Assessing investors' risk tolerance through a questionnaire

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Abstract

The assessment of investors' risk tolerance by investment firms is a crucial issue both for regulators and for the industry. The economic and psychological literature has identified a set of factors affecting the risk preferences and perception by individuals and a series of features that make the questionnaire an effective tool for risk profiling. The present study analyses the questionnaires used by a representative sample of Italian intermediaries in compliance with the suitability obligations dictated by the Market in Financial Instruments Directive (MiFID). In the light of the economic and psychological literature we review the way questionnaires are structured and given as well as their contents and wording. Regarding contents several limitations affect questionnaires. Questions used to assess customers' investment knowledge and experience are poor: they often rely on individuals' self-evaluation and are not aimed at verifying familiarity with basic notions like the relationship between risk and expected return and portfolio diversification. In addition the "measurement" of risk attitude almost always overlaps identification of the holding period and the purpose of the investment, in contrast with the suggestion of the literature stating that these items should be covered independently because they are affected by different factors. The way questions elicit risk tolerance does not control for those cognitive and behavioural biases which could induce flawed answers. As regards the wording, questions are often vague, ambiguous and use complex language unlikely to be understood.

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Contents

Introduction

The assessment of investors' risk tolerance by investment firms is a crucial issue both for regulators and for the industry. Indeed, the MiFID legislator includes the client's risk propensity and risk profile among the information that intermediaries must obtain in order to comply with the suitability requirement when providing financial advice or portfolio management. The correct elicitation of risk tolerance could also be regarded as an opportunity by investment firms, since it can enhance efficiency and competitiveness. The accurate identification of the client's risk attitude allows solid relationships to be built and avoids the clients' mistrust induced by the economic downturn.

The tool used by intermediaries to assess risk attitude is the questionnaire which also collects information on the client's socio-demographic position, his/her financial situation, investment objectives, investment holding period, etc.. The evidence collected so far shows that questionnaires are affected by serious limitations even in the Anglo-Saxon countries where financial advising has a well-established tradition. In particular, the same individual may be profiled differently by different questionnaires; the actual risk-taking behaviour corresponding to the observed investment choices does not always reflect the risk tolerance as measured by the questionnaire. Both these issues signal considerable room for improvement in the assessment tools used by the intermediaries.

A number of European regulators have already taken initiatives in this direction. The French financial markets authority (AMF) published a study suggesting a quantitative measurement method, while the British authority (FSA) and the ESMA published guidelines which, without examining the issue of measuring risk tolerance in detail, cover the kind of information to be gathered and the procedures to be put in place for the suitability assessment process.

In identifying possible improvements, we must start from the notion of risk tolerance. Often defined as the level of financial risk that an investor is willing to take, it is sometimes considered equivalent to the concept of risk aversion formulated by classic economic theory. However, although the two measurements might seem related, the most recent contributions make reference to a more structured definition which combines the classical notion of risk aversion with risk attitude, risk capacity and risk knowledge; risk attitude is defined as a psychological attitude, harder to measure than both risk knowledge and risk capacity, which regards the individual's economic and financial position (Cordell, 2001).

The notion of risk is another crucial node in measuring risk tolerance. Classical finance theory refers to an objective measure, which can be quantified through appropriate statistical methods and summarised by a single parameter (variance, downsize risk, the CAPM beta etc.). On the other hand behavioural finance refers to a subjective notion: its components, relating both to specific psychological traits and to the emotional sphere, may prevail on the cognitive risk perception mechanisms and make the standard risk measurements less effective.

It is clear, therefore, that in the face of such complexity, a wide range of tools is needed to assess risk tolerance. These tools must be able to combine the suggestions from classic economic literature with the indications of behavioural finance and of psychometrics, the science of measuring psychological magnitude.

This study analyses the questionnaires used by a sample of 20 Italian intermediaries, in the light of the indications from economic and psychological literature, with the aim of identifying major shortcomings and possible improvements. It does not, however, aim to propose a standard questionnaire and in this sense differs from the study published by the French authority, the AMF.

The work is organised as follows. Paragraph 2 briefly describes the contributions from neoclassical economic theory, from behavioural finance and from neuroscience on the subject of risk tolerance and intertemporal preferences. There follows, in paragraph 3, a review of the economic and psychological tools that have been applied to measure risk tolerance and to structure a questionnaire. Paragraph 4 compares the indications from the MiFID on the suitability evaluation with the insights of economic theory. The initiatives by the AMF, the FSA and the ESMA on suitability assessment are examined in paragraph 5. The work ends with an analysis of the questionnaires used by a sample of Italian intermediaries, by focusing on the way questionnaires are developed and administered, their content, layout, structure and wording.

1 Risk tolerance and intertemporal preferences

1.1 The expected utility paradigm

Classic portfolio choice theory is based on the assumption of rationality. Individuals maximise their utility given a budget constraint (*the rationality of process*); decisions are based on existing, stable and consistent preferences (*the rationality of preferences*) and are made after acquiring and processing, according to the probability theory, all the information available (*the rationality of perceptions*). Choices under uncertainty, like investment choices, are modelled within the framework of the Expected Utility Theory (EUT). Very briefly, EUT states that individuals choose between risky or uncertain prospects by comparing their expected utility values, i.e., the weighted sums obtained by adding the utility values of outcomes multiplied by their respective probabilities. This framework encompasses the preferences of risk-averse, risk-loving or risk-neutral individuals.

Once the utility function is specified, risk attitude can be measured through the well known Arrow-Pratt measures of absolute and relative risk aversion. The mean-variance model, which is the basis of the modern portfolio theory, is consistent with the expected utility framework only under restrictive assumptions of quadratic utility or normality of random returns. Although analytically tractable, quadratic preferences have several drawbacks exhibiting increasing absolute risk aversion in wealth and displaying negative marginal utility after some finite wealth level. To

overcome these implausible implications, alternative specifications have been used, having more realistic properties.

The "basic" expected utility model can be extended along several dimensions. First, risk aversion may vary with background risk, e.g. with the risk related to human capital which cannot be hedged. As background risk grows, the propensity to hold risky assets decreases; acting in the same direction is an increase in the correlation between human capital and the returns on financial assets.

Another extension which makes the model more realistic is the introduction of liquidity constraints and transaction costs. In a dynamic context, liquidity constraints raise risk aversion since they reduce the ability to smooth consumption over time. Also transaction costs discourage stock market participation if there are fixed entry costs, but the effect is ambiguous if the costs are variable.

Also the household composition may significantly impact portfolio choices. In the expected utility framework, for a given per-capita income, larger families ought to exhibit greater risk propensity because of a risk sharing effect.

When moving from a static to a dynamic model, the time horizon and, therefore, the age of the investor, become relevant. In a dynamic problem, the measure of risk attitude captures the aversion to wealth and consumption fluctuations over time. Overall, the relationship between age, aversion to fluctuations in wealth and portfolio composition is ambiguous unless certain assumptions on the properties of the utility function are met.

Finally, under the classic utility framework intertemporal decisions have been analysed through the discounted utility. This model assumes that people exponentially discount the value of outcomes according to how delayed they are in time. Choices are therefore dynamically consistent, that is, preferences between two consumption alternatives at two points in time depend only on the absolute time interval separating them. Given a certain time horizon, if one investment is preferred over another it will always be preferred; additionally, if someone is indifferent to two alternatives that are separated by a given time interval, they will always be indifferent, even if, given the same interval, they are both moved back or brought forward.

1.2 The behavioural finance framework

Behavioural finance draws from the observation that individual choices under uncertainty systematically contradict the assumption of rationality on which classical theory is founded. Indeed people are unable to process the available information correctly but rather rely on heuristics, that is, rules which allow complex problems to be solved and judgements to be made quickly. In addition, some psychological traits such as overconfidence, loss aversion, etc. make individual preferences context dependent, thus violating the assumption of the rationality of perceptions. These factors lead people to make systematic errors in their attempts to maximize

Box 1

Risk perception and risk attitude according to behavioural finance

Risk perception can be affected both by affective and cognitive aspects. As shown by experimental findings, people rarely perceive risk as an objective measure but rather as a subjective one (Mertz, Slovich and Purchase, 1998; Ganzach, 2000; Slovic, 2000).

As to the emotional component, Loewenstein et al. (2001) coined the expression "risk-as-feelings" to summarise the view that decision making under risk and uncertainty is based not only on a "cognitive/rational" assessment of the risk but also on the affective response. When the rational assessment and the emotional response differ, the latter normally prevails. In addition, changes in the distribution of probabilities seem to affect only the rational component.

Risk perception may be also sensitive to positive or negative judgements based on mental associations that have nothing to do with economic or financial assessment (MacGregor et al. 2000).

Cognitive issues relate to the way people collect and process information and may be distorted by heuristics (familiarity, availability, anchoring), framing effects, psychological traits such as optimism and overconfidence. As to heuristics, individuals may consider the stocks with greater media coverage (i.e. more familiar stocks) as safe, regardless of their risk/return characteristics. The framing effect makes risk preferences context dependent. Since any problem can be described in several different ways, equivalent situations can be tackled in several different ways. For example, when a decision is framed in terms of possible gains, people become risk-averse. Vice versa, when the same decision is described in terms of possible losses people become risk lovers since they are more willing to accept greater volatility in order to limit losses (Olsen, 1997). This behaviour reflects the individual attitude to be risk averse in the domain of gains and a risk lover in the domain of losses. This is due also to loss aversion, that is, people's tendency to strongly prefer avoiding losses to acquiring gains. Some studies suggest that losses are twice as powerful, psychologically, as gains. Loss aversion can cause inertia, often with negative consequences, and can also encourage short termism (so-called myopic loss aversion).

their preferences. Behavioural finance argues that cognitive psychology can be used to explain the observed deviations from full rationality (so called anomalies).[1]

Behavioural economists depart from the notion of objective risk by supporting the idea that risk is multi-dimensional and it is affected by emotional factors, cognitive limitations and psychological traits. Elements such as feelings, dread, knowledge, trust, optimism, overconfidence make perceived risk differ from the

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1   The well known seminal work is Kahneman and Tversky (1979), which developed the Prospect Theory, later used to develop the Cumulative Prospect Theory.

