

Understanding the Determinants of Investor's Subjective Risk Perception and Their Divergence from the Investor's Objective Risk

Laura Barbieri¹, Elena Calejari¹ & Andrea Lippi¹

¹ Department of Economic and Social Sciences, Università Cattolica del Sacro Cuore, Piacenza, Italy

Correspondence: Andrea Lippi, Department of Economic and Social Sciences, Università Cattolica del Sacro Cuore, Via Emilia Parmense, 84, 29122 Piacenza, Italy. E-mail: andrea.lippi@unicatt.it

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Abstract

This paper investigates the determinants of investors' subjective risk profiles and the factors associated with the divergence between subjective and objective risk. Using a proprietary dataset of 1,077 investors provided by a major Italian bank, we analyse risk profiles derived from MiFID suitability assessments and compare them with an ex-post indicator of portfolio–profile alignment. First, ordered logit models show that gender, financial wealth, financial knowledge and experience, and investment horizon are significant predictors of subjective risk tolerance, while age, occupation, and ESG attitudes play a limited role. Second, we examine the persistence of portfolio suitability over time and find that the determinants of ex-post alignment differ from those of subjective risk. Wealth emerges as the most stable predictor of portfolio–profile coherence, while the effects of financial knowledge and investment horizon become weaker. The findings highlight the limitations of static risk profiling and suggest that maintaining long-term portfolio suitability depends on factors extending beyond initial investor characteristics.

Keywords: subjective risk, objective risk, investor risk profile

1. Introduction

In the world of financial advisory, identifying an investor's risk tolerance is a crucial aspect. EU lawmakers have regulated suitability assessments since 2004, with the Markets in Financial Instruments Directive (known as MiFID). This directive placed particular emphasis on the collection of client information useful for assessing suitability, which is reflected in the absolute prevalence of the MiFID questionnaire. Each banking and financial intermediary must adopt a specific client profiling questionnaire to identify his/her risk profile and assess his/her risk tolerance on a scale ranging from low, medium, or high-risk tolerance, while allowing individual intermediaries the option of greater granularity and segmentation.

The identified risk profile is what the literature calls the “subjective risk profile,” which contrasts with the so-called “objective risk profile” (Hanna & Chen, 1997), represented by the actual composition of the investment portfolio, based on the riskiness of the financial instruments and investment products subscribed. Although some studies argue that there is a convergence between subjective and objective risk (Sung & Hanna, 1996; Chang et al., 2004; Yao et al., 2004), other authors (Ehm et al., 2014) argue that there are potential divergences.

Each intermediary is therefore obliged to offer to every investor an investment portfolio that is appropriate to his/her risk profile and to monitor its consistency over time. It is possible that, over time, the objective risk profile diverges from the subjective one. This can be caused by various factors, such as market movements, portfolio drift, and/or unexpected macroeconomic or geopolitical conditions. Alternatively, it can be due to informed choices made by the investor. This last point deserves clarification. The MiFID regulation is entirely focused on preventing investors from taking on unsustainable risks. This means that if an investor has a low risk profile, he/she certainly cannot have an entirely equity portfolio; on the other hand, if an investor has a high-risk profile, he/she can hold a portfolio composed entirely of equities or predominantly of bonds. This example therefore demonstrates how the regulatory framework protects investors with a low risk profile. The above generates a situation often encountered in investment practice: a misalignment between objective and subjective risk.

Using a proprietary database from a major Italian bank, this paper aims to address two important issues: i) verify which main socio-demographic and socio-economic determinants of a client's subjective risk profile; ii) assess which

variables influence the misalignment between subjective and objective risk.

The results obtained are important from several points of view. From an academic perspective, the subjective risk profile in this analysis is not experimentally assigned but originates from the intermediary's standard profiling procedures based on investor questionnaire and suitability evaluations. For this reason, our paper contributes to corroborate the existing literature on subjective risk with a specific contribution to survey-based studies. From an operational and practical perspective, our paper analyzes the relationship between subjective risk profiling and portfolio-profile coherence, a topic rarely studied in the literature but of high interest for banks, intermediaries and financial advisors. Furthermore, this specific aspect may also be of interest to supervisory authorities in understanding which investor characteristics may generate a misalignment between subjective and objective risk, offering a preliminary scope for intervention or not in verifying and monitoring compliance with intermediaries' internal advisory procedures.

