

Nicoletta Marinelli

Faculty of Economics, University of Macerata

Piazza Strambi 1, 62100, Macerata, Italy

Phone: +3907332583239

e-mail: nicoletta.marinelli@unimc.it

Camilla Mazzoli

Faculty of Economics, Marche Polytechnic University

P.le Martelli n.8, 60121 Ancona, Italy

Phone: +390712207254

e-mail: c.mazzoli@univpm.it

Determinants of suitable investment portfolios: evidence from a sample of Italian householders

Abstract

According to the Markets in Financial Instruments Directive (MiFID), financial intermediaries are requested to assess the suitability of the products they sell to clients, with a specific focus on retail clients, which are those requiring the highest level of protection. Nevertheless, the recent financial turmoil has evidenced that many retail investors have portfolios with a risk exposure that is not consistent with their effective risk profile. Supervisory Authorities have pointed out that one of the main problems in the practical implementation of the MiFID suitability rule stems from the omission or impreciseness of the questions addressed to know the customer's characteristics and needs with specific reference to his/her risk profile. Prompted by these evidence, we try to understand what information an investment firm should collect from the customer in order to properly define the client's risk profile. To do so, we analyze a sample of 3981 suitable portfolios and we put their risk composition in relation with some characteristics of the person the portfolio belongs to. By using the two step Heckit estimation procedure we are also able to set apart the variables that mainly explain the risk holding decision (that is the decision to acquire risky assets) and the risk allocation decision (that is the decision about what fraction of wealth to invest in these assets). We find that the risk ownership decision may be induced by a wider set of variables also including the personal characteristics of the individual; on the contrary, the following decision about the share of risky assets seems to be driven by a more rational and economic set of variables, expressing the effective ability of the subject to bear such a financial risk.

Keywords: Regulation and Supervision of Financial Institutions, Retail Banking, Relationship Banking, Financial Education

1. Introduction

Assessing suitability is an important Markets in Financial Instruments Directive (MiFID) requirement for investor protection, particularly in respect of retail clients. Accordingly, where the activities of an intermediary extend to the giving of specific advice or portfolio management services, investment firms must obtain the necessary information to understand the essential facts about the clients in order to ensure that the specific transaction recommended meets the client's characteristics and needs. The recent financial turmoil has even exacerbated structural problems stemming from poor advisory services and client's knowledge, as many retail investors have been found to have portfolios with a risk exposure not consistent with their effective risk profile. A study in Germany reports that clients end 50 to 80% of long-term investments prematurely because of unsuitable advice when buying financial products (Evers and Jung, 2008). Moreover, recent data provided to the European Commission by the FIN-NET network reveals an alarming increase in the number of complaints relating to financial investment advice, especially in Italy, Ireland, France, and Belgium (European Commission, 2011).

The growing concern regarding the quality and reliability of financial advice in the field of retail investments has also led international financial authorities to renew the debate about suitability. In December 2011, the European Securities and Markets Authorities (ESMA) set out for consultation draft guidelines on certain aspects of the MiFID suitability requirements in order to enhance clarity and foster convergence in the implementation of the legislative prescriptions. In addition, the European Commission is working on a review of the first version of the MiFID framework and has also suggested to use the MiFID suitability prescriptions as a benchmark for future regulation on the area of selling practices in the wider field of Packaged Retail Investments Products (PRIPs).

Recent evidence and supervisory experience (AMF, 2011; European Commission, 2011; FSA, 2011) indicate that the main problems in the practical implementation of the MiFID suitability rule stems from three areas of deficiencies:

- *poor quality of MiFID suitability questionnaires*, i.e. omission of questions or impreciseness of the questions asked which are relevant to know the customer's characteristics and needs;
- *poor quality of client profiles*, i.e. inconsistency in the way the scores are assigned to the different variables in order to classify the client according to different categories;
- *poor quality of advisor's product recommendation*, i.e. advisors may recommend products which are not in line with the client's profile.

Prompted by these evidences, this paper aims at contributing to the debate about the quality of the content of MiFID questionnaires actually used to gather information about the client in order to assess the suitability of an investment product, in a sense, the premise of the overall suitability process. Specifically, we try to understand what information an investment firm should collect from the customer in order to reach a comprehensive framework that allows to properly define the client's risk profile and, therefore, propose a suitable portfolio with respect to this parameter. We confine our analysis to just one aspect of the MiFID suitability assessment, that is the definition of the risk profile of the customer, as it has been found to be the most critical in practice and the trickiest to measure. Indeed, the FSA (FSA, 2011) shows that of the 366 cases ranked as "unsuitable" between March 2008 and September 2010, 199 are "unsuitable" on the ground that investment selection failed to meet the risk a client is willing and able to take. In addition, the EU Commission (European Commission, 2011) underlines that the excessive risk investment accounted for over 80% of "unsuitable" cases in Europe.

For this reason, we are interested in understanding to what extent the MiFID questionnaires that are currently used by financial intermediaries can be improved in terms of the information that should be asked to clients when profiling their risk.

In order to estimate which variables should be taken into account for assessing the willingness and ability to take risk, i.e. the risk profile of the client, we analyze the financial decisions of the sample of Italian families subject to the investigation of the Bank of Italy Survey of Household Income and Wealth; specifically, we analyze the decision of investing in risky assets among a subsample of 3981 subjects whose asset allocation may be considered suitable and we relate such a decision to the personal and family characteristics of the investor (socio-demographic characteristics, economic and financial situation, experience and knowledge, background risk) in order to derive which variables are more relevant in explaining a risky, but also suitable, financial behavior.

