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**Individual Sustainable Investment in Japan**

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## Abstract

Given the limited literature on sustainable investment behavior in the East Asian region, this study empirically examines individual sustainable investment behavior in Japan from three perspectives. Based on data from a representative web-based survey among financial decision makers in Japanese households, we analyze i) the individual awareness of sustainable investments, ii) the current share of sustainable investments in individual investors' portfolios, and iii) the individual investors' intention invest sustainably in the future. We find that the clear minority has ever heard of sustainable investments before, indicating huge information deficits among Japanese individual investors and that individual sustainable investment in Japan is still in its infancy. Moreover, financial literacy, social signaling or word-of-mouth learning, perceived financial performance, and risk preferences are the most important determinants of current individual sustainable investments in Japan. Remarkably, non-financial factors such as personal attitudes and values seem to be less important than in Western countries, suggesting country and cultural differences in individual investment behavior. Nevertheless, the intention to invest in a sustainable manner in the future is also driven by individual environmental values and ecological political identification. Overall, our results imply several potential avenues for practitioners and policymakers to mobilize individual investors for sustainable investments in the future.

**Keywords:** Sustainable investments; individual investors; Japan; survey

**JEL:** Q56, G11, C25

## 1. Introduction

Sustainable investment<sup>1</sup>, i.e. investment processes that account for environmental, social, and/or governance (ESG) criteria, has become a global phenomenon during recent years with considerable market shares and growth rates (e.g. Eurosif, 2018; US SIF, 2018; Global Sustainable Investment Alliance, 2019). Given the urgent need to make capital flows consistent with international climate goals (e.g. UNFCCC, 2015), understanding institutional and individual (i.e. retail) investors' preferences for sustainable investments is key to derive adequate measures for their mobilization (e.g. Gutsche and Zwergel, 2020). While institutional investors are certainly more relevant than individual investors in terms of investment volumes (e.g. Eurosif, 2018), the active involvement of individual investors could be an important cornerstone to increase or maintain public acceptance for the required profound changes and developments (e.g. Gutsche and Zwergel, 2020). Although a global phenomenon, most studies on individual sustainable investment focus on Western (and particularly European) countries and largely neglect other relevant regions such as East Asia where the economic growth has been most rapid, and the entailed environmental impact has been greatest among the world.<sup>2</sup>

Among East Asian countries, we focus on Japan because its financial market is considered to be the most mature in the region. We thereby not only consider the third largest economy in terms of GDP in the world (e.g. International Monetary Fund, 2020), but also a country whose sustainable investment market has grown tremendously during the past years. While Japan's sustainable investment market was small before 2015, it has emerged as one of the world's biggest sustainable investment markets (Global Sustainable Investment Alliance, 2019). This rapid growth has been driven by some significant changes such as the introduction of the Japan's Stewardship Code in 2014 and the signing of the United Nations Principles for Responsible Investment by the Government Pension Investment Fund as the world's largest pension fund (Japan Sustainable Investment Forum, 2016). While these measures have certainly fostered sustainable investments

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<sup>1</sup> Sustainable investment is also known as socially responsible investing (SRI). We use these terms interchangeably.

<sup>2</sup> Previous empirical studies, for example, consider individual investors in Germany or German speaking countries (e.g. Dorfleitner and Utz, 2014; Wins and Zwergel, 2016; Bassen et al., 2019; Brodback et al., 2019; Gutsche et al., 2019; Gutsche and Ziegler, 2019; Gutsche and Zwergel, 2020), the Netherlands (e.g. Borgers and Pownall, 2014; Bauer and Smeets, 2015; Apostolakis et al., 2016; Riedl and Smeets, 2017; Apostolakis et al., 2018; Van Dooren and Galema, 2018; Rossi et al., 2019), Norway (e.g. Døskeland and Pedersen, 2016, 2019), Sweden (e.g. Nilsson, 2008, 2009; Jansson and Biel, 2011), the UK (e.g. Webley et al., 2001; Berry and Yeung, 2013), and the US (e.g. Junkus and Berry, 2010). An exception is the study by Nakai et al. (2018a) considering preferences for sustainable investments based on a sample of students of Japanese university.

among institutional investors,<sup>3</sup> little is known about the knowledge and preferences of Japan's individual investors.

Our study addresses this issue by analyzing data from a large, representative survey conducted in March 2020 among financial decision makers in Japanese households. We included several survey questions allowing us to examine three facets of individual sustainable investment behavior in Japan, i.e. i) the individual awareness of sustainable investments, ii) the current share of sustainable investments in the portfolios of individual investors, and iii) the individual intention to hold sustainable investments in the future. We capture a wide variety of potentially relevant individual factors such as socio-demographic factors, financial literacy and the general connectedness to investments, individual perceptions of the relative financial performance of sustainable versus conventional investments, individual economic preferences (e.g. risk preferences, time preferences, and trust), and personal attitudes and values (e.g. environmental awareness and political ideology).

We find that the clear majority has never heard of sustainable investments before, indicating enormous information deficits among Japanese individual investors and that individual sustainable investment in Japan is still in its infancy. Financial literacy, social signaling or word-of-mouth learning, perceived financial performance, and risk preferences are the most important determinants of current individual sustainable investments in Japan. Remarkably, non-financial factors such as personal attitudes and values appear unimportant than in Western countries, suggesting country and cultural differences in individual investment behavior. Nevertheless, the intention to invest in a sustainable manner in the future is also driven by individual environmental values and ecological political identification.

Being the first analyzing this research topic by considering a broad sample of individual investors in the East Asian region, we significantly contribute to the empirical literature in this field (e.g. Nilsson, 2008; Riedl and Smeets, 2017; Gutsche et al., 2019; Gutsche and Ziegler, 2019; Rossi et al., 2019). We thereby also address the broader questions about the relevance of financial literacy and non-pecuniary motives in investment decisions (e.g. Kaustia and Torstila, 2011; van Rooij et al., 2011, 2012) or the role of economic preferences for economic and financial decisions (e.g. Falk et al., 2018). From a practitioners' and political perspective, we reveal important obstacles to be

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<sup>3</sup> For example, the Government Pension Investment Fund has been encouraging institutional investors to engage in sustainable investments (Global Sustainable Investment Alliance, 2019).

removed in order to mobilize sustainable investments from individual investors in Japan. We discuss potential implications and solutions in our conclusion.

The remainder of the paper is structured as follows. Section 2 describes the data, sampling procedure, and dependent as well as explanatory variables used for the econometric analysis. Section 3 considers financial decision makers and individual investors in Japanese households and empirically analyzes their awareness of sustainable investments (Section 3.1), the share of sustainable investments in their total portfolio (Section 3.2), and their intentions to invest sustainably in the future (Section 3.3). Finally, Section 4 summarizes and concludes.

## **2. Data and variables**

### **2.1 Survey data**

The data for our analysis stem from a representative online survey among financial decision makers aged 20–69 years in Japanese households.<sup>4</sup> The survey with 2,682 respondents was conducted in collaboration with the professional market research institute MyVoice Communications, Inc. (MyVoice) during March 2020. MyVoice was responsible for programming the questionnaire, hosting the survey, and recruiting respondents from online panels. To derive a representative sample of decision makers in Japanese households and not for Japanese citizens in general, a two-step recruitment procedure was adopted. First, MyVoice recruited people according to quotas for age, gender, and zip code for the general Japanese population. The respondents were then asked about who is the household’s decision maker concerning large expenditures such as buying a new fridge or car, or the choice of a new electricity contract. Only those respondents who indicated that they decide alone or with another household member were allowed to proceed with the questionnaire.<sup>5</sup> MyVoice further conducted quality checks (e.g. attention check items) throughout the field time. Low-quality interviews were excluded from the sample and new respondents were re-recruited accordingly.

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<sup>4</sup> By restricting the respondents’ age to this range, we follow previous studies analyzing representative samples in Japanese households from online surveys (e.g. Ida et al., 2015; Morita and Managi, 2015; Nakai et al., 2018b). This approach is chosen as survey respondents need access to computers or smartphones and should be familiar with their use to answer the questions appropriately. Accordingly, senior citizens, that is, those older than 69 years, are not considered in this analysis because only 51% of people who are from 70 years to 79 years and 21.5% of those who are equal to or older than 80 years use internet as of 2018 (Ministry of Internal Affairs and Communication Japan, 2019).

<sup>5</sup> The appendix provides an English translation of the survey questions and the corresponding response categories for all variables considered in this study.

After the initial screening questions, the survey consisted of several parts that aimed to capture (i) individual attitudes, traits, and values, (ii) general and sustainable investment behavior, and (iii) socio-demographic characteristics. To identify all current investors among the respondents, we provided a list of financial assets (e.g. stocks, equity funds, bonds, bond funds, etc.) and asked the respondents to indicate the financial assets owned at the time of the survey. Table 1 gives an overview of the current financial assets held by the respondents. Accordingly, 31.54% of the respondents held stocks, followed by equity funds (12.16%), bonds (5.33%), and bond funds (2.80%). About 15.66% of the respondents held other fixed interest rate assets (e.g. mortgage bonds and time deposits), while 5.41% indicated owning other assets with a variable interest rate (e.g. REIT and closed-end funds). Most importantly, we see that 1,143 respondents, and thus a share of about 43%, owned at least one of the aforementioned financial assets. We refer to this group of respondents as ‘current investors’ in the remainder of this paper.

-- insert Table 1 here --

## **2.2 Variables**

### **2.2.1 Dependent variables**

We consider one dependent variable for each of the three research questions. To analyze the level of awareness of sustainable investments among decision makers in Japanese households, we asked the respondents whether they had already heard of sustainable investments before the survey.<sup>6</sup> On this basis, we construct the dummy variable ‘heard of sustainable investments’ that takes the value one if the respondent answered “yes”, and zero otherwise. We use this variable as a dependent variable in the econometric analysis in Section 3.1.

The analysis of current sustainable investment behavior follows the study by Gutsche et al. (2019). Accordingly, we asked the respondents about the current share of sustainable investments in their total investments. The respondents had to select from eight categories: “0%,” “more than 0% to 20%,” “more than 20% to 40%,” “more than 40% to 60%,” “more than 60% to 80%,” “more than 80% to 100%,” and “100%”. Deviating from the original question used by Gutsche et al. (2019), we additionally included the response category “don’t know” as some respondents would

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<sup>6</sup> Before asking this question, we defined sustainable investments as follows: “The following section deals with sustainable investments. Sustainable investment, also known as ESG investment, means the investment method which incorporates environment, social and/or governance criteria in addition to financial criteria.”

not know how many sustainable investments they hold. Based on this question, we construct the multinomial variable ‘share of sustainable investments larger zero’ that takes the value one if a respondent’s self-indicated share of sustainable investments is larger than 0%, two if the respondent indicated “0%,” and three if the person selected “don’t know.”<sup>7</sup> We analyze this variable in Section 3.2.