2. Literature Review

Measuring an individual's financial risk tolerance is a difficult task because it is an elusive concept that appears to be influenced by a number of predisposing factors (Trone et al., 1996). According to Irwin (1993), Boyd et al. (1994), Levesque and McDougall (1996), Xiao et al. (2001) and Jamal and Naser (2002), risk-tolerance attitudes is influenced by environmental and biopsychosocial factors. Examples of environmental factors include socioeconomic status (e.g. net worth, income, and education) and family situation (e.g. marital status); biopsychosocial factors include characteristics such as gender, age, ethnicity, birth order and personality traits.

The relationship between gender difference and risk tolerance has received a lot of attention in the literature. A lot of studies (e.g. Burton, 1995; Bajtelsmit & Bernasek, 1997; Pålsson, 1996; Sung & Hanna, 1996; Embrey & Fox, 1997; Powell & Ansic, 1997; Morse, 1998; Jianakoplos & Bernasek, 1998; Grable, 2000; Hariharan et al., 2000; Bernasek & Shwiff, 2001; Graham et al., 2002; Chaulk et al., 2003; Yao et al., 2004; Gilliam et al., 2010; Lippi & Rossi, 2020) demonstrate that men tend to be more risk-tolerant than women even if according to Grable and Joo (1997), Hanna et al. (2001) and Hari et al. (2018) gender is not significant in predicting financial risk tolerance. Bearing in mind this literature review, we formulate the following hypothesis:

H1: Men are more risk tolerant than women.

Age is another very important factor considered in determining the individual's risk profile. Several studies assert that financial risk tolerance decreases with age (e.g. Brown, 1990; Dahlbäck, 1991; Bakshi & Chen, 1994; Pålsson, 1996; Schooley & Worden, 1996; Donkers & Van Soest, 1999; Chaulk et al., 2003; Hallahan et al., 2004; Yao et al., 2004; Fan & Xiao, 2006; Faff et al., 2009). On the contrary, Xiao and Anderson (1997) and Wang and Hanna (1997) argue that financial risk tolerance increases with age while other studies (Cutler, 1995; Grable & Lytton, 1999; Hariharan et al., 2000; Hanna et al., 2001; Gollier & Zeckhauser, 2002) find no relationship between age and risk tolerance. Moreover, Riley and Chow (1992), Bajtelsmit and VanDerhei (1997), Hallahan et al. (2004), Grable et al. (2006), Faff et al. (2009) demonstrate that the relationship between age and risk tolerance is not necessarily linear. We formulate the following hypothesis:

H2: Risk tolerance is negatively correlated with investor's age.

According to Wang (2009), Grable and Rabbani (2023) the subjective financial knowledge (how knowledgeable investors feel they are) is positively associated with investment risk tolerance. Haliassos and Bertaut (1995), Sung and Hanna (1996), Sivaramakrishnan et al. (2017) argue that the higher an investor's education level, the greater his/her capacity to evaluate investment risk, thus leading to a higher risk tolerance. Potts et al. (2025) find that subjective knowledge and investment experience are more predictive of risk tolerance than general characteristics like education or cognitive ability. Based on these studies, we formulate the following hypothesis:

H3: The higher the investor's subjective financial knowledge and experience, the higher the investor's risk tolerance.

Grable (2000), Bernheim et al. (2001), Chaulk et al. (2003), Yook and Everett (2003), Chang et al. (2004), Grable and Joo (2004), Hallahan et al. (2004), Yao et al. (2004), and Fan and Xiao (2006) find that people in high income/wealth categories present a higher financial risk tolerance. Moreover, other studies (Cicchetti & Dubin, 1994; Riley & Chow, 1992; Zhong & Xiao, 1995; Schooley & Worden, 1996; Shaw, 1996; Grable, 2000) argue that increased levels of income and educational attainment are associated with increased levels of risk tolerance. Our hypothesis is:

H4: The higher the individual level of wealth, the higher his/her risk tolerance.

The relationship between investor's occupation and risk tolerance is scarcely documented in the literature. Meyer et

al. (1961), Quattlebaum (1988), Masters (1989), Haliassos and Bertaut (1995), and Sadiq and Akhtar (2019) find that increasing levels of risk tolerance is associated with being employed in a professional occupation. Shtudiner (2018) compares employees and self-employed and find that self-employed individuals show less risk aversion. Thanki and Baser (2021) find that individual's occupation is a significant determinant of risk tolerance alongside gender, income, marital status, and number of dependents, while age and formal education are not. Wang (2009) find that the self-employed demonstrate higher risk tolerances than employees, even after controlling for income, education, and financial knowledge. Our hypothesis is:

H5: Investors with a stable income source (employees, retirees, and non-employed individuals) present a lower level of risk tolerance compared to self-employed investors.

