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ESG Labelling and Investor Preferences: Evidence from a Choice Experiment

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Abstract

Sustainable investing has gone mainstream and we need to ask how ESG or “green” labels affect individual investor behaviour. This thesis looks at the impact of ESG/green labels on investment decisions through a behavioural finance lens. Using a two-pronged approach—an experimental survey and an analysis of online investor sentiment—the study examines whether labelling an investment as “sustainable” changes allocation choices and what are the psychological factors and narratives behind such effects (Glac, 2009; Hartzmark and Sussman, 2019). In a controlled survey setting, retail investors were shown identical bonds with only the ESG label and framing different. The experiment finds that most participants prefer the ESG labelled option but the label alone doesn’t shift choices once individual attitudes towards sustainability are accounted for; investors with stronger pro-ESG values and higher ESG knowledge are much more likely to choose green investments, so it’s personal norms and awareness that drive the label’s effect (Riedl and Smeets, 2017; Barber, Morse and Yasuda, 2021). Complementing these findings, a sentiment analysis of 2020-2024 Reddit discussions shows mostly positive sentiment towards ESG investments but also pockets of scepticism and emotional polarisation, consistent with prior work linking investor discourse to market perceptions (Tetlock, 2007; Bollen, Mao and Zeng, 2011; Piñeiro-Chousa et al., 2021). Overall, the results show that ESG labels can be a behavioural “nudge” especially for values-driven investors but their impact is limited by credibility and individual differences. The research contributes by bridging experimental evidence with real-world sentiment and by situating micro-level behaviour alongside market evidence on labelled instruments and the “greenium” (IMF, 2023; Zerbib, 2019). Policy implications are label integrity, transparency and investor literacy; practical implications are segmentation and disclosure design to align ESG products with investor psychology (CBI, 2024; BIS, 2025).

Introduction

Sustainable investing has gone mainstream, with global issuance of green and sustainable bonds exceeding $1 trillion in 2024 (ICMA, 2021). Green bonds for example are structurally similar to regular bonds but earmarked for environmental projects, with an ESG or “green” label (ICMA, 2021). Since the Paris Agreement in 2015 the market for green financial instruments has grown exponentially (BIS, 2025) – a sign of increasing investor demand for assets that align with environmental and social values. At the same time a phenomenon has emerged: investors seem to be willing to accept slightly lower returns for “green” assets resulting in a modest pricing premium or “greenium” in bond markets (e.g. 2–5 basis points) (Zerbib, 2019). This suggests that non-financial factors – such as ethical preferences or the psychological impact of labels – may be influencing investment decisions beyond risk-return calculus. But the growing reliance on ESG labels raises critical questions. Do investors really care about the presence of a sustainability label on an investment, independent of the underlying financials? Or do ESG labels just attract those investors who already have pro-sustainability attitudes and not change the behavior of others? The question is important because if labels themselves drive investor behavior this has implications for market efficiency and policy – good if it channels capital to sustainable projects but bad if it leads to mispricing or “greenwashing” (i.e. superficial claims of sustainability). In fact 85% of global investors say greenwashing is a growing problem (EY, 2024). This environment of high enthusiasm mixed with skepticism makes it essential to understand the true impact of a green/ESG label on investor allocation decisions.

In this study I will investigate whether simply labelling a financial product as “green” or “ESG” changes investor preferences when financials are the same. Specifically the research will answer **three** questions:

1. Does the presence of a "green/ESG" label change allocation preferences compared to a "non-green" bond with the same financial payoffs? In other words will investors prefer a bond marketed as “ESG” over a regular bond offering the same return and risk profile?

2. What personal attitudes/norms (e.g. trust in the label, preference for transparency) are correlated with the "green" tool? Here the focus is on investor psychology – for example do individuals with strong pro-sustainability values or higher trust in ESG claims invest more in the labeled bond?

3. Which individual characteristics (socio-demography, experience/risk) moderate the effect of the label? This asks whether the label has the same impact on all or certain groups (e.g. younger vs. older investors)?

To answer these questions I use an experimental survey design that isolates the label effect in a controlled environment. Participants (retail investors) are shown two hypothetical bond options that are identical in financial terms (maturity, coupon, risk) – the only difference is that one bond is labelled as a "Green/ESG Bond" and the other has no label. By holding all economic variables constant, this design tests whether the label itself drives the allocation. Participants are randomly assigned to scenarios to ensure robust comparisons and the survey instrument also collects data on each individual's ESG-related attitudes, beliefs and background. We measure constructs like attitude towards sustainable investing, trust in ESG labels, knowledge of ESG investments, and demographics (age, gender, education etc.). The analysis then uses statistical models (logistic regression and interactions) to estimate the effect of the ESG label on choice and see how this effect depends on the personal factors. This allows us to quantify not only whether an ESG label influences investment choice but for whom and why – without assuming the outcome. The following chapters will set the theoretical framework for the analysis: Chapter 1 looks at ESG labelling and investment decisions through the lens of behavioural finance and Chapter 2 at the structure of green financial instruments and the emergence of the so-called "greenium" in investor behaviour.

Chapter 1: ESG Labelling and Investment Decisions – A Behavioural Finance Perspective

1.1 Introduction

ESG investing has gone from being a niche concept to mainstream over the past two decades. ESG criteria are the standards for evaluating companies on environmental performance, social responsibility and corporate governance. The appeal of ESG has grown exponentially; by 2020 global sustainable investment assets reached over US$35 trillion, or one-third of professionally managed assets (Global Sustainable Investment Alliance, 2021). This represents a significant shift in investor preferences, particularly among individual investors who want to align their portfolios with their values and social objectives. The rise of sustainability labels and ratings has followed this trend. From mutual funds branded as "sustainable" to third party ESG ratings, these labels are everywhere in financial marketplaces and fund disclosures. Policymakers and industry organizations have promoted standardized ESG labels to help investors make informed decisions and reward companies and funds that do well on sustainability metrics.

Understanding how ESG labels impact investment decisions is key, especially through the lens of behavioral finance. Unlike the classical assumption of fully rational investors maximizing utility purely in monetary terms, behavioral finance recognizes that real investors are influenced by cognitive biases, heuristics and social or emotional factors. ESG investing – and the use of labels in this space – is a great case study of these behavioral influences. Many individual investors are willing to give up some returns for alignment with their values or the "warm glow" of doing good (Riedl and Smeets, 2017). And how information is presented or framed can have a big impact on decisions: a sustainability rating or ethical label can be a salient cue or "nudge" that redirects investment flows, independent of fundamental financial data (Glac, 2009; Hartzmark and Sussman, 2019).In this background chapter we look at the role of ESG labeling in investment decisions, focusing on individual investors and drawing on behavioral finance. We first outline the key behavioral factors that drive investor choices in ESG. We then look at the evidence on how ESG labels and ratings impact investor behavior – in particular, do investors demand more of a fund or investment when it's labeled as "sustainable". Throughout we reference foundational studies and recent research to show how non-financial preferences and cognitive biases intersect with ESG information. The aim is to provide an overview of why ESG labels matter for investor decision making and how they can

shift capital flows in financial markets. We'll look at specific instruments (e.g. green bonds, sustainability linked bonds) and price evidence (e.g. the greenium) and recent market trends in the next chapter.

Individual investors' decisions on ESG investments are driven by a mix of intrinsic preferences and behavioral biases. Traditional finance theory would suggest that any investment decision is made solely on risk-adjusted returns. But behavioral finance and emerging evidence on sustainable investing show that many investors get more out of their investments than just financial returns. Investors want a combination of utilitarian benefits (financial performance) and expressive or intrinsic benefits (personal values, social impact, the feeling of doing good) from their investments (Riedl and Smeets, 2017).

A growing body of research suggests that many individual investors have genuine social or ethical preferences that inform their portfolio choices. These investors are willing to give up some financial return for investments that align with their values or contribute to positive societal outcomes.

Riedl and Smeets (2017) provide direct evidence of these trade-offs: in their study of retail investors in the Netherlands, they found that socially responsible investors expected to earn lower returns and pay higher fees on sustainable mutual funds relative to conventional funds, yet they still chose to hold those funds. So investors get psychic or "warm-glow" utility from investing responsibly – they value the act of supporting sustainable companies or funds for its own sake. The same study found that intrinsic social preferences (a genuine concern for social impact or altruism) play a big role in the decision to invest in ESG products. Investors with stronger pro-social attitudes were more likely to invest in a sustainable fund, even when aware of a financial cost (Riedl and Smeets, 2017).

In addition to intrinsic motives, social signaling is another non-financial motive identified in the literature. Some individuals may invest in ESG funds to signal their values or social identity to others (or even to themselves), essentially using investment choices to express solidarity with environmental or social causes. In this sense ESG investing can provide expressive benefits – the investment itself sends a message or reinforces the investor's self-concept (being a "responsible" investor), independent of the financial payoff (Riedl and Smeets, 2017).Another piece of evidence comes from Barber, Morse and Yasuda (2021) who look at investors in impact funds. They find that investors are willing to give up return for social impact: on average investors in impact-oriented private equity/venture funds accepted lower

financial performance relative to conventional funds. So investors get non-pecuniary utility from advancing social or environmental goals. This behavior fits with models of utility maximization that include social responsibility as part of the function (Barber, Morse and Yasuda, 2021).

In summary individual investors often have mixed objectives, money and morals. This is the departure from pure financial rationality that is why ESG labels matter: a label can cater to or trigger these non-financial preferences by clearly identifying the investments that meet the investor's ethical or social criteria.

Beyond deliberate preferences, the way ESG information is presented can influence investor decisions due to cognitive biases. One of those is the framing effect – investors will respond differently to the same information depending on how it's framed or labelled. In the context of sustainable investing, research shows that highlighting the ESG or ethical aspect of an investment can change decision making outcomes.

Glac (2009) demonstrates this through an experiment: when participants were presented with an investment choice framed in expressive terms (emphasising the social and ethical implications of the investment) versus a standard financial frame, they were more likely to choose a sustainable investment under the expressive frame. In other words, labelling or framing an investment as a socially responsible choice can nudge individuals towards that option (Glac, 2009). This means some investors have latent pro-social tendencies that can be triggered by cues in the decision environment. Simply calling a fund "sustainable" or providing information about its ESG impact might tilt the decision, even if the underlying financials are the same. This behaviour is in line with behavioural economics on how nudges and simple signals affect choices: an ESG label can be a salient heuristic, simplifying a complex decision into an easy cue for action.

Another bias related to ESG labelling is the halo effect – a positive attribute of a product or entity leads to an overall positive impression that can overshadow other attributes. When an investment has a sustainability label or high ESG rating, investors might subconsciously attribute other positive qualities to it – for example, assume the investment is generally "better" managed or financially more attractive – simply because it scores well on ESG. This psychological phenomenon is linked to the affect heuristic – investors who feel good about an investment's ESG profile will also judge it to be safer or more promising overall, regardless of the financials.

Indeed, some investors conflate sustainability with performance potential. Hartzmark and Sussman (2019) found evidence of this in their study: a subset of investors seemed to interpret a high sustainability rating as a signal of future outperformance, even though in aggregate that was not borne out by the returns. This is an important cognitive bias in ESG investing – optimism or confirmation bias – where investors see what they want to see, believing "doing good" will also mean "doing well" financially.Behavioural biases can also affect how investors process the absence of an ESG label. For example, if most funds have a sustainability rating and a particular fund doesn't, investors might infer the unlabeled fund is not sustainable. This is the default assumption heuristic: when a label becomes common, its absence becomes a negative signal. More broadly, limited attention is another relevant concept. Investors can't process all information about every investment, so an ESG label or score can influence decisions simply because it's prominent and easy to understand. A busy retail investor looking at a fund platform will probably gravitate towards one with a bold "ESG Certified" badge or a high sustainability score icon and use that as a mental shortcut without looking at fees or portfolio composition. Such shortcuts are how heuristics work: ESG labels are a form of information shortcut in a complex financial landscape, catering to the human tendency to reduce decision complexity.

1.3 The Effects of ESG Labels on Investment Decisions

ESG labels and sustainability ratings have had a demonstrable impact on investor behaviour, particularly among individual investors. Two contexts in which label effects have been studied stand out: (1) the introduction of third-party sustainability ratings for mutual funds, and (2) the difference in investor behaviour between labelled ESG funds and conventional funds. Together these show that the application of an ESG label can change investor demand, often independent of traditional performance.

One of the most striking examples of label influence is the Morningstar Sustainability Rating, symbolised by "globes". In 2016 Morningstar launched its sustainability rating system, assigning funds 1 through 5 globes based on how the ESG performance of their holdings compared to peers. This was effectively the sudden introduction of ESG labels across thousands of mutual funds, a natural experiment to observe investor behaviour.

Hartzmark and Sussman (2019) study this event and find strong evidence that sustainability labels mattered. Specifically, mutual funds that got the highest rating (five globes) saw huge inflows after the ratings were published, while those that got the lowest rating (one globe) saw

big outflows. Over the following year funds with high sustainability ratings attracted billions more in assets, while low-rated funds lost assets on net.

Crucially these flow changes happened with no change in financial performance. Hartzmark and Sussman (2019) found no evidence that five-globe funds outperformed one-globe funds after the ratings were published. Investors weren't just chasing better returns under the guise of sustainability; they were responding to the sustainability label itself.This implies that a big chunk of investors *value sustainability as an end in itself* (as per non-financial utility), or at least the label influenced their perception of the investment's desirability. Some investors even thought the sustainability rating predicted higher returns – a result of the affect heuristic where a positive label leads to an optimistic performance expectation (Hartzmark and Sussman, 2019).

A key difference emerges when comparing retail vs institutional investors. The Morningstar ratings were most visible to individual investors, and Hartzmark and Sussman (2019) show that retail driven share classes responded strongly to the labels, while institutional share classes didn't. This suggests individual investors are more susceptible to label effects, as per behavioural finance insights on heuristics and framing.

Beyond one-off labelling events, a longer view comparing ESG/SRI funds to conventional funds shows that labelled products attract different types of investors, with different flow dynamics and performance sensitivity. Early evidence from the US mutual fund market shows that socially responsible investors are more loyal and less redemptive when their funds underperform, consistent with investors getting non-financial utility from holding labelled funds (Bollen, 2007). In Bollen's analysis, flows into SRI funds were as responsive as conventional funds during good times, but outflows were milder after poor returns, so investors in labelled funds accept short-term underperformance without immediately exiting (Bollen, 2007). This behaviour is consistent with the presence of expressive benefits and warm-glow motives documented among retail investors (Riedl and Smeets, 2017).