Finally, to analyze the potential for future individual sustainable investments in Japan, we asked the respondents whether they want to invest in sustainable investments in the future. Respondents who answered “0%” or “don’t know” to the question about their current share of sustainable investments in their total investments, could choose among “yes, I want to invest in sustainable investments in the future,” “no,” and “don’t know.” Respondents who previously indicated that they are currently invested sustainably could choose among “yes, I want to keep investing in sustainable investments in the future as well,” “no,” and “don’t know.” Accordingly, we construct the multinomial variable ‘intention to invest in sustainable investments’ that takes the value one if a respondent stated the intention to invest sustainably in the future, two if a respondent answered “no,” and three if a respondent selected “don’t know.”<sup>8</sup> We analyze the characteristics of these three groups in Section 3.3.

### **2.2.2 Explanatory variables**

To explore the types of persons who have already heard of, have invested in, or plan to invest in sustainable investments, we build on previous studies and consider three broad groups of

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<sup>7</sup> Thus, our approach slightly deviates from the two dependent variables constructed by Gutsche et al. (2019). On the one hand, they construct a dummy variable indicating whether a person’s share of sustainable investments in the total portfolio is larger than zero. On the other hand, they consider an ordinal variable capturing the approximate share a person invested sustainably. However, as many respondents selected the newly added “don’t know” option (see Section 3.2.1), we believe that it is more appropriate to construct a variable that enables us to include these persons into our econometric analysis (instead of treating them as missing values). Nevertheless, we consider the other two dependent variables in several robustness checks.

<sup>8</sup> In line with Gutsche and Zwergel (2020), we are also able to construct a multinomial variable taking the values one, two, three, and four, respectively, to indicate the following four mutually exclusive investor groups: The first group consists of individuals who indicated to hold sustainable investments at the moment and to invest in sustainable investments in the future. The second group comprises respondents who stated to hold sustainable investments at the moment, but did not want to invest in sustainable investments in the future. The third group contains persons with no sustainable investments at the moment, but who intended to invest sustainably in the future. And finally, the fourth group consists of persons with no sustainable investments at the moment and who also did not plan to invest in such a way in the future. Gutsche and Zwergel (2020) label these four groups as ‘sustainable investors,’ ‘skeptical investors,’ ‘interested investors,’ and ‘conventional investors,’ respectively. However, as Gutsche and Zwergel (2020) do not include a “don’t know” option our results are not entirely comparable. Nevertheless, we refer to this study in our descriptive analysis (e.g. see Table 7) and consider the aforementioned multinomial variable as dependent variable in some further analyses.

variables in our descriptive and econometric analysis: (i) socio-demographic characteristics, (ii) indicators for individual financial behavior and expertise, and (iii) further individual characteristics, attitudes, and values.

### *Socio-demographic characteristics*

The consideration of socio-demographic and rather directly observable factors is relevant for at least two reasons. First, several studies have confirmed that socio-demographic characteristics at least partly affect the intended or actual individual investment behavior in general (e.g. Campbell, 2006) and sustainable investment behavior in particular (Nilsson, 2008, 2009; Berry and Yeung, 2013; Borgers and Pownall, 2014; Bauer and Smeets, 2015; Apostolakis et al., 2016; Riedl and Smeets, 2017; Apostolakis et al., 2018; Bassen et al., 2019; Brodback et al., 2019; Døskeland and Pedersen, 2019; Gutsche et al., 2019; Gutsche and Ziegler, 2019; Rossi et al., 2019; Gutsche and Zwergel, 2020). Therefore, it is likely that these factors are also linked to the probability of having heard of sustainable investments. Secondly, socio-demographic characteristics can be obtained easily rather than individual psychological characteristics, values, or attitudes. Therefore, the identification of typical investor groups in terms of socio-demographic factors is relevant for policymakers and practitioners as this allows them to address these groups according to their objectives.

Consequently, we consider five typical socio-demographic factors. The variable ‘age’ captures the respondents’ age in years. We additionally construct four dummy variables, which take the value one if the respondent is a woman (‘female’), has a bachelor or higher degree (‘high education’), lives in a household with an annual net income that is above the median class of the sample (‘household net income above median class’)<sup>9</sup>, and is married (‘married’), respectively.

### *Indicators for individual financial behavior and expertise*

Further, we consider several indicators for individual financial behavior, expertise, and performance perceptions. First, we capture individual financial literacy, which is relevant for several types of financial decisions at the individual level (e.g. van Rooij et al., 2011, 2012). Persons with higher financial knowledge might have more information on new products and

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<sup>9</sup> The median class of the sample is from greater than or equal to five million Japanese yen to less than six million Japanese yen, which is approximately equivalent to greater than or equal to 48,363 US dollars to less than 58,029 US dollars as of 23 December, 2020.

developments in the financial sector. Therefore, it is reasonable that these persons are more likely to be aware of sustainable investments. Concerning individual sustainable investment behavior, financially literate persons should have lower information costs than those with less financial knowledge, as it is easier for them to search, identify, and understand relevant information before making (sustainable) investment decisions (e.g. Gutsche and Zwergel, 2020). Conversely, being financially literate also implies that these individuals are more familiar with financial theoretical concepts, such as risk diversification. Accordingly, they might be aware of the idea that applying sustainable investment strategies (e.g. negative screening) restricts the universe of investable assets and thus risk diversification opportunities. Consequently, financially literate investors could shun sustainable investments. So far, empirical evidence on the role of financial literacy in individual sustainable investing is ambiguous and also seems to depend on whether objective or rather subjective measures are used to capture financial literacy (e.g. Rossi et al., 2019; Gutsche et al., 2020). As self-assessed financial literacy might be blurred by several issues (e.g. overconfidence), we apply an objective measure developed by Lusardi and Mitchell (2008). This measure is based on three quiz questions referring to interest rates, inflation, and risk diversification, respectively, which we adapted to the Japanese context. The variable ‘financial literacy’ comprises the number of correct answers and thus ranges between zero and three.

Unlike some other sustainable behaviors such as the purchase of electric vehicles, the adoption of photovoltaic systems, or waste-sorting behavior, individual sustainable investment decisions are not directly observable. Therefore, word-of-mouth learning could be an important information channel to increase awareness among citizens. Similarly, interacting with household members, friends, or neighbors can be an important source of information before making (sustainable) investment decisions (e.g. Hong et al., 2004; Gutsche and Zwergel, 2020). Moreover, some make sustainable investment decisions to signal to others that they behave sustainably (e.g. Riedl and Smeets, 2017). Also such investors need to talk about their investments to others. Therefore, consistent with Riedl and Smeets (2017), we additionally construct the dummy variable ‘often talk about investments’ that takes the value one if the respondent rather or totally agreed with the statement “I often talk to others about investments.”

Although empirical evidence is inconclusive, results from studies also suggest that the individual perception of the relative performance of sustainable compared with conventional investments can drive individuals’ investment decisions (e.g. Nilsson, 2008; Riedl and Smeets, 2017; Gutsche et al., 2019). Therefore, we follow Gutsche et al. (2019) and capture individuals’

perceptions of the relative returns, risk, and fees of sustainable investments compared with conventional investments. We construct three dummy variables. The first dummy variable ‘higher perceived returns sustainable investments’ takes the value one if a respondent indicated to perceive the returns of sustainable investments to be rather or much higher than the returns of conventional investments. Similarly, the dummy variable ‘higher perceived risk sustainable investments’ takes the value one if a respondent perceived sustainable investments as riskier than conventional investments. Finally, the dummy variable ‘higher perceived fees sustainable investments’ takes the value one if a respondent perceived the fees of sustainable investments as rather or much higher than that of conventional investments.

#### *Further individual characteristics, attitudes, and values*

We additionally consider further potentially relevant individual characteristics and attitudes. With respect to sustainable investment behavior, we consider the individuals’ self-assessed health status. This addresses earlier empirical findings that individual health can affect household portfolio decisions. For example, persons who self-assess their health status as poor are less likely to hold risky assets (e.g. Rosen and Wu, 2004). Given that some expect sustainable investments to outperform conventional investments in the long run, a good health status would be a prerequisite to realize the future benefits of sustainable investments. We capture the individuals’ self-assessed health status by constructing the dummy variable ‘good health’ that takes the value one if the respondents self-assessed as of rather or very good health.

We additionally consider different facets of economic preferences relevant to various economic decisions (e.g. Falk et al., 2018) and sustainable investment behavior. We first consider individual risk preferences that have already been analyzed in previous studies in this field (e.g. Nilsson, 2009; Riedl and Smeets, 2017). For example, Riedl and Smeets (2017) show that risk preferences are positively related to the share of sustainable equity funds in the investors’ total investments in equity. One explanation for this finding, although not discussed in this respect by Riedl and Smeets (2017), could be that risk-takers are willing to accept limited risk diversification opportunities arising from a restricted investment universe due to a sustainable investment strategy (e.g. negative screening). Additionally, risk-seeking persons probably have a strong tendency to search new investment opportunities, and thus might be more likely to have heard of sustainable investment than risk-averse persons. We measure individual risk preferences by following Dohmen et al. (2011) and asking respondents about the extent they are generally willing to take risks. We create

the dummy variable ‘risk taking’ that takes the value one if they stated to be rather or very willing to take risks.

The results by Riedl and Smeets (2017) also suggest that sustainable investors have longer investment horizons. Therefore, we additionally consider individual time preferences and expect that persons with more patience are more likely to be aware of sustainable investments as well as to invest in a sustainable manner. We therefore asked the respondents to indicate how patient they are in general. The corresponding dummy variable ‘patience’ takes the value one if a respondent answered to be rather or very patient. Riedl and Smeets (2017) also find that social preferences play an important role for individual sustainable investment decisions. Similarly, other studies find that altruistic persons are more likely to be sustainable investors (e.g. Nilsson, 2009; Nakai et al. 2018a; Brodback et al., 2019). It is further reasonable that the level of awareness of sustainable investments is also higher among persons with higher social preferences, as these persons might look for ways to express their values and help others. Consequently, and consistent with the questions on risk and time preferences, we asked the respondents to indicate how generous they are in general. The dummy variable ‘generosity’ takes the value one if a respondent claimed to be rather or very generous. We also capture individual trust, which is essential for individual economic and financial behaviors (e.g. Guiso et al., 2008; Georgarakos and Pasini, 2011; Falk et al., 2018). In the context of sustainable investments, Nilsson (2008) and Gutsche and Zwergel (2020) find that trustful investors are more likely to invest in a sustainable manner. We follow Dohmen et al. (2008) and asked the respondents to indicate to what extent they agreed with the following three statements: “In general, one can trust people,” “These days you cannot rely on anybody else,” and “When dealing with strangers, it is better to be careful before you trust them.” We constructed an ordinal variable for each statement. The first ordinal variable takes the value one (two, three, four, five) if the respondent selected “totally disagree” (“rather disagree,” “undecided,” “rather agree,” “totally agree”). The other two ordinal variables are constructed in reverse, i.e. take the value one (two, three, four, five) if the respondent selected “totally agree” (“rather agree,” “undecided,” “rather disagree,” “totally disagree”) for the corresponding statement. The variable ‘trust’ captures the sum of these three values for each respondent. It thus ranges from three to 15, while higher values indicate higher values of (interpersonal) trust.

