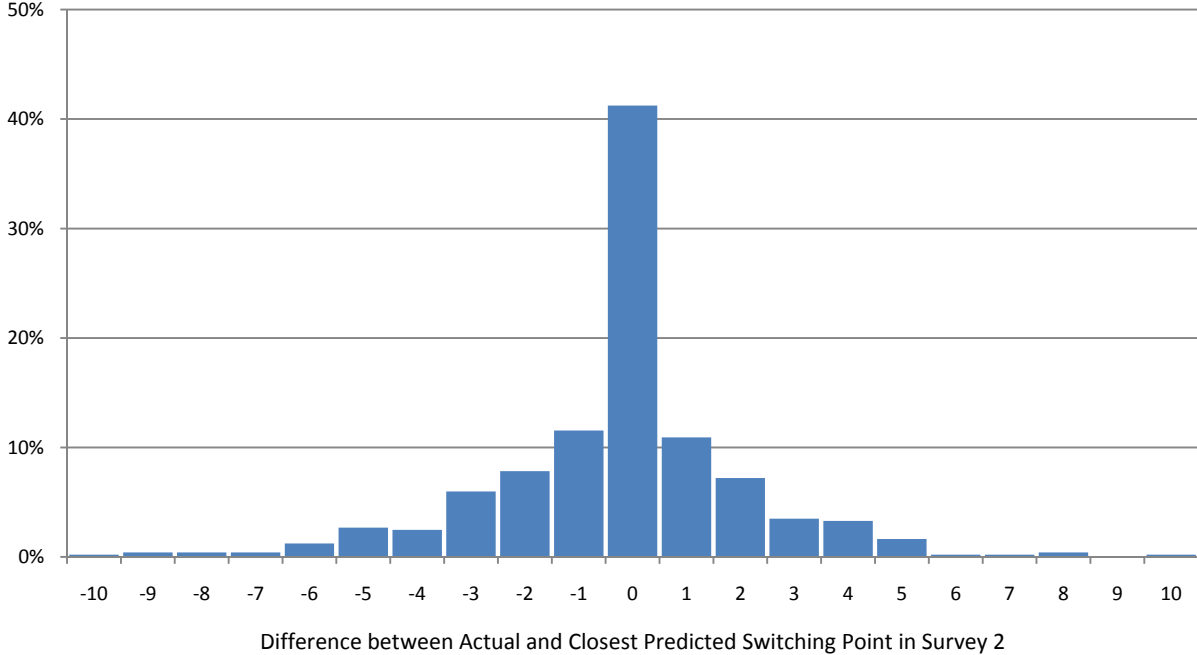


Figure 11: Adjustment Precision in Survey 2



Appendix A: Experimental Instruction (Ascending Scale Treatment)

You can earn extra money by answering the following 10 questions. In each question, you are asked to choose between 2 investments, investment **A** and investment **B**.

- If you choose investment **A**, then how much you earn depends on what the rate of inflation will be over the next 12 months. Your earnings under investment **A** depending on the rate of inflation are summarized in the table below:

Earnings under investment A												
Rate of inflation	-1% or less (deflation)	0%	1%	2%	3%	4%	5%	6%	7%	8%	9%	10% or more
Earnings	\$600	\$550	\$500	\$450	\$400	\$350	\$300	\$250	\$200	\$150	\$100	\$50

For example, we can see in the table that your earnings under investment **A** will be \$50 if the rate of inflation over the next 12-months is 10% or more. Alternatively, your earnings under investment **A** will be \$600 if the rate of inflation over the next 12-months is -1% or less (deflation).

- If you choose investment **B**, then how much you earn will not depend on the rate of inflation. Exactly how much you earn under investment **B** will be specified in each of the 10 questions below.

Once the survey is completed, we will randomly pick 1 of the 10 questions, and 2 survey participants. Twelve months from now, these 2 participants will be paid extra money according to the investment choice they made for the selected question. So answer every question carefully, as you may earn up to several hundred dollars. For investment **A**, the inflation rate over the next 12 months will be based on the official U.S. CPI index (Consumer Price Index) and it will be rounded to the nearest percentage point.

Earnings under investment **A**

Rate of inflation	-1% or less (deflation)	0%	1%	2%	3%	4%	5%	6%	7%	8%	9%	10% or more
Earnings	\$600	\$550	\$500	\$450	\$400	\$350	\$300	\$250	\$200	\$150	\$100	\$50

For every question, please choose between investment **A** and investment **B**.

Question 1: Which one of these two investments do you choose?

- Investment **A**: your earnings are determined by the table above.
- Investment **B**, your earnings are exactly **\$100**?

Question 2: Which one of these two investments do you choose?

- Investment **A**: your earnings are determined by the table above.
- Investment **B**, your earnings are exactly **\$150**?

Question 3: Which one of these two investments do you choose?

- Investment **A**: your earnings are determined by the table above.
- Investment **B**, your earnings are exactly **\$200**?

Question 4: Which one of these two investments do you choose?

- Investment **A**: your earnings are determined by the table above.
- Investment **B**, your earnings are exactly **\$250**?

Question 5: Which one of these two investments do you choose?