A global perspective confirms these findings. Renneboog, Ter Horst and Zhang (2011) look at SRI funds across multiple countries and show that ethical money is less flighty: investors in funds with explicit ethical screens or ESG mandates are less likely to withdraw assets after losses, while inflows in good times do not predict superior future performance (Renneboog, Ter Horst and Zhang, 2011). The absence of a "smart money" effect in SRI flows means that allocations are not driven by expectations of alpha, but rather by the non-pecuniary value

attached to the ESG label and mandate (Renneboog, Ter Horst and Zhang, 2011). In other words, labelling doesn't just inform; it re-segments the investor base, attracting people whose objective function includes values alongside returns.The types of investors in labelled funds also differ. Because labelled products broadcast a clear mission (e.g. "sustainable", "ethical", "impact") they act as self-selection devices that help values-aligned investors find suitable products quickly in an otherwise noisy market. This reduces search costs and amplifies limited-attention effects: when a salient label is present, retail investors can rely on it as a heuristic to screen options rather than parsing prospectuses or holdings data in depth (Hartzmark and Sussman, 2019). Over time this mechanism supports a stickier asset base: investors who chose the fund for its sustainability identity are less likely to churn in response to transitory performance because the utility they derive extends beyond returns (Bollen, 2007; Riedl and Smeets, 2017).

At the same time label-driven demand can have ambiguous implications for pricing and product design. On the positive side, steady demand can reduce run risk and enable longer-horizon strategies in labelled funds. On the negative side label salience can crowd out attention to fundamentals such as fees or risk if investors over-weight the sustainability cue when making decisions (Hartzmark and Sussman, 2019). This explains why marketing and naming (e.g. "Green", "Sustainable", "Impact") can matter for retail interest even before investors engage with detailed disclosures — a phenomenon consistent with framing effects (Glac, 2009). The behavioural channel goes both ways: it helps alignment between investors and values-consistent products, but can amplify misallocation if labels are unclear or investors infer too much from them (halo/affect).

Another nuance is investor heterogeneity. Not all individual investors respond the same way to labels. Some investors are values-dominant — willing to give up return for social/environmental impact (Riedl and Smeets, 2017; Barber, Morse and Yasuda, 2021). Others are return-dominant and may see ESG as a constraint or cost, especially if they think sustainability screens reduce the opportunity set; these investors can exhibit ESG aversion when they see labels as a signal of lower profitability (Hartzmark and Sussman, 2019). The overall flow patterns — strong flows into highly labeled funds despite no contemporaneous performance edge, and muted outflows after ESG funds lose money — suggest the values-dominant margin is material in retail markets (Bollen, 2007; Renneboog, Ter Horst and Zhang, 2011; Hartzmark and Sussman, 2019).

1.4 Mechanisms: Why the Label Matters

Bringing the strands together, three mechanisms explain why labeled ESG products alter behaviour:

Expressive/Intrinsic Utility: Investors get non-financial benefits from holding labelled assets which raises their reservation utility for those products and reduces redemption sensitivity (Riedl and Smeets, 2017; Barber, Morse and Yasuda, 2021).

Framing and Affect: Labels frame the choice in ethical terms and create positive affect which investors sometimes attribute to financial performance (halo). This boosts initial demand and can sustain flows even in the absence of performance differences (Glac, 2009; Hartzmark and Sussman, 2019).

Heuristics and Attention: Simple, salient labels act as decision shortcuts in complex environments, steer attention and reduce search costs for values-aligned investors, while potentially crowding out scrutiny of fees/risk (Hartzmark and Sussman, 2019).

1.5 Conclusion

The interaction between ESG labelling and individual investment decisions is a clear example of how markets are not just about risk and return. Across the evidence we reviewed, two themes emerge. First, many people get non-financial (expressive) utility from investing in line with their values, which makes labelled products more attractive and reduces redemption sensitivity during periods of underperformance (Riedl and Smeets, 2017; Bollen, 2007; Renneboog, Ter Horst and Zhang, 2011). Second, choice architecture and cognition matter: visible, simple labels and ratings frame decisions, trigger affect and halo inferences and operate as heuristics that channel attention towards labelled options (Glac, 2009; Hartzmark and Sussman, 2019).

These patterns have practical implications. At the acquisition margin, labels pull in a lot of new money into highly rated or explicitly sustainable funds even when returns are the same. At the retention margin, label aligned investors are stickier, absorbing outflows after losses and potentially allowing managers to maintain longer horizon strategies. At the beliefs margin, investors differ: some infer financial quality from ESG cues (optimism/halo) while others interpret them as constraints that could depress returns, producing heterogeneous reactions (Hartzmark and Sussman, 2019; Riedl and Smeets, 2017).

For policy and market design, the takeaway is simple: if labels matter, then label integrity is key. Clear definitions, auditability and consistent use across platforms reduces the scope for greenwashing and ensures that behavioural nudges align with investors' true preferences rather than exploiting them. Standardisation can also reduce confusion from competing taxonomies and ratings while preserving the information that makes labels effective in the first place.

For practitioners, the evidence suggests two guardrails. First, recognise that label driven demand can crowd out attention to fees, risk or portfolio composition; disclosures and client communications should counteract that by making material financial facts equally salient. Second, acknowledge investor heterogeneity: values dominant clients will respond strongly to credible ESG signals, while return dominant clients may need to be reassured that ESG integration doesn't mean a performance penalty.Finally, for research, there is still much to be done. We need to know which specific label attributes (naming, icons, thresholds, third party endorsements) move behaviour, how effects vary across demographics and cultures and how education or disclosure design can reduce misinference without diluting the expressive utility that many investors seek. Given the growing importance of sustainable investing, even small improvements in labelling practice can have big impacts on capital allocation. While this chapter has looked at the behavioural underpinnings of ESG labelling, the next chapter looks at the empirical evolution of green financial instruments and the greenium, and how labels show up in market pricing and investor demand. In short, ESG labels matter because people value what they stand for and because labels reorganise attention and inference. Understanding and using those mechanisms—while preventing their misuse—should be at the heart of both investor protection and sustainable finance.

The evidence reviewed in this chapter illustrates that ESG labels matter not only because of their informational role but also due to the behavioural responses they trigger. Investors derive expressive utility, rely on labels as heuristics, and sometimes conflate sustainability with financial quality, all of which shape allocation decisions beyond pure risk–return considerations. Building on these insights, the next chapter turns to the market-level evolution of labelled green instruments and the measurable phenomenon of the greenium, which captures how labels affect pricing and capital flows. At the same time, recent research also suggests that investor identity and perceptions of authenticity can amplify or moderate label effects, an aspect that will be explored more directly in the empirical design of this thesis.

Chapter 2: Green Financial Instruments and the "Greenium" in Investment Decisions

2.1 Introduction: The Rise of Green Financial Instruments

Green financial instruments have become the key to sustainable finance, allowing capital to flow to environmental projects while providing investors with assets that meet environmental, social and governance (ESG) criteria. Green financial instruments generally refer to financial assets—such as bonds, loans or other securities—whose proceeds are dedicated to environmental projects. The concept emerged in the late 2000s when institutions like the European Investment Bank (EIB) and the World Bank issued the first *green bonds*, earmarking funds for climate-friendly projects (EIB, 2022).

Green bonds are essentially the same as conventional bonds in terms of structure and credit risk but they have a use-of-proceeds commitment to finance or refinance projects with positive environmental impact (e.g. renewable energy, energy efficiency, clean transportation) (ICMA, 2021). This use-of-proceeds pledge is what makes green bonds *green* and underpins the *green label*. Over time the market has expanded beyond bonds to include green loans, green project finance and other labelled instruments; but bonds remain the flagship product in this space.

The growth of green financial instruments has been incredible, from niche to mainstream in just over a decade. Investor demand for sustainable investments and issuers' desire to signal environmental commitment have driven the growth. Since the *Paris Agreement* in 2015 global issuance of green bonds and similar instruments has grown exponentially (BIS, 2025). What started as a few development bank issues in the late 2000s has become a broad market with sovereign governments, municipalities, financial institutions and corporations across the world (CBI, 2024).

This chapter looks at the role of these green instruments in investment decisions, with a focus on the phenomenon of the "greenium"—a term used to describe the pricing premium associated with green labelled securities. We define and contextualise green financial instruments and their market trajectory. We then dive into the *greenium* and why it's relevant for understanding how green labels impact investor behaviour and issuers' cost of capital. Throughout we focus on how the green label—not the financial instrument itself—influences investment dynamics, in line with the thesis's core theme of sustainability labelling.

2.2 Defining Green Financial Instruments and Their Scope

Green financial instruments are any tradable or bankable assets specifically designated to fund environmental or climate related projects. The classic example is the green bond, which set the template for others. A green bond is a fixed income security where the issuer commits to use 100% of the proceeds for green projects and report on the project impacts. In practice green bonds have the same credit rating and financial characteristics as other bonds from the same issuer; the difference is the *label* and associated transparency. According to the International Capital Market Association (ICMA) which publishes the Green Bond Principles, green bonds fund projects in areas such as climate change mitigation, adaptation, natural resource conservation, biodiversity and pollution control (ICMA, 2021).

Beyond bonds, the sustainable finance market includes green loans, green asset backed securities (such as securitisations of solar leases or energy efficient mortgages) and green equity investments (such as yieldcos or green infrastructure funds). There are also related categories like social bonds and sustainability bonds, collectively often termed GSS (Green, Social, Sustainability) bonds. In recent years sustainability linked bonds (SLBs) and loans have appeared; these differ by not restricting use of proceeds but instead linking the instrument's financial terms to the issuer's achievement of pre-defined sustainability performance targets.

Voluntary guidelines such as the ICMA Green Bond Principles and the Climate Bonds Initiative taxonomy provide issuers and investors with criteria for eligible projects and reporting practices. Regulators have also stepped in; for example the European Union is finalising a Green Bond Standard aligned with its sustainable finance taxonomy (CBI, 2024). Many issuers seek a *second party opinion* or certification from approved verifiers to assure investors that the bond meets recognised green criteria (ICMA, 2021).

In short green financial instruments are the way sustainability labels are attached to capital market transactions. They don't differ financially from traditional instruments except for the label and associated commitments. But this label can have a big impact on both investor behaviour and issuers' financing costs.

2.3 Market Trends: Growth and Mainstreaming of Green Instruments

The green bond market has grown exponentially over the last decade, driven by increasing environmental awareness and issuer and policy maker action. From virtually nothing in 2007

(when the first green bond was issued), annual labelled green bond issuance has grown to hundreds of billions of dollars a year by the 2020s (EIB, 2022).

Annual global green bond issuance was $517 billion in 2021, a record at the time. Despite volatility in 2022, issuance stabilised at $510 billion before growing to $588 billion in 2023, a 15% year on year increase (CBI, 2024). By the end of 2023, at least 50 governments had issued green or sustainability bonds, raising nearly $486 billion of sovereign sustainable debt (CBI, 2024). Europe accounts for nearly half of all issuance, with Asia-Pacific and North America also playing big roles (BIS, 2025).

Investor demand has consistently outstripped supply, with many green bonds heavily oversubscribed. Dedicated green bond funds, indices and ETFs have amplified this trend. Central banks and official institutions have also become big investors – several have added green bonds to their reserves or purchase programmes (BIS, 2025).

Policy support has driven growth. The EU's sustainable finance taxonomy, China's guidelines and global initiatives like the Paris Agreement have created incentives for green issuance. But headwinds like ESG scepticism in parts of the US caused regional declines in 2023 (CBI, 2024).

Overall green instruments have gone from niche to mainstream and are now a permanent feature of global debt markets.

2.4 The "greenium": Concept and Relevance

As green bonds grew in number, people noticed they were priced slightly higher (lower yields) than similar conventional bonds. This is called the "greenium" (IMF, 2023).

In other words, a greenium means investors are willing to accept a lower yield (or pay a higher price) for a green bond compared to a non-green bond with similar features. For example, Germany's "twin bonds", where identical green and conventional bonds are issued side by side, has shown this clearly. German green twin bonds have always traded a few basis points tighter than their non-green twins (BMF, 2023).

Academic and institutional studies confirm the greenium exists. IMF (2023) finds that sovereign green bonds in advanced economies issue at yields about 4 bps lower than conventional peers, with even bigger effects (around 11 bps) in emerging markets. Zerbib

(2019) also documents a 2–5 bps greenium in corporate bond markets. ICMA (2021) notes that euro-denominated corporate green bonds often trade tighter in the secondary market.

The greenium is a real measure of the value of the green label. It shows investors are not just yield-hungry; they value the sustainability badge, and it has financial implications for issuers.

2.5 Evidence of the Greenium in Practice

Evidence from the markets shows how the greenium works in practice. In sovereign markets, Germany's "twin bond" has become the benchmark. By issuing two identical bonds – one conventional and one green – the German government has been able to show directly the price premium of the green label. Across different maturities, the green one has traded tighter, with premiums ranging from 2 to 9 basis points (BMF, 2023). France's first Green OAT in 2017 also confirmed this, pricing at a small premium due to very strong demand at issuance.

In corporate markets, similar effects have been seen. Zerbib (2019) documents greeniums of 2 to 5 basis points in secondary market, while ICMA (2021) notes that many euro-denominated corporate green bonds trade tighter than their non-green counterparts. This shows that investors are willing to pay a premium for green-labelled instruments is not limited to sovereign issuers but extends to private markets as well.

Investor behaviour reinforces the greenium. The UK's first green gilt in 2021 was oversubscribed by £100 billion for an issuance of only £10 billion. Bruce Power's first nuclear-labelled green bond in Canada was six times oversubscribed, showing that investor appetite can even extend to contested categories of green instruments (Ellmen, 2024).

But the evidence is not uniform. Some bonds have priced in line with or even at a discount to their conventional peers, especially during times of financial stress, low liquidity or when doubts were raised about the label (IMF, 2023). Despite these exceptions, the overall evidence shows a clear pattern: across both sovereign and corporate markets, the green label is often associated with a small but persistent greenium.

