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Trinomial: Return-Risk and Sustainability: Is Sustainability Valued by Investors? A Choice Experiment for Spanish Investors Applied to SDG 12

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Abstract: Traditionally, finance has paid attention to the risk-return trade-off. Recently, given the incorporation of the 2030 Agenda and climate change, a third pillar has been incorporated into the investment decision: sustainability. Socially responsible investment is an instrument that can incorporate all three pillars. This paper aims to assess sustainability by Spanish investors using a choice experiment by applying the Bayesian approach with Markov chain Monte Carlo sampling and obtain the willingness to pay (invest) for each attribute. The results show that profitability remains the most important factor, although risk is at the same level as sustainability.

Keywords: sustainable finance; return-risk; choice experiment; willingness to invest; relative importance; Bayesian

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1. Introduction

The 2030 Agenda for Sustainable Development establishes the so-called Sustainable Development Goals (SDGs), which are a global call to eradicate poverty, protect the environment, and pursue peace and development of Economies. To this end, each goal establishes several targets to be achieved by 2030. On many occasions, the achievement of these goals entails the recruitment of large amounts of financial resources, which will be obtained from different financial instruments (United Nations 2017). One of the most important market instruments in the financial industry is the investment fund. As a result of social concern for the planet and humanity in general, the development of so-called thematic investment funds has grown, having among their investment policy the contribution to the SDGs. This type of investment can be considered as a sustainable investment, so the contribution to the SDGs could be considered as a non-financial motivation, as pointed out by (Gutsche and Ziegler 2019) and (Lagerkvist et al. 2020) towards sustainable investments.

The United Nations presents an initiative on the Principles on Responsible Investment (www.unpri.org, accessed on 1 August 2023) to contribute to and support the development of socially responsible or sustainable investment by establishing standards and guiding investors. However, these principles are voluntary, with the aim of incorporating as far as possible actions that involve the inclusion of environmental, social, and economic (ESG) factors into investment practice (Lagerkvist et al. 2020). Currently, there is no minimum number of these factors that must be included in order to consider an investment as socially responsible or sustainable.

The literature shows that private investors who want to invest in funds that achieve sustainable objectives must take into account aspects that, in some ways, may be contradictory, such as the investment objectives via profitability and the type of analysis of

sustainable achievement (Joliet and Titova 2018). In turn, there are studies that show positive results for investment in ESG criteria, as shown by (Friede et al. 2015), although it has also been analyzed that depending on the type of industry analyzed, the ESG criteria applied, in the case of European investors, a negative relationship between ESG and profitability was observed, showing how sustainable investment has not been profitable (Auer and Schuhmacher 2016). In Japan, the paper (Gutsche et al. 2021) highlights a review of the determinants of sustainable investment for this country, showing that in Japan, sustainable investment is not as widespread as in Europe and that investors do not show relevant preferences compared to European investors. In Europe, the analysis of individual investors is extensive, including the paper of (Brodback et al. 2019; Dorfleitner and Utz 2014; Halbritter and Dorfleitner 2015) for Germany, (van Dooren and Galema 2018; M. Rossi et al. 2019) for the Netherlands, (Døskeland and Pedersen 2016, 2021) for Norway and (Lagerkvist et al. 2020; Jansson and Biel 2011) for Sweden. In the USA, we can also find papers that address sustainability and the individual investor (Junkus and Berry 2010). While in Spain, research is more limited (Fraile et al. 2023).

With respect to portfolio management, there is little or no support for positive ESG/performance ratios in portfolios with ESG criteria and profiles (Halbritter and Dorfleitner 2015; Friede et al. 2015). This conflicts head-on with the growth of assets managed under ESG criteria, which has led to the incorporation of ESG criteria as a central objective in many cases (Revelli 2017; Joliet and Titova 2018). However, asset allocation is critical because if it is focused on intensive investment selection with ESG criteria, it leads to a fixation on single returns rather than diversifiable returns, which leads to lower returns from choosing securities with lower systematic risk (D. D. Lee et al. 2010). It can also be seen that there are investors who are not only concerned with financial attributes but also pay attention to non-financial ones, as is the case of the contribution to the SDGs using the analysis of the performance of conventional and non-conventional investment funds (Bollen 2007; Renneboog et al. 2008b, 2011; Friede et al. 2015).