- Investment **A**: your earnings are determined by the table above.
- Investment **B**, your earnings are exactly **\$300**?

Question 6: Which one of these two investments do you choose?

- Investment **A**: your earnings are determined by the table above.
- Investment **B**, your earnings are exactly **\$350**?

Question 7: Which one of these two investments do you choose?

- Investment **A**: your earnings are determined by the table above.
- Investment **B**, your earnings are exactly **\$400**?

Question 8: Which one of these two investments do you choose?

- Investment **A**: your earnings are determined by the table above.
- Investment **B**, your earnings are exactly **\$450**?

Question 9: Which one of these two investments do you choose?

- Investment **A**: your earnings are determined by the table above.
- Investment **B**, your earnings are exactly **\$500**?

Question 10: Which one of these two investments do you choose?

- Investment **A**: your earnings are determined by the table above.
- Investment **B**, your earnings are exactly **\$550**?

Appendix B: Demonstrations of the Propositions in Section 2

Proposition 1: *If investment A and investment B have the same expected return then a risk-averse agent prefers investment B to investment A.*

Proof: We consider a standard expected utility framework. The agent's utility function over income, denoted $U(\cdot)$, is thrice differentiable, strictly increasing, and satisfies the von Neumann Morgenstern axioms. Assume that the agent's beliefs are such that the two investments have the same expected returns, so that $E[A] = E[B]$ or equivalently $E[\alpha X - \beta] = E[X]$. In that case, we have $\beta = (\alpha - 1)E[X]$ and the earnings under investment A are then $X + (\alpha - 1)(X - E[X])$.

Let $g(\delta) = E[U(X + (\delta - 1)(X - E[X]))]$ with $\delta > 0$. Observe that $E[U(A)] = g(\alpha)$ while $E[U(B)] = g(1)$. Note also that

$$\begin{aligned} g'(\delta) &= E[(X - E[X])U'(X + (\delta - 1)(X - E[X]))] \\ &= E[XU'(X + (\delta - 1)(X - E[X]))] - E[X]E[U'(X + (\delta - 1)(X - E[X]))] \\ &= COV[X, U'(X + (\delta - 1)(X - E[X]))] . \end{aligned}$$

Now, let $h(x) = U'(x + (\delta - 1)(x - E[X]))$ so that $h'(x) = \delta U''(x + (\delta - 1)(x - E[X]))$. When $U(\cdot)$ is strictly concave, $h'(x) < 0$, which implies that $g'(\delta) < 0$ for all risk averse agents. Then, because $\alpha > 1$, we have $g(1) > g(\alpha)$ or equivalently $E[U(A)] < E[U(B)]$. Conversely, $h'(x) > 0$ when $U(\cdot)$ is strictly convex, so that $g'(\delta) > 0$ for all risk loving agents, in which case $g(1) < g(\alpha)$ or equivalently $E[U(A)] > E[U(B)]$. ■

Proposition 2: *If a risk averse agent is indifferent between investment A and investment B, then, all else equal, a more risk averse agent (in the classical sense of Pratt 1964) prefers investment B to investment A.*

Proof: Consider two risk-averse agents, the first with a utility function $U(\cdot)$ and the second with a utility function $V(\cdot)$. The second agent is more risk-averse (in the classical sense of Pratt 1964) if his utility function verifies $V(\cdot) = \Phi(U(\cdot))$ with $\Phi'(\cdot) > 0$ and $\Phi''(\cdot) \leq 0$. Assume the two agents share the same beliefs about the distribution of the random variable X defined above. Let us also denote $F_A(\cdot)$ and $f_A(\cdot)$ (respectively $F_B(\cdot)$ and $f_B(\cdot)$) the cumulative and probability distribution functions associated with investment A (respectively investment B). To simplify, we assume that the support of investments A and B is the real line.

Proposition 2 may then be written

$$E[U(A)] = E[U(B)] \Rightarrow E[V(A)] \leq E[V(B)] . \quad (2.1)$$

Based on Theorem 1 of Jewitt (1989), the implication in (2.1) is satisfied when $F_A(\cdot)$ and $F_B(\cdot)$ satisfy the single crossing property:

$$F_A(x_0) = F_B(x_0) \Rightarrow f_A(x_0) \geq f_B(x_0) . \quad (2.2)$$

Observe that

$$F_A(y) = Pr[Y \leq y] = Pr[\alpha X - \beta \leq y] = Pr\left[X \leq \frac{y+\beta}{\alpha}\right] = F_B\left(\frac{y+\beta}{\alpha}\right).$$

Thus, when $F_A(x_0) = F_B(x_0)$ we have $F_B(x_0) = F_B\left(\frac{x_0+\beta}{\alpha}\right)$, or equivalently $x_0 = \frac{\beta}{\alpha-1}$. Thus x_0 exists and $x_0 > 0$ because $\alpha > 1$ and $\beta > 0$. Now observe that

$$f_A(x_0) = \frac{1}{\alpha} f_B\left(\frac{x_0+\beta}{\alpha}\right) = \frac{1}{\alpha} f_B(x_0).$$

