Online Appendix for

Ambiguity Attitudes about Investments: Evidence from the Field

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Online Appendix A. Experimental Design and Instructions

The DHS survey module started with questions about financial literacy (see Online Appendix B) and investing, followed by choice lists for measuring risk and ambiguity attitudes. The introduction text for the risk and ambiguity questions was as follows:

INTRODUCTION
In the next few questions you will be asked several times to make a choice between Option A and Option B. After completing the survey, one of the questions you answered will be selected randomly by the computer, and your winnings will be based on the choices you have made. You could win between 0 and 15 euro, in addition to your payment for answering the survey.

The order of the risk and ambiguity choice lists was randomized, with some respondents receiving the risk questions first, and others the ambiguity questions. Two of the choice lists for eliciting risk aversion, with their instructions, are shown in Figure A1 and A2 as an example. In total there were four choice lists for risk, with chances of winning of 50%, 33%, 17%, and 83%. The order of the risk choice lists was randomized.

Two of the ambiguity choice lists for the AEX stock market index, with their instructions, are shown in Figure 1 and 2 of the main text. In total there were 24 choice lists for ambiguity, namely six choice lists each for four different investments (AEX, MSCI, familiar stock and Bitcoin), as explained in Section 2. The order of the four investments was randomized, as well as the order of the six events for each investment. The 24 ambiguity choice lists were always preceded by one practice question about the temperature in Amsterdam, shown in Figure A3.

Figure A1: First Choice List for Eliciting Risk Attitudes

In this question you can win a prize depending on the result of a random coin toss **.**There is a 50% chance that the coin will come up heads and a 50% chance it will come up tails. For each of the 18 rows below, please choose whether you prefer Option A or Option B**.**

Option A*:* pays off €15 if the coin comes up head (50% chance)

Option B*:* A certain pay off with the amount increasing down the rows of the table.
For example, in row 1 the pay off is €0.00, in row 2 the pay off is €1.00, etc., until in row 18 the pay off is €15.00.

Please indicate whether you prefer Option A or Option B.
You do not have to make a choice in all of the 18 rows. If you select Option B in one particular row, then your choice in all following rows will automatically be set at Option B as well, and in all previous rows at Option A.

So you only have to select from which row onwards you prefer Option B.
It is also possible that you prefer Option A for every row. In that case if you select Option A in the last row, then your choice in all previous rows will automatically be set at Option A as well.

Option A You win €15 if the coin comes up heads (and nothing otherwise)	A	B	**Option B** You win the following amount with certainty.
Heads (50% chance): You win €15. Tails (50% chance): You win nothing.	X		A certain pay off of €0.00
	X		A certain pay off of €1.00
	X		A certain pay off of €2.00
	X		A certain pay off of €3.00
	X		A certain pay off of €4.00
	X		A certain pay off of €4.50
	X		A certain pay off of €5.00
	X		A certain pay off of €5.50
	X		A certain pay off of €6.00
	X		A certain pay off of €6.50
		X	A certain pay off of €7.00
		X	A certain pay off of €7.50
		X	A certain pay off of €8.00
		X	A certain pay off of €9.00
		X	A certain pay off of €10.00
		X	A certain pay off of €11.00
		X	A certain pay off of €12.50
		X	A certain pay off of €15.00

Figure A2: Second Choice List for Eliciting Risk Attitudes

In this question you can win a prize depending on the result of a role of a dice with 6 sides, numbered from 1 to 6, with each number equally likely. For each of the 18 rows below, please choose whether you prefer Option A or Option B**.**

Option A*:* pays off €15 if the dice comes up at number 1 or 2 (33% chance)

Option B*:* A certain pay off with the amount increasing down the rows of the table.
For example, in row 1 the pay off is €0.00, in row 2 the pay off is €1.00, etc., until in row 18 the pay off is €15.00.

From which row onwards do yo prefer Option B?