Research to date has focused on the motives and profiles behind socially responsible or sustainable investment (Nilsson 2008; Junkus and Berry 2010; Pérez-Gladish et al. 2012; Halbritter and Dorfleitner 2015; Palacios-González and Chamorro-Mera 2018; Wins and Zwergel 2016). Using largely indirect methods for measuring the importance of ESG attributes. Most research has addressed the issue by analyzing the potential trade-offs between variables in isolation of return and risk and sustainability characteristics of the investment, with the exception of (Berry and Yeung 2013; Apostolakis et al. 2018) addressing a larger number of indicators and the availability to accept lower pensions or the analysis of private investors' preferences for socially responsible investment in Sweden (Lagerkvist et al. 2020).

The purpose of this study is to analyze the preferences of Spanish investors in relation to investment funds that contribute to the goals of the 2030 Agenda through their investment policy. Specifically, we have chosen SDG 12: "consumption and production responsible", given the global importance of achieving this goal. As established by the UN, sustainable consumption and production is about doing more and better with less, i.e., being more efficient in the management of resources while taking into account environmental degradation and promoting sustainable lifestyles. Investment focused on achieving these goals will make a significant contribution to sustainability and economic development.

Socially responsible investment (SRI) generally uses two different kinds of investment screening: negative and positive selection. Negative screening involves the exclusion of securities or sectors from SRI portfolios on the criteria of social, environmental, and ethical considerations. Positive screening, on the other hand, focuses on the best companies based on their share of the market and on criteria relating to corporate governance, employee relations, the environment, investment sustainability, and the promotion of cultural diversity (Renneboog et al. 2008a). In our case, it was decided to include an attribute for responsible/sustainable investments as a positive criterion.

For this purpose, a choice experiment was carried out based on three alternatives, in which the contribution to the achievement of the SDG was considered as an attribute. In addition, the investors' willingness to pay (invest) was calculated to obtain a valuation in terms of the interest rate to quantify the different attributes.

Bayesian analysis is a statistical approach that responds to questions of research on uncertain statistical model variables by using likelihood statements. The econometric estimation has followed a Bayesian logit model.

Bayesian analysis is founded on the hypothesis that all the model parameters are random amounts and, hence, can include previous information. This hypothesis coincides, of course, with the rather conventional statistical inference, also known as frequentist, in which all of the parameters are treated as unknown but constant values. Bayesian analyses are based on a straightforward likelihood rule, Bayes' rule, which provides a formalism for merging previous data with the available data. Bayes' rule is employed to shape the model's parameter distribution posteriorly. One of the advantages of these models is that, in frequency statistics, stimulators are utilized to rough approximate the true values of the unknown parameters, while Bayesian statistics gives a full distribution of the parameters. Therefore, Bayesian methods offer a more powerful approach to estimation by not only using the available data, as well as certain data or information about the model's parameters but also by using a more robust estimation.

Bayesian inference is built on the prior distribution of the parameters and gives overviews of this distribution, providing the posterior means and their MCMC Markov chain Monte Carlo (MCSE) standard errors, as well as credible intervals. Although exact posterior distributions are only known in some cases, general posterior distributions can be estimated, for example, by sampling (MCMC) without any approximation to large samples.

The contribution of this paper is twofold. Firstly, it analyzes the preferences of Spanish investors for a specific type of contribution to the SDGs via goal number 12: responsible production and consumption, which entails an ESG classification criterion. In addition, each of the analyzed attributes is assessed in terms of willingness to invest by type of interest. Secondly, the methodology is approached by applying a Bayesian model that allows for obtaining more robust estimates than the classical frequentist estimates, as well as obtaining the distribution of the parameters to obtain the relative importance and the willingness to pay for the whole of the sample analyzed.

