CLIMATE ATTITUDES AND ASYMMETRIC BELIEF UPDATING IN SUSTAINABLE INVESTMENTS: EXPERIMENTAL EVIDENCE FROM HUNGARY

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ABSTRACT

This study examines whether and to what extent investors update their expectations for a green portfolio's performance upon receiving information that is either better or worse than the previously provided anchor. We conducted an experiment with 492 Hungarian investors to observe how their beliefs regarding green investment returns change when they receive good or bad news. Individuals with low green attitudes were more likely to revise their estimates in response to bad news than good news, indicating asymmetric updating. Moreover, individuals with strong green attitudes responded more strongly to good news than those with weak green attitudes. These findings suggest that attitudes toward climate issues influence how investors react to information about green portfolios. This study contributes to the literature on information processing in financial markets by highlighting the role of belief updating and climate attitudes in sustainable investment decision-making.

Keywords: belief update, asymmetric updating, sustainable investments, behavioral finance

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INTRODUCTION

Climate change has become one of the most significant forces reshaping global financial markets. Institutional investors, asset managers, and regulators increasingly face pressure to incorporate environmental considerations into capital allocation decisions (Kress, 2022; Myklebust, 2022; Singh et al., 2024). This shift has fueled rapid growth in ESG funds, green bonds, and sustainability-oriented investment products (Carlsson & Nilsson, 2023). Yet despite this expansion, the motivation behind sustainable investing remain contested. Some investors appear willing to accept lower returns—a phenomenon often described as the "greenium"—while others remain skeptical of the financial merits of green assets (Alves, 2024). This tension raises a fundamental question: *when investors receive new information about sustainable investments, how do their underlying beliefs and attitudes shape their reactions?*

Two theoretical frameworks dominate explanations of sustainable investment behavior. The risk-based view argues that sustainable assets reflect different regulatory or reputational risks, leading to lower expected returns. In contrast, the preference-based view proposes that some investors derive non-financial utility from sustainable investing and therefore weigh

ethical or environmental values alongside performance considerations (Bart & Schlag, 2023). However, both perspectives assume that individuals process information objectively. Growing evidence suggests otherwise. Behavioral research demonstrates that investors frequently interpret information in ways that reinforce their prior beliefs, especially in domains that are morally or politically charged, such as climate change (Golman et al., 2017; Sunstein, 2017).

Belief updating—the process by which individuals revise expectations in response to new evidence—is a central mechanism behind such distortions. Classical Bayesian theory predicts symmetric revisions regardless of whether news is favorable or unfavorable. Yet numerous studies show systematic deviations: individuals often outweigh good news and discount bad news, or the reverse, depending on their underlying preferences (Lord et al., 1979; Kahneman & Tversky, 1973; Holt & Smith, 2009). This asymmetry has been documented in diverse contexts, including earnings expectations, health risks, and climate change beliefs (Wiswall & Zafar, 2015; Sharot et al., 2011; Sunstein et al., 2017). These findings imply that information processing in financial markets may be especially prone to bias when investment themes evoke strong value-based attitudes.

Despite the relevance of these insights for sustainable finance, empirical evidence remains scarce. Prior literature links climate preferences to portfolio choices, but little is known about how investors react to new information about green investments, or whether climate-related attitudes condition belief updating. Understanding these dynamics is increasingly important as ESG investing becomes more widespread and politically polarized.

This study addresses this gap by examining how investors update their beliefs about the expected returns of a green stock portfolio when they receive new information that is either more favorable (good news) or less favorable (bad news) than an initial benchmark. Using experimental data from 492 Hungarian investors, we test whether belief updating is symmetric or whether reactions differ depending on climate attitudes. We hypothesize that individuals with weaker pro-environmental beliefs will react more strongly to negative information, while investors with stronger environmental attitudes will exhibit greater sensitivity to positive information.

By focusing on the interaction between climate attitudes and belief formation, our study contributes to three strands of literature: (1) behavioral finance research on biased information processing, (2) sustainable finance literature examining investor motivations, and (3) experimental evidence on asymmetric belief updating. To our knowledge, this is the first study to evaluate belief updating in the context of green investments using an investor-based experiment.

