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Individual behaviour and long-range planning attitude

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Declining welfare systems increase the importance of self-determination in pension decisions. Thus, the stability of long-life consumption markedly relies on individual long-range planning attitude. Our paper investigates how behavioural traits affect this attitude and influence the probability of holding voluntary integrative pension schemes (VIPS). We find that psychophysiological heterogeneity plays a role in predicting demand for VIPS, together with saving/indebtedness style and conventional sociodemographic characteristics. Specifically, individuals who have a high degree of non-planning impulsiveness, and who are inclined to intense psychophysiological arousals, are less likely to demand VIPS. Our results imply that behavioural individualities might prompt individuals to postpone, or even neglect, decisions necessary to maintain stable lifestyles in the long range.

Keywords: long-range planning attitude; psychophysiological heterogeneity; integrative pension schemes; impulsivity; Skin Conductance Response

JEL Classification: G02; G28; D14; D87

1. Introduction

This paper investigates how psychophysiological heterogeneity affects long-range planning attitude. We examine whether some personality traits and psychophysiological inclinations influence the probability of holding voluntary integrative pension schemes (VIPS), while controlling for saving/indebtedness style and sociodemographic characteristics.

In pension decisions, self-determination and self-control increasingly determine individual choices and behaviours. This is the case of declining welfare systems that ask individuals, worldwide, to make autonomous decisions in order to maintain stable lifestyles for the long term. Retirement income systems of many OECD countries are increasingly relying on private, or more generally funded, pensions, often organized as defined contribution (DC) plans (OECD 2012).¹

Unlike public pensions, private schemes are voluntary in many countries (OECD 2012). As a result, participation in and contributions to these plans are largely individual choices, and may lead to disparities in coverage and contribution rates across populations and between countries (OECD 2012).

Self-determination in long-range retirement planning implies that individuals determine the proper beginning and amount of saving, as well as the appropriate investment strategy. In addition, participants in DB pensions should also evaluate whether retirement plans are going to provide forward income sufficient to preserve quality of life during retirement; or, conversely,

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48 whether they should self-organize with supplemental plans, such as VIPS. These voluntary inte-
49 grative schemes may take different forms in different countries depending on both regulation
50 and the range of supply by the financial system. However, most often they appear as collective
51 pension funds similar to US 401(k) plans or individual schemes in the form of life insurance.

52 Both theoretical literature and empirical evidence indicate that individuals face a series of
53 obstacles in developing a long-range planning attitude. Some of these pitfalls refer to cogni-
54 tive biases that emerge when dealing with concepts such as discount rates and probabilities
55 (Thaler 1981; Ainslie and Haslam 1992; Lusardi and Mitchell 2009, 2011). Some others might
56 be related to personality traits, such as self-esteem in decisional tasks or impulsivity. Finally, a
57 concurring affective component may influence decision-making, especially in a long-range per-
58 spective (among others, McClure et al. 2004, 2007; Weber and Johnson 2009; Reimann and
59 Bechara 2010). This paper contributes mainly to this third stream of research, also known as
60 neuroeconomics. This relatively new field of studies applies tools and approaches from cog-
61 nitive neuroscience, such as imaging of brain activity and other techniques inferring how the
62 brain works, to analyse economic decision-making (Rustichini 2005; Glimcher 2011, among
63 others). It is an eclectic approach combining and extending methods from behavioural and
64 experimental economics with those from neuroscience and psychology, including experimental,
65 evolutionary, cognitive, ecological and social psychology. This paper pays particular attention
66 to the findings of cognitive neuroscientists who take a multiple-system approach, focusing on
67 the insight that the brain is composed of different interacting systems, for example, automatic
68 and controlled systems' interactions. As Glimcher (2003) observes, neuroeconomics analyses
69 take Plato's metaphor from classical philosophy: behaviour is like a chariot pulled by the two
70 horses of appetite and spirits and guided by the 'charioteer' of reason. Abandoning the strict
71 dichotomy between rational and irrational, neuroeconomics recognizes the important role played
72 by emotions in guiding economic and financial decisions.

73 Taking further steps in the field of neuroeconomics, this paper discusses a natural example of
74 migration from a public-oriented to a private-integrated pension system: the Italian retirement
75 system. We observe a qualified sample of 645 Italians with an appropriate participation in VIPS.
76 From traditional questionnaires and psychophysiological experiments, we discern personality
77 traits and emotional inclinations, together with saving/indebtedness style and sociodemographic
78 characteristics; in a multivariate probit model, we relate this information to retirement decisions
79 assumed in real life.

80 Our findings indicate that individuals who have a high degree of non-planning impulsiveness,
81 and who are inclined to intense psychophysiological arousal, are less likely to demand VIPS,
82 when controlling for saving/indebtedness style and sociodemographic variables. This supports
83 evidence that some behavioural individualities may induce lack of foresight and uncertainty of
84 life-quality standards during retirement.

85 The paper is organized as follows: Section 2 reviews literature concerning cognitive and
86 emotional components that influence human decision-making in long-range planning; Section
87 3 contextualizes the empirical analysis within the declining welfare of the Italian case study;
88 Section 4 describes methods, models and research hypotheses; Section 5 depicts results of
89 multivariate analysis and Section 6 concludes.

91 **2. Long-range planning attitude: cognitive and non-cognitive pitfalls**

92
93 The life-cycle model is the standard framework for designing intertemporal allocation of time,
94 money and effort. A consumer has a lifetime expected utility, which is the expected value of

95 the sum of period utility discounted to the present, multiplied by the probability of survival
 96 from the agent's current age to the oldest possible lifetime (among others, see Lusardi and
 97 Mitchell 2009). Such a model implies several strong hypotheses: first, that households are able
 98 to formulate expectations regarding prospective survival probabilities, discount rates, invest-
 99 ment returns, gross and net earnings, pensions and Social Security benefits, as well as inflation.
 100 Second, it assumes that individuals can *rationally* employ these data to plan and make optimal
 101 consumption/saving choices.

