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Investor preferences, financial literacy and intermediary choice towards sustainability

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ABSTRACT

Based on a large and representative sample of Italian adults, our study aims to detect the determinants of retail investor preferences for socially responsible (SR) financial intermediaries, i.e., intermediaries adopting environmental, social and governance strategies and offering both traditional and SR financial products. We demonstrate that SR financial intermediaries are chosen by individuals characterized by high self-reported orientation towards SR investments and high financial literacy. Disaggregating financial literacy into its three determinants, we show that the higher the financial knowledge and the more correct financial behavior of retail investors related to savings and financial control, the higher their preference for SR financial intermediaries. On the other hand, individual financial attitude towards savings and spending displays a negative relationship with this preference. Moreover, retail investors with more specific knowledge about portfolio diversification choose more SR financial intermediaries than other people.

1. Introduction

The Paris Agreement on climate change (UNFCCC, 2015), which came into force in 2016, states the urgent need to make “finance flows consistent with a pathway towards low GHG emissions and climate-resilient development” (Art.2). In line with this goal, in recent years socially responsible investment (SRI) has registered enormous growth, both in Europe (Eurosif, 2021) and in the US (US SIF, 2020). Although SRI volumes are much higher from institutional investors than retail investors (Eurosif, 2021), the role of individual investors is highly significant in terms of public acceptance (Revelli, 2017; Gutsche et al., 2021). This explains why European regulators amended the Insurance Distribution Directive (IDD) and Markets in Financial Instruments Directive (MiFID) II suitability rules, which came into force on 2 August 2022, to ensure that investors’ socially responsible (SR) preferences are taken into consideration during the investment advice and portfolio management processes.

This regulatory intervention is not an isolated measure, and the interest of financial regulators in environmental, social and governance (ESG) factors has grown considerably in recent years. In 2019 the European Banking Authority (EBA) published its first action plan on sustainable finance, and in 2022 it updated a roadmap showing the timeline for delivery and task objectives. Specifically, the roadmap requires banks to integrate ESG risks into their risk management framework, thus supporting the EU’s efforts to achieve the transition to a more sustainable economy.

In recent years, many financial companies have adopted ESG strategies following the regulatory guidelines, and the literature has investigated the effects of ESG strategies of financial intermediaries in terms of profitability, risk and cost of capital (Finger et al., 2018;

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Di Tommaso and Thornton, 2020; Azmi et al., 2021; Chiaramonte et al., 2022; Birindelli et al., 2022; Caby et al., 2022). Surprisingly, however, the effects on financial company capacity to attract customers interested in ESG factors are, to our knowledge, largely unexplored.

Our paper aims to fill this gap. Specifically, we investigate whether being an SR financial intermediary, i.e., a financial intermediary adopting ESG strategies and offering both SR and traditional financial products, impacts on retail customer attraction. We also study whether retail investor financial literacy (FL) and preferences for SRI influence their choice of SR financial intermediaries. Using both ordered probit and instrumental variable regressions, we use data from the "Italian Literacy and Financial Competence Survey" (IACOFI) carried out by the Bank of Italy (D'Alessio et al., 2020) in early 2020. The survey is based on 2036 Italian adults aged between 18 and 79. The sample is representative of the Italian population, and is stratified on the basis of gender, age and geographical area.

Italy is particularly interesting in this context since it is one of the largest growing markets for SRI in Europe (Eurosif, 2021) and is representative of other European intermediary-oriented countries. Our findings are thus also of interest for Spain, Germany, France and other financial systems where financial intermediaries are the main vehicle of capital allocation and investment. Moreover, Italian adults show a very low level of FL compared with the G20 average (D'Alessio et al., 2020), and this makes our sample a perfect case-study to test the impact of the future FL improvements on the population desired by regulators.

We innovate previous literature from different points of view. First, we study for the first time the impact of retail investors' preferences for SRI on the choice of SR financial intermediaries offering both SR and traditional financial products. Second, we investigate whether this choice is influenced by individuals' FL. On this point, the focus on the global FL of retail investors, rather than only on their financial knowledge (FK), is a further innovation. Finally, to our knowledge, our study is the first to test whether the combined effect of high levels of individual SR preferences and FL increases the preference for SR financial intermediaries.

The paper is structured as follows. Section 2 presents a literature review and hypotheses development, Section 3 shows data and methodology and Section 4 describes our main findings. Additional and robustness analyses are reported in Section 5, and Section 6 concludes the paper.

2. Literature review and hypothesis development

To date, many financial intermediaries have implemented ESG strategies at various levels (Chiaramonte et al., 2022; Birindelli et al., 2022), and academic literature has begun to investigate the effects of these choices. A recent bibliometric analysis on ESG outcomes in the banking industry (Galletta et al., 2022) shows that, overall, the orientation towards sustainability often leads banks to achieve better financial performance. Specifically, numerous analyses test the positive impact of implementing ESG strategies on bank profitability (Azmi et al., 2021; Caby et al., 2022; Finger et al., 2018), risk (Chiaramonte et al., 2022; Birindelli et al., 2022; Di Tommaso and Thornton, 2020; Galletta et al., 2022) and cost of capital (Azmi et al., 2021). Chiaramonte et al. (2022) demonstrate that banks showing higher ESG scores are more resilient and less fragile, particularly during periods of financial distress. Similarly, Birindelli et al. (2022) find that international listed banks with a higher commitment to climate change issues are more likely to lower the risk level of their loans. Ramzan et al. (2021) show that corporate ESG choices positively affect financial performance, financial inclusion, and financial stability of the banking sector in Pakistan. Moreover, Azmi et al. (2021) demonstrate that ESG activities, particularly environmental ones, improve bank value in emerging markets.

Extant literature has also carefully examined the main determinants of retail investors' preferences for SRI products, focusing specifically on investment portfolio (Hood et al., 2014; Gutsche and Ziegler, 2019; Rossi et al., 2019; Gutsche et al., 2020) rather than on lending (Bethlendi et al., 2022). Some papers in this area demonstrate that, under certain conditions, SR preferences are so strong that they can even lead individuals to be willing to pay, i.e., forgo financial performance, in order to invest in accordance with their SR values (Riedl and Smeets, 2017; Gutsche and Ziegler, 2019; Rossi et al., 2019).

Despite the extensive literature on the determinants of investor preferences for SRI products, investor preferences for SR intermediaries are to date almost unexplored. Only Bauer and Smeets (2015) have so far investigated the role of social identification in investment decisions of SR retail investors relating to two SR banks in the Netherlands. Their results show that social identification, i.e., the preference of SR investors for SR banks, thought to share their personal values, is strong among highly educated, younger and low-wealth individuals.

Bauer and Smith (2015) consider banks offering exclusively SRI products and savings accounts, and we believe their evidence can be extended to financial intermediaries offering both SRI and traditional investments, and adopting specific ESG strategies (hereafter, SR financial intermediaries). More precisely, we assume that SR investors do not choose a financial intermediary simply because it allows investment in both traditional and SRI products, but also because it adopts SR behavior internally, i.e., it implements specific ESG strategies in relation to customers, employees, suppliers and, in general, towards its stakeholders. We believe that the focus on SR financial intermediaries is particularly important for intermediary-oriented countries, as Japan and the countries of continental Europe are traditionally considered (Aggarwal and Goodell, 2016). Unlike market-based financial systems, where securities markets are more important than financial companies for transferring funding to firms, in intermediary-oriented systems financial intermediaries are the main vehicle of capital allocation and investment. Financial intermediaries are much trusted by deposit holders, who make few direct investments and prefer to invest through them as a key investment channel (Allen and Gale, 1995). Hence, we test the following hypothesis:

H₁ : SR retail investors prefer SR intermediaries.

Previous literature investigates different preferences of retail investors for SRI across gender, age, education, income, economic preferences (time horizon, risk acceptance and expected returns of investments), religion, political ideas, personal values, social norms,

Table 1
Sample description.

Variables	Obs	%	SR_INV	FL
<i>Gender</i>				
Female	1017	49.95 %	2.325	9.463
Male	1019	50.05 %	2.399	9.722
<i>Age</i>				
18–25	177	8.69 %	2.203	8.220
26–45	563	27.65 %	2.476	9.912
46–65	809	39.73 %	2.504	9.839
> 65	487	23.92 %	2.053	9.311
<i>Marital Status</i>				
Married	1276	62.67 %	2.511	9.892
Single	491	24.12 %	2.218	9.003
Widows/Divorced	269	13.21 %	1.922	9.248
<i>Education</i>				
No education	44	2.16 %	1.432	6.500
Primary school	197	9.68 %	1.919	8.755
Secondary school	1546	75.93 %	2.358	9.659
University degree	249	12.23 %	2.908	10.391
<i>Employment status</i>				
Employed	1018	50.00 %	2.642	10.083
Looking for a job	126	6.19 %	2.198	8.320
Not employed	892	43.81 %	2.066	9.212
<i>Family income</i>				
> 644	41	2.01 %	1.829	8.252
644 – 1059	221	10.85 %	1.697	7.903
1060 – 1549	686	33.69 %	2.245	9.020
1550 – 3875	966	47.45 %	2.537	10.251
> 3875	122	5.99 %	3.025	11.109
<i>Living with children</i>				
No	1232	60.51 %	2.252	9.231
Yes	804	39.49 %	2.531	10.146
<i>Geographical area</i>				
North-West	479	23.53 %	2.207	9.894
North-East	266	13.06 %	2.677	8.858
Center	464	22.79 %	2.526	9.746
South and Islands	827	40.62 %	2.260	9.568
Total	2036	100.00 %	2.362	9.593

Note: This table reports the description of our sample of respondents. It displays the number of observations considering the socio-demographic and socio-economic characteristics, the percentage composition of the sample and, in the last two columns, the average socially responsible preference score and the average financial literacy score.

personality traits, and also financial knowledge (Hood et al., 2014; Diouf et al., 2016; Dorfleitner and Nguyen, 2016; Rossi et al., 2019; Gutsche et al., 2020).