LITERATURE REVIEW

Sustainability has been shown to drive investor demand, making it a significant topic in finance (Hsu et al., 2023; Giglio et al., 2023). However, the reasons behind investors' pursuit of sustainable investments remain unclear. Theoretical literature offers two explanations. According to Pástor et al. (2021), sustainable investments are perceived as less risky in light of new regulations emerging from climate change, leading to lower risk and, consequently, lower expected returns. The risk-based explanation holds that lower expected returns reduce investor demand. Furthermore, empirical studies have shown that, in several instances, the green premium is negative or not statistically distinguishable from zero, indicating that green stocks do not perform better than brown stocks.

On the other hand, beyond the risk-based approach, sustainable investments provide utility to investors based on their preferences (preference-based explanation). For example, according to Giglio et al. (2023), ethical considerations and the mitigation of climate change are also decision-making factors, as indicated by a survey of investors. Bart and Schlag (2023) found that high ESG ratings alter the perceived risk-return relationship, suggesting lower credit risk. Pedersen et al. (2021) differentiate investors based on whether ESG preferences influence their decisions. In our study, we hypothesized, in line with the preference-based approach, that investors' decisions regarding green investments are influenced by belief updating.

Belief updating, which we focus on in our study, can be classified as active information avoidance (Golman *et al.*, 2017). Information avoidance occurs when decision-makers

deliberately refrain from obtaining information that could affect their decision, even though that information could help them make a better decision (Afifi & Weiner, 2006).

According to the traditional economic perspective, information is helpful to decision-makers, and important information should not be avoided unless doing so strategically benefits the individual or group. Empirical studies show that information avoidance arises not only when it is strategically rational, but also when beliefs and emotions play a role in decision-making.

Information avoidance can be divided into passive and active types, of which passive avoidance is a long-term process rooted in deep-rooted beliefs (Narayan *et al*., 2011). Golman *et al.* (2017) add to the above by arguing that active information avoidance occurs when an individual is aware that information exists and deliberately avoids it, even though it is readily accessible. He does so despite the potential disadvantages that may result.

Golman et al. (2017) identify several forms of active information avoidance, including physical avoidance, inattention, biased interpretation, and selective forgetting.

Experiments on information avoidance show that it is a common, frequent phenomenon in health (Case, 2005), morals (van der Weele, 2012), and religion (Narayan, 2011). However, some studies suggest it affects a wide range of investors and influences asset pricing. Galai and Sade (2006) first demonstrated the relationship between information avoidance and investment risk by studying one-year maturity liquid government bonds and illiquid bank deposits from February 2, 1992, to November 8, 2002.

Karlson *et al.* (2009) observed this ostrich effect in Swedish pension data (2002-2004) and U.S. Vanguard data (2006-2008), where higher past stock market returns led to increased account logins. Conversely, lower returns led to fewer logins, indicating that investors avoided bad news. Their findings showed a strong correlation between market returns and logins, with a higher impact in the U.S. Recent studies (Sicherman *et al.,* 2016) confirmed the ostrich effect across different time frames, demographics, and investment products, with decreased login during market downturns and heightened attention during volatility increases.

Belief updating can be classified as active information avoidance, specifically as biased interpretation of information (Golman *et al.,* 2017). Biased interpretation of information is the phenomenon where individuals interpret and consider available information in a way consistent with their prior beliefs. The consequence is a non-objective, sub-optimal decision, confirmation bias, which affects the individual, but can also have economic and social implications.

Standard economic theory assumes that individuals assess the probability of each event with unbiased beliefs formed according to Bayes' Rule. The following studies show that individuals deviate from Bayes' Rule in their updating behavior. Focusing on belief updating, Lord *et al.* (1979) conducted the first studies, but not in the financial domain. In an experiment involving 151 participants, they contrasted views in favor of and against the death penalty by presenting two studies to participants from each group. One suggested that the death penalty is effective in deterring crime, the other that it is not. Participants were then asked to rate the quality of both studies and the extent to which they found them convincing. Studies that contradicted their prior views scored lower on both scales than those that supported them. As a result, being confronted with the same data increased, rather than decreased, the polarization of the experiment participants' views.