102 Real-world investigation shows that households behave differently from what models postulate,
 103 because of either under- or, more often, overconsuming. This supposed 'misconsumption'
 104 might be the result of ill-suited life-cycle models failing to include subjective life-expectancy
 105 probabilities distribution. In fact, people save for retirement based on their personal expected
 106 length of life (Hamermesh 1985; Hurd and McGarry 2002). In general, poor financial literacy is
 107 argued to be one reason for people fail planning far into the future (Lusardi and Mitchell 2007,
 108 2008, 2009, 2011). In addition, research on intertemporal choices (Thaler 1981; Akerlof 1991;
 109 Ainslie 1992) includes demonstrations of the 'pervasive devaluation of the future', as described
 110 by Ainslie and Haslam (1992). Individuals are willing to accept a small sum of money today
 111 in exchange for a larger sum in the future (Thaler 1981). Thus, the value of the future conse-
 112 quence (money, time or effort) appears smaller when viewed in the present (Hausman 1979;
 113 Akerlof 1991; Soman 1998). This consequent bias towards the present is well explained by mod-
 114 els of hyperbolic discounting, as in Strotz (1956), or quasi-hyperbolic discounting, as proposed
 115 by Laibson (1997) and O'Donoghue and Rabin (1999).

116 While individuals might make well-reasoned and prudent choices for the future, the tempo-
 117 ral proximity to the stimuli often leads them to impulsively switch from their earlier selection.
 118 This behaviour has often been represented by using models of multiple selves,² referred to
 119 as the existence of two distinct systems of decision processing, as in Plato's metaphor.³ Sys-
 120 tem 1 is described as automatic, fast, effortless, unconscious, associative, slow learning and
 121 emotional, generally associated with baseline functioning. System 2 is painted as controlled,
 122 slow, effortful, conscious, rule based, fast learning, affectively neutral and more computationally
 123 demanding. Multiple systems have been extended and applied to economic situations. For exam-
 124 ple, Bernheim and Rangel (2004) and Benhanbib and Bisin (2004) study consumption choices
 125 and consumption-saving plans under 'cold' and 'hot' modes. Loewenstein and O'Donoghue
 126 (2005) use this duality to explain, among other things, why people tend to exhibit an S-shaped
 127 probability-weighting function. In another set of models pioneered by Thaler and Shefrin (1981)
 128 and Shefrin and Thaler (1988), dual processes acquire a myopic versus forward-looking tem-
 129 poral dimension: the individual is split into a long-term planner, interested in the future effects
 130 of choices, and a short-sighted doer, interested in immediate gratification only. The authors use
 131 the model to explain the benefits of commitment devices such as mandatory pension plans and
 132 lump-sum bonuses in promoting savings.

133 Important support for such a point of view comes from neuroimaging investigations of
 134 intertemporal choices for both primary (McClure et al. 2007) and secondary (McClure et al.
 135 2004) rewards. Using functional magnetic resonance imaging (fMRI), these authors show that
 136 decisions that involve at least some short-run trade-offs recruit both analytic and emotional brain
 137 systems, whereas decisions that only involve long-run trade-offs primarily recruit the analytic
 138 brain. These findings support the idea that System 1 involves a limbic brain, whereas System 2
 139 occurs in a pre-frontal cortex one.

140 Technology strengthens the understanding of physiology of human decision-making. Human
 141 decisions result from the network synchronization between central and peripheral systems, and

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142 emotions are simultaneous to any decision-making act, with an effect that is not transient. Among
 143 others, Wong, Xue, and Bechara (2011) integrate fMRI images with physiological measures,
 144 in particular the Skin Conductance Response (SCR). Their results suggest that physiological
 145 data, obtained from SCR, would complement fMRI findings in providing a more comprehensive
 146 understanding of the physiological and neural mechanisms of decision-making. These findings
 147 appear to be in line with Damasio's (1994) Somatic Marker Hypothesis, which sees the decision-
 148 making process as influenced by marker signals that arise in bioregulatory processes, including
 149 those that express themselves in emotions and feelings; this influence can occur at multiple levels
 150 of operation, some conscious and others non-conscious.

151 Our research investigates a large sample of individuals, and some experimental devices, such
 152 as fMRI, are impracticable for hundreds of agents. Therefore, based on neuroscience evidence
 153 of network synchronization between central and peripheral systems, we use measurement of
 154 physiological arousal and associate it with individual emotional activation, related to System 1
 155 and the limbic brain.

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3. A declining welfare in pension systems: the Italian case study

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The Italian pension system has undergone heavy reform during the last 20 years. A mandatory public-pension pillar, Pillar I, was organized as a DB-earnings-related scheme and has been progressively transformed into a notional DC scheme. The changes did not apply to the financing, which continued to be based on an intergenerational PAYG system. In order to counterbalance the expected reduction in the replacement rate of public pensions, caused by the Pillar I reform, a supplementary-funded pillar has been introduced. These supplementary schemes are the Italian version of the VIPS and can take one of two forms: collective (Closed/Open Pension Funds), similar in principle to the US 401(k), or individual (Open Pension Funds or *Piani individuali pensionistici* – PIPs, a sort of life insurance), similar in principle to the US IRA. Supplementary funds use mainly DC formulae. As part of these supplementary pension schemes, workers can contribute, at minimum, their severance pay, the *Trattamento di Fine Rapporto* (TFR). The TFR is a form of deferred remuneration, which, unless funnelled to voluntary pension schemes, is paid to employees at the moment when the employment contract ends for reasons like pensioning or dismissal. The TFR is calculated by dividing the yearly gross salary by a fixed parameter of 13.5, which yields 7.41% of the remuneration: 6.91% is allocated to the employee and 0.5% to a guarantee fund managed by a state agency (INPS), which intervenes in case the employer becomes insolvent. By law, the TFR is revaluated on a compounded basis yearly at 1.5 + 75% of the domestic inflation rate. In addition to TFR flows, workers can choose to commit to VIPS further sums. In the case of voluntary addition, further contributions can come from the employer (mandatory in case of closed funds, optional in the other forms). Regardless of the form, contributions up to around 5000 euro are tax-deductible.

In spite of the reform leading to a drastic reduction in the substitution rate, relatively few Italians workers embraced pensions outside Pillar I. In 2003, membership did not exceed 2.6 million, or only about 12% of the employed workforce. In 2005, in order to boost participation, an automatic-enrolment scheme for private-sector employees was implemented by law. Entered into force in 2007, the auto-enrolment is based on the payment into the pension fund of the future annual flow of TFR (the initiative has been often called 'the TFR reform'). In January 2007, individual workers were given a period of six months in order to decide whether to refuse this arrangement (and consequently the automatic enrolment with the pension funds); in case of refusal workers would maintain their rights on TFR as in the past. At present, this same

Table 1. Demand for VIPS.

