Measuring Beliefs under Ambiguity

Online Appendix

July 21, 2017

1 Classical statistical tests

1.1 Consistency

Table 1 shows the statistical tests for the comparison between the original and the repeated answer for the exchangeability task in Rotterdam (column (1)) and New York (column (3)) and for the certainty equivalence task in Rotterdam (column (2)) and New York (column (4)). Table 2 shows the results of a repeated-measure Anova with two within-subject factors: city (Rotterdam vs. New York) and taks (exchangeability vs. certainty equivalence).

	(1)	(2)	(3)	(4)
wilcoxon test (p-value)	0.710	0.217	0.965	0.321
Spearman correlation	0.736	0.747	0.823	0.669
p-value for correlation	0.000	0.000	0.000	0.000
Bayes factor	0.189	0.431	0.140	0.195

Table 1: Statistical tests for consistency checks

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Residuals	81.000	1823.280	22.510		
city	1.000	22.549	22.549	0.797	0.375
Residuals1	81.000	2291.951	28.296		
task	1.000	38.244	38.244	1.725	0.193
Residuals2	81.000	1796.256	22.176		
city:task	1.000	2.744	2.744	0.121	0.729
Residuals3	81.000	1843.756	22.762		

Table 2: repeated-measure ANOVA on consistency checks

Table 3 shows the statistical test for the comparison between Questions 1 and 13, used to test Model (1).

	Rotterdam	NYC
wilcoxon test (p-value)	1.000	0.287
Spearman correlation	0.819	0.812
p-value for correlation	0.000	0.000
Bayes factor	0.122	0.154

Table 3: Statistical tests for Questions 1 and 13

Table 4 shows the statistical test for the comparison between Questions 18 and 20, used to test the CRRA utility function.

	Rotterdam	NYC
wilcoxon test (p-value)	0.000	0.000
Spearman correlation	0.434	0.459
p-value for correlation	0.000	0.000
Bayes factor	1.699	482.653

Table 4: Statistical tests for Questions 18 and 20

1.2 Deterministic measurement of beliefs

Table 5 shows the results of the comparisons between the values of the first three elicited values of z (column (1) for the first one, column (2) for the second one, column (3) for the third one).

	(1)	(2)	(3)
wilcoxon test (p-value)	0.000	0.000	0.188
Bayes factor	9.421	1.077	0.161

Table 5: Statistical test for indifference values between Rotterdam and New-York

Table 6 shows the results of the comparison between the means and the variance of the distributions for Rotterdam and New York.

1.3 Stochastic measurement of beliefs

Table 7 shows the results of the comparison between the estimated parameters of the Beta distribution (parameters α and β) under the deterministic and the stochastic approach. Table 8 shows the results of the comparison between the implied moments of the Beta distribution under both approaches.

	mean	variance
wilcoxon test (p-value)	0.000	0.086
Bayes factor	39.647	0.214

Table 6: Statistical tests on Beta distribution moments, deterministic approach

	α^{Rott}	β^{Rott}	α^{NY}	β^{NY}
wilcoxon test (p-value)	0.023	0.019	0.674	0.637
Bayes factor	0.208	0.192	0.329	0.386

Table 7: Comparing deterministic and stochastic beliefs

Table 9 shows the results of the comparison between the means and the variance of the distributions for Rotterdam and New York.

1.4 Beliefs and attitudes

Table 10 shows the results of a repeated-measure Anova on the parameters and the moments of the beta distribution under the three approaches (deterministic approach, stochastic approach and complete elicitation approach).

Table 11 shows the results of the comparison between the estimated parameters of the Beta distribution (parameters α and β) under the deterministic and the complete elicitation approach. Table 12 shows the results of the comparison between the moments of the Beta distribution under the deterministic approach and the complete elicitation.

Table 13 shows the results of the comparison between the estimated parameters of the Beta distribution (parameters α and β) under the deterministic and the complete elicitation approach. Table 14 shows the results of the comparison between the moments of the Beta distribution under the deterministic approach and the complete elicitation.

To test for linearity of the utility function we ran a Wilcoxon test (p value: 0).

1.5 Distortion functions

Table 15 shows the results of the comparison of the parameters of the distortion functions between Rotterdam and New-York.

To test for perfect sensitivity ($g = 1$) we performed a Wilcoxon test (p value: 0.067 for Rotterdam and 0.17 for New-York).

To test for significant optimism/pessimism ($d = 1$) we performed a wilcoxon test (p value: 0 for Rotterdam and 0.002 for New-York).

To test the difference between error parameters for the exchangeability part and the certainty equivalence part, we performed a Wilcoxon test p-value: 0.

	$mean^{Rott}$	$variance^{Rott}$	$mean^{NY}$	$variance^{NY}$
wilcoxon test (p-value)	0.023	0.019	0.674	0.637
Bayes factor	0.208	0.192	0.329	0.386

Table 8: Comparing deterministic and stochastic beliefs, moments

	mean	variance
wilcoxon test (p-value)	0.000	0.086
Bayes factor	39.647	0.214

Table 9: Statistical tests on Beta distribution moments, stochastic approach

2 Random coefficients estimation

We estimated a random coefficients model to check the robustness of our individual estimates. We assumed lognormal distributions for error parameters, Beta distribution parameters and source function parameters. For the utility parameter, we assumed a normal distribution, because the utility parameter can be negative. For the variance-covariance matrix, we assumed that all non-diagonal elements were equal to zero, except for the Beta distribution parameters for which we allowed correlation between the α and β parameter. To be able to clearly separate these two coefficients, we assumed that the variance of the α parameter and the variance of the β parameter were the same in Rotterdam and New-York.