As to psychological traits, optimism and overconfidence lead to upward biased forecasts and hence to more risk taking. This implies that in order to measure risk tolerance we should also measure how optimistic and how overconfident people are (Nosic and Weber, 2010).

A further psychological trait which affects risk perception is the certainty effect. A number of experiments have shown that people assign a disproportionate weight to certainty. Changes in probability count more if they entail eliminating risk *and nothing else* rather than merely reducing it. In other words, a change in probability from 100% to 90% is more significant than a change from 50% to 40%. This preference tends to make people believe in things that are only probable, and to underestimate and even ignore things which are unlikely (or which have little probability or happening). In short, events considered "unlikely" are simply considered impossible. This simplification process is linked to the difficulty in conceptualising differences in probability where values are considered contiguous (events with probabilities of 70%, 80% and, 90% respectively can be perceived as events which are not certain but, however, equally probable). Unlike the challenges faced in standard theory, the certainty effect is challenged by errors from distorted values of objective probabilities which depend on the value of the probabilities themselves. That is to say that once the probabilities have been weighted in a non-linear manner according to their "position" in the interval (0, 1), the certainty effect introduces a distortion into the decision-making process, which is different from and additional to the one deriving from probability calculation errors, because it manifests itself even when probabilities are known (and hence, do not need to be estimated).

A further factor that distorts risk perception is the tendency to measure losses and gains relative to a reference point, which may be initial wealth, stock prices at a certain point in time, past experience, etc. This aspect is a departure from the expected utility theory and may lead to detrimental inertia.

The perception and assumption of risk, finally, seem to differ greatly by gender. Women generally are more prudent when making investment decisions; as a consequence they seem to be far more likely than men to receive advice aimed towards less risky products (Eckel and Grosmann 2002; Merrill Lynch, 1996). Gender differences, however, seem more pronounced amongst single people. A married couple, reach a "middle ground", influencing and balancing each other according to dynamics which, as detailed in some recent studies, depend on the distribution of financial wealth within the family, the professions and the educational level of the spouses (Gilliam et al., 2010).

objective risk as measured by standard finance scholars. Other relevant factors highlighted by empirical and experimental research include the so-called certainty effect, which over-states or under-states the probability associated with a possible event, even when it is known and no estimate is needed; gender and marital status; the initial reference point used by individuals to assess investment options; the format in which a situation or choice is presented (framing); asymmetries in the evaluations of gains and losses; the outcomes of previous decisions (Box 1).

Risk tolerance also varies according to the context: people may appreciate risk in their leisure activities but flee from it when making financial decisions. Therefore people's actual attitude to financial risk must therefore be measured explicitly in

the financial context. Even in the financial context people may exhibit different attitudes to risk depending on how they framed their assets and their choices. In fact it has been widely documented that people tend to code, categorize and evaluate economic outcomes depending on the "mental account" involved, that is on whether assets come either from current income, current wealth or future income and on the needs an account is set for. Accounts are largely non-fungible and behaviour for each account is different (Thaler, 1985 and 1989). A mental account is subject to several biases. For example, the so called "house money effect" predicts that investors will be more likely to purchase risky stocks after having experienced a gain. Since they don't yet consider the profit to be their own, they are willing to take more risk with it. On the other hand every time a mental account realises a loss, individuals may either exhibit a higher risk aversion or be encouraged to take greater risks in the hope of being able to recover the initial amount ("break even" effect). In other words, opportunities allowing individuals to break even may become more appealing. Overcoming these biases may help investors profit more over the long term (Thaler and Johnson, 1990).[2]

Mental accounting has much in common with pyramid investing, often recommended by financial planners. According to this approach, portfolio allocations can be represented as a pyramid whose bottom layer is filled with the safest assets to meet the client's most important objectives, while higher layers are allocated to progressively riskier investments for the client's less critical objectives until the portfolio is complete. The layers are portfolio segments, i.e. mental accounts, each meant to meet specific goals depending on whether they satisfy safety needs or the need of "potential" (Shefrin, 2000). This approach is easy to understand and intuitively seems 'responsible'. It can, however, lead to a flawed overall investment strategy. By segmenting her assets, the investor may not consider the correlations between these assets and may take too much risk or be excessively conservative.

Lastly, behavioural finance has pointed out that even intertemporal choices exhibit various anomalies that cannot be reconciled with the discounted utility theory. The discount rate, in fact, does not appear to be stable, but rather dependent on the context (personal economic situation, political situation, macroeconomic situation, etc.) and on the level of wealth. Moreover, subjects overestimate their patience in the distant future, resulting in preference reversal as time passes. In other words, when considering two intertemporal choices with the same time interval between two alternative rewards, individuals tend to be impulsive in the problem closest to the present, by preferring the small immediate reward, and to be more patient in the problem in the distant future, by preferring the delayed larger rewards. This behaviour is best represented through the hyperbolic discount model, which may

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2   How often accounts are closed does not seem to follow any objective or rational rule, but does seem, instead, to follow subjective rules that could lead to an incorrect assessment of gains or losses. This aspect is particularly relevant to investment decisions because accounts may be closed too often, distorting the risk attitude in later decisions. For example, accounts relating to equity investments seem to be closed, on average, within a year, that is to say with a time horizon that is too short.

explain various problematic behaviours such as loss of self-control or a deadline rush due to procrastination.[3]

To counter dynamic inconsistency, people can pre-commit themselves to "virtuous" alternatives. When the "voluntary" commitment is not sufficient, though, public intervention may be necessary. For pension choices, for example, default membership of occupational pension plans proved to be effective in having people save for retirement (of course it still being possible to explicitly opt out).

1.3 The contribution from neuroscience

Neuroeconomics studies economic behaviour by analysing how the human mind works and, in particular, which neuronal areas are activated when certain choices, such as those under uncertainty, are made.[4]

Neuroeconomic experiments confirm the systematic anomalies observed by behavioural finance scholars by showing that certain situations always stimulate the same neural areas and hence the same responses. For example, just looking forward to a monetary gain can activate cerebral areas which alter the risk–return perception in favour of the latter. Moreover, while the expected gain is perceived immediately, the related probability is estimated afterwards so any changes to probability lead to delayed responses with respect to responses triggered by changes in the gain.

Loss aversion also seems to be driven by the neuronal areas which process negative feelings, such as anxiety and fear, and make current choices dependent on past experience. The experimental data, for example, has shown that most healthy people avoid risk after suffering a series of financial losses. However, individuals with damaged amygdalae had a lack of loss aversion even though they had normal levels of general risk aversion (Motterlini, 2010).

Neuroeconomics explored also intertemporal choices. Dynamic inconsistency would seem to be triggered by the interplay of several areas of the brain that identify conflicting priorities, leading to behaviour which, as already noted, can be represented through hyperbolic discounting.

2 Assessing risk tolerance and intertemporal risk preferences

This paragraph contains a review of the tools which may be used to elicit risk tolerance. Before proceeding, we should define "risk tolerance", "risk preferences"

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[3] See ASSB (2009) for a brief review of the literature on the subject.

[4] Neuroeconomics drops the hypothesis of rationality, as does behavioural finance, to assume that individual decisions result from automatic and very often unconscious neuronal processes. These processes are reconstructed by means of tools which visually represent the brain areas that are activated when certain decisions are made (brain imaging). Neuroeconomics therefore combines research methods from neuroscience, experimental and behavioral economics, and cognitive and social psychology. As research into decision-making behavior becomes increasingly computational, it has also incorporated new approaches from theoretical biology, computer science, and mathematics.

and "risk attitude". These expressions are, in fact, often used interchangeably in the academic debate and by the industry but for the purposes of this study, and unless otherwise indicated, risk tolerance will mean the combination of risk preferences, defined (i) with respect to the characteristics of risk and return on an investment option and (ii) with respect to risk attitude, understood as the set of emotional and psychological components that affect an individual's perception and reaction to risk and, therefore, his/her emotional capacity to take risk.

2.1 Literature review

The tools used to elicit risk attitude and risk preferences over time can be divided into two categories. The first, relying on economic/quantitative measurement, draws from the theoretical framework of classical economics and/or behavioural finance and from experimental economics. The second category is based on psychology and psychometrics, that is, the field of study concerned with the theory and techniques of psychological measurement, which includes the measurement of knowledge, abilities, attitudes and personality traits (so-called constructs).

Economic tools

The economic/quantitative approach is based on quantitative analysis techniques based on the specification of a utility function and on the estimation of the parameters for that function. These parameters correspond to risk aversion and to a subjective discount rate. The estimate uses data collected from controlled experiments, or from an uncontrolled environment (so-called field data collected, for example, via the web), or by giving a questionnaire to a sample of people (survey data).

In a controlled experiment, people make hypothetical choices within an appropriately designed context aimed at testing the validity of a theory also by ruling out external and irrelevant factors; in order to obtain reliable results, people are given incentives which help to simulate real-life conditions.

One of the most popular tools is the Multiple Price List (MPL) by Holt and Laury (2002). Respondents make a series of consecutive choices between two outcomes (i.e. lotteries/risky options), where the expected value of one outcome increases at a higher rate than the other. The point at which an individual switches from choosing one outcome over the other is often used as a measure of risk aversion.[5]

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5 Another method used in controlled experiments was described by Sabater-Grande and Georgantzis (2002) and developed by Garcia-Gallego *et al.* (2010); the interviewers choose, for four consecutive times, one of ten possible bets that offer, with decreasing probability, the chance of winning a growing pay-off. The authors start from the assumption that economic decisions which result in a gain or a loss influenced not only by risk aversion but also by the strategic behaviour on which the prisoner's dilemma game is based, that is, on the willingness to cooperate with others. Experimental data would seem to confirm this hypothesis, showing a positive relationship between the tendency to cooperate and risk propensity. This approach could also be applied with reference to decisions in the financial field where, as well as risk attitude, an important role can be played by cooperating with the advisor and by

This method can also be used to reveal preferences over time by having people choose consecutively between two payoffs available either immediately or at a future date (the latter being higher than the former). Again, the switching point is used to estimate the individual intertemporal discount or rate.

Menon and Perali (2011) gave a Hault and Laury's MPL to a group of university and secondary school students to estimate their risk aversion and the subjective discount rate. According to the authors, this methodology could also be used by investment firms to profile their clients, provided that few devices are put in place. In particular, given that risk tolerance and the degree of impatience are very context-dependent, the framework in which "profiling" is carried out must be circumscribed as much as possible. In addition, individual income and wealth must be assessed as accurately as possible since they correlate strongly with risk and time preferences. The level of risk aversion and the subjective discount rate, finally, should be updated following changes in economic conditions and household composition, both of which can affect individual preferences.