2.6 Drivers of the Greenium

Several factors explain why investors accept lower yields on green instruments compared to conventional securities. A first driver is the presence of ESG mandates: many institutional investors are required to hold green-labelled assets, generating structural demand that supports tighter spreads (BIS, 2025). The label also broadens the investor base by attracting specialised

funds and sustainability-focused portfolios. This enlarged demand, combined with the persistent imbalance between issuance and appetite, often results in oversubscription and modest pricing premiums (CBI, 2024).

Risk perceptions further contribute. Some investors consider green issuers better prepared for the low-carbon transition, and therefore slightly less risky, which justifies lower yields (IMF, 2023). The credibility of the label is also crucial: external certification and robust disclosure enhance confidence, while weak reporting increases concerns about greenwashing (ICMA, 2021).

Finally, reputational incentives matter. Holding green bonds allows institutions to demonstrate alignment with sustainability goals, improving ESG ratings and signalling commitment to clients and regulators (BIS, 2025).In short, the greenium emerges from the combined effect of regulatory mandates, broader demand, limited supply, lower perceived risk, credible certification, and reputational benefits.

2.7 Controversies: Nuclear Green Bonds

One of the central challenges in the green bond market lies in defining what truly qualifies as "green." While early green bonds were typically linked to uncontested areas such as renewable energy or energy efficiency, the rapid growth of the market has brought more complex and contested sectors into the discussion. The evolution of standards and taxonomies has therefore become as important as the financial mechanics themselves, since they determine which projects can access the reputational and financial benefits of the green label.

The case of nuclear energy illustrates this dynamic. Long excluded from green finance due to safety concerns and waste management issues, nuclear has recently been reconsidered because of its low-carbon profile. In 2021, Bruce Power issued the first nuclear-labelled green bond in Canada, which was heavily oversubscribed, and other utilities such as Ontario Power Generation, EDF, and Finland's TVO have since followed (Ellmen, 2024). The EU's decision in 2022 to include nuclear within its taxonomy, under strict conditions, further legitimised such instruments.

This example highlights a broader point: the green label is not static but contested, shaped by regulatory decisions, investor expectations, and political compromises. Similar debates surround other sectors such as natural gas or large hydropower, where environmental benefits are weighed against potential negative impacts. For issuers, the inclusion of these sectors can

expand access to cheaper financing through the greenium effect, while for investors, it raises questions about credibility and the risk of greenwashing.

In this sense, nuclear-labelled bonds are not only a niche development but part of a larger conversation about the boundaries of sustainable finance. They show that the market value of the green label depends as much on trust and standard-setting as on the underlying asset. For the broader green bond market, this underscores both the opportunity — wider issuance and demand — and the challenge of ensuring that expansion does not undermine the integrity of the label itself.

2.8 Conclusion

Green financial instruments have become mainstream for sustainable investing and green bonds are leading the way. The greenium is proof that labels matter: investors accept slightly lower returns for green assets and issuers get marginally cheaper funding.

While the greenium is small, it shows the power of labelling to move markets. It encourages issuers to green their projects and broadens the investor base. Nuclear bonds show that the value of the label is not limited to “sustainable” actors; it can attract capital even in disputed sectors if the standards allow it.

For this argument the greenium is key: it proves that labelling doesn’t just symbolise sustainability but actually changes investment behaviour and financial outcomes.

Chapter 3: Methodology

3.1 Research Design

"To what extent does the presence of an ESG/Green label influence individual investment choices, and what personal characteristics or thematic attitudes modulate this effect?" The thesis investigates whether and to what extent the ESG/green label influences the investment choices of the individual retail saver, and whether this effect is heterogeneous as a function of individual traits (e.g. risk tolerance, financial experience/attitudes, perceived identity with respect to investors) or "themed" factors (trust in the label, importance attached to transparency, etc.). In operational terms, the QR is structured as follows:

1. **RQ1**. Does the presence of a "green/ESG" label alter allocation preferences compared to a "non-green" bond, with the same financial payoffs?
2. **RQ2**. What latent dimensions of personal attitudes/norms (e.g. trust in the label, preference for transparency) are associated with a greater propensity towards the "green" tool?
3. **RQ3**. Which individual traits (socio-demography, experience/risk) mediate or moderate the effect of the label?

The reasoning is based on two related findings. First, a "label (green) effect" appears in the green bond literature: for many retail investors the fact that the security is labeled as "green" counts more than the "green grade" (environmental performance) or even an excess return of the conventional bond; that is, there is a systematic preference for the labeled bond, sometimes at the cost of a lower financial return (so-called greenium). Second, behavioral finance shows that group identities and perceptions influence financial decisions: in Henkel & Zimpelmann's experiments (Henkel & Zimpelmann, 2023), individuals who associate negative traits (greed, gambling, selfishness) with "shareholders" show aversion to the stock option even when the payoffs are identical to options described in a neutral way; manipulating perceptions (information on prosocial behavior) changes investment choices. These two threads motivate an experiment that isolates the label effect and then measures attitudes and identities as possible drivers/mediators of the effect.

National surveys confirm that financial literacy levels in Italy are among the lowest in Europe. According to the Bank of Italy (2023), less than 35% of the adult population achieves an adequate score in basic financial concepts, placing the country near the bottom of OECD

rankings (Bank of Italy, 2023). At the beginning of the questionnaire a 5-point Likert scale question was asked to measure self-assessed competence in economic and financial matters: those who answered the minimum were excluded from the analysis and put in a separate category. This choice responds to three methodological needs:

1. to reduce the noise in the answers of those who lack the basic knowledge to understand the characteristics of the financial products offered;
2. to ensure that the answers in the experimental task are interpretable in light of a minimum knowledge of the decision context;
3. to preserve sample heterogeneity by including both those who already invest and those who may invest in the future while keeping the validity of the inferences.

The questionnaire was designed to minimize order, context and social desirability bias, following the literature on order effects and informational salience. The experimental task was placed at the beginning, before any section that could make the ESG theme more salient or induce a preconceived notion, so we could capture preferences in as neutral a condition as possible with respect to the framing provided by the other questions. After the experimental task, participants answered three batteries of questions on a Likert scale (5 points), calibrated for the measurement of specific theoretical constructs: attitude towards sustainable investing, trust/influence attributed to the ESG label, and importance of transparency/disclosure. Attitude and trust in the label were measured with agreement scales, while importance was measured with an importance scale (Joshi, et al., 2015)(Likert, 1932), to capture direction and intensity of the response and methodological coherence to compare between variables. These are the core of the independent variables to answer the second research question, which investigates what attitudes and perceptions drive green investing.

Then comes the request for self-positioning on the interest in investing in “green” or environmental related financial products. This will be used in the analysis phase as a segmentation tool to compare motivations and choices between participants who are inclined and not inclined to such investments. Finally the questionnaire collects socio-demographic information (age, gender, education, occupation) which will be used to describe the sample and as control and moderation variables in inferential analysis, especially to answer the third research question which investigates the role of individual traits in moderating the effect of the ESG label.

The core of the experimental survey is a task to choose between two bonds with the same basic financial characteristics (duration, risk level, expected return) but differentiated along a single factor or aspect of sustainable finance for each of the three scenarios. Each participant sees only one of the scenarios, assigned randomly and balanced among the respondents. The order in which the options are presented within the scenario is also randomized to further reduce possible order effects. The three factors selected to build the scenarios come from two streams of literature:

1. From the work of Saravade et al. (2025) (Saravade, et al., 2025), who tested the effect of three key dimensions in the perception of green bonds among retail investors: label, environmental benefits and transparency/reporting. In that context, the "label effect" was particularly strong, leading many participants to choose the labeled bond even in the presence of a lower yield.
2. From the identity perspective of Henkel and Zimpelmann (Henkel & Zimpelmann, 2023), which demonstrates how perceived traits and stereotypes related to a certain type of investor can influence financial choices even with the same payoff, suggesting that factors such as trust in the label or the importance attributed to transparency can act as identity levers in the decision.

In the design of experimental scenarios, the choice of the characteristics on which to introduce the variation is not random but is based on elements that the literature identifies as decisive in the perception and evaluation of sustainable financial instruments. The ESG or "green" label represents one of these elements: it acts as a synthetic signal of environmental and social commitment, capable of influencing investors' choices even when the financial characteristics are identical to those of unlabeled instruments. Previous studies have shown that the mere presence of a label can generate a marked preference for the instrument, sometimes accompanied by a willingness to accept a lower return, a phenomenon known as greenium (Hyun, et al., 2021).

A second aspect concerns the declared environmental benefits, i.e. the ability of the instrument to produce positive and measurable impacts on the environment. This dimension, which reflects the so-called environmental additionality, is crucial for assessing the real effectiveness of sustainable investments, as it distinguishes initiatives with transformative potential from those that merely meet minimum requirements. The literature suggests that, although this

information can guide choices, its decision-making weight is often lower than that of the label, especially among retail investors (Lebelle, et al., 2020). Finally, transparency and the level of reporting are a pillar of trust in ESG markets. The ability to access clear, verifiable and regularly updated information on the use of the funds and the environmental results achieved increases the issuer's accountability and reduces the perceived risk of opportunistic practices or greenwashing. Several studies show that a high standard of disclosure favors the propensity to invest, while the lack of structured reporting is perceived as a barrier to market development (Lebelle, et al., 2020). The inclusion of these three aspects in the experimental design allows not only to test their direct effect on investment choices, but also to observe how this effect can vary as a function of personal attitudes, trust in ESG signals and perceived identities, in line with the evidence provided by Henkel and Zimpelmann.

The data for this study were collected through telephone surveys carried out by the research firm Aton Research, with the valuable collaboration of Dr. Iuliana Zullo, whose support was instrumental in the implementation of the data collection process. The data collected through the Qualtrics platform will be exported in a format compatible with statistical software (e.g. SPSS) to be cleaned and processed. First, responses that don’t meet the inclusion criteria defined in the initial screening (i.e. those from participants with a minimum score on the Financial Knowledge Scale) will be eliminated. Any duplicates and incomplete questionnaires will also be excluded to ensure the quality and reliability of the sample. Once the cleaning phase is complete, the data from the three scenarios will be combined into one file so that the choices can be analyzed together. A summary variable will be created that will show for each participant which option they chose (green or non-green) regardless of the scenario and a dummy variable for each scenario so we can see which scenario they belong to. This will be accompanied by the Likert scale variables for attitudes and perceptions, the cluster variable for interest in green products and socio-demographic information which will be described in the results section.

For the statistical analysis the reference model will be a multiple linear regression where the choice of the green option will be the dependent variable. This will be coded as binary (1 = green option, 0 = non-green option) and analyzed according to the independent variables from the experimental design (factor variable: label, environmental benefits, transparency) and the individual characteristics detected. This will allow us to estimate the effect of the three experimental factors, check their statistical significance and control for any relevant covariates so we can test the hypotheses formulated from the research questions.

In addition to the main analysis to estimate the effect of the three experimental factors on the probability of choosing the green option, secondary tests will be run to investigate the role of attitudinal and perceptual variables. The three Likert scale batteries (attitude towards sustainable investing, trust/influence attributed to the ESG label and importance of transparency) will be aggregated into as many synthetic indices, calculated as the average of the answers to the individual items within each matrix. Since all questions are on the same scale and measure the same construct, this will give us a more stable and interpretable overall measure for each dimension and reduce the random error related to the answer to individual items.

These will be used as independent variables in logistic regression analyses, both on their own and in interaction with the treatment variable, to see if and how label, environmental benefits and transparency is influenced by individual attitudes and perceptions.

Further comparisons will be made between the subgroups defined by the cluster variable for general interest in green financial products and then descriptive analyses and tests will be run to compare the mean scores of the attitudinal and perceptual indices between the groups to get a full picture of the profile of the investor who will or won't choose green products.

To check the robustness of the results several checks will be performed. First, multicollinearity among the independent variables will be checked by looking at Variance Inflation Factors (VIF) to make sure each predictor is adding something different. Then models will be estimated for each experimental scenario (label, environmental benefits, transparency) to see if the effects found in the pooled analysis hold up in each individual context. Where possible alternative model specifications will be tested, such as a linear probability model alongside the logistic regression to check the results are robust across different approaches. Outlier sensitivity analysis will also be done by excluding extreme values (outliers) in the attitudinal scales to see if they materially affect the estimates. Finally descriptive analysis of choice distributions and attitudinal scores will be done to look for any anomalies in the data and to help interpret the results more accurately.

Chapter 4: An Online Sentiment Analysis: Insights from the Language of Investors on Social Media

Building on the survey experiment, this section looks at 2020–2024 Reddit discussions and uses pre-trained transformer models to classify sentiment/emotions, to see how ESG/"green" labels impact perceptions regardless of fundamentals. The purpose of this analysis is to see how investors talk about sustainable finance online and what this tells us about behavioral biases like labelling and framing effects. In sustainable finance, labels like "ESG" or "green" are powerful frames that can influence perceptions regardless of performance. Research has shown a "green label effect" where branding a bond or fund as *green* can make it more attractive even when its environmental greenness or financial returns are no better than an unlabeled equivalent. This tendency to prefer the label over fundamentals is consistent with framing effects in behavioral finance: how information is presented (here, via an ESG label) can change behavior.

Labelling a product as "ESG" or "green" can trigger positive associations (ethical, forward-looking) or skepticism (greenwashing) and influence choices beyond what the numbers would suggest. Sentiment analysis of investor online discourse serves two purposes here. First, it shows if investor spontaneous comments align with label/framing effects found in experiments or surveys. Second, it uncovers the narratives and emotional tones around ESG investments in real world conversations. A growing body of research in behavioral finance uses text analysis to measure investor sentiment and relate it to market behavior (Tetlock, 2007) (Bollen, et al., 2011). In particular, social-media-derived sentiment has been linked to asset price dynamics and risk perceptions, and recent work has begun to apply these techniques to sustainable finance by connecting sentiment to green bond market trends (Piñeiro-Chousa, et al., 2021). By conducting an online sentiment analysis focused on ESG-labelled investments, we extend this approach to examine how framing investments as "green" is reflected in the emotional and opinion landscape of investors.