Further studies have contributed significantly to understanding individuals asymmetrically update their beliefs and provided evidence of cognitive biases (Kahneman & Tversky, 1973; Camerer, 1987, 1995; Holt & Smith, 2009). Recent studies highlight the work of Sharot *et al.* (2011), in which life events such as being diagnosed with Alzheimer's disease or being robbed showed that individuals updated their beliefs asymmetrically. Experiments with students show that they update their beliefs more when they receive information that future earnings are greater than expected than when they receive information that earnings are less than expected (Wiswall & Zafar, 2015). Sunstein *et al.* (2017) made similar observations in an online experiment on climate change.

On the other hand, the results in the area of symmetrically updating beliefs are conclusive; we also see contradictory results in the area of asymmetric updating, regarding how individuals react to good and bad news. Several studies have

reached mixed conclusions on the issue (Eil & Rao, 2011; Ertac, 2011), while Barron (2020) found no evidence of asymmetric updating.

Previous studies confirm that belief updating affects individuals' investment decisions and asset prices. In capital markets, there are several areas where prior beliefs and biased information interpretation can affect not only individuals but also the market and market efficiency. For example, the preference for a concentrated rather than a broadly diversified portfolio is sub-optimal for investors (Petajisto, 2023). Another example is the environmentally responsible and sustainability-oriented (ESG) investment behavior, where research literature is full of contradictions, such as whether the green premium is negative or positive (Alessi, 2019). At the same time, investors are highly polarised on climate change issues (Sunstein, 2017), and the interpretation of information, shaped by prior beliefs, may lead to a less popular sustainability perspective among investors, with implications for climate change, economic processes, and capital markets. However, to date, no empirical studies have been carried out on this issue. Our research seeks to fill this gap.

METHODOLOGY

In this study, our goal was to examine whether and to what extent investors update their expectations for a green portfolio's performance upon receiving information that is either better or worse than the previously provided anchor information. The present study was designed to test the hypothesis that individuals who are less supportive of climate change or concerned about protecting the environment are less likely to alter their expectations regarding the performance of a green portfolio (i.e., the expected average annual return for a portfolio of green stocks) in response to unexpected good news than in response to bad news. Additionally, we hypothesized that those who place a high value on protecting the environment and firmly believe that human-induced climate change is occurring are more likely to respond to good news than to bad news.

In the first part of our survey, we measured participants' green attitudes. To this end, we employed the method used by Sunstein *et al.* (2017) and formulated three questions: (1) How important do you think it is to protect the environment? (2) Do you believe that artificial climate change is occurring? (3) Do you agree that Hungary was proper to sign the Paris Climate Agreement in 2015, which aims to reduce greenhouse gas emissions? Participants indicated their responses using a 5-point scale (1 = strongly disagree, 5 = strongly agree). The responses to the three questions were correlated (Q1&Q2: $r = 0.350, p = 0.000$; Q1&Q3: $r = 0.383, p = 0.000$; Q2&Q3: $r = 0.651, p = 0.000$) to a similar extent as observed by Sunstein *et al.* (2017). Again, following Sunstein *et al.* (2017), individual responses were aggregated for each respondent to generate an overall score for "climate change belief" (CCB), and the resulting scores were used to create the groups.

First, we used the following formula to classify subjects into four groups based on their CCB scores:

$$cutoff_t^* = \underset{\text{cutoff}}{argmin} \left| \frac{tN}{4} - \{i | i \in S, \quad CCB_i \leq cutoff\} \right|, \qquad (1)$$

where N is the sample size, t is the quartile, i is the index for the participant in ascending rank order with respect to CCB score, S is the set of all participant indices, and $cutoff^*$ is the cutoff point between the respective quartiles.

However, since respondents' scores were highly concentrated near the maximum value, we ended up with three groups: a low green attitude group with an average CCB score of $10{,}191 \pm 0{,}317$, a medium green attitude group with an average CCB score of $13{,}600 \pm 0{,}074$, and a high green attitude group with an average CCB score of $15{,}000 \pm 0{,}000$. In the second part of the survey, participants were presented with information regarding the expected return on a portfolio of green stocks. Initially, participants were provided with an estimate as follows: *"According to academic research, the expected average annual return on a portfolio of green stocks is 10 percent by 2050. The expected return is equivalent to a broadly diversified global equity portfolio."* Participants were then asked to indicate on a scale of 0 to 20 what they believed the expected annual return of the respective portfolio would be.