Finally, we consider the individuals’ environmental values and political orientation, which both seem to play a crucial role for (sustainable) investment decisions in Western countries. Based on previous findings (e.g. Gutsche et al., 2019; Gutsche and Ziegler, 2019; Gutsche et al., 2020), we

expect a positive relationship between environmental values and individual sustainable investments. Similarly, it is reasonable that persons with an environmental ideology are more likely to be aware of sustainable investments as they might belong to communities with similar worldviews and thus have easier access to this information. Likewise, these persons might be more willing to seek opportunities to express their environmental values. Considering earlier evidence, individual political identification might work through comparable channels explaining evidence that left-aligned persons are more likely to invest sustainably (e.g. Gutsche and Ziegler, 2019; Gutsche et al., 2020). Accordingly, left-aligned persons might be more aware of sustainable investments. However, empirical evidence is inconclusive. For example, Gutsche et al. (2019) find a negative relationship between individual left-aligned political orientation and sustainable investments, perhaps because left-aligned persons are less likely to participate in stock markets (e.g. Kaustia and Torstila, 2011). Consequently, the relationship between individual political orientation and sustainable investment behavior is unclear.

To capture individual pro-environmental values, we apply the widely-used revised New Environmental Paradigm (NEP) scale developed by Dunlap et al. (2000). This scale consists of 15 statements, of which eight are framed as pro-environmental and seven anti-environmental. We asked the respondents to indicate the extent to which they agree with each statement on a five-point scale. On this basis, we constructed one ordinal variable ranging from one to five for each statement. The variable ‘NEP’ is the sum of these 15 variables and consequently ranges between 15 and 75, while higher values indicate higher levels of individual environmental values. For measuring individual political identification, we follow Ziegler’s (2017, 2019) operationalization, which allows us to draw a differentiated picture of an individual’s political orientation. Accordingly, we measure the respondents’ individual political orientation along four dimensions and capture data on whether they identify themselves with conservatively, liberally, socially, or ecologically oriented policies. Therefore, we asked the respondents to indicate their agreement with the statement “I identify myself with conservatively oriented policy” and analogous statements for the other three dimensions. The corresponding four dummy variables ‘conservative political identification’, ‘liberal political identification’, ‘social political identification’, and ‘ecological political identification’ take the value one if the respondent rather or totally agreed with the corresponding statements.

### **3. Empirical analysis**

#### **3.1 Individual awareness of sustainable investments in Japan**

##### **3.1.1 Descriptive analysis**

Figure 1 illustrates the shares of respondents having already heard of sustainable investments before the survey. We see that only about 20% of all respondents and about 36% of all current investors - and thus the clear minority – indicated having ever heard of sustainable investments before. We are aware of only two survey studies that have also reported the extent of awareness of sustainable investments among the interviewees. Dorfleitner and Utz (2014) observe that about 90% of their sample of German-speaking private investors had heard about sustainable investments before. More recent evidence based on survey data among German citizens by Brodback et al. (2019) shows that 64.4% of the respondents have heard of sustainable investments before the survey. Though both studies consider different target populations making a comparison difficult, we observe considerably lower shares in our sample. This first main finding of our study indicates that individual sustainable investment in Japan is still in its infancy and that individual investors have enormous information deficits.

-- insert Figure 1 here --

Table 2 reports the means of our explanatory variables across all respondents and the subsample of all current investors. In addition to this differentiation, we also distinguish between respondents who had already heard of sustainable investments and those who had not. This allows us to derive some first insights into whether certain groups of investors are more aware of sustainable investments than others. We thereby focus on the most striking differences between the characteristics of the different subgroups, i.e. those which are statistically significant at the common significance levels.

-- insert Table 2 here --

Panel A in Table 2 refers to the group of socio-demographic characteristics. A comparison of the characteristics of all respondents with that of current investors shows that the group of current investors consists of more men (48% vs 55%), more individuals with a university degree (53% vs

64%), and more persons with a household net income above the median class (39% vs 49%). Additionally, current investors are slightly older than the average respondent of the survey (45.65 years vs 48.13 years). This finding is consistent with typical characteristics of individual investors in other countries such as Germany (e.g. Gutsche et al., 2020) or the United States (e.g. Choi and Robertson, 2020).

A comparison between those who had already heard of sustainable investments and those who had not shows the most striking patterns hold for both the sample of all respondents and the subsample of all current investors. In both cases, the clear majority of those who had already heard of sustainable investments is male (64% and 67%), has a university degree (75% and 78%), and belongs to the group of persons with a household net income above the median class of the sample (54% and 58%). We do not find any significant differences with respect to age or being married.

Panel B reports the means of our indicators for individual financial behavior and expertise. Current investors are more financially literate and more often indicate that they talk about investments regularly than the average respondent. These patterns are also visible when we compare those who had already heard of sustainable investments and those who had not. Among all respondents, persons who had already heard of sustainable investments answered, on average, 0.73 more quiz questions correctly than those who had not. Considering only all current investors, this difference is slightly lower and amounts to 0.35 questions, on average. The shares of persons indicating that they regularly talk about investments are 18 and 15 percentage points larger in the group of persons who had already heard of sustainable investments compared with those who had not, respectively. These findings suggest that financial education is positively related to the individuals' awareness of sustainable investments. Further, word-of-mouth learning seems to be an important dissemination channel for knowledge of sustainable investments.

Finally, Panel C summarizes the means of all further individual characteristics, attitudes, and values. While this reveals only a weak positive relationship between individual health status and awareness of sustainable investments, the share of risk-seeking persons is considerably larger among those who had already heard of sustainable investments than those who had not (i.e. 30% vs 13% for all respondents and 34% vs 18% among all current investors). This finding is consistent with our expectation that risk-seeking persons have a stronger tendency to seek new investment opportunities than risk-averse persons and thus are more aware of sustainable investments. The differences concerning time preferences, generosity, and environmental values are less pronounced,

but suggest a slight positive relationship between these factors and having heard of sustainable investments.

Conversely, other than social political identification, there are clearer patterns with respect to political attitudes. For both subsamples, the shares of persons with conservative, liberal, social, and ecological political identifications are larger among those who had already heard of sustainable investments than those who had not. This implies that a stronger political identification is positively related to the awareness of sustainable investments, regardless of the individuals' political ideology. This could indicate that persons from different political ideologies seek investment opportunities that are consistent with their individual values. Alternatively, persons with higher political identification use similar or more information channels than those with low political identification and are, thus, generally better informed about current events and new developments, such as sustainable investments.

### **3.1.2 Econometric analysis**

As the previous analysis only considers bivariate relationships between our explanatory variables and the individuals' awareness of sustainable investments, we move on to multiple regression models in the next step. Based on binary probit models, Table 3 reports the estimates of the average marginal and discrete probability effects of the explanatory variables considered in Table 2 on 'heard of sustainable investments'. As in the last section, we distinguish between the (sub-)samples of all respondents and all current investors. The estimates in models (1) to (3) are based on observations for the former group, while the estimates in columns (4) to (6) are based only on the observations for all current investors.

-- insert Table 3 here --

In models (1) and (4), we only include socio-demographic characteristics. Both estimations reveal that women are significantly less likely to have heard of sustainable investments. In contrast, education and household income are significantly positively related to the probability of having heard of sustainable investments. All three findings confirm the results from our earlier descriptive analysis. For the group of all respondents (see model 1), we also find that age is significantly positively related, whereas being married is significantly negatively associated with the estimated probability of being aware of sustainable investments.

In models (2) and (5), we additionally consider our indicators for individual financial behavior and expertise. Model (2) also contains a dummy variable indicating whether a person is a current investor. Adding these variables, the main results for the socio-demographic characteristics remain robust. However, the estimated probability effects slightly decrease and the effect of age loses statistical significance. Regarding the financial behavior variables, consistent with Figure 1, current investors are more likely to have already heard of sustainable investments. Moreover, financially literate persons and those who claim to regularly talk about investments are significantly more likely to be aware of sustainable investments.

These results remain stable when we finally add further individual characteristics, attitudes, and values in models (3) and (6). Interestingly, among these variables, we only find significant positive probability effects for ‘risk taking’ and ‘ecological political identification’. The effect of ‘ecological political identification’, however, is only significant when we consider all observations. All patterns observed in the descriptive analysis for the other variables of this group (e.g. patience, generosity, or other directions of political identification) do not hold in the multiple regression setting.

However, this approach not only allows us to control for several factors simultaneously and to evaluate their statistical significance. It also helps derive conclusions about their relative importance for explaining the individuals’ awareness of sustainable investments (i.e. their economic significance) within our two (sub-)samples. Therefore, by considering the size of the estimated probability effects for the group of all respondents, we see that current investors are 14.9 percentage points more likely to have heard of sustainable investments. Similarly, persons who answered all three financial quiz question correctly are approximately 13.2 percentage points more likely to be aware of sustainable investments than those who answered all questions wrong.<sup>10</sup> We also find a group of variables with similarly high estimated discrete probability effects, i.e. ‘often talk about investments’ (9.2 percentage points), ‘high education’ (8.4 percentage points), ‘risk taking’ (7.2 percentage points), and ‘household net income above median class’ (6.7 percentage

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<sup>10</sup> This value is calculated based on the estimated average marginal effect, i.e.  $3 \times 0.044 = 0.132$ , and is thus only an approximation. A more precise estimation can be derived by calculating the difference between the estimated average probabilities of having heard of sustainable investments for persons who answered all three questions correctly and those who answered all wrong. Here, we find an estimated average discrete probability effect of  $0.225 - 0.125 = 0.130$  (i.e. 13 percentage points). As this value is very close to the approximation and owing to simplicity, we solely consider approximated marginal probability effects in the following.

points). The further statistically significant factors, i.e. ecological identification, female, and married are somewhat unimportant in terms of the size of the estimated probability effects.

When all current investors are considered, the most relevant explanatory variables in the group of all respondents are also the most statistically and economically relevant variables, but with a slightly different order. That is, the even more pronounced estimated probability effect for financial literacy is followed by ‘high education’ (13.5 percentage points), ‘risk taking’ (13.4 percentage points), ‘often talk about investments’ (12.0 percentage points), and ‘household net income above median class’ (10.6 percentage points). With the exception of ‘female’ (-8.0 percentage points), the other explanatory variables are neither statistically nor economically significant.

Thus, investment experience and education, particularly financial education, are key to explain Japanese financial decision makers’ awareness of sustainable investments. Access to relevant information, i.e. via word-of-mouth learning, is similar important. Further, risk-seeking, male Japanese financial decision makers with above median household net income are more aware of sustainable investments. An obvious reason is that these persons have the opportunity to invest, as they have sufficient investable money, and might be more willing to seek new investment opportunities and strategies. Interestingly, other factors, especially non-pecuniary, such as ecological values seem to play an inferior role compared with the aforementioned factors.