2.1 Estimated parameters

Table 16 shows the value of the estimated coefficients for the random coefficients model. Column 4 shows the values of the exponential of the estimated mean for the multivariate normal distribution. Standard errors for the transformed μ values were computed using the delta method (for parameter i the standard error is therefore computed as $se_i(\mu_i) \times exp(\mu_i)$).

2.2 Individual-level parameters

Because the value of the parameters are not easily interpretable, and not easily comparable with individual values obtained with other methods, Table 17 give the value of median, quartiles, mean and standard deviation for each parameter based on simulated posterior distributions at the individual level.
The individual values were obtained by computing the mean of the posterior distribution at the individual level. A posterior distribution is defined as the estimated distribution conditional on the choices made by subjects. For each individual, we first generate 1000 draws for the prior distribution parameters to take into account parameter uncertainty. These draws were based on the estimated parameters for the prior distribution and the variance-covariance matrix of the estimates. For each draw, we then compute the posterior distributions for

	Pr[>F], Rott	Pr[>F], NYC
alpha	0.447	0.300
beta	0.489	0.250
mean	0.859	0.276
variance	0.020	0.206

Table 10: ANOVA on the parameters of the beta distribution under the three elicitation approaches

	α^{Rott}	β^{Rott}	α^{NY}	β^{NY}
wilcoxon test (p-value)	0.140	0.125	0.941	0.948
Bayes factor	0.191	0.182	0.175	0.194

Table 11: Comparing deterministic and stochastic beliefs with attitudes

each individual and evaluate the mean of these posterior distribution. Then we averaged over draws to obtain individual values. Table 18 shows the distribution of the mean and the variance of temperature in Rotterdam and New-York implied by the simulated values of the Beta distributions.

2.3 Comparison of belief distributions between Rotterdam and New-York

Table 19 shows the comparison of the distribution of estimated Beta distributions parameters and moments of the beta distibution between Rotterdam and New-York, based on individual values (obtained with simulated posterior means).

2.4 Comparison of belief distributions between approaches

Table 20 shows the results of both an ANOVA on the differences between the 4 measurements for the beta distribution parameters and moments.

Tables 21 and 22 shows the Spearman correlations between beta parameters for Rotterdam and NYC. The upper part of each table shows the correlations for the α coefficient and the lower part of each table shows the correlations for the β coefficient.

2.5 Comparison of attitudes between the complete elicitation and the random coefficient model

Table 23 shows the results of the comparisons between the simulated posteriors of the random coefficient model and the individual estimates for the parameters of the distortion function. For utility, the p-value of a Wilcoxon test was equal to 0.128.

	$mean^{Rott}$	$variance^{Rott}$	$mean^{NY}$	$variance^{NY}$
wilcoxon test (p-value)	0.460	0.009	0.661	0.959
Bayes factor	0.130	0.815	0.219	0.271

Table 12: Comparing deterministic and stochastic beliefs with attitudes, moments

	α^{Rott}	β^{Rott}	α^{NY}	β^{NY}
wilcoxon test (p-value)	0.254	0.254	0.871	0.828
Bayes factor	0.123	0.123	0.156	0.149

Table 13: Comparing stochastic approach and complete elicitation

3 Stability of attitudes to assumptions about belief extremes

Figure 1 shows the empirical cumulative distribution function for utility under three specifications for the bounds of the beliefs distribution. Figure 2 displays the same information for optimism/pessimism and insentivity for Rotterdam and New-York temperatures.

Figure 1, Figure 2 and Table 24 show the results of Kolmogorov-Smirnov tests for the comparison of attitude parameters. Table 25 and 26 shows additional results including Wilcoxon test, Spearman correlation and Bayes factors .

	$mean^{Rott}$	$variance^{Rott}$	$mean^{NY}$	$variance^{NY}$
wilcoxon test (p-value)	0.497	0.194	0.134	0.694
Bayes factor	0.446	0.122	0.294	0.166

Table 14: Comparing stochastic approach and complete elicitation, moments

	Insensitivity	Optimism/Pessimisim
wilcoxon test (p-value)	0.80	0.01
Bayes factor	0.12	0.14

Table 15: Comparison of distortion functions

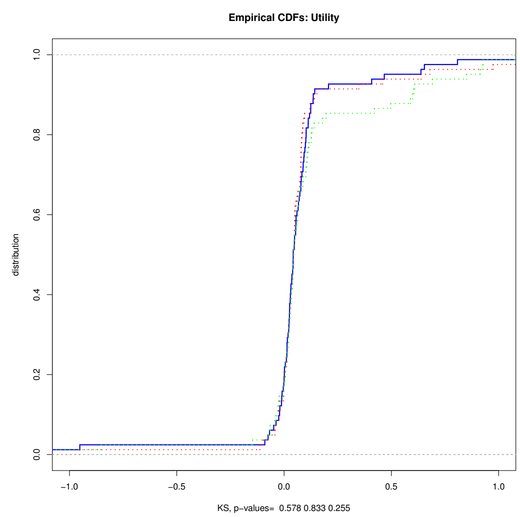

Figure 1: Distribution of utility parameters. Fixed bounds in blue. Elicited bounds in red. Estimated bounds in green. p-values of the Kolmogorov-Smirnov test indicated below the x-axis. The first value refers to the test fixed bounds (blue) vs. elicited bounds (red). The second value refers to the test fixed bounds (blue) vs. estimated bounds (green). The third value refers to the test elicited bounds (red) vs. estimated bounds (green).