Option A You win €15 if the role of the dice comes up as 1 or 2 (and nothing otherwise)	A	B	**Option B** You win the following amount with certainty.
For 1 or 2 (33% chance): You win €15. For 3, 4, 5, or 6 (67% chance): You win nothing.	X		A certain pay off of €0.00
	X		A certain pay off of €1.00
	X		A certain pay off of €2.00
	X		A certain pay off of €3.00
	X		A certain pay off of €4.00
	X		A certain pay off of €4.50
	X		A certain pay off of €5.00
	X		A certain pay off of €5.50
		X	A certain pay off of €6.00
		X	A certain pay off of €6.50
		X	A certain pay off of €7.00
		X	A certain pay off of €7.50
		X	A certain pay off of €8.00
		X	A certain pay off of €9.00
		X	A certain pay off of €10.00
		X	A certain pay off of €11.00
		X	A certain pay off of €12.50
		X	A certain pay off of €15.00

Figure A3: Ambiguity Practice Question

For each of the 15 rows below, please choose whether you prefer Option A or Option B.

Option A: pays off 15 euro if the temperature in Amsterdam 1 month from now at 3 p.m. is *more than 20 degrees Celsius.*

Option B: pays off 15 euro with a given chance, with the chance increasing down the rows of the table. For example, in row 1 the chance is 0%, in row 2 the chance is 2.5%, etc., until in row 15 the chance is 100%.

Note: any amount you win will be paid after one month, both for Option A and Option B.

Please indicate whether you prefer Option A or Option B.

You do not have to make a choice in all of the 15 rows. If you select Option B in one particular row, then your choice in all following rows will automatically be set at Option B as well, and in all previous rows at Option A. So you only have to select from which row onwards you prefer Option B. It is also possible that you prefer Option A for every row. In that case if you select Option A in the last row, then your choice in all previous rows will automatically be set at Option A as well

Option A You win €15 if the temperature in Amsterdam 1 month from now at 3pm is *more than 20 degree Celsius* (and nothing otherwise)	A	B	**Option B** You win €15 in one month time with the following chance (and nothing otherwise)
A: Win €15 if the temperature in Amsterdam 1 month from now at 3pm is *more than 20 degree Celsius* (and nothing otherwise)	X		B: Win €15 with chance of 0%
	X		B: Win €15 with chance of 2.5%
	X		B: Win €15 with chance of 5%
	X		B: Win €15 with chance of 10%
	X		B: Win €15 with chance of 20%
	X		B: Win €15 with chance of 30%
	X		B: Win €15 with chance of 40%
	X		B: Win €15 with chance of 50%
		X	B: Win €15 with chance of 60%
		X	B: Win €15 with chance of 70%
		X	B: Win €15 with chance of 80%
		X	B: Win €15 with chance of 90%
		X	B: Win €15 with chance of 95%
		X	B: Win €15 with chance of 97.5%
		X	B: Win €15 with chance of 100%

Online Appendix B. Risk Aversion and Financial Literacy

Section B.1 defines the risk aversion measures that are used as control variables in the main text, and discusses alternative measures as a robustness check. Section B.2 lists the financial literacy questions in the DHS survey, used to create measures of basic and advanced financial literacy.

B.1 Risk Aversion Measures

The DHS module included four choice lists to measure risk attitudes (two screenshots are shown in Online Appendix A, Figure A1 and A2). The first risk attitude choice list in Figure A1 elicited a certainty equivalent for a known 50% chance of winning €15, based on a fair coin toss. The other three choice lists elicited certainty equivalents for chances of winning of 33%, 17%, and 83%, respectively, using the throw of a die. Respondents could win real money for the risk questions, and the order of the risk and ambiguity question sets in the survey was randomized. Table B1 shows summary statistics of the respondents' risk premiums for the four questions. The mean risk premiums in Table B1 display risk aversion for moderate and high probabilities (50%, 87%), and risk seeking for low probabilities (17%, 33%), in line with common findings in the literature (see Fehr-Duda and Epper, 2011).

Table B1: Risk Premiums

The table shows summary statistics of the investors' risk premiums for the four risk questions. The choice lists elicited a certainty equivalent for a chance of winning a prize of €15 of 50%, 33%, 17% and 88%, respectively. A positive (negative) risk premium indicates that the respondent is risk averse (risk seeking), as his certainty equivalent for the risky prospect was below (above) the expected value of the prospect.