The novel contribution of our paper to the existing literature is twofold: first, academic research on individual financial behavior generally attempts to understand which factors determine individual evidence of investing in risky assets, without taking into account the “suitability” or “unsuitability” of such an investment decision, in other words whether it is effectively matching the willingness and ability of the subject to take risk. On the contrary, we restrict our analysis only to those subjects who may be supposed to hold suitable portfolios, under the hypothesis that if the portfolio has not undergone significant changes over the period considered (2008-2010) it can be considered as suitable for that subject¹. Secondly, our approach is based on the Heckit two-steps estimation procedure (Heckman, 1979); apart from its pure technical advantage, this approach allows us to shed light on two different aspects of risk profile, namely, the decision to acquire risky assets (risk-holding decision) and the decision about what fraction of wealth to invest in these assets (risk-allocation decision). These two aspects represent two different and subsequent stages in the process of knowing the client’s risk profile, i.e. the ownership decision firstly, and the allocation decision secondly. Indeed, it is plausible to expect that the variables influencing the first decision (risk-holding) are not necessarily the same that affect the second step of risk taking (risk-allocation).

The remainder of the paper is organised as follows: in Section 2 we describe the legislative background of our analysis and the results of previous studies in the field of suitability in Europe; in Section 3 we discuss the data and methodology; the empirical analysis as far as the most relevant variables in defining the risk profile of a client is carried out in Section 4, while in Section 5 we check to what degree a sample of retail MiFID suitability questionnaires meets the variables we have previously found to be significant in the risk profiling of the client. Section 6 concludes.

2. Background and previous studies

The most recent and comprehensive legislative framework assessing the provision of advice to retail clients is provided by the Directive 2004/39/EC on markets in financial instruments (MiFID). This directive regulates the provision of investment services relating to financial instruments by investment

¹ One may note that investors might change their own asset allocation over two years not only because of the “unsuitability” of the previous investment solution, but also as a consequence of changes in their personal conditions and financial needs. This possibility, even though reasonable, does not affect our suitability selection hypothesis, as it results only in a prudential restriction of our sample that will contain only those investors who have not felt the need to change significantly their asset allocation also taking their personal conditions into account.

firms and credit institutions. It sets a regulatory framework for safeguarding the interests of retail clients, whereby financial providers are required to act honestly, fairly and professionally in accordance with the best interests of their clients. Providers are also required, when offering the service of advice or portfolio management, to recommend investment products or services that are suitable for the client. Article 19 of the MiFID, as supplemented by the Implementing Directive 2006/73/CE, specifies the information that financial institutions are required to gather from their clients in order to define a suitable investment strategy that meets their characteristics and needs. This information relates to three main areas of knowledge about the client or potential client, specifically: the client's investment objectives, the client's financial capacity, the client's experience and knowledge².

Despite the explanations provided by the Implementing Directive, there is a considerable leeway for interpreting how these suitability requirements are to be implemented, particularly when it comes to the tools used to determine the client's risk profile. As a consequence, in the lack of a "tight" benchmark to follow, each financial institution makes use of its own suitability questionnaire, that is designed for each specific situation and that is likely to be different from the ones used by its competitors.

On the investigation of suitability and its implementation in practice, supervisors have proved to be particularly active in order to raise the level of investor protection. Specifically, supervisors commissioned studies to examine whether current advisory practices across EU Member States are in line with the current legislative framework and to evaluate whether advisers provide suitable investment recommendations to retail clients (e.g. AMF, 2011; European Commission, 2011; FSA, 2011). In this perspective, the occurrence of "unsuitable" investment recommendations appears to be varied across EU Member States. It was generally observed that countries with especially high incidence of "unsuitable" products recommendations' tend to be the ones with more developed financial industries (for example, Denmark, 68%; Finland, 56%; Netherlands, 52%; Sweden, 58%; UK, 55%; see European Commission, 2011).

Where there is evidence of "unsuitable" investment advice, these studies, in so far as this is possible, seek to identify and explain possible reasons behind recommendations of "unsuitable" products. The studies focused on the following key areas: poor quality of MiFID suitability questionnaires; poor quality of client profiles; poor quality of advisor's product recommendation. Each area has its own critical aspects: as far as the quality of the MiFID questionnaire, the studies outline the inaccurate understanding of the client's financial needs as a consequence of an inaccurate content of the suitability questionnaire arising from the omission of questions or the impreciseness of the questions asked. With regard to the quality of client profiles, the AMF report (AMF, 2011) points out the inconsistency in the way some questionnaires attribute points to the different variables and the use of scoring techniques that fail to use sufficiently sophisticated econometric methods. Finally, as far as the quality of advisor's product recommendation, the studies alarmingly observe that, even when the risk profile of the client is correctly assessed, the product or portfolio recommended does not always match this risk profile; possible underlying reasons accounting for these outcomes are the limited product range of the financial distributor or the incentive to sell products to gain high commissions or to achieve sale targets (in this sense, see also IOSCO, 2012).

² For an in-depth analysis of the MiFID prescriptions about suitability and its field of application, we refer the reader to Marinelli and Mazzoli (2011).

As the aim of our study is to shed light on the quality of the content of the MiFID suitability questionnaires actually used by Italian financial firms, the previous evidences we are most interested in are the ones relating to the quality of MiFID questionnaires across EU Member States. Clearly, this represents the first problem to be resolved, able to negatively affect the other areas of deficiency. Generally, the main issue regarding the content of MiFID suitability questionnaires across EU concerns the incompleteness of the questions asked: advisors often failure to collect and properly account for all the information relevant to assessing the risk a client is willing and able to take, gathering only basic information about the client. In more details, specific problems include the following:

- at the EU-level, it is observed that less than 10% of advisors adhere to all the general guidelines that are mapped under MiFID suitability requirements and the degree of compliance with the MiFID recommendations vary among countries and among financial firms within the same country (in this sense, Marinelli and Mazzoli, 2011; European Commission, 2011);
- areas that seem to be most overlooked by advisors are the financial knowledge and investment experience of the clients as well as their financial capacity, as evidenced by the omission or the limited number of questions asked on these aspects. Generally, the questions deal more with experience than with knowledge (AMF, 2011); moreover, while aspects relating to the clients' personal income and assets are relatively better covered, advisors do not seem to gather adequate information about the clients' financial capacity, especially with regard to the clients' financial commitments, as well as other regular transactions or expenditures (Marinelli and Mazzoli, 2011; AMF, 2011). In a word, advisors seem to be more interested in defining the amount of resources to be invested and less in defining the client's effective ability to finance such an investment;
- although the clients' risk appetite appears to have been profiled by most advisors, the rigour of questioning seems to be rather lacking for a significant number of advisors (Marinelli and Mazzoli, 2011; AMF, 2011). This suggests that advisors may have addressed MiFID's requirements on this aspects in a superficial way, since most do not seem to be very methodical or comprehensive in the manner in which they establish the client's profile or formulate the questions;
- finally, there is a tendency for some advisors to overlook also the client's education level and profession (Marinelli, 2011; EU, 2011). This may pose a concern as some studies have indicated a possible linkage between education and financial capability with regards to choice of investment products (see, among others, FSA 2006).

A common feature in the works cited above is that the analysis of questionnaire completeness is based solely on the MiFID general indications about the information to gather from the clients; in other terms, the approach of the previous studies is to evaluate how well each questionnaire complies with MiFID requirements about suitability, i.e. investment objectives, financial capacity, experience and knowledge. However, it is foreseeable that an advisor might have fulfilled all the required MiFID information from a question perspective and yet fails to arrive at a suitable recommendation; this does not suggest that the MiFID prescriptions are useless in preventing market failure, since adhering to such general guidelines helps at least to cover the baseline prerequisites for effective information gathering. Nonetheless, there are also some facts about the clients, not explicitly covered by the MiFID indications, that might be informative about the level of risk an individual is willing and able to take. For example, the MiFID does not make questions about the client's socio-demographic characteristics mandatory, even if academic

research (see, among others, Guiso et al., 2002; Bertocchi et al., 2008; Cardak and Wilkins, 2009) has shown that variables such as client's age, marital status, profession show correlation to investment objectives and are factor's in the client's risk profile.

In this sense, the present study tries to enrich the previous evidences on suitability by assessing the extent to which actual MiFID questionnaires comply not only with the "text" of MiFID but with the "spirit" of the underlying law as well, that is the effective knowledge of all the client' facts relevant to define a proper risk profile of the individual in order to recommend a suitable investment strategy.

3. Data and methodology

Our main hypothesis is that the information that are currently requested into the MiFID questionnaires may be not completely adequate to understand the level and typology of risk an investor is willing and able to bear. In order to investigate the variables that better help in providing suitable solutions to investors, we analyze the financial decisions of a sample of Italian families subject to the 2008 investigation of the Bank of Italy Survey of Household Income and Wealth; in particular, we analyze the decision of investing in risky assets among a subsample of subjects whose asset allocation may be considered suitable and we relate such a decision to some characteristics of the investor (socio-demographic characteristics, economic and financial situation, experience and knowledge, background risk). More specifically, by using the Heckit two-steps estimation procedure we are able to shed light on which variables are able to inform about the opportunity of giving risky asset to an investor, i.e. the risk-holding decision and also on the variables that indicate the quantity of risk that is suitable to them, conditional on holding risky assets, i.e. the risk-allocation decision³. The explanatory variables that we include in the model are partly adherent to those requested into the MiFID questionnaires and partly innovative of our model.

3.1 Selection of the sample

First of all we select within the sample used in the Bank of Italy survey a sub-sample made only by the householder of the families that were interviewed. In fact, the survey reports a definition of the householder as "the person who is responsible for the financial and economic choices of the household". Our selection of the sub-sample comes from the assumption that the family investment decision are likely to be taken by the householder and, as a consequence, the portfolio composition depends on his or her personal characteristics together with the economic and financial situation of the family. This restriction gives rise to a sample of 7977 subjects, instead of the 19907 interviewed in the 2008 Bank of Italy survey.

For each of the householders, we consider the portfolio composition in 2008 and 2010 with specific reference to the amount of risky assets included⁴. As a consequence, only the 4621 subjects that were interviewed in both the 2008 and 2010 surveys are considered. In order to group the assets into some

³ Using the risk profile language, this means that the first step of the Heckit is useful to distinguish the totally conservative risk profile from the others, while the second step should help to better scale the non totally conservative risk profiles.

⁴As the 2012 analysis is not yet available, we were forced to use the 2008 and 2010 surveys.

risky categories, we mainly follow the methodology already used by Bertocchi et.al (2008)⁵. We thus obtain a distinction between risky and not risky assets as follows:

- Risky assets: stocks, corporate bonds, foreign assets and managed investments;
- Non risky assets: deposits and government bonds.

The only difference between our approach and the one proposed by Bertocchi et al. (2008) consists in the classification of managed investments; in fact, they include managed investments into the non risky assets while we consider them risky as much as stocks or foreign investments. The risk profile of a managed investment can be high or low depending on the financial instruments it buys and sells. The Bank of Italy survey however does not provide any information about the instruments the managed investments invest in and so all of them have to be placed in the same risk-class. We decide this class to be the risky one as, according to the most recent survey from the Italian Association of Investment Manager, more than 70% of the mutual fund investments among Italian households is concentrated in stock and bonds mutual funds (see Assogestioni Factbook, 2010).