Focusing on financial knowledge (FK), empirical evidence of its impact on individual SRI decisions is unfortunately ambiguous and appears to depend on the use of subjective (Bauer and Smeets, 2015; Riedl and Smeets, 2017; Brodback et al., 2019; Rossi et al., 2019; D'Hondt et al., 2022) FK measures rather than objective (Borgers and Pownall, 2014; Gutsche et al., 2020; Anderson and Robinson, 2021; Aristei and Gallo, 2021; Gutsche et al., 2021; Filippini et al., 2022) FK measures. Even excluding papers based on self-assessed FK, which could be biased by overconfidence (Anderson et al., 2017; Gutsche et al., 2021), studies using the objective FK measure developed by Lusardi and Mitchell (2008) display conflicting results. They show that the impact of FK on individual SRI decisions can be negative (Anderson and Robinson, 2021; Gutsche et al., 2021), positive (Borgers and Pownall, 2014; Gutsche et al., 2020) or null (Filippini et al., 2022).

The role of FK in choosing SRI products remains unclear, but its role in choosing SR financial intermediaries is almost unexplored. Only Aristei and Gallo (2021) have so far demonstrated a positive impact of investors' FK on their preference for ethical financial companies. However, this study is limited to FK, and does not consider global financial literacy (FL). Unfortunately, in the last decade, despite the extensive work by national and international institutions aiming to define FL as the sum of three different dimensions (FK, financial behavior (FB), and financial attitude (FA)), and although the OECD (2018) underlines the importance of not limiting attention to FK, most previous literature has reduced FL to mere FK (Warmath and Zimmerman, 2019). In many theoretical and empirical studies, FL has become synonymous with FK, and the terms have even been used interchangeably (see, among others, Lusardi and Mitchell, 2007b; Fernandes et al., 2014). Yet literacy includes more than knowledge (Mouna and Anis, 2017), and the current myopic conceptualization and operationalization of FL hamper creativity and innovation in financial education (Warmath and Zimmerman, 2019). To overcome this impasse, Warmath and Zimmerman (2019) recommend considering all the three components of FL in analyzing individual financial behavior.

Moreover, previous literature shows that individuals with higher FK, having more information on theoretical concepts, products and development in the financial sector, are more likely to be aware of SRI (Gutsche et al., 2021). They are also more capable of

choosing financial products while simultaneously taking their preferences for SRI into account (Borgers and Pownall, 2014). We believe this could also be true for the choice of financial intermediaries, and that the finding could be enriched by considering the global FL of individuals, i.e., the sum of FK, FA and FB (OECD-INFE, 2011, 2018), without limiting the analysis to FK.

We therefore test the following hypothesis:

H₂ : Retail investors with high levels of financial literacy prefer SR intermediaries.

3. Data and methodology

3.1. Data

We base our analysis on the survey run by Bank of Italy (D'Alessio et al., 2020) in 2020¹ on a representative sample of 2036 Italian adults aged between 18 and 79. The sample population was stratified by quota on the basis of gender, age, and geographical area. The survey was conducted at the beginning of 2020, and findings were thus not affected by the events of 2020, including the COVID-19 pandemic.

Our sample (Table 1) is composed of 49.95 % females and 50.05 % males. Men are more financially literate than women, as suggested by previous studies (Bucher-Koenen and Lusardi, 2011; Calcagno and Monticone, 2015), and also slightly more SRI oriented. People between 26 and 45 years old, accounting for 39.73 % of the sample, show the highest FL, while individuals between 46 and 65 show the highest SRI preferences.

Looking at marital status, 62.67 % of respondents are married, 13.21 % are widowed or divorced and 24.12 % are single. Married individuals show both the highest FL scores and the highest SRI preferences. In terms of education, only 12.23 % of respondents hold a university degree, and the majority of the sample (47.94 %) hold a high school diploma. Twenty-eight% of respondents have a secondary school diploma, and the others have a primary school or lower-level certificate. The FL score reflects the level of education and is higher among better educated people. SR preferences go in the same direction: the higher the level of education, the higher the share of SRI oriented investors. Half of our sample are individuals in employment, 43.81 % are unemployed and 6.29 % are looking for a job. Those in employment are both the most financially literate and the most SR-oriented. It is interesting to note that unemployed respondents show higher FL than jobseekers, while jobseekers show higher SR preferences than the unemployed.

In terms of income, the higher the income, the higher are both FL and SRI preferences. Moreover, individuals living with at least one child account for about 40% of the total sample. They show higher FL and SRI preferences than respondents living without children.

Geographically, the sample is distributed across Italy: 13.56 % in the North-East, 23.53 % in the North-West, 22.79 % in the Center, and 40.62 % in the South or on the Islands (Sicily and Sardinia). Less SR-oriented investors live in the North-West and in the South and on the Islands. In terms of FL, individuals living in the North-East are shown to be the most financially illiterate.

3.2. Methodology

To test our hypotheses, we run two main regression models: an ordered probit regression (Model 1) and an instrumental variable (IV) ordered probit regression (Model 2). These two regression models are necessary because of the characteristics of our dependent and independent variables. As described below, the dependent variable is a category variable, and the ordered probit regression is the most common empirical model adopted in such cases. On the other hand, our independent variable, i.e., financial literacy, could be affected by endogeneity issues. Endogeneity could be a concern because of the possible linkage between some of the independent variables and the error term. For example, financial literacy could be related to some unobserved variables that also affect the choice of SR financial intermediary. Given that endogeneity can create bias coefficients, we also run an instrumental variable regression (Fornero and Monticone, 2010; Kadoya et al., 2018).

Model 1 is structured as follows:

$$Y_i = \alpha_i + \rho_i SR_INV_i + \eta_i FL_i + \sum_i^n \beta_i X_i + \sum_i^n \gamma_i Z_i + \sum_i^n \delta_i W_i + \sigma_i NEG_EXP_i + \varepsilon_i \quad (1)$$

where Y is the measure of investor propensity to select a SR financial intermediary (SR_INT). SR_INT is a categorical variable defined on the basis of the level of agreement with the statement: "I prefer to turn to financial intermediaries who make choices based on ethics (investments in clean energy, ban on investing in military equipment.)" expressed on a 5-point Likert scale. The dependent variable can take a value from 1 to 5, where 1 is a low propensity, and 5 is a high propensity, to choose a SR financial intermediary. We define an SR financial intermediary as a financial intermediary offering both SRI and traditional investments, and adopting specific ESG strategies in relation to customers, employees, suppliers and, in general, towards its stakeholders.

The two independent variables of main interest are: (a) self-reported SR score (SR_INV) and (b) investor financial literacy (FL). SR_INV is a categorical variable which takes a value from 0 to 5 according to respondents' level of agreement with the statement: "I think it is more important for investors to choose companies that prioritize making profits rather than those that are reducing the environmental,

¹ Since 2017, the Bank of Italy, following OECD guidelines, has conducted two different surveys on representative samples of Italian adults to assess the level of financial literacy. The data are freely available on the Bank of Italy website. The 2020 survey is the most recent available.

social and governance impact”, where 0 is “Refuse to answer” or “Do not know”, 1 is “Completely agree” and 5 is “Completely disagree”. The higher the value of SR_INV, the higher the propensity of the respondent to consider him/herself a SR investor. FL is the financial literacy score resulting from the sum of the answers to questions about (OECD, 2018): (i) FK, measured by the Big Five questions proposed by Lusardi and Mitchell (2007a; b), each taking value 1 if correct, 0 otherwise; (ii) FA, estimated by the average score of 3 sentences about investor attitude towards savings and spending, each requiring a level of agreement on a 5-point Likert scale; and (iii) FB, calculated by the sum of responses to 8 questions on investor behavior related to savings and financial control, 7 of which can take values 1 or 0, and one of which can take values 0, 1 or 2. Investor FL may therefore take values from 1 (lowest FL) to 19 (highest FL).

X, Z and W are the vectors referring to the socio-demographic, socio-economic and geographical characteristics of respondents.

Following Filippini et al. (2022), we include among socio-demographic variables: (a) gender, a dummy variable which equals 1 if the respondent is male, 0 otherwise (MALE) (the reference category is female); (b) age, measured using a set of dummy variables taking value 1 if the respondent falls into a specific category, i.e., 18–25; 26–45; 46–65, 0 otherwise (the reference category is individuals older than 65); (c) marital status, measured using a set of dummy variables that equal 1 if the respondent falls into a specific category, i.e. single, divorced or widowed, and 0 otherwise (the reference category is married individuals); (d) education level, estimated using a set of dummy variables that equal 1 when the respondent states he/she has a specific level of education, i.e. university or higher, high school, secondary school, and 0 otherwise (the reference category is primary school or lower); (e) living with children, which is a dummy variable that equals 1 if the respondent lives with at least one child, 0 otherwise.

We insert the following socio-economic variables into the second vector: a) employment status, measured by two dummy variables that equal 1 if the respondent is either unemployed or looking for a job, 0 otherwise (the reference category is in employment); b) income, estimated using a set of dummy variables that equal 1 if individual income is up to 644 euro, between 644 and 1059 euro, between 1060 and 1549 euro, or between 1550 and 3875 euro per month and 0 otherwise (the reference category is individual having an income higher than 3875 euro).