4.1 Reddit ESG Discussion Data Collection

In this section, we implement the data scraping pipeline to collect Reddit discussions about ESG ("Environmental, Social, Governance") and "green" investments from 2020 through 2024. We focus on gathering posts (titles and bodies) and their comments from the most relevant subreddit(s), then filtering by keywords (ESG, green, etc.), and finally organizing the

data into a structured format for sentiment analysis. The technical implementation details are reported in *Appendix A*.

Relevant posts were identified through a manual selection of the ten most active finance-related subreddits where ESG and sustainable investing were discussed. The subreddits were first scanned with ESG-related keywords (e.g., *"ESG"*, *"green bond"*, *"sustainable finance"*). Since keyword searches often retrieve posts that only mention these terms without focusing on them, a manual screening step was added: only opinion-focused posts clearly centered on ESG or green finance were retained. This ensured that the dataset reflected genuine discussions rather than incidental mentions.

The final selection included a curated list of threads, each of which was scraped in full. For each chosen post, up to 100 comments were collected. Comments without textual content (e.g., "[deleted]" or "[removed]") were excluded during scraping. The full scraping script is available in *Appendix A*.

After the initial scraping, the dataset included approximately 900 comments. A filtering step was then introduced to ensure that only contributions explicitly discussing ESG or green finance were retained. This was necessary because, even within relevant threads, many comments addressed side topics or mentioned keywords in a superficial way. The filtering procedure, illustrated in *Appendix A*, reduced the dataset to 366 comments, which were then used for the sentiment and emotion analysis.

4.2 Sentiment and Emotion Analysis

The comments obtained from the scraping stage were processed with two complementary pre-trained transformer models, available on the Hugging Face Hub. These models were not developed or trained as part of this thesis; rather, they were selected among existing architectures that had already been fine-tuned on large datasets of online discussions.

The first model classified the sentiment polarity of each comment, producing both a categorical label (positive, neutral, negative) and a continuous score computed as the difference between positive and negative probabilities. The second model captured emotional undertones in the comments, assigning one or more emotion labels (e.g., anger, joy, admiration) whenever their predicted confidence exceeded a set threshold. The use of pre-trained models was a deliberate choice: these architectures, already fine-tuned on large-scale Reddit and GoEmotions datasets, provided robust and validated performance without the need to build and manually annotate a

training set within this thesis. This approach ensured methodological soundness while keeping the focus on the behavioral finance application rather than model development.

This dual approach allowed the dataset to retain both a quantitative assessment of sentiment and a qualitative mapping of emotional expression. The implementation steps are documented in *Appendix B*.

4.3 Results of Sentiment and Emotion Analysis

The sentiment distribution shows that the majority of comments express a positive stance toward ESG investing, while a smaller share is neutral or negative.

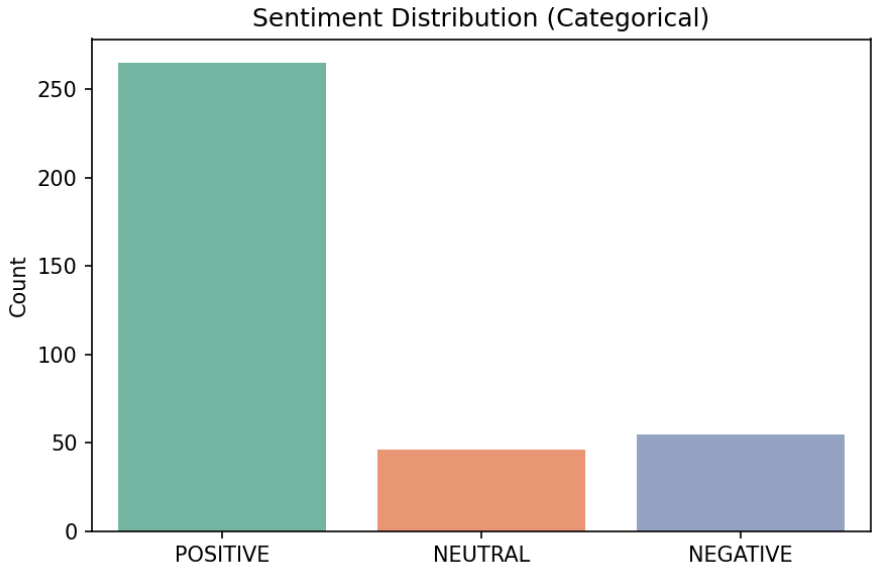

Figure 1: Distribution of Sentiment Categories in ESG Reddit Discussions (2020-2024)

This finding indicates that within the Reddit discussions considered, ESG and sustainable finance are more often framed in favorable terms than in hostile ones. However, the relatively limited presence of negative sentiment is still noteworthy, as it reflects an active critical minority. The continuous sentiment score provides further nuance.

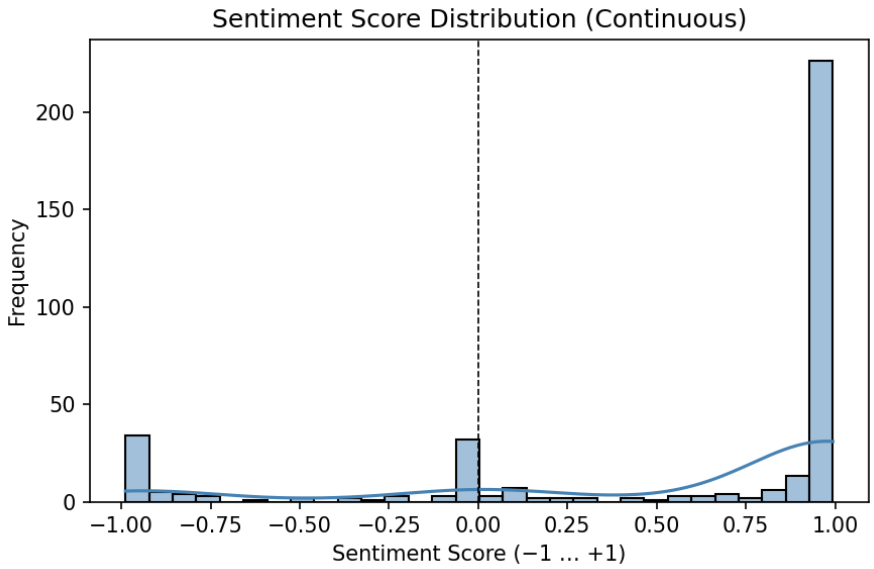

Figure 2: Continuous Sentiment Score Distribution

Most comments are clustered at the positive end, but a tail of highly negative scores means that for some users ESG means skepticism and rejection. This polarization means ESG is a symbolic label that can generate enthusiasm but also strong opposition.

Moving to the emotional dimension, the first analysis that includes all categories shows a dominance of the *neutral* label.

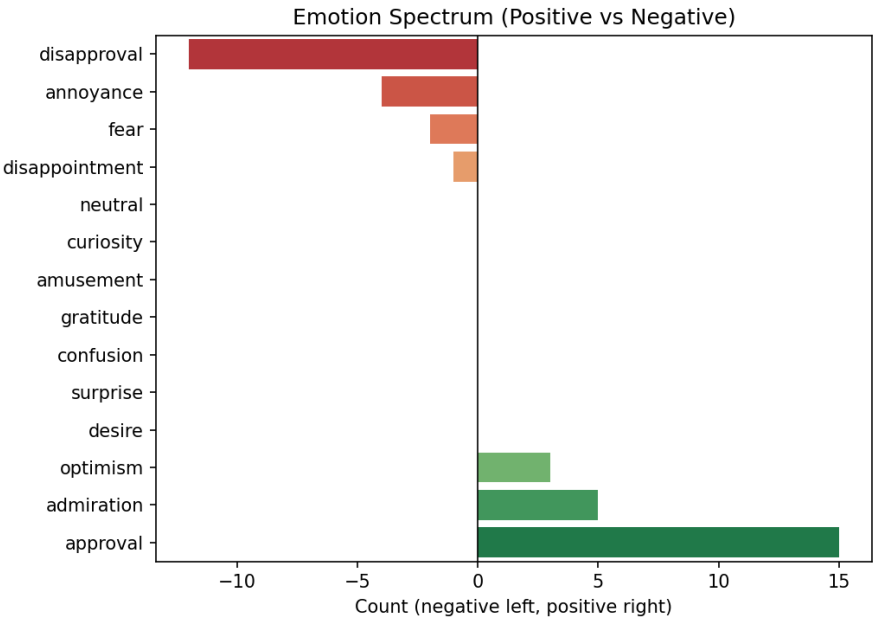

Figure 3: Emotional Categories in ESG Discussions (All Categories)

This makes sense given that financial discussions on Reddit are often descriptive or technical rather than emotional. But when the neutral category is removed and only explicit emotional content is considered, a more mixed picture emerges:

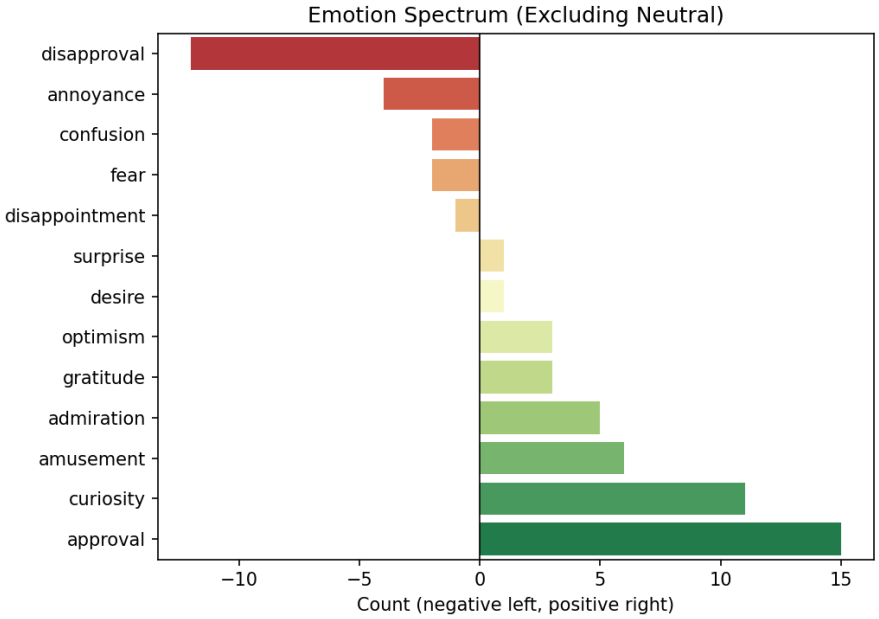

Figure 4: Emotional Categories in ESG Discussions (Excluding Neutral)

Positive emotions like *approval*, *admiration*, and *optimism* alongside negative reactions like *disapproval*, *fear*, and *annoyance*. This shows the ambivalence of ESG as a frame: it elicits enthusiasm for the ethical and forward-looking connotations, but also suspicion about greenwashing or financial underperformance.

Finally, the radar chart provides a visual fingerprint of the discussion.

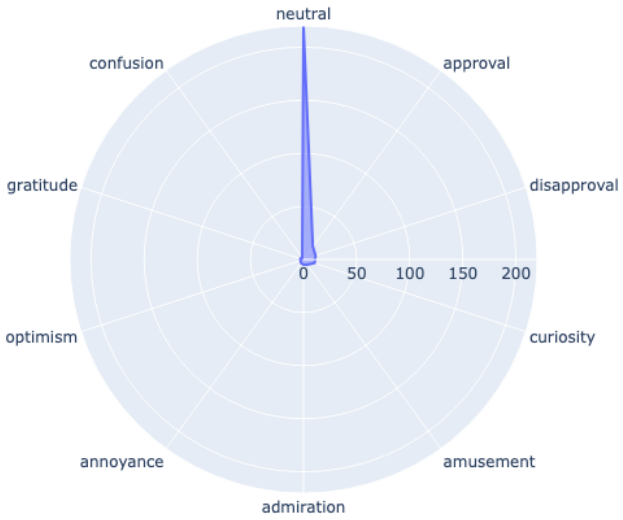

Figure 5: Emotional Fingerprint Radar Chart - ESG Investment Discussions

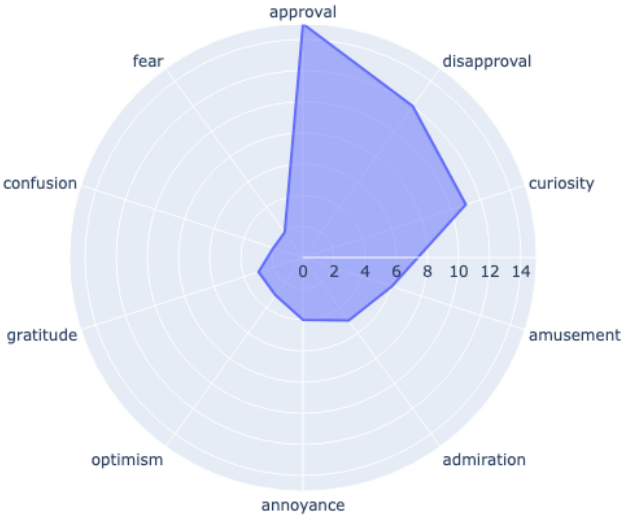

Figure 6: Emotional Fingerprint Radar Chart – ESG Investment Discussions (Excluding Neutral)

With neutral included, the chart is mostly flat, but when neutral is removed the underlying structure shows a balanced but fragmented emotional landscape, with positive and negative

reactions coexisting. This duality means ESG investing is both an aspirational frame that can mobilize approval and optimism and a contested label that provokes disapproval and skepticism.

Overall, the analysis shows that while ESG discourse on Reddit is mostly positive in sentiment, the emotional substrate is more complex. The coexistence of supportive and critical emotions means the “green label effect” doesn’t translate into universal approval, but rather into a polarized affective field where enthusiasm and distrust are both present.

The Reddit sentiment analysis provides important context for interpreting our experimental results. While the survey experiment found limited label effects in controlled conditions, the online discourse reveals the underlying emotional and cognitive processes that may explain this finding. The polarized sentiment on Reddit—with both enthusiasm and skepticism toward ESG—mirrors the heterogeneous responses observed in our experiment. The presence of both "approval" and "disapproval" emotions suggests that ESG labels trigger different psychological responses across investor types, which may cancel out in aggregate analyses.