The conclusions about the relationship between marital status and risk tolerance present no convergent conclusions. According to Roszkowski et al. (1993), Guiso et al. (1996), Sung and Hanna (1996), Hinz et al. (1997), Gutter et al. (1999), Hartog et al. (2002), Grable and Joo (2004), Hallahan et al. (2004), Yao et al. (2004), Fan and Xiao (2006) single investors are more risk tolerant than married people. Baker and Haslem (1974) and Cohn et al. (1975) confirm that married individuals tend to be less risk-taking than singles. This result can be justified through the evidence that single individuals do not bear the same responsibilities as those that are married, and thus single individuals are willing to accept more financial risk (Lippi & Rossi, 2020). In this stream of analysis Chaulk et al. (2003) argue that married individuals tend to be less financially risk tolerant because of a greater need for wealth protection. However, some studies argue there is no relationship between marital status and risk tolerance (McInish, 1982; Masters, 1989; Haliassos & Bertaut, 1995). We formulate the following hypothesis:

H6: Single individuals are more risk tolerant compared to other individuals.

One of the main study on the comparison between subjective and objective risk is, among others, that of Marinelli et al. (2017). Based on a sample of 2,374 investors, the authors measure the gap directly by comparing self-assessed risk tolerance (subjective risk) to actual portfolio composition (objective risk). The analysis highlights that the two risk types are frequently inconsistent and low financial literacy, high income, no children, and incautious economic behavior are indicated as predicted inconsistency. This suggests subjective self-assessments are not simply noisy versions of true preferences, but they are influenced by factors orthogonal to financial risk capacity.

3. The Sample and the Variables Used in the Analysis

The empirical analysis is based on an anonymized proprietary dataset provided by a leader private bank operating in the retail and private banking investment segments. The dataset contains information collected through the standard MiFID profiling process and includes socio-demographic characteristics, financial knowledge and experience, investment horizon, ESG attitudes. Moreover, the dataset provides the subjective risk profile of each investor originated from the bank's standard profiling procedures under the MiFID regulatory framework and internal indicators related to observed portfolio allocation. After data cleaning and removal of incomplete observations, the final sample consists of 1,077 investors and it provides a useful cross-sectional snapshot for studying the relationship between subjective risk profiling and portfolio-profile coherence.

Table 1 reports the variables employed in the empirical analysis while Table 2 reports the descriptive statistics.

Table 1. Description of variables used in the empirical analysis

Variable	Description
ID	Unique anonymous identifier assigned to each investor/portfolio.
Age	Investor age in years.
Age_c	Age centered around the sample mean. This transformation reduces collinearity between age and its squared term.
Age_c2	Squared centered age. Included to capture potential non-linear age effects in risk preferences.
Gender	Binary variable indicating investor gender (Female/Male).
MaritalStatus	Categorical variable indicating marital status: Single, Married (and/or Cohabiting), Separated (and/or Divorced), or Widowed.
Occupation	Categorical variable indicating occupational status: Employee, Self-employed (and/or Professional), Unemployed, or Retired.
FixedIncome	Binary variable distinguishing investors with relatively stable income sources (employees, retirees and non-employed individuals) from self-employed professionals.

Variable	Description
WealthTot	Continuous variable measuring the total financial wealth held by the investor, expressed in thousands of euros.
Log_WealthTot	Natural logarithm of total financial wealth. This transformation is used to reduce skewness and improve comparability with the scale of other explanatory variables.
RiskProfile	Ordered categorical variable representing the investor's subjective MiFID risk profile. Categories are: Low, Moderate, Balanced and Dynamic. The variable summarizes the outcome of the suitability profiling process.
KnowExp	Ordered categorical variable measuring the investor's self-reported level of financial knowledge and investment experience. Categories are: Basic, Medium and High coded from 1 to 3.
HoldingPeriod	Ordered categorical variable indicating the declared investment horizon. Categories are: Short, Medium and Long coded from 1 to 3.
ESG_attitude	Binary indicator of the investor's attitude toward ESG-related investment themes. Investors are classified as ESG-oriented or Neutral.
PP_align_score (Portfolio-profile alignment score)	Continuous indicator ranging from 1 to 5 that measures the degree of alignment between the observed portfolio risk and the risk level considered consistent with the investor's recommended asset allocation. Higher values indicate stronger portfolio-profile alignment, whereas lower values indicate increasing deviations from the original suitability conditions.

