	-	-
Nber of goals	1.30	0.94	0	6
Retail clients (N=68,190)	-	-	-	-

3.2. Banking records

Table 3 presents banking records, i.e. socio-demographic indicators (Panel A) and wealth and patrimony indicators (Panel B).

In Panel A, aside from classical variables such as gender and age, “Native” and “Paris” give a detailed insight into retail clients’ residency, which is rarely analyzed in the literature. Native-born retail clients (“Native”) are distinguished from those who were born in foreign countries. Retail clients living in the biggest city (“Paris”), in terms of economic activity and size, are distinguished from those living in other regions. Complementing marital status, matrimonial regime¹⁰ is included for the first time in our study. Specifically, matrimonial regime choice allows structuring wealth allocation between spouses before the marriage and after its breakdown. Among the different matrimonial regimes, we pay particular attention to the separation regime (also called “separation of property regime”). As its name suggests, the separation regime implies that there is no joint-ownership between spouses. So, any increase or decrease in the wealth level of a spouse does not impact the wealth level of the other spouse. This financial independence is considered as a proxy for patrimony protection needs. Finally, four socio-professional categories are identified: self-employed, salaried, retired and those exercising no professional activity.

Panel B presents wealth components such as income and bank loans¹¹. Income refers to the net monthly income of retail clients. Bank loans correspond to overall indebtedness including consumer and real estate loans. Two sub-panels are dedicated to studying investment in savings accounts (Sub-panel B1) and in financial products (Sub-panel B2). Similar to Shefrin and Statman (2000), we argue that a portfolio is designed as a “two-layered pyramid”. The low layer aims to preserve wealth by investing in risk-free accounts (Sub-panel B1) and the high layer aims to become richer by

10 In France, two matrimonial regime categories exist: community and separation regimes. Community regimes focus on the notion of common goods, while the separation regime implies no joint-ownership between spouses. In Europe, the community regime is the default regime in some countries (e.g. Belgium, France, Italy and Luxembourg), whereas separation regime is applied by default in other countries (e.g. England, Germany and Greece). In the US, the legal matrimonial regime is different from one state to another one.

11 Due to a large number of missing banking records, the net monthly income and the bank loan amount have been extracted from the MIFID questionnaire answers. In the questionnaire, six net monthly income brackets (in euros) are reported: 0; lower than 1,500; between 1,500-3,000; between 3,000-5,000; between 5,000-10,000 and above 10,000. In the analysis, we use their midpoint values, i.e. 0; 750; 2,250; 4,000; 7,500 and 10,000 (the lower bound), respectively. The same process is applied for bank loans. Indeed, the questionnaire reports four bank loans brackets (in euros): 0, lower than 10,000; between 10,000-100,000 and above 100,000. We use their midpoint values, i.e. 0; 5,000; 55,000 and 100,000 (the lower bound), respectively.

investing in financial markets (Sub-panel B2). In this paper, Sub-panel B1 refers to regulated savings accounts, standard savings accounts, home savings accounts and life insurance. Sub-panel B2 refers to stocks, mutual funds, warrants, bonds, unit-linked life insurance products and retirement plans. In each sub-panel, investment diversification is measured by “Nber of saving accounts” and “Nber of financial products”. We use Eurofidai and Bloomberg to complement this dataset by computing the market value of retail clients’ portfolios as of the 07/31/2015 and we document these values in Sub-panel B2.

Table 3. Banking records

Table 3 defines banking records variables of 68,190 retail clients.

Variables	Definitions
<i>Panel A: Socio-demographic indicators</i>	
Gender	Dummy variable coded 1 for male clients and 0 for female clients.
Age	Age of the clients as of the 07/31/2015 (in years).
Native	Dummy variable coded 1 if the client is native of the country and 0 otherwise.
Paris	Dummy variable coded 1 if the client lives in and close to the biggest city of the country and 0 otherwise.
Matrimonial	Dummy variable coded 1 if the client is subject to the separation of property legal regime and 0 otherwise.
Self-employed	Dummy variable coded 1 if the client directly perceives his/her income from his/her own professional activity and 0 otherwise.
Salaried	Dummy variable coded 1 if the client has a wage or salary from an employer and 0 otherwise.
Retired	Dummy variable coded 1 if the client is retired and 0 otherwise.
No occupation	Dummy variable coded 1 if the client has no occupation (e.g. students and those having no professional activity) and 0 otherwise.
<i>Panel B: Wealth and patrimony indicators</i>	
Income	Net monthly income (in euros).
Bank loans	Loan amount remaining to be reimbursed (in euros).
<i>Sub-panel B1: Savings accounts</i>	
Regulated savings accounts	Dummy variable coded 1 if the client holds regulated savings accounts and 0 otherwise.
Standard savings accounts	Dummy variable coded 1 if the client holds standard savings accounts and 0 otherwise.
Home savings accounts	Dummy variable coded 1 if the client holds home savings accounts and 0 otherwise.

Variables	Definitions
Life insurance	Dummy variable coded 1 if the client holds life insurance savings accounts and 0 otherwise.
Nber of savings accounts	Number of savings accounts held by the client as of the 07/31/2015 (from 0 to 7).
<i>Sub-panel B2: Financial products</i>	
Stocks	Dummy variable coded 1 if the client holds stocks and 0 otherwise.
Funds	Dummy variable coded 1 if the client holds mutual funds and 0 otherwise.
Warrants	Dummy variable coded 1 if the client holds warrants and 0 otherwise.
Bonds	Dummy variable coded 1 if the client holds bonds and 0 otherwise.
UL life insurance products	Dummy variable coded 1 if the client holds unit-linked life insurance products and 0 otherwise.
Retirement	Dummy variable coded 1 if the client holds retirement plans and 0 otherwise.
Nber of financial products	Number of different kinds of financial products held by the client as of the 07/31/2015 (from 0 to 6).
Portfolio value	Value of the investment assets of the client as of the 07/31/2015 (in euros).

Table 4 displays the descriptive statistics of banking records. In Panel A, we first shed light on the presence of gender parity. Men represent 50.82% of the sample, whereas this percentage is around 80% in European studies, such as in France (Boolell-Gunesh et al., 2009), Belgium (Bellofatto et al., 2018), Germany (Weber and Welfens, 2007), the Netherlands (Bauer et al., 2009), the UK (Richards et al., 2017), Italy (Guiso and Jappelli, 2005) and Finland (Grinblatt and Keloharju, 2009)¹², and in US studies (Barber and Odean, 2001), the only exception being China where men represent about 50% (Feng and Seasholes, 2008). The average retail client is 49 years old. 85.50% of retail clients are French native-born and 12.31% of them live in the Paris region. Looking at matrimonial regime choice, about 11% of retail clients are married under the separation of property regime. As for professional categories, the sample mainly consists of salaried employees (55.57%). By comparing our data on these socio-demographic variables with INSEE data, we find that our sample is representative of the whole French population.

¹² Grinblatt and Keloharju (2009) study a specific sample containing only men enlisted into mandatory military service.

Similarly, the representativeness of the sample is confirmed with regard to income and the residual amount of bank loans (Panel B). In our sample, the net monthly income and the bank loan amount remaining to be reimbursed are, on average, about €2,521 and €30,029 respectively¹³. We check for any sample selection bias by comparing average net monthly income and residual amount of bank loans in three groups of clients, according to the number of times they completed the questionnaire. We find that individuals who have been clients of the bank for a long time, completed successive questionnaires and have a net wealth that is slightly higher than that of new clients¹⁴. Although wealth increases with time, this is due to a net monthly income increase of which, over the 2007-2015 period, is close to the inflation rate¹⁵.

Analyzing Sub-panels B1 and B2, we define a classification criterion and argue that retail clients' perception differs between savings accounts and financial products.