Critically, the prevalence of skepticism and concerns about "greenwashing" in online discussions aligns with our finding that trust and attitudes, rather than labels alone, drive ESG investment choices. This convergence between spontaneous online sentiment and controlled experimental responses strengthens the external validity of our results.The Reddit analysis thus complements the survey by revealing the narratives and emotional underpinnings that drive the differential responses to ESG labels we observed experimentally. Where the survey quantifies the limited average treatment effect, social media discourse illuminates why this effect varies so dramatically across individuals.

Chapter 5: Analysis and Result

1. ESG Label Influence on Investment Allocation Preferences

The first research question asks whether labelling a bond as "green/ESG" changes investors' allocation preferences compared to a non-green bond with the same financial payoffs. In our experiment, participants were randomly assigned to one of three scenarios, each with a binary choice between two bonds with the same yield: one labelled with a green/ESG cue (Option A) and one without (Option B). The ESG-labelled bond varied in its narrative: either a generic Green Bond label, an Environmental Impact framing or a Transparency framing on how the proceeds would be used.

We measured each participant's allocation choice (whether they chose the sustainable bond option) as the dependent variable. Overall, about two-thirds of participants (66%) chose the ESG-labelled bond, so there was a general tilt towards the sustainable option.

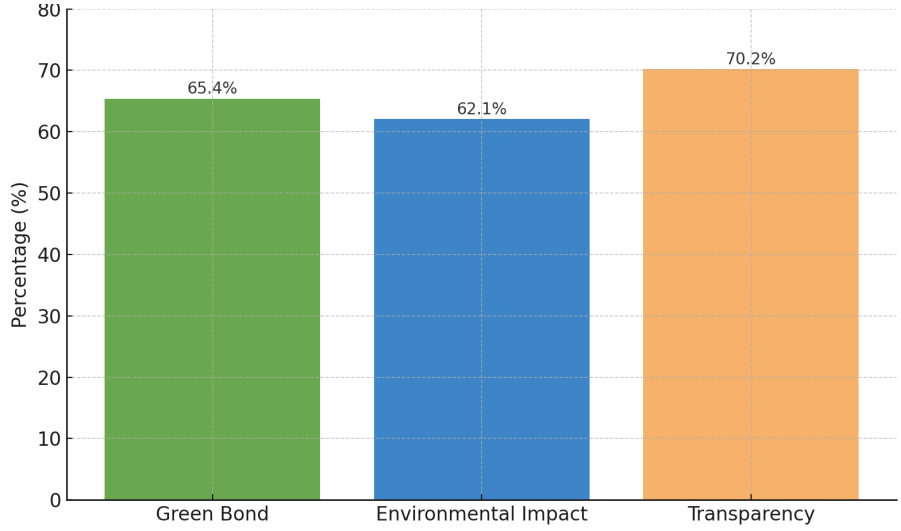

Figure 7: Share of participants choosing the ESG-labeled bond across scenarios

But the green label per se didn't produce a statistically significant shift in allocation probability when controlling for other factors. In a regression with scenario indicators and individual covariates, neither the Green Bond label nor the additional framing scenarios had an impact. For example, being in the Transparency scenario (versus Environmental Impact) had a small positive but non-significant effect ($\beta = +0.056$, $p = 0.341$) and the Green Bond scenario had a slight negative but non-significant effect ($\beta = -0.073$, $p = 0.211$).

In practical terms, participants didn't allocate significantly differently between bonds with different ESG narratives. So the type of framing used (environmental, transparent, or generic green) didn't play a big role.

This null effect regarding the ESG label appears to contradict the extensive literature on the "greenium" phenomenon documented in bond markets (Zerbib, 2019; BMF, 2023). However, this apparent contradiction reveals an important distinction between market-level pricing effects and individual-level behavioral responses under controlled conditions.

The greenium observed in secondary markets likely reflects the aggregated preferences of a subset of highly motivated ESG investors, whose strong preferences can influence pricing even when they represent a minority of market participants. In contrast, our experimental design captured the average treatment effect across a broader population of retail investors, many of whom may be indifferent to ESG labels when financial returns are held constant.

This finding suggests that the greenium may be driven by a concentrated group of values-driven investors rather than a general population-wide preference for ESG labels, which has important implications for understanding the scalability of sustainable finance markets.

One possible interpretation is that many participants responded more to the symbolic presence of the label than its content. That is, the fact that the bond was labelled as "green" might have acted as a shallow heuristic or moral signal, without triggering deeper reflection on what the label actually meant. If true, this would be in line with the idea that investors don't process the underlying narrative or criteria associated with ESG labels, but instead react to the presence of any sustainability signal as a general proxy for social desirability.

This interpretation is supported by later results (RQ2) where only the Attitude index – measuring internalized environmental preferences – predicts ESG choices. We may hypothesize that only participants with high ESG values evaluated the label meaningfully, while others chose Option A because of surface-level cues or social expectation.This is in line with the observation that the "greenium" (green premium) in bond markets – while present – is small and only driven by a segment of value-driven investors (Saravade et al., 2025). Indeed, a recent retail investor experiment by Saravade et al. (2025) found that most investors were influenced by a green label and preferred a labelled green bond over a higher-yield conventional bond. Our results show that in our sample the effect was muted, probably because of investor heterogeneity: those who care about ESG will choose the green option regardless, while those who don't are not moved by the label alone.

2. Attitudinal and Normative Factors Driving Green Investment Choices

The second research question asks what underlying personal attitudes or norms are associated with choosing the "green" investment option. In our study, we measured participants' attitudes and perceptions towards sustainable investing through composite scores: a Mean attitude score towards ESG investments (overall positive/negative attitude), a Mean trust score towards ESG labelled products (trust in ESG labels and claims) and a Mean knowledge score on ESG bonds (self-reported understanding of ESG bond concepts and information).

These composite indexes were calculated as arithmetic means of Likert-scale items (1 = strongly disagree, 5 = strongly agree). Each index aggregates multiple items capturing different but related dimensions. All items were weighted equally in the score but their interpretation captures a general latent orientation.

These can be seen as proxies for underlying norms and beliefs: for example a high ESG attitude may reflect strong personal values or moral norms towards sustainable investing and a high trust score means faith in ESG labels.

The regression analysis showed that attitude was the strongest predictor of choosing the green bond.

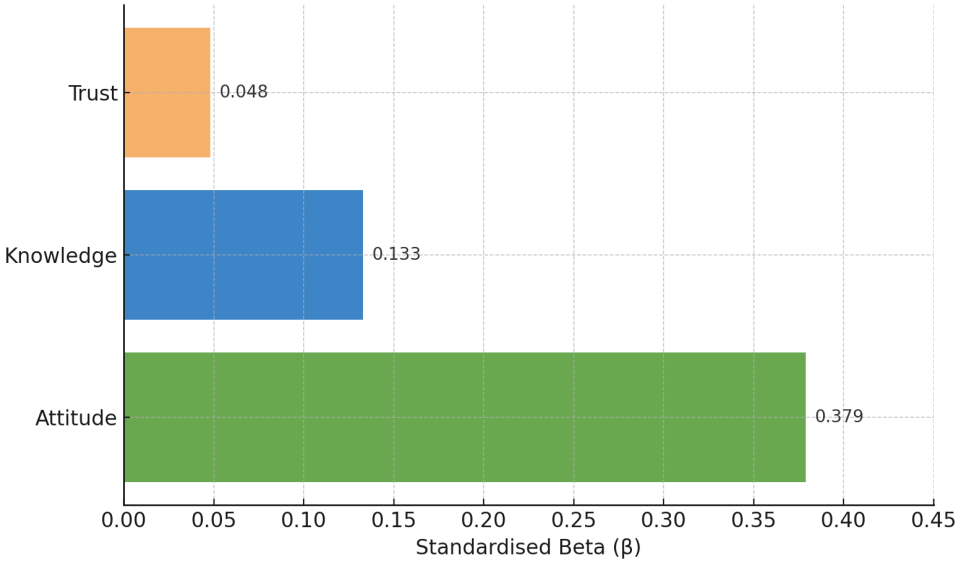

Figure 8: Standardised regression coefficients for ESG Invest. Choice

The mean ESG attitude score had a positive and highly significant effect (B = +0.208, SE = 0.041, β = +0.379, t = 5.09, p < 0.001). This means that for each unit increase in pro-ESG attitude (on its scale), the likelihood of choosing the green labelled bond increased significantly. In practical terms, participants who personally value sustainable investing were much more likely to allocate to the ESG option, all else being equal. This is consistent with a large body of behavioural research showing that personal norms and attitudes towards ethical investing drive actual investment choices. Investors with strong pro-social or environmental values get non-financial "utility" from investing in line with their principles and are willing to give up some return for alignment with their values. Our result confirms that attitudinal alignment is key: those who believe in ESG investing as a concept will act on that belief. The regression showed that attitude was the strongest predictor, with the mean ESG attitude score highly significant (B = +0.208, p < 0.001). This indicates that those who value sustainable investing will allocate to the ESG option, consistent with Riedl and Smeets (2017) and supported by our Cluster Analysis, where contributing to ecological transition was the most cited motivation among ESG investors..

We also found that knowledge and information play a role. The mean knowledge score about ESG bonds had a positive association with choosing the green instrument (B = +0.082, β = +0.133, p = 0.037). In other words, participants who reported more knowledge about ESG financial products were more likely to invest in the labeled green bond. This is an effect of familiarity or awareness: people who are more educated or informed about ESG investments may feel more confident in the benefits or less uncertain about the risks and therefore more open to them. This finding aligns with survey evidence that many retail investors still feel not well informed about ESG products which can deter participation. As a recent study (OECD, 2021) noted: "perceived credibility and transparency of ESG funds are key determinants of investor participation". Knowledge likely increases credibility – an informed investor is better able to distinguish between genuine ESG quality and is thus more comfortable to invest sustainably.

Interestingly our trust factor in the model – trust in ESG labels – did not show up as an independent significant predictor when attitude was controlled for (B = +0.031, β = +0.048, p = 0.473). This doesn't mean trust is not important; it just means its effect is intertwined with attitude. In fact trust in ESG labels was highly correlated with general ESG attitude (Pearson r ≈ 0.65). So participants who were enthusiastic about ESG investing also tended to trust ESG products' claims and it's statistically hard to separate the two effects. Many likely give the

benefit of the doubt to a green label if they are positively predisposed to sustainable finance overall. In our data once we controlled for that overall attitude additional variance from trust was minimal. We interpret this as: investors who are positive towards ESG are both more trusting and more likely to invest – trust is almost a component of their broader positive attitude. And those who are skeptical in attitude likely also distrust ESG labels. This aligns with broader market surveys: lack of trust and concerns about "greenwashing" are frequently cited by skeptics as reasons to avoid ESG investments. Indeed 85% of global investors in a 2024 EY survey (EY, 2024) believed greenwashing is getting worse, reflecting the widespread caution towards ESG claims.So our results show that intrinsic ESG attitude is the underlying driver – capturing both values and trust – of using the green investment tool. This supports the hypothesis from RQ1 – many might not critically evaluate the quality or detail of ESG information but rather respond to the label itself when they are already positive towards sustainability.

3. Moderating Role of Individual Traits in Label Effects

The third question asks which individual characteristics (socio-demographics, investment experience, risk perception) mediate or moderate the ESG label effect on investment choice. In other words, are there certain types of individuals for whom the green label has a stronger (weaker) impact? We looked at this by examining direct effects of traits like age, gender, education and occupation on the choice and by testing an interaction between age and ESG attitude as a potential moderator of label preference.

Age was a significant factor. In the model without interaction terms, age had a negative effect on choosing the green bond ($B = -0.060$, $\beta = -0.136$, $p = 0.012$). This means that older investors were less likely to choose the ESG-labeled option compared to younger investors. The effect size is moderate: roughly speaking, a difference of one standard deviation in age (about 11 years in our sample) corresponds to a 13.6% lower standardized propensity to choose the green bond. This confirms what is often said: younger people are more open to sustainable investments because they see these issues as more personal.

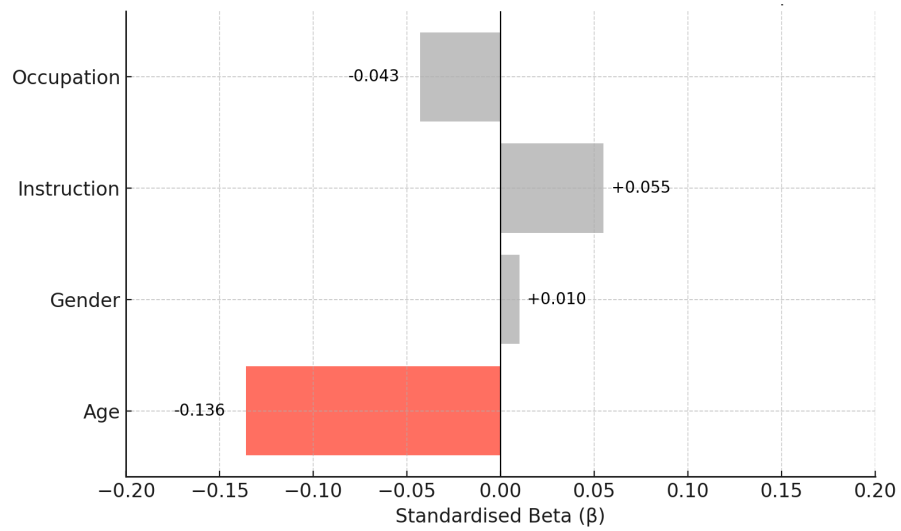

Figure 9: Effect of individual traits on ESG bond choice

This might be a broader generational trend: in Italy where our survey was conducted, younger cohorts are more exposed to sustainability topics through education and social media. They also tend to align more with values-based consumption and ethical finance. This is in line with previous research (OECD, 2021; Pedersen et al., 2020).It is worth noting that age did not change the importance of attitude – the Age × Attitude interaction was not significant in our analysis. We tested an Age × Attitude interaction to see if the effect of pro-ESG attitude on choice was different for younger vs older individuals. The interaction term was positive but not significant (B = +0.019, p = 0.459). This means that having a strong pro-ESG attitude increases the likelihood of choosing the green bond for both young and old investors equally. In other words, while older investors on average were less inclined towards the ESG bond, an older person with strong ESG-friendly attitudes is almost as likely to invest green as a younger person with similar attitudes. The attitude effect is uniform across age groups. So we did not find evidence that age moderates the label effect among those who are equally motivated; instead age is associated with differences in typical attitude levels or ESG openness.