Subsequently, respondents were divided into

two groups and provided with either better (good news condition) or worse (bad news condition) information than that initially received. In the good news condition, the following information was provided: *"Recent research on green stocks indicates that, contrary to the information outlined above, the average annual return on a portfolio comprising green stocks is projected to be higher in the future, estimated to range between 12% and 17%."* In bad news condition, respondents encountered the following text: *"Recent research on green stocks indicates that, contrary to the information outlined above, the average annual return on a portfolio comprising green stocks is projected to be lower in the future, estimated to range between 3% and 8%."* In light of the new information, respondents were asked to provide a revised estimate of the portfolio's expected performance on a scale from 0 to 20. The central question in our analysis is how respondents with varying attitudes toward climate change and environmental issues adjust their estimates when exposed to different types of information. Therefore, the key measure we focus on is the difference between the initial and revised estimates (i.e., the update score), calculated as follows: subjects' second estimate minus the first estimate in the good news condition, and the reverse for the bad news condition. Thus, positive values indicate an adjustment in response to new information.

At the end of the survey, we also collected data on participants' demographics, including age, gender, and education, as well as their investing experience and the percentage of green investments in their current portfolio.

DATA

The experiment was conducted with subscribers to the financial newsletter of a Hungarian financial news and education website (elemzeskozpont.hu). Subscribers confirm their email addresses through a double-opt-in process, and administrators manually verify them to filter out automated responses. A total of 13,055 invitation emails were sent, and the questionnaire was completed by 532 respondents. The email addresses of all participants were verified, and only those in the original database were included in the final analysis, reducing the sample size to 492. No incentives were offered for completing the questionnaire.

Our methodological approach follows Sunstein et al. (2016), who also employed a non-representative sample (via MTurk) to examine belief updating mechanisms. Similarly, our aim is not to generate nationally or globally representative conclusions, but to explore how psychological mechanisms—specifically belief updating—function in the context of sustainable investment. While the results may not be generalizable to the broader investor population, they yield valuable insight into the behavior of a motivated and relevant subgroup. This approach aligns with established practices in experimental behavioral research, and we explicitly acknowledge the limitation concerning representativeness.

Table 1: Demographic and financial characteristics of survey respondents

Variable	Category
Age	N=492; Mean=51; SD=13; Median=49; Min=22; Max=94
Gender	Male: 419; Female: 73
Educational Attainment	Primary: 20; Secondary: 110; Tertiary: 362
Investment Experience (years)	0: 26; 1-5 yrs: 62; 5 yrs: 195; 10 yrs: 209
Investment Horizon (years)	0-1 yrs: 156; 1-5 yrs: 211; >5 yrs: 125
Monthly Savings (HUF)	0: 62; 0–100k: 102; 100–500k: 226; >500k: 102

The final sample consists predominantly of experienced, well-educated investors: 85.2% of

respondents were male (419 out of 492), the median age was 49 years, and 74.6% held a university degree (367 out of 492). Moreover, 94.7% reported at least some investment experience, with 42.5% having more than 10 years of experience (209 out of 492). These characteristics indicate that the sample represents a specific and relevant subgroup of the investor population, namely, financially active, middle-aged men with higher education and substantial investment exposure (see Table 1 for descriptive statistics). While this limits the generalizability of our findings to the broader population of retail investors, it enhances the internal validity of our behavioral analysis by focusing on a demographically coherent and financially literate group.

RESULTS

Descriptive statistics for the main variables used in this study are presented in Table 2.

Table 2: Summary statistics

	N	Mean	SD	Min	Median	Max
CCB (Bad news condition)	246	13.171	2.306	4	14	15
First estimate (Bad news condition)	246	8.313	3.809	0	8	20
Belief update (Bad news condition)	246	1.028	1.781	0	0	8
CCB (Good news condition)	246	13.431	1.883	7	14	15
First estimate (Good news condition)	246	8.667	3.972	0	8	20
Belief update (Good news condition)	246	0.764	1.499	0	0	8

Notes: The table contains descriptive statistics. The CCB (bad news condition) row shows the CCB score of participants who received bad news. The first estimate (bad news condition) shows the initial estimate of this group relative to the future return on the green portfolio. The belief update (bad news condition) row illustrates the change in the return estimate after the bad news. The CCB (good news condition) row shows the CCB score of participants who received good news. The first estimate (good news condition) shows the initial estimate of this group relative to the future return on the green portfolio. The belief update (good news condition) row illustrates the change in the return estimate after the good news.

