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Catherine D'Hondt† Maxime Merli‡ Tristan Roger§

August 31, 2021

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Keywords: ESG factors, Crises, Financial literacy, Risk tolerance, Retail investors
JEL Classification: G11, G40

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1 Introduction

Retail investors have shown increasing interest in sustainable investing over the last decade. At the end of 2017, retail investors held 25% of the global socially responsible investment (SRI) portfolio, up from 11% in 2012 (GSIA, 2018).[1] Despite the growing importance of the retail segment in SRI, very little is known about how portfolio exposure to environmental, social, and corporate governance factors, i.e., ESG factors, differs across retail investors and over time. Better understanding the behavior of retail investors regarding ESG criteria becomes however crucial in a context where ESG considerations are put at the heart of the financial ecosystem and are reshaping regulatory frameworks and industry standards.[2] This paper fills the gap by examining stock holdings in a large set of retail trading accounts over the 2005-2011 period. Specifically, we investigate the time-varying exposure of retail stock portfolios to the three ESG factors while controlling for a large panel of sociodemographic and individual characteristics. Our historical perspective also allows us to identify the impact of the 2008 financial crisis on retail stock portfolio ESG scores.

Past and current research attempts to capture ESG preferences through fund inflows (Hartzmark and Sussman, 2019), market participation (Brière and Ramelli, 2021), reactions to ESG disclosures (Moss et al., 2020), field experiments and questionnaires (Ridel and Smeets, 2017; Rossi et al., 2019; Bauer et al., 2021; Heeb et al., 2021), and lab experiments (Cheng et al., 2015; Martin and Moser, 2016). Our contribution to this growing literature is threefold. First, we provide new insights into ESG preferences among retail investors. By controlling for both subjective financial literacy and subjective risk tolerance,[3] our paper helps better sketch the profile of the retail investors most likely to hold stock portfolios with higher ESG scores. In particular, we add to the findings of Anderson and Robinson (2020) on the impact of financial literacy and provide empirical evidence of a significant negative relationship between subjective financial literacy and stock portfolio environmental and social scores. Second, by combining survey data with actual

[1] This positive trend in retail demand for SRI is interpreted as a promising sign for the future development of the global SRI industry (PwC, 2020).

[2] For example, ESG preferences are integrated into the recent European "ESG Regulation", which is part of the European Commission's broader initiative on sustainable development. In short, this newly proposed ESG Regulation amends the existing "MiFID Organizational Regulation" and intends to clarify that ESG considerations and preferences should be integrated into the investment and advisory process in a consistent manner across sectors.

[3] The impact of financial literacy and risk tolerance on the behavior of retail investors is well documented in the literature (e.g., Dorn and Huberman (2005), Graham et al. (2009),van Rooij et al. (2011), Balloch et al. (2014), Hoffmann et al. (2015), Bellofatto et al. (2018)).

trading activity data, we are the first, to the best of our knowledge, to separately identify the determinants of each ESG factor within the same sample of retail investors. We find identical drivers of both the environmental and social components of retail ESG exposure, while some differences emerge for the governance factor. Third, recent research points to a reduced interest in environmental and social factors during the COVID-19 crisis (Döttling and Kim, 2021; Glossner et al., 2021). This suggests that retail investors might consider ESG investments a luxury good (Baumol and Oates, 1979). These results are based on indirect measures of ESG preferences (i.e., inferred from fund flows or trading volume) and are not controlled for individual investor characteristics. Thanks to our panel data analyses spanning a 7-year period that includes the 2008 financial crisis, we show that retail stock portfolio ESG scores significantly decreased during that crisis, even when controlling for a large panel of sociodemographic and individual characteristics. Our findings confirm that retail ESG preferences are time varying and not fully resilient to stressful periods. Put differently, we provide empirical support for the "luxury good" characterization of ESG investing.