Because $\alpha > 1$ we have $f_A(x_0) < f_B(x_0)$. The cumulative distributions $F_A(\cdot)$ and $F_B(\cdot)$ therefore satisfy the single crossing property in (2.2), which implies that the implication in (2.1) is also satisfied. ■

Proposition 3: *If a risk-averse agent with a HARA utility is indifferent between investment A and investment B, then the agent prefers investment B to investment A for any increase in risk (in the classical sense of Rothschild and Stiglitz 1970).*

Proof: Consider a risk-averse agent with a utility function $U(\cdot)$. The agent initially believes that investments A and B are characterized by a random variable X. For this distribution of beliefs, assume that the agent is indifferent between investment A and investment B, so that $E[U(A)] = E[U(B)]$ or equivalently $E[U(\alpha X - \beta)] = E[U(X)]$. Now, assume that the agent faces an increase in risk (in the classical sense of Rothschild and Stiglitz 1970), that is, he now believes that investments A and B are characterized by a random variable $\tilde{X} = X + \epsilon$, where ϵ is a mean zero random variable.

Let us denote \tilde{A} and \tilde{B} the investments that earn respectively $\alpha\tilde{X} - \beta$ and \tilde{X} . Proposition 3 may then be written

$$E[U(A)] = E[U(B)] \Rightarrow E[U(\tilde{A})] \leq E[U(\tilde{B})]. \quad (3.1)$$

Let us also denote A' the investment that earns $\alpha X - \beta + \epsilon$. To prove Proposition 3, let us first show that $E[U(A')] > E[U(\tilde{A})]$.

Let $g(\delta) = E[U(\alpha X - \beta + \delta\epsilon)]$ with $\delta > 0$. Observe that $E[U(\tilde{A})] = g(\alpha)$ and $E[U(A')] = g(1)$. Furthermore, note that

$$g'(\delta) = E[\epsilon U'(\alpha X - \beta + \delta\epsilon)] = COV[\epsilon, U'(\alpha X - \beta + \delta\epsilon)]$$

Now, let $h(\epsilon) = U'(\alpha X - \beta + \delta\epsilon)$ so that $h'(\epsilon) = \delta U''(\alpha X - \beta + \delta\epsilon)$. When $U(\cdot)$ is strictly concave then $h'(\epsilon) < 0$, which implies that $g'(\delta) < 0$ for all risk averse agents. Then, because $\alpha > 1$, we have $g(1) > g(\alpha)$ or equivalently $E[U(A')] > E[U(\tilde{A})]$.

Next, consider the following implication:

$$E[U(A)] = E[U(B)] \Rightarrow E[U(A')] \leq E[U(\tilde{B})]. \quad (3.2)$$

Because $E[U(A')] > E[U(\tilde{A})]$, it is sufficient to verify that the implication in (3.2) is satisfied in order to demonstrate Proposition 3 as stated in (3.1).

Let us denote the indirect utility function $V(X) = E_\epsilon[U(x + \epsilon)]$. The implication in (3.2) can then be written

$$E[U(A)] = E[U(B)] \Rightarrow E[V(A)] \leq E[V(B)]. \quad (3.3)$$

From Proposition 2 we know that the implication in (3.3) is satisfied when $V(\cdot)$ is more risk averse than $U(\cdot)$, that is, $V(\cdot) = \Phi(U(\cdot))$ with $\Phi'(\cdot) > 0$ and $\Phi''(\cdot) \leq 0$. From Gollier and Pratt (1996), $V(\cdot)$ is more risk averse than $U(\cdot)$ if $V(\cdot)$ satisfies the “vulnerability condition.” This condition, which imposes constraints up to the fourth derivative, is not satisfied by every risk averse utility function. Nevertheless, Gollier and Pratt (1996) show that the vulnerability condition is satisfied by the family of HARA utility functions. ■