As shown, the average climate change belief score (CCB) was relatively high in both groups, and the distributions between the two groups were not significantly different (Mann-Whitney U test: $W = 31{,}797, p = 0.548$). The average first estimate was 8.313 ± 3.809 in the bad news condition and 8.667 ± 3.972 in the good news condition, showing no significant difference between participants who subsequently received additional good or bad news (Mann-Whitney U test: $W = 30{,}724, p = 0.219$). Finally, the update scores ranged from -2 to 8 in the good news condition and from -3 to 8 in the negative condition, with positive mean values and median values of zero observed in both groups. It is important to note that the updated scores in both groups are highly concentrated at zero (bad news condition: 64.228%; good news condition: 72.358%), i.e., the majority of respondents did not change their initial estimates. Therefore, we first examine what determines whether respondents update their initial estimates in response to new information.

Given that the majority of respondents did not revise their initial estimate in the face of new information (i.e., their update score is zero), we first investigate the determinants of making an update. Table 3 presents the results of binary logit regressions, where the dependent variable in each regression is the probability of making an update. The independent variables include respondents' investing experience (Experience), the percentage of green investments in their current portfolio (Green portfolio) – all treated as continuous variables – as well as a condition dummy variable that takes a value of 0 for the good news condition and a value of 1 for the bad news condition ($d_{condition}$) . Additionally,

education (d_{school}), age, and gender (d_{gender}) are included as control variables. To demonstrate the distinct behavioral patterns of respondents with varying degrees of green attitudes, we conducted separate regressions for each of the three green attitude groups (low, medium, and high).

Table 3: Logit estimates of the decision to update by condition.

	(1)	(2)	(3)
	low green attitude	medium green attitude	high green attitude
Constant	0.241	-16.172	-14.221
	(1.273)	(1198.135)	(837.157)
$d_{condition}$ **(Bad news condition)**	1.007**	0.339	0.256
	(0.462)	(0.341)	(0.312)
Experience	-0.430	-0.204	-0.221
	(0.284)	(0.202)	(0.205)
Green portfolio	0.758**	0.143	0.117
	(0.325)	(0.186)	(0.162)
Age	-0.034*	-0.001	-0.023*
	(0.018)	(0.013)	(0.014)
d_{school} **(Secondary education)**	-0.029	15.887	15.224
	(1.046)	(1198.135)	(837.157)
d_{school} **(Tertiary education)**	0.987	15.837	15.161
	(0.950)	(1198.135)	(837.157)
d_{gender} **(Female)**	0.334	-0.197	0.716*
	(0.713)	(0.472)	(0.397)
Number of observations	127	170	195
Log. Lik.	-136.963	-125.324	-119.696
F	2.376	0.370	1.510

*Notes: * p <0,05, ** p <0,01, *** p <0,001; standard errors in parentheses.*

As shown, respondents with low green attitudes were more likely to revise their initial estimates in response to bad news than to good news. This was not the case for the other two groups, in which the type of news did not affect the likelihood of updating the forecast. Furthermore, for the low green attitude group, the proportion of green investments in the current portfolio was significant at the 5% level. The positive coefficient indicates that greater exposure to green investments increases the likelihood that individuals with low green attitudes will revise their initial estimates in light of new information about green investments. Note that, in addition to the control variables introduced, the investment experience did not play a significant role in responding to information. It should also be noted that, for the medium and high green attitude groups, neither the level of investment experience nor the proportion of green investments in the current portfolio affected the likelihood of updating the forecast, besides the control variables introduced. In summary, our findings indicate

that investors with low green attitudes are more likely to revise their estimates in response to negative news when they have greater exposure to green investment alternatives.

The following section presents an analysis of how respondents with varying green attitudes have revised their initial estimates in response to different types of information. To this end, the extent of change in respondents' predictions was examined across the between-subject factors of condition (bad or good news) and group (low, medium, and high green attitude).