Sub-panel B1 refers to four usual types of savings accounts. First, regulated savings accounts are deposit accounts, which are free of French income tax and social charges. They are limited to a maximum value (M) and pay a low interest rate (i) of about 1%¹⁶. Second, standard savings accounts are subject to taxes and social charges and they pay interest rates that are freely determined by banks¹⁷. These are taxed savings accounts, term deposits and popular savings plans¹⁸. Third, home savings accounts are interest-earning bank accounts giving access to a subsidized mortgage. In France, there are two types of home savings accounts: *Compte Epargne Logement (CEL)* and *Plan Epargne Logement (PEL)*. They differ slightly in terms of the down payment, the ceiling, remuneration rate and payment frequency. Life insurance accounts

13 According to INSEE, the net monthly income is about €2,225 (in 2014). As for bank loans, if we only consider indebted retail clients, the loan amount remaining to be reimbursed is, on average, €58,193. This amount is close to that communicated by INSEE, i.e. €61,900 (in 2010).

14 The average net monthly income is higher in the groups that completed three questionnaires (€2,962.24 for 11,592 clients, $std=2,453.73$) or two questionnaires (€2,565.09 for 19,140 clients, $std=2,257.92$) than in the group of clients who completed only one questionnaire (€2,361.31 for 37,458 clients, $std=2,111.77$) and the average bank loan amounts are comparable (€30,552.09, €29,519.85 and €29,182.19) for respectively one, two and three questionnaires (std are respectively 40,027.27, 38,812.06, 38,508.28).

15 In Section 4, we check that regression coefficients are not affected if we use the first set of questionnaires instead of the last set.

16 In France, regulated savings accounts are, for example, *Livret A* ($M=€22,950$ and $i=0.75\%$), *Livret Bleu* ($M=€22,950$ and $i=0.75\%$), *Livret de Développement Durable* or *LDD* ($M=€12,000$ and $i=0.75\%$), *Livret d'Epargne Populaire* ($M=€7,700$ and $i=1.25\%$) and *Livret Jeunes* ($M=€1,600$ and $i=1.75\%$).

17 There is no ceiling in such accounts.

18 Since 2003, it was no longer possible to open a popular savings plan (*Plan Epargne Populaire* in French). Individuals who opened this account before 2003 could continue to make deposits.

represent the fourth type of savings accounts. They primarily allow clients to set aside and invest money for retirement or other long-term projects. They also pay out in case of death before the end of the policy term. Two types of life insurance contracts exist: products in euros (Sub-panel B1) and unit-linked products (Sub-panel B2). Products in euros do not generate any capital risk¹⁹, whereas unit-linked products do, as these are investment vehicles allowing retail clients to invest in different asset classes such as stocks, bonds or funds. In France, life insurance mainly refers to life insurance for savings, i.e. products in euros. They offer a return that is generally higher than bank savings schemes and the right to make withdrawals during the life of the policy. Furthermore, they are an excellent tool promoting patrimony transmission due to their fiscal advantages, e.g. exemption from inheritance tax. On average, retail clients hold 1.34 different savings accounts. Reviewing empirical frequencies²⁰, the most popular savings accounts are regulated savings accounts (58.73%), then life insurance (35.38%), followed by home savings accounts (23.44%) and standard savings accounts (13.03%).

Sub-panel B2 refers to six risky financial products. We first point out that financial markets participation rate is low, since the number of different kinds of risky financial products is, on average, lower than one (0.34). Focusing on empirical frequencies, the more diversified products like unit-linked life insurance products (17.13%) and mutual funds (9.52%) account for a larger number of retail clients. Further, stocks (5.41%), retirement plans (1.45%), bonds (0.73%) and warrants (0.18%) show low rates. We note that financial market participation is mainly indirect through insurance companies and mutual funds.

¹⁹ Return is based on the government bonds that the insurer actually purchases when they invest clients' money.

²⁰ In Sub-panel B1, we only know if savings accounts were held by retail clients. The amount invested in the savings accounts is not available, unlike for Sub-panel B2.

Table 4. Descriptive statistics of banking records

Table 4 displays descriptive statistics of banking record variables. The first column reports variable names. The second column indicates the proportion (%) of retail clients for which the corresponding variable is coded 1 for binary variables and the mean (\bar{X}) for continuous variables. The third, fourth and fifth columns report the standard deviation, the minimum and maximum values respectively. Note that “Income” and “Bank loans” are the only variables extracted from the MiFID questionnaire answers due to a large number of missing banking records (see footnote 11 for further information).

Variables	%/ \bar{X}	std	min	max
<i>Panel A: Socio-demographic indicators</i>				
Gender	50.82%	-	-	-
Age	49.14	17.55	18	105
Native	85.50%	-	-	-
Paris	12.31%	-	-	-
Matrimonial	10.90%	-	-	-
Self-employed	12.76%	-	-	-
Salaried	55.57%	-	-	-
Retired	16.93%	-	-	-
No occupation	14.74%	-	-	-
<i>Panel B: Wealth and patrimony indicators</i>				
Income	2,520.66	2,225.25	0	10,000
Bank loans	30,029.48	39,437.44	0	100,000
<i>Sub-panel B1: Savings accounts</i>				
Regulated savings accounts	58.73%	-	-	-
Standard savings accounts	13.03%	-	-	-
Home savings accounts	23.44%	-	-	-
Life insurance	35.38%	-	-	-
Nber of savings accounts	1.34	1.19	0	6
<i>Sub-panel B2: Financial products</i>				
Stocks	5.41%	-	-	-
Funds	9.52%	-	-	-
Warrants	0.18%	-	-	-
Bonds	0.73%	-	-	-
UL life insurance products	17.13%	-	-	-
Retirement	1.45%	-	-	-
Nber of financial products	0.34	0.70	0	5
Portfolio value	58,414.83	1.01e+07	0	2.60e+09
Retail clients (N=68,190)	100%	-	-	-

4. Analysis of mental goals

In Section 4, we derive a typology of retail clients' mental goals from their investment goals. This typology is used to understand retail clients' actual investment decisions in Section 5. Section 4.1 presents the retail client mental goals typology. Section 4.2 provides descriptive statistics on mental goals. Section 4.3 focuses on the relationship between the number of investment goals and income.

4.1. Retail client mental goals typology

In this sub-section, MiFID questionnaire investment goals choices are aggregated into mental goals that support funds categorization as described in the literature.

Funds categorization implies that individuals assign activities to specific accounts (Thaler, 1999). Shefrin and Thaler (1988) and Thaler (1990, 1994 and 1999) describe a hierarchy of money locations wherein the temptation to spend money decreases from the first category to the third one. Indeed, the first category, i.e. "current assets", refers to cash on hand or checking accounts. The "current wealth" category refers to liquid asset accounts like savings accounts, stocks, bonds or mutual funds and home equity. Finally, the "future income" category refers to human capital and retirement savings accounts. In this paper, the study of investment goals enables us to focus on the two latter categories, i.e. "current wealth" and "future income", as they both reflect financial planning. Therefore, according to the literature on funds categorization, the investment goals "Saving", "Additional income", "Capital appreciation" and "Patrimony transmission" can be classified into the "current wealth" category while "Real estate project" and "Preparing retirement" belong to the "future income" category.

The Behavioral Portfolio Theory of Shefrin and Statman (2000), however, allows us to refine investment goal categorization, and specifically that of the "current wealth" category. Indeed, these authors depict the investors' portfolio as a pyramid with multiple layers. The first layer contains risk-free investments (e.g. savings accounts) for maintaining wealth levels, while the top of the pyramid refers to risky investments (e.g. foreign stocks or options) for becoming richer. On the basis of that representation, we distinguish "Saving" from the other investment goals of the "current wealth" category, i.e.

“Additional income”, “Capital appreciation” and “Patrimony transmission”, as these latter goals are better achieved by financial markets participation.

For that reason, we derive a typology of retail client mental goals based on their investment goals. In line with previous findings, four mental goals (labeled G1, G2, G3 and G4) are created. The first mental goal (G1) refers to retail clients who aim to preserve their wealth level, i.e. those opting for “Saving”. G1 then illustrates wealth preservation. The second mental goal (G2) includes retail clients who aim to increase their wealth level, i.e. those opting for “Additional income”, “Capital appreciation” and/or “Patrimony transmission”. G2 then illustrates wealth accumulation. The third mental goal (G3) gathers retail clients who aim to realize specific long-term investments, i.e. those opting for “Real estate project” and/or “Preparing retirement”. We consider that G3 corresponds to “specific long-term investments”. Finally, the fourth mental goal (G4) is devoted to retail clients who have no investment goal (“No goal”).