	Overall sample (a)		Excluding asset managers and financial advisors (b)		Excluding pensioners (c)	
	Frequency (<i>N</i> = 645)	Per cent (100)	Frequency (<i>N</i> = 411)	Per cent (100)	Frequency (<i>N</i> = 573)	Per cent (100)
Individuals holding VIPS	314	48.68	159	38.69	301	52.53
Individuals without VIPS	331	51.32	252	61.31	272	47.47

Notes: This table indicates, in column (a), absolute (Frequency) and relative (Per cent) number of individuals, from the overall sample of interviewed (*N* = 645), who hold VIPS (314), compared to those without such integrative schemes (331). In column (b), this table offers the same information when excluding the 234 asset managers and financial advisors, that is, within a sub-sample of 411 individuals. In column (c), it offers the information when excluding the 72 pensioners, that is, within a sub-sample of 573 individuals. Among these, only 13 underwrote VIPS. This is mainly due to the fact that historically Italian retirement schemes relied on public pensions, and VIPS are a recent phenomenon (mid-2000s). Mature cohorts of Italians can still largely rely on public pensions.

mechanism applies to all first-time employees. By law, the default investment line must guarantee the repayment of the principal plus a yield comparable to TFR revaluation.

Unlike other successful national experiences, the Italian auto-enrolment scheme did not remarkably increase participation. COVIP, the pension system watchdog, reports that by the end of 2012 membership reached around 5.8 million, still barely 25% of the employed workforce. In analysing this poor result, Rinaldi (2011) notes the poor design of the default option combined with the lack of unanimous consensus by the different parties involved (social parties, employers and government) for such a process.

Given the minimal success of VIPS, in our empirical study we have been forced to recruit a number of individuals with voluntary pension participation that over-represents the Italian situation (49% with VIPS, 51% without; 39–61%, when financial professionals are excluded; 53–47%, when pensioners are excluded, as shown in Table 1). This is coherent with the collection of sociodemographic, psychological and psychophysiological information large enough to include individuals both *inside* and *outside* voluntary pension schemes. Marginally, we note that the participant rate increases when excluding pensioners because mature cohorts of Italians can still largely rely on generous public pensions accrued before the recent reforms.

4. Methods, models and research hypotheses

4.1 Sample, experiment and questionnaire

The empirical analysis is developed within an Italian research project addressed to study behavioural and emotional issues related to financial decision-making (Lucarelli and Brighetti 2010⁴). A research team of economists and psychologists carried out an *in-person survey* that involved a large sample of individuals in a psychophysiological experiment (*N* = 645). The recruitment rule is that individuals must be directly responsible for their financial decisions. This circumstance renders appropriate the investigation of a relationship between individual heterogeneity and real-life financial choices.⁵

236 The recruitment rule explains two main features of our sample: first, a considerable share
 237 (almost one third) of financial professionals (mainly online traders, asset managers and finan-
 238 cial advisors⁶); second, a dominance of males (two-thirds), because our sample indirectly
 239 reflects those who take care, in Italy, of household familial decisions.⁷ An overall description
 240 of demographic and socio-economic profile of our sample is offered in Table 2.

241 The in-person psychophysiological trial requires the cooperation of financial institutions to
 242 invite both employees and customers, and to host experiments inside their offices, across the
 243 Italian territory. A stringent privacy statement ensures individuals' anonymity. In order to recruit
 244 people seriously committed to the task, a personal psychological profiling is given to participants,
 245 as feedback, instead of a monetary reward.

246 We jointly submit a verbatim questionnaire with a psychophysiological experiment which
 247 reproduces in a laboratory setting the context of individual decision-making under uncertainty.
 248 We use the Iowa Gambling Task (IGT) with the simultaneous measurement of the SCR, fol-
 249 lowing Bechara and Damasio (2002), in order to assess the individual physiological arousal to
 250 stimuli – here, monetary outcomes (Boucsein 1992; Figner and Murphy 2011).⁸

251 Briefly, the IGT simulates real-life decisions in conditions of uncertainty and requires an indi-
 252 vidual to make a series of choices from decks A, B, C and D, which implies different gains
 253 (rewards) and losses (punishments). According to the original definition of Bechara and Dama-
 254 sio (2002, 1677), two of these decks (deck A and deck B) were defined as being '*in the long run*
 255 *disadvantageous*', because the risks they contained were not adequately rewarded and, at the end
 256 of the task, individuals who preferred these decks 'lost'; conversely, decks C and D were defined
 257 as '*advantageous*' because the risks unbundled in these decks were adequately rewarded. During
 258 the task, participants sequentially select a card from four decks and receive a (virtual) monetary
 259 outcome after each selection. The subject is not told the number of choices he/she will have to
 260 make, even if he/she ultimately makes 100 choices.

261 While making IGT choices, that is, receiving positive or negative outcomes from choices,
 262 individuals experience a physiological arousal, assessed via SCR. This measure comes from the
 263 voltage drop between two electrodes placed on the skin surface. Electrodes are attached to the
 264 palm surface of the second phalanx of the index and middle fingers of the non-dominant hand,
 265 after the agent is seated in a comfortable chair in front of the computer screen where the sequence
 266 of the IGT choices is displayed. Changes in SCR occur when the eccrine sweat glands, which are
 267 innervated by the sympathetic autonomic nervous system fibres, receive a signal from a certain
 268 part of the brain. Recording of SCR starts at least 10 minutes before the beginning of the IGT
 269 and continues throughout. Filtering rate is set at 1 Hz.

270 Somatic reactions to IGT rewards and punishments are generated after each card selection so
 271 that individuals begin to trigger anticipatory reactions that will guide their forthcoming choices,⁹
 272 coherent with the Somatic Marker Hypothesis (Damasio 1994). In line with Bechara and Dama-
 273 sio's (1997) formulation, we measure the value of SCR that individuals show *before* the choice
 274 of disadvantageous decks, and we refer to this value as a measure of emotional arousal of
 275 individuals in the context of risky situations.

276 The verbatim questionnaire includes an impulsivity test – the BIS-11 questionnaire of Patton,
 277 Stanford, and Barratt (1995) – as well as a wide range of questions concerning sociodemographic
 278 information that is used to set descriptive variables and controls. Part of the questionnaire collects
 279 information about personal financial choices, such as investments, VIPS, insurance coverage, and
 280 debt. From Table 1 we observe that participation in VIPS over-represents the Italian condition.

