Crying Wolf in the Lab

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Abstract

Keywords:

1 Introduction

A   Tables

Table 1: List of Treatments

Prop. of black balls (p)	Honest	Black-eyed	White-eyed	FP rate	FN rate
		Gremlins composition			
0.1,0.2,0.3,0.5	2	0	0	0	0
0.1,0.2,0.3,0.5	3	1	0	0.333	0
0.1,0.2,0.3,0.5	3	0	1	0	0.333
0.1,0.2,0.3,0.5	3	1	1 0	0.333	0.333
0.1,0.2,0.3,0.5	5	1	0	0.2	0
0.1,0.2,0.3,0.5	5	0	1	0	0.2
0.1,0.2,0.3,0.5	5	1	1	0.2	0.2

Table 2: Demographic Characteristics of Subjects

	All		$p \in \{0.1, 0.3\}$		$p \in \{0.2, 0.5\}$	
	N	%	N	%	N	%
Male	43	41	22	41	21	41
Age>23yrs old	14	13	6	11	8	16
Students	88	84	46	85	42	82
Had statistics classes	63	60	37	69	26	51
Total	105	100	54	100	51	100

Table 3: Risk Aversion Measurement

Switching Probability (π^*)	θ	N
Always protect	>2	1
0.1	2	10
0.15	1.216	13
0.2	0.573	29
0.25	0	16
0.3	-0.539	15
Never protect	<-0.539	14

Table 4: WTP for Information (Discrepancy)

	(1)	(2)	(3)	(4)	(5)
FP costs	.564***	.473***	.403	.502***	.435***
	(0.1)	(0.1)	(0.3)	(0.2)	(0.1)
FN costs	-.22*	.0351	-.495	.0816	-.62***
	(0.1)	(0.1)	(0.5)	(0.1)	(0.2)
Risk-loving			0		
			(.)		
Risk-averse			0		
			(.)		
No risk av. measure			0		
			(.)		
Risk-loving × FP costs			.12		
			(0.4)		
Risk-averse × FP costs			.104		
			(0.3)		
No risk av. measure × FP costs			-.142		
			(0.4)		
Risk-loving × FN costs			.744		
			(0.5)		
Risk-averse × FN costs			.552		
			(0.5)		
No risk av. measure × FN costs			.492		
			(0.5)		
Inaccurate beliefs				.0678	
				(0.2)	
Inaccurate beliefs × FP costs				.636	
				(0.8)	
Inaccurate beliefs × FN costs				.00218	
				(0.3)	
plevel=200					0
					(.)
plevel=200 × FP costs					.141
					(0.2)
plevel=200 × FN costs					.816***
					(0.2)
Constant	-.108	-.152*	-.149*	-.211	-.123
	(0.2)	(0.1)	(0.1)	(0.2)	(0.1)
Observations	315	315	315	315	315
Adjusted R^2	0.05	0.59	0.59	0.59	0.60

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: WTP - Value of Information, by prior with order effects

	(1)	(2)	(3)	(4)	(5)	(6)
	p=0.1,0.2	p=0.3,0.5	p=0.1,0.2			
FP rate	2.23***	-.249	2.12***	1.21*	-.249	-.325
	(0.5)	(0.7)	(0.7)	(0.7)	(0.7)	(0.8)
FN rate	-.254	2.64***	-1.22**	.169	2.64***	1.33***
	(0.4)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)
Starts with p=0.2			-1.13***	.256		
			(0.3)	(0.3)		
Starts with p=0.2 × FP rate			.215	-.444		.157
			(1.0)	(1.0)		(0.7)
Starts with p=0.2 × FN rate			1.99***	2.11***		2.71***
			(0.7)	(0.8)		(0.6)
First prior					.0367	.0367
					(0.2)	(0.2)
First prior × FP rate					2.48***	2.48***
					(0.7)	(0.7)
First prior × FN rate					-2.9***	-2.9***
					(0.3)	(0.3)
Constant	-.135	-.172	.412*	-.278	-.172	-.172
	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)
Observations	315	315	315	630	630	630
Adjusted R^2	0.04	0.04	0.12	0.04	0.04	0.06