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	μ parameter	σ parameter	ρ parameter	$exp(\mu)$ parameter
α^{Rott}	4.156	0.756	0.975	63.832
(se) α^{Rott}	0.057	0.028	0.003	3.655
α^{NY}	3.700		0.981	40.461
(se) α^{NY}	0.045		0.002	1.831
β^{Rott}	4.011	0.792		55.209
(se) β^{Rott}	0.057	0.027		3.158
β^{NY}	3.719			41.208
(se) β^{NY}	0.045			1.873
ϵ_{ex}	0.588	0.321		1.801
(se) ϵ_{ex}	0.026	0.028		0.046
λ	0.040	0.014		
(se) λ	0.004	0.002		
g^{Rott}	-0.497	-0.324		0.608
(se) g^{Rott}	0.039	0.013		0.024
g^{NY}	-0.372			0.689
(se) g^{NY}	0.034			0.023
d^{Rott}	0.298	0.415		1.347
(se) d^{Rott}	0.049	0.018		0.067
d^{NY}	0.169			1.184
(se) d^{NY}	0.045			0.053
ϵ_{ce}	1.566	0.340		4.786
(se) ϵ_{ce}	0.019	0.017		0.090

Table 16: Estimated parameters, binary RDU model, random coefficients model

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	median	Q1	Q3	mean	sd	% difference with $exp(\mu_i)$
α^{Rott}	66.997	45.105	98.737	86.246	76.896	0.000
α^{NY}	41.657	28.623	59.067	49.598	32.444	0.000
β^{Rott}	61.329	40.455	88.632	79.044	66.447	0.000
β^{NY}	42.837	27.617	64.485	50.811	35.637	0.000
ϵ_{ex}	1.892	1.616	2.237	1.950	0.478	0.000
λ	0.038	0.030	0.047	0.038	0.013	0.000
g^{Rott}	0.625	0.543	0.791	0.658	0.183	0.000
g^{NY}	0.701	0.565	0.867	0.742	0.239	0.000
d^{Rott}	1.436	1.159	1.862	1.552	0.552	0.000
d^{NY}	1.283	1.030	1.542	1.366	0.487	0.000
ϵ_{ce}	4.624	3.513	5.762	4.798	1.458	0.000

Table 17: Quantiles and moments for the estimated multivariate distribution of parameters, binary RDU model, random coefficients model, individual simulated posterior means

	Median	Q1	Q3
mean (Rotterdam)	2.440	0.901	4.270
mean (New-York)	-0.759	-2.606	1.998
variance (Rotterdam)	19.124	13.018	28.609
variance (New-York)	28.891	19.892	43.552

Table 18: Distribution of moments based on Beta distribution parameters, individual simulated posterior means, RDU

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	α	β	mean	variance
wilcoxon test (p-value)	0.000	0.000	0.000	0.000
Bayes factor	3324.088	217.420	1498902.425	1760890.140

Table 19: Statistical test for Beta distribution parameters and moments, comparison between Rotterdam and New-York, simulated individual posterior means

	Pr[>F], Rott	Pr[>F], NYC
alpha	0.731	0.101
beta	0.770	0.106
mean	0.958	0.513
variance	0.001	0.071

Table 20: ANOVA on belief measurement, comparison of the four approaches

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	deterministic	stochastic	complete	random coeff.
deterministic	1.000	0.732	0.726	0.442
stochastic	0.755	1.000	0.963	0.573
complete	0.743	0.954	1.000	0.561
random coeff.	0.435	0.612	0.616	1.000

Table 21: correlations between methods, Rotterdam. alpha parameter on the upper diagonal, beta parameter on the lower diagonal

	deterministic	stochastic	complete	random coeff.
deterministic	1.000	0.671	0.676	0.445
stochastic	0.663	1.000	0.967	0.694
complete	0.666	0.972	1.000	0.681
random coeff.	0.485	0.714	0.697	1.000

Table 22: correlations between methods, New-York, alpha parameter on the upper diagonal, beta parameter on the lower diagonal

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	g_{Rott}	d_{Rott}	g_{NYC}	d_{NYC}
wilcoxon test (p-value)	0.033	0.959	0.073	0.701
Bayes factor	15.248	0.753	12.022	0.447

Table 23: Individual estimation vs. random coefficient model, attitudes

	Fixed vs. Elicited	Fixed vs. Estimated
λ	0.578	0.833
g^{Rott}	0.129	0.454
g^{NY}	0.255	0.710
d^{Rott}	0.578	0.710
d^{NY}	0.345	0.255

Table 24: Fixed bounds vs. alternative hypothesis, K-S test p-values

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	λ	g^{Rott}	d^{Rott}	g^{NY}	d^{NY}
wilcoxon test	0.611	0.000	0.013	0.000	0.026
Spearman correlation	0.876	0.686	0.824	0.641	0.796
p-value for correlation	0.000	0.000	0.000	0.000	0.000
Bayes factor	0.212	0.505	0.293	39.103	0.368

Table 25: Comparison of estimated parameters with fixed bounds and elicited bounds

	λ	g^{Rott}	d^{Rott}	g^{NY}	d^{NY}
wilcoxon test	0.244	0.462	0.076	0.367	0.031
Spearman correlation	0.849	0.823	0.747	0.779	0.792
p-value for correlation	0.000	0.000	0.000	0.000	0.000
Bayes factor	0.419	0.579	0.274	0.281	0.231

Table 26: Comparison of estimated parameters with fixed bounds and estimated bounds