### *Robustness checks*

Our core results are robust to various model specifications based on the aforementioned explanatory variables.<sup>11</sup> They are also stable when we include several other explanatory variables not part of the core analysis. For example, our set of economic preferences considered earlier (i.e. risk preferences, time preferences, and generosity) tends to be correlated with other social preferences such as trust or reciprocity (e.g. Falk et al., 2018). Consequently, we additionally controlled for these factors to mitigate potential omitted variables bias, but our results remain stable. We additionally included measures for the Big Five personality traits (i.e. openness to experiences, conscientiousness, extraversion, agreeableness, and neuroticism) according to Gosling et al. (2003), as they might serve as complements to economic preferences for explaining individual economic behavior (e.g. Becker et al., 2012). The corresponding estimation results confirm the robustness of the core results. Moreover, persons who are more open to experiences, conscientious, and

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<sup>11</sup> These robustness checks are not reported due to brevity, but are available upon request.

emotionally stable, respectively, are more likely to have heard of sustainable investments. While we have no theoretical explanations for the latter two findings, the result for openness to experiences is obvious, given that sustainable investment is a rather new phenomenon.

## **3.2 Individual sustainable investment behavior**

### **3.2.1 Descriptive analysis**

After analyzing the awareness of sustainable investments among decision makers in Japanese households, we now examine the extent of and reason for sustainable investments by Japanese individual investors. Therefore, Table 4 provides an overview of the shares of sustainable investments in the total portfolios of the 1,143 current investors in our sample. This reveals that only 18.81% of all current investors indicated to hold sustainable investments. Interestingly, this is similar to the share of 20.68% sustainable investors reported by Gutsche et al. (2019) based on an almost identical question for a sample of financial decision makers in German households in 2014. The number is even higher than the share of 8.1% sustainable investors estimated by Rossi et al. (2019) for Dutch individuals aged 16 and older. This indicates that the share of sustainable individual investors in Japan is similar to those observed in Western countries, which typically have been examined so far.

However, if we compare our results in more detail with the results of Gutsche et al. (2019), Japanese individual investors, on average, invest a slightly lesser proportion of their total portfolio sustainably.<sup>12</sup> Moreover, the share of persons who indicated that they hold no sustainable investments at all is severely lower in our sample compared to the share reported by Gutsche et al. (2019), i.e. 43.57% vs 79.32%. The main reason is probably that, in contrast to Gutsche et al. (2019), we included the option “don’t know” as response category. One advantage of the inclusion of this category is that respondents are not forced to give a (possibly wrong) answer. As another advantage, the ratio of “don’t know” responses can be used as alternative and – compared with our initial direct question on the individuals’ awareness of sustainable investments – rather indirect indicator measuring investors’ interests in considering ESG criteria in investment decisions. In other words,

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<sup>12</sup> For example, about 11% of the Japanese investors, and thus more than half of the Japanese investors with a share of sustainable investments larger than zero, stated that their share of sustainable investments amounts to more than 0% to 20% of their total portfolio. In contrast, Gutsche et al. (2019) report a share of 5.49% for the same category, and similar shares of 5.89% and 4.80% for the categories of “more than 20% to 40%” and “more than 40% to 60%,” respectively.

our result of 37.62% of current investors choosing “don’t know” on the share of sustainable investments in the total portfolio supports the findings of low awareness of sustainable investments even among current investors. A drawback, however, is that we cannot identify respondents who actually held sustainable investments at the time of the survey, but just did not know the precise share of these investments in their total portfolio. Similarly, some investors with actually no sustainable investments in their portfolio might have answered “don’t know” as they could not rule out the possibility that they might have invested in a sustainable manner ‘by accident’, i.e. unconsciously. Therefore, the shares of 18.81% and 43.57% of individual investors in our sample who had or had not invested sustainably, respectively, are rather conservative estimates for the corresponding unknown population parameters. This can be confirmed if we only consider current investors who had already heard of sustainable investments before the survey. As depicted in the lower part of Table 4, the share of investors unaware of the share of sustainable investments in their total portfolio is considerably smaller (18.29% vs 37.62%), whereas the shares of those with no sustainable investments (49.27% vs 43.57%) and with sustainable investments (32.44% vs 18.81%) are significantly larger than the group of all current investors.

-- insert Table 4 here --

To find the Japanese individual investors holding sustainable investments, Table 5 reports the means of the aforementioned explanatory variables for these two groups. As we have also learned in the last paragraph that about 38% of the current investors are unaware of the share of the sustainable investments in their total portfolio, we also consider this specific group of investors in Table 5. Additionally, we again only consider the most striking patterns in the following and separately report the values for the subsamples of current investors who had already heard of sustainable investments before the survey. However, as the most striking patterns can be observed for both subsamples, we focus on the analysis of the subsample of all current investors in the following.

With respect to socio-demographic characteristics, sustainable investors on average are slightly younger (45.88 vs 48.44 years) and have a net income above the median class (56% vs 48%) than investors who do not hold sustainable investments. Interestingly, respondents in the “don’t know” group tend to be female and seldom have a high education than the respondents in the other two groups. Persons answering “don’t know” also tend to have a lower financial literacy (1.89 vs 2.11

or 2.25, respectively) and to talk less regularly about investments (16% vs 43% or 21%, respectively) than those indicating the share of sustainable investments in their portfolio. This finding suggests that persons in the “don’t know” group have lesser financial knowledge and are less connected to the topic of investments than the other two groups.

Remarkably, also sustainable investors tend to have a slightly lower financial literacy than those who hold no sustainable investments, which is consistent with the findings reported by Rossi et al. (2019). However, the proportion of persons regularly talking about investments is considerably larger among sustainable investors than among those with no sustainable investments (43% vs 21%) highlighting the relevance of social signaling (e.g. Riedl and Smeets, 2017) or word-of-mouth learning (e.g. Hong et al., 2004). With regard to perceived financial performance, the proportion of persons perceiving the returns of sustainable investments as higher than the returns of conventional investment is larger among sustainable investors than among the other two groups (17% vs 10% for other groups). The perceptions of risk and fees, however, are similar among those who indicated the share of sustainable investments in their total portfolio.

Finally, consideration of the further individual characteristics, attitudes, and values reveals that sustainable investors tend to have a better health status and to be more risk seeking, patient, generous, and trustful than those with no sustainable investments. These observations are consistent with our expectations raised above. Remarkably, environmental values seem to be slightly lower among sustainable investors than among their counterparts. This could indicate that persons with a strong environmental ideology do not believe that sustainable investments are suitable for improving and protecting the environment. Finally, with respect to political ideology, the results seem to be consistent with our expectations (e.g. we can observe a slightly larger share of persons with an ecological political orientation among sustainable investors), however, we find no clear patterns in terms of statistical significance.

-- insert Table 5 here --

### **3.2.2 Econometric analysis**

In the next step, we analyze the relevance of the explanatory variables in a multiple regression framework. To this end, we consider the dependent multinomial variable ‘share of sustainable investments larger zero’ that allows us to include the large group of respondents who selected “don’t know” in the corresponding question. As our descriptive analysis also reveals that the most

striking patterns hold for both subsamples, i.e. for all current investors and all current investors who have heard of sustainable investors before, we only consider the larger subsample of all current investors.<sup>13</sup> However, we introduce the variable ‘heard of sustainable investments’ as an additional explanatory variable.

Table 6 reports the estimates of marginal and discrete probability effects based on the corresponding multinomial logit model. This reveals that socio-demographic factors only play an inferior role. We only find some weak evidence for a negative correlation between age and the probability of investing in a sustainable manner (i.e. the category “yes”), indicating that younger persons are more likely to be sustainable investors. We find no further significant probability effects of socio-demographic factors on this category. However, consistent with our descriptive analysis, women are more likely to be uncertain about the share of sustainable investments in their total portfolio.

Regarding financial behavior, we find the intuitive result that prior awareness of sustainable investments increases the estimated probability of knowing the share of sustainable investments in the total portfolio. The further results are mainly consistent with our descriptive analysis. Financial literacy is significantly positively related with the probability of holding no sustainable investments, and significantly negatively correlated with being in one of the other two groups. While this finding seems logical with regard to the “don’t know” category, the significant negative effect on being a sustainable investor is remarkable. This implies that financially literate persons shun sustainable investments, although they should have lower information costs and therefore participation costs as it is easier for them to search and process the relevant information needed before making an (sustainable) investment (e.g. Gutsche and Ziegler, 2020). A possible explanation is that financial literate persons wish to diversify unsystematic risk and avoid limited risk diversification opportunities resulting from a restricted investment universe due to a sustainable investment strategy (e.g. negative screening), as discussed above. We can explore this point further, as the third question of the quiz used to construct our variable ‘financial literacy’ refers to risk diversification. Accordingly, we replace our variable ‘financial literacy’ with the underlying three individual dummy variables, where the third dummy variable indicates whether a respondent is familiar with the concept of risk diversification or not, and reestimate our model. However, this reveals only weak evidence for this explanation, especially as the second dummy variable (i.e.

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<sup>13</sup> Though, we consider the subsample of all current investors who had heard of sustainable investments before in a variety of robustness checks.

knowledge on the concept of inflation) seems to drive the results.<sup>14</sup> Only when we exclusively consider those current investors who have heard of sustainable investments before, we find evidence for risk diversification motives because only the corresponding variable is significantly correlated with the probability of holding sustainable investments. As a more detailed analysis on this issue are out of the scope of this paper, this could be an interesting avenue for further research.

We further find that persons regularly talking about investments are 12.6 percentage points more likely to hold sustainable investments (and 7.3 percentage points less likely to hold sustainable investments). Qualitatively consistent with the findings of Riedl and Smeets (2017), this result suggests that social signaling is a key motivation for Japanese individual investors to invest in a sustainable manner. However, this finding also highlights the importance of word-of-mouth learning for individual investment behavior (e.g. Hong et al., 2004). Unfortunately, based on our data, we cannot clarify which of these two potential channels is more important; therefore, this issue would be an interesting question for future research.

With regard to the individuals' perception of the relative financial performance of sustainable compared with conventional investments, especially expectations of relatively higher returns increase the estimated probability of being a sustainable investor by 6.6 percentage points.<sup>15</sup> Similarly, these persons are less likely to hold no sustainable investments (i.e. -9.6 percentage points). Additionally, the probability of holding no sustainable investments is significantly higher among persons perceiving the risk or fees of sustainable investments as higher than for conventional investments (i.e. 10.2 and 6.9 percentage points, respectively). Overall, we see that our indicators for individual financial behavior and expertise are highly relevant for sustainable investment decisions among Japanese individual investors.

In contrast to the results reported in empirical studies for Western countries, we find almost no evidence for the relevance of further (non-pecuniary) individual characteristics, attitudes, and values. With respect to these variables, only risk taking and generous investors appear significantly more likely to hold sustainable investors (i.e. 5.2 and 4.2 percentage points, respectively). This reflects the ideas that rather risk-seeking persons invest in this rather new category of investment products and that altruistic motives play a role for sustainable investments (e.g. Riedl and Smeets, 2017; Brodback et al., 2019). The finding for 'risk taking' is also consistent with the perspective that risk-seeking persons are more willing to accept limited risk diversification opportunities

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<sup>14</sup> These estimation results are not reported due to brevity, but are available upon request.