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: WTP - Value of Information, by prior

	(1)	(2)	(3)	(4)	(5)
	All	0.1	0.2	0.3	0.5
FP rate	.822*	1.96***	2.3***	-.121	-.865
	(0.5)	(0.7)	(0.7)	(0.9)	(0.9)
FN rate	1.2***	-1.24***	.783	1.57***	3.79***
	(0.4)	(0.4)	(0.5)	(0.6)	(0.7)
Constant	-.134	.435***	-.713***	-.921***	.677***
	(0.1)	(0.1)	(0.1)	(0.1)	(0.2)
Observations	630	162	153	162	153
Adjusted R^2	0.36	0.64	0.49	0.42	0.48

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7: WTP - Value of Information, by prior

	(1)	(2)	(3)	(4)	(5)
	All	0.1	0.2	0.3	0.5
FP rate	.817	2.36***	2.18***	.0143	-1.1
	(0.5)	(0.6)	(0.8)	(1.0)	(0.9)
FN rate	1.22***	-1.27**	.745	1.4**	3.68***
	(0.4)	(0.5)	(0.5)	(0.7)	(0.7)
Constant	-.0329	.448***	-.633***	-.772***	.828***
	(0.1)	(0.1)	(0.1)	(0.2)	(0.2)
Observations	552	135	141	135	141
Adjusted R^2	0.30	0.64	0.44	0.31	0.43

Standard errors in parentheses

Only subjects who change their decisions across priors

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: WTP for Information, by prior (tobit)

	(1)	(2)	(3)	(4)
	0.1	0.2	0.3	0.5
model				
FP rate	-2.81**	-2.08**	-4.35***	-3.25**
	(1.1)	(1.0)	(1.0)	(1.3)
FN rate	-2.45**	-2.73***	-3.67***	-3.65***
	(1.1)	(1.0)	(1.0)	(1.3)
Constant	1.72***	2.33***	2.63***	3.32***
	(0.2)	(0.2)	(0.2)	(0.3)
sigma				
Constant	1.86***	1.7***	1.77***	2.16***
	(0.1)	(0.1)	(0.1)	(0.2)
Observations	162	153	162	153
Adjusted R^2				

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Informed protection response: probit

	(1)	(2)	(3)	(4)	(5) S=White	(6) S=Black
False pos. rate	.841***	1.14***	1.07**	1.48***	.524***	-.129
	(0.2)	(0.4)	(0.5)	(0.5)	(0.1)	(0.6)
False neg. rate	.222	.294	.342	2.45***	.32	.0476
	(0.2)	(0.3)	(0.4)	(0.8)	(0.3)	(0.1)
p>0.2			.721***			
			(0.1)			
FP rate x (p $\geq$ 0.2)			.125			
			(0.6)			
FN rate x (p $\geq$ 0.2)			-.113			
			(0.5)			
S=Black				3.23**		
				(1.4)		
FP rate x (S=Black)				-4.93**		
				(2.4)		
FN rate x (S=Black)				-2.52***		
				(0.9)		
Observations	629	587	587	587	315	314
Adjusted R^2						

Standard errors in parentheses

Reporting average marginal effects, errors are clusterd by subject.

With flexible controls of posterior probability

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 10: Informed protection response: probit

	(1)	(2)	(3)	(4)	(5) S=White	(6) S=Black
False pos. rate	.555**	.745	.733	.98**	.335***	-.0731
	(0.2)	(0.5)	(0.5)	(0.5)	(0.1)	(0.7)
False neg. rate	.0501	-.0311	-.193	1.31	-.0907	.0871
	(0.2)	(0.3)	(0.4)	(0.9)	(0.3)	(0.2)
p>0.2			.759***			
			(0.2)			
FP rate x (p ≥ 0.2)			.0544			
			(0.7)			
FN rate x (p ≥ 0.2)			.323			
			(0.5)			
S=Black				2		
				(1.3)		
FP rate x (S=Black)				-3		
				(2.3)		
FN rate x (S=Black)				-1.46		
				(1.0)		
Observations	629	587	587	587	313	314
Adjusted R^2						