Table 2. Descriptive statistics

Variable	Statistic	Full	PP_align_score			Test
			Low alignment	Medium alignment	High alignment	
			(<2)	(2 ≤ x ≤ 4)	(>4)	
	N (%)	1077 (100%)	429 (39.8%)	317 (29.4%)	331 (30.7%)	
Numeric variables						
Age	Mean (SD)	63.731 (14.596)	62.900 (15.062)	64.599 (14.720)	63.976 (13.829)	0.272
	Min–Max	[14, 99]	[14, 97]	[17, 99]	[24, 98]	
Age_c	Mean (SD)	0.000 (14.596)	-0.831 (15.062)	0.869 (14.720)	0.245 (13.829)	0.272
	Min–Max	[-49.731, 35.269]	[-49.731, 33.269]	[-46.731, 35.269]	[-39.731, 34.269]	
WealthTot	Mean (SD)	208.096 (98.499)	197.200 (96.257)	206.716 (97.932)	223.540 (100.193)	0.001***
	Min–Max	[100.000, 500.000]	[100.000, 500.000]	[100.403, 492.846]	[100.004, 498.426]	
KnowExp	Mean (SD)	2.095 (0.685)	2.026 (0.695)	2.069 (0.685)	2.208 (0.657)	0.001***
	Min–Max	[1, 3]	[1, 3]	[1, 3]	[1, 3]	
HoldingPeriod	Mean (SD)	2.501 (0.551)	2.441 (0.563)	2.498 (0.549)	2.583 (0.529)	0.002***
	Min–Max	[1, 3]	[1, 3]	[1, 3]	[1, 3]	
PP_align_score	Mean (SD)	2.724 (1.598)	1.000 (0.000)	2.983 (0.597)	4.710 (0.312)	0.000***
	Min–Max	[1, 5]	[1, 1]	[2, 4]	[4, 5]	
Categorical variables						
RiskProfile						
	Low	108 (10.0%)	51 (11.9%)	36 (11.4%)	21 (6.3%)	0.000***
	Moderate	515 (47.8%)	201 (46.9%)	168 (53.0%)	146 (44.1%)	
	Balanced	316 (29.3%)	137 (31.9%)	66 (20.8%)	113 (34.1%)	
	Dynamic	138 (12.8%)	40 (9.3%)	47 (14.8%)	51 (15.4%)	
Gender						
	Female	515 (47.8%)	196 (45.7%)	162 (51.1%)	157 (47.4%)	0.338
	Male	562 (52.2%)	233 (54.3%)	155 (48.9%)	174 (52.6%)	

MaritalStatus						
	Single	320 (29.7%)	130 (30.3%)	91 (28.7%)	99 (29.9%)	0.330
	Married	573 (53.2%)	240 (55.9%)	162 (51.1%)	171 (51.7%)	
	Separated	65 (6.0%)	22 (5.1%)	20 (6.3%)	23 (6.9%)	
	Widowed	119 (11.0%)	37 (8.6%)	44 (13.9%)	38 (11.5%)	
Occupation						
	Employee	402 (37.3%)	167 (38.9%)	111 (35.0%)	124 (37.5%)	0.884
	Self-employed	191 (17.7%)	80 (18.6%)	55 (17.4%)	56 (16.9%)	
	No income	94 (8.7%)	36 (8.4%)	30 (9.5%)	28 (8.5%)	
	Retired	390 (36.2%)	146 (34.0%)	121 (38.2%)	123 (37.2%)	
ESG_attitude						
	No	431 (40.0%)	167 (38.9%)	135 (42.6%)	129 (39.0%)	0.539
	Yes	646 (60.0%)	262 (61.1%)	182 (57.4%)	202 (61.0%)	
FixedIncome						
	No	170 (15.8%)	70 (16.3%)	51 (16.1%)	49 (14.8%)	0.838
	Yes	907 (84.2%)	359 (83.7%)	266 (83.9%)	282 (85.2%)	

Note. The table reports summary statistics for the full sample and by degree of portfolio-profile measured by the portfolio-profile alignment score (PP_align_score) classified as Low (PP_align_score < 2), Medium (2 ≤ PP_align_score ≤ 4) and High (PP_align_score > 4). For ease of exposition, the three intermediate alignment categories are collapsed into a single Medium category, whereas Table 5 reports the full five-category classification.