The rest of the paper is organized as follows. Section 2 describes our data, our sample, and our approach to measuring stock portfolio ESG scores. We report our empirical analyses in Section 3. Section 4 concludes.

2 Retail data and ESG scores

2.1 Retail trading accounts

Our primary data set comes from a large Belgian online brokerage firm and consists of the trading accounts of 9,826 retail investors.[4] These unique data span approximately 10 years from January 2003 to March 2012 and therefore include the 2008 financial crisis. For the purpose of this study, we exclusively focus on common stock investments. Using the trading data, we build end-of-month stock portfolios for each investor and rely on historical market data to compute monthly portfolio values.[5]

Over the whole 111-month period, our sample of investors executed a total of 1,610,609 trades

[4]The same database is used in D'Hondt and Roger (2017), Bellofatto et al. (2018), D'Hondt et al. (2020), Desagre and D'Hondt (2021), and D'Hondt et al. (2021).

[5]Historical stock prices come from EUROFIDAI (`www.eurofidai.org`) and Bloomberg.

on stocks,[6] representing an aggregate amount exceeding €13,669 million. On a monthly basis, the typical investor executed 4.7 trades (2 trades for the median investor) with a corresponding value of €39,794 (median of €8,325). The cross-sectional average monthly portfolio value is €66,319 (with a median of €17,249), and the average portfolio size is 6.8 stocks (median of 4.6). These values point to a sample representative of retail investors.[7]

The trading account data include a set of sociodemographic characteristics, such as age, gender, spoken language, education, and survey-based subjective financial literacy and subjective risk tolerance measures.[8] As shown in Table 1, the average investor in our sample is 52 years old. The majority of our sample is male (i.e., 91.7%) and highly educated (i.e., 75.3%). Regarding language, 40.1% of our investors are French speaking.[9] For the subjective individual characteristics, the average investor self-reports high financial literacy (with a score of 3.6 out of 5) and high risk tolerance (with a score of 3.9 out of 5).

[6]Most of the trading activity pertains to Belgian stocks (34%), US stocks (20%), French stocks (17%) and Dutch stocks (9%).

[7]In the literature, the typical retail investor holds between 3 and 7 stocks, depending on the sample (e.g., Barber and Odean (2000), Kumar and Lee (2006), Merli and Roger (2013), Korniotis and Kumar (2013), Magron and Merli (2015)).

[8]These survey data were collected by the brokerage firm within the context of the Markets in Financial Instruments Directive (MiFID) regulation implemented in November 2007. MiFID I (2004/39/EC) was the first version of this directive, while a review of it, known as MiFID II (2014/65/UE), was implemented in January 2018. For more details, please visit the European Commission website (`https://ec.europa.eu/info/law/markets-financial-instruments-mifid-ii-directive-2014-65-eu_en`).

[9]Belgium has three official languages, among which French and Dutch are the most spoken.

Table 1: Statistics about individual characteristics

	%	Mean	Q1	Median	Q3
Panel A: **Sociodemographics**					
Age	-	52	43	52	62
Gender (male)	91.7	-	-	-	-
Language - French	40.1	-	-	-	-
Language - Dutch	56.4	-	-	-	-
Language - English	3.5	-	-	-	-
Education - University	75.3	-	-	-	-
Education - High school	20.4	-	-	-	-
Education - No degree	4.3	-	-	-	-
Panel B: **Subjective characteristics**					
Financial literacy (5-level scale)	-	3.6	3	4	4
Risk tolerance (5-level scale)	-	3.9	4	4	5

This table reports statistics about individual investor characteristics. Panel A provides sociodemographic characteristics, while Panel B refers to subjective measures based on survey data. *Age* is investor age in 2012. *Gender* is a dummy variable set to 1 for men. For *Language*, investors choose among French, Dutch, and English on the trading platform. *Education* refers to the level of education; three levels are available: no degree, secondary school/high school degree, and university degree (or equivalent). Each measure in Panel B is defined as an ordinal variable on a five-level scale designed by the brokerage firm for its MiFID questionnaires. With respect to financial literacy, investors self-assess their knowledge of financial markets on a scale ranging from 0 (no knowledge – level 1) to 5 (very good knowledge – level 5). Considering risk tolerance, investors self-report their attitude toward risk/losses on a scale ranging from 1 (high risk aversion – level 1) to 5 (high risk tolerance – level 5).