2. Materials and Methods

2.1. Choice Experiment

The Choice Experiment (CE) was considered in this study to be the most suitable technique for estimating the preferences of investors in funds whose investment policy is to achieve Goal 12: "consumption and production responsibility".

The CE is founded on the concept that a good or service can be defined by the attributes that compose it (Lancaster 1960) and that individuals, in this case investors, make financing decisions according to these attributes. A CE is characterized by including alternative options of the same product with different attributes and characteristics, and the respondent selects the option or alternative that best reflects their preferences (Gutsche and Ziegler 2019; Lagerkvist et al. 2020). Choice experiments are a widespread instrument used in the field of economics, whether in health economics (Kruk et al. 2009; Vallejo-Torres et al. 2018; Watson et al. 2017; Johnson et al. 2019), agriculture (Sama et al. 2018; Ortiz et al. 2020; Díaz-Caro et al. 2019), environmental economics (Crespo-Cebada et al. 2020a, 2020b), or more recently, in finance and accounting (Wang and Huo 2013; Mirón-Sanguino and Díaz-Caro 2022; Crespo-Cebada et al. 2021), although in the latter field the work is more recent and scarce. One of the main advantages of this type of approach is to be able to consider a product in its global form and decompose it into different characteristics that are valued individually but within the product as a whole, thus making it possible to establish trade-offs between attributes.

The initial stage in CE research is the identification of the attributes and levels that will compose the different products that will be introduced to the investors. Table 1 shows the attributes and levels selected for this study, which have been selected based on the review of previous literature in studies that analyze the preferences of investors (Apostolakis et al. 2018; Gutsche and Ziegler 2019; Lagerkvist et al. 2020).

Table 1. Attributes and levels used in the Choice Experiment.

Attributes	Levels
Supplier	Conventional; Cooperative; Sustainable
Interest rate	1%; 3%; 5%
Risk	Low; Medium; High
Contribution to SDGs	Yes; No

Source: Own compilation.

The overall set of potential hypothetical products that can be generated by a combination of the chosen attributes/levels amounts to 54 ($3 \times 3 \times 3 \times 2$), which would be an excessive number of products for respondents to compare. Considering that they are presented with "choice sets" consisting of two funds and a "no choice" option, here would have been a possible set of 2862 (54×53); this is unmanageable in both time and cost. Thus, a fractional design was implemented to decrease the total number of comparisons to an efficiency score utilizing Stata's "Dcreate" package, which can generate this type of design. This package utilizes the modified Fedorov algorithm to produce an efficient design (Carlsson and Martinsson 2003). Lastly, eight choice sets were constructed and utilized in the study. Table 2 provides an example of a choice set.

Table 2. Example of choice card presented to respondents.

	Comparison 1		
	Option 1	**Option 2**	**Option 3**
Supplier	Sustainable Bank	Bank	None before
Interest Rate	3%	5%	
Risk	Medium	High	
Contribution SGDs	None	CPR	

Source: Own compilation.

To reduce the hypothetical bias that may arise in this kind of research, we used the cheap talk technique, seeking to put ourselves actively in a real investment situation. To this end, we incorporated into the questionnaire an explanatory statement on hypothetical bias and its relevance to the effectiveness of the research. Available evidence on "ex ante" (such as the cheap talk screen employed in this study), as on ex post hypothetical bias mitigation methods, has demonstrated successful methods to mitigate hypothetical bias (Fifer et al. 2014).

2.2. Bayesian Approach

A hierarchical Bayesian algorithm is then presented to calculate the part-worths of the investment attributes investigated by examining the individual investment choices of the various mergers in the questionnaire survey, following the previous study by (Gaspar et al. 2022). Within- and between-respondent variation can thus be assessed on the repeated choices of each investor (Orme and Howell 2009).