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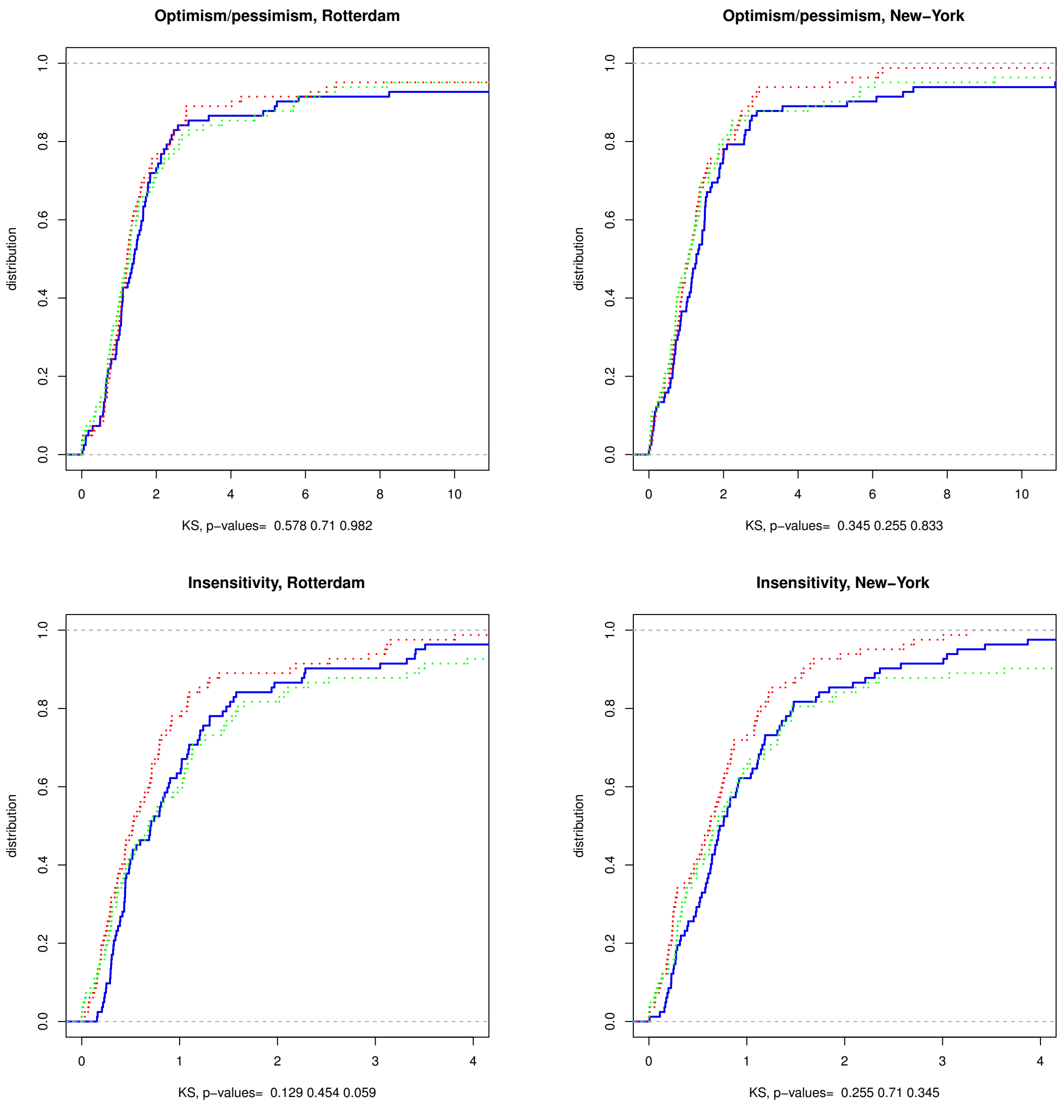

Figure 2: Source function parameters for Rotterdam and New York. Fixed bounds in blue. Elicited bounds in red. Estimated bounds in green. p-values of the Kolmogorov-Smirnov test indicated below the x-axis. The first value refers to the test fixed bounds (blue) vs. elicited bounds (red). The second value refers to the test fixed bounds (blue) vs. estimated bounds (green). The third value refers to the test elicited bounds (red) vs. estimated bounds (green).

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4 Individual estimates

The next table shows the results of the maximum likelihood estimations for each subject separately.