In Section 5, we investigate whether this typology of mental goals is consistent with retail clients’ investment decisions. Specifically, we expect to find that G1 (wealth preservation) exhibits a high propensity to use saving accounts, G2 (wealth accumulation) exhibits a high propensity to hold savings accounts together with financial products and G3 (specific long-term investments) exhibits a high propensity to hold mainly financial products. For the control group G4 (no goal), negative or low propensities to hold investment vehicles are expected.

4.2. Retail client mental goals typology’s descriptive statistics

Based on their declared investment goals, we match retail clients to the mental goals typology. Retail clients with multiple investment goals may fall into different mental goals within the typology. For example, a retail client who aims to build precautionary savings and to prepare his/her patrimony transmission belongs both to G1 and to G2.

In the mental goals typology, our retail clients are distributed according to the following proportions: G1 (wealth preservation) corresponds to 58.41% of the sample, G2 (wealth accumulation) to 34.91%, G3 (specific long-term investments) to 23.45% and G4 (no goal) to 18.49% of the sample. We also observe that retail clients differ, depending on the number of investment goals they chose. 45.77% of retail clients have a single investment goal and

one quarter of retail clients chose two investment goals (Table 5). We note that saving is mostly represented in pairwise combinations (31.48%). Only 10.15% of the sample has three or more investment goals²¹. Likewise, in Lee and Hanna (2015), the number of goals chosen by respondents significantly decreases from three investment goals. This result is unsurprising because of the high number of investment goals in the questionnaire. Tversky (1964), Sidick et al. (1994), Rodriguez (2005) and Schneid et al. (2014) argue that three-option items are optimal for multiple-choice type tests.

4.3. *Investment goals and income*

We also focus our analysis on retail clients who reported in the MiFID questionnaire that they have no investment goal (G4). The lack of an investment goal can arise from two explanations. First, retail clients may not actually have an investment goal because they do not care about future financial planning. We classify these retail clients into the sub-group G4-1. Second, retail clients have investment goals, but they deliberately choose not to discuss how to develop them with their banker. Indeed, they may prefer not to justify their investment decisions by specifying an investment goal, since they consider it is personal information. These clients belong to the sub-group G4-2.

In order to empirically differentiate these two sub-groups, we look at the average net monthly income depending on the number of investment goals. Actually, we assume that G4-1 retail clients have insufficient income to allocate to any financial project, while G4-2 retail clients have (at least) one unreported goal because their income is higher. Table 5 shows the results for all goal numbers.

First, we point out that, on average, retail clients' net monthly income and the number of investment goal choices increase together (except for the lowest proportion of retail clients who checked all goals). This finding is in line with those of Chang (1994), Dynan et al. (2004), Rha et al. (2006) and Yuh and Hanna (2010). In order to distinguish retail clients unwilling to communicate their investments goals, we assume €2,354.11 as a threshold beyond which retail clients have a single non-reported investment goal. As a consequence, within G4, 18.27% of retail clients are classified into the

21 As an illustration, hereafter we report the two highest numbers of retail clients having chosen three investment goals. 2.29% of retail clients aim to save, appreciate their capital and prepare their patrimony transmission. 1.14% of them aim to save, appreciate their capital and prepare their retirement.

sub-group G4-2. Conversely, 81.73% of them belong to G4-1, i.e. true no goal retail clients.

Table 5. Income analysis regarding the number of investment goals

Table 5 displays descriptive statistics on retail clients' income regarding the number of investment goals. The first column reports the number of investment goals. For each number of investment goals, the second and third columns report the average net monthly income (in euros) and the percentage of retail clients, respectively.

Nber of goals	Average net monthly income	%
0	1,999.13	18.49%
1	2,354.11	45.77%
2	2,845.28	25.29%
3	3,283.92	8.56%
4	3,857.80	1.60%
5	3,940.91	0.24%
6	3,342.86	0.05%
Retail clients (N=68,190)		100%

5. Investment decisions and mental goals

In Section 5, we analyze retail clients' actual investment decisions and their mental goals. Section 5.1 focuses on the determinants of the number of investment goals. Section 5.2 assesses the consistency between actual investment decisions and mental goals of retail clients.

5.1. *The determinants of the number of investment goals*

The impact of the number of goals on savings behavior has been documented by Soman and Zhao (2011). These authors demonstrate that having a single goal drives a higher rate of savings than those who have multiple goals, due to having to make trade-offs between competing goals. In this subsection, we aim to study the determinants of the number of investment goals. Note that the number of investment goals includes G4-2 retail clients for whom we assume they have one investment goal. We perform an ordinary least squares (OLS) regression, wherein the dependent variable is the number of investment goals ("Nber of goals") and independent variables²² are given in Table 3.

²² Since savings account value is not available in the banking records, we only study the holding of savings accounts and financial products. Therefore, we exclude "Portfolio value".

Table 6 presents OLS results²³. Except for gender, all independent variables significantly influence the number of investment goals chosen by retail clients²⁴.

In Panel A, we first notice that older retail clients are more likely to choose additional investment goals than younger ones. The impact of age on savings has been documented in the literature, although findings are not clear cut. Yuh and Hanna (2010) find that young households are more likely to save than their older counterparts, whereas Mirer (1979) and Chang (1994) find that savings behavior increases with age²⁵. Interestingly, native-born retail clients and those opting for the separation regime are more likely to choose additional investment goals. Retail clients living in the capital region, however, are less likely to choose multiple investment goals. We argue that the high cost of living in the capital, may restrict the number of investment goals of these individuals.

Regarding professional categories, the number of investment goals is higher among the self-employed and salaried employees, whereas it is lower for the retired (compared to those exercising no professional activity). In a similar vein, Yuh and Hanna (2010) show that the propensity to save is higher among self-employed households than for other professional categories and is lower among retired households than in non-retired ones.

Panel B shows that income and bank loans have a positive impact on the number of investment goals. The impact of income is particularly strong whereas, for bank loans, it is much lower, as a situation of indebtedness limits the diversification of investment goal choices²⁶. Finally, the number of goals is higher among retail clients holding savings accounts and/or financial

23 We first check the presence of possible correlation problems. The variables "Nber of savings accounts" and "Nber of financial products" are excluded since they are highly correlated with the savings accounts and financial products respectively (Pearson correlation coefficient being larger than 0.50). The typology groups are not included as they are obviously correlated with the number of investment goals. We also test the presence of the multicollinearity problem by using two methods. First, the condition index (or BKW indicator) of Belsley et al. (1980) is 18.77. Since it is below the critical threshold of 30, we conclude that this problem is not present in our study. We also respect the critical threshold of 20 suggested by Erkel-Rousse (1995). The strength of this method has been demonstrated by De Bourmont (2012). Second, we compute the Variance Inflation Factor (or VIF). According to Chatterjee et al. (2000), a VIF larger than 10 and/or a mean VIF larger than or equal to 2 denote the presence of multicollinearity problem. Satisfying both conditions (the largest VIF is 3.07 and the mean VIF is 1.66), the multicollinearity problem is not present on our study.

24 Note that we get similar results when G4-2 retail clients are classified into the modality 0 of "Nber of goals", except for "Gender" which is significant at 5% and "Matrimonial" which is no longer significant. Variable signs remain unchanged.

25 We point out that the impact of age on the number of savings goals and on the amount of savings, could be different.

26 We check for any sample selection bias by running the regression for the first set of questionnaires instead of the last set, i.e. the more recent one. As results are not different from the ones of Table 6, we conclude that the increase in net monthly income over time has a negligible impact on our findings.

products²⁷. We point out that the coefficients of both sub-panels are greater than those of other variables. Therefore, actual investment decisions have a strong impact on investment goal diversification.