This is known as a "hierarchical" model since it has two stages. At the top level, the partial values of any individual are characterized by a multivariate normal distribution, with a vector of means and a covariance matrix.

$$\beta_i \sim Normal(\alpha, D) \quad (1)$$

β_i is a vector of partial values for the i-th individual, α is the vector of means of the distribution of the individual's partial values, and D is a covariance matrix of the distribution of the partial values among individuals (P. E. Rossi et al. 2006).

The lowest level supposes that, provided the partial values of an individual, the likelihood of selecting certain choices is driven by a multinomial logit model,

It is expressed by the formula:

$$p_{ki} = \exp\left(x_k{}'\beta_i\right) / \sum_j \exp\left(x_j{}'\beta_i\right) \quad (2)$$

where p_k is the probability that the i-th individual chooses the k-th alternative in a specific choice set, and x_j is the vector of values that outlines the j-th alternative in that choice set.

In order to include some additional variables explanning in the model, the Bayesian method also allows some extra explanning variables to be included in the model. Such covariates can assist in gaining insight into the relationship between the role of other factors that influence the decision-making process. When covariates in BH estimation are used, the single partial values are linked by means of a multivariate regression model:

$$\beta_i = \theta' z_i{}' + \varepsilon_i{}' \; where \; \varepsilon_i \; \sim Normal(0, D) \quad (3)$$

where ε_i~$Normal$ (0,D) in which θ is the regression parameter matrix, z_i is the covariate vector, and ε_i is a random error vector (Orme and Howell 2009). The parameters β, α, D, and θ are calculated using an MCMC (Markov chain Monte Carlo) algorithm, an iterative method, which is rather robust, and the outcomes do not rely on the starting values (see details at (P. E. Rossi et al. 2006)). To compupte the Bayesian hierarchical model as explained here, the Stata program (Baker 2021; Conover 1999) ran a total of 50,000 iterations, with 5000 dropped prior to the outcomes being used.

Each MCMC approach is intended to return values from a kernel such that it draws from the kernel confluence to a previously determined targeted distribution. Simulates a Markov chain with the objective distribution as the steady state or the equilibrium of the chain. By definition, a Markov chain is defined as a sequence of states or values in the command of the objective distribution so that each such value is dependent on its immediate predecessor alone. The further the chain, the nearer the samples are to the stationary distribution for a well-designed MCMC. The MCMC approaches vary significantly in their simulation efficiency and computational complexity (Conover 1999).

The Metropolis algorithm proposed in Metropolis and Ulam (1949) and Metropolis et al. (1953) seems to represent the first release of MCMC. The algorithm outputs a series of states, each of them extracted from the preceding one, in accordance with a suggested Gaussian distribution centered on that state. Hastings (1970) described a more general version of the algorithm, now known as the Metropolis–Hastings (MH) algorithm, that any distribution may be used as a default distribution. The general MH algorithm and a few special use cases are discussed next.

Thus, every attribute that impacts the choice of an alternative has a varying level of relevance in the decision process. This level can be assessed using the value of the relative importance of the attribute (R_{ik}), which can be solved by using the partial value of each attribute. The individual coefficients of attribute k can be computed by multiplication of the coefficients of attribute k, B_{nk}, by the interval of the attribute.

The average relative importance of each attribute is calculated from the estimated coefficients and the partial value (J. Lee et al. 2009).

$$Average\ RI_k = \frac{1}{N}\sum_{n=1}^{N} \frac{part - worth}{part - worth_k} \times 100 \; where \; part - worth_{nk} \quad (4)$$

Willingness to Investment

Once the partial utilities have been obtained, it is possible to obtain a quantified measure of these parameters in monetary terms. To achieve this, a monetary value is used

to obtain the willingness to invest (*WTI*), in this case, the interest rate (*IR*), and each of the levels of the attributes is relativized, i.e., to obtain a measure of the cost in terms of the interest rate to be paid (or renounced if it is negative) following the formula:

$$WTI_k = -\frac{\beta_i}{IR_i} \quad (5)$$

2.3. Data Collection

The questionnaire was developed in Spanish with closed questions. In turn, the survey was composed of two blocks, a first block containing the choice experiment to estimate the preferences of investors in investment funds and the second block containing the socioeconomic questions of the participants.