A further study relying on the quantitative assessment of risk attitude is ASSB (2009). The authors gave the customers of three Italian banks a questionnaire which combined economic and psychological questions.[6] People were asked to choose between securities having different risk-return characteristics, and between risky securities and an insurance contract with a guaranteed, on-maturity amount. The answers were used to estimate risk aversion assuming a quadratic function of utility. Psychological questions concerned risk attitude both with respect to contexts external to the investment choices and with respect to economic hypothetical questions relating to inheriting or winning a large sum of money. The authors show that this type of questionnaire can be regarded as valid and reliable and should also be used by investment firms.[7]

Psychological tools

Psychology and psychometrics provide several tools to survey psychological traits, particularly in regard to the attitude to taking risks and the degree of impatience/impulsiveness.

The "sensation-seeking scale" developed by Zuckerman in the 1960s is a questionnaire designed to measure how much stimulation a person requires and the extent to which he/she enjoys the excitement. It can be used to assess people's

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strategies associated, for example, with emotional factors (ASSB, 2009). For a brief review of the main tools used in the field of experimental economics, see Garcia-Gallego *et al.* (2010).

6   Questionnaires are also used to assess demographic variables and variables relating to the economic and financial situation, the level of knowledge of how the economic-financial system works, the subjective discount rate, and confidence in other people. The questionnaire can also help in assessing investors' impatience by asking how long they are willing to wait before a certain amount, which is available immediately, doubles.

7   A further study on quantitative risk attitude measurement has recently been published by the *Autorité des marchés financiers* (De Palma and Picard, 2010). This will be discussed in detail in the next paragraph.

attitude to taking risk by exploring past experiences and their intentions with respect to the future.

Another tool, originally proposed by Bechara *et al.* (1994), is the Iowa Gambling Task (IGT). Participants are presented with 4 virtual decks of cards on a computer screen. They are told that each time they choose a card they will win some money; however, choosing a card may also cause them to lose money. The goal of the game is to win as much money as possible. The decks differ from each other in the number of trials over which the losses are distributed. Thus, some decks are "bad decks", and other decks are "good decks", because some will lead to losses over the long run, and others will lead to gains. Healthy people, by evoking the emotions relating to past events, benefit from past experience and, after a certain number of trials, learn how to stay with the good decks. Patients with orbitofrontal cortex (OFC) dysfunction, however, continue to persevere with the bad decks, sometimes despite knowing that they are losing money overall. Concurrent measurement of galvanic skin response shows that healthy participants show a "stress" reaction to looking at the bad decks after only 10 trials, long before a conscious sensation that the decks are bad. By contrast, patients with OFC dysfunction never develop this physiological reaction to impending punishment. Bechara and his colleagues explain these findings in terms of the somatic marker hypothesis.

This approach, when applied to the investment decision-making process, allows somebody to obtain an unbiased measure of people's risk aversion through the measurement of the somatic signals (such as, for example, changes in blood pressure and galvanic skin response) experienced by them when making the choice. Such an unbiased measure can then be compared with individuals' self-assessed risk attitude and their real risk attitude, as emerging from real-life choices. Lucarelli and Brighetti (2010 and 2011) have shown, in an experimental setting, that the gaps between these measures depend on the socio-demographic characteristics of the interviewees, self-confidence, difficulty in representing oneself, the image that people want to project to others, and the expected returns associated with a certain self-representation.

Moreover, as noted by (Lucarelli, 2011), people would take financial risk on the basis of self-assessment rather than emotional tolerance of risk. This does not rule out, however, that in exceptional circumstances of crisis or bubbles in the financial markets, emotions - as a sort of sleeping factor which wakes up - could gain the upper hand, leading to excessive risk-taking. The impact of this sleeping factor would depend on the individual decision-making model, on his/her financial literacy and on his/her effort in collecting information. In particular, people who make decisions based on the suggestions of friends, colleagues and relatives also have low levels of financial knowledge and declare themselves to be risk-averse in spite of being emotionally attracted by it. People who make choices autonomously tend to take more risk, while investors who make use of advisory services would seem to be more balanced.

Psychometrics also provides criteria and analytical tools for defining a "reliable and valid" questionnaire. A valid measure is one that measures what it is intended to measure; it is also reliable when it gauges a construct consistently across time, individuals, and situations (Roszkowski *et al.*, 2005).

Financial risk tolerance depends on many factors, which need to be surveyed separately. Cordell (2001) classifies these factors into four categories: risk knowledge; risk propensity, with reference to the notion of objective risk, that is, to the risk-return trade-off which people are willing to accept; risk attitude, with reference to the notion of subjective risk, i.e. emotional capacity to deal with uncertainty; and risk capacity, determined by the current economic situation and income prospects. A valid questionnaire distinguishes between risk attitude, which is actually a psychological construct, and risk capacity, which is, instead, associated with people's socio-economic condition. From this point of view, questions which lead to an answer depending on both risk attitude and financial capacity are not valid.

Reliability is linked to the margin of error of the measurement. This margin depends on many factors including how many questions there are and how clearly they are written. The smaller the number of questions then the less reliable the questionnaire, because a single question provides too high a contribution to the final measurement, making it unstable. The clarity of questions is also fundamental, especially with respect to investment choices, a subject so complex that it can easily lead to misunderstandings and confusion. Clarity can be achieved through several devices, concerning layout, structure, types of questions, language used, etc..

2.2 Designing a questionnaire

Structuring a questionnaire for customer profiling and formulating investment recommendations involves choosing tools to survey risk tolerance and risk preferences over time, identifying significant items, questions on one or more variables corresponding to each item, and formulating the questions themselves.

Choosing the tools goes hand-in-hand with defining the elements to be measured.[8] In the case of risk tolerance, for example, emphasising the cognitive component of the decision-making process implies greater attention to measuring risk preferences and therefore to the economic/quantitative approach (among others, Hanna *et al.* 1998; Menon and Perali, 2011; De Palma and Picard, 2010). On the other hand, if emotional factors are considered more significant than the cognitive component, attention moves towards psychological tools. This is because tools based on quantities, such as probabilities or the maximum possible loss or the variance, are not valid since they are significant only in the cognitive and not in the emotional sphere (Loewenstein *et al.*, 2001). Compromise positions are those suggesting a combination of both tools and the definition of a summary indicator (Roszkowski, 1992).

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8   See, amongst others, ASSB (2009); Bouchey (2004); Callan and Johnson (2003); De Palma and Picard (2010); Grable and Lytton (1999, 2001 and 2003); Hanna et al. (2001); Roszkowski (1992); Roszkowski et al. (2005); Roszkowski and Grable (2005); Yook and Everett (2003); Holzhauer and McLeod (2009).

As regards the identification of the significant items, Cordell (2001) cites, as mentioned above, risk propensity, risk attitude, risk capacity and risk knowledge. Risk attitude is, in turn, associated by Cordell (2002) with six categories of questions regarding, respectively: ranking of the investment objectives, choice of an investment option from a set of hypothetical alternatives, choice of a risk-return combination from a series of possible alternatives, anxiety or excitement associated with investment decisions, identification of probability of losing (gaining) in correspondence with which a certain alternative is chosen, identification of the return required to accept a given combination of probabilities. Holzhauer and McLeod (2009) reach similar conclusions, identifying five factors that explain risk tolerance: generic risk attitude, risk capacity, loss aversion, risk knowledge and risk preferences.

As risk tolerance is a composite quantity, a valid questionnaire must measure each item separately: assessing an answer depending on both risk attitude and financial capacity, as we have already noted, undermines the validity of the measurement. In general, risk tolerance must be assessed separately from measuring the set of variables, including the investment time horizon and investment objectives, which the intermediary must acquire to formulate an investment recommendation. Confusing the measurement of these quantities or, worse still, focusing attention exclusively on measuring the horizon and objectives rather than risk tolerance would make the questionnaire an asset allocation calculator (Roszkowski *et al.*, 2005).

With respect to each item, it is also necessary to identify the relevant questions, finding the right balance between reliability (correlated positively with the number of questions) and the need for brevity. On this point, quantitative techniques are of some help, such as factor analysis or Cronbach's alpha, which make it possible to select questions on the basis of their significance and correlation with the quantity to be measured (Holzahuer and McLeod, 2009, for example, design a questionnaire selecting a subset of 25 questions from an initial group of 115).

The contents of the questions are those suggested by the theory and by the empirical evidence surveyed in the previous paragraph. As mentioned above, some of the important variables can be easily surveyed (for example, socio-demographic characteristics such as race, age, gender, area of residence, employment, household composition, etc.); other variables are only measurable with a certain degree of approximation (wealth, income), while others (such as overconfidence) can only be proxied (in this example, through gender).

Wording questions is an aspect which requires particular attention because, as we have seen, it can affect the reliability of the questionnaire. Questions must be clear and comprehensible; moreover, they must contain the errors in perception which might be driven by behavioural biases and cognitive distortions (see Holzahuer and McLeod, 2009, for several examples on this point).

Box 2

Assessing risk attitude through a questionnaire: insights of behavioural finance

The questions in a questionnaire must be formed to prevent any perceptive or cognitive distortion (as highlighted by behavioural finance) from impairing the answers and affecting their validity and reliability. Some examples are:

Framing effects. Holzahuer and McLeod (2009) check for the framing effect which corresponds to the so-called isolation effect. By eliminating questions that split a choice into two stages, they prevent interviewees from simplifying the problem by ignoring the first stage (and the related probabilities) and taking into consideration only the second.

Anchorage to initial wealth. Holzahuer and McLeod (2009) consider people's tendency to assess investment options with respect to the possible impact on their initial wealth and express the expected return as a percentage of their point of reference, such as initial wealth or purchase price, using an expression such as: "*Imagine that you receive an amount equivalent to 50% of your current income...*".

An alternative formulation, used in the ASSB (2009), contains the possible investment returns of an amount X not just in percentage terms but also in absolute terms, additionally showing the final wealth figure corresponding to each of the possible outcomes.