A further restriction of our sample comes from the need of taking into account only those subjects holding suitable portfolios. To do this, we select only the householder that did not change significantly the composition of their portfolio in terms of risk between 2008 and 2010. We consider as a 'significant change' any change in the portfolio that increases or reduces by more than 20% the total percentage of risky assets. The main assumption behind this hypothesis is that portfolios that were not suitable for a particular subject in 2008 are likely to have changed in the following two years. In particular, if a portfolio provides a level of risk and return that is too low for the risk profile of its holder, the same subject is likely to change its composition by increasing the level of risk. On the contrary, a portfolio whose risk and return are too high, are likely to be changed in terms of reduced risky asset. The 20% change in the amount of risky assets is the threshold we assume to signal that a portfolio is not suitable. After this further restriction the sample of subjects involved in our analysis is 3981.

3.2 *Dependent variables*

Starting from the information about the 2008 portfolio composition, we build the dependent variables involved in the Heckit two-steps estimation procedure. Specifically, we derive the dependent variable of the first step by linking to each subject in the sample a dummy variable (*Risk Holding - RH*) whose value is 0 if no risky asset is included in the portfolio and 1 if any risky asset is involved. The first step of the model should give information about the variables to be taken into account when choosing *if* risky assets are suitable for a specific investor.

The same information about 2008 portfolio composition are used to build the dependent variable of the second step of the model. In particular, we build the variable *Risk Allocation (RA)* that is the percentage of risky assets that is included into the portfolio following the distinction between risky and not risky assets already illustrated above. The equation of the model is expected to inform on the variables that must be taken into account when deciding *how much* risk is suitable for a specific investor.

⁵ The authors use a risk classification that is based on the joint consideration of credit risk and market risk; as for the latter, three main forms are considered, i.e. exchange rate risk, interest rate risk and price risk. Still, they skip some other forms of risk such as liquidity risk because of the lack of information in the Bank of Italy Survey and we are forced to do the same.

3.3 Independent variables

For each householder, the survey provides plenty of both personal and family information, of which we have used those illustrated in table 1 and grouped as follows:

- Socio-demographic (SD);
- Background risk (BR);
- Knowledge and experience (KE);
- Investment objectives (IO);
- Economic and financial situation (EFS).

Table 1 illustrates, for each of the five categories, the single variables that are involved in the model, their Mnemonic into the Bank of Italy survey and the typology of variable.

Table 1 – List of independent variables in the model

Category	Variable	Mnemonic	Typology
SD	Year of birth	ANASC	number
SD	Education	STUDIO	scale: 1 low education, 8 high education
SD	Marital status	STACIV	dummy: 1 if married
SD	Gender	SEX	dummy: 1 if man
SD	Number of children	NFIGL	number
BR	Unemployed	DISOCCUPATO	dummy: 1 if yes
BR	Health situation	SALUT	scale: 1 very good, 5 very bad
KE	Financial literacy	QRISK ⁶	scale: 0 low, 2 high
IO	Risk attitude	RISFIN	scale: 1 risk lover, 4 risk averse
EFS	Number of dependents	NGOMP	number
EFS	Mortgage	DEBITA1	amount
EFS	Household wealth	W	amount
EFS	General economic condition of the family	CONDGEN	scale: 1 very bad, 6 very good
EFS	Household income	Y2	amount
EFS	House ownership	PROPRIA	dummy: 1 if yes
EFS	Consumer credit installment	RATA	amount
EFS	Amount of overdrawn	FSCOPER	amount

As we already pointed out above, some of the variables that we consider into our model are also included into the MiFID provisions and some others are innovative of our model. More specifically, the first two categories of variables (socio-demographic and background risk) are not included into the MiFID but are likely to influence the risk profile of an investors. For example, with reference to the socio-demographic variables, previous studies take into account the relationship between gender and marital status and risk propensity. Hinz et al. (1997), Dohmen et al. (2005) and Lusardi and Mitchell

⁶ The financial literacy variable comes from question C.47 and C.48 of the Bank of Italy Survey. In particular, in both the questions we assign a score equal to 1 to the first possible answer (the right one) and a score 0 to the remaining ones. We then sum the scores of each question, thus obtaining a range from 0 (no answer is right) to 2 (both answers are right).

(2008) find that women generally reveal a higher degree of risk aversion if compared to men. Moreover, Waite and Gallagher (2000) and Lupton and Smith (2003) demonstrate that the marital status is positively linked to risk perception, as marriage seems to play a sort of financial security over subjects. As far as background risk, it was initially formalized by Pratt and Zeckhauser (1987); specifically, background risk is associated with a number of factors supposed to increase an individual's situation of uncertainty, such as labor income uncertainty, poor health risk or committed expenditures. These predictions have led to empirical studies aimed at assessing the role of background risk in the portfolio allocation of households (see, for example, Cardak and Wilkins, 2009). The remaining categories, that are experience and knowledge, investment objectives and economic and financial situation, are included into the MiFID provisions.

3.4 The model

Analytically, the Heckit two-steps estimation procedure is:

$$\left\{ \begin{array}{l} RH^*_i = z'_i \gamma + u_i \\ RA_i = x'_i \beta + \varepsilon_i \quad \Leftrightarrow RH^*_i > 0 \end{array} \right. \quad \text{Where } i \text{ is the sample size from 1 to 3981.}$$

The first equation is the selection equation, where z'_i is a group of 17 variables belonging to the five categories illustrated above which determine the decision to take risk, measured by a latent variable RH^*_i (*Risk Holding*), γ is a vector of coefficients which reflects the effect of these variables on the risk holding decision and u_i is the random error term. The latent variable RH^*_i is not observed; a dichotomic variable RH_i which is positive if the considered portfolio contains at least one risky asset is observed instead. The second equation of the system is the *RA (Risk Allocation)* equation which is the linear model of interest; the vector x'_i contains the same 17 explanatory variables as before which determine the percentage of risky assets held in the 2008 portfolios, β is a vector of coefficients which reflects the effect of these variables on the risk allocation decision and ε_i is the random error term.