<sup>15</sup> Although this probability is only significantly different from zero at the 10% -significance level.

arising from a restricted investment universe due to a sustainable investment strategy (e.g. negative screening). However, and in contrast to our initial descriptive findings, we find no evidence for significant effects of individual time preferences or trust. Interestingly, and in line with our descriptive results, persons with stronger environmental values are less likely to hold sustainable investments (and more likely to hold no sustainable investments). This finding stands in sharp contrast to previous results for Western countries (e.g. Gutsche et al., 2019) suggesting that Japanese individual investors do not perceive sustainable investments as an adequate tool to express their environmental values. In contrast to previous studies, we find no evidence for a significant role of any individual political identification.

To summarize, our results suggest that in terms of statistical and economic significance, especially financial expertise, social signaling, and performance expectations are the most important determinants of sustainable investment decisions among Japanese individual investors. Non-financial factors such as personal attitudes and values seem to play a less important role than in Western countries.

-- insert Table 6 here --

### *Robustness checks*

To check the robustness of our estimation results, we i) control for further individual factors, ii) include alternative measures, and iii) consider alternative dependent variables.<sup>16</sup> Regarding the first point, we extend the set explanatory variables in our main model by including measures for negative and positive reciprocity, which are typically correlated with other economic preferences such as risk or time preferences (e.g. Falk et al. 2018). However, we find no significant effects for these two factors and all further estimation results remain stable. We further include measures developed by Gosling et al. (2003) to capture the Big Five personality traits<sup>17</sup>, as Becker et al. (2012) find that including such factors in addition to individual economic preferences is helpful. Therefore, including these factors to our model, we see that individual openness to experiences and conscientiousness are positively related to having invested in sustainable investments. All further results remain robust, with the exception that the significant effect of ‘risk taking’ disappears. This

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<sup>16</sup> The robustness checks are not reported due to brevity, but are available upon request.

<sup>17</sup> The Big Five personality traits comprise openness to experiences, conscientiousness, extraversion, agreeableness, and neuroticism (e.g. Borghans et al., 2008; Almlund et al., 2011).

finding supports our previous explanation that risk-seeking persons are more willing to invest in this rather new category of investment products.

Secondly, we refer to previous studies showing that the estimation results for financial literacy may depend on whether an objective or self-reported measure is used (e.g. Rossi et al., 2019). Accordingly, we asked the respondents to indicate to the extent to which they agree with the statement “I have good knowledge in the field of financial investments.” The corresponding dummy variable takes the value one if a respondent rather or totally agreed with this statement. The inclusion of this variable into our main model reveals that our previous results remain stable. Interestingly, we generally find no significant relationship between self-reported financial literacy and ‘share of sustainable investments larger zero’. In some specifications, however, we find a weak positive correlation suggesting that self-reported financially literate persons are more likely to invest in a sustainable manner, in contrast to our main results. While we rather trust the objective measure, this again reveals that the measurement of financial literacy strongly matters for the estimation results and potential implications for practitioners and policy makers.

Finally, consistent with Gutsche et al. (2019), we consider alternative dependent variables, i.e. a binary variable indicating whether a respondent holds sustainable investments or not and an ordinal variable capturing the share of sustainable investments in the total portfolio. The corresponding results in binary and ordered probit models, respectively, show similar results with respect to our main findings for sustainable investors. However, as we need to treat persons answering “don’t know” on their share of sustainable investments in the total portfolio as missing values in this approach, our main results should be more informative.

### **3.3 Who wants to invest in sustainable manner in the future?**

#### **3.3.1 Descriptive analysis**

We finally turn to our third research question, that is, whether and which individual investors in Japan plan to invest sustainably in the future. Therefore, Table 7 presents an overview of the current and planned sustainable investments among all current investors in our sample. The number of investors who can imagine to invest sustainably in the future is similar to the number of investors who do not want to invest in such a manner (22.57% vs 21.61%). The majority of investors (i.e. 55.82%) expressed uncertainty. However, this implies that about 78% of the individual investors could potentially be mobilized for sustainable investments.

Considering the respondents current sustainable investment status, we see that 115 (or  $115/215 = 53.49\%$ ) of all current investors who already hold sustainable investments also plan to do so in the future.<sup>18</sup> Thus, almost half of the current sustainable investors either plan to surrender their sustainable investments<sup>19</sup> or are not sure about their future sustainable investments (i.e.  $20/215 + 80/215 = 9.30\% + 37.21\% = 46.51\%$ ). Among all investors who indicated as holding no sustainable investments, 100 persons (i.e. about 20%) stated their intention to invest sustainably in the future.<sup>20</sup> However, about 31% of the investors with currently no sustainable investments<sup>21</sup> do not intend to invest sustainably in the future and about 49% selected the option “don’t know.” The share of persons who are uncertain about their future sustainable investments is even larger among those investors who did not know the share of sustainable investments in their total portfolio (i.e. 72.79%). In contrast, only 10% percent of the persons who did not report the share of sustainable investments in their portfolio stated the intention to hold sustainable investments in the future.

Overall, we find potential future sustainable investors among all three groups, with the largest share among current sustainable investors, although there is a similar number of interested persons among investors who currently hold no sustainable investments. Remarkably, we observe a large number of uncertain investors, especially among those who were unaware of their current share of sustainable investments. This implies a huge potential to mobilize individual investors for sustainable investments in Japan.

-- Insert Table 7 here --

### 3.3.2 Econometric analysis

To understand which individual investors have the intention to invest in sustainable investments in the future, we consider the variable ‘intention to invest in sustainable investments’ as a dependent variable in a multinomial logit model. Besides all explanatory variables considered in the preceding analyses, we additionally control for the respondents’ current sustainable investment

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<sup>18</sup> Gutsche and Zwergel (2020) refer to this group as “sustainable investors” (see footnote 4). In their sample, the share of this group is 13.61%, which is slightly higher compared to the share of 10.06% observed in our study. However, as aforementioned, these numbers are not entirely comparable as we included a “don’t know” option.

<sup>19</sup> Gutsche and Zwergel (2020) refer to this group as “skeptical investors” and report a share of 10.36% for this group in the sample. The share is thus remarkably higher than the corresponding value of 1.75% reported in Table 7.

<sup>20</sup> Gutsche and Zwergel (2020) refer to this group as “interested investors”. They report a share of 30.96%, which is considerably larger than value of 8.75% reported in Table 7.

<sup>21</sup> Gutsche and Zwergel (2020) refer to this group as “conventional investors”. They report a share of 45.07%, which is considerably larger than the share of 45.07% reported in Table 7.

status by including the dummy variables ‘currently not invested in sustainable investments’ and ‘currently invested in sustainable investments’.<sup>22</sup> Table 8 reports the corresponding estimates of marginal and discrete probability effects.

Regarding socio-demographic characteristics, younger and married persons are more likely to have the intention to invest sustainably. Thus, practitioners or policymakers aiming to mobilize Japanese individual investors for sustainable investments should address these persons in particular. Consistent with our previous findings, especially women are uncertain about their future sustainable investments. This suggests that women need more advice on sustainable investments in order to be mobilized. Remarkably, we find no evidence for further relevant sociodemographic characteristics (e.g. education or income).

In terms of variables capturing individual financial behavior and expertise, both individual’s current information level and investment status significantly affect the intention to invest sustainably. Persons being aware of or having invested in sustainable investments are significantly more likely to state their intention for future sustainable investments than their counterparts. Similarly, persons who currently have no sustainable investments or those who did not know the share of sustainable investments in their total portfolio are more likely to maintain their current investment status. Interestingly, there is no evidence for a significant correlation between financial literacy and the intention to invest sustainably among Japanese individual investors. Instead, financially literate investors tend to be uncertain about their future sustainable investments. This suggests that these persons require further, probably more targeted information on sustainable investments to help them make decisions on sustainable investment. Accordingly, measures to increase the individuals’ financial literacy in the area of sustainability (e.g. definition of ESG criteria, ESG ratings, available products, and impact of sustainable investments) could be another promising way to mobilize individual investors. These considerations are consistent with the finding that persons regularly talking about investments are significantly more likely to invest sustainably, as they might receive the relevant information to make a decision via word-of-mouth learning. Alternatively, these persons might perceive peer pressure and aim to signal prosocial behavior. We also again see that the perceived financial performance of sustainable investments

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<sup>22</sup> The variable ‘currently not invested in sustainable investments’ takes the value one if the respondent’s share of sustainable investments equals zero. Similarly, the variable ‘currently invested in sustainable investments’ takes the value one if the respondent’s share of sustainable investments is larger than zero. Accordingly, the base category consists of respondents who did not know the share of sustainable investments in their current total portfolio.

compared with conventional investments matters to Japanese individual investors, as it significantly affects their intention to invest sustainably. Therefore, mobilization of individual investors also requires information on the (relative) financial performance of sustainable investments. This could include the clarification that empirical studies find in many cases a positive relationship or at least no negative relationship between financial performance and ESG criteria (e.g. Friede et al., 2015).

Finally, considering further individual characteristics, attitudes, and values, risk-seeking investors are more likely to express a positive intention towards future sustainable investments. This is consistent with the notion that these persons are eager to try something new. Remarkably, individual trust is also significantly positively related to stating the intention to invest sustainably. This finding corresponds to the results by Gutsche and Zwergel (2020) emphasizing the importance of individual trust, especially in the area of credence goods (such as sustainable investments), which are prone to information asymmetries and window dressing. Lastly, we find that individual environmental values and an ecological political orientation – though they are not significantly related to the individuals’ current sustainable investment status – significantly positively affect the intention to invest sustainably in the future. This offers further avenues to mobilize private investors such as highlighting potential positive environmental impacts of sustainable investments.

-- insert Table 8 here --

### *Robustness checks and further analyses*

We again ran several robustness checks and conducted further analyses following Gutsche and Zwergel (2020).<sup>23</sup> We included measures for negative and positive reciprocity and the Big Five personality traits to mitigate potential omitted variables bias. However, we find no significant effects for any of these variables and almost all further results remain stable. We only find a significant negative impact of ‘generosity’ on the intention to invest sustainably when controlling for the Big Five personality traits. This finding might indicate that generous persons prefer alternatives to sustainable investments to express their personal values.

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<sup>23</sup> The estimation results of these approaches are not reported due to brevity, but are available upon request.

The analysis of the four different investor groups according to Gutsche and Zwergel (2020), namely “sustainable investors,” “skeptical investors,” “interested investors,” and “conventional investors,” leads to a severe drop to only 388 observations due to missing values. Besides, this analysis only provides a few new insights. Most interestingly, we see that persons who currently have no sustainable investments but intend to invest sustainably in the future are financially literate and driven by environmental values and their ecological political orientation. In contrast, persons with a liberal political orientation are less likely to belong to this group of investors. Instead, liberals and respondents with a conservative political orientation are more likely to be in the group of investors that currently have no sustainable investments and do not plan to invest in such a manner in the future. Therefore, practitioners and policymakers should consider individual personal values and attitudes when they aim to mobilize individual investors who currently hold no sustainable investments.