Other socio-demographic factors didn't show much effect in our data. Gender had no impact (coefficient near zero, p = 0.857) so males and females (and others, though our sample had a binary gender measure) were about equally likely to choose the ESG option when attitudes and other variables are controlled for. Education level (measured by the "Instruction" variable which ranged from high school to PhD) was not significant (p = 0.385). Occupation (whether the respondent was a finance professional, student etc.) was not significant (p = 0.536).

This lack of significance is likely due to two combined factors. First, we excluded participants with no background in economics or finance during the survey's screening phase. This "rejection filter" reduced variability in financial literacy making Education less differentiating. Second, most of the effect of education was already captured by the Attitude and Knowledge indexes – more educated individuals score higher on both. Once those mediators are in the model, Education itself doesn't add much explanatory power.

We didn't measure risk tolerance directly in our main model but it's conceptually relevant. Prior studies show risk tolerance can moderate interest in ESG investments. For example Saravade et al. (2025) found that retail investors with higher risk tolerance were more likely to invest in a labeled green bond. They interpret this as risk-tolerant individuals being more comfortable venturing into relatively new or unfamiliar investment products like green bonds.

In our sample we didn't have an explicit risk aversion measure but we can infer that our "ESG enthusiast" group didn't think the green bond was risk-free (only 29% of them thought ESG instruments have lower long-term risk). Maybe those who chose the ESG bond were willing to do so without perceiving it as safer – implying a tolerance for potential risk or at least non-averse behavior. Meanwhile more risk-averse investors might have stuck to the status quo (non-green bond) unless given clear evidence that the ESG bond was equally safe.Another trait is investment experience. We didn't find an effect of occupation (e.g. working in finance) on ESG choice but external studies suggest experience matters in subtle ways. Saravade et al. (2025) found that individuals with previous experience in bonds or stocks and those working in the financial industry were more likely to invest in a green-labeled bond. In our sample the effect of "Occupation" might have been diluted by the initial screening: participants were already filtered for minimum economic knowledge so the gap between professionals and non-professionals was reduced.

In summary, individual traits can influence ESG investment behaviour, mainly through their impact on underlying attitudes or comfort with ESG products. Age was a factor, with older investors less likely to choose the green bond overall but age didn't change the power of pro-ESG attitudes when present. Gender and education didn't show independent effects once attitudes/knowledge were controlled for. Risk tolerance and investment experience, although not measured in our model, are suggested by other studies to drive ESG investment – probably because they reduce the perceived barrier of uncertainty or risk in new sustainable products. So to increase the appeal of ESG investments, one might target the segments that are currently

more sceptical (e.g. older, more risk averse investors) with strategies that make them feel more comfortable with ESG products (e.g. through guarantees of performance or better transparency). This leads nicely into the cluster analysis of investor profiles which helps to contextualise the "ethical" vs "sceptical" mindset divide that underlies much of the above results.

4. Ethical vs. Skeptical Investment Profiles (Cluster Analysis)

To break this down further, we segmented participants into two broad groups based on their responses: those who are inclined towards ESG investing ("Yes" cluster) and those who are not ("No" cluster)**.** This clustering (which matched closely with whether they were interested in ESG instruments) gives us a better picture of the reasoning each group uses – essentially an *ethical investor profile* vs *skeptical investor profile*. The clusters were visualized with radar charts showing the level of agreement with each motivation statement.

Figure 10: Motivational Profile of ESG-Interested Investors ("Yes" Cluster)

Cluster 1: The "Yes" (Ethical) Investors. This group are people who will invest in ESG labelled products. Their profile is clearly driven by ethical and pro-social motivations. Virtually all of these investors said a primary reason for investing in ESG is *"to contribute to the ecological transition or the fight against climate change"* (100% agreement) . They genuinely

want to make a positive impact – they see their investments as a way to do good. Many also want *"to support companies whose environmental values align with mine,"* with about 58% checking this as a motivation . This means they identify with the mission and values of sustainable businesses. In short, these investors exhibit what can be called value alignment or normative commitment: they invest as an expression of their personal ethics and identity.

Not all of the Yes cluster are naive idealists; they also consider financial aspects, but as secondary. Most (63%) of these investors believe ESG instruments have good performance prospects. They're not sacrificing financial returns blindly – they think doing good can go hand in hand with doing well financially. But they don't generally believe ESG products are inherently safer or lower risk: only ~29% think these instruments are lower risk over the long run than conventional investments . This is an interesting insight – they are willing to bear normal market risk for the sake of their goals, rather than seeking ESG as a risk shelter. They likely view ESG bonds as competitive on returns but not necessarily less volatile or more secure than others. And 87% said "personal curiosity or interest in innovation" as a reason to invest in ESG . This means they are intrinsically motivated – they are intellectually or emotionally engaged by the idea of sustainable finance. It may also mean they are open to new financial products and forward thinking.

Overall the Yes cluster can be described as values-driven but pragmatic. They invest in green products because of their values (to bring about environmental change and support like-minded companies) and they have enough trust and interest to engage with these new products. They also believe you can invest responsibly without sacrificing returns – a view increasingly supported by sustainable finance research in recent years. This cluster aligns with the concept of *"responsible investors"* or *"impact investors"* in the literature who seek both financial and social returns. They are the segment identified in previous research with high altruism and environmental awareness who are even willing to accept a lower yield (a "greenium") to hold green bonds. In other words, their *minimum required return* might be slightly lower because they get extra utility from the positive impact (a phenomenon also noted by Riedl & Smeets, 2017 and reflected in green bond pricing). Our data didn't force a return trade-off (returns were equal by design), but the fact that ~66% chose the green bond suggests a latent willingness to prefer the sustainable option; this could translate into accepting slightly lower returns for ESG in real life. Indeed Saravade *et al.* (2025) showed that many retail investors would choose a labeled green bond over a higher-yield conventional bond – a finding our cluster's sentiment supports.

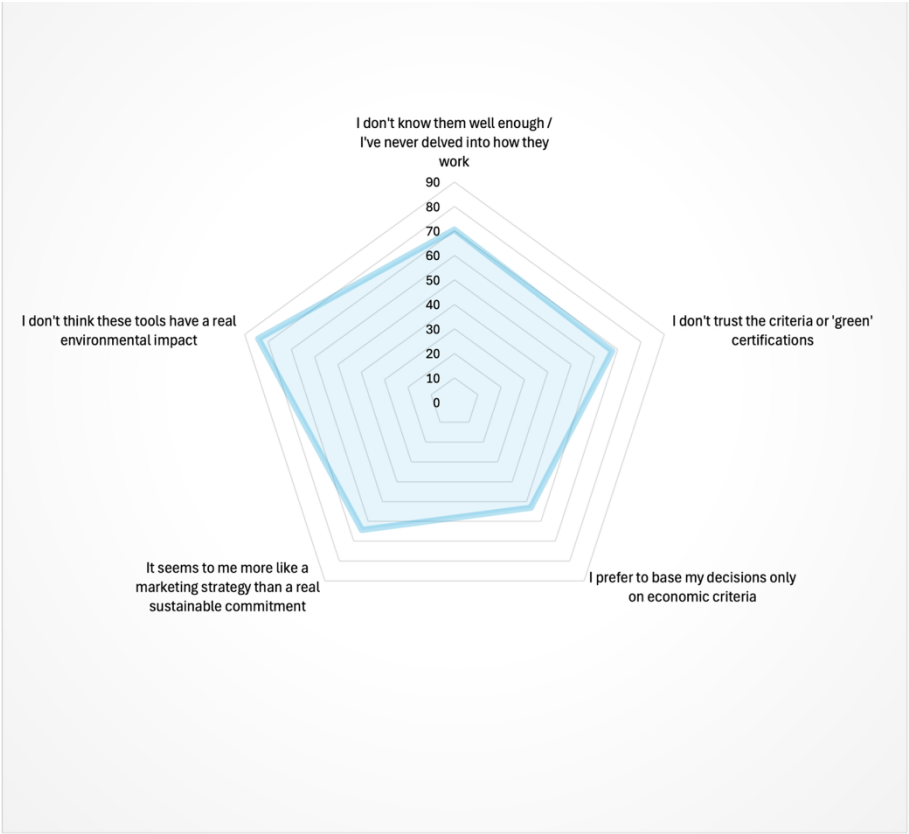

Figure 11: Motivational Profile of ESG-Interested Investors ("No" Cluster)

Cluster 2: The "No" (Skeptical) Investors. The other group consists of those who didn't want to invest in the ESG tool. We have less direct survey data on their reasons (since they presumably skipped the pro-ESG motivation questions) but we can infer their rationale from our results and from external evidence on ESG skepticism. These investors likely have a financial-first or distrustful rationale. Common reasons for not investing in ESG, as documented in surveys, are: distrust in ESG claims**,** concerns about "greenwashing", and doubt about financial performance. It's very likely that our No cluster held attitudes such as: *"I don't believe these "green" bonds really make a difference,"* or *"I worry that the ESG label is just marketing and lacks substance."* In fact the prevalence of greenwashing concerns in global investor surveys is striking – in Morgan Stanley's 2024 Sustainable Signals report, lack of transparency and trust in ESG data was the top barrier cited by individual investors (63% globally), followed by greenwashing fears (61% of investors). Our skeptical cluster likely echoes those sentiments, being fundamentally unconvinced that ESG products are trustworthy or meaningfully different from conventional ones. This ties back to their lower trust scores and negative ESG attitudes in our data.

Another likely rationale for the No cluster is a focus on financial risk and return from a conservative standpoint. Skeptical investors may believe that ESG investments require sacrificing returns or taking on additional risk. They might say *"I stick with what I know works; I'm not sure these green bonds can match the returns of regular investments."* Indeed, as noted, 43% of retail investors in one study said they worry ESG means higher risk or lower returns . Our No cluster's behavior (choosing not to invest in the green bond despite equal payoffs on paper) suggests a possible perception that something about the ESG instrument is disadvantageous – maybe they think hidden costs, future underperformance or just don't want to mix social goals with investing. Some in this cluster may also say lack of knowledge is a reason: without familiarity or clear information, sticking to traditional investments feels safer. This aligns with the finding that over a quarter of investors feel they don't have enough information about ESG funds , and so they abstain.

We can also consider personal values on the other side. If the Yes cluster is motivated by ethical values, the No cluster simply may not prioritize environmental or social outcomes in their investment decisions. It's not that they are anti-ESG; they are just *"value-neutral" or purely profit-driven"* investors for whom ESG factors are irrelevant unless they affect returns. In ethical terms they might think *"my investments are about making money, charity is separate."* This is well-documented in the investor typology – as Bollen (2007) and others have shown, there are investors who derive utility from aligning with their social values and those who don't mix ethics with investing. Our cluster analysis essentially captures this dichotomy: an ethical/value-driven segment versus a traditional/financial-driven segment. But these skeptical investors will only engage with ESG products if their concerns are addressed. So credibility and transparency are key to converting the skeptics. Regulators and issuers need to reduce greenwashing and provide clear evidence of impact and performance. For example, introducing third-party certifications or standards for green bonds can reassure skeptics by ensuring the label really means environmental benefit – thereby *building trust*. The EU's Sustainable Finance Disclosure Regulation (SFDR) and proposed green bond standards are moves in this direction, to harmonize what "green" means and eliminate false claims. The importance of this is shown by the finding that when credible labels are in place and aligned with actual sustainability performance, it *"helps build investor trust and provide clearer guidance"*. Increased transparency – for example, reporting exactly how proceeds are used and what environmental impact is achieved – can also speak to the skeptics' demand for proof. In short, the more ESG investments start to look like regular investments in terms of reliable data and

proven returns (while still delivering extra-financial benefits), the more the skeptical segment may warm up to them.

How these views shape ESG engagement is huge. The ethical vs. skeptical divide means that uptake of ESG labelled products in the market will depend on the population mix of these investor types and on initiatives to bridge the gap. The ethical investors have been the early adopters driving the growth of ESG – their engagement has created the sustainable finance market we see, including the green bond "greenium" (where demand from values-driven investors allows issuers to pay lower yields). The skeptics might limit the *scaling* of ESG investing unless their criteria are met. If for example a large fraction of investors remain unconvinced, ESG products could plateau as a niche. On the other hand if evidence mounts that ESG investments can perform as well as or better than traditional ones (for instance through the climate transition creating new growth opportunities) some skeptics will join in purely for financial reasons – effectively *mainstreaming* ESG. And robust anti-greenwashing regulations could pull in those who were on the fence due to trust issues.

In our study we see that once attitudes and knowledge are accounted for the label didn't sway people – which perfectly illustrates that the key is changing hearts and minds (or information), not just slapping on a label. The ethical cohort's hearts and minds are already aligned with ESG, so the label is a welcome signpost for them. The skeptical cohort's are not; for them additional incentives or assurances are needed. This is a broader point made in the sustainable finance literature: effective policy must both **"**push**"** and **"**pull**"**. Pushing would involve regulatory measures to ensure ESG quality (thereby pulling in skeptics by removing grounds for doubt), while pulling involves marketing and education efforts that highlight the competitive performance and real impact of ESG investments (thereby attracting those who might not have considered them).In summary the cluster analysis confirms our regression findings in a more qualitative way. The Yes cluster (ethical investors) show how personal norms (wanting to help the environment) and trust/interest lead to high ESG uptake, with confidence that returns can be sufficient. The No cluster (skeptics) illustrate the barriers – primarily lack of trust or interest and concern for returns – that dampen the label's effect. These views are reflected in real-world behaviour: the ethical investors are the ones creating the sustained demand for ESG products, while the skeptics often stay on the sidelines or need extra persuasion. As ESG investing moves forward closing this gap will be key. Bridging strategies might include increasing transparency (to satisfy the skeptics' information needs) and showcasing success stories where sustainability and profitability go hand in hand (to satisfy

their return requirements). Already we see shifts – by 2024 many institutional investors openly admitted short-term performance focus as a reason to temper ESG allocations, so as soon as ESG can meet those performance expectations more mainstream investors will integrate it.