	Mean	Median	St dev	Min	Max
Risk premiums					
Question 1: chance of winning 50%	0.08	0.03	0.59	-1.00	1.00
Question 2: chance of winning 33%	-0.13	-0.05	0.77	-2.00	1.00
Question 3: chance of winning 17%	-0.77	-0.40	1.60	-5.00	1.00
Question 4: chance of winning 87%	0.32	0.24	0.41	-0.20	1.00

Following Abdellaoui et al. (2011), we estimate index *b* for risk as a measure of *Risk Aversion* and index *a* for risk as a measure of *Inverse-S* probability weighting. The underlying assumptions are as follows: risk preferences are modelled with a rank-dependent utility model, using a neo-additive probability weighting function and a linear utility function.

In a rank-dependent utility model with utility function U and probability weighting function w, indifference between the sure amount CE_k and winning €15 with chance p_k implies:

(B1) $U(CE_k) = w(p_k)U(15) + \big(1 - w(p_k)\big)U(0)$, for risk question $k = 1, 2, 3, 4$.

As utility curvature is often close to linear for small amounts and risk aversion can be modelled with the probability weighting function w, we assume U is linear with $U(x) = x$:

(B2) $CE_k = w(p_k)15$

The probability weighting function is of the neo-additive type as in Chateauneuf et al. (2007):

(B3) $w(p) = c + sp$ for $0 < p < 1$, with $w(0) = 0$ and $w(1) = 1$.

The expression for the certainty equivalent in Equation (B2) now reduces to:

(B4) $\frac{CE_k}{15} = c + sp_k$

The unknown parameters c and s in Equation (B4) are estimated with ordinary least squares, for each respondent separately, using the four certainty equivalents. Following Abdellaoui et al. (2011), index *b* and *a* for risk are then defined as follows, as functions of c and s:

(B5) *Risk Aversion* = index b for risk $= 1 - s - 2c$,

(B6) *Inverse-S* = index a for risk $= 1 - s$.

The *Risk Aversion* measure captures the tendency to underweight all probabilities (pessimism). The *Inverse-S* measure captures the tendency to overweight extreme good and bad events that occur with small known probabilities. See Figure 2 in Abdellaoui et al. (2011) for a graphic illustration of these measures. The risk attitude measures above have the advantage that they are conceptually related to index *b* for ambiguity aversion and index *a* for perceived ambiguity, while having an axiomatic foundation in the rank-dependent utility model with a neo-additive probability weighting function, see Cohen (1992), Chateauneuf et al. (2007), and Abdellaoui et al. (2011).

As a robustness check, we have also estimated two alternative, non-parametric, measures of risk attitudes. First, *Alt. Risk Aversion* is the average of the risk premiums for the two risk questions with 50% and 33% chance of winning. *Alt. Inverse-S* is defined as the difference in the risk premiums for the two questions with 83% and 17% chance of winning, similar to Dimmock, Kouwenberg, Mitchell, and Peijnenburg (2018). Table B2 shows the correlations between these alternative measures and the risk measures used for the main paper. *Alt. Risk Aversion* has a strong correlation of $r = 0.9$ with *Risk Aversion*, implying that the two measures are highly similar. In addition, *Alt. Inverse-S* has a correlation of $r = 0.6$ with *Inverse-S*.

All results reported in the main text are qualitatively similar when using *Alt. Risk Aversion* and *Alt. Inverse-S* as the control variables for risk attitudes in Table 3 and Table 4. For example, Table B3 shows the same analyses as Table 3 in the main text, but using the alternative risk attitude measures. The main difference is that the alternative measure of Inverse-S probability weighting has a weaker correlation with perceived ambiguity, likely because it also partially captures risk seeking attitudes (the correlation of *Alt. Risk Aversion* and *Alt Inverse-S* is -0.5).

Table B2: Correlations of Alternative Risk Attitude Measures

The table shows correlations between the main risk attitude measures, *Risk Aversion* (index *b* for risk) and *Inverse-S* (index *a* for risk), and two alternative non-parametric measures: *Alt. Risk Aversion* and *Alt. Inverse-S*, defined above. The sample consists of $n = 289$ investors.