For numeric variables, means and standard deviations are shown, together with mean differences; for categorical variables, number of observation and percentages are reported. Statistical significance is based on two-sample *t*-tests (continuous variables) and Pearson's χ^2 tests (categorical variables).

* Significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level.

The descriptive evidence provides a first indication that portfolio-profile alignment is related to investor characteristics. Higher alignment groups tend to be characterized by greater financial literacy, longer investment horizons, and higher levels of financial wealth. Conversely, lower alignment categories appear relatively more concentrated among investors with lower financial literacy and shorter holding periods. Moreover, the distribution of subjective risk profile categories also differs significantly across alignment groups, suggesting that the degree of portfolio-profile coherence may vary according to the investor's original risk classification.

4. Determinants of Subjective Risk Profile

The first part of the empirical analysis investigates which investor characteristics are associated with the subjective risk profile assigned through the MiFID suitability process. Because the dependent variable is naturally ordered — from Low to Dynamic risk profile — the analysis employs ordered logit models. The specifications are estimated sequentially in order to evaluate whether the associations observed for socio-demographic characteristics remain stable after progressively controlling for financial knowledge, investment horizon, and ESG attitudes. The analysis uses financial knowledge and investment horizon as ordinal numerical variables. A sequence of specifications are estimated in order to assess whether the associations between investor characteristics and subjective risk remain robust after progressively controlling for additional dimensions of investor sophistication and preferences. Model 1 estimates the association between socio-demographic characteristics and the investor's subjective risk profile. The specification includes both centered age (*Age_c*) and its squared term (*Age_c2*) in order to test for potential non-linear age effects in risk-profile classification. Centered age is used to reduce multicollinearity between age and its squared term. Model 2 introduces the variable *KnowExp*, which captures the investor's self-reported financial knowledge. The objective is to assess whether higher levels of financial knowledge are associated with more dynamic subjective risk profiles. Model 3 additionally includes the investment holding period (*HoldingPeriod*) to evaluate whether longer investment horizons are associated with higher risk tolerance classifications. Finally, Model 4 incorporates ESG attitude in order to verify whether preferences toward sustainable investing are systematically related to subjective risk-profile assignment. Table 3 jointly reports the four ordered logit specifications, allowing the robustness of the estimated relationships to be assessed across progressively richer model specifications.

Table 3. Ordered logit: determinants of subjective risk profile

	Model 1	Model 2	Model 3	Model 4
Age_c	-0.030*** (0.006)	-0.029*** (0.006)	-0.005 (0.007)	-0.005 (0.007)
Age_c2	-0.001*** (0.000)	-0.001*** (0.000)	-0.000 (0.000)	-0.000 (0.000)
Log_WealthTot	0.489*** (0.015)	0.194*** (0.021)	0.183*** (0.032)	0.188*** (0.033)
Gender	0.432*** (0.120)	0.454*** (0.123)	0.523*** (0.126)	0.524*** (0.126)
MaritalStatus				
<i>Married</i>	0.300** (0.142)	0.337** (0.145)	0.310** (0.149)	0.319** (0.149)
<i>Separated</i>	0.171 (0.263)	0.183 (0.271)	0.202 (0.280)	0.216 (0.281)
<i>Widowed</i>	-0.121 (0.232)	0.034 (0.236)	0.244 (0.243)	0.251 (0.243)
Occupation				
<i>Self-employed</i>	-0.004 (0.168)	0.085 (0.172)	0.042 (0.175)	0.042 (0.175)
<i>No income</i>	-0.310 (0.228)	-0.308 (0.233)	-0.568** (0.239)	-0.572** (0.238)
<i>Retired</i>	-0.025 (0.194)	0.059 (0.198)	-0.199 (0.203)	-0.201 (0.203)
KnowExp		1.278*** (0.097)	1.159*** (0.100)	1.157*** (0.100)
HoldingPeriod			1.674*** (0.133)	1.671*** (0.133)
ESG_attitude - Yes				0.101 (0.123)
Thresholds				
<i>Low/Moderate</i>	3.736*** (0.004)	2.684*** (0.004)	6.220*** (0.004)	6.327*** (0.005)
<i>Moderate/Balanced</i>	6.437*** (0.111)	5.708*** (0.126)	9.605*** (0.143)	9.713*** (0.143)
<i>Balanced/Dynamic</i>	8.132*** (0.137)	7.616*** (0.159)	11.726*** (0.181)	11.836*** (0.181)
Obs.	1077	1077	1077	1077
Log Lik.	-1244.680	-1150.635	-1065.905	-1065.569
AIC	2515.4	2329.3	2161.8	2163.1
BIC	2580.1	2399.0	2236.5	2242.8
McFadden pseudo-R2	0.042	0.114	0.180	0.180
Nagelkerke pseudo-R2	0.106	0.265	0.386	0.387

* Significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level.