It is also worth mentioning the experiment by Benartzi, Iyengar and Previtero (2007) which showed that if the outcome of a particular investment choice is represented differently, it can lead to a different investment decision. The authors presented different pension plans to a group of people. Based on various contribution rates, the final, total assets of the pension plans were presented to the group in two ways: in the canonical form as an amount of money; and in the form of which type of apartment that could be bought upon retirement. The first form of representation encouraged people to use analytical reasoning whilst the second form stimulated the affective-practical system of the brain, helping to increase knowledge and understanding of the savings plan and, consequently, the savings rate.

Certainty effect. Holzahuer and McLeod (2009) check the certainty effect, proposing five alternative answers to each question, ordered along the Likert scale (completely agree, agree, uncertain, disagree, completely disagree) and assigning a value from 1 to 5. In this way, two assumptions are referenced which lie at the heart of the Likert scale. Firstly, the answers are points on an underlying continuum which expresses a certain orientation towards the subject of the question. Secondly, assuming that the order is identical for all interviewees, the distance between the answers is taken to be constant and equal.

Reflection effect. To mitigate the reflection effect Holzahuer and McLeod (2009) randomly assign a positive or negative order to the possible answers.

3   Questionnaire content according to the MiFID: a comparison with the literature

The Directive 2004/39/EC (Market for Financial Instruments Directive, MiFID henceforth) and the Directive 2006/73/EC (so-called Level 2 directive) identify the information that intermediaries must obtain when they provide investment advice or portfolio management in order to assess the suitability of financial instruments recommended to customers. Given that such information is obviously a benchmark for the design of the questionnaires used by the industry, it is interesting to compare the MiFID prescriptions with the items that are relevant to the elicitation of individuals' risk tolerance according to economic theory and behavioural finance.

Article 19(4) of MiFID states that intermediaries must obtain "*the client's or potential client's knowledge and experience in the investment field relevant to the specific type of product or service, his financial situation and his investment objectives*".

Table 1 The MiFID and the literature compared

MiFID		Literature		
Items	Variables	Items	Variables	
		socio-demographic characteristics	gender	
			age	
			marital status	
			current and expected household composition	
experience and knowledge	profession	experience and knowledge	profession	
	education		education	
	nature, volume, and frequency of the client's transactions in financial instruments and the period over which they have been carried out		previous investment experience	
			outcome of previous investment choices (positive/negative)	
			knowledge of financial products	
	types of service, transaction and financial instrument with which the client is familiar		knowledge of how financial markets work	risk-return trade-off
				risk dimensions (credit/market/exchange rate)
				portfolio diversification principle
				perception of probability
			overconfidence and optimism	
financial situation	investments and real property; assets, including liquid assets	financial situation	investments and real property; assets, including liquid assets	
	source and extent of regular income		source and extent of regular income	
	regular financial commitments		regular financial commitments	
			other financial commitments (expected changes in regular revenues and expenses)	
investment objectives	holding period	investment objectives	holding period	
			time preferences (discount rate/degree of impatience)	
			liquidity needs	
	purpose of the investment		purpose of the investment	
			amount (in relation to wealth/income)	
	risk preferences	risk tolerance	risk attitude (objective risk)	
	risk profile		emotional capacity to assume risk (subjective risk)	
			loss aversion	

Article 34(3) of the Level 2 Directive additionally suggests that the "*information regarding the financial situation of the client or potential client shall include, where relevant, information on the source and extent of his regular income, his assets, including liquid assets, investments and real property, and his regular financial commitments*"; Article 34(4) states that the "*information regarding the investment objectives of the client or potential client shall include, where relevant, information on the length of time for which the client wishes to hold the investment, his preferences regarding risk taking, his risk profile, and the purposes of the investment*"; finally, Article 37(1) states that information regarding a client's or potential client's knowledge and experience in the investment field includes (a) the types of service, transaction and financial instrument with which the client is familiar; (b) the nature, volume, and frequency of the client's transactions in financial instruments and the period over which they have been carried out; (c) the level of education, and profession or relevant former profession of the client or potential client.

Table 1 summarises the comparison between the items regarded as relevant by the regulations and the items regarded as relevant by the economic literature and in particular by behavioural finance. The former are in fact a subset of the latter, as will be extensively discussed below.[9]

3.1 The client's knowledge and experience

The first element mentioned by the directive concerns "*the types of service, transaction and financial instrument with which the client is familiar*". The purpose of this provision is to assess the client's ability to understand the risks, in all their dimensions, associated with a certain investment and the related consequences. Questions designed to assess knowledge of specific financial instruments, however, can lead to unreliable answers if investors overestimate their financial knowledge or are reticent about admitting their ignorance. The financial literacy of Italian investors is quite low, on average.[10] Therefore, it would be better to assess the client's knowledge and understanding of fundamental notions, such as the relationship between risk and return, and the principle of risk diversification. Based on these responses, questions referring to specific financial products may still be useful in assessing not only a more precise level of financial knowledge but also how self-confident the client is.

The second element that the MiFID suggests with regard to the client's knowledge and experience concerns "*the nature, volume, and frequency of the client's transactions in financial instruments and the period over which they have been carried out*"; besides experience, however, the outcomes of past investments may also matter: as shown in behavioural finance studies, more experience combined with past

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9   The ESMA guidelines on the suitability assessment are in line with many of the observations noted below.

10 Proof, in this sense, can be found in the financial literacy indicator developed by the *Patti Chiari* Consortium (the so-called PattiChiari ICF). In 2010, the average level was 4.3 on a rising scale from 0 to 10, where 0 indicates a complete lack of any concept or idea relating to finance matters and 10 indicates an excellent knowledge of basic financial notions, terms and concepts.

positive results can lead to overconfidence and optimism and, therefore, a greater willingness to take risk, regardless of the client's risk capacity. Therefore also assessing overconfidence and optimism (or pessimism) may be important in defining a clearer picture of the customer's perception of his/her experience.

The third set of information relates to the "*the level of education, and profession or relevant former profession of the client or potential client*". These are the only socio-demographic characteristics mentioned by the MiFID legislation. Yet economic literature argues that many other characteristics affect investment choices, both in terms of their impact on risk attitude as well as the constraints on risk capacity. These characteristics refer to the client's age, gender, current and expected household composition, and planned retirement age.

3.2 Financial situation

Under the terms of the implementing directive, the information on the client's financial situation could include "*information on the source and extent of his regular income, his assets, including liquid assets, investments and real property, and his regular financial commitments.*"[11]

As income and wealth have a significant effect on risk tolerance and are obviously central to assessing a client's financial capacity, these variables should be measured with a certain precision, increasing the degree of detail and the type of information requested in order to overcome any possible reticence and to mitigate any consequential errors of measurement. Moreover, when considering income, it might be worth obtaining the income of the entire household rather than just the individual's. Indeed, several empirical studies show that the level and distribution of total income among family members also affect spending and investment choices of the individuals. Moreover, this variable is useful in assessing the stability of available income. On this point, the household's significant expenses should be considered (such as rent or mortgage, the number of children)[12] as well as factors that could have an impact on the regularity of income (such as a particularly difficult professional situation) and factors affecting the background risk, such as professional status and the area where the client lives.

3.3 Investment objectives

Holding period

The holding period depends on many different factors including the expected return objective, the investor's degree of impatience (or the subjective discount rate) and the foreseeable needs for liquidity. These elements should be assessed to appreciate how reasonable the holding period is: a high degree of impatience, for

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[11] Dir. 2006/73/EC, Art. 35.3.

[12] With reference to financial commitments, questions need to be asked about duration, residual capital, amount and frequency of instalments.

example, could lead to expectations of return in the holding period which are unrealistic or at least incompatible with the market conditions and/or the client's risk tolerance and/or liquidity needs.[13]

Risk propensity and risk profile

The difference between risk preferences and risk profile, as mentioned by the European regulator, is not clear. It is reasonable to say that the expression "*risk preferences*" refers to someone's preference to invest in a financial instrument with a given risk-return characteristic (the so-called objective risk), while the expression "*risk profile*" refers to someone's emotional capacity to assume risk (the so-called subjective risk). The legislation gives no indications on how to measure these variables. Including them in the investment objectives section, it seems to accept in practice the prevailing industry method which, as already noted, is criticised in the literature and confuses and overlaps the assessment of risk tolerance with the assessment of other elements when formulating an investment recommendation. This method opens up the real possibility that the section of the questionnaire which should actually be designed to assess risk tolerance will, instead, become an asset allocation calculator - a tool similar to a portfolio picker and one already used by the intermediary.

As mentioned above, loss aversion can play a fundamental role in determining risk propensity. This attitude, in fact, together with the tendency to evaluate outcomes in the short-term can discourage investment in stocks because they are more exposed to market fluctuations and therefore increase the probability of short-term losses. It is important, therefore, to understand how much this bias is significant to a certain client.

Purpose of the investment

According to classical theory, single investment choices should be cast in a process of global portfolio optimisation. As shown by the experimental evidence, however, many behavioural traits may have a substantial impact on what investors consider to be an efficient portfolio. Loss aversion and mental accounting interact with investment goals and may lead the investor to regard as optimal investment strategies based first on the allocation of wealth among investment goals and second on the definition of an optimal investment strategy for each investment goal separately. Understanding how extreme the individual's loss aversion is, how ambitious the goals and their time horizons are may be relevant to the assessment of the individual's attitude to adopt safer or riskier investment strategies.

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13   This last aspect becomes more significant as the effective liquidity degree of the offered product declines. On this topic, Consob noted in the Communication of 2 March 2009, "The intermediary's duty to behave with correctness and transparency when distributing illiquid financial products", stressing that the intended holding period of an investment "must be directly and specifically related to the characteristics of duration and liquidity of operations recommended to clients, rather than incorporated in an inevitably approximate manner in the summary profile of the same", in order to judge the suitability of operations and on the basis of the liquidity risk deriving from the position, if assumed.

4 The regulatory perspective

The weakness of the questionnaires used by intermediaries when profiling clients has attracted the attention not only of researchers but also of a number of supervisory Authorities. In Europe, the *Autorité des marchés financiers* (AMF) published a study which analyzed a sample of 14 questionnaires by using as a benchmark a "standard" questionnaire, based on the quantitative measurement of risk aversion defined consistently with the findings of the economic literature (De Palma and Picard, 2010).[14] The evidence obtained by administering such questionnaires to a sample of about 1,500 people shows that the tools used by the intermediaries are unreliable, given that they very often collect irrelevant information; that is, information which does not explain risk attitude. Moreover, they profile the same person in different ways, that is, the profiles resulting from giving different questionnaires to the same client are not consistent. On policy grounds, the study argues that the most appropriate measurement tool of risk attitude is the quantitative one.