281 As said (see Section 3), we do not aim at a representative survey of the Italian pension
 282 situation; instead, we look for the existence of a relationship between psychophysiological

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Table 2. Demographic and socio-economic profile of the sample.

Profile	Obs	Mean	Std. Dev.	Min.	Max.	Variables in Matrix S
Age	645	44	12	18	82	<i>age age²</i>
	Overall sample			Frequency (N = 645)	% (100)	
Gender	Males			509	78.91	<i>gender</i> (dummy where 1 stands for males, 0 for females)
	Females			136	21.09	
Dependants	Having dependants			357	55.35	
	No dependants			288	44.65	
Education	Secondary school			30	4.65	
	High school			283	43.88	
	University degree			261	40.47	
Profession	Master or Ph.D.			71	11.01	<i>fin-profession</i> (dummy where 1 stands for financial professionals, i.e. individuals with a financial profession; 0 elsewhere)
	Unemployed			26	4.03	
	Employees–pensioners			184	28.53	
	Entrepreneurs–managers–professionals			154	23.88	
Stability of working contract	Financial professionals			281	43.57	<i>stable-workcont</i> (dummy where 1 stands for holding a stable working contract; 0 elsewhere)
	No stable contract			332	51.47	
	With stable contract			313	48.53	

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Table 2. Continued

Profile	Obs	Mean	Std. Dev.	Min.	Max.	Variables in Matrix S
Age	645	44	12	18	82	age age^2
	Overall sample			Frequency ($N = 645$)	% (100)	
Monthly income of household	< 500 euros			2	0.31	<i>income-dol</i> (mid-points in value of the income classes proposed)
	(500–1000 euros)			10	1.55	
	(1000–2000 euros)			57	8.84	
	(2000–3000 euros)			129	20	
	(3000–4000 euros)			124	19.22	
	(4000–5000 euros)			92	14.26	
	(5000–6000 euros)			58	8.99	
	> 6000 euros			173	26.82	
Number of owned houses	0			93	14.42	
	1			292	45.27	
	2			123	19.07	
	3			51	7.91	
	More than 3			86	13.33	

Notes: This table summarizes sociodemographic features of the sample. Among the variables indicating the economic power of individuals, we omit to show financial wealth and the value of real estate because these are highly correlated with *income-dol* and *real-estate* (numbers of houses). A selection of these sociodemographic features represents regressors of Matrix S and is shown in the right column of this table. Here we specify also which condition we observe in the multivariate analysis for dummy variables. For example, the *gender* dummy considers males (1) as opposed to females (0). For the *profession* feature, we use a *fin-profession* dummy, which is 1 for our financial professionals, more specifically: 51 online traders, 84 professional asset managers and 150 professional financial advisors.

377 heterogeneity, such as a behavioural or emotional component, and specific personal financial
 378 choices. In this sense, characteristics of our sample benefit the study because they allow us to
 379 observe quite a large number of individuals who opted for VIPS, whose numbers otherwise
 380 would have been smaller.

381 This inclusion of financial professionals could induce biases in the VIPS demand due to con-
 382 flict of interest, because these professionals might be either managing or selling the VIPS they
 383 hold. In fact, the VIPS participation rate decreases from 49% to 39% when we exclude finan-
 384 cial professionals from the overall sample. Therefore, we run a multivariate analysis on both
 385 the overall sample and the restricted sample (asset managers and professional financial advisors
 386 excluded). Coherently, in the multivariate framework, we observe also a second restricted sub-
 387 sample obtained excluding pensioners because, due to the country-specific situation, they could
 388 be relying on public pensions and have generated their choices for VIPS for reasons different
 389 from long-range planning (e.g. investments with a favourable fiscal regime).

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4.2 Models for probability of holding VIPS

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The probability of holding VIPS is explained by a series of explanatory variables organized
 in matrices/vectors, according to indications from existing literature (holding VIPS = 1; 0
 otherwise):

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$$\Pr(\text{VIPS} = 1 | S, F, C, P, E). \quad (1)$$

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Matrix S embraces a selection of sociodemographic variables, Matrix F includes information
 on financial literacy and the financial decision process, Matrix C collects variables of individual
 consumption and debt style, Matrix P gathers variables describing certain personality traits and
 vector E is the variable for emotional arousal.

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Demand for pension funds is highly affected by the nature and generosity of Social Security
 systems and by the legal framework for private pension schemes (mandatory, quasi-mandatory
 or voluntary), so that sociodemographic characteristics of subscribers may change accordingly.
 At the macro-level, OECD (2012) shows that younger individuals are less likely to be enrolled
 in privately managed funded pensions, especially in voluntary systems. Participation tends to
 increase with age and also with income. Gender-wise findings are heterogeneous: a negative
 female gap is remarkable in countries like the Netherlands and Ireland (16.4 and 10.3 percentage
 points, respectively) and negligible in others like the UK, Germany and the USA. Finally, the
 coverage rate is lower for workers having a temporary contract than for workers having a perma-
 nent contract in all countries that provide such an information. At the micro-level, Hira, Rock,
 and Loibl (2009), surveying high-income US workers (\$75,000 income per year and above),
 find that a combination of sociodemographic and behavioural variables are likely to influence
 pension-fund participation and contribution maximization. Older and Caucasian individuals are
 more likely to own a private pension, as well as to be early and active investors. Consistent con-
 clusions are drawn in the UK by Clark, Knox-Hayes, and Strauss (2008), who find that income,
 age and household status – in other words, having a spouse who contributes – are correlated with
 saving for the future. These evidences motivate the list of sociodemographic variables that we
 include in Matrix S as shown in Table 2: age, gender, profession, the presence of a stable working
 contract (*stable-workcont*) and income level (*income-dol*).

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Matrix F embraces conditions of financial literacy and financial decision process (Table 3)
 according to literature indicating these conditions (Lusardi and Mitchell 2007, 2008, 2009, 2011).
 Moreover, Hira, Rock, and Loibl (2009) find evidence that individuals are more likely to own a

Table 3. Financial literacy and financial decision process (Matrix *F*).