	e_{exc}	e_{ce}	α_{rott}	β_{rott}	α_{ny}	β_{ny}	λ	g_{rott}	d_{rott}	g_{nyc}	d_{nyc}
1	1.17	3.22	207.38	179.61	39.31	40.20	0.47	1.52	0.06	5.92	54.43
	(0.32)	(0.86)	(219.09)	(188.85)	(11.47)	(11.78)	(1.94)	(5.30)	(0.74)	(23.45)	(885.54)
2	0.95	2.52	246.98	235.04	110.24	122.03	0.03	0.25	1.55	0.18	2.09
	(0.19)	(0.77)	(275.59)	(261.01)	(58.83)	(65.37)	(0.03)	(0.27)	(0.97)	(0.07)	(0.59)
3	1.17	4.30	199.66	177.70	39.94	40.35	0.02	0.39	0.93	0.52	1.50
	(0.24)	(1.05)	(226.45)	(201.42)	(18.06)	(18.49)	(0.07)	(0.37)	(0.91)	(0.28)	(1.12)
4	1.16	1.85	65.26	59.73	25.92	25.93	0.10	1.19	15.40	1.36	10.90
	(0.40)	(0.41)	(36.88)	(33.24)	(4.91)	(4.92)	(0.06)	(0.68)	(13.62)	(0.57)	(10.86)
5	1.17	6.45	39.38	36.14	25.30	23.54	0.41	0.74	1.59	0.16	0.14
	(0.23)	(2.15)	(8.51)	(7.67)	(11.58)	(11.20)	(0.75)	(1.23)	(1.78)	(0.62)	(0.54)
6	1.64	4.99	127.90	137.15	23.48	25.14	0.12	0.39	0.60	0.17	1.50
	(0.39)	(1.74)	(99.37)	(106.50)	(5.48)	(5.87)	(0.07)	(0.19)	(0.36)	(0.07)	(0.82)
7	2.52	6.41	79.11	64.12	19.81	23.78	0.11	0.25	0.62	0.25	0.58
	(0.69)	(1.96)	(61.77)	(50.73)	(7.76)	(9.21)	(0.10)	(0.21)	(0.62)	(0.13)	(0.54)
8	1.14	3.09	77.90	67.56	31.65	43.91	0.08	0.42	0.65	0.91	0.25
	(0.43)	(0.70)	(35.88)	(30.83)	(9.73)	(13.75)	(0.03)	(0.20)	(0.19)	(0.17)	(0.11)
9	1.18	1.80	566.25	507.54	44.12	48.06	0.05	0.32	1.40	1.14	0.41
	(0.29)	(0.43)	(703.79)	(629.40)	(10.37)	(11.12)	(0.04)	(0.31)	(0.73)	(0.30)	(0.26)
10	2.61	6.64	12.87	8.63	15.32	10.74	−0.95	0.23	33.52	0.23	28.89
	(0.40)	(2.50)	(3.71)	(2.51)	(7.03)	(4.54)	(108.03)	(0.08)	(3801.40)	(0.11)	(3278.61)
11	0.80	4.44	31.26	35.40	30.15	28.34	0.21	3.40	0.11	2.08	0.20
	(0.28)	(0.65)	(7.10)	(7.05)	(8.56)	(7.87)	(0.50)	(7.05)	(0.67)	(4.20)	(0.93)
12	2.40	22.39	35.12	46.65	5.90	6.24	1.27	8.32	0.11	2.57	0.00
	(0.52)	(5.79)	(24.81)	(33.41)	(2.26)	(1.95)	(0.34)	(56.14)	(2.56)	(2.52)	(0.00)
13	1.87	4.05	34.86	31.69	16.60	18.13	0.02	0.29	1.09	0.64	0.72
	(0.48)	(1.19)	(16.76)	(15.29)	(5.70)	(6.12)	(0.02)	(0.11)	(0.27)	(0.15)	(0.18)
14	0.53	2.61	51.67	46.12	37.20	36.24	0.06	0.69	1.42	0.68	1.15
	(0.21)	(0.48)	(12.65)	(11.13)	(5.67)	(6.04)	(0.02)	(0.24)	(0.56)	(0.14)	(0.29)
15	1.32	3.39	29.12	26.05	12.92	13.27	0.00	0.71	1.47	0.89	1.56
	(0.25)	(0.82)	(13.12)	(11.46)	(3.20)	(3.33)	(0.02)	(0.23)	(0.48)	(0.17)	(0.40)
16	1.62	3.22	19.92	20.26	10.49	11.49	0.05	1.08	0.69	1.18	0.87
	(0.38)	(0.96)	(6.09)	(6.13)	(3.92)	(4.27)	(0.02)	(0.24)	(0.20)	(0.29)	(0.26)
17	1.14	2.33	155.33	155.85	143.87	134.03	0.03	0.90	2.21	0.33	2.71
	(0.42)	(0.55)	(118.76)	(118.75)	(109.82)	(104.19)	(0.06)	(0.70)	(1.96)	(0.24)	(1.36)
18	1.81	2.92	126.62	136.80	53.40	49.31	0.06	0.49	1.10	0.61	1.00
	(0.50)	(0.52)	(144.22)	(155.92)	(24.83)	(23.58)	(0.02)	(0.35)	(0.37)	(0.24)	(0.36)
19	0.98	4.44	23.57	19.84	21.97	17.51	0.07	0.52	1.41	0.49	1.01
	(0.36)	(1.33)	(3.77)	(3.09)	(3.96)	(3.21)	(0.03)	(0.14)	(0.44)	(0.13)	(0.30)