In vector W we include the geographical area in which the respondent is resident, shown by three dummy variables, i.e., North-West, North-East, and Center (the reference category is South and Islands). In the regression model we therefore include three dummy variables, one for the North-West (equal to 1 if individual lives in the North-West, 0 otherwise), one for the North-East (equal to 1 if individual lives in the North-East, 0 otherwise), one for the Center (equal to 1 if individual lives in the Center, 0 otherwise). The results show the difference compared to the South and the Islands.

Finally, we insert into the model a categorical variable (NEG_EXP) that can take a value from 0 to 8 according to the previous negative financial experience of respondents. The higher the value of NEG_EXP, the more negative the financial experience of the individual in the past.²

We also run an instrumental variable (IV) ordered probit regression (Model 2), using the same variables implied in Regression (1) except for FL. It is well known that FL measures suffer endogeneity when the relationship between FL and financial behavior is investigated, because of the link between FL and financial experience accumulated during life. As financial experience may simultaneously drive individual FL as well as the decision to choose one financial intermediary rather than another, we apply an instrumental variable approach to manage this problem of endogeneity. We use two FL instruments: the average FL of the geographical area in which the respondent lives and his/her internet use. We use the average FL of the local area in the belief that living in an area where average FL levels are high stimulates the individual to improve his/her FL (Bucher-Koenen and Lusardi, 2011; Calcagno and Monticone, 2015). We take internet use because internet is a key channel for information transfer, and many education tools and financial information which improve decision-making are available online (Bavafa et al., 2019). Previous literature (Fornero and Monticone, 2010; French et al., 2020; Aristei and Gallo, 2021) suggests moreover that internet use directly increases financial competencies, but only indirectly influences financial behaviors through the financial knowledge channel.³ To check the validity of our instrumental variables and the consistency of our regression model, we run two post-estimation tests: a) the Durbin test; and b) the Sargan test. The Durbin test is used to determine whether endogenous regressors in the model are exogenous. The Sargan test verifies the over-identifying restrictions. Specifically, we test whether financial literacy can be treated as an exogenous variable. If the endogenous regressors are exogenous, this means that the OLS estimator is more efficient and, depending on the strength of the instruments and other factors, the loss of efficiency from using an instrumental-variable estimator can be significant. The Sargan test reveals whether the variable is endogenous and consequently whether the 2SLS regression model fits better for our purpose. We also run the variance inflation factor (VIF) to check the possible multicollinearity which can arise in our regression model. The results of the VIF test are reported in the Appendix together with the descriptive statistics.

4. Empirical results

4.1. The choice of SR financial intermediaries: The role of investor preferences and FL

In this Section we report our main results on the impact of retail investors’ self-reported preferences for SRI and their FL on the choice of SR financial intermediaries. Findings are shown in Table 2. In Columns (1), (3) and (4) we report the results of the ordered probit regressions, where the independent variables SR_INT and FL are included together (Column 1) and shown separately (Columns 3 and 4). Columns (2) and (5) show the results of the IV regression model, where FL is instrumented.

² More information is provided in Table A3 in the Appendix.

³ In the Appendix, Table A4 shows the relationship between instrumental variables, financial literacy and SR financial intermediary.

Table 2
The choice of SR financial intermediary: the determinants.

VARIABLES	(1) Probit	(2) IV_regr	(3) Probit	(4) Probit	(5) IV_regr
SR_INV	0.195 *** (0.016)	0.264 *** (0.021)	0.196 *** (0.016)	-	-
FL	0.081 *** (0.009)	0.127 ** (0.058)	-	0.081 *** (0.009)	0.148 ** (0.060)
MALE	0.025 (0.048)	0.015 (0.065)	0.043 (0.048)	0.017 (0.048)	0.003 (0.068)
AGE	0.001 (0.002)	0.000 (0.003)	0.003 (0.002)	0.001 (0.002)	-0.000 (0.003)
WIDOWERS/DIVORCED	-0.115 (0.078)	-0.164 (0.102)	-0.103 (0.078)	-0.169 ** (0.077)	-0.250 ** (0.106)
SINGLE	-0.132 * (0.075)	-0.195 * (0.100)	-0.151 ** (0.075)	-0.140 * (0.075)	-0.212 ** (0.105)
UNIVERSITY DEGREE	0.467 *** (0.116)	0.496 *** (0.172)	0.558 *** (0.116)	0.491 *** (0.116)	0.542 *** (0.180)
HIGH DEGREE	0.237 ** (0.095)	0.234 (0.147)	0.337 *** (0.094)	0.251 *** (0.094)	0.257 * (0.154)
LOW SECONDARY SCHOOL	-0.016 (0.092)	-0.077 (0.125)	0.034 (0.091)	0.007 (0.091)	-0.044 (0.131)
LIVING WITH CHILDREN	0.013 (0.057)	-0.020 (0.077)	0.027 (0.057)	0.003 (0.057)	-0.037 (0.080)
< 644	-0.266 (0.206)	-0.384 (0.298)	-0.439 ** (0.204)	-0.319 (0.204)	-0.447 (0.311)
644–1059	-0.436 *** (0.140)	-0.536 ** (0.237)	-0.640 *** (0.138)	-0.440 *** (0.139)	-0.521 ** (0.248)
1060–1549	-0.269 ** (0.116)	-0.337 * (0.182)	-0.401 *** (0.114)	-0.281 ** (0.115)	-0.334 * (0.190)
1550–3875	-0.248 ** (0.107)	-0.311 ** (0.145)	-0.289 *** (0.106)	-0.243 ** (0.107)	-0.296 * (0.151)
UNEMPLOYED	-0.112 * (0.059)	-0.168 ** (0.081)	-0.139 ** (0.059)	-0.117 ** (0.059)	-0.178 ** (0.084)
LOOKING FOR A JOB	0.062 (0.107)	0.117 (0.147)	0.009 (0.106)	0.035 (0.106)	0.096 (0.153)
NEG_EXP	0.128 *** (0.018)	0.183 *** (0.026)	0.114 *** (0.018)	0.140 *** (0.018)	0.208 *** (0.027)
NORTH-WEST	-0.088 (0.068)	-0.083 (0.095)	-0.138 ** (0.067)	-0.179 *** (0.067)	-0.211 ** (0.099)
NORTH-EAST	0.175 ** (0.079)	0.299 ** (0.127)	0.067 (0.078)	0.156 ** (0.079)	0.297 ** (0.132)
CENTER	0.106 * (0.064)	0.201 ** (0.086)	0.079 (0.064)	0.053 (0.063)	0.138 (0.090)
Constant	-	0.685 (0.587)	-	-	1.148 * (0.616)
Observations	2036	2036	2036	2036	2036
Pseudo R2	0.128		0.192	0.172	
Sargan (p-value)		0.301			0.303
Durbin		0.002			0.004
R-squared		0.215			0.146

Note: This table reports the results of the probit and the probit IV regression where the dependent variable is the probability of choosing choose an SR intermediary. The main independent variables are: a) the SR preferences of the investor; b) the financial literacy level (FL).

Standard errors in parentheses

*** p < 0.01, ** p < 0.05, * p < 0.1

Our findings show that retail investors' self-reported preferences for SRI and their FL both positively impact on the choice of SR financial intermediaries.

Specifically, SR_INV displays a positive relationship with SR_INT in both Model 1 (Columns 1 and 3) and Model 2 (Column 2). This means that retail investors who claim to be SR prefer SR financial intermediaries, which are thought to share their personal values, and, at the same time, they do not reduce ex-ante their investment portfolio exclusively to SRIs. This supports the validity of Hypothesis H₁. Previous papers demonstrate that SR retail investors choose more SRI products (Bauer and Smeets, 2015; Riedl and Smeets, 2017), and our results extend this evidence showing the importance of SRI preferences also in choosing SR intermediaries which offer both traditional and SRI products.

Moreover, FL always displays a positive link with SR_INT, both using ordered probit (Columns 1 and 4) and IV regression models (Columns 2 and 5). Therefore, more financially literate individuals are shown to choose SR financial intermediaries more frequently than others. This supports Hypothesis H₂, and can be explained by the fact that retail investors with low FL tend to face higher processing costs for understanding relevant information about SRI and are thus less likely to choose SR intermediaries. Inadequate FL is

Table 3
Financial literacy components and the choice of SR financial intermediaries.