The *Financial Services Authority* (FSA) has published guidance on assessing suitability following concern raised by the level of unsuitable advice (and the quality of discretionary client management services) observed in the market (FSA, 2011). As explicitly stated by the Supervisory Authority, the aim of its guidance is to help firms improve the standards by which they provide investment advice to retail customers rather than prescribe a method to assess a client's risk attitude and make an investment selection (Box 3). Unlike the AMF, therefore, the FSA focuses on how firms establish and check the level of investment risk that retail customers are willing and able to take in the wider context of the overall suitability assessment (which also involves classifying financial instruments and making investment recommendations) and identifies quite general principles that should guide the assessment of risk attitude, which is not the focus of this document.

Not only the FSA but also the European Securities and Markets Authority (ESMA) has recently published guidelines concerning certain aspects of assessing suitability.[15] Such guidelines detail the information that the intermediary should gather and define the principles on which client classification, product classification and asset allocation procedures should be based, without focusing on the methods of assessment of risk attitude. Following a proportionality principle, ESMA recalls that the extent of information to be collected from clients about their risk profile, investment objectives and financial capacity can vary depending on the products and services offered, the amount invested with respect to the clients' financial wealth and the clients' time horizon (Box 4).

Even in the United States, assessing risk attitude has not attracted much attention. In November 2010, the Securities and Exchange Commission (SEC) approved the proposal by the Financial Industry Regulatory Authority (FINRA, formerly the

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14 Risk aversion, in particular, has been estimated by proposing a choice of investment options with different risk-return combinations over the same time horizon; a CRRA utility function was used.

15 Final report, *Guidelines on Certain Aspects of the MiFID Suitability Requirements*, July 2012, ESMA/2012/387.

Box 3

The FSA guidance on the assessment of suitability

The FSA guidance draws from the evidence gathered on the risks and weaknesses of the approaches and tools used by firms providing investment advice or discretionary management services to retail customers. The Authority reviewed 11 risk-profiling tools and found that 9 of them were so weak as to actually invalidate client classification.

One key failure related to the inability of the tools used to collect and properly account for all the information relevant to assessing the risk a customer is willing and able to take. The number of questions was insufficient, the wording inappropriate, the answer choices poor; moreover, the tools often had over-sensitive scoring or attributed inappropriate weighting to answers.

The FSA provides a number of examples of good practice. Firms should ensure that the process for assessing the risk a customer is willing and able to take considers a customer's capacity for loss, appropriately interprets customer responses to questions and appropriately weights all the answers; moreover, the wording has to be fair, clear and not misleading. Firms should also discuss the clients' profile with the clients themselves, monitor it over time and update it when necessary.

With an unsatisfactory client profiling process, the FSA also noted critical weaknesses in how risk categories are described. Ill-defined words and phrases open to interpretation are very often used; language is vague and/or contains emotive or judgemental connotations.

Regarding this point, the FSA suggests that firms should describe risk categories using fair and balanced short summary descriptions, bullet points detailing the capital loss risk associated with a specific instrument, simple figures presenting the variability of the annual return.

The asset-allocation procedures, finally, are not strong enough. In many cases the suitability assessment only considers risk attitude, if measured at all. The client's investment objectives, knowledge, experience and financial capacity to withstand losses are thus neglected. Furthermore, firms increasingly rely on automated investment selection tools and model portfolios, which may lead to unsuitable recommendations. In addition, the FSA found examples of model portfolios and asset allocation tools often considering just the volatility of the return as the sole measure of risk and ignoring other dimensions of risks (liquidity, inflation, lack of diversification, etc...) which might be relevant to the customer. And finally, in many cases, the advisers or discretionary managers simply do not have a satisfactory understanding of the products they recommend or negotiate.

On these points, too, the FSA indicates poor and good practices, emphasising that the investment recommendations must be based on a complete and thorough knowledge of the products and should be consistent with the diversification principle.

National Association of Securities Dealers) to extend the application of the know-your-customer rule and the suitability rule, previously applied only to associated brokers and dealers, to all supervised subjects. In May 2011, FINRA published guidelines on the new rules which, in July 2012, came into effect.[16]

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16   FINRA, Regulatory Notice 11-02 and Regulatory Notice 11-25.

Box 4

The ESMA guidelines on certain aspects of the MiFID suitability requirements

The document was produced because the supervisory authority recognised critical shortcomings in the tools used by investment firms to collect information about clients and to classify financial products. In addition, the procedures used to formulate investment recommendations were considered inadequate. In particular, at the profiling stage, firms tend to overestimate the client's level of knowledge and experience (often relying on the client's self-assessment), insufficient information is collected about the client's financial capacity and investment objectives, and poorly-designed risk profile assessment tools are used. As regards the asset allocation process, financial products are often classified incorrectly and advisers often do not have a satisfactory knowledge of the product characteristics. The investments recommended, therefore, are generally unsuitable as is the investment strategy proposed (typically implying excessive portfolio movements). Furthermore, firms tend to create ambiguity or confusion about their own responsibilities.

The guidelines regard, first of all, the information to clients about the suitability assessment. Investment firms must help investors understand why the information is requested, and must encourage investors to provide, in their own interest, information as accurately and completely as possible. For the same purpose, firms must be certain that investors are aware of the relationship between risk and return and must explain to investors the method(s) used to define the risk profile. The suitability assessment is the responsibility of investment firms and it is wholly incorrect to give the impression that it lies, instead, with the client.

Regarding procedural profiles, internal policies and procedures must help firms understand the essential facts about the client and the features of the financial instruments available for that client. On the first point, the document recognises that age, marital status, household size, employment situation and liquidity are some of the essential items of information to collect. Investment firms must also ensure that staff involved in the suitability process have adequate knowledge and expertise. As regards the amount of information to be collected, ESMA leaves a certain amount of discretion to firms, adopting a principle of proportionality with respect to (i) the service offered, (ii) the characteristics of the products and (iii) the amount of the investment. For example, the information from the client requested by an advisor as part of an advice service will be more completed and detailed when requested by advisers rather than by portfolio managers (who make investment decisions on behalf of clients), although, in any case, customers must be given the opportunity to understand the overall risk of the portfolio and the risks linked to the single instruments included in the portfolio. More information will be required when the products proposed are complex or illiquid, because it is important to verify the investor's ability to understand the related risks and his financial capacity to sustain any losses. Finally, information about clients must be increasingly detailed as the investment amount increases with respect to the total financial portfolio.

Investment firms must also consider the reliability of the information collected; a client's self-assessment in relation to knowledge, experience and financial situation is rarely reliable. Another significant issue concerns the procedures defined in order to maintain adequate and updated information about the clients when providing investment advice on an ongoing basis. Such procedures should be able to accommodate changes in the client profile or suggest appropriate action if the information provided by the client is lacking.

If clients are a group, or a legal person or natural person representing another natural person, the investment firm and the client must agree on how to define the relevant set of information to assess suitability. As a minimum, the information requested must consider the financial situation and investment objectives of the effective beneficiary of the investment.

To guarantee that the investment is suitable, the intermediary's policies and procedures must consider all the information available, including the structure and overall composition of the portfolio at the moment the service is provided, as well as the characteristics of the investments considered, with respect to all types of risk and to the direct or indirect costs.

ESMA states that investment firms should at least define procedures that ensure orderly and transparent record-keeping regarding the suitability assessment process. This will allow the investment recommendation to be tracked ex-post, also by the competent authorities, and allow any critical issues to be identified and removed (as in the case of misselling).

FINRA Rule 2090, the new know-your-customer rule as revised by the SEC, requires intermediaries to use reasonable diligence in collecting and keeping essential client information. FINRA Rule 2111, the new suitability rule, states that investment firms (brokers/dealers, etc.) "*must have a reasonable basis to believe that a recommended transaction or investment strategy involving a security or securities is suitable for the customer, based on the information obtained through the reasonable diligence of the member or associated person to ascertain the customer's investment profile.*"

As regards the information needed to classify the client, the rule provides a non-exhaustive list which includes age, previous investments, financial situation, financial commitments and liquidity needs, tax status, investment objectives and time horizon, experience and degree of risk tolerance.

The FINRA guidelines specify, however, that the information listed in Rule 2111 cannot always be considered sufficient or necessary: firms, in fact, are not obliged to request and analyse all the information indicated if they can reasonably argue and document that one or more pieces of information are not relevant. Firms can, therefore, follow a risk-based approach in determining how much information and which information to request depending on the complexity of the recommended security or investment strategy and/or the risks involved.

5 Questionnaires used by Italian investment firms: evidence on their validity and reliability

The empirical evidence on the questionnaires used by the Italian investment firms available so far documents several shortcomings (Marinelli and Mazzoli, 2010). In general, the questionnaires are prepared and based on the business model of the investment firms, the characteristics of the products offered and the level of knowledge of the staff involved in the assessment and recommendation process. The main weakness refers to risk tolerance assessment, in most cases elicited only by requesting the risk-return expectations for future investments with respect to hypothetical

investment situations. Past financial investments (that is, the risks already assumed in real life) and current financial constraints (risk capacity) are often neglected. In addition, different questionnaires classify the same individual in different ways. This result was obtained with respect to a sample of 100 people who were interviewed by giving them two out of three questionnaires previously selected: depending on the pairs of questionnaires considered, the number of cases in which a person is classified differently varies between 51% and 60%.

In principle, however, the same person could be classified differently by two investment firms having different business models, simply because the products and the services offered match different needs of that person, that is, different investment objectives and time horizons, which in turn combine with a different risk attitude. In fact, as mentioned above, financial risk tolerance is context-dependent and this explains the apparent "paradox" of the person who buys insurance policies after having bought lottery tickets. A more sophisticated explanation of such a paradox is given by the Behavioural Portfolio Theory, modelling individual choices according to a paradigm which shares many features with the mental accounts and the investment pyramid approaches: people aim at achieving a minimum gain target, which may well be consistent with a combination of very risky investments with low-risk ones in order to reduce the probability of missing their target.