Table 6. The determinants of the number of investment goals

Table 6 displays OLS results that aim to identify the determinants of the number of investment goals. Note that the dependent variable takes into account G4-2 retail clients, i.e. those who did not report their investment goals, by assuming they have one investment goal. The first column reports variable names. The second and third columns display coefficients and standard deviations of the corresponding variables, respectively. The variable “No occupation” is the reference category among professional categories. Statistical significance levels are fixed at 1% and 5% that are represented by *** and ** respectively.

	coef.	std
Dependent variable		
Nber of goals		
Independent variables		
<i>Panel A: Socio-demographic indicators</i>		
Gender	-0.0020	0.0065
Age	0.0010***	0.0003
Native	0.1011***	0.0093
Paris	-0.0226**	0.0099
Matrimonial	0.0324***	0.0105
Self-employed	0.0622***	0.0138
Salaried	0.0396***	0.0108
Retired	-0.0449***	0.0148
No occupation	(omitted)	
<i>Panel B: Wealth and patrimony indicators</i>		
ln(Income)	0.0714***	0.0020
ln(Bank loans)	0.0081***	0.0007
<i>Sub-panel B1: Savings accounts</i>		
Regulated savings accounts	0.1068***	0.0069
Standard savings accounts	0.0942***	0.0100
Home savings accounts	0.2449***	0.0081
Life insurance	0.3850***	0.0085
<i>Sub-panel B2: Financial products</i>		
Stocks	0.0611***	0.0154
Funds	0.1545***	0.0123
UL life insurance products	0.1463***	0.0101

27 We do not include warrants, bonds and retirements plans due to their low empirical frequencies (Table 4).

	coef.	std
_cons	0.3125***	0.0169
N	68,190	
F test	861.85	
Prob>F	0.0000	
R ²	0.1769	
Adjusted R ²	0.1767	

5.2. *The impact of mental goals on investment decisions*

In this sub-section, we aim to test the consistency between retail clients' actual investment decisions and their mental goals (i.e. G1 to G4), while controlling for socio-demographic indicators and wealth and patrimony indicators.

We separately analyze mental goals (G1, G2, G3 and G4)²⁸, savings accounts (Sub-panel B1) and financial products (Sub-panel B2). In Sub-panel B1, we group regulated and standard savings accounts together in the variable "Classical savings accounts". This grouping is justified by temporal bracketing (Thaler and Johnson, 1990): outcomes that are temporally proximate are more likely to be positioned in the same mental accounts²⁹. In Sub-panel B2, we exclude warrants, bonds and retirement plans due to the low proportion of ownership of these products (Table 4).

We perform binary logistic regressions (BLR), wherein the dependent variable is the decision whether to invest or not in savings accounts/financial products. We pay particularly attention as to whether or not these decisions fit with the mental goals³⁰. Average marginal effects (AMEs) are used for interpreting the magnitude effects.

Table 7 presents the results corresponding to savings accounts and Table 8 presents those corresponding to financial products.

Looking first at our typology of mental goals, we emphasize that all coefficients are statistically significant at all reasonable significance levels

28 Typology groups are separately analyzed, as retail clients with multiple goals may belong to several groups.

29 As opposed to narrow bracketing, which promotes the separation of mental accounts. Moreover, grouping regulated and standard savings accounts together leads to a decrease of the log likelihood of the estimation.

30 The presence of the multicollinearity problem is tested. Analyzing all the BLR, we find that the maximum value taken by the condition index (Belsley et al., 1980) is 18.60. Being below the critical threshold and satisfying VIF criteria (the largest VIF is 3.03 and the largest mean VIF is 1.61), we conclude that the multicollinearity problem is not present in our study.

and display the highest AMEs. First, G1 retail clients are more likely to hold savings accounts than financial products, which is not surprising. Specifically, AME of classical savings accounts (10.76%) is higher than those of home (7.66%) and life insurance (2.24%) savings accounts. G2 retail clients are more likely to invest both in savings accounts and in financial products. We notice that the AME is significantly higher in life insurance holdings (26.73%) compared to classical (12.64%) and home (14.65%) savings accounts. This result is consistent with G2 retail clients' goals since increasing wealth could better be achieved with life insurance. They also exhibit a greater preference for diversified products such as mutual funds (10.78%) and unit-linked life insurance products (16.26%). The same pattern is observed for G3 retail clients, who exhibit a high propensity to invest in home savings (11.44%) and in life insurance (14.71%) accounts. Both accounts fit these retail clients' specific goals, i.e. preparing a real estate project (achieved by home savings account investments) and/or retirement (achieved by life insurance investments). Besides, looking at financial product holdings, we notice that AMEs of G3 are lower than those of G2, which is contrary to our expectations. We argue that investing in financial markets is better suited to retail clients wishing to accumulate further wealth than to those with long-term specific goals. As for G4 retail clients, AMEs are unsurprisingly negative and the lowest of all the models, thus, illustrating the absence of future financial planning. Indeed, they are specifically stronger and consistent for savings accounts since the latter are adapted to take into account the lowest-level needs (Xiao and Anderson, 1997). Overall, we demonstrate that retail clients' investment decisions fit their mental goals. More importantly, we show that mental goals are strong determinants of investment behavior.

In Panel A, we first notice that there is no gender difference in savings account holdings. In line with Riley and Chow (1992), Sundén and Surette (1998), Agnew et al. (2003) and Charness and Gneezy (2012), we find that male retail clients are more likely to participate in financial markets than their female counterparts. Older retail clients are more prone to invest in savings accounts and in financial products than younger ones (Mirer, 1979, Chang, 1994 and Shum and Faig, 2006). We also find that being native-born and/or living in the capital region increases the likelihood of holding savings accounts (except for classical accounts for which the coefficients are not significant) and financial products. Specifically, AMEs of "Native" are stronger than those of "Paris". Likewise, Osili and Paulson (2007) and

Table 7. Savings account investment decisions

Table 7 reports the results of BLR, wherein the dependent variables are the savings account investment decisions of 68,190 retail clients as of the 07/31/2015. The Average Marginal Effects (AMEs) are reported for each independent variable. Standard deviations are indicated in parentheses. The variable "Salaried" represents the reference category among professional categories. Statistical significance levels are fixed at 1%, 5% and 10% and are denoted by ***, ** and * respectively.

	Classical savings accounts			Home savings accounts			Life insurance			
G1	0.1076*** (0.0037)			0.0766*** (0.0034)			0.0224*** (0.0036)			
G2	0.1264*** (0.0041)			0.1465*** (0.0034)			0.2673*** (0.0028)			
G3		0.0964*** (0.0045)			0.1144*** (0.0036)			0.1471*** (0.0039)		
G4			-0.1709*** (0.0044)				-0.1941*** (0.0053)		-0.2794*** (0.0053)	
Gender	0.0004 (0.0037)	-0.0034 (0.0037)	-0.0007 (0.0037)	0.0014 (0.0033)	-0.0017 (0.0033)	-0.0019 (0.0033)	0.0011 (0.0033)	0.0003 (0.0036)	-0.0015 (0.0034)	-0.0014 (0.0035)
Age	0.0038*** (0.0001)	0.0022*** (0.0002)	0.0031*** (0.0001)	0.0016*** (0.0001)	-0.0002 (0.0001)	0.0015*** (0.0001)	0.0011*** (0.0001)	0.0084*** (0.0001)	0.0055*** (0.0001)	0.0086*** (0.0001)
Native	0.0750*** (0.0052)	0.0643*** (0.0052)	0.0723*** (0.0052)	0.0651*** (0.0049)	0.0509*** (0.0049)	0.0616*** (0.0049)	0.0561*** (0.0049)	0.0737*** (0.0051)	0.0450*** (0.0048)	0.0691*** (0.0050)
Paris	0.0076 (0.0057)	-0.0029 (0.0057)	0.0025 (0.0056)	0.0411*** (0.0049)	0.0318*** (0.0048)	0.0299*** (0.0048)	0.0380*** (0.0048)	0.0519*** (0.0053)	0.0441*** (0.0050)	0.0436*** (0.0053)
Matrimonial	-0.0384*** (0.0059)	-0.0549*** (0.0059)	-0.0475*** (0.0059)	-0.0074 (0.0054)	-0.0227*** (0.0053)	-0.0141*** (0.0054)	-0.0115** (0.0053)	0.0116** (0.0055)	-0.0074 (0.0052)	0.0095* (0.0054)
Self-employed	-0.1210*** (0.0059)	-0.1339*** (0.0059)	-0.1360*** (0.0059)	-0.0251*** (0.0054)	-0.0340*** (0.0053)	-0.0374*** (0.0054)	-0.0272*** (0.0053)	-0.0013 (0.0055)	-0.0072 (0.0052)	-0.0100* (0.0054)