Variable	Value	Overall sample	Frequency (<i>N</i> = 645)	% (100)
<i>profess-advise</i>	1 if individuals follows a professional advice in their financial decision;	Absence of professional advice	450	69.77
	0 otherwise	Presence of professional advice	195	30.23
<i>use-financ-info</i>	1 if individuals are used to read specialized financial information; 0 otherwise	No use of financial newspapers	585	90.7
		Regular use of financial newspapers	60	9.3

Notes: This table describes regressors that are included in Matrix *F* with the aim of depicting conditions of financial literacy and financial decision process. The variable *profess-advise* describes the individuals' decision process and indicates whether they are guided by financial professionals. The variable *use-financ-info* indicates whether individuals are used to reading financial newspapers and it is also a proxy of financial literacy.

private pension if they collect financial information from different sources. Information strategies matter as well: individuals who engage in ex ante research – researching financial information before speaking with an individual – and in ex post evaluation – reviewing investment material received in the mail – are more likely to maximize their contribution. The list of Matrix *F* variables is offered in Table 3 and includes having access to professional financial advice during the decision-making process (*profess-advise*), and having regular access to financial information, that also indicates a condition of financial literacy (*use-financ-info*).

Matrix *C* consists of variables describing individual consumer style and its implications for saving capacity with respect to current expenses (*positive-saving*), for debt repayments (*debt-repayment*), for access to informal debt agreements (*use-informal-debt*) and, finally, for overall insurance coverage (*IC*; Table 4). In our empirical analysis, we do not explicitly collect information about cognitive biases that individuals face in managing discount rates and probabilities (Thaler 1981; Ainslie and Haslam 1992). We obtain indirect information about these biases from consuming behaviours. For example, the *positive-saving* variable (the exceeding of monthly income with respect to current expenses) is an indicator both of saving attitude and of a tendency towards overconsumption, because we have cases of individuals, in our sample, that are not able to save even if belonging to the highest income class.

Matrix *P* embraces variables describing certain personality traits, such as self-esteem and impulsivity (Table 5). There is evidence that psychographic factors, such as conscientiousness, may have a bearing on health and longevity (Friedman 2008; Kern and Friedman 2008). Consequently, there may be a causal chain with psychographic factors affecting the propensity to save partly due to considerations related to life expectancy. In addition, there is a large body of literature suggesting that impulsivity might affect long-range planning attitude. For example, Martin and Potts (2009) suggest that highly impulsive individuals are biased towards immediate rewards when evaluating options and are less sensitive to the negative consequences of their choices. Howlett, Kees, and Kemp (2008) find that a lack of self-regulation and a lower propensity to consider future outcomes of current behaviours negatively influence long-term financial decisions.

Impulsivity is measured via BIS-11 (Patton, Stanford, and Barratt 1995), which assesses the multifactorial nature of impulsiveness: non-planning, motor and cognitive. Scores used in the analysis measure various aspects of impulsivity: (1) non-planning impulsiveness (*bisnpl*), which

Table 4. Consumer style and its financial implications (Matrix C).

Variable	Description	Overall sample	Frequency (N = 645)	% (100)
<i>positive-saving</i>	Dummy variable which is 1 if monthly income exceeds current expenses and individuals are able to save; 0 if monthly income is either just enough to cover current expenses or not sufficient to cover current expenses and individuals are obliged to use reserves or assume debt	Monthly income insufficient to generate saving	129	20
		Monthly income exceeding current expenses and able to generate saving	516	80
<i>debt-repayment</i>	Monthly debt repayment in value	0 (no debt repayment)	283	43.88
		Below 200 euros	20	3.1
		200–400 euros	63	9.77
		400–600 euros	61	9.46
		600–800 euros	55	8.53
		800–1000 euros	62	9.61
		1000–2000 euros	71	11.01
<i>use-informal-debt</i>	Dummy variable which is 1 if individuals resolve to informal debt arrangements, 0 if not	No informal debt	541	83.88
		Request for informal debt	104	16.12
<i>IC</i>	Insurance coverage	No policy	148	22.95
		1 policy	159	24.65
		2 policies	157	24.34
		3 policies	101	15.66
		4 policies	80	12.4

Notes: This table describes regressors that are included in Matrix C in order to characterize for individual consumer style and saving/debt behaviour. We include *positive-saving* to indicate whether monthly income of interviewed exceeds current expenses and they are able to save; *debt-repayment*, the value of the monthly debt repayment; *use-informal-debt*, which indicates whether individuals ever asked for financial support from relatives, friends, colleagues or neighbours; and *IC*, the number of insurance policies underwritten, among the four: life insurance, health insurance, casualty insurance and indemnity insurance.

reflects a lack of planning for the future; 2) motor impulsiveness (*bismot*), which reflects a tendency to act without forethought; and (3) attentional impulsiveness (*biscog*), which is largely characterized by a selective concentration on one aspect of the environment while ignoring other aspects.

Finally, we include the indicator of emotional arousal (Table 6), which we calculate as the mean value of SCR recorded for each individual before any selection from disadvantageous decks (A and B), within the last set of 80 choices of the trial, strictly following the protocols of Bechara and Damasio (2002). We exploit benefits of SCR measurement, which is considered a cheap, unobtrusive and reliable proxy for neural and brain activation (Figner and Murphy 2011), mainly referred to as emotions (Bechara, Damasio, and Damasio 2000). We assume that a tendency towards arousal, shown by individuals during the task, reveals a behavioural inclination that might be linked to long-range planning attitude, coherently with the framework of multiple

Table 5. Personality traits (Matrix *P*).

Variable	Observed condition	Overall sample		Frequency (<i>N</i> = 645)	% (100)	
<i>self-esteem</i>	Dummy variable, 1 if the individual declares having self-esteem in her decision process, 0 otherwise	Absence of self-esteem		549	85.12	
		Presence of self-esteem		96	14.88	
		<i>N</i>	<i>M</i>	SD	Min.	Max.
<i>bisnpl</i>	BIS score non-planning impulsiveness	645	0.25	0.04	0.15	0.36
<i>bismot</i>	BIS score motor impulsiveness	645	0.19	0.03	0.11	0.34
<i>biscog</i>	BIS score attentional impulsiveness	645	0.14	0.03	0.08	0.24

Notes: This table describes regressors that are included in Matrix *P* to include information about some personality traits. *Self-esteem* is a dummy variable whose value is 1 if the individual declares having self-esteem in her decision process. Impulsivity scores, desegregated, result from the BIS-11 questionnaire of Patton, Stanford, and Barratt (1995). We provide, for the valid number of observations/individuals (*N* = 645), the mean (*M*), the standard deviation (SD), the lowest (Min.) and the highest (Max.) value of the BIS score for non-planning impulsiveness (*bisnpl*), of the BIS score for motor impulsiveness (*bismot*) and of the BIS score for attentional impulsiveness (*biscog*). BIS scores are relative to 100.

systems (Thaler and Shefrin 1981; Shefrin and Thaler 1988) and the empirical neuroscience findings of McClure et al. (2004, 2007).