2.2 ESG data and stock portfolio ESG scores

Our ESG data come from Thomson Reuters Asset4.[10] Table 2 provides statistics on the matching between our trading data and the ESG ratings. Unsurprisingly, the coverage of the ESG ratings increases over time. For 2003, 60.55% of the stocks in our sample have an ESG rating, and 68.78% of the stock positions in end-of-month portfolios can be matched with ESG ratings. These two proportions steadily increase over the years to reach 89.32% and 94.03% for 2011, respectively. For years from 2005 onward, the extent of the ESG coverage is satisfactory, with 4 out of 5 stocks and 90% of stock positions having ESG ratings. In the data for the 2005-2011 period, more than 96% of investors hold at least one stock with ESG ratings, and more than 92% of investors have at least three stock positions rated on ESG factors. We therefore focus our main analysis on this period.[11]

For each investor and each quarter end, we measure the stock portfolio score for each of the three ESG factors separately. For a given factor, the portfolio score is calculated as the weighted

[10] Asset4 data are used in many articles (Semenova and Hassel, 2015; Ferrell et al., 2016; Liang and Renneboog, 2017; Chang et al., 2019; Dyck et al., 2019; Gomes, 2019; Dai et al., 2020; Flammer, 2021; Marsat et al., 2021).

[11] We exclude 2012 since we have trading data for only the first three months of that year.

Table 2: Statistics on the coverage of ESG ratings in our sample

Years	Number of stocks	Number of stocks with ESG ratings	Proportion of stocks with ESG ratings	Proportion of stock positions with ESG ratings	Proportion of investors with ESG ratings		
					with at least 1 position	with at least 2 positions	with at least 3 positions
2003	436	264	0.6055	0.6878	0.8117	0.6944	0.6492
2004	552	393	0.7120	0.8442	0.9336	0.8695	0.8300
2005	742	589	0.7938	0.8993	0.9624	0.9427	0.9236
2006	873	682	0.7812	0.9099	0.9673	0.9503	0.9319
2007	945	729	0.7714	0.9127	0.9717	0.9546	0.9389
2008	1002	853	0.8513	0.9346	0.9771	0.9672	0.9573
2009	1096	973	0.8878	0.9543	0.9867	0.9760	0.9723
2010	1126	1019	0.9050	0.9608	0.9876	0.9793	0.9809
2011	1152	1029	0.8932	0.9403	0.9828	0.9718	0.9669

The first column refers to the year. Column 2 indicates the number of stocks in our sample (i.e., for which at least one retail investor holds an open position at the end of the year). Column 3 indicates the number of stocks for which an ESG rating is available, while Column 4 provides the ratio between the number of stocks with ESG ratings and the total number of stocks. The sixth column shows the proportion of stock positions with ESG ratings based on end-of-month portfolios at the end of the corresponding year. The last three columns provide the proportion of retail investors who hold at least one, two, or three stock positions with ESG ratings.

average score of the different stocks held in the portfolio. Formally, we have:

$$E_{i,t} = \sum_{j=1}^{J} w_{i,j,t} \times \textit{E-rating}_{j,t} \tag{1}$$

$$S_{i,t} = \sum_{j=1}^{J} w_{i,j,t} \times \textit{S-rating}_{j,t} \tag{2}$$

$$G_{i,t} = \sum_{j=1}^{J} w_{i,j,t} \times \textit{G-rating}_{j,t} \tag{3}$$

where $\textit{E-rating}_{j,t}$ ($\textit{S-rating}_{j,t}$ and $\textit{G-rating}_{j,t}$, respectively) corresponds to the environmental (social and corporate governance, respectively) rating of stock j at the end of quarter t and $w_{i,j,t}$ is the weight of stock j in investor i's portfolio at the end of quarter t. Since stock positions with no ESG ratings at time t are disregarded, the sum of weights $w_{i,j,t}$ is equal to 1 for any quarter t and any investor i.