	Classical savings accounts				Home savings accounts				Life insurance			
	(0.0056)	(0.0055)	(0.0056)	(0.0055)	(0.0053)	(0.0052)	(0.0053)	(0.0052)	(0.0054)	(0.0051)	(0.0054)	(0.0053)
Retired	-0.0192***	-0.0264***	-0.0023	-0.0186***	-0.0347***	-0.0408***	-0.0125**	-0.0340***	-0.0404***	-0.0404***	-0.0048	-0.0286***
	(0.0070)	(0.0070)	(0.0070)	(0.0070)	(0.0058)	(0.0058)	(0.0059)	(0.0058)	(0.0058)	(0.0058)	(0.0060)	(0.0059)
No occupation	-0.0141**	-0.0281***	-0.0129**	-0.0163***	-0.0055	-0.0186***	0.0016	-0.0060	-0.0207***	-0.0035	0.0089	0.0000
	(0.0061)	(0.0061)	(0.0061)	(0.0061)	(0.0055)	(0.0054)	(0.0055)	(0.0054)	(0.0058)	(0.0061)	(0.0061)	(0.0060)
Salarié	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)
In(Income)	0.0099***	0.0083***	0.0087***	0.0064***	0.0081***	0.0048***	0.0055***	0.0042***	0.0111***	0.0019***	0.0071***	0.0045***
	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0010)	(0.0010)	(0.0011)	(0.0012)	(0.0011)	(0.0012)	(0.0012)
In(Bank loans)	-0.0030***	-0.0025***	-0.0026***	-0.0029***	-0.0060***	-0.0056***	-0.0058***	-0.0059***	-0.0032***	-0.0030***	-0.0033***	-0.0034***
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0004)	(0.0003)
N	68,190	68,190	68,190	68,190	68,190	68,190	68,190	68,190	68,190	68,190	68,190	68,190
LR Chi2	2,902.35	2,991.88	2,543.27	3,466.86	1,258.81	2,497.70	1,671.16	2,335.53	7,553.60	13,686.50	8,819.02	10,599.85
Prob>chi2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Pseudo-R2	0.0320	0.0330	0.0281	0.0383	0.0170	0.0336	0.0225	0.0315	0.0852	0.1544	0.0995	0.1196
Log likelihood	-43,852.74	-43,807.98	-44,032.28	-43,570.48	-36,500.62	-35,881.18	-36,294.44	-35,962.26	-40,530.46	-37,464.01	-39,897.75	-39,007.33

Table 8. Financial product investment decisions

Table 8 reports the results of BLR, wherein the dependent variables are the financial product investment decisions of 68,190 retail clients as of the 07/31/2015. The Average Marginal Effects (AMEs) are reported for each independent variable. Standard deviations are indicated in parentheses. The variable "Salaried" represents the reference category among professional categories. Statistical significance levels are fixed at 1%, 5% and 10% and are denoted by ***, ** and * respectively.

	Stocks		Funds		UL life insurance products					
G1	-0.0241*** (0.0018)		-0.0225*** (0.0022)		-0.0058** (0.0029)					
G2	0.0576*** (0.0020)		0.1078*** (0.0025)		0.1626*** (0.0028)					
G3		0.0136*** (0.0021)		0.0393*** (0.0026)		0.0923*** (0.0032)				
G4			-0.0416*** (0.0031)		-0.0930*** (0.0043)	-0.1716*** (0.0053)				
Gender	0.0188*** (0.0018)	0.0197*** (0.0018)	0.0192*** (0.0018)	0.0066*** (0.0022)	0.0061*** (0.0023)	0.0072*** (0.0023)	0.0165*** (0.0029)	0.0162*** (0.0028)	0.0160*** (0.0029)	0.0182*** (0.0029)
Age	0.0024*** (0.0001)	0.0020*** (0.0001)	0.0026*** (0.0001)	0.0036*** (0.0001)	0.0027*** (0.0001)	0.0039*** (0.0001)	0.0037*** (0.0001)	0.0040*** (0.0001)	0.0043*** (0.0001)	0.0040*** (0.0001)
Native	0.0297*** (0.0028)	0.0250*** (0.0028)	0.0299*** (0.0028)	0.0426*** (0.0036)	0.0287*** (0.0028)	0.0423*** (0.0036)	0.0398*** (0.0036)	0.0448*** (0.0044)	0.0285*** (0.0042)	0.0424*** (0.0043)
Paris	0.0325*** (0.0022)	0.0354*** (0.0022)	0.0338*** (0.0022)	0.0249*** (0.0031)	0.0355*** (0.0022)	0.0275*** (0.0031)	0.0253*** (0.0031)	0.0173*** (0.0043)	0.0156*** (0.0042)	0.0138*** (0.0043)
Matrimonial	0.0188*** (0.0022)	0.0190*** (0.0022)	0.0207*** (0.0022)	0.0226*** (0.0031)	0.0214*** (0.0022)	0.0200*** (0.0030)	0.0245*** (0.0031)	0.0258*** (0.0043)	0.0149*** (0.0042)	0.0153*** (0.0043)
Self-employed	0.0027 (0.0025)	0.0049* (0.0025)	0.0040 (0.0025)	0.0064* (0.0033)	0.0053*** (0.0025)	0.0081** (0.0032)	0.0066** (0.0033)	0.0100*** (0.0043)	0.0007 (0.0044)	-0.0008 (0.0044)

	Stocks			Funds			UL life insurance products					
Retired	-0.0191*** (0.0027)	-0.0197*** (0.0026)	-0.0172*** (0.0027)	-0.0189*** (0.0027)	-0.0281*** (0.0035)	-0.0293*** (0.0034)	-0.0219*** (0.0035)	-0.0276*** (0.0035)	-0.0379*** (0.0048)	-0.0418*** (0.0046)	-0.0210*** (0.0048)	-0.0370*** (0.0048)
No occupation	0.0130*** (0.0032)	0.0119*** (0.0032)	0.0154*** (0.0032)	0.0144*** (0.0032)	-0.0017 (0.0043)	-0.0054 (0.0042)	0.0034 (0.0043)	0.0005 (0.0042)	-0.0185*** (0.0053)	-0.0273*** (0.0052)	-0.0088* (0.0053)	-0.0156*** (0.0053)
Salaried	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)
In(Income)	0.0128*** (0.0010)	0.0092*** (0.0009)	0.0132*** (0.0010)	0.0125*** (0.0010)	0.0166*** (0.0012)	0.0099*** (0.0010)	0.0156*** (0.0012)	0.0146*** (0.0012)	0.0111*** (0.0011)	0.0045*** (0.0010)	0.0083*** (0.0011)	0.0073*** (0.0011)
In(Bank loans)	-0.0006*** (0.0002)	-0.0006*** (0.0002)	-0.0008*** (0.0002)	-0.0008*** (0.0002)	-0.0005*** (0.0002)	-0.0004* (0.0002)	-0.0007*** (0.0002)	-0.0006*** (0.0002)	-0.0005 (0.0003)	-0.0004 (0.0003)	-0.0007** (0.0003)	-0.0007** (0.0003)
N	68,190	68,190	68,190	68,190	68,190	68,190	68,190	68,190	68,190	68,190	68,190	68,190
LR Chi2	3,652.30	4,451.71	3,496.72	3,687.04	4,103.82	6,188.49	4,216.87	4,636.38	2,669.91	5,768.46	3,438.66	4,037.06
Prob>chi2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Pseudo-R2	0.1274	0.1552	0.1219	0.1286	0.0957	0.1444	0.0984	0.1081	0.0428	0.0924	0.0551	0.0646
Log likelihood	-12,513.23	-12,113.53	-12,591.02	-12,495.86	-19,383.66	-18,341.33	-19,327.14	-19,117.38	-29,890.59	-28,341.31	-29,506.21	-29,207.01