	(1) *Risk Aversion*	(2) *Alt. Risk Aversion*	(3) *Inverse-S*	(4) *Alt. Inverse-S*
Risk Aversion	1.00			
Alt. Risk Aversion	0.90***	1.00		
Inverse-S	0.28***	0.02	1.00	
Alt. Inverse-S	-0.52***	-0.51***	0.58***	1.00

Table B3: Factors Associated with Ambiguity Attitudes

Panel A shows correlations of ambiguity aversion (*b_avg*) and perceived ambiguity (*a_avg*) with financial literacy, education, and the alternative measures of risk aversion and Inverse-S. Panel B shows standardized beta coefficients from regression models of ambiguity aversion and perceived ambiguity regarding financial sources. In Column (1), the dependent variable is *b_avg*, the index of ambiguity aversion averaged over the four financial sources (*aex, stock, msci* and *bitcoin*). In Column (2), the dependent variable is *a_avg*, the index of perceived ambiguity averaged over the four financial sources (*aex, stock, msci* and *bitcoin*). In Panel B, the controls are financial literacy (total score), education, the alternative risk aversion and Inverse-S measures, age, gender, single, an indicator for employment, the logarithm of the number of children living at home, family income, and household financial wealth, plus a control for missing wealth. The sample consists of $n = 289$ investors. *, **, *** denote significant coefficients at the 10%, 5% and 1% level.

Panel A: Correlations with Financial Literacy, Education and Risk Attitudes

	(1) Ambiguity Aversion *b_avg*	(2) Perceived Ambiguity *a_avg*
Financial Literacy	-0.09	-0.21***
Education	-0.10*	-0.27***
Alt. Risk Aversion	0.49***	-0.01
Alt. Inverse-S	-0.27***	0.13**

Panel B: Multiple Regression Models

	(1) Ambiguity Aversion *b_avg*	(2) Perceived Ambiguity *a_avg*
Financial Literacy	-0.058	-0.132***
Education	-0.062	-0.210***
Alt. Risk Aversion	0.427***	0.027
Alt. Inverse-S	-0.082	0.105
Age	0.125*	0.120
Female	0.042	-0.057
Single	-0.081	-0.070
Employed	-0.052	-0.025
Number of kids (log)	0.038	0.011
Family Income (log)	0.043	-0.103**
Financial Wealth (log)	-0.056	0.066
R^2	0.293	0.142
N	289	289

B.2 Financial Literacy Questions

The financial literacy questions are taken from Lusardi and Mitchell (2007) and Van Rooij, Lusardi, and Alessie (2011). Responses to the financial literacy questions were provided by the DHS (Centerdata), collected in a 2017 survey. For respondents with missing financial literacy data, these questions were included in our own DHS survey module.

The questions were preceded by the following instructions: *"The following 12 questions are about financial knowledge and investments. Please do not look up information and do not use a calculator. Your initial thought matters."* Apart from the possible answers shown below each question, respondents could also choose "I do not know" and "Refuse to answer" as a response.

FL1: Suppose you had 100 euro in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?

1. *More than 102 euro*
2. *Exactly 102 euro*
3. *Less than 102 euro*

FL2: Assume a friend inherits euro 10,000 today and his sibling inherits 10,000 euro 3 years from now. Who is richer because of the inheritance?

1. *My friend*
2. *His sibling*
3. *They are equally rich*

FL3: Suppose that in the year 2018, your income has doubled and prices of all goods have doubled too. In 2018, how much will you be able to buy with your income?

1. *More than today*
2. *The same*
3. *Less than today*

FL4: Suppose that you have 100 euro in a savings account and the interest is 20% per year, and you never withdraw the money or interest. How much do you have on the account after 5 years?

1. *More than 200 euro*
2. *Exactly 200 euro*
3. *Less than 200 euro*

FL5: Suppose the interest on your savings account is 1% per year and the inflation is 2% per year. After 1 year, can you buy more, exactly the same, or less than today with the money on the account?

1. *More than today*
2. *Exactly the same as today*
3. *Less than today*

FL6: Is the following statement true, or not true?
"A company stock usually provides a less risky return than an equity mutual fund."

1. *True*
2. *Not true*

FL7: Which of the following statements describes the main function of the stock market?