Table 3 gives a yearly overview of the average stock portfolio ESG scores (in bold) and a picture of how these scores would have evolved if stock holdings in a given year had remained unchanged (i.e., in the absence of portfolio rebalancing). The average stock portfolio scores are higher at the end of the sample period (in 2011) than at the beginning (in 2005). We note, however, that corporate governance scores decreased during the 2008 financial crisis. This is consistent with governance concerns being the most prevalent at that time.[12] In turn, environmental awareness in public opinion spiked after the United Nations Climate Change Conference (COP21) in 2015.[13]

[12]In 2011, the US Financial Crisis Inquiry Commission concluded that the 2008 financial crisis was caused by dramatic failures of corporate governance and risk management at many systemically important financial institutions (Commission, 2011).

[13]The survey "French citizens, COP21 and the action of mayors of large cities" highlights the ecological turn in public opinion, with the primary concern becoming the fight against climate change (IFOP, 2016).

Table 3: Evolution of stock portfolio ESG scores

Panel A: E score							
		⟶ Scores with no rebalancing					
	Actual scores	2006	2007	2008	2009	2010	2011
2005	**69.8554**	69.0735	69.9460	71.1676	74.2798	74.3731	76.3326
2006	**66.9564**		69.1608	70.7121	73.3810	73.1056	75.6884
2007	**66.3088**			68.0743	71.0209	70.6348	73.1764
2008	**66.7184**				69.4233	69.0464	71.2943
2009	**69.8112**					69.2120	71.2683
2010	**70.3498**						72.4258
2011	**73.2439**						
Panel B: S score							
		⟶ Scores with no rebalancing					
	Actual scores	2006	2007	2008	2009	2010	2011
2005	**71.3966**	69.1606	68.5158	71.2521	71.1669	72.7006	76.1669
2006	**68.6511**		67.3307	69.9583	70.3680	71.6443	75.8025
2007	**64.1251**			66.3889	67.2810	68.6462	72.4796
2008	**64.5126**				65.5032	66.9422	70.3275
2009	**65.7881**					67.1251	70.4656
2010	**68.0791**						71.2582
2011	**71.6379**						
Panel C: G score							
		⟶ Scores with no rebalancing					
	Actual scores	2006	2007	2008	2009	2010	2011
2005	**63.5976**	62.3692	62.3673	60.8652	66.9016	69.0225	71.6100
2006	**61.9602**		62.5260	59.2923	66.1749	68.1177	72.7439
2007	**59.3798**			57.0978	64.8534	67.1906	70.8914
2008	**56.5975**				62.6691	66.0640	70.1781
2009	**62.7418**					66.1600	69.7606
2010	**67.2238**						70.4099
2011	**70.9526**						

This table reports the evolution of average stock portfolio scores on each of the three ESG factors. In each panel, 'Actual scores' refers to the average stock portfolio score in the corresponding year. The upper triangular matrix represents the evolution of the average scores had investors not rebalanced their portfolios (with respect to the corresponding year at the beginning of each row). For instance, in the first row of Panel A, the actual average stock portfolio score on the environmental factor is equal to 69.86 in 2005. The score provided in the next column (i.e., 69.07) is the average score that would have been observed had investors kept their portfolios unchanged from their holdings in 2005. Similarly, the last column gives the average score that would have been observed in 2011 with unchanged portfolios from 2005 (i.e., 76.33).