Standard errors in parentheses

With flexible controls of posterior probability and beliefs

Errors are clustered by subject, average marginal treatment effects

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 11: Informed protection by prior

	(1) 0.1	(2) 0.2	(3) 0.3	(4) 0.5	(5) 0.1	(6) 0.2	(7) 0.3	(8) 0.5
Informed protection								
False pos. rate	1.67*	3.33***	1.49*	1.42	-.536	-.564	.569	1.81
	(1.0)	(0.7)	(0.8)	(0.9)	(0.8)	(1.0)	(1.4)	(1.1)
False neg. rate	3.28***	2.62***	5.37***	5.2***	-.625	.727	-.239	.689
	(0.9)	(0.9)	(0.8)	(0.9)	(0.6)	(1.0)	(0.7)	(1.0)
Constant	-1.85***	-1.58***	-1.44***	-1.3***	.803***	1.08***	1.33***	.972***
	(0.3)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)
Observations	162	153	162	153	161	153	162	153
Adjusted R^2								

Standard errors in parentheses

First four for white signal, the rest - black

Errors are clustered by subject

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 12: Informed protection response: semiparametric control for posteriors

	(1)	(2)	(3)	(4)
False pos. rate	.547***	.439**	.527***	.361*
	(0.2)	(0.2)	(0.2)	(0.2)
False neg. rate	-.186	-.197	-.643	.00259
	(0.2)	(0.2)	(0.4)	(0.2)
p>0.2		.0377		
		(0.0)		
FP rate x (p $\geq$ 0.2)		.225		
		(0.2)		
FN rate x (p $\geq$ 0.2)		.0451		
		(0.3)		
S=Black			-6.21	
			(11.0)	
FP rate x (S=Black)			.00529	
			(1.1)	
FN rate x (S=Black)			.516	
			(0.4)	
Stat. class				-.0199
				(0.0)
FP rate x Stat. class				.326
				(0.2)
FN rate x Stat. class				-.298
				(0.2)
Observations	629	629	629	629
Adjusted R^2	0.02	0.02	0.02	0.02

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Model	Prediction
Strict risk-aversion EU	Higher sensitivity to FN rates
Strict risk-aversion EU+prudence	Ratio of FN to FP sensitivities $\uparrow$ with π
Loss aversion	FP sensit. $\downarrow$ with π FP sensit. is lower than for risk-neutral (RN)
Probability weighting	FP sensit.>RN for low π FP sensit.<RN for high π FN sensit. is higher than RN for $\pi P(W\|B) < P(S=B) < 1/2$
Probability estimation bias	FP sensitivity decreases with π rel. to RN FN sensitivity increases with π rel. to RN Diff. WTP for treatments with eq. FP and FN frequencies