VARIABLES	(a)						(b)	
	(1) Probit	(2) IV_regr	(3) Probit	(4) IV_regr	(5) Probit	(6) IV_regr	(7) Probit	(8) IV_regr
FK	0.147 *** (0.016)	0.608 *** (0.218)	-	-	-	-	-	-
FA	-	-	-0.152 *** (0.031)	-0.371 (0.620)	-	-	-	-
FB	-	-	-	-	0.119 *** (0.013)	0.153 * (0.081)	-	-
FK_div	-	-	-	-	-	-	0.411 *** (0.049)	1.872 *** (0.683)
SR_INV	0.193 *** (0.016)	0.238 *** (0.026)	0.204 *** (0.016)	0.290 *** (0.035)	0.204 *** (0.016)	0.278 *** (0.021)	0.193 *** (0.016)	0.242 *** (0.025)
MALE	0.019 (0.048)	-0.060 (0.079)	0.041 (0.048)	0.040 (0.065)	0.034 (0.048)	0.033 (0.064)	0.034 (0.048)	0.002 (0.072)
AGE	0.003 (0.002)	0.003 (0.003)	0.004 * (0.002)	0.005 (0.004)	0.001 (0.002)	0.001 (0.003)	0.003 (0.002)	0.002 (0.003)
WIDOWERS/DIVORCED	-0.122 (0.078)	-0.216 * (0.114)	-0.132 * (0.078)	-0.217 (0.155)	-0.128 (0.078)	-0.179 * (0.103)	-0.116 (0.078)	-0.198 * (0.113)
SINGLE	-0.166 * * (0.075)	-0.264 * * (0.109)	-0.178 * * (0.075)	-0.295 * * (0.146)	-0.133 * (0.075)	-0.206 * * (0.100)	-0.151 * * (0.075)	-0.215 * * (0.109)
UNIVERSITY DEGREE	0.475 *** (0.116)	0.261 (0.223)	0.543 *** (0.116)	0.632 *** (0.169)	0.478 *** (0.116)	0.547 *** (0.166)	0.512 *** (0.116)	0.409 * * (0.193)
HIGH DEGREE	0.255 *** (0.095)	0.035 (0.191)	0.327 * * * (0.094)	0.384 * * * (0.133)	0.247 * * * (0.095)	0.282 * * (0.141)	0.288 * * * (0.094)	0.160 (0.163)
LOW SECONDARY SCHOOL	-0.020 (0.092)	-0.218 (0.154)	0.009 (0.091)	-0.047 (0.153)	-0.016 (0.092)	-0.060 (0.125)	0.006 (0.091)	-0.117 (0.139)
LIVING WITH CHILDREN	0.000 (0.057)	-0.106 (0.092)	0.035 (0.057)	0.027 (0.085)	0.034 (0.057)	0.012 (0.076)	0.026 (0.057)	-0.006 (0.083)
< 644	-0.298 (0.205)	-0.066 (0.365)	-0.386 * (0.204)	-0.545 (0.345)	-0.257 (0.206)	-0.426 (0.298)	-0.309 (0.205)	-0.054 (0.371)
644–1059	-0.479 * * * (0.139)	-0.161 (0.323)	-0.593 * * * (0.138)	-0.752 * * * (0.273)	-0.434 * * * (0.140)	-0.597 * * (0.233)	-0.522 * * * (0.139)	-0.294 (0.290)
1060–1549	-0.300 * * * (0.115)	-0.106 (0.232)	-0.371 * * * (0.115)	-0.482 * * (0.203)	-0.264 * * (0.116)	-0.374 * * (0.181)	-0.327 * * * (0.115)	-0.203 (0.211)
1550–3875	-0.268 * * (0.107)	-0.270 * (0.160)	-0.260 * * (0.107)	-0.312 (0.191)	-0.223 * * (0.107)	-0.293 * * (0.150)	-0.276 * * * (0.107)	-0.311 * * (0.157)
UNEMPLOYED	-0.143 * * (0.059)	-0.218 * * (0.085)	-0.142 * * (0.059)	-0.221 * * * (0.080)	-0.098 * (0.059)	-0.160 * (0.083)	-0.124 * * (0.059)	-0.130 (0.091)
LOOKING FOR A JOB	-0.021 (0.107)	-0.074 (0.158)	-0.008 (0.107)	-0.012 (0.155)	0.099 (0.107)	0.145 (0.154)	0.001 (0.107)	-0.003 (0.155)
NEG_EXP	0.131 * * * (0.018)	0.228 * * * (0.035)	0.104 * * * (0.018)	0.137 * * * (0.052)	0.113 * * * (0.018)	0.159 * * * (0.025)	0.118 * * * (0.018)	0.178 * * * (0.027)
NORTH-WEST	-0.137 * * (0.068)	-0.160 * (0.097)	-0.153 * * (0.067)	-0.196 * (0.109)	-0.077 (0.068)	-0.083 (0.097)	-0.148 * * (0.068)	-0.198 * * (0.098)
NORTH-EAST	0.124 (0.079)	0.362 * * * (0.139)	0.067 (0.078)	0.138 (0.105)	0.180 * * (0.079)	0.275 * * (0.126)	0.137 * (0.079)	0.429 * * * (0.155)
CENTER	0.083 (0.064)	0.178 * (0.092)	0.057 (0.064)	0.102 (0.127)	0.098 (0.064)	0.182 * * (0.085)	0.081 (0.064)	0.159 * (0.092)
Constant	-	0.505 (0.558)	-	2.835 * (1.698)	-	1.201 * * * (0.427)	-	0.912 * * (0.445)
Observations	2036	2036	2036	2036	2036	2036	2036	2036
Pseudo-Rsquared	0.0896		0.092		0.220		0.913	
Sargan		0.198		0.195		0.192		0.199
Durbin		0.001		0.001		0.001		0.001
R-squared		0.057		0.189		0.213		0.053

Note: This table reports the results of the probit and the probit IV regression where the dependent variable is the probability of choosing an SR intermediary. The main independent variables are: a) the SR preferences of the investor; b) the main components of FL, i.e. financial knowledge, financial attitude and financial behavior. The table also shows the FK_div which is a dummy variable equal to 1 if the respondent answers the question on financial diversification correctly.

Standard errors in parentheses

*** p < 0.01, ** p < 0.05, * p < 0.1

thus a significant barrier to individuals' making SRI.

These results extend the findings of previous literature from different points of view. First, we demonstrate that not only the FK (Aristei and Gallo, 2021), but also the global FL of individuals, increases their preference for SR intermediaries. Second, given that Borgers and Pownall (2014) prove that individuals with higher FK are more capable of choosing financial products while

simultaneously taking their preferences for SRI into account, we extend their evidence showing that more financially literate retail investors are more able to consider their SR preferences and choose financial intermediaries at the same time. Our findings suggest that improvements in FL levels may significantly contribute to increasing trust in financial intermediaries offering SRI products, overcoming initial entry hurdles for individual investors, and encouraging participation in the SRI market.

We also investigate the socio-demographic and economic characteristics explaining the choice of SR intermediaries.

Looking at the socio-demographic factors, single individuals, living without a partner, are less oriented to select SR financial intermediaries than others. The level of education also matters in explaining the dependent variable. Respondents holding at least a high school diploma are in fact more likely to choose a SR financial intermediary than less educated respondents. This is probably because higher educated individuals, having more information available overall, are more aware of SRI, and are therefore more likely to choose SR financial intermediaries.

Moving to the economic factors, family income is shown to be relevant in explaining the dependent variable. Specifically, SR financial intermediaries seem to be “stuff for the rich”: the higher the family income, the higher the propensity to choose an SR financial intermediary. Similar results are obtained for employment status. Unemployed individuals are in fact less likely to choose SR financial intermediaries than those in employment. These results may be due to the higher availability of money for investors who are in employment and rich, compared to unemployed and less wealthy ones, so that the former are more interested in financial investments and intermediaries in general than the latter.

Financial experience also matters in determining the choice of SR financial intermediaries. Our findings show in fact a positive and statistically significant relationship between the number of previous negative financial experiences of the respondent and our dependent variable. This suggests that individuals who have been victims of financial fraud or harassment in the past are now more likely to choose SR financial intermediaries.

Finally, considering the geographical area in which respondents live, although our results are not consistent in all the regression models, we observe that a higher proportion of retail investors living in the North-East and Center prefer SR financial intermediaries than individuals living in other areas of Italy.

Looking globally at socio-demographic and economic aspects, we note that individuals preferring SRI products and SR financial intermediaries are not exactly the same. Specifically, previous literature shows that retail investors more oriented towards SRI products are young (Gutsche et al., 2020, 2021), female (Borgers and Pownall, 2014; Rossi et al., 2019; Gutsche et al., 2020), with high levels of education (Borgers and Pownall, 2014; Rossi et al., 2019) and high family income (Gutsche et al., 2020). Our findings demonstrate that high education and high family income contribute to explaining individuals' preferences for SR financial intermediaries, too. However, neither gender nor age gap emerge as a significant socio-demographic factor.

The results of the first step of the IV regression are reported in the Appendix (Table A5). Our findings show that both of the instruments selected relating to financial literacy are positive and statistically significant. In general, individuals living in a geographical area with a higher financial literacy are more likely to show a higher financial literacy. Moreover, individuals displaying greater confidence with internet and stating that they access internet frequently show higher financial literacy (Fornero and Monticone, 2010; Bucher-Koenen and Lusardi, 2011; Calcagno and Monticone, 2015; Bavafa et al., 2019; French et al., 2020; Aristei and Gallo, 2021). These findings are also confirmed in the subsequent analysis which uses an alternative or a component measure of financial literacy as independent variable.

4.2. The choice of SR financial intermediaries: disaggregating FL

In Section 3.1 we demonstrate that SR financial intermediaries are preferred by individuals characterized by high self-reported preferences for SRI, high FL, high education, high family income, married status, employed status, previous negative financial experience and living in the North-East and Center of Italy. In this section we investigate the role played by FL in the choice of SR financial intermediaries in more depth. Our results are shown in Table 3, which reports evidence of both ordered probit (Columns 1, 3, 5, and 7) and IV regressions (Columns 2, 4, 6, and 8), where the components of FL are instrumented using the same instrumental variables adopted in our main analysis.

First, we disaggregate FL into its three determinants identified by OECD (2018), i.e., FK, FA and FB, and investigate the specific impact of these on choosing SR financial intermediaries (Table 3(a)). Our results show that FK is positively related to the dependent variable (Table 3, Columns 1 and 2). Therefore, the higher the FK of retail investors, the higher their propensity to choose a SR financial intermediary, which confirms previous evidence from Aristei and Gallo (2021). However, for FA the relationship with the dependent variable is negative, although statistically significant only in the case of Model 1 (Table 3, Column 3). In order to interpret this result, it is necessary to consider that Bank of Italy (D'Alessio et al., 2020), like the OECD (2011), estimates individual FA as a mere attitude towards savings and spending, without considering other dimensions of FA identified by previous literature, such as financial anxiety, optimism, financial security, deliberative thinking, and interest in financial issues (Fünfgeld and Wang, 2009; Paluri and Mehra, 2016; Talwar et al., 2021). The evidence suggests that individuals more oriented to saving are less likely to choose SR financial intermediaries than traditional intermediaries because they are more interested in financial returns of their investments than in SR factors. However, the result is observed only when we run the probit regression, as when we control for the endogeneity bias, using an instrumental variable, the significance disappears. This suggests that the result is not robust. Moreover, our results show that FB is positively related to the dependent variable (Table 3, Columns 5 and 6). Therefore, the more “correct” the FB of retail investors related to savings and financial control, the higher their propensity to choose SR financial intermediaries. Overall, our evidence suggests that the implementation of financial education programs aiming to improve FK and FB among the general population could help to increase levels of trust in financial intermediaries offering SRI products. Such programs could be useful in overcoming the initial skepticism of retail

Table 4
The choice of SR financial intermediary: high vs low FL.