4.1 Effects of estimated variables on the probability of holding risky assets

This section reports the results for the first step of the Heckit model aimed at investigating which characteristics of an individual are more likely to predict the ownership of risky assets. This may help to define a preliminary threshold in the risk profiles graduation, separating the totally conservative risk profile from the others. The estimation results are provided in Table 2.

The relationship between age and the risky asset ownership does not fit the traditional form which is often assumed in the studies of risky asset holdings: prime-age individuals are usually expected to be willing and able to take greater investment risks, while we obtain a non significant coefficient for younger investors.

However, our results may be explained by considering that what really matters is not just the age of the subject, but rather the increased knowledge of the investment landscape and opportunities that come with experience, as outlined by King and Leape (1987), Bertaut (1998), Cardak and Wilkins (2009). In

line with this interpretation, we also find that the likelihood of risky asset holding increases with educational attainment, and even more with a greater level of financial education: these results are consistent with holdings being strongly affected by knowledge and financial literacy, as discussed by Campbell (2006), Guiso et al. (2002), Van Rooij et al. (2007), Bertocchi et al. (2008), Cardak and Wilkins (2009), and highlights the importance of being able to understand financial institutions and markets as a determinant of household's decision to invest in risky assets.

Table 2 –Heckit estimation: Risk Holding equation

Variables	Coefficient	s.e.	z	p-value
Year of birth	-0.0050	0.0037	-1.3757	0.1682
Education	0.1116	0.0236	4.7320	<0.00001 ***
Marital status	0.2704	0.1021	2.6488	0.0081 ***
Gender	0.1577	0.0943	1.6731	0.0943 *
Number of children	0.2124	0.1007	2.1102	0.0348 **
Unemployed	-0.0468	0.0962	-0.4868	0.6264
Health situation	-0.1144	0.0512	-2.2320	0.0256 **
Financial literacy	0.4175	0.0442	9.4558	<0.00001 ***
Risk attitude	-0.2508	0.0443	-5.6587	<0.00001 ***
Number of dependents	-0.1151	0.0389	-2.9572	0.0031 ***
Mortgage	-2.8356e-06	1.6761e-06	-1.6917	0.0907 *
Household wealth	4.7562e-07	1.3008e-07	3.6564	0.0003 ***
General economic condition of the family	0.2112	0.0335	6.3106	<0.00001 ***
Household income	5.3120e-06	2.2345e-06	2.3773	0.0174 **
House ownership	0.1831	0.1033	1.7728	0.0763 *
Consumer credit installment	2.1439e-05	2.6513e-05	0.8086	0.4187
Amount of overdrawn	-1.0857e-05	1.2439e-05	-0.8729	0.3827

Males are more likely to invest in risky assets than females. These results are consistent with the common belief that females are more risk averse than males and, in that sense, do not present any novel evidence (see, among others, Powell and Ansic, 1997; Hartog et al., 2002; Fellner and Maciejovsky, 2007; Eckel and Grossman, 2008). Gender differences are likely to occur because males and females may differ with respect to factors that determine the ownership decision (e.g. females are on average less wealthy and more risk averse than males). Yet, we anticipate that the results obtained in the second step of the Heckit deserve additional consideration. Married individuals seem to be more inclined to participate in risky investments: the possibility of sharing the risk with a spouse seems to induce a more risky financial behaviour. The estimation results also indicate that large households with many dependents are less likely to take financial risks, while the number of children has a positive impact on the likelihood of investing in risky assets: as suggested in Bertocchi et al. (2008), the presence of children probably induces a longer time horizon and thus investment choice that are riskier and more rewarding over the long run.

Among the variables used to proxy the background risk of an individual, we find that only the variable relative to the health status is significant with a negative coefficient: people in poor health are less willing to take financial risks, in line with the results of Guiso et al. (1996), Rosen and Wu (2004) and Berkowitz and Qiu (2006). One interpretation of this finding is that poor wealth can be considered as a

source of labor income risk as well as a source of “expense” risk, besides the fact that poor wealth also negatively affects a person’s planning horizon.

In line with our expectations, individual’s risk attitude and economic characteristics seem to play a decisive role in the decision to hold risky assets. Households that consider themselves financially risk averse have a lower probability of holding risky assets, as in Cardak and Wilkins (2009), while all the variables measuring the individual’s income and wealth (specifically, household income and wealth, house ownership, general economic condition of the family) are both significant and positive. The estimation for the variables capturing credit constraints reveals that only those households engaged in a house mortgage are less likely to invest in risky assets; however, given the estimated coefficient is very low, the resulting effect has minimal economic implications.

4.2 Effects of estimated variables on the share of wealth allocated in risky assets

The second step of the Heckit model allows us to discuss, conditional on owning some risky assets, which variables are relevant to predict a greater share of financial wealth into these assets. This is a sort of second risk threshold, which enables to graduate different level of risk, farther and farther from the totally conservative profile. Also these empirical results are summarized in Table 3.