	e_{exc}	e_{ce}	α_{rott}	β_{rott}	α_{ny}	β_{ny}	λ	g_{rott}	d_{rott}	g_{nyc}	d_{nyc}
20	1.59	3.61	335.04	261.17	192.49	164.39	−0.01	0.16	2.41	0.40	1.49
	(0.31)	(0.78)	(729.58)	(569.12)	(200.84)	(171.18)	(0.05)	(0.32)	(1.13)	(0.22)	(0.79)
21	0.84	1.63	32.19	28.13	39.99	42.40	−0.07	1.09	1.65	0.92	1.52
	(0.24)	(0.42)	(6.04)	(5.70)	(8.86)	(9.01)	(0.07)	(0.21)	(1.00)	(0.16)	(0.93)
22	0.00	2.51	133.56	150.49	160.16	208.44	−0.01	0.30	1.70	0.01	2.55
23	2.95	3.66	29.87	23.92	38.27	43.20	0.04	0.85	1.50	1.12	0.52
	(0.47)	(0.66)	(21.64)	(17.29)	(44.50)	(49.80)	(0.04)	(0.39)	(0.60)	(0.71)	(0.38)
24	0.86	2.35	34.12	40.26	29.97	42.66	−0.00	3.32	5.18	1.48	0.68
	(0.26)	(0.45)	(9.38)	(10.80)	(6.80)	(9.81)	(0.05)	(2.40)	(8.01)	(0.44)	(0.40)
25	0.05	2.91	104.94	113.08	179.61	211.11	0.02	0.35	1.23	0.46	1.17
	(0.26)	(0.62)	(61.30)	(71.84)	(236.72)	(276.80)	(0.04)	(0.15)	(0.72)	(0.44)	(0.59)
26	1.96	2.38	262.46	285.78	165.46	178.10	0.03	1.02	0.30	0.52	1.35
	(0.35)	(0.55)	(629.99)	(684.88)	(261.73)	(275.85)	(0.05)	(0.97)	(0.29)	(0.64)	(1.18)
27	1.21	5.40	38.42	32.20	82.94	67.40	0.64	3.51	0.18	1.74	0.10
	(0.39)	(1.33)	(8.14)	(6.94)	(50.00)	(41.10)	(0.06)	(1.20)	(0.47)	(0.86)	(0.12)
28	3.18	8.69	51.89	57.85	15.39	27.92	0.07	0.30	0.64	1.11	0.12
	(0.87)	(1.41)	(60.99)	(66.29)	(8.40)	(15.57)	(0.05)	(0.36)	(0.48)	(0.45)	(0.12)
29	1.75	4.71	25.01	25.01	20.16	20.00	0.65	2.25	0.02	4.57	22.35
	(0.58)	(0.94)	(7.53)	(7.56)	(6.68)	(6.52)	(1.01)	(3.33)	(0.12)	(7.11)	(125.73)
30	1.97	6.76	45.74	59.18	62.94	76.36	−0.02	0.16	2.05	0.23	1.91
	(0.44)	(1.48)	(30.13)	(39.99)	(43.32)	(50.36)	(0.07)	(0.08)	(1.22)	(0.14)	(1.32)
31	2.87	4.94	20.55	17.19	12.34	9.52	−0.00	1.10	1.05	0.83	1.43
	(0.60)	(0.80)	(12.94)	(11.52)	(4.50)	(3.55)	(0.02)	(0.44)	(0.59)	(0.23)	(0.43)
32	1.01	5.82	86.39	96.68	82.02	114.22	−0.09	0.24	5.23	0.28	2.76
	(0.41)	(1.80)	(38.12)	(42.71)	(33.02)	(45.42)	(0.09)	(0.11)	(3.23)	(0.09)	(1.92)
33	1.40	5.09	74.11	56.22	32.80	23.16	0.08	0.44	0.57	0.63	0.64
	(0.44)	(1.03)	(42.25)	(32.11)	(8.62)	(6.31)	(0.06)	(0.25)	(0.41)	(0.26)	(0.42)
34	1.47	3.60	56.71	48.18	18.66	23.23	0.05	0.83	1.02	1.84	0.63
	(0.35)	(0.44)	(29.29)	(24.76)	(3.62)	(4.60)	(0.05)	(0.36)	(0.58)	(0.76)	(0.35)
35	0.72	2.94	151.97	148.56	94.59	133.67	0.00	0.21	3.41	1.10	1.32
	(0.36)	(0.72)	(74.45)	(71.91)	(82.51)	(118.17)	(0.06)	(0.11)	(1.41)	(0.64)	(0.96)
36	1.50	2.71	57.09	48.99	39.86	41.39	0.04	0.89	2.58	0.58	1.18
	(0.53)	(0.67)	(28.19)	(23.99)	(14.49)	(14.80)	(0.04)	(0.43)	(1.51)	(0.16)	(0.51)
37	1.20	2.62	51.08	45.05	31.82	35.15	0.14	2.27	0.94	3.87	0.02
	(0.31)	(0.49)	(16.93)	(15.43)	(7.78)	(8.90)	(0.13)	(1.88)	(1.18)	(2.35)	(0.06)
38	1.56	5.47	34.15	31.48	16.78	16.73	0.04	0.44	1.10	0.67	1.24
	(0.29)	(1.33)	(20.78)	(19.40)	(8.16)	(8.19)	(0.04)	(0.20)	(0.46)	(0.26)	(0.47)
39	1.93	2.87	52.37	45.77	71.83	70.02	0.03	0.45	1.02	0.37	1.27
	(0.52)	(0.63)	(22.64)	(19.94)	(56.80)	(55.28)	(0.02)	(0.13)	(0.23)	(0.18)	(0.32)
40	1.47	3.83	68.46	58.58	31.64	25.63	0.01	0.50	1.78	0.48	2.00
	(0.31)	(0.80)	(42.36)	(36.60)	(8.83)	(7.61)	(0.03)	(0.23)	(0.63)	(0.10)	(0.58)
41	0.83	3.09	17.10	14.86	10.90	9.86	0.04	0.97	2.28	1.40	2.59
	(0.32)	(0.74)	(1.71)	(1.48)	(1.77)	(2.04)	(0.03)	(0.20)	(0.64)	(0.32)	(0.98)
42	1.75	2.47	63.68	61.70	138.60	129.03	0.01	0.52	2.00	0.19	1.99