#### **4. Conclusion**

Based on data from a representative survey among financial decision makers in Japanese households, this study empirically analyzes the current state of individual sustainable investments in Japan along three facets. Our empirical analysis reveals that the clear minority of Japanese financial decision makers and individual investors has already heard of sustainable investments. This implies that individual sustainable investment in Japan is still in its infancy and that individual investors have enormous information deficits. This is supported by the finding that particularly financial literacy and regularly talking about investments is positively related to the individuals’ awareness of sustainable investments. Moreover, some groups (e.g. male, well educated, above median income, or risk-seeking persons) exhibit higher levels of awareness of sustainable investments. An obvious explanation is that these groups have the ability (i.e. sufficient education and financial resources) and willingness (i.e. sufficient risk appetite) to search for and invest in new investment products. Other and especially non-pecuniary factors (e.g. ecological values) seem to play an inferior role.

Further, about one-fifth of all current investors hold sustainable investments, suggesting that the share of sustainable individual investors in Japan does not differ from those observed in Western countries. However, the results also suggest that Japanese individual investors, on average, invest a slightly lower proportion of their total portfolio sustainably. A considerable proportion of individual investors (i.e. about 40%) do not know the share of sustainable investments in their total

portfolio, indicating that many Japanese individual investors disregard ESG criteria when making investment decisions. However, it also implies room for improvements in the presentation and preparation of information on retail investors' portfolios. With respect to the determinants of individual sustainable investments in Japan, sustainable investors tend to be younger, to have rather positive return expectations, and to regularly talk about investments compared to investors with no sustainable investments. The latter finding highlights the relevance of social signaling (e.g. Riedl and Smeets, 2017) or word-of-mouth learning (e.g. Hong et al., 2004). Remarkably, non-financial factors such as personal attitudes and values seem to be less important than in Western countries and individual financial literacy is significantly negatively correlated with being a sustainable investor. This implies that financially literate individual investors in Japan shun sustainable investments, even though they should have lower information and participation costs than persons with a lower financial literacy.

This result nicely connects to our finding that financially literate investors tend to be uncertain about their future sustainable investments, which also applies to women. This suggests a need for more advice and information on sustainable investments (e.g. clear information on how ESG components affect investment performance or how sustainable investments contribute to environmental conservation) to mobilize the large share of potential individual sustainable investors in Japan of about 78% (i.e. all those who do not generally refrain from sustainable investing in the future). To mobilize these investors, practitioners and policymakers can address that the individuals' age, marital status, perception of the relative financial performance of sustainable investments, risk preferences, interpersonal trust, environmental values, ecological political values, and their communication behavior with respect to investments affect their intention to invest sustainably. Therefore, methods to mobilize individual investors should include reduction of information asymmetries and knowledge gaps by providing targeted, transparent, and comprehensible information on the (relative) financial performance or the environmental impact of sustainable investments.

Being the first study considering individual preferences for sustainable investments in Japan, some questions remain. On the one hand, the comparison of our results with those published for Western countries is complicated because these studies often consider slightly different populations, definitions (e.g. for sustainable investments), survey questions, potential determinants, and have been conducted at different points in time. Therefore, a study that allows a simultaneous analysis across countries by applying the same set of methodological approaches is desirable. Such a study

could also analyze the potential underlying channels in more detail. For example, based on our study, it is rarely possible to identify to what extent the significant positive effect of regularly talking about investments can be traced back to social signaling or word-of-mouth learning.

On the other hand, this study analyzes stated preferences data from an online survey. While this approach is rather standard in the field of sustainable investment (e.g. Nilsson, 2008; Gutsche et al., 2019) or general investment behavior (e.g. Choi and Robertson, 2020), it might be prone to several biases, as discussed by, for example, Riedl and Smeets (2017) or Gutsche and Ziegler (2020). Therefore, future studies could apply other approaches such as considering stated choice experiments in the lab (e.g. Nakai et al., 2018a) or in online surveys (e.g. Apostolakis et al., 2018; Bassen et al., 2019; Gutsche and Ziegler, 2019; Brodback et al., 2020). However, most desirable are certainly studies based on the combination of administrative and survey data (e.g. Riedl and Smeets, 2017) or incentivized investment experiments (e.g. Gutsche et al., 2020).

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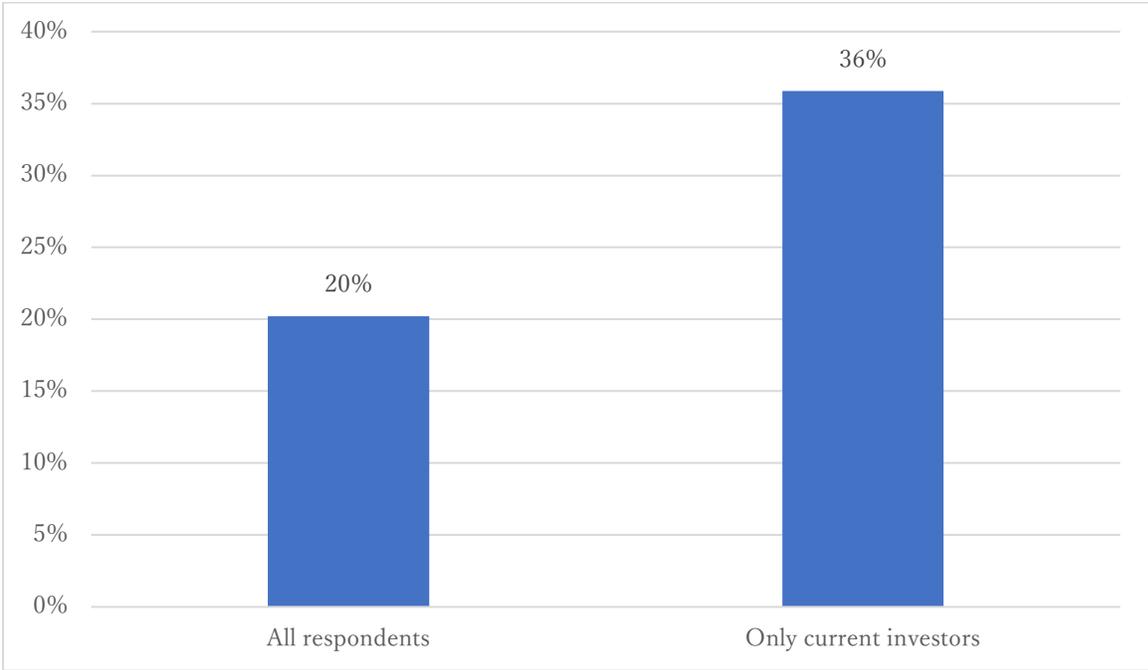
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**Figures**

Figure 1: Awareness of sustainable investments among all respondents and current investors



Note: This figure reports the shares of respondents having heard of sustainable investments among the (sub-) samples of all respondents (N = 2,682) and all current investors (N = 1,143).

## Tables

Table 1: Overview of current financial assets held by respondents

	Stocks	Equity funds	Bonds	Bond funds	Other fixed interest rate assets	Other variable interest rate assets	At least one of these assets
Absolute frequency	846	326	143	75	420	145	1,143
Relative frequency	31.54%	12.16%	5.33%	2.80%	15.66%	5.41%	42.62%

Note: This table reports the absolute and relative frequencies for the financial assets currently held by the 2,682 respondents in the sample. The corresponding survey question can be found in the appendix.

Table 2: Awareness of sustainable investments across individual characteristics

Explanatory variables	All respondents			Current investors		
	All (N = 2,682)	Heard of sustainable investments		All (N = 1,143)	Heard of sustainable investments	
		No (N = 2,140)	Yes (N = 542)		No (N = 733)	Yes (N = 410)
Panel A: Socio-demographic characteristics						
Female	0.52	0.56	0.36	0.45	0.51	0.33
Age	45.65	45.34	46.90	48.13	48.29	47.84
High education	0.53	0.48	0.75	0.64	0.56	0.78
Household net income above median class	0.39	0.35	0.54	0.49	0.44	0.58
Married	0.60	0.60	0.59	0.62	0.62	0.63
Panel B: Indicators for individual financial behavior and expertise						
Financial literacy	1.63	1.48	2.21	2.09	1.96	2.31
Often talk about investments	0.13	0.09	0.27	0.23	0.18	0.33
Panel C: Further individual characteristics, attitudes, and values						
Good health	0.44	0.43	0.48	0.46	0.45	0.47
Risk taking	0.16	0.13	0.30	0.24	0.18	0.34
Patience	0.54	0.53	0.59	0.56	0.55	0.60
Generosity	0.48	0.46	0.56	0.53	0.52	0.55
NEP	53.93	53.73	54.75	54.33	54.12	54.72
Conservative political identification	0.28	0.27	0.34	0.33	0.32	0.36
Liberal political identification	0.19	0.17	0.29	0.27	0.24	0.32
Social political identification	0.10	0.10	0.12	0.12	0.11	0.13
Ecological political identification	0.31	0.29	0.39	0.35	0.33	0.39

Note: This table reports the means of all explanatory variables used in the econometric analysis across the two (sub-)samples of all respondents (N = 2,682) as well as all current investors (N = 1,143). Within these two groups, we further distinguish between persons having heard of sustainable investments and those having not. This allows us to derive some first descriptive insights about the factors affecting individual awareness of sustainable investments within the two (sub-)samples. The underlying survey questions can be found in the appendix.