Appendix C: Additional Figures

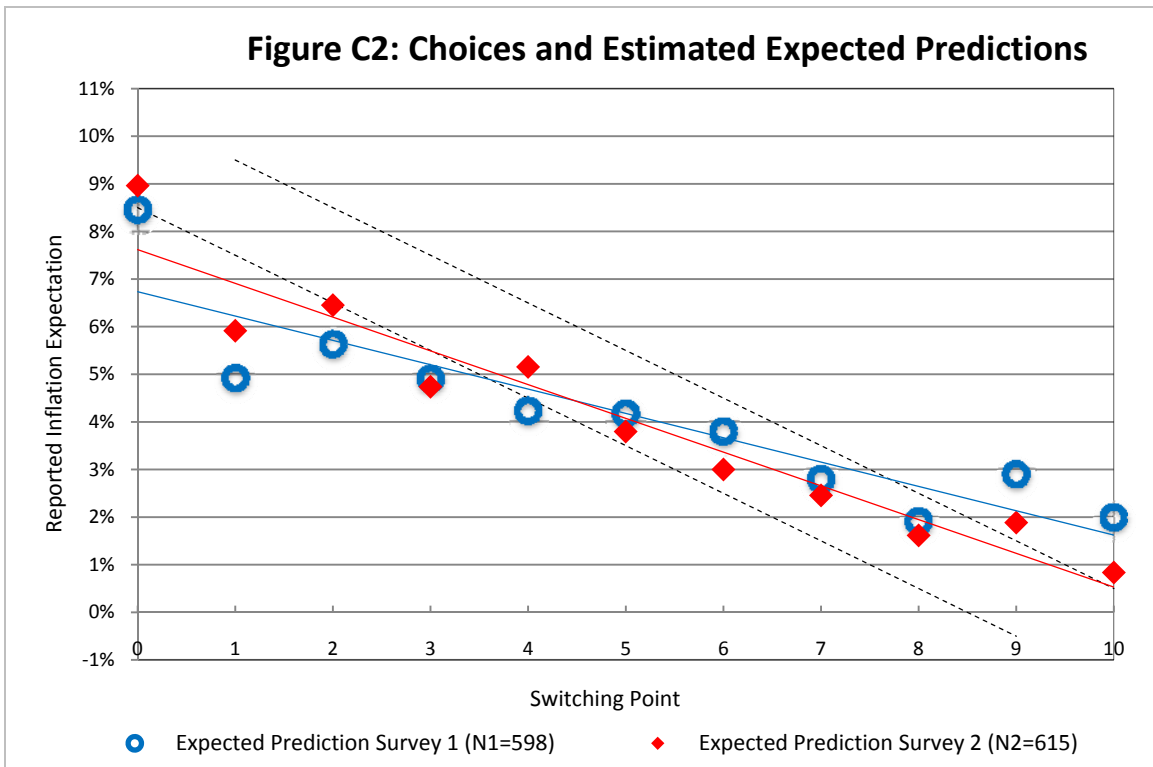
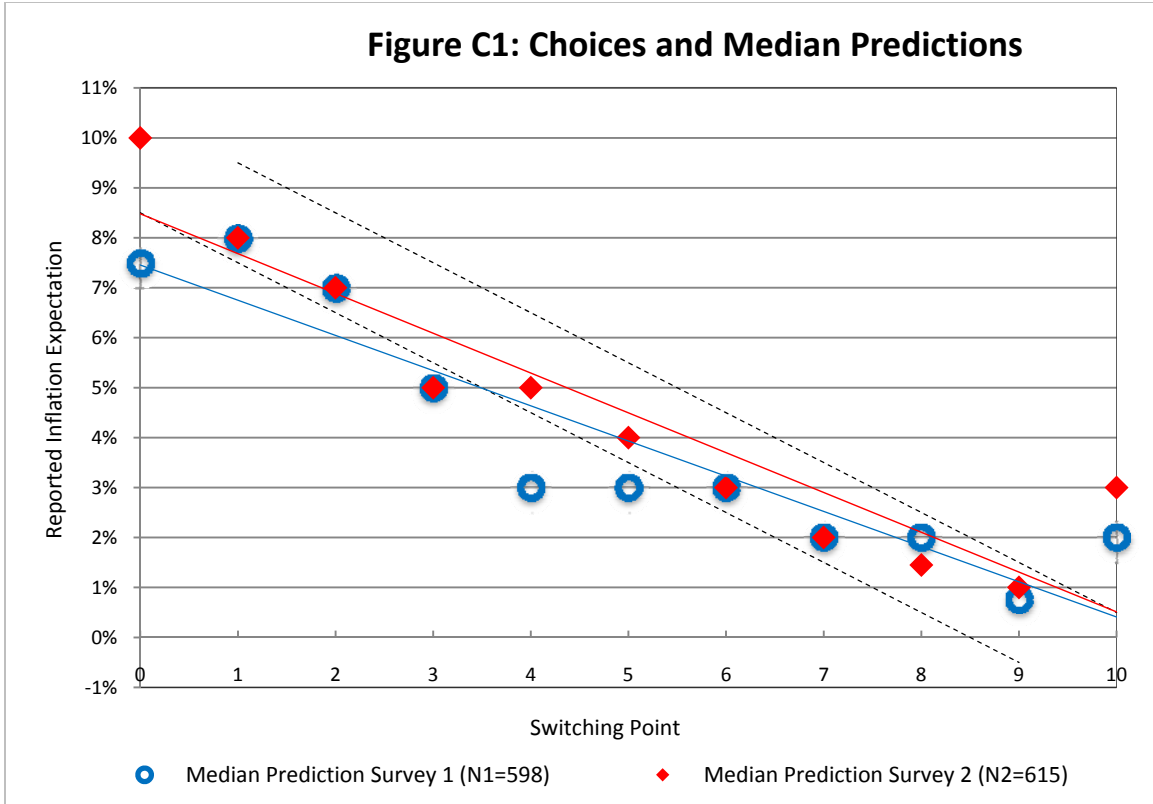


Figure C3: Choices and Predictions
 "Prices" * "Increasing"