Chatterjee (2009) demonstrate that immigrants participate less in financial markets than natives in the US. As for the matrimonial regime, retail clients opting for the separation regime are less likely to hold classical and home savings accounts. Being financially independent from their spouse, they are more attracted by the possibility of receiving a high remuneration (via life insurance account holdings) and bearing capital risk (due to financial markets participation). Reviewing the professional categories³¹, we find that salaried employees are more likely to hold savings accounts than the other professional categories. The retired are less likely to invest in financial markets than the salaried. This result is in line with that of Yuh and Hanna (2010). Finally, we find that financial independence, illustrated by “Matrimonial” and “Self-employed”, promotes financial markets participation.

In Panel B, we find that higher income levels make retail clients more likely to hold both savings accounts and financial products. Specifically, AMEs of financial products are higher than those of savings accounts. Therefore, retail clients with higher incomes are much more likely to hold financial products than savings accounts. As for bank loans, retail clients are less likely to hold both savings accounts and financial products, when the loan amount increases. Although AMEs are negative in both investments, we notice that retail clients are much less likely to hold financial products than savings accounts, when their loan amount increases.

6. Robustness checks

In Section 6, we perform three robustness checks of the determinants of the number of investment goals (Section 5.1):

- Robustness check 1 (RC1) evaluates whether the value of the portfolio influences the number of investment goals. We replace portfolio holdings, i.e. “Stocks”, “Funds” and “UL life insurance products”, with the whole investment asset value in order to test whether a quantitative measure of financial wealth has an impact on the main findings.
- Robustness check 2 (RC2) tests the impact of retail clients’ attitudes towards risk on the number of investment goals. According to Devaney

31 Among professional categories, “Salaried” is the reference category, as it contains the largest number of retail clients. Moreover, it is highly correlated with each of the other professional categories. Therefore, “Salaried” is the most appropriate reference for interpreting professional categories.

et al. (2007), risk tolerance has an impact on the likelihood of movement from lower to higher savings levels. In the MiFID questionnaire, retail clients (N=64,086) self-assess their attitudes towards risk by choosing one out of three proposals, in which risk tolerance increases from the first to the third one. Looking at the distribution of retail clients, a large proportion of retail clients (about 68%) are not risk tolerant, whereas about 32% of them have a low or high, risk tolerance level. This result is similar to that of Hong et al.³².

- Robustness check 3 (RC3) tests the impact of financial literacy on the number of investment goals. In the MiFID questionnaire, some retail clients (N=46,553) self-assess whether they understand the risks associated with stocks, bonds, and other particular financial products (such as warrants, differed service settlements, convertible bonds and other financial investments) and whether they understand financial markets (i.e. change of order execution delay and existence of different types of orders). Based upon these questions, we build a financial literacy score (“Financial literacy”) that ranges from 0 (no financial knowledge) to 4 (high level of knowledge). In our sample, the average score is about 1.98 (std=1.16).

Table 9 reports robustness checks results. In RC1, we find that the number of investment goals increases with portfolio value, while controlling for the whole wealth and patrimony indicators. Portfolio value’s coefficient is close to those of the continuous variables “Income” and “Bank loans”. Therefore, we reinforce our main findings. In RC2 and RC3, we exclude Panel B to check whether our findings are robust regarding qualitative analysis. We test whether both socio-demographic indicators³³ (Panel A) and individual characteristics (Panel C), i.e. risk tolerance and financial literacy, have an impact on the number of goals. Individual characteristics are separately analyzed to isolate their impact on the number of goals. In RC2, we find that risk tolerance level influences the number of investment goals. Retail clients who are not risk tolerant are much more likely to limit the diversification of goal numbers than those who have a high risk tolerance level (coefficient value being the greatest). In RC3, we find that financial literacy has a significant and positive impact on the number of

32 In their study, Hong et al. (2004) report that 32.53% of US households are risk tolerant.

33 Among the professional occupations, the reference category is different in RC2 and RC3 because of collinearity. This change does not impact the interpretation of results.

goals. Retail clients with high financial literacy are more prone to diversify their investment goal choices.

Table 9. Robustness checks results

Table 9 displays OLS results corresponding to robustness checks (RC1, RC2 and RC3). The dependent variable “Nber of goals” takes into account G4-2 retail clients by assuming they have one investment goal. Statistical significance levels are fixed at 1%, 5% and 10% and are represented by ***, ** and * respectively.

	RC1		RC2		RC3	
	Coef.	Std.	Coef.	Std.	Coef.	Std.
Dependent variable						
Nber of goals						
Independent variables						
<i>Panel A: Socio-demographic indicators</i>						
Gender	-0.0037	0.0065	-0.0130*	0.0067	-0.0118	0.0084
Age	0.0006**	0.0003	0.0062***	0.0003	0.0061***	0.0003
Native	0.0971***	0.0092	0.1327***	0.0097	0.0956***	0.0127
Paris	-0.0260***	0.0099	0.0010	0.0103	-0.0274**	0.0124
Matrimonial	0.0287***	0.0105	0.0253**	0.0108	0.0049	0.0126
Self-employed	0.0646***	0.0138	0.1505***	0.0140	0.1547***	0.0170
Salaried	0.0430***	0.0108	0.1475***	0.0119	0.1620***	0.0136
Retired	-0.0392***	0.0148	(omitted)		0.0026	0.0188
No occupation	(omitted)		-0.0432***	0.0151	(omitted)	
<i>Panel B: Wealth and patrimony indicators</i>						
ln(Income)	0.0707***	0.0020				
ln(Bank loans)	0.0085***	0.0007				
<i>Sub-panel B1: Savings accounts</i>						
Regulated savings accounts	0.1080***	0.0069				
Standard savings accounts	0.0828***	0.0100				
Home savings accounts	0.2406***	0.0081				
Life insurance	0.3804***	0.0081				
<i>Sub-panel B2: Financial products</i>						
ln(Portfolio value)	0.0279***	0.0011				

	RC1		RC2		RC3	
	Coef.	Std.	Coef.	Std.	Coef.	Std.
<i>Panel C: MiFID indicators</i>						
<i>Risk tolerance level</i>						
No risk			-0.5138***	0.0249		
Low risk			0.0102	0.0252		
High risk			(omitted)			
Financial literacy					0.1050***	0.0037
_cons	0.3294***	0.0169	1.2424***	0.0344	0.8426***	0.0222
N	68,190		64,086		46,553	
F test	992.15		792.33		201.31	
Prob>F	0.0000		0.0000		0.0000	
R ²	0.1792		0.1100		0.0375	
Adjusted R ²	0.1790		0.1099		0.0373	

7. Conclusion

In this study, we analyzed retail clients' investment decisions together with their self-assessed investment goals. This unique opportunity was provided by the availability of the answers to the MiFID questionnaire, together with the banking records of retail clients. In other words, data on investment goals are rare and, more importantly, it is even rarer to find data on both intended goals and actual decisions, for an identical set of individuals. Therefore, as soon as we had this appropriate measure of investment goals, we were able to analyze, on a more granular level, the individual's mental accounting process.