1. *The stock market helps to predict stock earnings*
2. *The stock market results in an increase in the price of stocks*
3. *The stock market brings people who want to buy stocks together with those who want to sell stocks*
4. *None of the above*

FL8: Which of the following statements is correct? If somebody buys the stock of firm B in the stock market:

1. *He owns a part of firm B*
2. *He has lent money to firm B*
3. *He is liable for firm B's debts*
4. *None of the above*

FL9: Which of the following statements is correct?

1. *If one invests in a mutual fund, one cannot withdraw the money in the first year*
2. *Mutual funds can invest in several assets, for example invest in both stocks and bonds*
3. *Mutual funds pay a guaranteed rate of return which depends on their past performance*
4. *None of the above*

FL10: Normally, which asset displays the highest fluctuations over time: a savings account, bonds or stocks?

1. *Savings accounts*
2. *Bonds*
3. *Stocks*

FL11: When an investor spreads his money among different assets, does the risk of losing money: increase, decrease, or stay the same?

1. *Increase*
2. *Decrease*
3. *Stay the same*

FL12: Is the following statement true, or not true? 'Stocks are normally riskier than bonds.'

1. *Yes*
2. *No*

Online Appendix C. Robustness Checks

Section C.1 first summarizes the main results of the paper after screening out investors who violate monotonicity conditions, or who make several mistakes on the ambiguity questions. Then Section C.2 summarizes the results for a separate group, non-investors, who are not included in the main paper. In sum, the results are similar to the findings presented in the body of the main paper.

C.1 Excluding investors who make errors on the ambiguity questions

As a robustness check, we exclude 109 investors who violate the monotonicity condition (*a_avg* > 1) or who make more than three errors on any ambiguity question set of 6 choice lists. Respondents could make two errors on each choice list: always choosing Option A, or always choosing Option B. There are 180 investors left (62.3%) in this restricted sample of respondents with more consistent responses to the ambiguity questions.

The proportion of ambiguity averse, neutral, and seeking respondents are 63%, 4%, 33%, respectively, based on *b_avg*. These proportions are not significantly different from the full sample (66%, 4%, 30%), illustrating that ambiguity averse and ambiguity seeking attitudes are not driven by respondents making errors on the choice lists. Table C1 shows summary statistics for the ambiguity attitude measures (n = 180; restricted sample). In the restricted sample, the mean level of ambiguity aversion and perceived ambiguity are lower at 0.13 and 0.69, compared to 0.18 and 0.80 in the full sample, arguably because investors making less errors on the ambiguity questions have less extreme measurements.

Table C2 shows correlation of the ambiguity attitude measures. In the restricted sample, ambiguity aversion is still driven by a single factor explaining 77% of the variation, with Cronbach's alpha of 0.90. The means of the *b*-indexes are not significantly different (T^2 = 5.35, p = 0.156). Perceived ambiguity still differs between sources, even for the same individual: the first factor can explain 29% of the variation, with Cronbach's alpha of 0.14. The means of the a-indexes are significantly different (T^2 = 14.16, p = 0.004).

In the multiple regression models explaining ambiguity attitudes, shown in Table C3, risk aversion is the only significant driver of ambiguity aversion in the restricted sample (R^2 = 23%). Further, when explaining perceived ambiguity, the betas of financial literacy, education, Inverse-S, and income are now all significant at the 1% level, with higher effect sizes than before (R^2 = 35%).

When explaining investment in the familiar stock, the results in Table C4 for the restricted sample are similar to the full sample: perceived ambiguity is significant at the 5% level without controls, but insignificant with controls. When explaining investment in crypto-currencies, *a_bitcoin* is no longer significant, but *b_avg* is still significant at the 1% level without controls (but insignificant with controls).

C.2 Results for non-investors

Our survey was also given to a random sample of 304 non-investors, with 225 complete and valid responses (74%). Compared to the investors, the non-investors are younger, less educated, more often female, have less financial wealth, and lower financial literacy.