It is also clear that the riskier a range of products is, the more detailed the information gathering process should be. Only this may ensure a proper suitability assessment of the proposed investment, also with respect to the composition of the total portfolio and the client's financial capacity to withstand risk.[17]

This study explores issues partly overlapping and partly extending the work by Marinelli and Mazzoli (2010). It analyses a sample of 20 questionnaires, both with respect to the way they are structured and given and to their contents and certain reliability features. No information on the algorithms used by firms to aggregate the information collected from clients was available.

5.1 How the questionnaires are structured and administered

First of all, information was collected from the investment firms on how they defined their questionnaires, what (if any) validity and reliability checks were done, how the questionnaires were administered and how the clients' profile was updated (Box 5).

In particular, the process of structuring the questionnaire was examined. Two initial questions asked whether the investment firms used any experts in economics, statistics or psychology, and whether any checks were done on validity and reliability, by testing the tool on a pilot sample, for example.

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17 It would be interesting to verify whether the degree of inconsistency in client classification, observed in the various contributions reviewed, decreases for questionnaires defined as "uniform" with respect to the segmentation of intermediaries by business and product type and whether there is a correlation between the complexity and riskiness of the instruments offered and the type and quantity of information gathered.

Box 5

How the questionnaires are structured and administered to clients: the Consob "interview"

1) When preparing the questionnaire, were specific professions involved (such as, for example, communications experts, psychologists, economists, statisticians, etc.)?

2) Was the validity of the questionnaire checked? If so, how (for example, was a pilot test performed on a representative sample of clients)?

3) Have different questionnaires been prepared for different types of clients (natural versus legal persons)?

4) Is there a procedure describing how to administer the questionnaire? If so, please describe its essential features with particular reference to the following:

   a. the qualifications of the staff involved (for example, area manager)

   b. the administration channel for the questionnaires (face-to-face, telephone, mail, online)

   c. any differentiation in how questionnaires are administered depending on the type of client (retail versus professional).

5) Do the staff administering the questionnaire receive specific training? If so, please describe its essential features. For example, is attention paid to the case in which the client has a low level of financial knowledge and/or is affected by behavioural biases?

6) Can the IT procedure used for client profiling handle illogical or inconsistent answers? If so, please describe the control mechanism.

7) Is there a procedure for updating client profiles? If so, please describe its essential features.

8) Are there limits on how frequently client profiles can be updated using questionnaires by bank staff?

9) Can clients modify their profiles themselves, for example, by answering a questionnaire via home banking? Are there limits and conditions in this case?

10) Is collecting information about the client's liquidity preferences/needs separate from administering the questionnaire or, vice versa, is it an integral part of the suitability assessment of the operations recommended?

The third question looked at whether different formats were available depending on whether the client was a natural or legal person. The question acknowledges the fact that relevant profiling information is likely to be different for each category of client and therefore different tools are required to gather the different information. In addition, the MiFID directive itself envisages different levels of protection for retail and professional clients. For the latter it can be reasonable to assume that they have a certain level of experience and knowledge, whilst no such assumption can be made for retail clients.

How the questionnaire was given and how the personnel giving them were trained was investigated in the fourth and fifth questions. The procedures covering how a questionnaire is administered must guarantee that the information provided by the client is both reliable and consistent. Just as important is the ability of the staff involved with supporting clients in reading and completing the questionnaire. These people may be asked to clarify or explain certain points and their response must be clear and correct but, above all, neutral.

The sixth question checked whether a computer-assisted interview procedure had been developed to monitor consistency and to ensure that the client did not give incompatible answers.

How and when the client profile is updated are explored in the seventh, eighth and ninth questions. The purpose is to establish whether any procedures have been envisaged to ensure information provided by clients is periodically monitored and whether clients can update their profiles autonomously.

The last question verifies whether the algorithm used to classify clients considers any information about their liquidity needs/preferences. This information is important both to complete the picture of the client's financial situation and to assess risk tolerance.

The key points that emerged from the Consob interview are presented below.

1) When preparing the questionnaire, were specific professions involved (such as, for example, communications experts, psychologists, economists, statisticians, etc.)?

Most of the firms (14 out of 20) prepared their questionnaire without involving specific professional figures but only internal resources.

2) Was the validity of the questionnaire checked? If so, how (for example, was a pilot test performed on a representative sample of clients)?

Testing the validity of a questionnaire implies checking the wording of the questions, which must be plain and comprehensible, the average compilation time, the structure and the distribution of the answers. Many banks (14 out of 20) state that they have undertaken such a test; however, not all the firms performed a pilot test, while some assessed the questionnaires already given in order to review the format or the weights used for profiling.[18]

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18 One intermediary said that it had verified *ex post* how a client's portfolio matched the client's profile (defined with respect to the risk and time preferences). In this regard, it is worth remembering that the questionnaire's validity test does not involve assessing how or whether the portfolio decisions recommended/taken match the client's profile defined on the basis of the information gathered. Instead a test is done on whether the questions asked effectively represent the phenomenon being investigated. Rather than the validity of the survey tool, any inconsistency be-

3) Have different questionnaires been prepared for different types of clients (natural versus legal persons)?

Almost all the questionnaires were prepared with reference to the specific type of client at which they are aimed (natural person versus legal person). Only three banks provide for a distinction between questionnaires for retail and professional clients.

4) Is there a procedure describing how to administer the questionnaire? If so, please describe its essential features with particular reference to the following:

   a. the qualifications of the staff involved (for example, area manager)

   b. the administration channel for the questionnaires (face-to-face, telephone, mail, online)

   c. any differentiation in how questionnaires are administered depending on the type of client (retail versus professional).

5) Do the staff administering the questionnaire receive specific training? If so, please describe its essential features. For example, is attention paid to the case in which the client has a low level of financial knowledge and/or is affected by behavioural biases?

6) Can the IT procedure used for client profiling handle illogical or inconsistent answers? If so, please describe the control mechanism.

Questionnaires are administered by the account manager (private banker, financial adviser, branch staff, commercial staff) in direct contact with the client. In most cases the interviewer records the client's answers and checks their internal consistency via a computer. These procedures help detect incongruities: for example, non-logical criteria can be established to guarantee consistency between level of "experience" and level of "knowledge" or between "investment objectives" and "risk preferences".

Almost all the banks organise specific training for staff administering questionnaires. In most cases, however, these initiatives consist of refresher courses on the reference legislation, or generic training courses for advisers. Training does not always include modules expressly devoted to the questionnaire and almost never make explicit reference to the potentially significant cognitive and behavioural biases which may negatively affect the administration of the questionnaires.

7) Is there a procedure for updating client profiles? If so, please describe its essential features.

tween the portfolio decisions and the client's profile could refer to issues relating to the correctness of the intermediary's conduct.

8) Are there limits on how frequently client profiles can be updated using questionnaires by bank staff?

9) Can clients modify their profiles themselves, for example, by answering a questionnaire via home banking? Are there limits and conditions in this case?

Clients' profiles are normally updated regularly following a procedure that freezes operations on the clients' portfolio (often only purchases) when too much time has passed since the last update. The account manager or the client can, however, ask for an update (sometimes the clients themselves can modify their profile through home banking) if they consider it necessary. Almost no firm limits updates to the client profile but some check that the frequency of updating is not anomalous or that re-profiling does not take place in conjunction with particular operations on the portfolio.

10) Is collecting information about the client's liquidity preferences/needs separate from administering the questionnaire or, vice versa, is it an integral part of the suitability assessment of the operations recommended?

Most questionnaires have one or more questions on preferences in terms of time horizon and investment objectives, which are relevant for suitability assessment purposes.

5.2 Analysis of the questionnaires

Contents

Overall, the questionnaires are compliant with the MiFID and, as MiFID does, only focus on a subset of the items judged as relevant by the literature. However, around 25% of the questionnaires include a number of socio-demographic variables. One questionnaire makes reference to the notion of risk diversification and two questionnaires investigate risk tolerance in a more detailed manner than the average.

The analysis checks the presence and number of questions with reference to the three sections indicated by the Level 1 (L1) Directive and to the information indicated (in a non-binding manner) by the Level 2 (L2) Directive.

Of the 20 questionnaires considered, 18 contain an introduction which mentions the legislation covering the questionnaire being administered and the objectives of the questionnaire. This introduction, however, is not always easily found: often the font, layout and other graphic features make it difficult to attract the reader's attention. These limitations, however, can easily be overcome if the intermediary explains to the client the purposes of the interview and how the information will be used.

In only one case is the number of questions fewer than 10. In 13 cases, there are between 10 and 17 questions and in 4 cases there are between 18 and 27. The two longest formats contain 37 and 44 questions.

Almost every questionnaire is divided into several sections. In half the cases, these sections correspond to the three areas indicated by the MiFID: 1) the client's experience in and knowledge of investments with specific regard to the type of product or service; 2) the client's financial situation; 3) the client's investment objectives. In the other half, there are more sections: sometimes, for example, a section refers to personal/sociometric data; in other cases, questions on experience and knowledge are divided into two areas. In only one questionnaire have the second and third sections pursuant to the MiFID been combined.

All the questionnaires contain at least one question for each of the areas indicated by the Directive. The average number of questions is 9 for the section relating to experience and knowledge, while it drops to 4 in the sections relating to the client's financial situation and investment objectives (Figure 1).

Figure 1 Number of questions per section
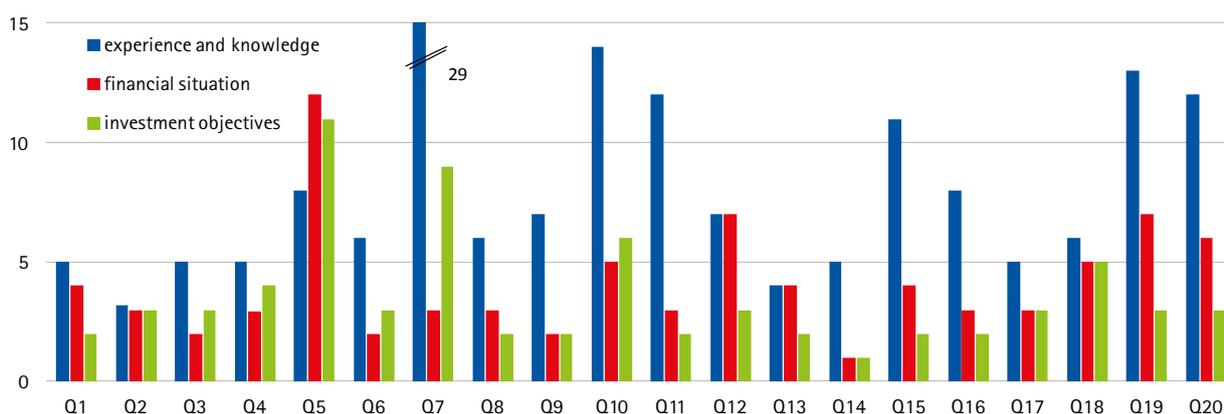
As for the items suggested by the L2 Directive, not all the questionnaires cover each subject with at least one question. All questionnaires do, however, ask at least one question relating to which products/services the client is familiar with (Figure 2).