In short ESG engagement with a broad investor population is a tale of two mindsets. One is *ethically and trusting* – these investors buy into the ESG label and will continue to demand green products. The other is *skeptical and return oriented* – these investors need to be convinced on conventional terms (trust, transparency, performance) before the label has any impact on their decisions. The interplay of these two will determine how much a "green label" can move the needle on investment flows at scale. Our research shows that without addressing personal attitudes and trait mediated concerns an ESG label on its own has limited power; but when aligned with supportive attitudes or improved credibility it can be a powerful lever to steer capital towards sustainability.

Chapter 6: Limitations of the Research and Future Directions

1. Introduction

All research is bounded by practical constraints, methodological decisions and contextual contingencies. Making those boundaries explicit is not weakening the contribution; it's essential for scientific transparency and cumulative progress. This chapter therefore presents the limitations of the study as natural boundaries that clarify the scope of inference and help to identify the most promising avenues for extension. The tone is constructive—the limitations are acknowledged, situated in the methodological literature and used to motivate a concrete research agenda—while retaining a degree of defensiveness where choices were deliberate trade-offs (e.g. internal validity and feasibility over maximum realism).

2. Main Limitations

Geography. The sample is mostly Italian (≈90%). This is a national case study but reduces external validity: the results can be most confidently generalised to populations that are similar to the sample in terms of cultural background and financial environment. Cross-country research in sustainable finance shows that investor knowledge, attitudes and adoption vary meaningfully across jurisdictions (Amel-Zadeh and Serafeim, 2018; OECD, 2020). In

particular, Italy's relatively low financial literacy—documented by several national surveys—may affect how much investors rely on simple cues, such as an ESG label, when evaluating products (D'Alessio et al., 2020; Bank of Italy, 2023). Framed constructively, the thesis is an "in Italy, now" that invites replication elsewhere.

Self-selection. As with most online surveys, self-selection likely occurred: individuals with at least some interest in finance or ESG are more likely to participate. Screening measures excluded those with very low self-assessed financial literacy to avoid noise or forced comprehension. This was a defensible design choice to protect measurement quality but it also means the study under-represents novice investors with minimal literacy—an important segment in many markets (D'Alessio et al., 2020; Bank of Italy, 2023). In short, the sample is best understood as Italian retail investors with at least basic comprehension, rather than the whole population.Hypothetical, simplified choice. The core behavioural task presented two bonds with the same financial terms, differing only by the presence/absence of an ESG label. This simplification was intentional to isolate the label effect and avoid confounding by coupon, maturity or risk differentials. The trade-off is reduced ecological validity: real investment environments have multiple alternatives, richer product information and real money at stake. The literature shows hypothetical bias—survey respondents may overstate pro-social choices or willingness to pay when there are no real consequences (Harrison and Rutström, 2008).

Information load and salience. A more detailed, prospectus-like description of the green bond (use-of-proceeds, verification, reporting frequency) would increase realism but risk hiding the label behind complex text and overwhelming respondents, thus reducing completion and statistical power. The minimalist presentation was a stylistic and practical choice aligned with survey-experiment best practice (simple, controlled manipulations). We acknowledge, however, that in markets, granular transparency—and the fear of its absence—modulates investor reaction to labels (EU TEG, 2020; Lebelle, Lajili Jarjir and Sassi, 2020).

Randomisation and order/framing. Random assignment ensured treatment comparability. The ESG topic was after the choice task to avoid priming. These are strengths, not weaknesses: they help internal validity and reduce experimenter demand.

Likert scales and self-reports. Attitudes, norms and preferences were measured with Likert scales. While common in behavioural finance, these measures are prone to social desirability and central tendency biases (Krumpal, 2013). On topics with moral overtones (sustainability, transparency), respondents will over-report pro-social attitudes. The thesis uses

anonymity, neutral wording and balanced items to mitigate these effects, but measurement error will still inflate absolute levels of attitude indices. Importantly, relationships (e.g. attitudes predicting choices) are usually more robust than raw means under such bias.

Lack of qualitative depth. The study deliberately forgoes open-ended or interview data to have a clean, scalable survey experiment. This means we don't get to see why people think and choose as they do – nuances (e.g. identity expression, scepticism narratives) are unobserved. Moreover, doing this experiment with a qualitative sample would have been difficult: selecting the right participants and isolating biases would be hard, and working with small numbers would risk contaminating their choices through awareness or interaction effects.

Model form and interactions. Models are linear by default. While simple and interpretable, they may miss non-linearities or untested interactions (e.g. label impact conditional on very high pro-environmental norms or on risk tolerance thresholds). Theory-motivated interactions can be included, but not exhaustively; so some complex patterns may be under-captured.

The absence of significant label effects in our experiment needs careful interpretation. This null result could mean either: (1) there is truly no label influence among Italian retail investors, or (2) there were methodological limits that made it harder to detect such effects. Several design choices may have reduced the observed impact. First, our screening for basic financial literacy might have selected participants who are more financially sophisticated and therefore less influenced by simple cues like labels. Second, the hypothetical nature of the task removed real financial stakes which might otherwise increase the emotional and identity-driven aspects of ESG investing. Third, our simplified choice setting excluded the richer context usually found in real markets such as fees, issuer reputation and distribution channels.

The Italian context also matters: lower financial literacy and a less developed ESG market means that these results might not be applicable to countries where ESG investing is more established. In markets with higher awareness and more mature sustainable finance ecosystems, label effects might be stronger.

We focused on label presence, stated benefits, transparency and selected individual traits. While this makes the analysis manageable, it leaves out other potential drivers of behavior such as fees, taxes, liquidity, peer effects or adviser recommendations. We also don't test directly the role of greenwashing risk.

So while our findings question simple assumptions about the power of labels, they should be seen as showing that ESG label effects are conditional—dependent on context and other factors—rather than universal.

This suggests a possible ceiling effect or a limited sensitivity of the models to detect subtle framing impacts, especially when ESG attitudes already account for most of the variance. The robustness of RQ2 results (attitude and knowledge) reinforces this interpretation: once individual ESG orientation is controlled for, the marginal role of labeling diminishes.

Therefore, future studies could explore alternative modeling strategies (e.g. latent class, interaction trees, or non-linear specifications) to better capture heterogeneity in label responsiveness.

Time Period. Data were collected in a specific period when ESG was hot in the public debate and when EU sustainable finance regulation (e.g. Taxonomy, SFDR) was shaping market narratives (EU TEG, 2020; European Commission, 2021). Perceptions and trust change with media cycles, regulation and performance narratives; so findings are time-bound. And national context matters: Italy's literacy profile, product availability and distributor practices influence how labels are encountered and understood (Bank of Italy, 2023; OECD, 2020).

3. Implications of the Limitations

First, the sample and context constraints imply bounded generalisability. The strongest claims apply to Italian retail investors with basic literacy. Translating effect sizes to other geographies or segments (e.g., older, less educated, non-EU) requires caution and ideally empirical confirmation (Amel-Zadeh and Serafeim, 2018; OECD, 2020). This doesn't mean labels don't matter—just where we have evidence.

Second, the hypothetical, simplified design means the observed effects are a clean upper-bound under equal-returns conditions. In markets where returns, risk, fees and documentation differ, behaviour will attenuate. This is consistent with evidence that survey statements diverge from transactional behaviour when real money is involved (Harrison and Rutström, 2008). So, take the main effect as: *holding financials constant, an ESG label pulls on choice*—a statement about mechanism, not a forecast of market shares.

Third, measurement limitations mean be cautious with absolute levels of self-reported attitudes. High scores on morally desirable items don't necessarily mean uniformly strong

conviction; the predictive relations (e.g., transparency preference → choice of ESG-labelled security) are the more reliable features of the data (Krumpal, 2013).

Fourth, model simplicity means the results capture average marginal effects; they are not a full map of heterogeneity. The absence of some interactions in the final specification doesn't mean they don't exist, just that they are beyond scope given sample size and complexity. This calls for confirmatory and more granular studies.Fifth, the theoretical focus means the thesis provides evidence on label and transparency effects not a full portfolio choice model. The results add to (not replace) the literatures on greenium in secondary markets (Zerbib, 2019; Baker, Bergstresser, Serafeim and Wurgler, 2018), flows to high-ESG funds driven by ratings/shelf placement (Hartzmark and Sussman, 2019), and performance beliefs (Pedersen, Fitzgibbons and Pomorski, 2021).

So, policy or managerial implications should be scoped to how to present ESG products (labels, plain-language transparency) rather than whether investors will allocate regardless of return differentials. Finally, temporality means don't assume stability. Trust in labels is sensitive to greenwashing scandals and shifting regulatory baselines (Lebelle, Lajili Jarjir and Sassi, 2020). Take the findings as a snapshot of preferences under specific informational and institutional conditions.

4. Future Research Directions

Building directly on these limitations, several extensions can materially strengthen the evidence base. A priority is replication across countries with different literacy levels, regulatory regimes and market maturity. Sampling in Northern Europe, North America and selected Asian markets would test whether the label effect is stronger where trust in verification is high or where sustainability norms are embedded. It would also be interesting to see how these dynamics play out across cultures before and after key historical or political events. Stratified sampling should oversample under-represented segments (older, less educated, first-time investors) to map heterogeneity. Comparative work could use OECD/INFE instruments for financial literacy to standardise measurement across sites (OECD, 2020).

To address hypothetical bias, pair survey-experiments with behavioural data. Options include (i) brokerage-level data on flows into labelled funds/bonds versus comparable conventional products (controlling for fees and performance) (Hartzmark and Sussman, 2019), (ii) field A/B tests on digital platforms that toggle ESG badges or disclose verification to random sub-

samples, and (iii) incentivised choices in lab-in-the-field experiments where small real stakes are allocated across labelled and unlabelled options. Such triangulation would show whether the label effect holds when money is real and when alternatives differ on multiple dimensions.

Future experiments should introduce financial trade-offs (e.g. a 10-30 bps yield disadvantage for the green bond) to estimate behavioural greenium thresholds at the retail level, complementing secondary-market estimates (Zerbib, 2019). Designs can also vary use-of-proceeds detail, third-party verification, and impact reporting frequency to test how transparency and credibility mediate label effects (Lebelle, Lajili Jarjir and Sassi, 2020). Including negative signals (e.g. a news vignette about greenwashing) would measure the fragility of label-driven preference under scepticism. It would also be great to see which factors have the biggest impact, running separate experiments on each of them. Adding qualitative interviews to a purposive sub-sample can dig into mechanisms: identity expression, moral satisfaction ("warm-glow"), reputational concerns and trust formation (Johnson and Onwuegbuzie, 2004; Riedl and Smeets, 2017).

This would help with psychometrics, refine constructs (e.g. distinguishing *impact-seeking* from *signal-seeking* investors) and interpret nulls (e.g. high stated importance but no predictive power).

With larger samples, models can include interaction terms (e.g. label × high pro-environmental values; label × risk tolerance; transparency × trust propensity) and non-linear specifications (splines, logits with thresholds). Latent class or finite mixture models can identify investor archetypes—Idealists (values-first), Pragmatists (returns-first unless label credible), and Sceptics (label-averse)—to tailor product communication. ESG investors are not monolithic (Riedl and Smeets, 2017).

Because perceptions change, re-running the same experiment after a set period would allow researchers to see if investor choices change over time panel surveys or repeated cross-sections can track changes in label salience over time, and correlate with regulatory milestones (e.g. implementation of EU Green Bond Standard), market performance cycles, and media sentiment.

This would separate stable preferences from narrative-driven fluctuations and assess durability of the label effect.

Conclusion

This thesis investigated whether ESG labels influence investor preferences when financials are constant and which individual traits or psychological factors mediate or moderate this influence. Using a controlled experiment, it aimed to isolate the behavioural impact of ESG labelling, controlling for attitudes, trust, knowledge and demographics.

Our results show a more complex picture than the literature would have you believe. While 66% of respondents preferred ESG labelled products, the statistical analysis shows that labels don't drive allocation decisions when individual attitudes are controlled for. This doesn't contradict the greenium phenomenon in bond markets; it just means that market level pricing effects are driven by a concentrated group of highly motivated ESG investors whose preferences can influence pricing even when they are a minority of the market. The key insight is that ESG labels are signals that are interpreted differently across investor types. For those with strong pro-sustainability attitudes and higher ESG knowledge, labels are useful heuristics that align with their existing preferences. For others, labels have little to no impact on actual allocation decisions. This heterogeneity explains both the persistence of the greenium (driven by values-committed investors) and its modest size (limited by the broader population's relative indifference).

What was most clear from the analysis was that attitudes towards ESG investing are the key driver of sustainable choices. Those with strong pro-ESG values were much more likely to allocate to the green labelled bond even without financial incentives. This supports the idea that personal norms, identity alignment and moral beliefs are the key drivers of ESG adoption (Bollen, 2007). Those who reported higher levels of self-assessed knowledge about ESG products were slightly but significantly more likely to invest sustainably, so familiarity plays a supporting role in shaping comfort and decision making.

Demographics played a smaller role. Older participants were less likely to choose the ESG labelled option, as expected with generational differences in sustainable investing preferences. But the interaction analysis showed that age did not weaken the effect of ESG friendly attitudes: when values were held constant, both younger and older investors responded the same. Other variables like gender, education and occupation did not show significant independent effects once psychological variables were included – so beliefs and perceived understanding trump background characteristics.These results are interesting but must be considered with the limitations in mind. The sample was Italian and self-selected so not generalisable. The task was

hypothetical and simplified – intentionally so to isolate the label effect – but this means that other real world features like fees, returns, risk profiles and distribution channels were not included. Fear of greenwashing was likely influential but not directly manipulated. The model was linear and did not fully explore non-linear or conditional relationships. Some investor segments may only respond above a certain threshold of values or trust – patterns that would require more complex modelling to detect (Amel-Zadeh and Serafeim, 2018).

Despite all this, the results are useful for both academic and practical purposes. With growing regulatory and market pressure on sustainable finance, this study suggests that labelling alone may not be enough to drive retail ESG adoption. Investors don't respond to the label itself, but to what it represents—so trust, transparency and alignment with personal values are key. Efforts to increase retail ESG engagement may need to focus less on product relabelling and more on the underlying factors that build investor confidence: education, certification standards and communication that speaks to identity and purpose.