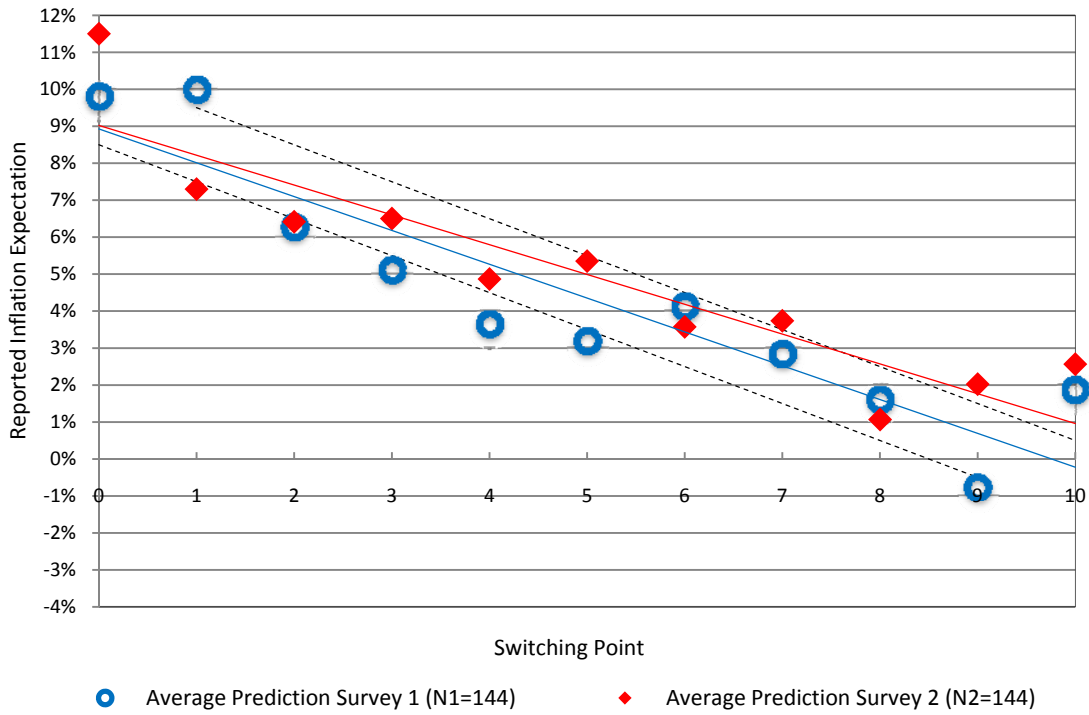


Figure C4: Choices and Predictions
 "Prices" * "Decreasing"