B   Figures

Figure 1: Average Blind Protection Response
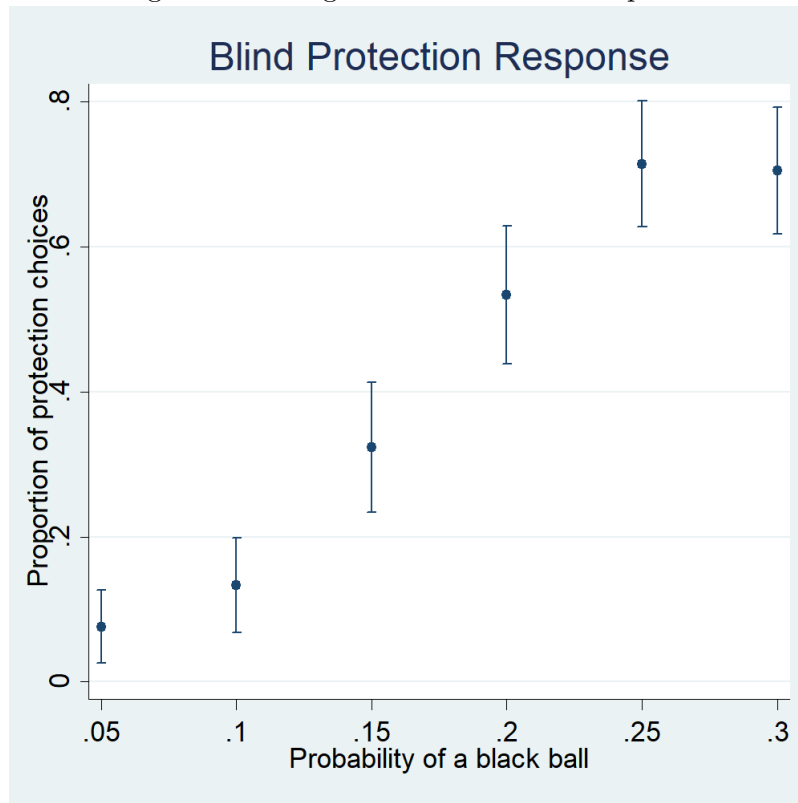
Figure 2: Average Informed Protection Response
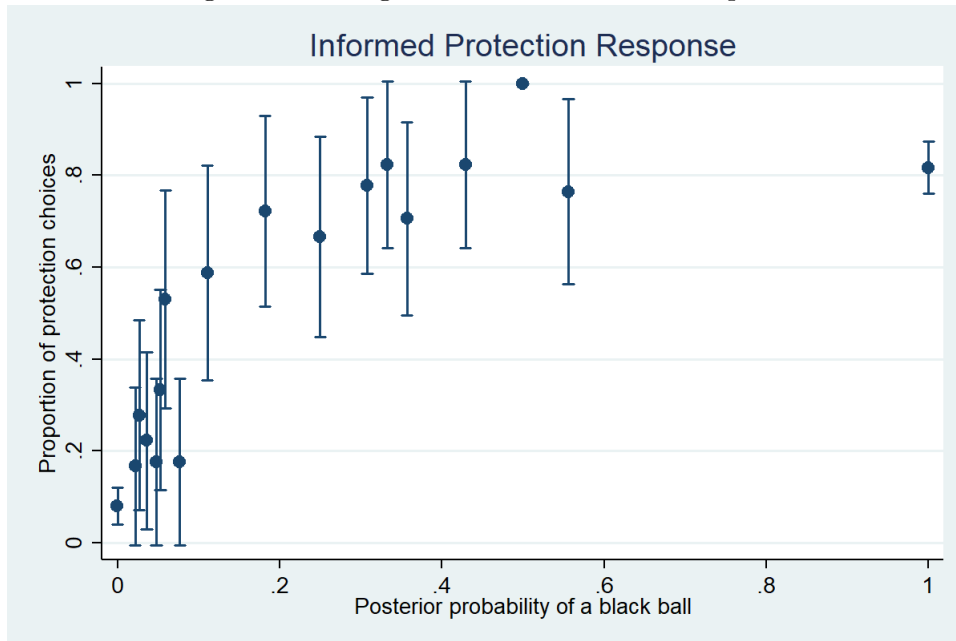
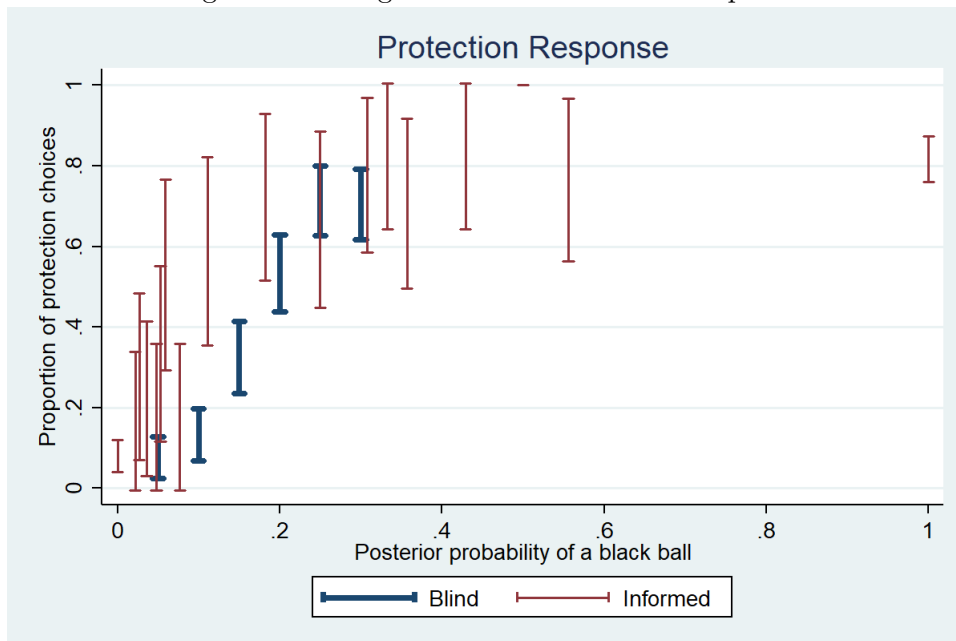Figure 3: Average Informed Protection Response