Table 3 –Heckit estimation: Risk Allocation equation

Variables	Coefficient	s.e.	z	p-value
Constant	3.8447	4.0802	0.9423	0.3461
Year of birth	-0.0018	0.0021	-0.8574	0.3912
Education	0.0146	0.0131	1.1185	0.2633
Marital status	0.1259	0.0544	2.3159	0.0206 **
Gender	0.0333	0.0484	0.6886	0.4911
Number of children	0.0912	0.0407	2.2396	0.0251 **
Unemployed	0.0369	0.0477	0.7723	0.4399
Health situation	-0.0269	0.0247	-1.0895	0.27595
Financial literacy	0.11874	0.0236	5.0317	<0.00001 ***
Risk attitude	-0.0383	0.0223	-1.7184	0.0857 *
Number of dependents	-0.0723	0.0198	-3.6488	0.0003 ***
Mortgage	1.5076e-06	5.1448e-07	2.9309	0.0034 ***
Household wealth	-6.2028e-09	5.0341e09	-1.2322	0.2179
General economic condition of the family	-0.0030	0.0200	-0.1518	0.8793
Household income	1.3488e-06	6.9376e07	1.9441	0.05188 *
House ownership	-0.0628	0.0531	-1.1829	0.2369
Consumer credit installment	-1.1062e-05	9.2740e-06	-1.1928	0.2330
Amount of overdrawn	3.6687e-06	2.3125e-06	1.5865	0.1126
Lambda	0.0970	0.0500	1.9401	0.0524 *

Overall, we find that several variables, including those relevant in the first step, have no effect on the allocation decision. Although education is found to have some recognizable effects in the first step, it does not exert an influence upon the decision of the portion of risky assets to hold. Interestingly, there are no significant differences between males and females with respect to risk-taking in the portfolio allocation decision; if certain levels of wealth and risk propensity are prerequisites for ownership of risky

assets, then males and females who hold such assets should exhibit more similarities with each other than males and females in the population at large. Hence, conditional on ownership, the difference between males and females regarding the portfolio share allocated to risky assets may disappear.

The variables which remain significant between the first and the second step are those more related to the effective capability of the subject to take and understand financial risk: among the demographic variables, we find that the civil status and the number of children are significant and positively related to the percentage of risky assets in the portfolio; if we accept the idea that the civil status is an expression of the opportunity to share more risk, while the presence of children can be viewed as a proxy of an individual's planning horizon, this evidence confirms that the allocation decision is driven more by a rational valuation rather than by a personal attitude toward risk. Moreover, financial education, risk attitude, family size and household income are relevant, as one might expect.

Our investigation also finds a positive and statistically significant, but economically insignificant, effect of committed (mortgage) expenditures: individuals with higher house mortgage payments display a greater portion of the portfolio invested in risky assets. Our seemingly counter-intuitive finding is in contrast with Fratantoni (1998) but are consistent with mortgage effects found by Heaton and Lucas (2000), Yamishita (2003) and Cardak and Wilkins (2009). In particular, Cardak and Wilkins (2009) note that households might be leveraging off home-ownership to diversify portfolios and raise risky financial assets, hence producing the observed positive correlation.

Finally, it should be noted that results reported in Table 3 also show that the coefficient for λ is statistically significant. This indicates that a sample selection mechanism is indeed operating and thus that the Heckit model is superior to OLS. The fact that this coefficient is also positive suggests that the two stages of the portfolio decision – decision to hold risky assets and decision about the amount of risky assets - are positively correlated, as one might expect.

To summarize, conditional on ownership of risky assets, the decision about what portion of wealth to invest in these assets seems to be driven only by a subsample of variables relevant for the ownership decision; specifically, if the ownership decision in the first step may be induced by a wider set of variables also including the personal characteristics of the individual and the subjective willingness to take risk, the following decision about the share of risky assets seems to be driven by a more rational and economic set of variables, expressing the effective ability of the subject to bear such a financial risk.

5. Analysis on a sample of suitability questionnaires

A key part of our analysis aims at understanding to what degree financial firms are aware of the importance of the single variables we have found to be essential in the risk profiling of the customer. In particular, we are interested in identifying which variables financial firms insert in the suitability questionnaires they submit to their clients before providing them with financial advisory or portfolio management. To carry out such an analysis, we collected a sample of 25 questionnaires addressed to retail clients; all of the questionnaires belong to the major Italian financial groups but, in order to respect applicable privacy laws, we are forced to skip their names. The analysis takes into account the presence of both the variables that are crucial in the assessment of the risk-holding decision and of the variables involved in the risk-allocation choice, although separately. Table 4 is referred to the first phase and table 5 regards the second step of the analysis.

As we expected, a high percentage of financial firms is interested in understanding the economic and financial situation of their clients.

Table 4 – % presence in the 25 questionnaires of the significant variables in the risk-holding assessment

Significant Variable in the model	% in the 25 questionnaires
General economic condition of the family	64%
Household wealth	60%
Household income	32%
House ownership	16%
Mortgage	16%
Education	72%
Financial literacy	96%
Risk attitude	96%
Number of children	8%
Number of dependents	16%
Health situation	0%
Marital status	12%
Gender	8%

In particular, the 60% asks questions about the wealth amount, in terms of both financial and real estate consistencies and the 64% pays attention to how clients consider their economic condition (with questions such as ‘*Do you make use of your investments return to cover current expenses as your income flow is not sufficient on the purpose?*’). Still, little attention is dedicated to other important economic variables such as the house ownership (16%), the credit constraints due to mortgages (16%) and the income flow (32%). This last information together with the data about the wealth level leads us to assume that financial firms are more interested in the amount of wealth that clients are likely to invest more than into their income flow and their effective ability to bear the underlying financial risk. With regard to education, table 4 shows that a high percentage of financial firms asks customers questions about their education, both at the financial (96%) and school (72%) level. Still, despite a high percentage of firms investigating the financial education level, most of the times, clients are requested to declare how educated they think to be, thus giving rise to answers that can be biased by the self evaluation of the subject. In fact, some questions are asked as “*Are you aware that stocks are more risky than bonds?*”. Other times, the questions is placed as a confirmation of the answer, such as “*How would you define your financial knowledge*’ or ‘*Tick the box if you know the financial instrument*’. This way, financial firm cannot be sure of the real financial education of the subject and seems to be more interested in being compliant with the law than understanding the financial education of the client.