Table 3: Determinants of individual awareness of sustainable investments

Explanatory variables	Heard of sustainable investments					
	(1)	(2)	(3)	(4)	(5)	(6)
Female	-0.079*** (-5.11)	-0.044*** (-3.06)	-0.039*** (-2.69)	-0.117*** (-4.07)	-0.093*** (-3.27)	-0.080*** (-2.73)
Age	0.002*** (2.93)	-0.001 (1.12)	0.000 (0.31)	0.001 (0.74)	0.001 (1.28)	0.000 (0.43)
High education	0.139*** (9.16)	0.087*** (5.87)	0.084*** (5.72)	0.168*** (5.64)	0.146*** (4.86)	0.135*** (4.48)
Household net income above median class	0.113*** (6.76)	0.066*** (4.24)	0.067*** (4.36)	0.112*** (3.82)	0.100*** (3.49)	0.106*** (3.74)
Married	-0.046*** (-2.71)	-0.041** (-2.53)	-0.037** (-2.30)	-0.023 (-0.75)	-0.024 (-0.80)	-0.017 (-0.54)
Current investor	--	0.157*** (10.85)	0.149*** (10.26)	--	--	--
Financial literacy	--	0.048*** (6.58)	0.044*** (5.81)	--	0.066*** (4.36)	0.060*** (3.92)
Often talk about investments	--	0.109*** (4.65)	0.092*** (3.95)	--	0.143*** (4.29)	0.120*** (3.57)
Risk taking	--	--	0.072*** (3.60)	--	--	0.134*** (3.88)
Patience	--	--	0.005 (0.35)	--	--	0.014 (0.48)
Generosity	--	--	0.002 (0.13)	--	--	-0.039 (-1.32)
NEP	--	--	0.000 (0.42)	--	--	0.001 (0.48)
Conservative political identification	--	--	0.001 (0.04)	--	--	0.016 (0.56)
Liberal political identification	--	--	0.026 (1.37)	--	--	0.055 (1.61)
Social political identification	--	--	-0.026 (-1.17)	--	--	-0.039 (-0.91)
Ecological political identification	--	--	0.044** (2.48)	--	--	0.054 (1.63)
Number of observations		2,682			1,143	

Note: This table reports the estimates (robust z-statistics) of average marginal and discrete probability effects in binary probit models, dependent variable: 'heard of sustainable investments'. \* (\*\*, \*\*\*) means that the corresponding parameter is different from zero at the 10% (5%, 1%) significance level. Whilst we use the data of all respondents in models (1) – (3), we only include the subsample of current investors in models (4) – (6).

Table 4: Overview of shares of sustainable investments in the total portfolios of current investors

Investor group	Frequency	Share of sustainable investments in total portfolio							
		0%	More than 0% to 20%	More than 20% to 40%	More than 40% to 60%	More than 60% to 80%	More than 80% to less than 100%	100%	Don't know
Current investors (N = 1,143)	Absolute	498	126	49	25	13	2	0	430
	Relative (in %)	43.57	11.02	4.29	2.19	1.14	0.17	0.00	37.62
Current investors who have heard sustainable investments (N = 410)	Absolute	202	77	31	15	8	2	0	75
	Relative (in %)	49.27	18.78	7.56	3.66	1.95	0.49	0.00	18.29

Note: This table reports the absolute and relative frequencies for the shares of sustainable investments in the portfolios of all current investors (N = 1,143) as well as those current investors who have already heard of sustainable investments before the survey (N = 410). The corresponding survey questions can be found the in the appendix.

Table 5: Current individual sustainable investments across individual characteristics

Explanatory variables	All current investors			Current investors who have heard of sustainable investments before		
	Share of sustainable investments larger zero			Share of sustainable investments larger zero		
	Yes (N = 215)	No (N = 498)	Don't know (N = 430)	Yes (N = 133)	No (N = 202)	Don't know (N = 75)
Panel A: Socio-demographic characteristics						
Female	0.38	0.37	0.57	0.33	0.29	0.44
Age	45.88	48.44	48.90	46.65	47.68	50.36
High education	0.69	0.68	0.57	0.80	0.78	0.72
Household net income above median class	0.56	0.48	0.47	0.59	0.55	0.65
Married	0.63	0.61	0.64	0.62	0.60	0.72
Panel B: Indicators for individual financial behavior and expertise						
Financial literacy	2.11	2.25	1.89	2.19	2.47	2.12
Often talk about investments	0.43	0.21	0.16	0.47	0.27	0.21
Higher perceived returns sustainable investments	0.17	0.10	0.10	0.21	0.12	0.11
Higher perceived risk sustainable investments	0.21	0.20	0.11	0.20	0.20	0.11
Higher perceived fees sustainable investments	0.28	0.27	0.15	0.32	0.30	0.11
Panel C: Further individual characteristics, attitudes, and values						
Good health	0.51	0.44	0.45	0.50	0.45	0.48
Risk taking	0.37	0.26	0.15	0.46	0.34	0.15
Patience	0.63	0.56	0.54	0.66	0.57	0.56
Generosity	0.63	0.52	0.50	0.65	0.54	0.43
Trust	8.25	7.83	7.94	8.35	7.95	7.87
NEP	53.21	54.99	54.14	53.47	55.12	55.84
Conservative political identification	0.33	0.36	0.30	0.36	0.39	0.27
Liberal political identification	0.30	0.26	0.26	0.37	0.27	0.36
Social political identification	0.16	0.12	0.09	0.17	0.11	0.11
Ecological political identification	0.38	0.35	0.35	0.42	0.34	0.47

Note: This table reports the means of all explanatory variables used in the econometric analysis across the two subsamples of all current investors (N = 1,143) as well as those current investors who have already heard of sustainable investments before the survey (N = 410). Within these two groups, we further distinguish between persons who indicated that the share of sustainable investments in their portfolio is larger than 0%, equal to 0%, or is unknown to them, respectively. The underlying survey questions can be found in the appendix.

Table 6: Determinants of individual sustainable investments

Explanatory variables	Share of sustainable investments larger zero		
	Yes	No	Don't know
Female	-0.010 (-0.396)	-0.100*** (-3.179)	0.110*** (3.718)
Age	-0.002* (-1.729)	0.000 (0.361)	0.001 (1.045)
High education	-0.032 (-1.246)	0.032 (0.972)	0.000 (0.013)
Household net income above median class	0.012 (0.500)	-0.028 (-0.896)	0.016 (0.552)
Married	0.017 (0.639)	-0.030 (-0.907)	0.013 (0.441)
Heard of sustainable investments	0.184*** (6.794)	0.065** (2.036)	-0.249*** (-8.645)
Financial literacy	-0.023* (-1.775)	0.064*** (3.867)	-0.041*** (-2.733)
Often talk about investments	0.126*** (4.375)	-0.073** (-2.065)	-0.053 (-1.583)
Higher perceived returns sustainable investments	0.066* (1.860)	-0.096** (-2.166)	0.029 (0.688)
Higher perceived risk sustainable investments	0.009 (0.301)	0.102** (2.292)	-0.111*** (-2.741)
Higher perceived fees sustainable investments	0.021 (0.711)	0.069* (1.710)	-0.090** (-2.439)
Good health	0.012 (0.546)	-0.014 (-0.484)	0.002 (0.083)
Risk taking	0.052** (1.962)	0.023 (0.622)	-0.074** (-2.195)
Patience	0.009 (0.346)	-0.004 (-0.134)	-0.004 (-0.144)
Generosity	0.042* (1.690)	-0.025 (-0.771)	-0.017 (-0.563)
Trust	0.007 (1.345)	-0.009 (-1.247)	0.001 (0.225)
NEP	-0.003* (-1.775)	0.005** (2.328)	-0.002 (-1.074)
Conservative political orientation	-0.035 (-1.494)	0.041 (1.333)	-0.007 (-0.228)
Liberal political orientation	-0.011 (-0.392)	-0.030 (-0.848)	0.041 (1.182)
Social political orientation	0.029 (0.785)	0.036 (0.745)	-0.065 (-1.477)
Ecological political orientation	0.023 (0.911)	-0.029 (-0.826)	0.005 (0.158)
Number of observations		1,143	

Note: This table reports the estimates (robust z-statistics) of average marginal and discrete probability effects in a multinomial logit model, dependent variable: 'share of sustainable investments larger zero'. \* (\*\*, \*\*\*) means that the corresponding parameter is different from zero at the 10% (5%, 1%) significance level, respectively.

Table 7: Overview of current and intended future individual sustainable investments

		Intention to invest in sustainable investments			Absolute frequencies (relative frequency in %)
		Yes	No	Don't know	
Share of sustainable investments larger zero	Yes	115 <sup>A</sup> (10.06%)	20 <sup>B</sup> (1.75%)	80 (7.00%)	215 (18.81%)
	No	100 <sup>C</sup> (8.75 %)	153 <sup>D</sup> (13.39%)	245 (21.43%)	498 (43.57%)
	Don't know	43 (3.76%)	74 (6.47%)	313 (27.38%)	430 (37.62%)
Absolute frequencies (relative frequency in %)		258 (22.57 %)	247 (21.61%)	638 (55.82%)	1,143 (100 %)

Note: This contingency table reports the absolute and relative (in %) frequencies for the variables 'share of sustainable investments larger zero' and 'intention to invest in sustainable investments' based on the subsample of all current investors (N = 1,143). The underlying survey questions can be found in the appendix. For further comparison, a similar overview can be found in Gutsche and Zwergel (2020) based on a sample of financial decision makers in German households. Therein, Gutsche and Zwergel (2020) distinguish between "sustainable investors" (here group A), "skeptical investors" (here group B), "interested investors" (here group C), and "conventional investors" (here group D).

Table 8: Determinants of individual intention to invest in sustainable investments

Explanatory variables	Intention to invest in sustainable investments		
	Yes	No	Don't know
Female	-0.033 (-1.403)	-0.040 (-1.618)	0.073** (2.404)
Age	-0.005*** (-5.273)	0.003*** (3.270)	0.001 (1.238)
High education	-0.002 (-0.065)	0.005 (0.183)	-0.003 (-0.098)
Household net income above median class	0.006 (0.262)	-0.033 (-1.317)	0.027 (0.910)
Married	0.047** (2.014)	-0.000 (-0.009)	-0.047 (-1.486)
Heard of sustainable investments	0.193*** (7.038)	-0.064** (-2.463)	-0.129*** (-3.948)
Currently not invested in sustainable investments	0.041 (1.516)	0.140*** (5.273)	-0.181*** (-5.460)
Currently invested in sustainable investments	0.235*** (6.132)	-0.044 (-1.371)	-0.191*** (-4.356)
Financial literacy	0.009 (0.719)	-0.046*** (-3.515)	0.037** (2.332)
Often talk about investments	0.114*** (4.077)	-0.072*** (-2.712)	-0.042 (-1.241)
Higher perceived returns sustainable investments	0.062* (1.811)	-0.044 (-1.227)	-0.018 (-0.409)
Higher perceived risk sustainable investments	-0.057** (-1.975)	0.078** (1.995)	-0.021 (-0.497)
Higher perceived fees sustainable investments	0.049 (1.628)	0.076** (2.151)	-0.125*** (-3.172)
Good health	0.012 (0.541)	-0.004 (-0.160)	-0.008 (-0.296)
Risk taking	0.050* (1.911)	0.011 (0.373)	-0.061* (-1.768)
Patience	0.022 (0.923)	0.014 (0.536)	-0.036 (-1.159)
Generosity	-0.040 (-1.598)	0.017 (0.671)	0.023 (0.740)
Trust	0.014*** (2.732)	-0.009 (-1.639)	-0.005 (-0.685)
NEP	0.003* (1.901)	-0.003* (-1.894)	0.000 (0.174)
Conservative political orientation	-0.027 (-1.204)	0.015 (0.613)	0.011 (0.391)
Liberal political orientation	-0.017 (-0.676)	0.018 (0.646)	-0.002 (-0.051)
Social political orientation	0.021 (0.627)	-0.063* (-1.651)	0.042 (0.960)
Ecological political orientation	0.106*** (3.670)	-0.027 (-0.993)	-0.078** (-2.269)
Number of observations	1,143		

Note: This table reports the estimates (robust z-statistics) of average marginal and discrete probability effects in a multinomial logit model, dependent variable: 'intention to invest in sustainable investments'. \* (\*\*, \*\*\*) means that the corresponding parameter is different from zero at the 10% (5%, 1%) significance level, respectively.