The results presented in Table 3 indicate that a remarkably stable pattern emerges across all specifications. Gender, wealth, financial knowledge and investment horizon are positively associated with higher subjective risk profiles, and these associations remain largely unchanged as additional controls are introduced. Overall, financial sophistication—captured by financial knowledge and investment horizon—emerges as the strongest determinant of the investor's subjective risk profile. The progressive inclusion of explanatory variables improves the explanatory capacity of the model without substantially changing the signs of the main coefficients, suggesting that the estimated relationships are robust to alternative specifications.

Men tend to be more risk tolerant than women and our H1 is confirmed in line with much of the literature. Similarly, H4 is confirmed since the investor level of wealth is positively associated with higher risk tolerance. H3 is confirmed

because compared with individuals with a “basic” level, investors with “medium” and “high” experience show a significantly higher probability of belonging to higher risk categories. This result is consistent with the literature on financial literacy (e.g. Ramaswami et al., 1992), according to which greater knowledge of financial instruments reduces perceived uncertainty and increases willingness to take risk. Similarly, the investment time horizon has a particularly strong effect. Compared with investors with a “short” horizon, those with a “long” horizon show a significantly greater propensity toward higher risk profiles; a longer time horizon allows investors to better absorb market fluctuations and makes investment in risky assets more sustainable (Gollier & Zeckhauser, 2002).

The comparison of the four models shown in Table 3 also indicates that the remaining socio-demographic variables play a considerably smaller role in explaining subjective risk tolerance. Age effects are significant in Models 1 and 2, showing a negative relationship between age and risk tolerance; however, their effect becomes substantially weaker once financial knowledge and investment horizon are introduced. This finding suggests that the apparent relationship between age and risk tolerance is largely mediated by differences in investor sophistication and investment planning rather than by age itself. Thus, our H2 is rejected.

Interesting is the result obtained for marital status. In each model, married people present a higher probability of belonging to higher risk classes. Thus, our H6 is rejected. This result, in contrast with the prevalent literature on the topic, may reflect specific wealth-related characteristics because married people present a higher level of wealth than single ones.

Investor occupational status appears to play a secondary role relative to financial knowledge and investment horizon. The only consistently significant result concerns non-employed individuals, who display a lower propensity to belong to higher-risk categories. However, the remaining occupational effects are generally small and unstable across specifications, suggesting that employment status contributes only marginally to explaining the subjective risk profile. Thus, our H5 is rejected.

ESG attitude is constructed as a relatively coarse binary indicator and may not capture the multidimensional nature of sustainable-investment preferences among investors. However, this variable is not statistically significant across specifications. Taken together, the evidence suggests that subjective risk profiling is driven primarily by investor sophistication, wealth, and gender, whereas the contribution of the remaining socio-demographic characteristics appears comparatively limited.

5. The Ex-Post Portfolio Alignment

One task, among others, imposed by the MiFID regulation to banks and intermediaries is to verify the coherence of the investor’s risk profile (subjective risk) and the risk assumed in the subscribed portfolio (objective risk), over time. Different metrics can be used, and in this second part of the analysis we consider an internally bank generated indicator that measures the ex-post degree of consistency between the observed portfolio allocation and the risk level considered coherent with the investor’s original MiFID profile (*PP_align_score*). This variable ranges from 1 to 5. Higher values indicate stronger alignment between the subscribed portfolio and the investors’ risk propensity, while lower values indicate increasing deviation from the original suitability conditions.

The indicator is not observed at the same moment as the initial investor profiling. Therefore, it should not be interpreted as a contemporaneous measure of subjective-versus-objective risk inconsistency. Rather, it captures the persistence of portfolio suitability over time. Lower values of the indicator, corresponding to greater misalignment between subjective and objective risk, may reflect several mechanisms: portfolio drift, market movements, changes in asset prices and volatility, incomplete or delayed rebalancing, active investor decisions, changes in financial conditions, or evolving investor preferences. Consequently, the estimates should be interpreted as descriptive associations rather than causal effects.