While the concern of the firms on the education and economic conditions of the client is more predictable, the high percentage of firms that focuses on the risk attitude of the client (96%) is more unexpected. In fact, due to the difficulty in assessing the risk attitude of a subject, one might hypothesize that this item is not always taken into account in the risk profiling of a client. Nevertheless, the high

percentage of firms investigating the risk attitude can be better explained by going deeper into the questions that are generally asked with reference to this topic. Most of the financial firms in the sample seem to be only interested in the level of risk the client declares to desire in terms of general purpose of his or her investments. In particular, the client is often asked about his or her preferences in respect of the financial risk-return combination of future investments; conversely, the attitude of the client towards a general situation of riskiness or uncertainty is rarely comprised. This gives rise to a well know problem (Marinelli and Mazzoli, 2011) about the misrepresentation of the risk attitude of the client.

Other variables that we found to be very important in the risk profile of the client are almost completely forgotten by financial firms. We refer, in particular, to the number of children (8%) and more than this to the number of dependents (16%) that can heavily influence the risk profile of the client in terms of economic condition, as already mentioned in the previous section of this paper. Moreover, some personal information, such as the health situation as a background risk signal, the gender and the marital status are almost ignored in the sample.

With reference to the second phase of the analysis, i.e. the variables involved into the risk-allocation decision, some problems emerge in terms of the variables that are used in order to understand how much risk to give to a client. Table 2 shows that the only variables that are investigated consistently by financial firms are the financial education and the risk attitude of the client that, as already mentioned above, are both present in the 96% of the questionnaires; still, we cannot forget the heavy limits we underlined above with reference to the way these two variables are investigated in the questionnaires. The other variables we have found to be crucial are almost ignored by the financial firms in the sample; in particular, questions about the number of children and the number of dependents are present respectively only in the 8% and 16% of the cases and only the 12% of the financial firms in the sample considers the marital status. The same little attention is dedicated to the economics and financial variables such as the income flow and presence of mortgage. In a sense, financial firms seem to focus their attention more on the variables that we have found to be relevant in the risk-holding decision; on the contrary, the risk-allocation decision variables are generally less covered. As a result, we might say that questionnaires currently used by financial firms work better as tools to define a threshold between the totally conservative risk profile and the others. Conversely, they seem to fail in collecting some important information regarding the suitable amount of risk in order to better scale the other non totally conservative risk profiles.

Table 5 – % presence in the 25 questionnaires of the significant variables in the risk-allocation assessment

Significant Variable in the model	% in the 25 questionnaires
Financial literacy	96%
Risk attitude	96%
Number of children	8%
Number of dependents	16%
Marital status	12%
Household income	32%
Mortgage	16%

6. Concluding remarks

This paper aims at contributing to the debate about the quality of the content of MiFID questionnaires that are actually used to collect information about the client in order to assess the suitability of an investment product. In particular, we try to understand what information an investment firm should collect from the customer in order to properly define the client's risk profile and, therefore, propose a suitable portfolio with respect to this parameter. Our main hypothesis is that the information that are currently requested into the MiFID questionnaires may be not completely adequate to understand the level and typology of risk an investor is willing and able to bear. In order to investigate the variables that better help in providing suitable solutions to investors, we analyze the financial decisions of a sample of Italian families subject to the 2008 investigation of the Bank of Italy Survey of Household Income and Wealth; in particular, we analyze the decision of investing in risky assets among a subsample of subjects whose asset allocation may be considered suitable and we relate such a decision to some characteristics of the investor (socio-demographic characteristics, economic and financial situation, experience and knowledge, background risk). Our objective is to shed light on the variables that a financial firm should take into account both in the risk-holding and risk-allocation decision regarding single investors. Moreover, in order to understand to what degree the financial firms take into account the variable we have found to be important in such decisions, we carry out an analysis on a sample of 25 questionnaires addressed to retail clients belonging to the major Italian financial groups. As expected, some huge problems emerge when we explore how much the above mentioned variables are investigated in the considered sample. In fact, many important variables, such as the economic condition in terms of income flow, number of children and dependents are almost ignored and some others, despite their substantial presence, are misplaced. In particular, the financial education and the risk attitude are present in the 96% of the cases but the way the questions are placed cannot grant a reliable profiling of the client.

Some concluding remarks can be addressed to shed light on the improvements that can be suggested to the financial firms. On the one hand, more and better questions could be introduced into the questionnaires by taking into account the variables that can really help in understanding the risk profile of the client; on the other hand, some improvements can be suggested with reference to the questions that are always considered but very often misplaced. In particular, as far as the financial education level, some enhancements could be immediately realized by placing questions that are not biased by any self evaluation in that they really investigate the financial knowledge of the client. More complicated is the improvement regarding the risk attitude item as a whole field of literature is still working on the topic in order to find appropriate and reliable tools assessing the risk tolerance of a subject both in the investment activity and in everyday life (Brighetti and Lucarelli, 2010).

The theme of suitability is topical and extremely relevant as it involves both the interests coming from the authorities with reference to the investors' protection and the single intermediaries that offer investment services such as portfolio management and investment advice in terms of clients' knowledge. Intermediaries should be extremely interested in a correct risk profiling of their clients as, by assessing wrong risk profiles, they face two possible mistakes; if they give to a client a profile that undervalues the risk he or she really can bear, the customer could not be totally satisfied with the low return of the investments. Even worst, by overvaluing the profile, a customer could be given too much risk compared

to the level of risk he or she can really bear or wishes and this is likely to rise conflicts between intermediaries and clients.

For all of these reasons, the topic certainly deserves more attention and further investigation. In particular, future development of this research will be addressed to overcome some limits of this paper. The first one is related to the sample, and it will be solved by submitting a questionnaire to a selected sample of financial firms clients declaring to consider their portfolio as suitable to them, instead of deriving the suitability of portfolios from a subjective change threshold. The second one is addressed to better understand the variables that should be considered in the risk profiling of a client by inserting in the above mentioned questionnaire more specific questions compared to those included in the Bank of Italy survey whose purpose is far from risk profiling.