Since the evolution of actual stock portfolio ESG scores in Table 3 may reflect either active security selection by investors and/or overall enhancement of firm ESG ratings over time,[14] the counterfactual view of how the scores would have changed without any portfolio rebalancing is insightful. On the environmental factor, the average portfolio score based on the 2005 stock holdings would have been 76.33 in 2011, greater than the average actual score of 73.24. Portfolio rebalancing on average erased the overall improvement in environmental firm ratings over time and even led to lower scores. Similar patterns are noticeable for both the social and governance scores. Hence, portfolio rebalancing over time mostly led to a decrease in ESG scores. We note a change, however, following the 2008 financial crisis, with investors rebalancing their portfolios toward stocks with higher ESG ratings. For instance, environmental scores evolve from 66.71 in 2008 to 73.24 in 2011, while keeping the portfolios of 2008 unchanged would have resulted in an environmental score of 71.29 in 2011. This pattern is found for all three ESG scores.

3 Empirical analyses

To identify the determinants of actual stock portfolio ESG scores, we estimate the following panel data regression model:

$$Y_{i,t} = \alpha + \beta_1 SD_i + \beta_2 SIC_i + \beta_3 TPTF_{i,t} + \beta_4 MKT_t + \epsilon_{i,t} \tag{4}$$

wherein the dependent variable is one of the ESG scores of the stock portfolio of investor i at the end of quarter t.[15] The explanatory variables are organized into four sets. To characterize investor i, we include SD_i as a set of sociodemographic characteristics including age, gender, language, and education (see Table 1). We add SIC_i as a set of two dummies based on the subjective individual variables (also reported in Table 1). The first dummy is $Financial\_literacy$, which is equal to 1 when investor i selected one of the two highest levels on the financial literacy scale.[16] Similarly, the second dummy, $Risk\_tolerance$, is equal to 1 when investor i selected one of the two highest levels on the risk tolerance scale.[17] To capture investor behavior, $TPTF_{i,t}$ is a set

[14] Unreported statistics (available upon request) show that all three firm ESG ratings exhibit an upward trend over the sample period.

[15] We opt for quarterly (instead of monthly) frequency to ensure enough variability in ESG scores over time.

[16] Approximately 49% and 12% of investors selected the fourth and fifth levels, respectively.

[17] Approximately 48% and 28% of investors selected the fourth and fifth levels, respectively.

of both individual- and time-varying variables. Specifically, it includes # *trades* as a proxy for trading intensity, defined as the natural logarithm of 1 plus the total number of trades executed by investor i during quarter t; Ptf_value as a proxy for wealth, measured as the natural logarithm of 1 plus investor i's monthly average portfolio market value over quarter t; and Ptf_size as a proxy for diversification, defined as the natural logarithm of 1 plus investor i's monthly average number of stocks held in the portfolio during quarter t. The last set of explanatory variables, MKT_t, consists of two market-related variables. The first one, $Market\_return$, corresponds to the arithmetic average of monthly market returns over quarter t.[18] The second variable, $Crisis\_period$, designed to capture whether stock portfolio ESG scores significantly differ during the crisis period, is a dummy set to one for each quarter from January 2008 to June 2009. When estimating this regression, we cluster standard errors by quarter to address potential issues related to cross-sectional correlation (Seasholes and Zhu, 2010; Bhattacharya et al., 2017).