VARIABLES	(1) LOW FL	(2) HIGH FL
SR_INV	0.259 * ** (0.028)	0.100 * ** (0.029)
MALE	0.110 (0.084)	-0.016 (0.084)
AGE	-0.002 (0.003)	0.001 (0.004)
WIDOWERS/DIVORCED	-0.049 (0.132)	-0.116 (0.142)
SINGLE	-0.258 * * (0.127)	-0.058 (0.130)
UNIVERSITY DEGREE	0.496 * * (0.202)	0.710 * ** (0.217)
HIGH DEGREE	0.523 * ** (0.160)	0.304 (0.186)
LOW SECONDARY SCHOOL	0.371 * * (0.149)	-0.166 (0.181)
LIVES WITH CHILDREN	0.057 (0.102)	0.069 (0.095)
< 644	-0.203 (0.338)	0.636 (0.449)
644–1059	-0.256 (0.260)	-0.547 * * (0.259)
1060–1549	-0.222 (0.235)	-0.209 (0.176)
1550–3875	-0.213 (0.229)	-0.195 (0.153)
UNEMPLOYED	0.005 (0.104)	0.007 (0.102)
LOOKING FOR A JOB	-0.124 (0.166)	0.054 (0.232)
NEG_EXP	0.150 * ** (0.027)	0.120 * ** (0.036)
NORTH-WEST	-0.226 * (0.127)	0.150 (0.113)
NORTH-EAST	0.348 * ** (0.130)	0.064 (0.160)
CENTER	0.099 (0.117)	0.230 * * (0.109)
Pseudo R-squared	0.140	0.159
Observations	698	691

Note: This table reports the results of the probit and the probit IV regression where the dependent variable is the probability of choosing an SR intermediary. The main independent variable is the SR preferences of the investor. The sample is split into two parts: a) individuals with an FL higher than the median; b) individuals with an FL level lower than the median.

Standard errors in parentheses

* ** $p < 0.01$, * * $p < 0.05$, * $p < 0.1$

investors and encouraging wider participation in the SRI market.

Second, we test the impact of only one component of FK, specifically knowledge about portfolio diversification (FK_div), on the choice of SR financial intermediaries (Table 3(b)). FK_div is a dummy variable that equals 1 if the response to the following statement is correct: “It is usually possible to reduce the risk of investing in the stock market by buying a wide range of stocks and shares”, 0 otherwise. Theoretically, individuals more familiar with the idea of risk diversification might think that SRIs restrict the universe of investable assets applying their SR strategies, and could therefore shun SRI products in order not to reduce diversification opportunities (Gutsche et al., 2021). However, again from a theoretical point of view, individuals more familiar with the concept of risk diversification might prefer SR financial intermediaries offering both traditional and SRI products, thus not forgoing the benefits of diversification. Our results (Table 3(b), Columns 7 and 8) support this idea, as they show that retail investors with more specific knowledge about portfolio diversification prefer SR financial intermediaries offering both traditional and SRI products.

Overall, results shown in Table 3 confirm our previous findings on the positive effect on the choice of SR financial intermediaries exerted by high self-reported preferences for SRI, high level of education, high family income, being married, being employed, previous negative financial experience and living in the North-East and Center of Italy.

Table 5
The choice of SR financial intermediary: high vs low self-reported SR preferences.

Variables	(1) Probit	(3) IV_regr	(4) Probit	(6) IV_regr
FL	0.112 * ** (0.014)	0.189 * (0.098)	0.072 * ** (0.020)	0.353 * ** (0.125)
MALE	0.017 (0.073)	0.011 (0.109)	0.084 (0.111)	-0.049 (0.166)
AGE	-0.003 (0.003)	-0.006 (0.005)	0.012 * ** (0.005)	0.007 (0.007)
WIDOWERS/DIVORCED	-0.064 (0.116)	-0.144 (0.166)	-0.286 (0.201)	-0.310 (0.275)
SINGLE	-0.139 (0.117)	-0.258 (0.181)	-0.135 (0.173)	-0.042 (0.240)
UNIVERSITY DEGREE	0.687 * ** (0.172)	0.806 * * (0.323)	0.603 * * (0.275)	0.300 (0.427)
HIGH DEGREE	0.407 * ** (0.141)	0.405 (0.257)	0.426 * (0.228)	0.027 (0.386)
LOW SECONDARY SCHOOL	0.174 (0.138)	0.055 (0.208)	-0.077 (0.204)	-0.264 (0.295)
LIVING WITH CHILDREN	0.011 (0.089)	-0.049 (0.132)	-0.090 (0.132)	-0.172 (0.183)
< 644	-0.234 (0.288)	-0.518 (0.447)	-0.572 (0.483)	-0.124 (0.716)
644–1059	-0.554 * ** (0.205)	-0.861 * * (0.384)	-0.362 (0.335)	0.420 (0.619)
1060–1549	-0.325 * (0.167)	-0.532 * (0.308)	-0.177 (0.281)	0.263 (0.451)
1550–3875	-0.276 * (0.153)	-0.438 * (0.241)	-0.112 (0.259)	0.119 (0.373)
UNEMPLOYED	0.025 (0.091)	-0.035 (0.143)	-0.184 (0.133)	-0.078 (0.191)
LOOKING FOR A JOB	-0.034 (0.162)	-0.044 (0.261)	0.075 (0.240)	0.294 (0.337)
NEG_EXP	0.199 * ** (0.031)	0.324 * ** (0.046)	0.089 * ** (0.043)	0.212 * ** (0.078)
NORTH-WEST	-0.227 * * (0.101)	-0.288 * (0.151)	0.137 (0.172)	0.601 * ** (0.300)
NORTH-EAST	0.186 (0.127)	0.362 * (0.203)	0.031 (0.167)	0.472 (0.313)
CENTER	0.131 (0.097)	0.302 * * (0.149)	-0.191 (0.165)	0.031 (0.259)
Constant	-	0.650 (1.046)	-	-1.520 (1.334)
Observations	937	937	391	391
Sargan	-	0.111	-	0.114
Durbin	-	0.006	-	0.004
R-squared	0.05	0.243	0.07	0.261

Note: This table reports the results of the probit and the probit IV regression where the dependent variable is the probability of choosing an SR intermediary. The main independent variable is the individual's financial literacy level. The sample is split into two parts: a) individuals with an SR preference higher than the median; b) individuals with an SR preference level lower than the median.

Standard errors in parentheses

* ** p < 0.01, * * p < 0.05, * p < 0.1

5. Additional analysis and robustness checks

In [Section 3](#), we demonstrate that retail investors' self-reported preferences for SRI and their FL both positively impact on the choice of SR financial intermediaries. In order to establish whether this is general or whether there are reference thresholds to consider, we conduct some additional analyses.

First, we split our sample into tertiles according to the level of FL of respondents. Results are shown in [Table 4](#), where Columns (1) and (2) report sub-samples based on low (first tertile of the distribution) and high (third tertile of the distribution) FL, respectively. To compare regression coefficients across groups and test whether their difference is statistically significant, we run the test of difference in coefficients. The p-value of our test is 0.001, thus suggesting that the difference between the two coefficient SR_INV is statistically significant. The variable SR_INV remains statistically significant and positive, which means that preference for SRI leads all retail investors to choose SR financial intermediaries, regardless of their level of FL. However, looking at the magnitude of the coefficients, the SR_INV coefficient in Column (1) is more than double that in Column (2). This suggests that when the level of FL is low, the preference for SRI is more important in determining the choice of SR financial intermediaries.

Second, we split our sample according to the level of SR self-reported preferences of respondents ([Table 5](#)). We identify individuals

Table 6
The choice of SR financial intermediaries and FK measured by PCA.

VARIABLES	(1) Probit	(3) IV_regr
FK(PCA)	0.157 * ** (0.017)	0.670 * ** (0.241)
SR_INV	0.193 * ** (0.016)	0.238 * ** (0.026)
MALE	0.018 (0.048)	-0.067 (0.081)
AGE	0.003 (0.002)	0.003 (0.003)
WIDOWERS/DIVORCED	-0.125 (0.078)	-0.231 * * (0.116)
SINGLE	-0.166 * * (0.075)	-0.266 * * (0.110)
UNIVERSITY DEGREE	0.477 * ** (0.116)	0.259 (0.224)
HIGH DEGREE	0.256 * ** (0.095)	0.031 (0.193)
LOW SECONDARY SCHOOL	-0.018 (0.092)	-0.216 (0.154)
LIVING WITH CHILDREN	0.000 (0.057)	-0.110 (0.093)
< 644	-0.294 (0.205)	-0.032 (0.375)
644–1059	-0.476 * ** (0.139)	-0.132 (0.333)
1060–1549	-0.298 * ** (0.115)	-0.085 (0.239)
1550–3875	-0.268 * * (0.107)	-0.262 (0.162)
UNEMPLOYED	-0.144 * * (0.059)	-0.221 * ** (0.086)
LOOKING FOR A JOB	-0.020 (0.107)	-0.069 (0.159)
NEG_EXP	0.132 * ** (0.018)	0.231 * ** (0.036)
NORTH-WEST	-0.137 * * (0.068)	-0.160 * (0.097)
NORTH-EAST	0.123 (0.079)	0.364 * ** (0.140)
CENTER	0.084 (0.064)	0.179 * (0.093)
Constant	-	1.963 * ** (0.298)
Observations	2036	2036
Sargan		0.441
Durbin		0.005
Pseudo-Rsquared	0.073	
R-squared		0.045

Note: This table reports the results of the probit and the probit IV regression where the dependent variable is the probability of choosing an SR intermediary. The main independent variables are: a) SR preferences of the investor; b) financial knowledge defined using the principal component analysis.