The first section included a choice experiment with eight questions similar to those in Figure 1 and another section containing socioeconomic questions such as age, sex, income, and work in order to classify respondents according to their socioeconomic characteristics. Data were collected using a Google form during the months of April–August 2022. The survey was disseminated in several sources: a database of the research group's staff (including diversified individuals) and social networks. The investigation was carried out in accordance with the regulations of the Bioethics and Biosafety Committee of the University of Extremadura on studies involving human participants. All respondents were requested to provide their consent to participate in the research and were given assurances that their responses would be kept confidential and fully anonymous. No compensation was given to respondents for their involvement in the survey. Although a total of 541 questionnaires were received, 35 of them were discarded for different reasons, mainly incomplete responses, so the final number of valid questionnaires used in this research was 506. Table 3 contains the descriptive statistics of the sample.

Table 3. Descriptive statistics of the sample.

Variable	Mean
Age (S.d)	47.44 (11.33)
Gender (female)	47.92%
Income (less tan 900)	3.37%
Between 901 and 1500	10.91%
Between 1501 and 2500	34.92%
More than 2501	50.79%
Household size 1	11.73%
2	24.25%
3	26.44%
4 o more	37.57%

Source: Own compilation.

3. Results

This section shows the results obtained from the application of the methodology to the data obtained. Specifically, the following results are shown: First, the parameters obtained from the estimation of the Bayesian mixed logit model are shown. Secondly, the willingness to invest for each attribute (levels) is calculated from the estimated coefficients. Finally, and based on the estimated coefficients, the relative importance of the attributes is shown.

3.1. Preference Results

Table 4 shows the results of the Bayesian mixed logit model estimation, applying a significance test of the parameters.

Table 4. Bayesian Mixed Logit Model.

Random Variables	Coefficient	Standard Error	t	P > |t|	[95% Conf. Interval]	
Interest rate	−18.915	12.593	−1.500	0.134	−43.646	5.816
Cooperative (COOP)	0.756	1.705	0.440	0.658	−2.593	4.104
Sustainable (SUS)	8.400	3.804	2.210	0.028	0.930	15.870
Low risk(LR)	4.611	0.949	4.860	0.000	2.747	6.475
High risk (HR)	0.659	3.090	0.210	0.831	−5.409	6.728
SDG	10.430	4.228	2.470	0.014	2.127	18.733
Cov Random	**Coefficient**	**Standard Error**	**t**	**P > |t|**	**[95% Conf. Interval]**	
Var Interest rate	6555.438	4446.668	1.470	0.141	−2177.488	15,288.360
Cov Interest rate × Cooperative	−507.282	387.107	−1.310	0.191	−1267.532	252.967
Cov Interest rate × Sustainable	−1019.596	618.724	−1.650	0.100	−2234.724	195.531
Cov Interest rate × Low Risk	193.839	170.432	1.140	0.256	−140.877	528.555
Cov Interest rate × High Risk	−1330.966	990.311	−1.340	0.179	−3275.863	613.931
Cov Interest rate × SDG	−48.958	153.989	−0.320	0.751	−351.381	253.464
Var Cooperative	70.044	49.184	1.420	0.155	−26.549	166.637
Var Cooperative × Sustainable	9.792	22.345	0.440	0.661	−34.092	53.676
Var Cooperative × Low Risk	−29.399	22.304	−1.320	0.188	−73.202	14.405
Var Cooperative × High Risk	176.102	122.858	1.430	0.152	−65.182	417.386
Var Cooperative × SDG	16.513	22.593	0.730	0.465	−27.858	60.883
Var Sustainable	365.308	193.356	1.890	0.059	−14.428	745.045
Cov Sustainable × Low Risk	5.742	9.632	0.600	0.551	−13.175	24.658
Cov Sustainable × High Risk	17.763	56.642	0.310	0.754	−93.478	129.004
Cov Sustainable × SDG	28.356	23.537	1.200	0.229	−17.868	74.581
Var Low Risk	36.266	24.911	1.460	0.146	−12.659	85.190
Cov Low Risk × High Risk	−67.829	5.413	−1.320	0.188	−168.801	33.142
Cov Low Risk × SDG	−48.751	37.856	−1.290	0.198	−123.098	25.597
Var High Risk	463.485	316.627	1.460	0.144	−158.346	1085.316
Cov High Risk × SDG	−6569	34.725	−0.190	0.850	−74.766	61.627
Var SDG	171.378	120.907	1.420	0.157	−66.075	408.831