The proportion of ambiguity averse, neutral, and seeking non-investors are 69%, 5%, 26% based on *b_avg*, which is not significantly different from the investor group (66%, 4%, 30%). Table C5 displays summary statistics of the ambiguity attitudes for the non-investor group. Additional tests show that the mean of ambiguity aversion (*b_avg*) is not different between the groups of investors and non-investors (0.18 vs. 0.20, p = 0.63). However, the average level of perceived ambiguity (*a_avg*) is higher for non-investors (0.88 vs. 0.80, p = 0.01), as expected. Hence, ambiguity preferences toward financial assets are not significantly different between investors and non-investors on average, but the level of perceived ambiguity is.

Among non-investors, ambiguity aversion is driven by a single factor explaining 83% of the variation, with Cronbach's alpha of 0.93. The means of the *b*-indexes are not significantly different (T^2 = 6.21, p = 0.11). Perceived ambiguity does vary between sources for the same individual: the first factor can explain only 40% of the variation in the a-indexes, with Cronbach's alpha of 0.49. These results are similar to the investor group. The only difference is that among non-investors the mean of perceived ambiguity (*a*-indexes) for the four financial assets is not significantly different (T^2 = 4.43, p = 0.23).

The correlations of ambiguity attitudes with other variables (Table 3 in the main paper) are similar for investors and non-investors, except that in the non-investor group ambiguity aversion (*b_avg*) also has a significant negative correlation with financial literacy (*r* = -0.24) and education level (*r* = -0.19). In multiple regressions, similar to Panel B of Table 3, ambiguity aversion is positively related to risk aversion and age, and negatively related to financial literacy (p = 0.01). When explaining perceived ambiguity in Column (3), the betas of financial literacy, Inverse-S, income and the dummies for employment and female are significant (R^2 = 16%). Hence, in the non-investor group, ambiguity aversion is negatively related to financial knowledge. However, this effect is not robust when excluding respondents who make errors on the ambiguity questions. After excluding respondents who violate monotonicity or make several errors (similar to Section C.1), the only significant drivers of ambiguity aversion are risk aversion and age (R^2 = 36%), while perceived ambiguity is best explained by Inverse-S probability weighting and income (R^2 = 25%).

Table C1: Descriptive Statistics for Ambiguity Measures – Restricted Sample

Panel A shows summary statistics for ambiguity attitudes regarding the local stock market index (*b_aex*), a familiar company stock (*b_stock*), the MSCI World stock index (*b_msci*) and Bitcoin (*b_bitcoin*), as well as the average of the four b-indexes (*b_avg*). Positive values of the *b*-index denote ambiguity aversion, and negative values indicate ambiguity seeking. Panel B shows summary statistics for the perceived ambiguity indexes regarding the local stock market index (*a_aex*), a familiar company stock (*a_stock*), the MSCI World stock index (*a_msci*) and Bitcoin (*a_bitcoin*), as well as the average of the four *a*-indexes (*a_avg*). Positive values of the *a*-index denote perceived ambiguity. The sample is restricted to $n = 180$ investors who did not violate the monotonicity condition ($a\_avg \leq 1$) and made three or less errors on any ambiguity question set of 6 choice lists. In Panel A, Hotelling's T^2 tests the null hypothesis that the means of the four ambiguity attitude measures are equal for *b_aex, b_stock, b_msci* and *b_bitcoin*. In Panel B, Hotelling's T^2 tests whether the means of the four perceived ambiguity measures are equal for *a_aex, a_stock, a_msci* and *a_bitcoin*.

Panel A: Ambiguity Aversion

	Mean	Median	St dev	Min	Max
b_aex	0.11	0.09	0.43	-0.98	0.99
b_stock	0.11	0.04	0.45	-0.98	0.99
b_msci	0.16	0.11	0.42	-0.98	0.99
b_bitcoin	0.14	0.10	0.44	-0.98	0.98
b_avg	0.13	0.10	0.38	-0.98	0.98

Test of equal means: Hotelling's $T^2 = 5.35$, $p = 0.1561$

Panel B: Perceived Ambiguity

	Mean	Median	St dev	Min	Max
a_aex	0.75	0.90	0.51	-0.70	2.35
a_stock	0.58	0.61	0.56	-0.98	1.92
a_msci	0.67	0.77	0.46	-0.86	1.70
a_bitcoin	0.76	0.90	0.47	-1.02	2.51
a_avg	0.69	0.73	0.26	0.02	1.00