	e_{exc}	e_{ce}	α_{rott}	β_{rott}	α_{ny}	β_{ny}	λ	g_{rott}	d_{rott}	g_{nyc}	d_{nyc}
	(0.53)	(0.49)	(32.30)	(30.88)	(152.29)	(142.12)	(0.03)	(0.21)	(0.61)	(0.16)	(0.57)
43	1.18	2.84	39.51	36.33	32.73	29.51	0.09	0.80	1.36	0.77	1.84
	(0.19)	(0.65)	(20.99)	(18.04)	(8.47)	(7.71)	(0.04)	(0.38)	(0.58)	(0.24)	(0.63)
44	0.93	1.74	442.75	392.32	369.42	308.53	0.10	0.32	1.10	0.27	1.49
	(0.34)	(0.41)	(1074.03)	(954.32)	(461.55)	(384.30)	(0.09)	(0.68)	(0.95)	(0.29)	(0.85)
45	1.11	0.95	93.23	75.87	31.85	29.32	−0.04	0.45	8.25	0.90	5.31
	(0.29)	(0.50)	(62.65)	(50.61)	(10.45)	(10.26)	(0.04)	(0.27)	(2.89)	(0.25)	(1.84)
46	0.02	3.68	142.32	142.40	257.89	300.81	0.07	0.33	1.84	0.23	1.43
	(6.54)	(0.71)	(9.30)	(42.19)	(321.94)	(309.13)	(0.06)	(0.22)	(1.56)	(0.78)	(4.39)
47	1.04	1.38	59.85	68.75	94.55	119.62	0.12	4.36	1.77	3.05	0.16
	(0.19)	(0.45)	(38.70)	(43.40)	(81.24)	(103.64)	(0.12)	(3.61)	(2.46)	(2.28)	(0.30)
48	0.89	4.33	27.01	22.31	25.58	23.78	0.05	0.70	1.27	0.63	0.86
	(0.19)	(1.09)	(13.61)	(11.18)	(3.26)	(3.24)	(0.03)	(0.27)	(0.42)	(0.16)	(0.34)
49	1.72	4.04	18.43	14.56	14.68	19.16	0.11	1.44	0.77	2.36	0.07
	(0.38)	(0.74)	(5.65)	(4.15)	(5.00)	(6.51)	(0.06)	(0.73)	(0.48)	(0.97)	(0.09)
50	0.00	2.66	56.49	69.02	49.21	67.82	0.14	1.20	1.06	1.71	1.65
	(88.46)	(0.71)	(315.16)	(264.09)	(235.10)	(323.98)	(0.14)	(15.33)	(43.05)	(6.62)	(24.03)
51	1.20	4.84	60.73	48.31	50.43	44.12	0.01	0.43	2.87	0.32	2.56
	(0.41)	(0.87)	(96.50)	(73.06)	(17.68)	(15.92)	(0.05)	(0.58)	(1.48)	(0.14)	(1.64)
52	0.75	2.36	194.25	154.81	94.83	75.79	−4.00	0.79	103.99	0.72	154.05
	(0.31)	(0.55)	(89.92)	(70.84)	(36.40)	(29.87)	(4445.31)	(0.37)	(115621.09)	(0.26)	(171268.42)
53	1.31	1.41	30.20	24.33	25.70	21.58	0.10	1.55	4.87	1.47	1.89
	(0.29)	(0.48)	(7.82)	(6.32)	(10.36)	(7.96)	(0.04)	(0.50)	(2.61)	(0.52)	(0.70)
54	0.85	2.62	25.78	26.25	10.55	15.72	0.01	1.01	1.48	1.45	0.77
	(0.26)	(0.55)	(6.07)	(6.31)	(1.53)	(2.31)	(0.03)	(0.28)	(0.59)	(0.37)	(0.31)
55	0.52	2.54	140.77	133.78	172.07	169.40	0.09	0.43	0.99	0.39	0.79
	(0.17)	(0.57)	(73.80)	(71.11)	(81.54)	(80.59)	(0.04)	(0.18)	(0.36)	(0.13)	(0.29)
56	0.95	4.79	156.64	143.27	67.83	59.64	0.08	0.22	0.91	0.26	1.27
	(0.30)	(0.70)	(118.39)	(110.71)	(23.49)	(20.29)	(0.07)	(0.20)	(0.63)	(0.12)	(0.81)
57	0.81	3.16	42.84	40.94	53.45	52.37	0.04	1.02	1.30	0.71	1.43
	(0.21)	(0.67)	(10.75)	(10.87)	(10.99)	(10.90)	(0.04)	(0.29)	(0.64)	(0.21)	(0.59)
58	2.27	6.00	35.45	24.97	32.18	23.50	0.81	3.05	0.49	3.01	0.14
	(0.51)	(0.87)	(21.10)	(15.39)	(14.49)	(11.34)	(0.00)	(2.46)	(3.37)	(1.20)	(0.38)
59	1.41	5.33	23.98	19.97	58.07	45.14	0.10	1.24	1.60	0.54	1.14
	(0.41)	(0.77)	(5.77)	(4.82)	(30.89)	(23.84)	(0.10)	(0.58)	(1.04)	(0.35)	(0.84)
60	1.10	3.78	50.35	45.04	47.03	53.16	−0.02	0.30	2.47	0.29	1.50
	(0.30)	(0.69)	(11.76)	(9.98)	(21.98)	(25.33)	(0.03)	(0.08)	(0.77)	(0.09)	(0.54)
61	1.08	5.15	67.34	54.81	40.10	42.54	0.01	0.34	2.13	0.71	1.89
	(0.28)	(1.09)	(33.36)	(27.39)	(11.04)	(11.44)	(0.05)	(0.17)	(1.20)	(0.31)	(1.16)
62	2.05	2.90	129.11	117.95	193.39	181.86	0.03	0.48	5.82	0.11	2.70
	(0.40)	(0.64)	(131.00)	(119.99)	(128.03)	(121.81)	(0.06)	(0.47)	(5.40)	(0.02)	(1.07)
63	0.30	3.25	85.46	78.80	53.00	57.74	0.06	0.44	0.70	0.57	0.57
	(0.29)	(0.77)	(15.43)	(14.40)	(9.08)	(10.07)	(0.03)	(0.09)	(0.24)	(0.13)	(0.21)
64	1.26	3.17	92.27	80.22	40.25	37.73	0.09	0.56	0.93	0.60	0.85
	(0.42)	(0.93)	(62.31)	(54.67)	(13.63)	(13.13)	(0.04)	(0.35)	(0.58)	(0.15)	(0.28)