Source: Own compilation.

The coefficients of the estimation contained in the table show the investors' preferences. As can be seen, the highest preference is given to the interest rate, which has the highest coefficient, followed by the SDG and risk. The covariance is higher in the case of interest rate than other variables. Likewise, much variability is also observed with the SDG.

3.2. Willingness to Invest

This section shows the results of the willingness to invest. Specifically, the results are shown after applying Formula 4 to the results obtained previously. Table 5 shows the results of the willingness to invest based on the descriptive statistics for each of the attributes (levels).

Table 5. Willingness to invest. Statistic descriptives.

	MEAN	VAR	DESV. EST.	COEF. VAR	MIN	MAX	CUART 1	CUART 2	CURTOSIS
WTP COOP	0.188	2.707	1.645	8.735	−2.713	29.631	0.005	0.065	221.811
WTP SUS	0.292	6.925	2.632	9.003	−27.674	15.153	0.028	0.199	43.802
WTP RL	0.174	1.715	1.310	7.539	−10.138	10.941	−0.090	0.004	26.897
WTP HR	0.299	9.716	3.117	10.423	−11.126	53.038	0.011	0.167	177.530
WTP SDG	0.733	32.646	5.714	7.795	−37.118	81.583	−0.044	0.114	108.410

Source: Own compilation.

This WTP shows the monetization of the coefficients, i.e., the valuation of the coefficients in terms of interest rate. The higher the WTP, the higher the interest rate they are

willing to pay for each attribute. The results show that the greatest willingness to invest is given by the contribution to the SDG, i.e., that investors demand a higher interest rate when making or choosing investments containing this type of characteristic. This is followed by high risk. However, on this occasion, it is not statistically significant compared to the average risk.

Next, the fact that the provider is a sustainable financial institution is placed in third position, which is reasonable given the requirement of rate increases demanded by investors for the contribution to the SDG. The cooperative entity is in fourth place, and finally, the low risk.