Standard errors in parentheses

* ** p < 0.01, * * p < 0.05, * p < 0.1

with low SR preferences, i.e., answering the question with 1 or 2 (Columns 1 and 2), and investors with high SR preferences, i.e., answering the question with 4 or 5 (Columns 3 and 4). In this case too, we run the test of difference in coefficients across two sub-samples. The p-value (0.002) shows that the two coefficients can be considered statistically different. The variable FL remains statistically significant and positive, which means that FL leads all retail investors to choose SR financial intermediaries, regardless of their preferences for SRI. However, considering the more robust Model 2, and the magnitude of the coefficients, we observe that the FL coefficient in Column (4) is approximately double that in Column (2). This means that FL is always crucial in determining the choice of SR financial intermediaries, but it matters more for individuals highly oriented towards SRI.

We also conduct some robustness tests. First, we introduce into Models 1 and 2 a further variable measuring FK (FK_PCA), created

Table 7
Self-reported FK and the choice of SR financial intermediaries.

VARIABLES	(1) Probit	(2) IV_regr
FK_SELF_REP	0.198 * ** (0.025)	0.700 * ** (0.248)
SR_INV	0.180 * ** (0.016)	0.204 * ** (0.032)
MALE	0.004 (0.049)	-0.094 (0.083)
AGE	0.002 (0.002)	0.001 (0.003)
WIDOWERS/DIVORCED	-0.093 (0.078)	-0.107 (0.107)
SINGLE	-0.148 * * (0.075)	-0.207 * * (0.104)
UNIVERSITY DEGREE	0.443 * ** (0.117)	0.222 (0.225)
HIGH DEGREE	0.247 * ** (0.095)	0.061 (0.178)
LOW SECONDARY SCHOOL	0.017 (0.091)	-0.062 (0.127)
LIVING WITH CHILDREN	0.023 (0.057)	-0.013 (0.079)
< 644	-0.356 * (0.205)	-0.358 (0.301)
644–1059	-0.552 * ** (0.138)	-0.531 * ** (0.224)
1060–1549	-0.327 * ** (0.115)	-0.270 (0.188)
1550–3875	-0.254 * * (0.107)	-0.245 (0.155)
UNEMPLOYED	-0.103 * (0.059)	-0.081 (0.094)
LOOKING FOR A JOB	0.058 (0.107)	0.197 (0.159)
NEG_EXP	0.093 * ** (0.019)	0.085 * * (0.038)
NORTH-WEST	-0.162 * * (0.068)	-0.239 * ** (0.096)
NORTH-EAST	0.014 (0.079)	-0.051 (0.127)
CENTER	0.065 (0.064)	0.103 (0.090)
Constant		0.786 * (0.463)
Observations	2036	2036
Sargan		0.164
Durbin		0.006
Pseudo Rsquared	0.128	
R-squared		0.144

Note: This table reports the results of the probit and the probit IV regression where the dependent variable is the probability of choosing an SR intermediary. The main independent variables are: a) SR preferences of the investor; b) self-reported financial literacy level (FL).

Standard errors in parentheses

* ** p < 0.01, * * p < 0.05, * p < 0.1

using principal component factor analysis (PCA), as suggested by Borges and Pownall (2014). We estimate this variable retaining only the components with an eigenvalue higher or equal to one (Comp1).⁴ The results, shown in Table 6, confirm our previous results, strongly supporting both Hypotheses 1 and 2.

Moreover, as a further robustness check, we substitute the objective FK index, measured using the Big Five Questions proposed by Lusardi and Mitchell (2007a); b), with subjective (self-reported) FK.

The survey in fact contains the following direct question assessing the respondent's level of self-confidence: "How would you rate your level of financial knowledge on a scale of 1–5 compared with other adults in your country?" (1 = well below average, 5 = well above average). The results, reported in Table 7, strongly support our previous findings. Specifically, FK, including when it is self-reported,

⁴ More details on PCA are reported in the Appendix.

Table 8
Propensity score matching.

ATET	Coef	St.err robust	p-value	[95% conf	Interval]
HIGH_FL					
NNM(1)	0.519	0.126	0.000	0.270	0.768
NNM(2)	0.616	0.117	0.000	0.386	0.846
NNM(3)	0.618	0.113	0.000	0.396	0.841
NNM(4)	0.627	0.108	0.000	0.414	0.839
HIGH_SR_INV					
NNM(1)	0.211	0.115	0.068	-0.015	0.437
NNM(2)	0.241	0.099	0.015	0.047	0.435
NNM(3)	0.246	0.093	0.008	0.063	0.428
NNM(4)	0.208	0.088	0.019	0.034	0.381

Note [Table 7](#) reports the results of the propensity score matching and shows the coefficients, the robust standard errors, the p-value and the interval of significance. Different nearest neighbor matching procedures (from 1 to 4) are used to perform the analysis.

positively affects the intention to choose SR financial intermediaries. This partially contradicts previous findings by [Rossi et al. \(2019\)](#), who find different results depending on the use of subjective or objective FK measures. Our findings can be explained considering that the main bias affecting self-reported FK is overconfidence ([Anderson et al., 2017](#); [Gutsche et al., 2021](#)), although among the OECD countries Italy, together with Austria, displays the lowest incidence of individuals overconfident of their FK ([di Salvatore et al., 2018](#)). It is therefore reasonable to find that FK positively impacts the intention to choose SR financial intermediaries, both when it is subjectively and objectively measured.

Following previous literature ([Bottazzi and Lusardi, 2021](#); [Madeira and Margaretic, 2022](#)), to check the robustness of our main analysis, we also run a propensity score matching model (PSM). Propensity scoring is a method of estimating the effects of treatment when random assignment of treatment to subjects is not feasible. It consists of the pairing of treatment and control units with similar values on the propensity score and possibly other covariates, and the discarding of all unmatched units ([Rubin, 2001](#)). It is mainly used to compare two groups of subjects, but can be also used for more than two groups. In our analysis, treated subjects are individuals with high financial literacy in the first case, and individuals with high preference for SR financial investments in the second case. The control groups of individuals are those having a low level of FL and low preference for SR financial investments, respectively. To perform the PSM, we first measure the propensity score, and secondly, we measure the effect of having high FL and having high preference for SR investments on the choice of SR financial intermediaries. When the propensity score method is used, the decision on how many comparison units to match is important. If one single comparison unit is used, PSM ensures the smallest propensity-score distance between the treatment and the control group; whereas if more than one comparison unit is used there can be increased bias even though the estimates are still precise. The nearest-neighbor method makes it possible to select m comparison units whose propensity scores are closest to the treated unit in question. Caliper matching is another method, and uses all the comparison units within a predefined propensity score radius, or “caliper”. An advantage of caliper matching is that it uses only as many comparison units as are available within the calipers, allowing for the use of extra-units when good matches are available ([Dehejia and Wahba, 2002](#)). Therefore, we run the propensity score matching method incorporating both nearest-neighbor matching and the caliper method.

[Table 8](#) reports the results obtained using the Nearest Neighbor Matching (NNM) and Caliper at 0.01. In this method, the absolute difference between the estimated propensity scores for the control and treatment groups is minimized. As suggested by [Bottazzi and Lusardi \(2021\)](#), we use different m of nearest neighbors – i.e., from 1 to 4 – as the number of matching procedures. We also incorporate the caliper method to improve the quality of matching. [Fig. A1 in the Appendix](#) shows the matching results between the treated and control groups.

The results confirm our main findings. Individuals with higher financial literacy, and individuals with high preference for SR financial investments, are more likely to prefer SR financial intermediaries. The results are also confirmed when a different number of neighbors are used. They again indicate that SR investors and more financial literate individuals tend to prefer SR financial intermediaries. This implies that in order to attract more financially literate customers and SR retail investors, it is not sufficient for financial companies to offer both traditional and SRI products; they also need to implement ESG strategies that allow them to be perceived as sustainable intermediaries.

6. Conclusion

This study tests whether it is important for financial intermediaries to be perceived as SR in order to attract more financially literate customers and investors, oriented towards SRI investing. Although previous literature studies in-depth the determinants of retail investor preferences for SRI products, the analysis of preferences for SR financial intermediaries is to date almost unexplored. We aim to fill this gap by investigating the potential market for SR financial intermediaries adopting ESG strategies and offering both traditional and SRI products for the entire population of Italian adults. We use a survey administered by the Bank of Italy ([D’Alessio et al., 2020](#)) to a representative sample of Italians aged between 18 and 79. We aim to test whether and how retail investor preferences toward SRI and their FL impact on the choice of SR financial intermediaries. We investigate whether there is market room for SR financial intermediaries and identify the population segments most oriented to these intermediaries.

Summarizing, we find that retail investors characterized by high self-reported SRI preferences and high FL tend to choose, more

Table A1
Principal component analysis.