4.3 Research hypotheses

We investigate whether *behavioural individualities* affect long-range planning attitude. Therefore, we examine whether consumer style, personality traits and psychophysiological inclinations

Table 6. Emotional activation (vector *E*).

Variable	<i>N</i>	<i>M</i>	SD	Min.	Max.
SCR	641	0.178	0.167	0.006	1.333

Notes: This table provides information about the emotional arousal shown by participants during the psychophysiological experiment. From the IGT-SCR experiment, we obtain a measurement for emotional activation: it is the individual SCR shown before disadvantageous decks (A and B), after the trial period of the first 20 choices, according to the traditional protocol of Bechara and Damasio (2002). The SCR is measured by the voltage drop between two electrodes placed on the skin surface of the individual running the experiment. Changes in SCR occur when the eccrine sweat glands, which are innervated by the sympathetic autonomic nervous system fibres, receive a signal from a certain part of the brain. Recording of SCR starts at least 10 minutes before the beginning of the IGT and continues throughout. Sample rate is set at 1 Hz. Among 645 subjects, four individuals were excluded from the analysis because they never selected disadvantageous decks, the condition for our SCR variable computation. Precisely, this table offers, for the valid number of observations/individuals (*N* = 641), the mean (*M*), the standard deviation (SD), the lowest (Min.) and the highest (Max.) value of SCR shown before disadvantageous decks, after the trial period of the first 20 choices.

565 influence the probability of holding VIPS, while controlling for sociodemographic characteris-
 566 tics. As anticipated, we rely on information about individuals who effectively hold VIPS in
 567 real life.

568 Sociodemographic characteristics here are mainly used as a control variable, and we formulate
 569 hypotheses gathered from the literature (Clark, Knox-Hayes, and Strauss 2008; Hira, Rock, and
 570 Loibl 2009) and OECD findings:

571

572 *H1.a:* The probability of holding VIPS increases with age; nevertheless, given the country-specific
 573 situation, we expect that this positive relationship reduces its intensity for more mature cohorts of
 574 individuals.

575

576 *H1.b:* The probability of holding VIPS increases with income.

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578 *H1.c:* Having a stable contract increases the probability of holding VIPS.

579

580 *H1.d:* Being an active investor increases the probability of holding VIPS.

581

582 With reference to Matrix *F*, from the literature (Lusardi and Mitchell 2007, 2008, 2009, 2011;
 583 Hira, Rock, and Loibl 2009) we would expect the following:

584

585 *H2.a:* The probability of holding VIPS increases if the subject relies on professional advice.

586

587 *H2.b:* The probability of holding VIPS increases with access to financial information, which is also
 588 a proxy for financial literacy.

589

590 With reference to Matrix *C*, and with reference to the literature on behavioural life-cycle
 591 consumer choices, we would expect the following:

592

593 *H3:* The probability of holding VIPS increases with saving attitude and decreases with overconsump-
 594 tion.

595

596 With reference to Matrix *P*, mainly from Martin and Potts (2009) and Howlett, Kees, and
 597 Kemp (2008), we would expect the following:

598

599 *H4:* The probability of holding VIPS decreases with individual impulsivity.

600

601 With reference to vector *E*, inspired by Thaler and Shefrin (1981), Shefrin and Thaler (1988)
 602 and McClure et al. (2004, 2007), we would expect the following:

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604 *H5:* The probability of holding VIPS decreases with emotional activation, as a sort of behavioural
 605 inclination towards a predominance of System 1, limbic-myopic, over System 2, pre-frontal-
 606 forward-looking.

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5. Results and discussion

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611 We estimate the probit models of Equation (1) reporting marginal effects in Table 7, includ-
 ing all the individuals of the sample, and excluding asset managers and professional financial
 advisors,¹⁰ on the one hand, and pensioners, on the other, because both categories might hold

Table 7. Multivariate analysis for the probability of holding VIPS.

	Whole sample		Asset managers and financial advisors excluded		Pensioners excluded	
	dF/dx	St. err.	dF/dx	St. err.	dF/dx	St. err.
<i>Dependent variable:</i>						
<i>P(VIPS = 1)</i>						
Age	0.047	0.014***	0.029	0.015*	0.051	0.020**
age ²	-0.0005	0.0001***	-0.0004	0.0002**	-0.0006	0.0002**
gender	0.027	0.054	0.014	0.067	0.033	0.057
fin-profession	0.158	0.049***	-0.059	0.090	0.159	0.050***
stable-workcont	0.122	0.044***	0.164	0.056***	0.097	0.047**
income-dol	-0.034	0.049	0.010	0.054	-0.060	0.053
profess-advise	0.101	0.052*	0.139	0.057**	0.074	0.055
use-financ-info	0.108	0.079	0.095	0.075	0.115	0.089
positive-saving	0.139	0.056**	0.133	0.062**	0.140	0.061**
debt-repayment	0.010	0.007	0.007	0.008	0.006	0.007
use-informal-debt	-0.117	0.057**	-0.187	0.062***	-0.110	0.060*
IC	0.085	0.018***	0.083	0.021***	0.092	0.019***
self-esteem	0.099	0.045**	0.060	0.058	0.086	0.046*
Bisnpl	-1.652	0.669**	-1.274	0.778*	-1.886	0.718***
bismot	0.016	0.722	0.492	0.872	-0.277	0.784
Biscog	0.971	0.863	0.965	1.033	1.205	0.924
SCR	-0.057	0.021***	-0.079	0.026***	-0.045	0.022**
Number of observations	641 ^a		409 ^b		570 ^c	
LR chi ² (17)	133.000		89.690		94.160	
Prob > chi ²	0.000		0.000		0.000	
Log-likelihood	-377.58		-227.98		-347.325	
Pseudo-R ²	0.150		0.164		0.119	