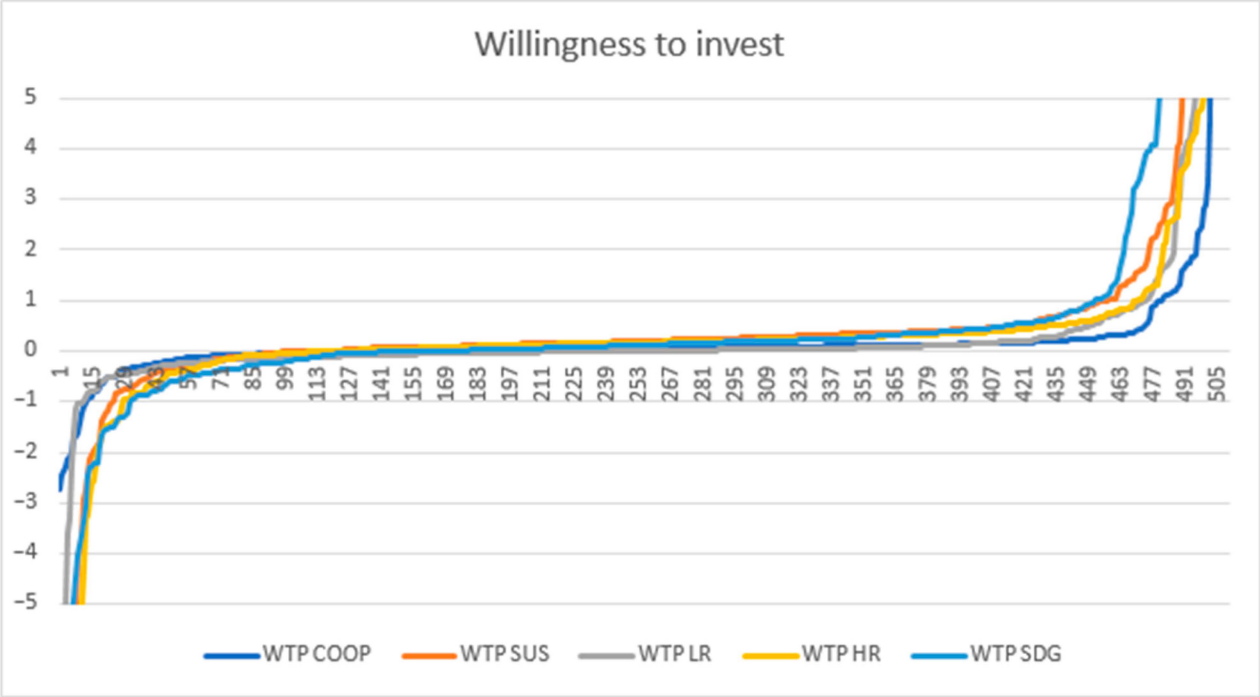

Figure 1. Willingness to invest (individual results).

Figure 1 shows the results of the distribution of the willingness to pay of the group of investors interviewed for each of the attributes (levels) analyzed. As can be seen, a large part of the sample shows relatively low results in terms of percentage points of interest for each of the attributes.

It is worth noting that approximately 10% to 15% of investors have a relatively high willingness to invest in absolute terms (the extremes of the graph). The rest are at levels between −1% and 1%.

3.3. Relative Importance

Figure 2 shows the relative importance of the different attributes according to Equation (3).

As can be seen, investors give greater relative importance to the interest rate than to any other type of attribute. This is followed by the other three attributes with a very similar relative weight with only a 1% difference between them. However, the next attribute with the highest relative weight is the contribution to the SDG, followed by risk, and finally, the type of provider in last place. Figure 2 Relative importance of attributes.