Table 4 reports the results for the 2005-2011 period.[19] Regarding sociodemographics, Panel A shows that age is positively related to ESG scores, meaning that older investors have higher exposure to the three ESG factors than their younger counterparts. This result is in line with age having a positive impact on investments in SRI funds and in environmentally friendly firms (Rossi et al., 2019). The opposite relationship is found for education: highly educated investors display significantly lower ESG scores on their stock portfolios than their counterparts. This suggests that highly educated investors pay less attention to ESG factors that convey nonfinancial information when making investment decisions. This finding is not consistent with prior evidence showing that individuals with university education are more likely to invest in SRI funds than less educated individuals (Ridel and Smeets, 2017; Rossi et al., 2019). Such a difference might be related to the features of the samples under scrutiny.[20] Regarding language, French-speaking investors exhibit higher stock portfolio ESG scores. This result might be consistent with language and cultural differences affecting stock selection and/or ESG preferences. In line with Grinblatt and Keloharju (2001), French-speaking investors are expected to have a tilt toward French stocks and Dutch-speaking investors to be likely to trade more Dutch stocks. This could induce some mechanical effect if French stocks have, on average, higher ESG ratings. In our sample, French

[18] We use the STOXX Europe 600 index to measure market returns.

[19] For the sake of consistency with Section 2.2, we focus on these 28 quarters in which the extent of the ESG rating coverage is high. The results are still qualitatively similar when we include the first quarter of 2012. All the variance inflation factors (VIFs) are below 5, meaning that multicollinearity is not an issue.

[20] Whether investors trade online, whether investments are in funds or stocks, sample period, etc.

stocks exhibit, on average, higher ratings on the environmental factor, but Dutch stocks have, on average, higher ratings on both the social and governance factors.[21] Hence, the positive relationship between language and stock portfolio scores observed in the three models reveals that ESG preferences are likely to be affected by language and cultural background. As far as gender is concerned, we find a positive relationship with stock portfolio scores only on the governance factor. The coefficient estimate is highly significant, meaning that men have higher stock portfolio scores on that factor than women. By contrast, no gender difference is observed for both environmental and social factors. This result is in line with Ridel and Smeets (2017) and Rossi et al. (2019) but not with Bauer et al. (2021), who report that women are more likely to support sustainable investments than men.

Panel B of Table 4 provides new insights into how individual preferences differ depending on the ESG factor. Focusing first on financial literacy, we find a strong negative relationship between subjective financial literacy and stock portfolio scores on both the environmental and social factors. Compared to investors self-reporting less financial knowledge, investors with higher financial literacy have less exposure to these two factors. These results are consistent with recent evidence that individuals who consider themselves financially literate are less interested in SRI products than others (Rossi et al., 2019). In the same vein, Anderson and Robinson (2020) reveal a low overlap between environmental and financial knowledge. These authors even suggest that financial literacy is a barrier preventing environmental preferences from impacting portfolio choices. However, when we consider the governance factor, our results reveal the opposite relationship: financial literacy is positively related to exposure to the governance factor. This is consistent with the latter arguably conveying a type of nonfinancial information that requires at least a minimum of financial knowledge or interest in financial matters to comprehend.[22]

Regarding subjective risk tolerance, the results (in Panel B) also depend on which factor is considered. We find a strong negative relationship between higher risk tolerance and both the environmental and social scores. Since the top motivation for considering ESG factors is managing investment risks (CFA, 2020),[23] less risk-tolerant investors might care more about

[21] Cross-sectional average ESG ratings per country are available upon request.

[22] According to the Principles for Responsible Investments, governance issues cover tax avoidance, executive pay, corruption, director nominations, and cybersecurity (`https://www.unpri.org/sustainability-issues/environmental-social-and-governance-issues`).

[23] In this report, the dataset covers 3,525 retail investors (minimum assets of US $100,000) and 921 institutional investors (US $50 million assets under management or greater) across 15 markets surveyed in October/November 2019.

both the environmental and social factors because they associate them with lower risk. Higher risk tolerance is, on the other hand, positively related to stock portfolio scores on the governance factor, which is a more puzzling result that would call for further investigation. Nevertheless, this finding again indicates that the three ESG factors are not homogeneous.

Focusing on actual investor behavior, Panel C of Table 4 shows that investors who trade the most and wealthier investors (based on portfolio value) exhibit significantly lower exposure to the three ESG factors. This result brings support to the view that actual financial engagement is weaker for environmentally oriented individuals (Anderson and Robinson, 2020). Portfolio size also displays a significant but positive coefficient estimate for the governance score only.