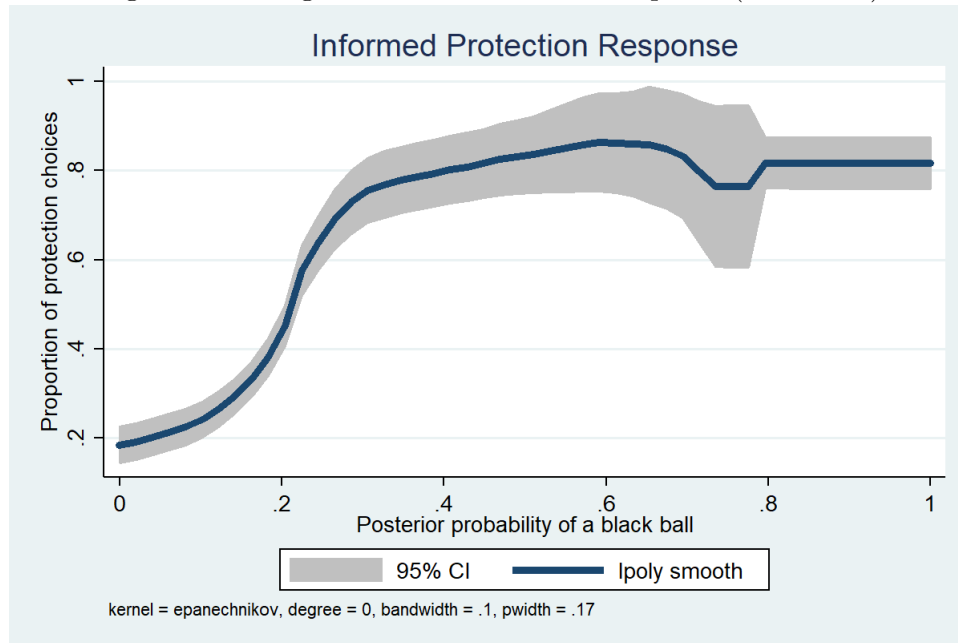Figure 4: Average Informed Protection Response (Smoothed)
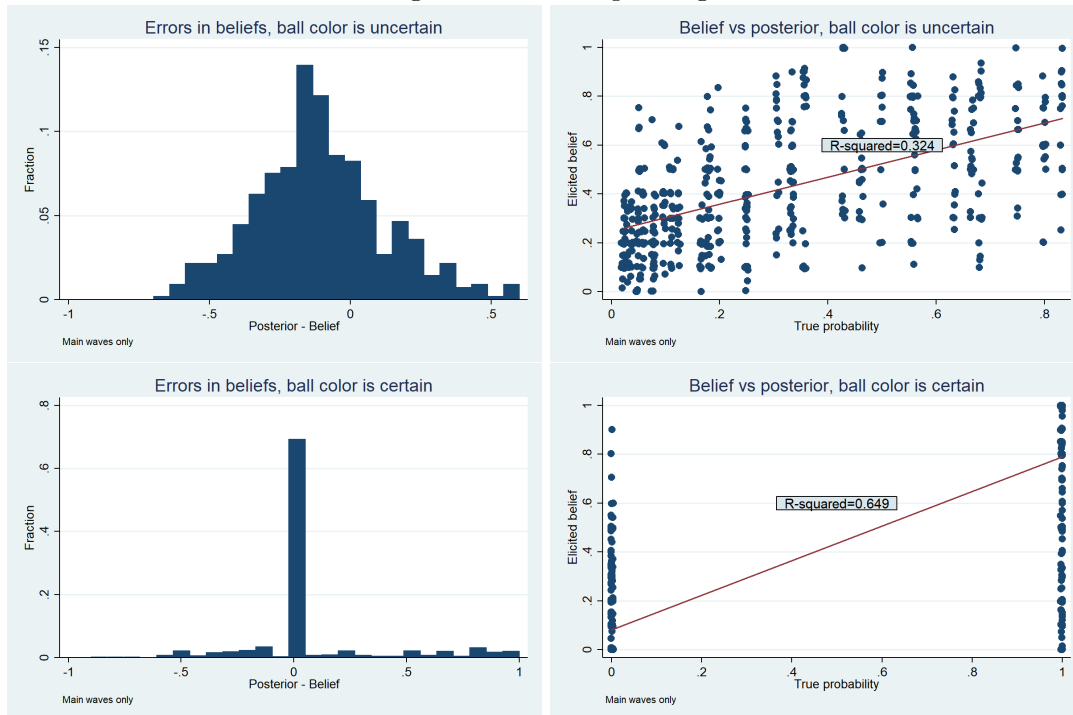