Panel A					
Component	Eigenvalue	Difference	Proportion	Cumulative	
Comp1	2.207	1.299	0.441	0.441	
Comp2	0.907	0.126	0.182	0.623	
Comp3	0.782	0.167	0.156	0.779	
Comp4	0.614	0.124	0.123	0.902	
Comp5	0.490	.	0.098	1.000	
Panel B					
Variable	Comp1	Comp2	Comp3	Comp4	Unexplained
FK1_Inflation	0.392	0.185	0.884	0.169	0.001
FK2_Simple Int	0.496	-0.413	-0.206	0.195	0.247
FK3_Compound Int	0.451	-0.613	-0.005	-0.190	0.189
FK4_Risk-Return	0.441	0.462	-0.389	0.585	0.048
FK5_Diversification	0.450	0.454	-0.158	-0.745	0.006

Table reports the results of a principal component factor analysis on five financial knowledge questions. In Panel A we report the eigenvalues and the (cumulative) proportions of the variance explained when using 1–5 factors. In Panel B we report the eigenvectors.

Table A2
Summary statistics.

	VIF	N	Mean	Median	SD	Min	Max
SR_INT	-	2036	2.362	3.000	1.566	0	5
SR_INV	1.04	2036	2.286	3.000	1.533	0	5
FL	1.18	2036	9.593	9.333	2.995	3	18.33
MALE	1.07	2036	0.5	1.000	0.5	0	1
AGE	2.26	2036	51.694	51.000	17.368	18	79
WIDOWS/DIVORCED	1.25	2036	0.132	0.000	0.339	0	1
SINGLE	1.89	2036	0.241	0.000	0.428	0	1
UNIVERSITY DEGREE	2.64	2036	0.122	0.000	0.328	0	1
HIGH DEGREE	4.05	2036	0.479	0.000	0.5	0	1
LOW SECONDARY SCHOOL	3.03	2036	0.28	0.000	0.449	0	1
LIVES WITH CHILD	1.45	2036	0.395	0.000	0.489	0	1
< 644	1.51	2036	0.02	0.000	0.141	0	1
644 – 1059	3.43	2036	0.109	0.000	0.311	0	1
1.060 – 1549	5.49	2036	0.337	0.000	0.473	0	1
1550 – 3.875	5.23	2036	0.474	0.000	0.499	0	1
UNEMPLOYED	1.57	2036	0.438	0.000	0.496	0	1
LOOKING FOR A JOB	1.22	2036	0.062	0.000	0.241	0	1
NEGATIVE EXPERIENCE	1.08	2036	0.43	0.000	1.298	0	8
NORTH-WEST	1.49	2036	0.235	0.000	0.424	0	1
NORTH-EAST	1.31	2036	0.131	0.000	0.337	0	1
CENTER	1.32	2036	0.228	0.000	0.42	0	1

Note: This table reports the descriptive statistics of the variables used in our analyses

than other people, SR financial intermediaries. These are identified as financial intermediaries that, on the one hand, offer both traditional and SRI products, and, on the other, are also perceived to adopt SR behavior, as they implement specific ESG strategies in relation to customers, employees, suppliers and, in general, towards stakeholders.

The role of SRI preferences in determining this choice is more important for financially illiterate than for financially literate individuals. Conversely, the role of FL in explaining the orientation toward SR intermediaries is stronger for retail investors characterized by high rather than low SRI preferences. Investigating FL in more depth, our results show that individuals with high FK and high FB related to savings and financial control choose SR financial intermediaries more than others, while a high FA towards savings and spending tends to discourage this choice. Moreover, specific knowledge about portfolio diversification increases preference for SR financial intermediaries offering both traditional and SRI products.

Socio-demographic and economic characteristics also matter in explaining the choice of SR intermediaries. Specifically, individuals characterized by high education, high family income, married status, employed status, with previous negative financial experience and living in the North-East and Center of Italy tend to show more preference for SR financial intermediaries than other people.

Our findings have some important theoretical, practical and policy implications. Theoretically, they suggest that retail investor preferences for SRI and their FL impact not only on the choice of SRI products, as shown by previous literature, but also on the choice of SR financial intermediaries. In this context, our investigation underlines the importance of focusing not only on the role of FK in explaining individual financial choices, as suggested by extant papers, but on all the three dimensions of FL, i.e., FK, FB and FA. These are in fact shown to impact differently on investor preferences for SR financial intermediaries.

Table A3
Variable description.

Variable	Explanation
SR_INT	A categorical variable defined on the basis of response to the following sentence "I prefer to turn to financial intermediaries who make choices based on ethics (investments in clean energy, ban on investing in military equipment.)", where the respondent is asked to indicate the level of agreement on a 5-point Likert scale.
SR_INV	A categorical variable which can take values from 0 to 5 according to response to the following sentence "I think it is more important for investors to choose companies that stand making profits rather than those that are reducing the environmental, social and governance impact", where 0 is "refuse to answer" or "do not know", 1 is "completely agree" and 5 is "completely not agree".
FL	Financial literacy score resulting from the sum of financial knowledge, financial attitude and financial behavior. Ranges from 1 to 19.
FK	A measure of basic financial knowledge. Respondents are asked to answer the Big Five financial knowledge questions proposed by Lusardi and Mitchell (2007a; b). Ranges from 0 to 5.
FK_div	A dummy variable that equals 1 if the respondent answers correctly the question "It is usually possible to reduce the risk of investing in the stock market by buying a wide range of stocks and shares", 0 otherwise.
FK(PCA)	Financial knowledge index measured using principal component analysis. FK index retains only the components with an eigenvalue higher or equal to one (Comp1).
FK_SELF_REP	Self-reported financial knowledge; respondents answer the question: "How would you rate your level of financial knowledge on a scale of 1–5 compared with other adults in your country?" (1 = well below average, 5 = well above average).
FB	A categorical variable ranging from 2 to 9. It is calculated by the sum of 8 questions on investor behavior related to savings and financial control, 7 of which can take value 1 or 0, and one of which can take values 0, 1 or 2.
FA	Financial attitude - a measure of attitude towards savings and spending. Respondents are asked to respond to three sentences, each requiring a level of agreement on a 5-point Likert scale.
MALE	A dummy variable that equals 1 if the respondent is male, 0 otherwise.
AGE	Measured using a set of dummy variables taking value 1 if the respondent falls into a specific category, i.e., 18–25; 26–45; 46–65, 0 otherwise
WIDOWERS/DIVORCED	A dummy variable that equals 1 if the respondent is widowed or divorced, 0 otherwise.
SINGLE	A dummy variable that equals 1 if the respondent is single, 0 otherwise.
UNIVERSITY DEGREE	A dummy variable that equals 1 if the respondent has at least a university degree, 0 otherwise.
HIGH SCHOOL DIPLOMA	A dummy variable that equals 1 if the respondent has at a high school diploma, 0 otherwise.
LOW SECONDARY SCHOOL	A dummy variable that equals 1 if the respondent has at a low secondary school education, 0 otherwise.
LIVING WITH CHILDREN < 644	A dummy variable that equals 1 if the respondent lives with at least one child, 0 otherwise.
644–1059	A dummy variable that equals 1 if the respondent has a monthly family income lower than 644 euro, 0 otherwise.
1.060–1549	A dummy variable that equals 1 if the respondent has a monthly family income between 644 and 1059 euro, 0 otherwise.
1550–3875	A dummy variable that equals 1 if the respondent has a monthly family income between 1060 and 1549 euro, 0 otherwise.
UNEMPLOYED	A dummy variable that equals 1 if the respondent has a monthly family income between 1550 and 3875 euro, 0 otherwise.
LOOKING FOR A JOB	A dummy variable that equals 1 if the respondent is unemployed, 0 otherwise.
NEG_EXP	A dummy variable that equals 1 if the respondent is looking for a job, 0 otherwise.
	A categorical variable showing the number of negative financial experiences suffered by the respondent. Ranges from 0 to 8. Respondents are asked the following question: Have you been in any of the following situations in the last two years? (True or False): 1) I've accepted suggestions to invest in something which following a police investigation turned out to be a scam (e.g., pyramid scheme); 2) I provided financial and banking information in response to an email (phishing) or a phone call that later turned out to be dishonest; 3) I discovered that someone used my cards (credit, debit, prepaid ...) or my data to purchase goods and services without being authorized; 4) I requested information about a transaction on my bank statement or credit card which I did not recognize; 5) I have made a formal complaint about a service from a bank or other intermediary; 6) I did not receive compensation from insurance which I thought was due to me; 7) I complained to a provider (bank, money transfer.) about the costs of a bank transfer; 8) I lost money to a hacker scam or phishing.
NORTH-WEST	A dummy variable that equals 1 if the respondent lives in the North-West, 0 otherwise.
NORTH-EAST	A dummy variable that equals 1 if the respondent lives in the North-East, 0 otherwise.
CENTER	A dummy variable that equals 1 if the respondent lives in the Center, 0 otherwise.

Note: This table reports the description of the variables used in our analyses.

Practically, the study could help SR financial institutions to better target potential customers interested in their products and services. Our evidence in fact identifies the socio-demographic and socio-economic characteristics of those retail investors who are particularly oriented towards SR financial intermediaries. Our findings relating to the preferences of SR investors are also of great value to financial companies. Previous literature has shown that SR-oriented individuals tend to prefer SRI, and here new evidence about SR intermediaries is presented. Specifically, we find that for financial companies to attract SR investors, it is important not only offer SRI, but also to be SR themselves. Financial intermediaries should therefore make greater disclosure of their SR in order to better inform existing and potential customers on their SR orientation and strategy.