With reference to sociometric questions, only 4 questionnaires ask about a client's age. Almost always absent is a question on household composition and in only 4 cases is the client asked to disclose her/his marital status (although this information is relevant in assessing the client's financial situation, in determining current regular financial commitments and in determining potential future ones).

None of the questionnaires focuses on the notions of "positive risk-return trade-off", "exchange rate risk", "discounting /capitalisation", "inflation" (only one questionnaire contains a question which refers to the concept of "risk diversification").

Figure 2 Completeness with respect to the items in the L2 Directive

no. of questionnaires containing at least one question per item

average number of questions per *item*
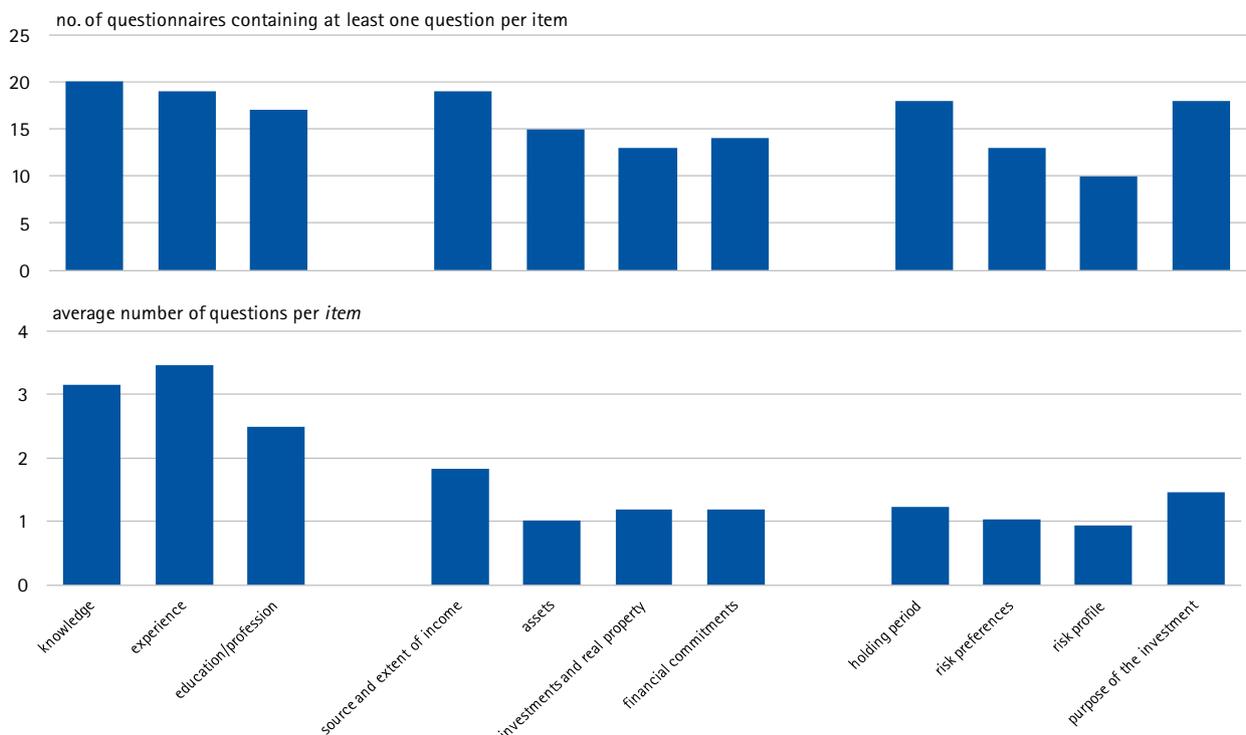
As regards the section on the client's financial situation, the number of questions on the client's assets/investments/properties and financial commitments ranges from a minimum of one to a maximum of 12. Most of the questionnaires only contain questions relating to regular financial commitments. Only in four cases, moreover, do the intermediaries check whether the client has an insurance policy or a pension plan.

The least detailed section is that relating to investment objectives: only 13 questionnaires contain (at least) one question on risk preferences (objective risk); only 10 refer to the risk profile (subjective risk).

Most intermediaries ask clients to describe their approach to investments/risk profile giving a choice of four or more alternative strategies in terms of risk-return, or four different levels of acceptable risk (minimum, moderate, etc.), or various investment purposes (capital growth/preservation). In only three cases are investors asked to describe how they would react (or what decisions they would make) when faced with a particular scenario (negative market performance, portfolio losses, inheritance and possible real estate investments).

Validity and reliability

For validity, the analysis checked whether the client's risk attitude and financial capacity had been identified as distinct items either through separate questions or questions whose answer could not be driven indistinctly by both quantities.

For reliability, a number of aspects which can affect the clarity and comprehensibility of a questionnaire were examined, namely, number of questions, layout, structure, question type and wording.

The **layout analysis** focused on format and reading features, such as the font used, line spacing and division into paragraphs, the presence of a column/space where answers are to be written, and any numbering of pages and questions.

The **structure analysis** first checked the presence of an introduction on the purpose of the questionnaire and then how questions were grouped by subject area (people should focus on one subject at a time) and by degree of complexity (people should tackle the most complex subjects when their level of attention is highest).

The **type of questions** and the answer format were also evaluated, provided that such features may influence answers. In particular, the questions were divided into various categories: quantitative versus qualitative; closed versus open-ended[19] and open-ended guided (depending on whether the answer "*no answer/don't know*"[20] is an option or not). Answer scales, when used, were also examined to detect whether they included the same number of positive and negative options and whether, in multiple-choice answers, the options are mutually exclusive. Finally, the use of filter questions and batteries of questions was examined. Filter questions allow for one or more successive questions to be skipped if certain conditions are fulfilled, and batteries of questions are a series of questions which vary only in the subject to which they refer but are preceded by the same introduction and followed by answers formulated in the same way. This structure can produce random and/or "mechanically" given answers. The interviewee can be induced, in fact, to use a "thinking shortcut", choosing the option which occupies the same position in the scale or in the alternatives irrespective of the content of the question (the so-called response effect). It may be useful, therefore, to introduce into the battery a number of control questions or questions with inverted polarity to control this effect.

Wording analysis was aimed at checking whether the questions were worded so as to be easily understood. In general, words should be simple and not ambiguous; jargon, acronyms and technical language should be avoided; moreover syntactic structure should be precise, linear and concise. Questions should not be "loaded" (i.e. evocative or judgemental), or "leading" (i.e. implying or containing their own answer), or "double-barrelled" (i.e. asking about more than one issue in a single question).

The results of the analysis are shown below.

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19   The answer may be dichotomous (yes/no), polytomous or a fixed alternative; it may be multiple-choice, a numerical scale or a verbal scale (an example is the Likert scale giving a range of answers from "I strongly agree" to "I strongly disagree").

20   It should be remembered on this point that the Level 2 Directive states that "An investment firm shall not encourage a client or potential client not to provide information required for the purposes of Article 19, sections 4 and 5 of Directive 2004/39/EC".

Assessing investors'
risk tolerance through
a questionnaire

Layout

Not all the questionnaires contain numbered pages and/or numbered questions. In surveying the results, therefore, it is not always easy to identify the question-answer combination or the relationships between sections, questions and answers, nor to distinguish the various sub-questions in any batteries of questions.

The font and line spacing are generally adequate, that is, they are chosen to make reading easy, but the layout does not always clearly identify the sections or areas reserved for the answer.

Structure

Almost all the questionnaires open with sociometric questions. Personal data is typically asked on the first page, together with questions on the level of education, profession and financial situation. Since these questions do not require particular attention, the literature recommends placing them at the end of the questionnaire, when the client may be more distracted or may simply have had enough of the questionnaire. However, given that the questionnaires analysed are generally not overly long, positioning the sociometric questions at the beginning probably does not affect the outcome of the interview.

As regards the number of questions and the structure of the sections see the sub-paragraph above (*Contents*).

Types of questions and answers

The intermediaries generally avoid formulating questions in batteries: only three of the questionnaires examined make recurrent use of them, collecting information on a series of items through a single question which does not allow somebody to identify the items which a given answer refers to.

Almost 70% of the questions formulated in the questionnaires in the sample require polytomous and, obviously, mutually exclusive answers; a smaller number envisage closed dichotomous answers and in very few cases open-ended answers. All the questions are qualitative.

In only two questionnaires, the option of not answering or of answering "*don't know*" is repeatedly provided for. For one of these, the intermediary has, however, pointed out that the software used does not permit the reply "*no answer*" more than once. Only one format contains a couple of optional questions (relating to information on sources of income and financial assets).

Language and wording

The most critical shortcomings emerged with respect to the sections devoted to experience and knowledge of investments and to risk tolerance.

As regards questions on familiarity with investments, clients are generally invited to self-evaluate their financial literacy, with regard to specific financial products and investments: as shown by the experimental evidence, self-evaluation

may be biased by overconfidence, optimism, the outcomes of previous investments and also by the tendency to improve one's image.

Questions are often double-barrelled, since they ask about more than one issue in a single question (this may result in inaccuracies in the attitudes being measured by the question), or leading, since they imply or contain their own answer.

Questions often provide for a choice between dichotomous alternatives or alternatives ordered in a scale: such wording can cause clients to become remissive, since they are pushed to follow the unconscious tendency to respond positively to each question, or to position themselves centrally in the scales of the answers (so-called acquiescence or central tendency).