Figure 1 illustrates the distribution of responses of the groups in each condition. As observed, respondents with varying attitudes reacted differently to the information provided. Those with low green attitudes modified their initial forecasts significantly more in response to negative information than to positive information (Kruskal-Wallis χ^2 = 5.140, p = 0.023), whereas those in the medium green attitude group did not show a significant difference in updating between conditions (Kruskal-Wallis χ^2 = 1.816, $p = 0.178$). In contrast, the graph suggests that for respondents with strong green attitudes, good news leads to a larger forecast update. However, this observation is not supported by the statistical analysis (Kruskal-Wallis χ^2 = 0.033, $p = 0.857$), suggesting that further investigation is needed to understand the asymmetric updating of high-green-attitude investors.

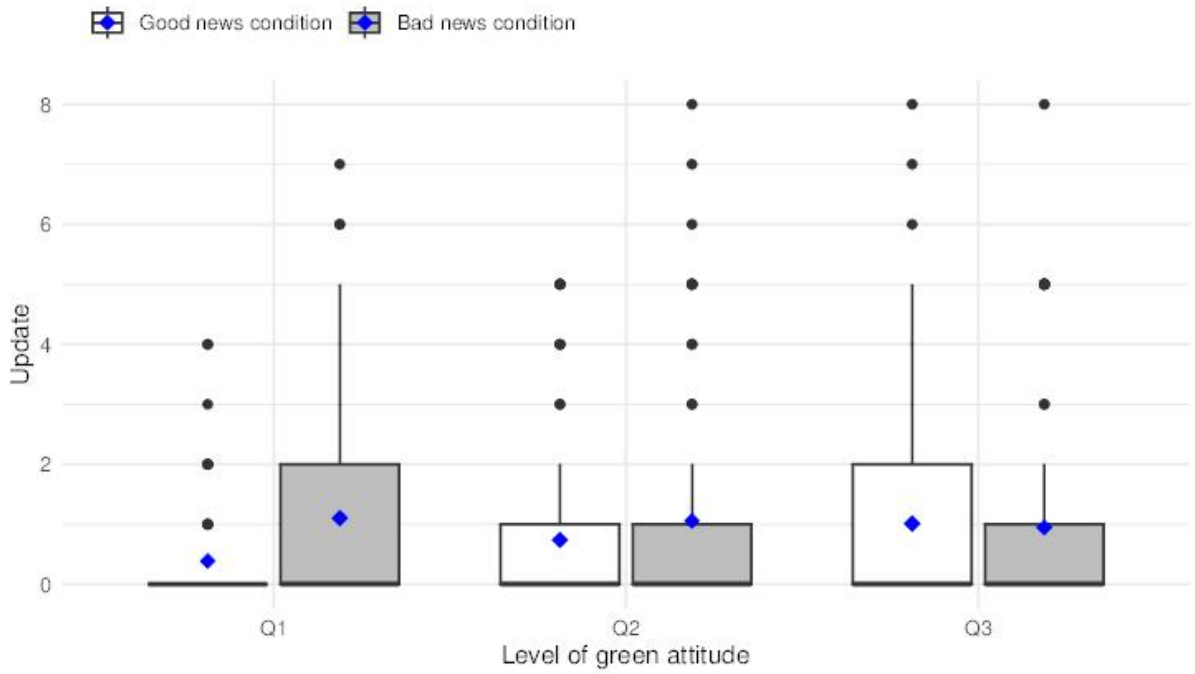

Figure 1: Forecast updates for each green attitude group based on condition.

Notes: The figure illustrates the distribution of responses across the three groups (Q1 = low, Q2 = medium, Q3 = high green attitude) in each condition. The good news condition is marked in white, and the bad news condition is marked in gray.

Our results indicate that asymmetric updating is most pronounced among individuals who are less supportive of climate change initiatives or less concerned about environmental protection. These individuals react more strongly to bad news and are less sensitive to positive information. In contrast, no asymmetric updating was observed among those most concerned about climate change. Additionally, the magnitude of responses to the same type of information varied between groups: individuals with high green attitudes reacted more strongly to good news than those with low green attitudes. Therefore, our findings suggest that investors' attitudes toward climate issues influence their reactions to information about

green portfolios in the financial markets.

DISCUSSION

The findings support the notion that belief updating is not a neutral process but is shaped by prior attitudes and cognitive biases. Investors process information in ways that reinforce their existing views, leading to asymmetric reactions to new information about green investments. This pattern mirrors the broader tendency in psychology, in which individuals filter information through their pre-existing beliefs rather than evaluating new data objectively (Lord, Ross, & Lepper, 1979; Kahneman & Tversky, 1973).