From the self-assessed investment goals of retail clients, we derive a retail client typology of mental goals, i.e. preserving wealth, increasing wealth, investing in specific long-term investments and no goal. We also show that the number of self-assessed investment goals is determined by socio-demographics, wealth and patrimony indicators. Our main result is that retail clients' actual investment decisions are consistent with their mental goals, while controlling for the same indicators. More importantly, mental goals

explain approximately 10% to 20% of the likelihood of investing in the corresponding investment vehicles and are, therefore, key drivers of saving and investment decisions. Throughout this study, we use a variety of variables, of which some are defined, such as the usual drivers of investment decisions including gender, age and income. Specific variables are also taken into account, such as geographical criteria, which are rarely studied, and matrimonial regime choice, which has not yet been studied. Finally, we show that our findings are robust to three robustness checks, by considering financial wealth, risk tolerance and financial literacy.

Our findings have the following implications. First, we contribute to the literature on mental accounting because we match investment goals and fund categorization/earmarking. Second, by showing that MiFID questionnaire answers are helpful in terms of mental accounting analyses, we give an academic justification for administering this mandatory questionnaire. We show that data collection from investment service providers through MiFID, seems to achieve its objective, i.e. offering advice and financial products suited to the clients' financial situation. We hope that this finding will encourage a systematic data collection of MiFID questionnaire answers. Finally, as investment goals were assessed by individuals in a mandatory questionnaire, we expect that it could support retail clients to achieve their goals. Not only by helping them identify those goals in the first instance but also to encourage them to develop a discipline around savings and/or investments through regular or even automatic deposits, for example, a monthly direct debit to build an education fund for their children. These tools may also help people set investment goals, establish budgets and keep track of their expenses and savings. More importantly, they may also help individuals to avoid the pitfalls of mental accounting, for example, by facilitating the connection between different mental accounts that correspond to differently labeled savings accounts.

References

- Abeler, J. and Marklein, F. (2017). Fungibility, Labels, and Consumption. *Journal of the European Economic Association* 15: 99-127.
- Agnew, J., Balduzzi, P. and Sundén, A. (2003). Portfolio Choice and Trading in a Large 401(k) Plan. *The American Economic Review* 93: 193-215.
- Alexander, G. J. and Baptista, A. M. (2011). Portfolio selection with mental accounts and delegation. *Journal of Banking & Finance* 35: 2637-2656.
- Alexander, G. J., Baptista, A. M. and Yan, S. (2017). Portfolio selection with mental accounts and estimation risk. *Journal of Empirical Finance* 41: 161-186.
- Bao, Y., Gao, Z., Xu, M., Sun, H. and Yang, H. (2015). Travel mental budgeting under road toll: An investigation based on user equilibrium. *Transportation Research Part A: Policy and Practice* 73: 1-17.
- Baptista, A. M. (2012). Portfolio selection with mental accounts and background risk. *Journal of Banking & Finance* 36: 968-980.
- Barber, B. M. and Odean, T. (2001). Boys Will be Boys: Gender, Overconfidence, and Common Stock Investment. *Quarterly journal of Economics* 116: 261-292.
- Bauer, R., Cosemans, M. and Eichholtz, P. (2009). Option trading and individual investor performance. *Journal of Banking & Finance* 33: 731-746.
- Bellofatto, A., D'Hondt, C. and Winne, R. D. (2018). Subjective financial literacy and retail investors' behavior. *Journal of Banking & Finance* 92: 168-181.
- Belsley, D. A., Kuh, E. and Welsch, R. E. (1980). Regression diagnostics: identifying influential data and sources of collinearity. New York: John Wiley.
- Booelll-Gunesh, S., Broihanne, M.-H. and Merli, M. (2009). Disposition effect, investor sophistication and taxes: Some French Specificities. *Finance* 30: 51-78.
- Brida, J. G. and Tokarchuk, O. (2015). Keeping mental budgets: Visitors' spending at a Christmas market. *Tourism Economics* 21: 67-82.
- Canova, L., Rattazzi, A. M. M. and Webley, P. (2005). The hierarchical structure of saving motives. *Journal of Economic Psychology* 26: 21-34.
- Chang, Y. R. (1994). Saving Behavior of US Households in the 1980s: Results from the 1983 and 1986 Survey of Consumer Finance. *Financial Counseling and Planning* 5: 45-64.
- Charness, G. and Gneezy, U. (2012). Strong Evidence for Gender Differences in Risk Taking. *Journal of Economic Behavior & Organization* 83: 50-58.
- Chatterjee, S. (2009). Individual Stockownership in the United States: Native-Immigrant Gap and the Role of Risk Tolerance. *International Research Journal of Finance and Economics* 28: 160-168.

- Chatterjee, S., Hadi, A. S. and Price, B. (2000). *Regression Analysis by Example*. New York: John Wiley.
- Cheema, A. and Soman, D. (2006). Malleable Mental Accounting: The Effect of Flexibility on the Justification of Attractive Spending and Consumption Decisions. *Journal of Consumer Psychology* 16: 33-44.
- Crossley, T. F., Bresser, J., Delaney, L. and Winter, J. (2017). Can Survey Participation Alter Household Saving Behaviour? *The Economic Journal* 127: 2332-2357.
- De Bourmont, M. (2012). La résolution d'un problème de multicollinéarité au sein des études portant sur les déterminants d'une publication volontaire d'informations : proposition d'un algorithme de décision simplifié basé sur les indicateurs de Belsley, Kuh et Welsch (1980). In *Comptabilités et innovation*. Grenoble, France, cd-rom.
- De Giorgi, E. G. (2011). Loss aversion with multiple investment goals. *Mathematics and Financial Economics* 5: 203-227.
- Devaney, S., Anong, S. T. and Whirl, S. E. (2007). Household Savings Motives. *The Journal of Consumer Affairs* 41: 174-186.
- Duffy, B., Smith, K., Terhanian, G. and Bremer, J. (2005). Comparing Data from Online and Face- to-face Surveys. *International Journal of Market Research* 47: 615-639.
- Dynan, K. E., Skinner, J. and Zeldes, S. P. (2004). Do the Rich Save More? *Journal of Political Economy* 112: 397-444.
- Erkel-Rousse, H. (1995). Détection de la multicollinéarité dans un modèle linéaire ordinaire: quelques éléments pour un usage averti des indicateurs de Belsley, Kuh et Welsch. *Revue de Statistique Appliquée* 43: 19-42.
- Evans, J. R. and Mathur, A. (2005). The value of online surveys. *Internet Research* 15: 195-219.
- Feng, L. and Seasholes, M. S. (2008). Individual investors and gender similarities in an emerging stock market. *Pacific-Basin Finance Journal* 16: 44-60.
- Fisher, P. J. and Anong, S. T. (2012). Relationship of Saving Motives to Saving Habits. *Journal of Financial Counseling and Planning* 23: 63-79.
- Fisher, P. J. and Montalto, C. P. (2010). Effect of saving motives and horizon on saving behaviors. *Journal of Economic Psychology* 31: 92-105.
- Friedman, M. (1957). *A Theory of Consumption Function*. Princeton, NJ: Princeton University Press.
- Galperti, S. (2017). A Theory of Personal Budgeting. Available at SSRN: <https://ssrn.com/abstract/2964067> or <http://dx.doi.org/10.2139/ssrn.2964067>.
- Grinblatt, M. and Keloharju, M. (2009). Sensation Seeking, Overconfidence, and Trading Activity. *The Journal of Finance* 64: 549-578.