In short, this thesis is saying that sustainable investing is not just about optics—it's about beliefs. Understanding what drives ESG behaviour and designing systems that nurture those motivations is essential for market growth without sacrificing integrity. This work contributes to bridging the gap between sustainable finance rhetoric and investor reality.

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Appendix A - Reddit Data Collection and Filtering

This appendix contains the Python scripts used to scrape Reddit discussions and filter ESG-related comments. The scripts were implemented with the official Reddit API through the PRAW wrapper.

```
import re
import time
import pandas as pd
import praw

REDDIT = praw.Reddit(
    client_id="QFdsfPwWBNG5YSxrL9Y_2Q",
    client_secret="Oe0TRQsmIUOA4B0K-DOhLkuoejOu6A",
    user_agent="esg_sentiment_analysis by u/Spirited-Ask-5369"
)

POSTS = [

"https://www.reddit.com/r/UKInvesting/comments/1cvra2p/do_you_consid
er_esg_as_part_of_your_investment/",

"https://www.reddit.com/r/investing/comments/1azvmup/what_is_the_pur
pose_of_investing_in_esg_companies/",

"https://www.reddit.com/r/investing/comments/18yp5rm/any_insight_int
o_the_poor_performance_of_esgs_in/",

"https://www.reddit.com/r/investing_discussion/comments/1ltqyap/impa
ct_investing_is_not_just_for_rich_people/",

"https://www.reddit.com/r/Bogleheads/comments/1gbycly/esg_funds/",

"https://www.reddit.com/r/investing_discussion/comments/1k7j07c/esg_
funds_facing_investor_outflows/",

"https://www.reddit.com/r/investing/comments/1kt7qns/is_green_energy
_and_esg_stocks_now_uninvestable/",

"https://www.reddit.com/r/investing/comments/pgnt9w/why_is_esg_envir
onmental_social_and_governance/",

"https://www.reddit.com/r/investing/comments/1if805f/esg_scores_in_t
he_trump_era/",

"https://www.reddit.com/r/investing/comments/1esns6n/impact_investin
g_are_people_really_doing_this/",

"https://www.reddit.com/r/finance/comments/1cm27gd/us_fund_managers_
with_esg_mandates_have_worstever/",

"https://www.reddit.com/r/investing/comments/1bor0ub/how_can_anyone_
take_esg_funds_seriously_when/",
```

```
"https://www.reddit.com/r/Bogleheads/comments/llznqw/esgsustainable_
investing_great_so_long_as_you/",

"https://www.reddit.com/r/CFP/comments/1gfzz6n/millennials_true_prio
rities/",

"https://www.reddit.com/r/Bogleheads/comments/1llj100/have_any_of_yo
u_bogleheads_added_a_moral_filter/",

"https://www.reddit.com/r/financialindependence/comments/xruk3h/esg_
investing_is_apparently_a_sham/"
]

MAX_COMMENTS = 300
PAUSE = 0.6
ID_RE = re.compile(r"/comments/([a-z0-9]+)/", re.IGNORECASE)

def extract_id(url_or_id: str) -> str:
    m = ID_RE.search(url_or_id)
    return m.group(1) if m else url_or_id.strip()

def fetch_comments(submission, max_comments=300):
    submission.comments.replace_more(limit=None)
    comments, count = [], 0
    for c in submission.comments.list():
        if count >= max_comments:
            break
        body = (c.body or "").strip()
        if not body or body in ("[deleted]", "[removed]"):
            continue
        comments.append({
            "post_id": submission.id,
            "comment_id": c.id,
            "timestamp":   pd.to_datetime(c.created_utc,   unit="s",
utc=True).isoformat(),
            "body": body,
            "score": c.score,
            "author": str(c.author) if c.author else None
        })
        count += 1
    return comments

def gather(post_list):
    out, seen = [], set()
    total = len(post_list)
    for i, item in enumerate(post_list, 1):
        sid = extract_id(item)
        if sid in seen:
            continue
        seen.add(sid)
        try:
            subm = REDDIT.submission(id=sid)
            _ = subm.title
            comms = fetch_comments(subm, MAX_COMMENTS)
            out.extend(comms)
```

```
            print(f"[{i}/{total}]   {subm.subreddit.display_name}   |
{subm.title[:70]}... | {len(comms)} comments kept")
            time.sleep(PAUSE)
        except Exception as e:
            print(f"[WARN] Failed {sid}: {e}")
            continue
    return out

def main():
    data = gather(POSTS)
    import datetime
    ts = datetime.datetime.now().strftime("%d-%H-%M")
    out_name = f"esg_comments_{ts}.csv"
    cols                                                              =
["post_id","comment_id","timestamp","body","score","author"]
    pd.DataFrame(data, columns=cols).to_csv(out_name, index=False)
    print(f"\nSaved {len(data)} comments.")
    print(f"File: {out_name}")

if               __name__               ==               "__main__":
main()
```

Filtering procedure (to keep only ESG-related content):

```
import pandas as pd
import re

df = pd.read_csv("esg_comments_raw.csv")

keywords = [
    "esg", "green", "sustainable", "sustainability",
    "impact investing", "responsible investing",
    "ethical investing", "social governance"
]

pattern = re.compile("|".join(keywords), re.IGNORECASE)

df_filtered         =         df[df['body'].apply(lambda         x:
bool(pattern.search(str(x))))]

df_filtered.to_csv("esg_comments_filtered.csv", index=False)
print(f"Kept {len(df_filtered)} comments from {len(df)}")
```

Appendix B - Sentiment and Emotion Analysis

This appendix reports the Python scripts used for sentiment polarity classification and emotion tagging of the filtered Reddit comments. Two transformer models from Hugging Face were used: one fine-tuned on Reddit sentiment and one on GoEmotions.

```
import pandas as pd
from transformers import pipeline

df = pd.read_csv("esg_comments_filtered.csv")

# Sentiment classification
sentiment_pipe = pipeline(
    "sentiment-analysis",
    model="akshataupadhye/finetuning-sentiment-model-reddit-data",
    top_k=None
)

def get_sentiment(text):
    results = sentiment_pipe(str(text)[:512])[0]
    label_map   =   {"LABEL_0":   "NEGATIVE",   "LABEL_1":   "NEUTRAL",
"LABEL_2": "POSITIVE"}
    scores = {label_map.get(r['label'], r['label']): r['score'] for r
in results}
    score = scores.get("POSITIVE", 0) - scores.get("NEGATIVE", 0)
    label = max(scores, key=scores.get)
    return pd.Series([label, score])

df[['sentiment_label',              'sentiment_score']]              =
df['body'].apply(get_sentiment)

# Emotion classification
emotion_pipe = pipeline(
    "text-classification",
    model="cirimus/modernbert-large-go-emotions",
    top_k=None
)

def get_emotions(text):
    results = emotion_pipe(str(text)[:512])[0]
    labels = [r['label'] for r in results if r['score'] > 0.5]
    return ", ".join(labels) if labels else None

df['emotions'] = df['body'].apply(get_emotions)

# Save output
df.to_csv("esg_comments_with_sentiment_emotions.csv", index=False)
print(df.head())
```

Appendix C – Supplementary Statistical Analyses

The following section presents the regression results. Among the different scenarios considered, the analysis reports only the specification using the Green Bond as the baseline, since the outcomes across alternative scenarios did not substantially differ.

	Mean	Std. Deviation	N
Scenario Reply	0.6622	0.47377	296
Transparency Scenario	0.3277	0.47017	296
Mean Attitude	3.8007	0.86208	296
Mean Trust	3.9493	0.72775	296
Mean Knowledge	4.2162	0.76836	296
Age	3.1149	1.06738	296
Occupation	2.1723	0.98155	296
Gender	1.402	0.49114	296
Instruction	2.3649	0.9683	296
Environmental Impact Scenario	0.3378	0.47377	296
Attitude_Age_Interaction	11.8041	4.80841	296

Table 1: Descriptive statistics of the variables included in the regression, showing mean, standard deviation, and number of observations (N)

	Scenario Reply	Transparency Scenario	Mean Attitude	Mean Trust	Mean Knowledge	Age
Scenario Reply	1	0.057	0.474	0.353	0.378	-0.178
Transparency Scenario	0.057	1	-0.098	-0.06	-0.028	-0.055
Mean Attitude	0.474	-0.098	1	0.648	0.592	-0.038
Mean Trust	0.353	-0.06	0.648	1	0.456	-0.075
Mean Knowledge	0.378	-0.028	0.592	0.456	1	-0.063
Age	-0.178	-0.055	-0.038	-0.075	-0.063	1
Occupation	-0.035	-0.042	0.117	0.05	0.121	-0.046
Gender	0.003	0.132	0.006	-0.016	0.058	-0.103
Instruction	0.004	-0.018	0.144	0.041	0.025	0.019
Environmental Impact Scenario	-0.079	-0.499	0.049	-0.046	0.283	0.019
Attitude_Age_Interaction	0.126	-0.111	0.529	0.301	0.29	0.806

Table 2: Correlation matrix among dependent and independent variables. Pearson correlation coefficients are reported (1° half)

	Occupation	Gender	Instruction	Environmental Impact Scenario	Attitude_Age_Interaction
Scenario Reply	-0.035	0.003	0.004	-0.079	0.126
Transparency Scenario	-0.042	0.132	-0.018	-0.499	-0.111
Mean Attitude	0.117	0.006	0.144	0.049	0.529
Mean Trust	0.05	-0.016	0.041	-0.046	0.301
Mean Knowledge	0.121	0.058	0.025	0.283	0.29
Age	-0.046	-0.103	0.019	0.019	0.806
Occupation	1	0.283	-0.103	0.049	0.338
Gender	0.283	1	0.019	-0.047	0.032
Instruction	-0.103	0.019	1	-0.047	0.101
Environmental Impact Scenario	0.049	-0.047	-0.047	1	0.025
Attitude_Age_Interaction	0.338	0.032	0.101	0.025	1

Table 3: Correlation matrix among dependent and independent variables. Pearson correlation coefficients are reported (2° half)

	Scenario Reply	Transparency Scenario	Mean Attitude	Mean Trust	Mean Knowledge	Age
Scenario Reply	.	0.163	<.001	<.001	<.001	0.001
Transparency Scenario	0.163	.	0.047	0.151	0.316	0.173
Mean Attitude	<.001	0.047	.	<.001	<.001	0.259
Mean Trust	<.001	0.151	<.001	.	<.001	0.098
Mean Knowledge	<.001	0.316	<.001	<.001	.	0.138
Age	0.001	0.173	0.259	0.098	0.138	.
Occupation	0.276	0.236	0.022	0.195	0.019	0.217
Gender	0.48	0.011	0.461	0.434	0.395	0.039
Instruction	0.475	0.38	0.006	0.217	0.162	0.212
Environmental Impact Scenario	0.088	0	0.199	0.197	0.413	0.375
Attitude_Age_Interaction	0.015	0.028	0	0	0	0

Table 4: One-tailed significance values (Sig. 1-tailed) corresponding to the correlation matrix presented in Table 2 (1° half)

	Occupation	Gender	Instruction	Environmental Impact Scenario	Attitude_Age_Interaction
Scenario Reply	0.276	0.48	0.475	0.088	0.015
Transparency Scenario	0.236	0.011	0.38	0	0.028
Mean Attitude	0.022	0.461	0.006	0.199	0
Mean Trust	0.195	0.434	0.217	0.197	0
Mean Knowledge	0.019	0.395	0.162	0.413	0
Age	0.217	0.039	0.212	0.375	0
Occupation	.	0	0.039	0.212	0
Gender	0	.	0.375	0.199	0.292
Instruction	0.039	0.375	.	0.197	0.042
Environmental Impact Scenario	0.212	0.199	0.197	.	0.336
Attitude_Age_Interaction	0	0.292	0.042	0.336	.

Table 5: One-tailed significance values (Sig. 1-tailed) corresponding to the correlation matrix presented in Table 2 (2° half).

	Sum of Squares	df	Mean Square	F	Sig.
Regression	18.675	10	1.868	11.196	<.001
Residual	47.541	285	0.167		
Total	66.216	295			

Table 6: Results of the ANOVA test, used to assess the overall statistical significance of the regression model.

	B	Std. Error	Beta	t	Sig.
(Constant)	-0.075	0.362		-0.206	0.837
Transparency Scenario	0.059	0.059	0.058	0.988	0.324
Mean Attitude	0.15	0.089	0.272	1.68	0.094
Mean Trust	0.031	0.043	0.048	0.72	0.472
Mean Knowledge	0.08	0.039	0.13	2.045	0.042
Age	-0.132	0.099	-0.297	-1.331	0.184
Occupation	-0.017	0.027	-0.035	-0.631	0.528
Gender	-0.008	0.049	-0.009	-0.168	0.867
Instruction	-0.022	0.026	-0.046	-0.863	0.389
Environmental Impact Scenario	-0.073	0.058	-0.073	-1.253	0.211
Attitude_Age_Interaction	0.019	0.026	0.194	0.741	0.459

Table 7: Unstandardized and standardized coefficients for each independent variable, with corresponding t-values and significance (Sig.)

The following section presents the frequencies of the identified clusters, in order to illustrate the distribution of respondents across groups and to provide an initial overview of the underlying motivations behind the (non-)adoption of ESG instruments.

	Percentage (Yes)	Frequency (Yes)	Total N
I don't know them well enough / I've never delved into how they work	70.6%	101	143
I don't trust the criteria or 'green' certifications	67.8%	97	143
I prefer to base my decisions only on economic criteria	53.1%	76	143
It seems to me more like a marketing strategy than a real sustainable commitment	64.3%	92	143
I don't think these tools have a real environmental impact	84.3%	121	143

Table 8: Reasons why respondents are not interested in ESG-labeled instruments. Percentages are calculated on the total number of respondents in Cluster NO.

	Percentage (Yes)	Frequency (Yes)	Total N
To contribute to the ecological transition or the fight against climate change	100.0%	153	153
To support companies whose environmental values I recognise as mine	58.2%	89	153
Because I believe these instruments have good performance prospects	62.7%	96	153
Because I think they have a lower risk in the long run	28.8%	44	153
For personal curiosity or interest in innovation	86.9%	133	153

Table 9: Motivations driving respondents to choose ESG-labeled instruments. Percentages are calculated on the total number of respondents in Cluster YES.