From a theoretical perspective, Bayesian updating suggests that individuals should objectively integrate new information into their beliefs, weighting it according to prior probabilities and the reliability of new evidence (Jaynes, 2003). However, empirical studies have demonstrated systematic deviations from Bayesian updating due to psychological biases (Eil & Rao, 2011; Ertac, 2011). Our results indicate that, in financial decision-making, investors tend to engage in motivated reasoning, interpreting information in ways that confirm their existing views rather than updating their beliefs in a purely rational manner (Kunda, 1990; Golman et al., 2017). In particular, low-green-attitude investors are more sensitive to negative information, as it reinforces their skepticism about green investments. This is consistent with prior findings on selective information processing, in which individuals give greater weight to information that aligns with their preconceptions while discounting contradictory evidence (Nickerson, 1998).

One of the key takeaways from our study is that exposure to new information does not necessarily reduce belief disparities; instead, it may increase investor polarization. When investors selectively integrate information based on their prior attitudes, the gap between different investor groups may widen over time. This polarization has significant implications for financial markets, as belief-driven biases can influence the demand for sustainable investments and the pricing of ESG stocks (Giglio et al., 2023; Pástor, Stambaugh, & Taylor, 2021). If investors systematically misinterpret green investment data, it may contribute to mispricing and market inefficiencies, similar to the behavioral anomalies documented in other areas of asset pricing (Barberis & Thaler, 2003).

CONCLUSION AND RECOMMENDATION

This study examined how investors update their expectations about the performance of a green stock portfolio when presented with new information that contradicts an initial anchor. Using experimental evidence from 492 Hungarian investors, we show that belief updating in sustainable investment contexts is neither neutral nor symmetric. Instead, the process is strongly conditioned by investors' underlying climate-related attitudes.

The results reveal that individuals with low green attitudes revise their forecasts significantly more in response to negative information, while showing little sensitivity to positive information. Conversely, investors with strong pro-environmental attitudes respond more to favorable signals about green portfolio performance than their less climate-concerned counterparts, although this asymmetry is weaker and not uniformly statistically significant. These findings suggest that belief updating in sustainable finance reflects elements of motivated reasoning: new information is incorporated in ways that align with pre-existing values rather than in a purely Bayesian manner.

Overall, our evidence indicates that climate attitudes meaningfully shape how investors interpret performance-related information about green assets. Because sustainable investing is both ethically charged and increasingly salient in financial markets, belief-driven biases may amplify heterogeneity in expectations, contribute to persistent mispricing, and reinforce polarization across investor types. Policymakers and financial intermediaries should therefore anticipate that communication about ESG investments may be processed asymmetrically across investor groups, and design disclosures, education tools, and regulatory frameworks that promote more balanced and objective information processing.

LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

While the findings offer important insights, several limitations should be acknowledged.

First, the sample consists predominantly of older, experienced male investors subscribed to

a financial newsletter. Although this group is highly relevant for studying investment-related decision-making, the results may not generalize to younger or less financially literate populations. Future studies should replicate the design across more diverse demographic groups and in different cultural contexts to improve external validity.

Second, the experiment uses hypothetical return estimates rather than real financial stakes. Although common in belief-updating research, hypothetical scenarios may understate or overstate sensitivity to information. Future research could incorporate incentive-compatible designs or real portfolio decisions to assess the robustness of these behavioral patterns.

Third, the measurement of climate attitudes relies on a concise three-item index. While consistent with prior work, more comprehensive psychological or political-attitude measures may better capture the deeper value structures driving information processing. Future studies may also explore how media exposure, political ideology, or climate misinformation interact with financial judgments.

Finally, our results primarily highlight asymmetry in updating but do not fully capture the underlying cognitive processes, such as trust in information sources, perceived credibility, or affective responses. Future research could incorporate qualitative methods, eye-tracking, or neuroeconomic tools to map the cognitive mechanisms that produce belief updating patterns in sustainable investing.

Despite these limitations, the present study provides a rigorous baseline for understanding how climate attitudes shape financial information processing and offers a foundation for a broader research agenda at the intersection of behavioral finance and sustainability.

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