Test of equal means: Hotelling's $T^2 = 14.16$, $p = 0.0036$

Table C2: Correlations of Ambiguity Measures – Restricted Sample

Panel A shows pairwise correlations of the ambiguity attitude indexes for the local stock market index (*b_aex*), a familiar company stock (*b_stock*), the MSCI World stock index (*b_msci*), and Bitcoin (*b_bitcoin*), as well as the average of the b-indexes (*b_avg*). Panel B shows correlations of the perceived ambiguity indexes for the local stock market index (*a_aex*), a familiar company stock (a_*stock*), the MSCI World stock index (*a_msci*) and Bitcoin (*a_bitcoin*), as well as the average of the a-indexes (*a_avg*). The sample is restricted to $n = 180$ investors who did not violate the monotonicity condition ($a\_avg \leq 1$) and made three or less errors on any ambiguity question set of 6 choice lists. The last two rows of Panels A and B show the percentage of variation in the four ambiguity measures (*aex, stock, msci* and *bitcoin*) explained by the 1st factor in a factor analysis, as well as Cronbach's alpha of the four measures (*aex, stock, msci* and *bitcoin*). *, **, *** denote significant correlations at the 10%, 5% and 1% level.

Panel A: Correlations of Ambiguity Aversion

	b_aex	*b_stock*	*b_msci*	*b_bitcoin*	*b_avg*
b_aex	1.00				0.88***
b_stock	0.74***	1.00			0.91***
b_msci	0.73***	0.74***	1.00		0.88***
b_bitcoin	0.59***	0.68***	0.63***	1.00	0.83***

Percentage explained by 1st factor: 76.5%
Cronbach's alpha: 0.897

Panel B: Correlations of Perceived Ambiguity

	a_aex	*a_stock*	*a_msci*	*a_bitcoin*	*a_avg*
a_aex	1.00				0.51***
a_stock	0.00	1.00			0.64***
a_msci	0.06	0.14*	1.00		0.48***
a_bitcoin	0.00	0.12	-0.11	1.00	0.46***

Percentage explained by 1st factor: 28.9%
Cronbach's alpha: 0.139

Table C3: Factors Associated with Ambiguity Attitudes – Restricted Sample

Panel A shows correlations of ambiguity aversion (*b_avg*) and perceived ambiguity (*a_avg*) with financial literacy, education, risk aversion, and Inverse-S probability weighting. Panel B shows standardized beta coefficients from regression models of ambiguity aversion and perceived ambiguity regarding financial sources. In Column (1), the dependent variable is *b_avg*, the index of ambiguity aversion averaged over the four financial sources (*aex, stock, msci* and *bitcoin*). In Column (2), the dependent variable is *a_avg*, the index of perceived ambiguity averaged over the four financial sources (*aex, stock, msci* and *bitcoin*). In Panel B, the controls are financial literacy (total score), education, risk aversion, Inverse-S probability weighting, age, gender, single, an indicator for employment, the logarithm of the number of children living at home, family income, and household financial wealth, plus a control for missing wealth. The sample is restricted to $n = 180$ investors who did not violate the monotonicity condition ($a\_avg \leq 1$) and made three or less errors on any ambiguity question set of 6 choice lists. *, **, *** denote significant coefficients at the 10%, 5% and 1% level.

Panel A: Correlations with Financial Literacy, Education and Risk Attitudes

	(1) Ambiguity Aversion *b_avg*	(2) Perceived Ambiguity *a_avg*
Financial Literacy	-0.07	-0.23***
Education	-0.12	-0.13*
Risk Aversion	0.41***	0.10
Inverse-S	0.13*	0.26***

Panel B: Multiple Regression Models

	(1) Ambiguity Aversion *b_avg*	(2) Perceived Ambiguity *a_avg*
Financial Literacy	-0.048	-0.213***
Education	-0.015	-0.263***
Risk Aversion	0.404***	-0.051
Inverse-S	-0.033	0.348***
Age	0.135	0.045
Female	0.126*	-0.061
Single	-0.147*	-0.061
Employed	0.049	0.013
Number of kids (log)	-0.044	-0.038
Family Income (log)	-0.025	-0.140***
Financial Wealth (log)	-0.047	0.081
R^2	0.230	0.346
N	180	180