Finally, retail stock portfolio ESG scores are unrelated to market returns, as shown in Panel D of Table 4. However, the crisis period pushed down stock portfolio ESG scores, especially on both the social and governance factors, for which the coefficient estimates are highly significant. Such findings offer empirical support to the view of Döttling and Kim (2021), who posit that ESG investments are luxury goods for retail investors.

Table 4: Panel data regression results

Variable	E score	S score	G score
Intercept	72.4741***	71.4675***	64.1688***
Panel A : **Sociodemographics**			
Age	0.0476***	0.0750***	0.0135**
Gender	0.1881	0.1586	1.4305***
Language	5.6479***	5.3825***	2.7137***
Education	-0.2251**	-0.5740***	-0.3514***
Panel B : **Subjective individual variables**			
Financial literacy	-0.7341***	-0.8317***	0.1866***
Risk tolerance	-0.6526***	-0.4592***	0.6928***
Panel C : **Trade- & portfolio-based variables**			
# trades	-1.0387***	-0.9123***	-1.0858***
Portfolio value	-0.4471***	-0.6580***	-0.2168***
Portfolio size	-0.1946	0.2962	0.5911***
Panel D : **Market-related variables**			
Market return	-0.3469	-6.1933	1.7571
Crisis period	-1.8299*	-3.5502***	-6.1283***
N	204,519	204,486	204,519
R^2	0.0233	0.0246	0.0341

This table reports the coefficient estimates for panel regression models in which the dependent variable is one of the investor stock portfolio ESG scores. The set of explanatory variables is presented in four panels. Panel A contains sociodemographic variables. *Age* is investor age in 2012. *Gender* is a dummy variable set to 1 for men. *Language* is a dummy variable set to 1 for French-speaking investors. *Education* refers to the level of education, which is set to 1 for investors who hold a university degree. Panel B refers to subjective individual variables. *Financial_literacy* is equal to 1 when investor i selected one of the two highest levels on the financial literacy scale. *Risk_tolerance* is equal to 1 when investor i selected one of the two highest levels on the risk tolerance scale. Panel C refers to trade- and portfolio-based variables, defined quarterly. *# trades* is the natural logarithm of 1 plus the total number of trades executed by the investor. Ptf_value is the natural logarithm of 1 plus the investor monthly average portfolio market value. Ptf_size is the natural logarithm of 1 plus the investor monthly average number of stocks held in the portfolio. Panel D refers to market-related variables, defined quarterly. $Market\_return$ corresponds to the arithmetic average of monthly market returns. *Crisis_period* is a dummy variable for the financial crisis period set to one from January 2008 to June 2009. ***, **, and * indicate significance at 1%, 5% and 10%, respectively. Standard errors are clustered by quarter. Thirty-three stock portfolio scores on the social factor are missing (out of 204,519 observations).

4 Conclusion

Using sociodemographic information, survey data and stock holdings over the period 2005-2011 for a large sample of retail investors, we provide novel evidence that both individual characteristics and actual behavior contribute to explaining exposure to ESG factors over time. Our results show that heterogeneity across investors (i.e., in terms of age, language, education, subjective

financial literacy and risk tolerance, trading intensity, and wealth) truly matters for a better understanding of retail ESG preferences. They also reveal that the three ESG factors are not homogeneous, suggesting that it is worth focusing on each component separately. In addition, our findings point to a fragility of retail ESG preferences during the 2008 financial crisis. This further confirms that ESG preferences are time varying and potentially not fully resilient to stressful periods.

This paper paves the way for further research on retail ESG preferences. First, future research should examine whether our main findings can be generalized across time, especially in more recent periods. Next, further investigating the differences in retail preferences across the three ESG factors would also be of particular interest.

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