Figure 5: Belief Updating
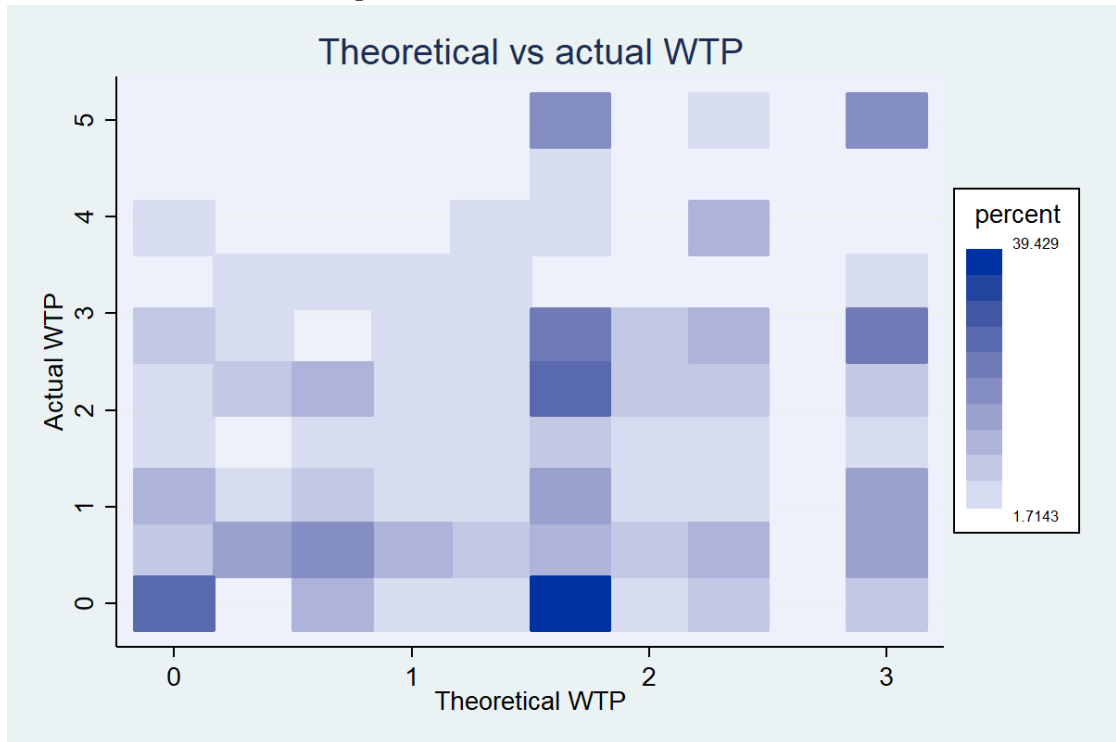
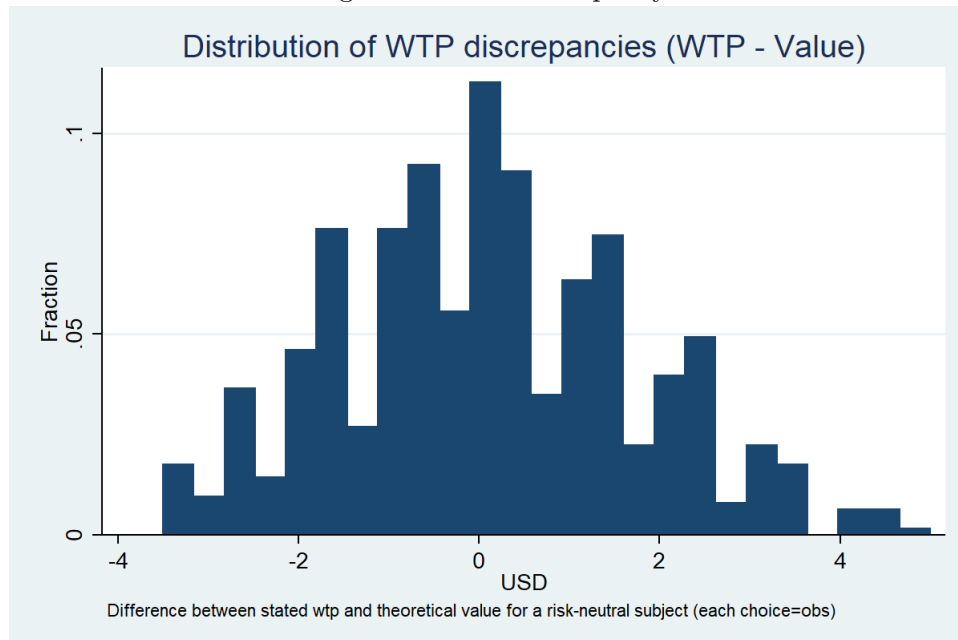