Table C4: Investment in Familiar Stock and Crypto-Currency – Restricted Sample

This table reports estimated results for investing in a familiar stock (columns 1 and 2) and investing in crypto-currency (columns 3 and 4). The numbers displayed are percent changes in the odds ratio (exp(β) – 1) of investing in the asset based on estimated coefficients (β) from a logistic regression model. In Columns (1) and (2), the dependent variable is 1 if the respondent invests in the familiar individual stock and 0 otherwise. In Columns (3) and (4), the dependent variable is 1 if the respondent invests in crypto-currency and 0 otherwise. Independent variables include *b_avg*, the overall index of ambiguity aversion averaged over the four financial sources (*aex, stock, msci* and *bitcoin*), as well as perceived ambiguity about the familiar stock (*a_stock*) and perceived ambiguity about Bitcoin (*a_bitcoin*). In Column (2) and (4), a limited set of control variables is included. Discrete control variables such as gender and education are omitted to avoid problems with complete separation (when a discrete explanatory variable completely separates the dependent variable). The sample is restricted to n = 180 investors who did not violate the monotonicity condition (*a_avg* ≤ 1) and made three or less errors on any ambiguity question set of 6 choice lists. *, **, *** denote significant coefficients at the 10%, 5% and 1% level.

	Investment in Familiar Stock		Investment in Crypto-Currencies	
	(1)	(2)	(3)	(4)
a_stock	-0.473**	-0.479*		
a_bitcoin			-0.465	-0.472
b_avg	-0.484	-0.706*	-0.681***	-0.803
Financial Literacy		0.090		0.062
Risk Aversion		1.812*		0.357
Inverse-S		0.478		0.49
Age		-0.005		-0.139***
Family Income (log)		0.152		-0.156
Financial Wealth (log)		0.237**		0.102
Pseudo R^2	0.033	0.097	0.026	0.387
N	180	180	180	180

Table C5: Descriptive Statistics for Ambiguity Measures – Non-Investor Sample

Panel A shows summary statistics for ambiguity attitudes regarding the local stock market index (*b_aex*), a familiar company stock (*b_stock*), the MSCI World stock index (*b_msci*) and Bitcoin (*b_bitcoin*), as well as the average of the four b-indexes (*b_avg*). Positive values of the *b*-index denote ambiguity aversion, and negative values indicate ambiguity seeking. Panel B shows summary statistics for the perceived ambiguity indexes regarding the local stock market index (*a_aex*), a familiar company stock (*a_stock*), the MSCI World stock index (*a_msci*) and Bitcoin (*a_bitcoin*), as well as the average of the four *a*-indexes (*a_avg*). Positive values of the *a*-index denote perceived ambiguity. The sample consists of $n = 225$ non-investors. In Panel A, Hotelling's T^2 tests the null hypothesis that the means of the four ambiguity attitude measures are equal for *b_aex, b_stock, b_msci* and *b_bitcoin*. In Panel B, Hotelling's T^2 tests whether the means of the four perceived ambiguity measures are equal for *a_aex, a_stock, a_msci* and *a_bitcoin*.

Panel A: Ambiguity Aversion

	Mean	Median	St dev	Min	Max
b_aex	0.20	0.20	0.51	-1.00	1.00
b_stock	0.23	0.23	0.55	-1.00	1.00
b_msci	0.19	0.15	0.52	-1.00	1.00
b_bitcoin	0.17	0.10	0.55	-1.00	1.00
b_avg	0.20	0.17	0.48	-1.00	1.00
Test of equal means: Hotelling's $T^2 = 6.21$, $p = 0.1075$					

Panel B: Perceived Ambiguity

	Mean	Median	St dev	Min	Max
a_aex	0.91	1.00	0.50	-1.00	2.35
a_stock	0.82	1.00	0.52	-0.95	2.38
a_msci	0.89	1.00	0.44	-0.74	2.14
a_bitcoin	0.89	1.00	0.49	-0.65	2.95
a_avg	0.88	0.96	0.31	0.14	1.84
Test of equal means: Hotelling's $T^2 = 4.43$, $p = 0.2256$					

Online Appendix References

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