From the policy point of view, our findings suggest that improvements in FK and FB levels may significantly contribute to increasing trust in financial intermediaries offering SRI products and implementing ESG strategies, to overcoming initial entry hurdles for individual investors, and to encouraging participation in the SRI market. The mobilization of capital flows towards sustainable investments suggested by the Paris Agreement on climate change (UNFCCC, 2015) requires a good understanding of both institutional and retail investors' preferences for SRI. Following a personal finance perspective, we demonstrate that FL is a powerful instrument

Table A4
Relationship between instrumental variables, financial literacy and SR_INT.

VARIABLES	(1) FL	(2) FL	(3) SR_INT	(4) SR_INT
INTERNET	2.248 *** (0.205)	-	-	0.580 (0.709)
FL_AREA		1.000 *** (0.148)	-0.0730 (0.0780)	-
Constant	9.341 *** (0.0685)	-8.12e-08 (1.417)	3.062 *** (0.749)	2.298 *** (0.0366)
Observations	2036	2036	2036	2036
R-squared	0.056	0.022	0.000	0.014

Note: Table reports results of the OLS regression to show the relationship between the instrumental variables, financial literacy (instrumented variable) and SR_INT (the main dependent variable).

Table A5
Determinants of financial literacy – first step of the IV regressions.

VARIABLES	(1) FL	(2) FK	(3) FA	(4) FB	(5) FK_div	(6) FL_PCA	(7) FL_high esg	(8) FL_low esg
MALE	0.072 (0.046)	0.099 ** (0.048)	-0.027 (0.046)	0.044 (0.047)	0.051 (0.059)	0.144 ** (0.064)	0.162 (0.105)	0.055 (0.051)
AGE	0.007 *** (0.002)	0.000 (0.002)	0.006 *** (0.002)	0.008 *** (0.002)	0.001 (0.002)	0.001 (0.003)	0.009 ** (0.004)	0.006 *** (0.002)
WIDOWERS/DIVORCED	-0.033 (0.072)	0.025 (0.075)	-0.278 *** (0.073)	0.052 (0.073)	0.035 (0.094)	0.081 (0.102)	-0.027 (0.191)	-0.028 (0.079)
SINGLE	-0.193 *** (0.064)	-0.048 (0.066)	-0.262 *** (0.064)	-0.144 ** (0.065)	-0.062 (0.082)	-0.063 (0.089)	-0.179 (0.146)	-0.193 *** (0.071)
UNIVERSITY DEGREE	0.417 *** (0.110)	0.481 *** (0.114)	-0.147 (0.110)	0.345 *** (0.112)	0.356 ** (0.141)	0.579 *** (0.154)	0.498 * (0.262)	0.401 *** (0.122)
HIGH DEGREE	0.453 *** (0.089)	0.430 *** (0.092)	-0.095 (0.089)	0.381 *** (0.090)	0.329 *** (0.115)	0.540 *** (0.124)	0.557 *** (0.216)	0.430 *** (0.098)
LOW SECONDARY SCHOOL	0.244 *** (0.085)	0.307 *** (0.089)	-0.183 ** (0.086)	0.206 ** (0.087)	0.210 * (0.110)	0.368 *** (0.119)	0.235 (0.194)	0.247 *** (0.095)
< 644	-0.598 *** (0.190)	-0.674 *** (0.200)	0.496 *** (0.192)	-0.639 *** (0.194)	-0.824 *** (0.254)	-0.917 *** (0.267)	-0.483 (0.454)	-0.598 *** (0.211)
644–1059	-0.778 *** (0.125)	-0.808 *** (0.131)	0.471 ** (0.126)	-0.786 *** (0.128)	-0.762 *** (0.163)	-1.106 *** (0.175)	-0.976 *** (0.309)	-0.747 *** (0.138)
1060–1549	-0.530 *** (0.106)	-0.540 *** (0.111)	0.279 *** (0.106)	-0.516 *** (0.108)	-0.472 *** (0.137)	-0.743 *** (0.148)	-0.690 *** (0.262)	-0.515 *** (0.116)
1550–3875	-0.200 ** (0.100)	-0.189 * (0.106)	0.281 *** (0.101)	-0.298 *** (0.102)	-0.126 (0.131)	-0.233 * (0.141)	-0.364 (0.245)	-0.183 * (0.110)
UNEMPLOYED	-0.066 (0.056)	0.035 (0.058)	-0.004 (0.056)	-0.146 ** (0.057)	-0.076 (0.071)	0.056 (0.079)	-0.075 (0.126)	-0.065 (0.063)
LOOKING FOR A JOB	-0.137 (0.101)	0.160 (0.104)	-0.044 (0.102)	-0.340 *** (0.104)	0.114 (0.127)	0.237 * (0.142)	0.015 (0.228)	-0.190 * (0.113)
FL_AREA	0.263 *** (0.051)	0.125 ** (0.052)	0.058 (0.051)	0.316 *** (0.052)	0.197 *** (0.065)	0.140 ** (0.071)	0.401 *** (0.109)	0.212 *** (0.058)
INTERNET	0.598 *** (0.074)	0.369 *** (0.077)	0.026 (0.074)	0.652 *** (0.076)	0.480 *** (0.099)	0.474 *** (0.104)	0.553 *** (0.188)	0.609 *** (0.081)
Constant					-1.895 *** (0.657)	-1.383 * (0.721)		
Observations	2036	2036	2036	2036	2036	2036	391	1645
R-squared	0.108	0.102	0.105	0.101	0.107	0.108	0.108	0.109

Note: This table reports the results of the first step of the IV regressions run using different measures of financial literacy. As instrumental variables we use the average financial literacy level of the geographical area in which the respondent lives, and the individual's use of internet.

that allows retail investors to make financial decisions while simultaneously taking their SR preferences into account. Low FL is shown to be an important obstacle to SRI by individual investors, which implies that targeted financial education programs on specific SRIs and on more general financial topics are required.

Our findings show some limitations which open up new avenues for future research. First, the study considers self-reported preferences towards SRI and investigates only retail investor intention to choose SR financial intermediaries. Future research should replicate our analysis using actual choices as well as preferences for SRI and SR financial intermediaries. Second, the paper investigates the different roles of FK, FB and FA in explaining retail investor orientation for SR financial intermediaries, but the proxy used to estimate FA captures only the attitude towards savings and spending, without considering other dimensions of FA identified by previous literature, such as financial anxiety, optimism, financial security, deliberative thinking, and interest in financial issues. These dimensions should be considered in future research. Finally, our analysis focuses only on Italy, and simultaneous investigation

a) Financial literacy (High vs Low)

b) SR investors (High vs Low)

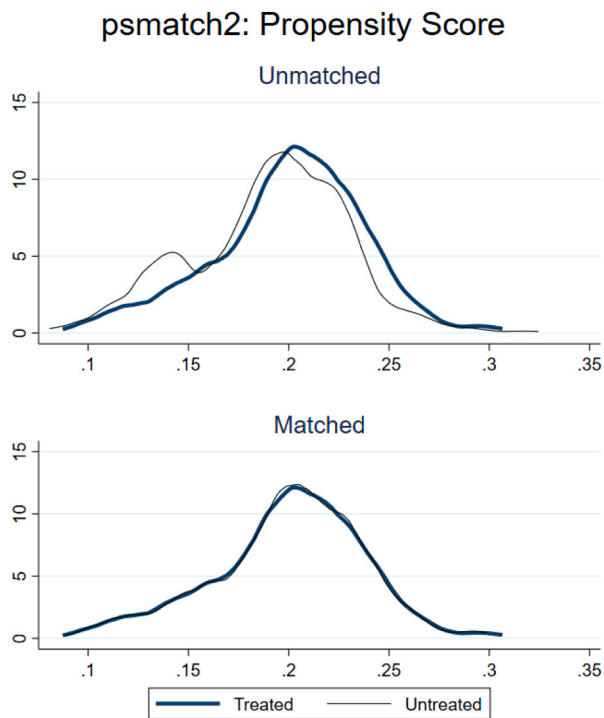
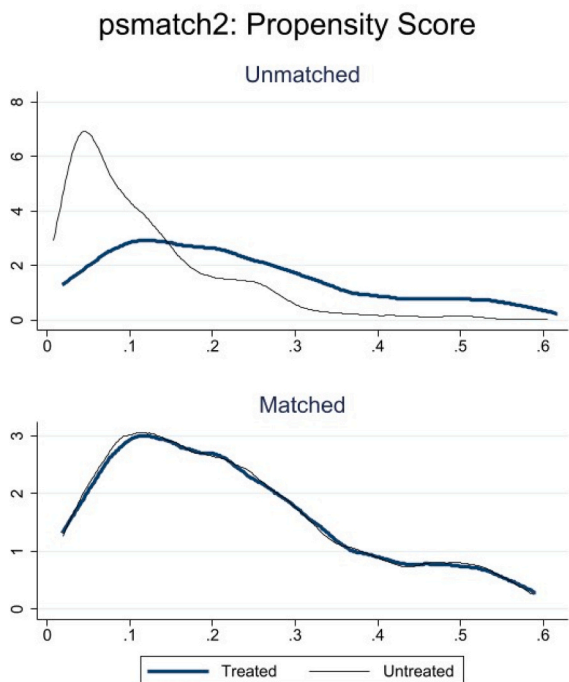


Fig. A1. Propensity score matching results. Note: These figures show the results of the propensity score matching and the two groups of treated and control group, before and after the matching, for both the financial literacy and the SR preference.

applying the same methodology across different countries would be useful and interesting.

CRedit authorship contribution statement

Maria Gaia Soana: Conceptualization, Writing - Original draft preparation and Editing. **Doriana Cucinelli:** Data curation, Methodology, Software, Writing- Reviewing and Editing.

Data availability

Data will be made available on request.

Appendix

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