Figure 6: Theoretical vs actual WTP
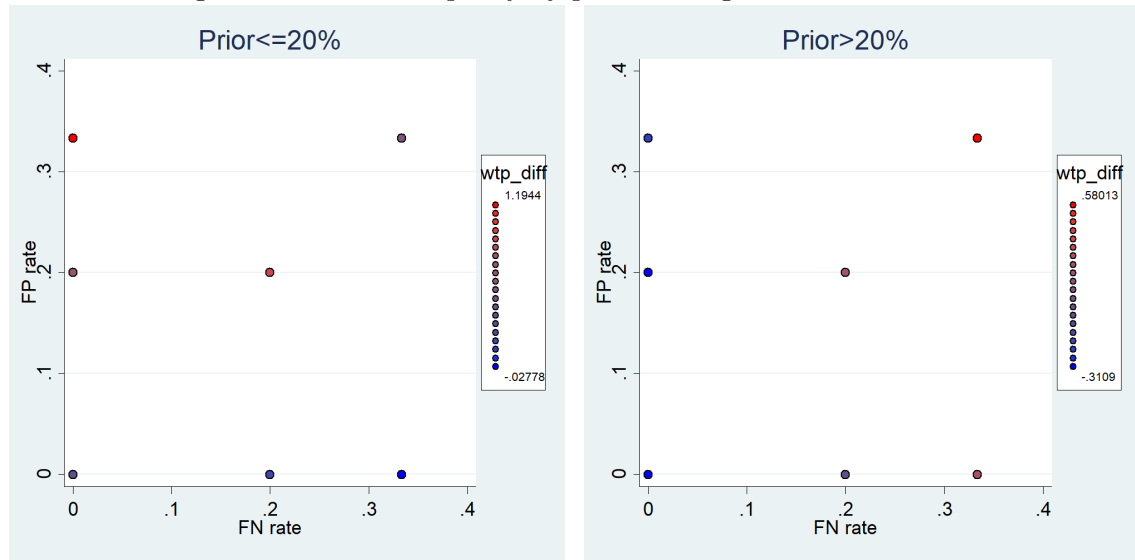