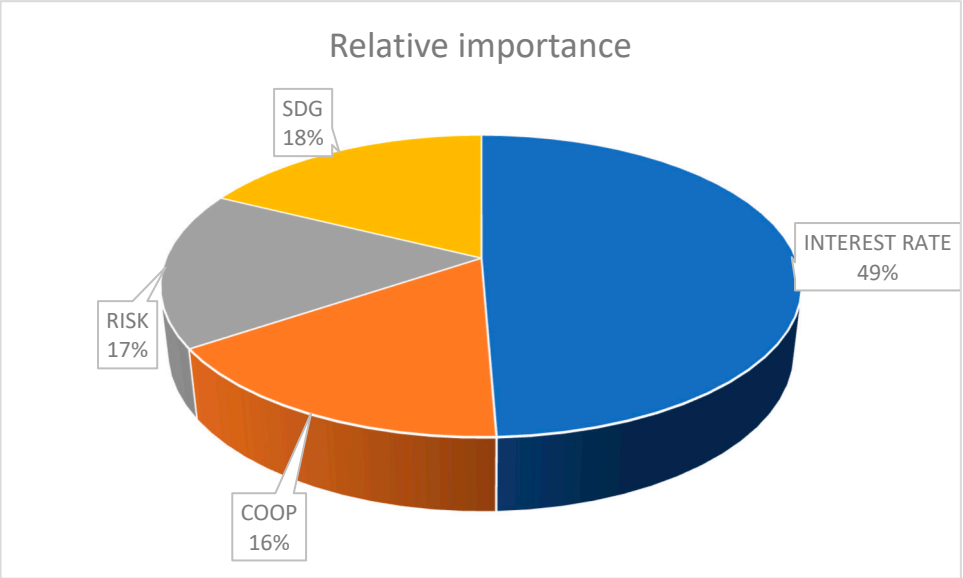

Figure 2. Relative importance of attributes.

4. Discussion and Conclusions

The purpose of this article is to investigate the preferences of private investors when investing in investment funds that contribute to Sustainable Development Goal 12: sustainable consumption and production. This paper contributes to the literature by means of a choice experiment model with Bayesian estimation of the coefficients or partial utilities of the different attributes analyzed.

Preferences indicate that investors mostly show a higher preference for interest rates, corroborating the literature on the choice criterion and against sustainability being more important than other attributes as obtained in previous work analyzing sustainability investment by applying preference models (Brimble et al. 2013; Rietjens 2011; Vyvyan et al. 2007). While these results run counter to the existing literature analyzing investment in conventional vs. non-conventional funds, the methodology they apply is very different from the one applied here.

One possible explanation for this behavior could be that people who do not claim to be pro-sustainability and, therefore, do not claim to want to invest in such funds may be more biased or distracted when looking at the set of options (Lagerkvist et al. 2020). In addition, behavioral economics demonstrates how people make decisions with behavioral biases and limited rationality, leading to a lack of optimal planning. In finance, such irrational sharing is often attributed to certain problems of self-control, bounded rationality, and myopia (Apostolakis et al. 2018). In this sense, a recommendation of this paper shown by other authors (Lynch and Zauberman 2007) is to argue that politicians should encourage individuals to take decisions or measures that, although in the short term, may have a higher cost, are more beneficial in the long term (such as saving for retirement) and are applicable to sustainable investment.

The relative importance results show how investment return is the attribute that has the greatest weight in investment choices, followed by other attributes. While it is true that the SDG objective is relatively insignificant compared to risk, the latter does not have a relevant relative weight either when, traditionally, the most important characteristics of an investment in traditional finance are profitability and risk. The paper shows that profitability outweighs the risk and the contribution to the SDG by a considerable margin.

The importance of analyzing individual investment preferences in mutual funds is notable for improving well-being at different levels. The adoption by investment funds of sustainable criteria should not contradict the interests of the participants. This paper contributes to the literature an analysis of the preferences of mutual fund participants in

Spain for sustainable investments. The results reveal which financial and non-financial attributes of the investment and which levels of these attributes maximize utility. Although, as behavioral economics establishes, offering people the possibility of making their own investment decisions is subject to the biases of human behavior, an appropriate election architecture centered on steering people from irrational behaviors will support them in their decision-making.

This election architecture is intended to mitigate the impact of psychological distancing by rendering desirable options feasible and more concrete abstract notions more concrete. In addition, an appropriate election architecture can incorporate framing and encouragement strategies to transcend the human behavioral biases of pension fund beneficiaries. In this sense, incorporating psychological aspects to be analyzed in the future may contribute to developing the current work. In this line, the work opens the door to the possibility of establishing different investment selection criteria for institutional banking, given the preferences of Spanish investors. That is, taking into account what they prefer and to what extent. Therefore, the results of this work are useful for the implementation of strategies to optimize the financial decisions of investors.

One of the advantages of applying the Bayesian methodology is that the individual parameters and their distribution can be obtained in order to segment the investors and obtain more information about them, which is proposed as a future line of research. Another possible development would be the inclusion of explanatory covariates to be able to segregate investors and go deeper into both observable and unobservable heterogeneity through latent variables.

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