Finally, in some cases, questionnaires use imprecise terms - which can be misunderstood - or too many technical terms - which can be difficult to understand.

Focus on the questions about risk tolerance

As already noted, under the terms of the MiFID, risk preferences and risk profile are elicited within the third section, also embracing time horizon preferences and investment objectives.

On average, four questions per questionnaire relate to the third section of the MiFID. Of these, only one (on average) regards risk attitude. As already mentioned, thirteen questionnaires include at least one question on risk preferences, while only ten devote at least one question to the risk profile.[21] These questionnaires generally refer to the notion of risk ambiguously, since questions relate to both investment objectives and risk preferences, while financial literature suggests assessing risk preferences and risk profile independently from the holding period and the investment aims, since each of these variables is influenced by different factors. The wording is often vague, imprecise, or technical; sometimes clients are required to self-assess their risk attitude.

In conclusion, only two out of the 20 questionnaires analysed can be considered sufficiently clear, effective and "valid", because they use precise and unambiguous questions. The remainder fail to provide clear measurements on risk attitude, risk capacity, risk tolerance and investment objectives, and are deficient in both wording and comprehensibility.

6 Conclusions

After reviewing the variables which, according to the literature, are relevant to investor profiling, this work analysed the procedural aspects associated with structuring questionnaires and methods for administering them as well as their contents on a sample of 20 Italian intermediaries.

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21 In two questionnaires there is no question relating to a client's risk preferences nor their risk profile.

In particular, as regards structuring and administering questionnaires, it emerged that the formats were often prepared by internal staff and only in a few cases had they been specifically trained. This may be a critical shortcoming because, as the empirical evidence on risk tolerance assessment tools shows, formulating a valid and reliable questionnaire requires specific multidisciplinary skills.

Although, overall, they comply with the provisions of the MiFID, and are consistent with the Directive itself, most questionnaires are not aligned with the economic and psychological literature; in addition their clarity and comprehensibility are flawed by some linguistic-textual characteristics which have been extensively pointed out.

With respect to the information collected on experience and knowledge of investments, none of the questionnaires contain questions designed to test knowledge of basic notions such as, for example, the risk-return relationship, portfolio diversification, inflation, discounting and capitalisation operations; rather, clients' knowledge of specific financial instruments is enquired about. In addition, questionnaires very often elicit clients' self-evaluation, which may lead to unreliable answers.

With reference to information on the client's financial situation, most of the questionnaires examined do not assess all the sociometric or economic variables that the literature considers relevant to a client's financial situation. For example, the household-level variables (such as its composition, income and assets) are neglected while they should be taken into account along with individual variables.

As regards information on the client's investment objectives, in the questionnaires examined, risk attitude is generally elicited jointly with preferences on the time horizon and investment aims. This format has been criticised in the literature because risk preferences and the risk profile should be assessed independently from the other elements which must be gathered when formulating an investment recommendation, since each of these variables is influenced by different factors (for example, risk preferences and risk profile are attributable to sociometric, psychological and behavioural factors, while the time horizon and investment objectives depend on economic and financial factors, the level of impatience, etc.).

An analysis of the structural, linguistic and textual aspects, which can affect the clarity and comprehensibility of questionnaires, shows that questions on knowledge/experience and risk attitude are often ambiguous because they refer to several subjects at the same time, or contain technical terms that may make them difficult to understand. Finally, the way questions on risk attitude are worded lacks the stylistic and lexical devices which, according to behavioural finance, may be useful in enhancing the reliability of the answers which may be affected by the client's cognitive and behavioural biases.

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Table 1 How the questionnaires are structured and administered to clients: the firms' answers to Consob interview

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Firm 1	Yes	Yes	Yes	CAPI	Yes	No	every 3 years	No	No	in the questionnaire
Firm 2	No	No	Yes	CAPI or IB	Yes, but not specific	Yes	on demand or through IB	No	Yes, no limits	in the questionnaire
Firm 3	No	No	No	CAPI or IB	Yes	No	every 3 years	No	Yes, no limits	not yet
Firm 4	No	Yes	Yes	Face to face	Yes	No	periodically	at least after 2 years	No	in the questionnaire
Firm 5	No	Yes	Yes	CAPI	Yes	Yes	every 2 years	No	No	also in the questionnaire
Firm 6	No	Yes	Yes	CAPI	Yes	Yes	every 3 years	No	Yes, no limits	in the questionnaire
Firm 7	No	Yes	Yes	CAPI or IB	Training materials	Yes	every 5 years or on demand	No	Yes, no limits	in the questionnaire
Firm 8	Yes	Yes	Yes	CAPI	Yes	Yes	annual	No	Yes, apart from section 3	in the questionnaire
Firm 9	No	Yes	Yes	CAPI	Yes	Yes	annual	No	No	No
Firm 10	Yes	Yes	Yes	CAPI	Yes	Yes	every 3 years	at least after 6 months	No	in the questionnaire
Firm 11	No	Yes	Yes	Face to face	No	Yes	periodically	No	No	in the questionnaire
Firm 12	Yes	No	No	Face to face	Yes	No	No	No	No	not yet
Firm 13	Yes	Yes	Yes	Face to face/IB/PB	Yes	Yes	periodically	at least after 3 months	Yes, no limits	in the questionnaire
Firm 14	Yes	No	No	Face to face	No	No	on demand	No	No	not in the questionnaire
Firm 15	No	Yes	No	Face to face	Yes	No	No	No	No	in the questionnaire
Firm 16	No	No	Yes	Face to face	Yes	Yes	annual or whenever necessary	No	No	No
Firm 17	No	Yes	No	Face to face	No	-	annual or on demand	No	No	No
Firm 18	Yes	No	No	Face to face	Training materials	No	periodically	No	No	in the questionnaire
Firm 19	No	Yes	No	Face to face	Yes	No	No	No	No	[n.a.]
Firm 20	No	No	Yes	No	No	No	periodically	No	No	No

Legend: IB = *internet banking*; PB = *phone banking*; CAPI = *computer assisted personal interview.*

Table 2 Layout and structure of the questionnaires

Firm	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
page numbering	No	Yes	Yes	Yes	No	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No	No	Yes
question numbering	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes
introduction recalling the objectives of the questionnaire	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
separate graphic identification of the introduction	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	No	Yes	Yes	Yes	Yes
legibility	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
grouping of questions by thematic area	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
number of thematic areas	3	//	4	4	3	3	//	3	4	3	2	4	3	3	4	4	3	7	3	5
graphic identification of the sections	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3 Completeness of the questionnaires with respect to items in the L2 Directive

Firm	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	N°	Mean
experience and knowledge	5	3	5	5	8	6	29	6	7	14	12	7	4	5	11	8	5	6	13	12	20	9
types of service, transaction and financial instrument with which the client is familiar	1	1	<2	<1	2	6	10	1	2	12	8	3	2	1	2	3	1	3	2	1	20	3
nature, volume, and frequency of the client's transactions in financial instruments and the period over which they have been carried out	2	1	<3	<3	4		16	5	2	2	2	2	1	1	4	3	3	2	7	4	19	3
profession and education	2	>1	1	2	2		3		3		2	2	1	3	5	2	1	1	4	7	17	2
financial situation	4	3	2	3	12	2	3	3	2	5	3	7	4	1	4	3	3	5	7	6	20	4
source and extent of regular income	2	<1	1	1	5	1	2	1	1	2	2	3	2		2	1	2	1	3	2	19	2
assets, including liquid assets	<1	1	1	>1	1		1	1		1		>1	<1	1	1	<1		2	1	1	15	1
investments and real property	<1	>1		<1	2				1	1	1	>1	<1			<2	1	1	2	2	13	1
regular financial commitments	1	>1		<1	4	1			1	1	1	1	1		1		1	1	1	1	14	1
investment objectives	2	3	3	4	11	3	9	2	2	6	2	3	2	1	2	2	3	5	3	3	20	4
holding period	<1	<1	1	1	5		3		<1	1	1	1	1	<1	1	>1	1	1	1	1	18	1
risk preference	1					1	1	1	1	2			<1	<1	<1		1	2	1	1	13	1
risk profile		1	1	1	1	1				1	1					<1		1	1	1	10	1
purpose of the investment	<1	<2		3	5	1	5	1	<1	2	1	1	<1	<1	<1	<1	1	1	1	1	18	1

Symbols "<" (less than) and ">" (greater than) are used when the item is examined through battery of questions or double barrelled questions.

Table 4 Knowledge and investment experience

	number of questions on risk tolerance	ambiguous or double-barrelled questions	vague, imprecise or technical questions	self-evaluation is required	leading questions
Firm 1	5	X		X	
Firm 2	3			X	
Firm 3	5	X		X	
Firm 4	5			X	
Firm 5	8	X	X	X	X
Firm 6	6	X	X	X	X
Firm 7	29	X	X	X	X
Firm 8	6	X		X	
Firm 9	7			X	X
Firm 10	14	X	X	X	X
Firm 11	12	X	X	X	X
Firm 12	7			X	
Firm 13	4	X		X	
Firm 14	5		X	X	
Firm 15	11		X	X	
Firm 16	8		X	X	
Firm 17	5		X	X	
Firm 18	6			X	
Firm 19	13	X		X	
Firm 20	12			X	

Table 5 The elicitation of risk tolerance

	number of questions on risk tolerance	ambiguous or double-barrelled questions	vague, imprecise or technical questions	self-evaluation is required	leading questions	it is clearly stated that the risk-profile resulting from the administration of the questionnaire will be discussed with the client
Firm 1	1		X	X	X	No
Firm 2	1	X	X			No
Firm 3	2		X			Yes
Firm 4	0					Yes
Firm 5	1	X	X	X		No
Firm 6	2		X	X	X	Yes
Firm 7	1		X	X		No
Firm 8	1		X			Yes
Firm 9	1		X	X		No
Firm 10	3		X			No
Firm 11	0					No
Firm 12	1					No
Firm 13	<1	X	X			No
Firm 14	<1	X	X			Yes
Firm 15	<1	X	X		X	Yes
Firm 16	<1		X	X		No
Firm 17	1		X			No
Firm 18	3		X		X	No
Firm 19	2	X			X	No
Firm 20	1		X	X		No

Symbol "<" (less than) is used when the item is examined through battery of questions or double barrelled questions.