Notes: This table offers estimations of probit regressions, reporting marginal effects, where the dependent variable is the probability that the interviewee holds a VIPS (VIPS dummy variable = 1). Independent variables are those included in matrices/vector of Equation (1). As far as sociodemographic variables are concerned (Matrix *S*), we include *age* and its quadratic term *age*², *gender* as male as opposed to female; a dummy *fin-profession* for financial professionals; a dummy *stable-workcont* for having a stable working contract as opposed to not; *income-dol* as mid-points in value of the income classes proposed, as in Table 1. Then, within Matrix *F*, we include *profess-advise*, whether they rely on a professional advice in their financial decision; and *use-financ-info*, whether they are used to reading specialized financial information. Moreover, we have variables of Matrix *C*: *positive-saving*, to indicate whether monthly income exceeds current expenses and individuals are able to save; *debt-repayment*: mid-points in value of the monthly debt repayment classes, as in Table 4; *use-informal-debt*, to indicate whether individuals resort to informal debt arrangements; and *IC*, for their insurance coverage. Finally, we have variables indicating some personality traits (Matrix *P*) in terms of *self-esteem* and impulsivity, with the three BIS scores (*bisnpl*, non-planning impulsiveness; *bismot*, motor impulsiveness; *biscog*, attentional impulsiveness). Vector *E* with the emotional arousal before risky choices (SCR) concludes the list of regressors. Variables *income-dol*, *debt-repayment* and *SCR* are used in log. The column dF/dx is for discrete change of dummy variables from 0 to 1.

^aAmong 645 subjects, 4 individuals were excluded because they never selected disadvantageous decks, the condition that allows SCR computation.

^bFrom 645 subjects we excluded 84 professional asset managers and 150 professional financial advisors. The dummy *fin-profession* still comprehends online traders. Among these 411 residual individuals, two subjects never selected disadvantageous decks and were therefore excluded.

^cFrom 645 subjects we excluded 72 pensioners. Among these 573 residual individuals, 3 subjects never selected disadvantageous decks and were therefore excluded. This figure is consistent with point (2) because one individual is both a pensioner and a financial advisor.

*Statistical significance at the 10% level.

**Statistical significance at the 5% level.

***Statistical significance at the 1% level.

659 a peculiar behaviour concerning retirement plans. Financial professionals might opt for self-
 660 producing retirement integrative investments, and pensioners should belong to those cohorts of
 661 generations still largely relying on public pensions, nevertheless results are robust throughout all
 662 the samples.

663 As far as sociodemographic variables are concerned, there is no evidence of a gender role on
 664 long-range choices, while age is able to predict demand for VIPS and with a U-shape relation-
 665 ship, as expected (positive sign of *age* and negative sign of the quadratic term age^2), because
 666 people tend to underwrite VIPS when ageing, but with a decreasing intensity as they age, as
 667 expected. Therefore, *H1.a* is accepted, consistently in all three sub-samples. Conversely, *H1.b*
 668 cannot be accepted because the *income-dol* variable is never significant in our estimations. It
 669 seems that the economic power of individuals has no effect in predicting the demand for VIPS,
 670 when other variables are controlled for. *H1.c* is largely accepted, instead, because having a sta-
 671 ble contract (*stable-workcont*) always significantly and positively predicts holding VIPS, even
 672 when restricting the sample and adding further variables. In opposition, *H1.d* is to be selectively
 673 accepted, because being a financial professional, as a proxy for being an *active investor*, increases
 674 the probability of holding VIPS, but only when using the whole sample, that is, when including
 675 asset managers and professional financial advisors. This raises a concern that the increased prob-
 676 ability of holding VIPS, for these professionals, might not be related to their active/conscious
 677 involvement in financial issues, but is rather linked to their business (i.e. they opt for schemes
 678 either they manage or sell). Within financial literacy Matrix *F*, our results are not immediately
 679 in line with the findings of Lusardi and Mitchell (2007, 2008, 2009, 2011). While the *profess-*
 680 *advise* variable is always positively significant, the *use-financ-info*, which is also a proxy for
 681 financial literacy, plays a fragile role, because in the estimations in Table 7 it is never significant.
 682 Therefore, only *H2.a* can be unambiguously accepted.

683 Moving to Matrix *C*, *H3* is largely accepted because the probability of holding VIPS increases
 684 with saving attitude and decreases with overconsumption, as shown by the significant and posi-
 685 tive sign of the *positive-saving* variable, in all our samples of estimations. The same consistent
 686 role is played by the *use-informal-debt* variable, and its interpretation is enriched if it is joined
 687 with the *debt-repayment* variable. In fact, the latter is never significant, indicating that having
 688 debt *tout court* has no relevance for long-range investment choices. Instead, the *use-informal-*
 689 *debt* variable always has a significant and negative effect on VIPS holding. This means that those
 690 individuals who are used to relying on informal debt solutions, that is, requesting financial sup-
 691 port from friends and family members, colleagues or neighbours, are less likely to have access
 692 to VIPS. Interpretation is twofold: on the one hand, informal debt arrangements may represent a
 693 source of social capital, which might induce people to substitute formal long-range investments,
 694 such as VIPS, with the availability of this kind of resource. On the other hand, informal debt
 695 may also play the role of lender of last resort, used when regular debt from financial institutions
 696 is interdicted, as a consequence of over-indebtedness. The consequent deduction is that those
 697 individuals more likely to have access to last-resort debt solutions are less likely to hold VIPS.
 698 Finally, the significance of the variable *IC*, which indicates the intensity of insurance coverage
 699 by the number of policies underwritten, may testify, first, that VIPS are jointly offered with
 700 insurance contracts, as a cross-selling policy; and second, that those agents inclined to avoid
 701 ambiguity, thanks to insurance policies, are also more likely to hold VIPS.

702 With reference to psychographic variables, *bispl* is significant and has a negative sign, as
 703 expected. Therefore, *H4* is accepted: the probability of holding VIPS decreases with individ-
 704 ual impulsivity. The inclusion of disaggregated BIS scores indicates that the impulsivity driver

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706 is non-planning impulsiveness (*bisnpl*), which reflects an individual lack of mind-set for plan-
707 ning for the future. This result is fascinating and supports evidence that long-range planning
708 attitude is driven also by individual psychographic features, such as impulsivity; nevertheless,
709 the remaining variable in Matrix *P* is significant only when the whole sample is considered
710 (*self-esteem*).