References

- ASSOGESTIONI, Factbook, 2010
- AMF, “Evaluation of MiFID questionnaires in France”, November 2010
- BERTAUT, C.C., “Stockholdings behavior of US households: evidence from the 1983-1989 survey of consumer finances”, *The review of Economics and Statistics*, 80, pp. 263-275, 1998
- BERTOCCHI, G., BRUNETTI, M., TORRICELLI, C., “Portfolio choices, gender and marital status”, *Rivista di Politica Economica*, 2008, 98(5), pp. 119-154
- BERKOWITZ, M.K., QIU, J., “A further look at household portfolio choice and health status”, *Journal of Banking and Finance*, 30, pp. 1201-1217, 2006
- CAMPBELL, J.Y., “Household finance”, *Journal of Finance*, 61, pp. 1553-1604, 2006
- CARDAK, B.A., WILKINS, R., “The determinants of household risky asset holdings: Australian evidence on background risk and other factors”, *Journal of Banking and Finance*, 33, pp. 850-860, 2009
- DOHMEN, T., FALK, A., HUFFMAN, D., SUNDE, U., SCHUPP, J., WAGNER, G.G., “Individual Risk Attitudes: New Evidence from a Large, Representative, Experimentally-Validated Survey”, IZA Discussion Paper 1730, 2005
- ECKEL, C. C., GROSSMAN, P.J., “Forecasting risk attitudes: An experimental study using actual and forecast gamble choices”, *Journal of Economic Behavior and Organization*, 68(1), pp. 1-17, 2008
- EUROPEAN COMMISSION, “Consumer market study on advice within the area of retail investment services – Final Report”, 2011
- ESMA, “Guidelines on certain aspects of the MiFID suitability requirements”, Consultation Paper, 22 December 2011
- EVERS & JUNG, “Anforderungen an Finanzvermittler”, September 2008, launched by the German Consumer Affairs Ministry
- FELLNER, G., MACIEJOVSKY, B., “Risk attitude and market behavior: Evidence from experimental asset markets”, *Journal of Economic Psychology*, 28(3), pp. 338-350, 2007
- FRATANTONI, M.C., “Homeownership and investment in risky assets”, *Journal of Urban Economics*, 44, pp. 27-42, 1998
- FSA, “Levels of Financial Capability in the UK: Results of a baseline survey”, March 2006
- FSA, “Assessing suitability: establishing the risk a customer is willing and able to take and making a suitable investment selection”, March 2011
- GUIISO, L., JAPPELLI, T., TERLIZZESE, D., “Income risk, borrowing constraints, and portfolio choice”, *American Economic Review*, 86, pp. 159-172, 1996
- GUIISO, L., HALIASSOS, M., JAPPELLI, T., “Household portfolios, Cambridge, MIT Press, 2002
- HARTOG, J., FERRIER-CARBONELL, A., JONKER, N., “Linking measured risk aversion to individual characteristics”, *Kyklos*, 55(1), pp. 3-26, 2002.
- HEATON, J., LUCAS, D., “Portfolio choice and asset prices: the importance of entrepreneurial risk”, *Journal of Finance*, 55, p. 1163-1198, 2000
- HECKMAN, J., “Sample selection bias as a specification error”, *Econometrica*, 47, pp.153-161, 1979.
- HINZ, R.P., MCCARTHY, D.O., TURNER, J.A., “Are Women Conservative Investors? Gender Differences in Participant-Directed Pension Investments”, Pension Research Council Working Paper no. 96-17, University of Pennsylvania, 1997.

- IOSCO, "Suitability Requirements with respect to the Distribution of Complex Financial Products", Consultation Paper, February 2012
- KING, M.A., LEAPE, J.I., "Asset accumulation, information, and the life cycle", Working Paper 2392, NBER, 1987
- LUCARELLI C., BRIGHETTI G., "Risk tolerance in financial decision making - The economics and the neuroscience perspective", Palgrave Macmillan, Basingstoke (UK), 2010
- LUPTON, J.P., SMITH, J.P., "Marriage, assets and savings", in Grossbard-Shecht, S. (Ed.), *Marriage and the Economy: Theory and Evidence from Advanced Industrial Societies*. Cambridge University Press, 2003
- LUSARDI, A., MITCHELL, O.S., "Planning and financial literacy: How do women fare?", *American Economic Review, Papers & Proceedings* 98, pp. 413-417, 2008.
- MARINELLI N., MAZZOLI C., "The traditional approach to risk tolerance" in C. Lucarelli e G. Brighetti (a cura di) "Risk tolerance in financial decision making", pp. 81-112, *Palgrave Macmillan Studies in Banking and Financial Institutions*, Basingstoke (UK), 2011
- POWELL, M., ANSIC, D., "Gender differences in risk behavior in financial decision making: An experimental analysis", *Journal of Economic Psychology*, 18(6), pp. 605-628, 1997
- PRATT, J., ZECKHAUSER, R., "Proper risk aversion", *Econometrica* 55 (1), pp. 143-154, 1987
- ROSEN, H.S., WU, S., "Portfolio choice and health status", *Journal of Financial Economics*, 72, pp. 457-484, 2004
- VAN ROOIJ, M., LUSARDI, A., ALESSIE, R., "Financial literacy and stock market participation", NBER Working Paper 13565, 2007
- YAMISHITA, T., "Owner-occupied housing and investment in stocks: An empirical test", *Journal of Urban Economics*, 53, pp. 220-237, 2003
- WAITE, L., GALLAGHER, M., "The Case for Marriage: Why Married People are Happier, Healthier, and Better Off Financially", New York: Doubleday, 2000