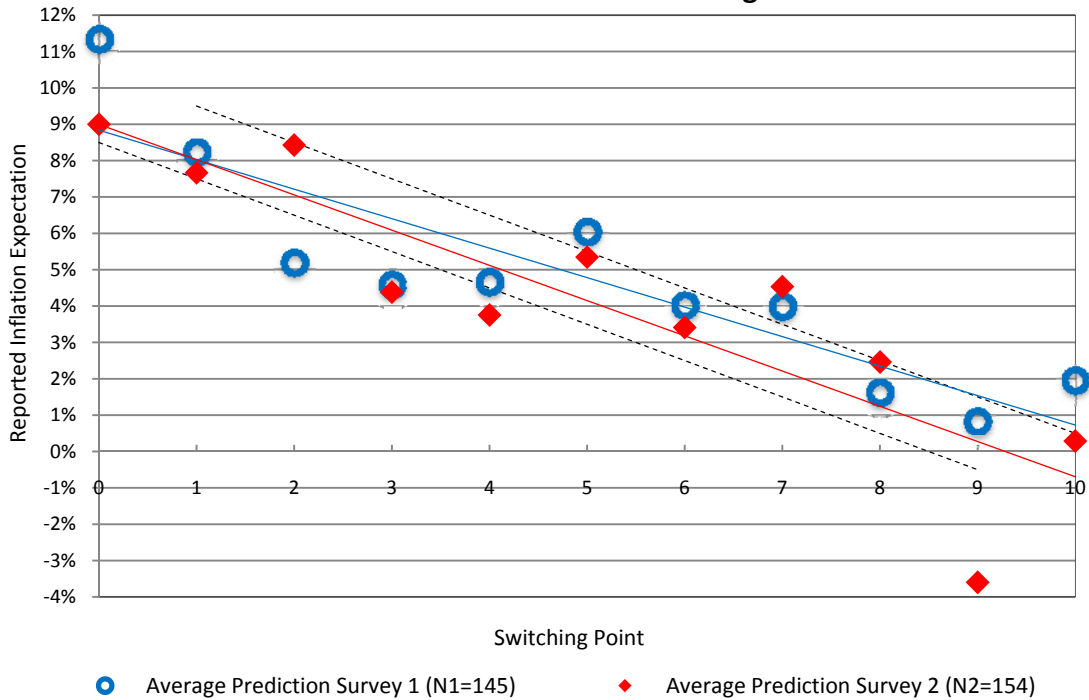
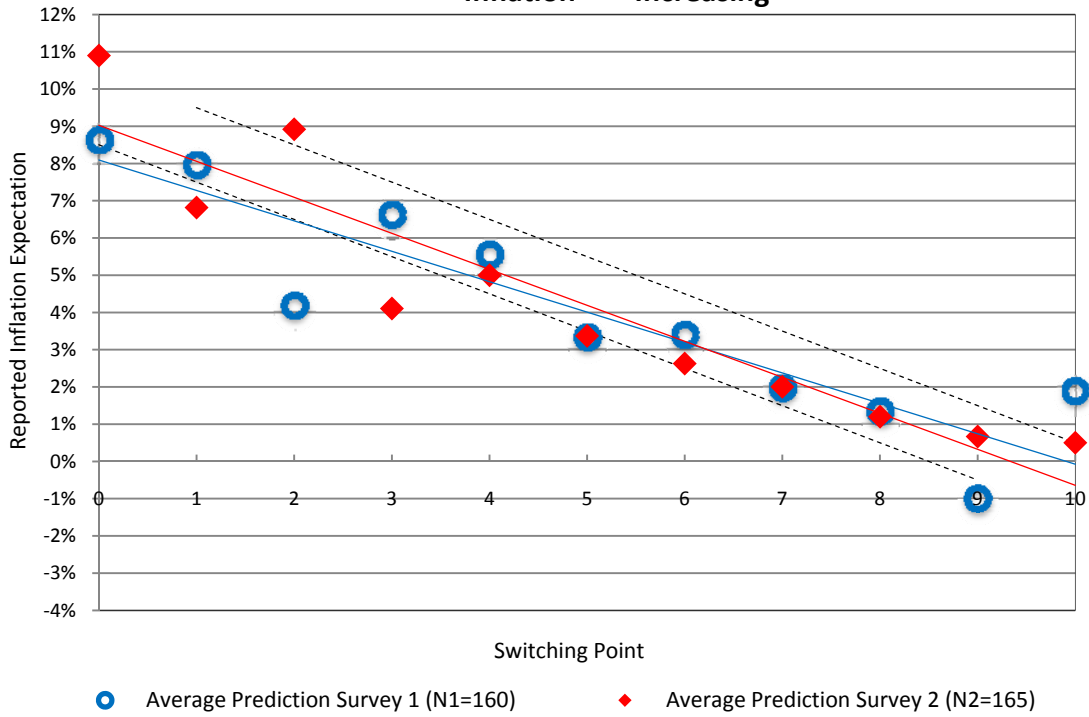
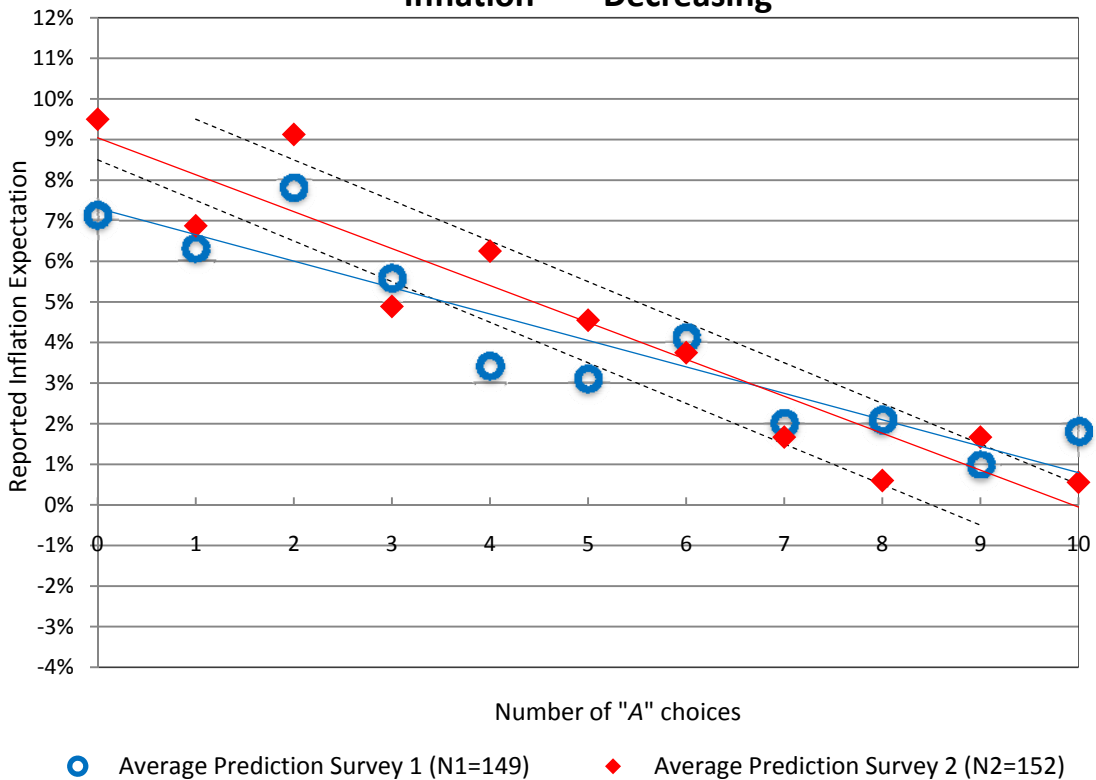


Figure C5: Choices and Predictions
"Inflation" * "Increasing"



Choices and Predictions
"Inflation" * "Decreasing"