While the previous section examined the determinants of the investor’s initial subjective risk profile, the following analysis addresses the central question of whether the same characteristics are also associated with the persistence of portfolio suitability over time. Correctly identifying an investor’s risk profile at the beginning of the advisory relationship does not necessarily imply that the observed portfolio will remain aligned with that profile as market conditions and portfolio composition evolve.

Table 4 reports the distribution of investors across different levels of portfolio–profile alignment. Approximately 40% of the sample falls into the low-alignment category, while about 31% exhibits high alignment. Intermediate levels account for the remaining observations, suggesting substantial heterogeneity in the extent to which portfolio allocations remain consistent with the original suitability profile over time.

Table 4. Sample distribution by portfolio–profile alignment category

Alignment level	PP_align_score	N	%
Low	< 2	429	39.83
Medium-low	$2 \leq x < 3$	155	14.39
Medium	= 3	22	2.04
Medium-high	$3 < x \leq 4$	140	13.00
High	> 4	331	30.73

To investigate the determinants of portfolio–profile alignment, the analysis begins with a set of OLS specifications in which the continuous indicator *PP_align_score* is regressed on investor demographic characteristics, financial knowledge, investment horizon, ESG attitude, and the three main levels of risk profile. The sequential specifications mirror those estimated for the subjective risk profile and allow us to assess whether the determinants identified in the first-stage analysis remain relevant once the outcome of interest becomes ex-post portfolio–profile alignment. The results are shown in Table 5.

Table 5. OLS models: Ex-post portfolio-profile alignment

	Model (a)	Model (b)	Model (c)	Model (d)
Gender	-0.020 (0.099)	-0.020 (0.099)	-0.018 (0.099)	-0.026 (0.100)
MaritalStatus				
<i>Married</i>	-0.070 (0.112)	-0.069 (0.113)	-0.051 (0.112)	-0.062 (0.112)
<i>Separated</i>	0.216 (0.218)	0.219 (0.219)	0.223 (0.219)	0.215 (0.220)
<i>Widowed</i>	0.207 (0.168)	0.207 (0.168)	0.325* (0.170)	0.316* (0.170)
Log_WealthTot	0.410*** (0.112)	0.411*** (0.112)	0.417*** (0.112)	0.409*** (0.112)
FixedIncome	0.071 (0.133)	0.071 (0.133)	0.090 (0.131)	0.104 (0.132)
KnowExp	0.213*** (0.071)	0.213*** (0.072)	0.160** (0.073)	0.140* (0.077)
ESG_attitude		0.019 (0.098)	0.018 (0.098)	0.020 (0.098)
HoldingPeriod			0.295*** (0.092)	0.275*** (0.100)
RiskProfile				
<i>Moderate</i>				-0.018 (0.123)
<i>Dynamic</i>				0.169 (0.170)
const.	-2.756** (1.349)	-2.775** (1.354)	-3.507** (1.365)	-3.338** (1.384)
Num.Obs.	1077	1077	1077	1077
R2	0.028	0.028	0.038	0.039
R2 Adj.	0.022	0.021	0.030	0.029
AIC	4051.7	4053.7	4045.4	4048.1
BIC	4096.5	4103.5	4100.2	4112.8
Log.Lik.	-2016.854	-2016.835	-2011.681	-2011.025
F	4.845	4.240	5.005	4.270
RMSE	1.57	1.57	1.57	1.57
Std.Errors	HC1	HC1	HC1	HC1

* Significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level.

The OLS estimates provide the main evidence on the determinants of ex-post portfolio–profile alignment. Positive coefficients indicate characteristics associated with higher alignment scores, while negative coefficients indicate lower ex-post alignment quality. The results differ substantially from those obtained for the subjective risk profile. Variables that strongly explain the initial risk classification display considerably weaker associations once the dependent variable becomes the ex-post portfolio–profile alignment indicator. This suggests that the determinants of subjective risk tolerance and the determinants of portfolio–profile alignment should not be regarded as equivalent.

A key aspect of the analysis is whether variables that strongly explain the subjective risk profile (such as financial knowledge and investment horizon) also explain the ex-post quality of the portfolio-risk alignment. The evidence indicates that this is only partially the case.

In the first-stage ordered logit models (Table 3), gender, financial knowledge and investment horizon were strongly associated with higher subjective risk tolerance. In contrast, in the alignment models (Table 5), gender loses statistical significance altogether, while the effects of financial knowledge and investment horizon become substantially weaker once the risk profile is introduced.