**Appendix:**  
**Survey questions for variables used in the empirical analysis (translated into English)**

*(i) Screening questions*

*Question for variable 'age' and for guaranteeing the representativeness of our sample:*

Please enter your age:

\_\_\_\_\_ years

*Question for variable 'female' and for guaranteeing the representativeness of our sample:*

Please enter your gender:

- Male
- Female
- Other

*Question for guaranteeing the representativeness of our sample:*

Please indicate your zip code of your main residence.

If you live more than one residents, please indicate the zip code of your main residence.

Zip code: \_\_\_\_\_

*Screening question to identify financial decision makers in Japanese households:*

Please indicate which of the following statements applies to your household when it comes to large expenditures like buying a new fridge or car, or the choice of a new electricity contract.

- I decide alone
- I decide together with other household members
- I don't decide, but someone else (e.g. landlord)

***(ii) Individual attitudes, traits, and values***

First, we would like to ask you some questions about your attitudes, your personality and individual preferences.

*The following 15 items are relevant to construct the index variable 'NEP':*

Listed below are statements about the relationship between humans and the environment. Please indicate to what extent you agree with the following statements:

Statement	Totally disagree	Rather disagree	Undecided	Rather agree	Totally agree
We are approaching the limit of the number of people the earth can support.	<input type="checkbox"/>				
Humans have the right to modify the natural environment to suit their needs.	<input type="checkbox"/>				
When humans interfere with nature it often produces disastrous consequences.	<input type="checkbox"/>				
Human ingenuity will insure that we do NOT make the earth unlivable.	<input type="checkbox"/>				
Humans are severely abusing the environment.	<input type="checkbox"/>				
The earth has plenty of natural resources if we just learn how to develop them.	<input type="checkbox"/>				
Plants and animals have as much right as humans to exist.	<input type="checkbox"/>				
The balance of nature is strong enough to cope with the impacts of modern industrial nations.	<input type="checkbox"/>				
Despite our special abilities humans are still subject to the laws of nature.	<input type="checkbox"/>				
The so-called "ecological crisis" facing humankind has been greatly exaggerated.	<input type="checkbox"/>				
The earth is like a spaceship with very limited room and resources.	<input type="checkbox"/>				
Humans were meant to rule over the rest of nature.	<input type="checkbox"/>				
The balance of nature is very delicate and easily upset.	<input type="checkbox"/>				
Humans will eventually learn enough about how nature works to be able to control it.	<input type="checkbox"/>				
If things continue on their present course, we will soon experience a major ecological catastrophe.	<input type="checkbox"/>				
Please select 'rather agree'.	<input type="checkbox"/>				

Statements one to three, four to six, and seven to nine are items to construct the index variables 'trust', 'positive reciprocity', and 'negative reciprocity', respectively:

Listed below are statements about the relationship between humans. Please indicate to what extent you agree with the following statements:

Statement	Totally disagree	Rather disagree	Undecided	Rather agree	Totally agree
In general, one can trust people.	<input type="checkbox"/>				
These days you cannot rely on anybody else.	<input type="checkbox"/>				
When dealing with strangers, it is better to be careful before you trust them.	<input type="checkbox"/>				
If someone does me a favor, I am prepared to return it.	<input type="checkbox"/>				
I am ready to undergo personal costs to help somebody who helped me before.	<input type="checkbox"/>				
I go out of my way to help somebody who has been kind to me before.	<input type="checkbox"/>				
If I suffer a serious wrong, I will take revenge as soon as possible, no matter what the cost.	<input type="checkbox"/>				
If somebody puts me in a difficult position, I will do the same to him/her.	<input type="checkbox"/>				
If somebody insults me, I will insult him/her back.	<input type="checkbox"/>				

Question for variable 'good health':

How do you describe your current health status?

Very bad	Rather bad	Neither good nor bad	Rather good	Very good
<input type="checkbox"/>				

Question for variable 'risk taking':

How willing are you generally to take risks?

Not at all willing to take risks	Rather not willing to take risks	Undecided	Rather willing to take risks	Very willing to take risks
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

*Question for variable 'generosity':*

How generous are you in general?

Not at all generous	Rather not generous	Undecided	Rather generous	Very generous
<input type="checkbox"/>				

*Question for variable 'patience':*

How patient are you in general?

Very impatient	Rather impatient	Undecided	Rather patient	Very patient
<input type="checkbox"/>				

*The variables 'openness to experiences', 'conscientiousness', 'extraversion', 'agreeableness', and 'emotional stability' are based on the following questions:*

Below are different qualities that a person can have. You will probably find that some apply to you perfectly and that some do not apply to you at all. With others, you may be somewhere in between. Please indicate to what extent you agree with the following statements.

Statement	Totally disagree	Rather disagree	Undecided	Rather agree	Totally agree
I see myself as someone who is original, comes up with new ideas.	<input type="checkbox"/>				
I see myself as someone who values artistic, aesthetic experiences.	<input type="checkbox"/>				
I see myself as someone who has an active imagination.	<input type="checkbox"/>				
I see myself as someone who is eager for knowledge.	<input type="checkbox"/>				
I see myself as someone who does a thorough job.	<input type="checkbox"/>				
I see myself as someone who tends to be lazy.	<input type="checkbox"/>				
I see myself as someone who does things effectively and efficiently.	<input type="checkbox"/>				
I see myself as someone who is communicative, talkative.	<input type="checkbox"/>				
I see myself as someone who is outgoing, sociable.	<input type="checkbox"/>				
I see myself as someone who is reserved.	<input type="checkbox"/>				

I see myself as someone who is sometimes somewhat rude to others.	<input type="checkbox"/>				
I see myself as someone who has a forgiving nature.	<input type="checkbox"/>				
I see myself as someone who is considerate and kind to others.	<input type="checkbox"/>				
I see myself as someone who worries a lot.	<input type="checkbox"/>				
I see myself as someone who gets nervous easily.	<input type="checkbox"/>				
I see myself as someone who is relaxed, handles stress well.	<input type="checkbox"/>				
Please select 'totally disagree'.	<input type="checkbox"/>				

*The following four items are relevant for the variables 'conservative political identification', 'liberal political identification', 'social political identification', and 'ecological political identification':*

Please indicate to what extent you agree with the following statements about political orientation:

Statement	Totally disagree	Rather disagree	Undecided	Rather agree	Totally agree
I identify myself with conservatively oriented policy	<input type="checkbox"/>				
I identify myself with liberally oriented policy.	<input type="checkbox"/>				
I identify myself with socially oriented policy.	<input type="checkbox"/>				
I identify myself with ecologically oriented policy.	<input type="checkbox"/>				

***(iii) General and sustainable investment behavior***

*The following questions are to identify the current investors:*

Please indicate which of the following financial assets you currently own.

- Stocks
- Equity funds (including ETF, index funds)
- Bonds
- Bond funds
- Other fixed interest rate assets (e.g. mortgage bonds, government bond and time deposit)
- Other variable interest rate assets (e.g. open-ended funds, REIT, closed-ended funds)
- I own none of them above.

*Questions for variables ‘often talk about investments’ and ‘good knowledge:’*

Please indicate to what extent you agree with the following statements:

	Totally disagree	Rather disagree	Undecided	Rather agree	Totally agree
I often talk to others about investments.	<input type="checkbox"/>				
I have good knowledge in the field of financial investments.	<input type="checkbox"/>				

The following section deals with sustainable investments. Sustainable investment, also known as ESG investment, means the investment method which incorporates environment, social and/or governance criteria in addition to financial criteria.

*Questions for variables ‘heard of sustainable investments’:*

Have you ever heard of sustainable investments before this survey?

- Yes
- No

*Questions to construct the variable 'share of sustainable investments larger zero':*

What is the current share of sustainable investments in the total of all your investments?

0%	More than 0% to 20%	More than 20% to 40%	More than 40% to 60%	More than 60% to 80%	More than 80% to less than 100%	100%	Don't know
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					

*Questions used to construct the variable 'intention to invest in sustainable investments':*

Do you want to invest in sustainable investments in the future?

- Yes, I want to invest sustainable investment in the future. *(Only those respondents who answered "0%" and "Don't know" in the previous question.)*
- Yes, I want to keep investing sustainable investment in the future, too. *(Only those respondents who did not answer "0%" and "Don't know" in the previous question.)*
- No
- Do not know

*Question for variable 'higher perceived returns sustainable investments':*

How do you expect the return of sustainable investments compared to conventional investments?

Much lower	Rather lower	Neither lower or higher	Rather higher	Much higher
<input type="checkbox"/>				

*Question for variable 'higher perceived risk sustainable investments' and 'higher perceived fees sustainable investments', respectively:*

Please indicate to what extent you agree with the following statements:

	Totally disagree	Rather disagree	Undecided	Rather agree	Totally agree
Sustainable investments are riskier than conventional investments.	<input type="checkbox"/>				
Sustainable investments have higher fees than conventional investments	<input type="checkbox"/>				

*The variable 'financial literacy' is based on the following statements:*

Imagine you have 10,000 JPY on a savings account and the interest rate is 2% per year. Please give your estimate of how much money you would have on the savings account after five years if you never withdraw money or interest payments during this time.

Less than 10,200 JPY	Exactly 10,200 JPY	More than 10,200 JPY	Don't know
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Imagine that the interest rate on your savings account is 1% per year and inflation is 2% per year. Please give your estimate of how much you could spend the money in your savings account after one year.

Less than today	Exactly the same	More than today	Don't know
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please state your opinion as to whether the following statement is true or false: "The purchase of an individual share usually has a more secure return than an equity fund".

True	False	Don't know
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

***(iv) Socio-demographic characteristics***

Finally, please answer a few questions about yourself again.

*Question for variable 'high education' is derived on the basis of the following question:*

What is your highest school degree?

- Junior high school
- High school
- Vocational college
- College (2 year)
- Technical school
- Bachelor Degree
- Master or Doctoral degree
- Other degree, namely \_\_\_\_\_

*Question for variable 'household net income above median class' derived on the basis of the following question:*

What is your annual household income? Please refer to the current annual net income that is after deduction of taxes. Please make sure to include pensions and child allowance

- Less than 1 million JPY
- 1 million JPY– less than 2 million JPY
- 2 million JPY – less than 3 million JPY
- 3 million JPY – less than 4 million JPY
- 4 million JPY – less than 5 million JPY
- 5 million JPY – less than 6 million JPY
- 6 million JPY – less than 7 million JPY
- 7 million JPY – less than 8 million JPY
- 8 million JPY – less than 9 million JPY
- 9 million JPY – less than 10 million JPY
- 10 million JPY – less than 15 million JPY
- 15 million JPY and more

*Question for variable 'married':*

Are you married?

- No (including unmarried, divorced, etc.)
- Yes