	e_{exc}	e_{ce}	α_{rott}	β_{rott}	α_{ny}	β_{ny}	λ	g_{rott}	d_{rott}	g_{nyc}	d_{nyc}
65	1.53	2.03	22.56	22.31	27.81	32.79	0.02	1.97	1.72	3.15	0.65
	(0.31)	(0.54)	(7.31)	(7.21)	(21.56)	(25.79)	(0.04)	(0.63)	(0.81)	(1.61)	(0.71)
66	2.54	3.66	13.38	12.31	22.74	17.90	0.12	1.58	0.59	1.16	2.00
	(0.37)	(0.77)	(6.10)	(5.76)	(9.83)	(8.50)	(0.06)	(0.74)	(0.32)	(0.51)	(1.31)
67	0.91	3.48	48.57	42.63	19.35	21.19	0.02	0.46	1.65	0.69	1.13
	(0.22)	(0.65)	(16.34)	(14.74)	(3.50)	(3.75)	(0.03)	(0.13)	(0.53)	(0.13)	(0.34)
68	2.01	3.71	37.71	24.37	24.08	26.55	−0.02	0.29	1.33	0.28	1.53
	(0.47)	(1.53)	(27.91)	(17.76)	(9.35)	(10.23)	(0.02)	(0.17)	(0.37)	(0.08)	(0.38)
69	0.58	1.89	108.01	70.92	341.51	256.82	0.14	3.41	142.05	0.65	6.82
	(0.22)	(0.51)	(33.47)	(22.32)	(739.04)	(554.36)	(0.17)	(2.94)	(589.63)	(1.38)	(15.40)
70	1.19	5.34	73.00	58.12	33.04	28.91	0.00	1.21	0.49	0.76	0.71
	(0.32)	(1.11)	(32.47)	(26.38)	(13.59)	(11.71)	(0.04)	(0.51)	(0.38)	(0.22)	(0.37)
71	1.23	1.50	25.22	24.12	47.62	51.42	0.09	4.40	0.79	3.43	0.07
	(0.35)	(0.51)	(6.24)	(5.95)	(16.54)	(16.78)	(0.08)	(1.97)	(0.62)	(1.98)	(0.12)
72	0.74	1.95	47.13	43.89	50.29	50.95	−0.05	1.31	37.83	0.83	7.09
	(0.33)	(0.49)	(10.34)	(9.07)	(35.41)	(34.20)	(0.08)	(0.75)	(75.50)	(0.52)	(4.46)
73	1.76	2.41	80.98	75.07	130.57	125.27	0.07	1.94	1.65	1.04	0.83
	(0.46)	(0.45)	(48.24)	(46.02)	(143.16)	(137.08)	(0.07)	(1.36)	(1.85)	(0.61)	(0.52)
74	1.54	4.15	53.72	60.57	20.81	22.38	0.04	0.60	1.07	1.31	1.09
	(0.32)	(0.56)	(24.92)	(27.53)	(5.56)	(5.94)	(0.05)	(0.41)	(0.57)	(0.54)	(0.69)
75	0.92	3.25	32.12	29.53	20.76	16.59	0.05	0.70	1.06	0.80	1.69
	(0.21)	(0.56)	(9.78)	(9.09)	(4.54)	(3.17)	(0.03)	(0.21)	(0.37)	(0.34)	(1.02)
76	1.43	0.71	187.66	169.33	35.35	31.02	0.02	2.28	25.61	2.21	6.10
	(0.37)	(0.58)	(237.66)	(209.76)	(9.74)	(8.55)	(0.03)	(3.55)	(121.88)	(0.60)	(3.12)
77	2.10	4.42	25.41	21.56	13.11	11.85	0.03	1.31	0.65	1.33	1.04
	(0.46)	(0.74)	(14.64)	(12.42)	(4.16)	(3.70)	(0.04)	(0.51)	(0.37)	(0.46)	(0.49)
78	1.83	5.02	27.00	18.92	22.88	16.47	0.08	0.87	1.75	0.80	0.67
	(0.52)	(1.35)	(7.94)	(5.77)	(6.09)	(4.08)	(0.05)	(0.31)	(0.87)	(0.37)	(0.30)
79	1.21	3.52	37.00	34.35	28.22	27.00	0.04	0.81	2.12	1.19	3.58
	(0.33)	(0.62)	(11.56)	(11.10)	(8.44)	(8.03)	(0.07)	(0.36)	(1.29)	(0.57)	(2.03)
80	1.45	1.97	195.43	236.31	100.64	112.73	−0.07	0.31	2.37	0.20	2.89
	(0.78)	(0.57)	(126.81)	(154.15)	(83.61)	(94.43)	(0.04)	(0.12)	(0.92)	(0.13)	(1.02)
81	1.03	2.60	22.30	19.54	12.18	14.24	0.10	1.48	0.67	2.31	0.43
	(0.35)	(0.47)	(5.05)	(4.27)	(1.67)	(1.98)	(0.04)	(0.51)	(0.28)	(0.71)	(0.22)
82	1.16	2.87	187.17	153.05	48.76	57.68	−0.01	0.37	1.83	1.06	0.71
	(0.28)	(0.47)	(206.07)	(169.75)	(18.96)	(22.49)	(0.06)	(0.27)	(1.15)	(0.34)	(0.52)

Table 27: Individual Estimates