Appendix D: Linear Regressions

Table D.3: Factors Influencing the Choice of the Switching Point

Outcomes of linear regressions where the dependent variable is the switching point (an integer between 0 and 10) for each respondent

	Model 1		Model 2		Model 3		Model 4	
	Survey 1	Survey 2	Survey 1	Survey 2	Survey 1	Survey 2	Survey 1	Survey 2
Point prediction	-0.182 ^{***} (0.020)	-0.213 ^{***} (0.017)	-0.182 ^{***} (0.020)	-0.213 ^{***} (0.018)	—	—	-0.188 ^{***} (0.024)	-0.180 ^{***} (0.031)
Estimated Expected Prediction ^c	—	—	—	—	-0.199 ^{***} (0.025)	-0.226 ^{***} (0.019)	—	—
Reported Risk Tolerance ^a	0.436 ^{***} (0.065)	0.417 ^{***} (0.061)	0.435 ^{***} (0.067)	0.417 ^{***} (0.064)	0.379 ^{***} (0.068)	0.376 ^{***} (0.064)	0.403 ^{***} (0.072)	0.418 ^{***} (0.064)
Numeracy and Financial Literacy Score ^b	0.012 (0.078)	0.042 (0.080)	0.010 (0.079)	0.029 (0.072)	0.017 (0.081)	0.040 (0.072)	0.023 (0.085)	0.026 (0.071)
Inflation Uncertainty ^c	-0.015 ^{***} (0.004)	-0.009 ^{***} (0.003)	-0.014 ^{***} (0.004)	-0.009 ^{***} (0.003)	-0.011 ^{***} (0.004)	-0.013 ^{***} (0.003)	-0.019 ^{***} (0.004)	-0.010 ^{**} (0.003)
Log of Time Taken to Complete the Survey	0.025 (0.054)	-0.025 (0.043)	0.029 (0.054)	-0.017 (0.043)	0.031 (0.055)	-0.032 (0.044)	-0.006 (0.060)	-0.014 (0.044)
Age	—	—	0.005 (0.007)	-0.001 (0.007)	0.006 (0.007)	-0.001 (0.007)	0.003 (0.008)	0.001 (0.007)
Gender (female)	—	—	-0.172 (0.201)	-0.180 (0.200)	-0.284 (0.203)	-0.307 (0.202)	-0.325 (0.208)	-0.179 (0.201)
Income greater than \$75k	—	—	-0.056 (0.202)	-0.197 (0.198)	-0.122 (0.204)	-0.117 (0.200)	-0.116 (0.208)	-0.203 (0.199)
Education: No more than High School	—	—	0.245 (0.284)	0.065 (0.288)	0.017 (0.287)	0.074 (0.290)	0.160 (0.310)	0.092 (0.289)
Education: More than Bachelor	—	—	0.172 (0.241)	0.437 (0.239)	0.088 (0.246)	0.248 (0.241)	0.263 (0.246)	0.426 [*] (0.239)
“Prices” * “Increasing”	-0.288 (0.269)	-0.294 (0.272)	-0.288 (0.270)	-0.292 (0.273)	-0.354 (0.274)	-0.208 (0.276)	0.063 (0.375)	0.021 (0.371)
“Prices” * “Decreasing”	0.101 (0.269)	0.017 (0.268)	0.109 (0.273)	0.038 (0.269)	0.060 (0.274)	0.032 (0.270)	-0.249 (0.329)	0.128 (0.341)
“Inflation” * “Decreasing”	-0.052 (0.268)	0.182 (0.268)	-0.063 (0.279)	0.153 (0.270)	-0.036 (0.272)	0.161 (0.272)	-0.073 (0.331)	0.459 (0.343)
Point prediction * “Prices” * “Increasing”	—	—	—	—	—	—	-0.078 (0.084)	-0.057 (0.050)
Point prediction * “Prices” * “Decreasing”	—	—	—	—	—	—	0.038 (0.035)	-0.022 (0.045)
Point prediction * “Inflation” * “Decreasing”	—	—	—	—	—	—	-0.033 (0.040)	-0.068 (0.047)
Constant	5.659 ^{***} (0.534)	5.327 ^{***} (0.478)	5.450 ^{***} (0.719)	5.450 ^{***} (0.672)	5.594 ^{***} (0.732)	5.714 ^{***} (0.680)	5.934 ^{***} (0.778)	5.295 ^{***} (0.686)
N	589	607	589	607	589	607	589	607
Adjusted R ²	0.221	0.287	0.218	0.287	0.192	0.277	0.240	0.287

The standard deviations are robust and clustered at the treatment combination level. Significance: * = 10%, ** = 5%, *** = 1%.

^a Self reported willingness to take risk regarding financial matters on a scale from 1 (Not willing at all) to 7 (very willing).

^b The variable takes integer values between 0 and 6 depending on the number of correct answers the respondent gave to the six questions asked to measure the respondent’s numeracy and financial literacy.

^c As explained in Section 2, these variables are calculated using the probabilistic beliefs reported by the respondent.