- Guiso, L. and Jappelli, T. (2005). Awareness and Stock Market Participation. *Review of Finance* 9: 537-567.
- Hastings, J. S. and Shapiro, J. M. (2013). Fungibility and Consumer Choice: Evidence from Commodity Price Shocks. *The Quarterly Journal of Economics* 128: 1449-1498.
- Heath, C. (1995). Escalation and De-escalation of Commitment in Response to Sunk Costs: The Role of Budgeting in Mental Accounting. *Organizational Behavior and Human Decision Processes* 62: 38-54.
- Heath, C. and Soll, J. B. (1996). Mental Budgeting and Consumer Decisions. *Journal of Consumer Research* 23: 40-52.
- Helion, C. and Gilovich, T. (2014). Gift Cards and Mental Accounting: Greenlighting Hedonic Spending. *Journal of Behavioral Decision Making* 27: 386-393.
- Henderson, P. W. and Peterson, R. A. (1992). Mental accounting and categorization. *Organizational Behavior and Human Decision Processes* 51: 92-117.
- Hoffmann, A. O., Post, T. and Pennings, J. M. (2013). Individual investor perceptions and behavior during the financial crisis. *Journal of Banking & Finance* 37: 60-74.
- Hoffmann, A. O., Post, T. and Pennings, J. M. (2015). How Investor Perceptions Drive Actual Trading and Risk-Taking Behavior. *Journal of Behavioral Finance* 16: 94-103.
- Hogarth, J. M. and Anguelov, C. E. (2003). Can the Poor Save? *Journal of Financial Counseling and Planning* 14: 1-18.
- Hong, H., Kubik, J. D. and Stein, J. C. (2004). Social Interaction and Stock-Market Participation. *The Journal of Finance* 59: 137-163.
- LaBarge, M. C. and Stinson, J. L. (2014). The Role of Mental Budgeting in Philanthropic Decision-Making. *Nonprofit and Voluntary Sector Quarterly* 43: 993-1013.
- Lee, J. M. and Hanna, S. D. (2015). Savings Goals and Saving Behavior From a Perspective of Maslow's Hierarchy of Needs. *Journal of Financial Counseling and Planning* 26: 129-147.
- Mirer, T. W. (1979). The Wealth-Age Relation among the Aged. *The American Economic Review* 69: 435-43.
- Modigliani, F. and Brumberg, R. (1954). Utility analysis and the consumption function: An interpretation of cross-section data. In Kurihara, K. K. (ed.), *Post Keynesian Economics*. New Brunswick, NJ: Rutgers University Press, 388-436.
- Osili, U. O. and Paulson, A. (2007). Understanding Immigrant-Native Differences in Financial Market Participation. Networks Financial Institute Working

- Paper No. 2007-WP-19. Available at SSRN: <https://ssrn.com/abstract/1060841> or <http://dx.doi.org/10.2139/ssrn.1060841>.
- Read, D., Loewenstein, G. and Rabin, M. (1999). Choice Bracketing. *Journal of Risk and Uncertainty* 19: 171-197.
- Rha, J.-Y., Montalto, C. and Hanna, S. D. (2006). The Effect of Self-Control Mechanisms on House-hold Saving Behavior. *Journal of Financial Counseling and Planning* 17: 3-16.
- Richards, D. W., Rutterford, J., Kodwani, D. and Fenton-O’Creevy, M. (2017). Stock market investors’ use of stop losses and the disposition effect. *The European Journal of Finance* 23: 130-152.
- Riley, W. B. and Chow, K. V. (1992). Asset Allocation and Individual Risk Aversion. *Financial Analysts Journal* 48: 32-37.
- Rockenbach, B. (2004). The behavioral relevance of mental accounting for the pricing of financial options. *Journal of Economic Behavior & Organization* 53: 513-527.
- Rodriguez, M. C. (2005). Three Options Are Optimal for Multiple-Choice Items: A Meta-Analysis of 80 Years of Research. *Educational Measurement: Issues and Practice* 24: 3-13.
- Roediger, H. L. and Marsh, E. J. (2005). The positive and negative consequences of multiple-choice testing. *Journal of Experimental Psychology: Learning, Memory and Cognition* 31: 1155-1159.
- Schneid, S. D., Armour, C., Park, Y. S., Yudkowsky, R. and Bordage, G. (2014). Reducing the number of options on multiple-choice questions: response time, psychometrics and standard setting. *Medical Education* 48: 1020-1027.
- Shefrin, H. and Statman, M. (2000). Behavioral Portfolio Theory. *Journal of Financial & Quantitative Analysis* 35: 127-151.
- Shefrin, H. and Thaler, R. (1988). The Behavioral Life-Cycle Hypothesis. *Economic Inquiry* 26: 609-643.
- Shum, P. and Faig, M. (2006). What explains household stock holdings? *Journal of Banking & Finance* 30: 2579-2597.
- Sidick, J. T., Barrett, G. V. and Doverspike, D. (1994). Three-alternative multiple choice tests: An attractive option. *Personnel Psychology* 47: 829-835.
- Soman, D. (2001). The mental accounting of sunk time costs: why time is not like money. *Journal of Behavioral Decision Making* 14: 169-185.
- Soman, D. and Ahn, H.-K. (2011). Mental accounting and individual welfare. In Keren, G. (ed.), *Perspectives on framing*. Psychology Press, New York, NY, 65-92.
- Soman, D. and Cheema, A. (2011). Earmarking and Partitioning: Increasing Saving by Low-Income Households. *Journal of Marketing Research* 48: S14-S22.

- Soman, D. and Zhao, M. (2011). The Fewer the Better: Number of Goals and Savings Behavior. *Journal of Marketing Research* 48: 944-957.
- Statman, M. (2014). Behavioral finance: Finance with normal people. *Borsa Istanbul Review* 14: 65-73.
- Stilley, K. M., Inman, J. J. and Wakefield, K. L. (2010). Spending on the Fly: Mental Budgets, Promotions, and Spending Behavior. *Journal of Marketing* 74: 34-47.
- Sundén, A. E. and Surette, B. J. (1998). Gender Differences in the Allocation of Assets in Retirement Savings Plans. *The American Economic Review* 88: 207-11.
- Thaler, R. (1985). Mental Accounting and Consumer Choice. *Marketing Science* 4: 199-214.
- Thaler, R. (1990). Anomalies: Saving, Fungibility, and Mental Accounts. *Journal of Economic Perspectives* 4: 193-205.
- Thaler, R. (1994). Psychology and Savings Policies. *The American Economic Review* 84: 186-192.
- Thaler, R. (1999). Mental Accounting Matters. *Journal of Behavioral Decision Making* 12: 183-206.
- Thaler, R. and Johnson, E. J. (1990). Gambling with the House Money and Trying to Break Even: The Effects of Prior Outcomes on Risky Choice. *Management Science* 36: 643-660.
- Toppino, T. C. and Brochin, H. A. (1989). Learning from Tests: The Case of True-False Examinations. *The Journal of Educational Research* 83: 119-124.
- Tversky, A. (1964). On the optimal number of alternatives at a choice point. *Journal of Mathematical Psychology* 1: 386-391.
- Tversky, A. and Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science* 211: 453-458.
- Ülkümen, G. and Cheema, A. (2011). Framing Goals to Influence Personal Savings: The Role of Specificity and Construal Level. *Journal of Marketing Research* 48: 958-969.
- Wärneryd, K.-E. (1989). On the psychology of saving: An essay on economic behavior. *Journal of Economic Psychology* 10: 515-541.
- Wärneryd, K.-E. (1999). *The Psychology of Saving. A Study of Economic Psychology*. Cheltenham: Edward Elgar Publishing.
- Weber, M. and Welfens, F. (2007). An Individual Level Analysis of the Disposition Effect: Empirical and Experimental Evidence. Sonderforschungsbereich 504 Publications 07-45, Universität Mannheim.
- Xiao, J. J. and Anderson, J. G. (1997). Hierarchical Financial Needs Reflected by Household Financial Asset Shares. *Journal of Family and Economic Issues* 18: 333-355.

- Xiao, J. J. and Fan, J. X. (2002). A Comparison of Saving Motives of Urban Chinese and American Workers. *Family and Consumer Sciences Research Journal* 30: 463-495.
- Xiao, J. J. and Noring, F. E. (1994). Perceived saving motives and hierarchical financial needs. *Financial Counseling and Planning* 5: 25-44.
- Yuh, Y. and Hanna, S. D. (2010). Which Households Think They Save? *The Journal of Consumer Affairs* 44: 70-97.
- Zhang, C. Y. and Sussman, A. B. (2018). *The Role of Mental Accounting in Household Spending and Investing Decisions*. Wiley-Blackwell, chap. 6. 65-96.
- Zhong, L. X. and Xiao, J. J. (1995). Determinants of Family Bond And Stock Holdings. *Journal of Financial Counseling and Planning* 6: 107-114.