Figure 7: WTP discrepancy

Figure 8: WTP discrepancy by prior and signal characteristics

C   Appendix Tables

Table 13: Belief Elicitation: Discrepancy

	(1)	(2)	(3)	(4)	(5)	(6)
False neg. rate	-.016	-.016	.014	.014	.0562	.0554
	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
False pos. rate	-.919***	-.919***	-1.07***	-1.07***	-1.05***	-1.05***
	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
Good quiz			-.0469	-.0673		
			(0.0)	(0.0)		
Good quiz × False neg. rate			-.0463	-.0464		
			(0.1)	(0.1)		
Good quiz × False pos. rate			.286*	.284*		
			(0.2)	(0.2)		
Stat. class					.00193	.0127
					(0.0)	(0.0)
Stat. class × False neg. rate					-.127	-.126
					(0.1)	(0.1)
Stat. class × False pos. rate					.229	.226
					(0.2)	(0.2)
Constant	.076***	.0656***	.101***	.102***	.0751***	.0563
	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Prior prob dummies	No	Yes	No	Yes	No	Yes
Observations	630	630	630	630	630	630
Adjusted R^2	0.17	0.17	0.17	0.17	0.17	0.17

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 14: WTP for Information (Discrepancy, demographic variables)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
FP costs	.564***	.602***	.548***	.475**	.416**	.546***	.496***	.66***	.591***
	(0.1)	(0.2)	(0.2)	(0.2)	(0.2)	(0.1)	(0.1)	(0.2)	(0.2)
FN costs	-.22*	-.317*	-.0684	-.242	-.0701	-.285*	-.0318	-.037	.223
	(0.1)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.1)	(0.2)	(0.2)
Male		-.23	-.27						
		(0.4)	(0.4)						
Male × FP costs		-.126	-.131						
		(0.2)	(0.2)						
Male × FN costs		.244	.251						
		(0.3)	(0.2)						
Stat. class				-.186	-.226				
				(0.4)	(0.4)				
Stat. class × FP costs				.146	.141				
				(0.2)	(0.2)				
Stat. class × FN costs				.0344	.201				
				(0.3)	(0.2)				
>23 yrs						-.807**	-.747**		
						(0.4)	(0.3)		
>23 yrs × FP costs						.187	.148		
						(0.3)	(0.3)		
>23 yrs × FN costs						.454**	.387		
						(0.2)	(0.3)		
Good quiz								.316	.346
								(0.4)	(0.4)
Good quiz × FP costs								-.184	-.159
								(0.2)	(0.2)
Good quiz × FN costs								-.337	-.35
								(0.3)	(0.2)
Constant	-.108	-.0115	.356	.00585	.387	-.00545	.324	-.279	.0568
	(0.2)	(0.2)	(0.3)	(0.3)	(0.4)	(0.2)	(0.2)	(0.3)	(0.3)
Prior dummies	No	No	Yes	No	Yes	No	Yes	No	Yes
Observations	315	315	315	315	315	315	315	315	315
Adjusted R^2	0.05	0.04	0.11	0.04	0.12	0.06	0.12	0.04	0.11

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$