Table D.4: Explaining the Deviations from Risk Neutrality
 Linear regressions based on the difference between a respondent
 switching point and her/his pair of “risk neutral switching points.”

	Model 1 ^a		Model 2 ^b		Model 3 ^c		Model 4 ^d	
	Dependent = Deviation		Dependent = Absolute Deviation		Dependent = Deviation when Deviation < 0		Dependent = Deviation when Deviation > 0	
	Survey 1	Survey 2	Survey 1	Survey 2	Survey 1	Survey 2	Survey 1	Survey 2
Reported Risk Tolerance ^e	0.651*** (0.074)	0.497*** (0.069)	-1.029*** (0.221)	-1.086*** (0.213)	0.361*** (0.073)	0.335*** (0.816)	0.495*** (0.080)	0.294*** (0.081)
Square of Reported Risk Attitude	—	—	0.146*** (0.029)	0.143*** (0.030)	—	—	—	—
Inflation Uncertainty ^g	0.015*** (0.004)	-0.001 (0.003)	0.008*** (0.003)	0.008*** (0.002)	-0.016*** (0.005)	-0.007** (0.003)	0.014*** (0.005)	0.011*** (0.004)
Numeracy and Financial Literacy Score ^f	-0.085 (0.088)	-0.115 (0.077)	-0.262*** (0.062)	-0.239*** (0.056)	0.307*** (0.080)	0.346*** (0.086)	-0.212** (0.099)	-0.322*** (0.092)
Log of Time Taken to Complete the Survey	-0.072 (0.060)	-0.071* (0.047)	0.139*** (0.043)	0.130*** (0.034)	-0.119** (0.049)	-0.102** (0.050)	0.131** (0.073)	0.107* (0.057)
Gender (female)	0.271 (0.220)	0.052 (0.217)	0.074 (0.156)	0.009 (0.175)	0.161 (0.201)	-0.004 (0.241)	0.121 (0.268)	0.241 (0.286)
Age	0.009 (0.008)	-0.001 (0.008)	-0.001 (0.006)	0.004 (0.003)	0.001 (0.008)	-0.007 (0.009)	0.007 (0.010)	0.013 (0.010)
Income greater than \$75k	-0.201 (0.222)	-0.295 (0.215)	-0.246 (0.175)	-0.097 (0.157)	0.273 (0.205)	0.458** (0.242)	-0.142 (0.268)	-0.217 (0.285)
Education: No more than High School	0.805** (0.312)	0.250 (0.311)	1.120*** (0.222)	1.217*** (0.226)	-0.705** (0.310)	-1.013*** (0.332)	1.236*** (0.317)	1.249*** (0.344)
Education: More than Bachelor	-0.008 (0.266)	0.251 (0.258)	-0.477** (0.189)	-0.588*** (0.189)	0.593** (0.250)	0.851** (0.305)	-0.819** (0.357)	-0.990*** (0.368)
“Prices” * “Increasing”	0.009 (0.308)	-0.140 (0.301)	0.240 (0.217)	0.213 (0.218)	0.078 (0.282)	-0.210 (0.332)	0.218 (0.372)	0.431 (0.396)
“Prices” * “Decreasing”	0.425 (0.306)	0.322 (0.295)	0.086 (0.216)	0.059 (0.214)	0.033 (0.297)	-0.102 (0.340)	0.190 (0.363)	-0.344 (0.375)
“Inflation” * “Decreasing”	-0.282 (0.287)	-0.427 (0.292)	-0.049 (0.210)	-0.077 (0.212)	0.292 (0.263)	-0.009 (0.313)	-0.168 (0.386)	-0.523 (0.429)
Constant	-2.768*** (0.787)	1.121 (0.718)	4.012*** (0.654)	3.391*** (0.595)	-5.016*** (0.747)	-4.694 (0.836)	0.868 (0.910)	1.632 (0.791)
N	589	607	589	607	242	134	161	134
Adjusted R ²	0.140	0.083	0.172	0.204	0.252	0.270	0.331	0.309

The standard deviations are robust and clustered at the treatment combination level. Significance: * = 10%, ** = 5%, *** = 1%.

^a In Model 1 the dependent variable is the difference between a respondent actual switching point and his/her pair of “risk neutral switching points.”

^b In Model 2 the dependent variable is the absolute value of the difference between a respondent actual switching point and his/her pair of “risk neutral switching points.”

^c In Model 3 the dependent variable is the difference between a respondent actual switching point and his/her pair of “risk neutral switching points,” but the sample is restricted to respondents who behaved as if risk averse (i.e. the deviations from risk neutrality is strictly negative).

^d In Model 4 the dependent variable is the difference between a respondent actual switching point and his/her pair of “risk neutral switching points,” but the sample is restricted to respondents who behaved as if risk loving (i.e. the deviations from risk neutrality is strictly positive).

^e Self reported willingness to take risk regarding financial matters on a scale from 1 (Not willing at all) to 7 (very willing).

^f The variable takes integer values between 0 and 6 depending on the number of correct answers the respondent gave to the six questions asked to measure the respondent’s numeracy and financial literacy.

^g As explained in Section 2, these variables are calculated using the probabilistic beliefs reported by the respondent.