711 Conversely, the last inclusion of emotional variables, with the vector *E*, significantly increases
712 the predictive power of the model, across all the samples considered.¹¹ The sign of the relation-
713 ship with the variable *SCR* is negative, and it provides support for *H5*. We find evidence that the
714 probability of holding VIPS decreases the higher the personal inclinations of the individual to
715 be affected by emotional arousal. It seems to support that when System 1, the limbic, is prevail-
716 ing *ceteris paribus* over System 2, the pre-frontal, forward-looking behaviour is reduced, in turn
717 reducing the likelihood of holding long-range investment plans.

718 719 720 **6. Conclusions** 721

722 Retirement is about dreams, fears and changes, not just money and schedules. Self-determination
723 and self-control influence retirements and pension choices. In declining welfare systems, stable
724 consumption throughout life increasingly depends on individual long-range planning attitude.
725 Many obstacles impede forward-looking financial decision-making: theoretical and empirical
726 research supports that individuals tend to privilege present over future consumptions.

727 Our paper contributes to the understanding of how behavioural traits affect real-life long-range
728 investment choices. We provide empirical evidence that psychophysiological heterogeneity plays
729 a role in predicting the demand for VIPS. Sociodemographic variables and individual economic
730 behaviours in relation to savings, consumption and indebtedness mainly confirm traditional
731 results from existing literature. We contribute to it by showing that additional psychologi-
732 cal and psychophysiological components are significantly related to the probability of holding
733 long-range investment plans. *Ceteris paribus*, agents with high impulsivity, and specifically a
734 non-planning impulsiveness, and with a tendency to be affected by emotional arousal, in terms
735 of somatic response to monetary stimuli, are less likely to demand VIPS.

736 At the individual level, our research makes clear that demand for VIPS is regularly affected
737 by psychological components influencing time preferences: individuals who are less inclined to
738 emotional arousal and less impulsive are likely to discount less severely future consumption and
739 to be more willing to plan for retirement; others, who are more emotive and impulsive, tend to
740 weight present consumption too highly, and to delay, or neglect, their access to retirement integra-
741 tive schemes. Our results suggest that these behavioural characteristics might compel individuals
742 to make (or not make) financial choices that determine, in the long range, the amount of money
743 necessary to preserve their life-quality standards.

744 Implications of these findings are remarkable for both communication and regulation. As long
745 as impulsive or emotional individuals lack a long-range planning attitude, in other words, a capa-
746 bility to plan for retirement, communication campaigns regarding the individuals' choices, and
747 the potential implications these choices have for their financial well-being in retirement, should
748 be considered. Benartzi, Iyengar, and Previtro (2007) show that affective communication might
749 help increase willingness to save. Coherently, communication campaigns regarding individuals'
750 retirement choices should be specifically designed to target impulsive or emotional individu-
751 als. Time preferences can also be manipulated thanks to an emotional visualization of self. For
752 example, Hershfield et al. (2011) propose that allowing people to interact with age-progressed

753 renderings of themselves will cause them to allocate more resources towards the future. In gen-
 754 eral, as our results show, managing via communication or other tools the emotional component
 755 in choices is fundamental to improving long-range planning decisions.

756 Additional implications at the policy level could be considered, as well. While reforming
 757 pension systems, policy-makers could capitalize on our findings by taking special care in commu-
 758 nicating the role that VIPS can play in old-age welfare. In designing a default option, they should
 759 put special emphasis on the emotional consequences of different features such as contribution
 760 rate escalation or financial design. Default options seem to be important not only because they
 761 might foster participation decisions, but because they complement education and information,
 762 which alone might be insufficient, as we show, to induce a long-range planning culture.

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 780 Banca Mediolanum; Finanza & Futuro Banca; Finecobank and Ubi Banca Private Investment.

781 **Disclosure statement**

782 No potential conflict of interest was reported by the authors.

783 **Notes**

- 784
- 785 1. Private pension schemes are expected to grow as pension reforms in these countries lead to a reduction in pay-as-
 786 you-go (PAYG) public pension benefits, traditionally organized as defined benefits (DB) plans.
 - 787 2. An individual is best understood as a succession of selves with different preferences and different levels of awareness
 788 of such preferences. While most of the time these systems interact synergistically to determine behaviour, at times
 789 they may compete, producing different responses to the same information.
 - 790 3. The idea of multiple systems of processing is not unique to decision-making and has been developed, in strikingly
 791 similar ways, by many thinkers in philosophy, psychology, neuroscience and medicine over the past several hundred
 792 years. The earliest accounts of dual-process theories in cognitive psychology date back to the 1970s and 1980s
 793 (Wason and Evans 1975; Evans 1989) and have become the focus of much interest in contemporary research on
 794 these topics (Evans and Over 1996; Sloman 1996; Stanovich 1999, 2011; Stanovich and West 2000; Kahneman and
 795 Frederick 2002; Barbey and Sloman 2007; Evans 2007, 2008; Kahneman 2011). Although there are nuances specific
 796 to each theoretical conception, for the most part these dual-process models are all structurally very similar.
 - 797 4. An overview of the project is offered in Lucarelli and Brighetti (2010), where they refer to a first set of 445
 798 individuals and focus on research questions that are different from those investigated in this paper.
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- 800 5. We take into consideration, properly in multivariate analysis, those conditions under which financial decisions could
 801 be affected by familial context (e.g. economic capability is typically referred to as overall familial condition) or by
 802 other forms of external influence (i.e. the presence of professional financial advice).
 803 6. Even if these individuals make *professional* financial decisions, we always asked them to answer based on their
 804 *personal* financial decisions.
 805 7. More than 80% of our sample are males. An analysis of the Istat annual household surveys shows that men are
 806 predominantly heads of household in around 70% of cases (Istat 2011).
 807 8. For a description of the task, visit the online appendix: <http://www.risktolerance.univpm.it/IGTSCR>.
 808 9. Even if gains and losses are only simulated, a similar performance pattern emerges when the nature of the incen-
 809 tive used is varied, for example, when giving real money instead of facsimile reinforcers (Bowman and Turnbull
 810 2003).
 811 10. In the restricted sample, the *fin-profession* includes *online traders*, that is, those individuals specializing exclusively
 812 in short-term trading strategy, either professionally or as a secondary occupation.
 813 11. The *p*-value of the LR test, for the full model compared to the restricted one, is .0053 with 641 individuals, .0021
 814 with 409 individuals, and .0359 with 570 individuals.

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