Financial knowledge remains positively associated with portfolio–profile alignment after controlling for the original risk classification, although both the magnitude and statistical significance of the coefficient decline. This pattern suggests that part of the effect of financial knowledge operates through the initial risk-profiling process, while a smaller but still detectable component remains associated with the subsequent maintenance of portfolio suitability.

Wealth emerges as the most stable determinant of portfolio–profile alignment across all specifications. Investors with larger portfolios tend to display significantly higher alignment scores, suggesting that portfolio monitoring and maintenance may be easier among wealthier investors. Unlike the other significant determinants identified in the first-stage analysis, wealth retains both its magnitude and statistical significance across all specifications, making it the only variable that consistently explains both the initial subjective risk profile and the subsequent persistence of portfolio suitability.

Taken together, these results indicate that wealth and time horizon are the two main variables influencing the alignment of the portfolio with the subjective risk over time. One possible interpretation is that wealthier people and those with longer investment horizons may better tolerate temporary deviations from the original target allocation, rebalance less mechanically, or adjust portfolio risk dynamically over time.

The inclusion of the risk-profile categories does not materially improve the explanatory power of the model. Neither the Moderate nor the Dynamic profile displays a statistically significant association with subsequent portfolio–profile alignment relative to the reference category. This finding suggests that the investor’s initial suitability classification provides only limited information about the long-run persistence of portfolio alignment. Instead, ex-post suitability appears to be driven primarily by portfolio evolution, market dynamics, and rebalancing behavior occurring after the initial profiling process.

From an econometric point of view, the relatively low R^2 values should not necessarily be interpreted as evidence of poor model quality, but rather as an indication that portfolio suitability evolves over time and depends on several unobserved dynamic factors. Additional diagnostic tests support the adequacy of the empirical specification. Variance inflation factors remain very low for all regressors, indicating that multicollinearity is not a relevant concern and that the explanatory variables capture distinct dimensions of investor characteristics. The fitted values generated by the model also remain comfortably within the observed range of the alignment indicator, suggesting that the linear specification provides a reasonable approximation of the underlying relationship.

The Breusch–Pagan test detects some evidence of heteroskedasticity. For this reason, all statistical inference is based on heteroskedasticity-robust standard errors. Importantly, the use of robust inference does not alter the substantive conclusions of the analysis, which remain consistent across alternative specifications.

Overall, the empirical evidence suggests that correctly identifying an investor’s subjective risk profile does not automatically guarantee the long-run persistence of portfolio suitability. While investor sophistication plays a central role in the initial profiling process, maintaining portfolio–profile alignment appears to depend on a broader set of dynamic factors that are only partially captured by observable investor characteristics.

As an additional robustness check, the continuous alignment indicator was transformed into a binary outcome identifying investors whose portfolios remain within a relatively high alignment range with respect to the original suitability profile. A logistic specification was then estimated to assess whether the determinants of portfolio–profile alignment remain consistent under this alternative definition.

6. Conclusions and Future Research

The topic of subjective risk is very important to define the MiFID level of risk tolerance of each investor. This paper corroborates the existing literature on this field of research considering a real-world investors dataset provided by an important Italian bank. Our results confirm that gender, wealth, financial knowledge (a component of financial literacy), marital status and time horizon influence the risk propensity of the investor. We have the opportunity to analyse the ex-post portfolio–profile alignment with the subjective risk and we find that it is only partially explained by these same characteristics. Wealth remains one of the most stable predictors of alignment; financial knowledge and investment horizon at the same time positively influence the positive alignment with portfolio and subjective risk over time. However, the analysis of ex-post portfolio–profile alignment indicates that the persistence of suitability over time is more difficult to explain using observable investor characteristics alone. This finding highlights a potentially important limitation of static profiling procedures: correctly identifying the investor's initial risk tolerance does not automatically guarantee the long-run persistence of portfolio suitability. Moreover, in this paper, we consider the ex-post portfolio–profile alignment calculated by a specific bank using an owner methodology, but it could be very interesting compare this methodology with another ones. The MiFID framework does not impose a single methodology to determine the ex-post portfolio–profile alignment, so we have different methods. Future research could consider this gap in the real-world investors observation over time to better understand which determinants can influence the maintenance of a greater or lesser alignment between subjective risk and portfolio risk (objective risk) over time.

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