

**Inflated Reputations: Uncertainty, Leniency & Moral
Wiggle Room in Trader Feedback Systems**

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Supplementary material for online publication

1 APPENDIX A – SUPPLEMENTARY TABLES

Honest seller	Baseline	Uncertainty	Baseline	Uncertainty
Feedback score	0.630 ^{***}	0.494 ^{***}	0.732 ^{***}	0.626 ^{***}
	(9.824)	(8.329)	(8.655)	(9.260)
# Feedbacks			-0.088	-0.028
			(-1.304)	(-0.478)
Announced			-0.023 [*]	-0.038 ^{***}
			(-2.473)	(-4.872)
Period			0.015	-0.002
			(0.922)	(-0.183)
Intercept	-1.471 ^{***}	-1.838 ^{***}	0.301	1.171
	(-8.165)	(-8.892)	(0.365)	(1.889)
<i>N</i>	608	571	608	571
pseudo <i>R</i> ²	0.25	0.16	0.29	0.22
% correctly classified	78.9	71.3	82.9	72.5

Table 1: Probit regression on honest seller. Periods 1-35; *t* statistics in parentheses; ⁺ $p < 0.1$, ^{*} $p < 0.05$, ^{} $p < 0.01$, ^{***} $p < 0.001$.**

Expected quality	Model 1	Model 2	Model 3
Uncertainty	-0.436 (-0.212)	0.074 (0.025)	8.591 (1.413)
Feedback score	5.344*** (16.783)	5.413*** (12.286)	5.370*** (16.873)
Announced quality	0.206*** (6.217)	0.205*** (6.197)	0.253*** (5.699)
Period	-0.025 (-0.632)	-0.026 (-0.650)	-0.025 (-0.628)
Feedback score X Uncertainty		-0.162 (-0.255)	
Announced X Uncertainty			-0.104 (-1.572)
Intercept	38.758*** (11.538)	38.560*** (10.832)	34.566*** (8.147)
<i>N</i>	2358	2358	2358
R ² overall	0.216	0.216	0.219

Table 2: Random-effects regression on expected quality. Observations where no bid was submitted are excluded. Periods 1-35; *t* statistics in parentheses; * $p < 0.05$, ** $p < 0.01$, * $p < 0.001$.**

Price	Model 1	Model 2	Model 3
Uncertainty	-1.482 (-0.306)	-7.615 (-0.892)	40.107 (1.832)
Feedback score	10.913*** (10.124)	10.034*** (6.806)	11.004*** (10.221)
Announced	0.724*** (6.016)	0.723*** (6.002)	0.923*** (5.844)
Period	0.431*** (3.412)	0.440*** (3.472)	0.430*** (3.411)
Feedback score X Uncertainty		1.838 (0.871)	
Announced X Uncertainty			-0.474 (-1.944)
Intercept	12.814 (1.098)	15.990 (1.309)	-4.968 (-0.336)
<i>N</i>	1075	1075	1075
Log likelihood	-4315.2	-4314.8	-4313.3

Table 3: Random effects Tobit regressions with price (100-300) as dependent variable. Periods 1-35; *t* statistics in parentheses; + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, * $p < 0.001$.**

Shipped quality	Model 1	Model 2	Model 3
Uncertainty	-12.605 ⁺ (-1.688)	-12.307 ⁺ (-1.888)	28.977 ⁺ (1.923)
Period	-0.206 [*] (-2.350)	-0.289 ^{***} (-3.294)	-0.283 ^{**} (-3.229)
Announced		0.539 ^{***} (6.634)	0.774 ^{***} (6.844)
Announced X Uncertainty			-0.480 ^{**} (-3.006)
Intercept	83.348 ^{***} (15.117)	38.340 ^{***} (4.601)	17.983 ⁺ (1.686)
<i>N</i>	1400	1400	1400
Log likelihood	-5742.8	-5720.8	-5716.3

Table 4: Random effects tobit regressions with shipped (0-100) as dependent variable. Periods 1-35; *t* statistics in parentheses; ⁺ $p < 0.1$, ^{*} $p < 0.05$, ^{} $p < 0.01$, ^{***} $p < 0.001$.**

Efficiency	Model 1	Model 2	Model 3
Uncertainty	-0.157 [*] (-2.043)	-0.155 [*] (-2.310)	0.090 (0.566)
Period	0.001 (0.599)	-0.000 (-0.287)	-0.000 (-0.244)
Announced		0.006 ^{***} (6.429)	0.007 ^{***} (5.768)
Announced X Uncertainty			-0.003 ⁺ (-1.678)
Intercept	0.689 ^{***} (12.119)	0.226 ^{**} (2.580)	0.105 (0.922)
<i>N</i>	1400	1400	1400
Log likelihood	-685.3	-664.6	-663.2

Table 5: Random effects tobit regressions with efficiency (0-1) as dependent variable. Periods 1-35; *t* statistics in parentheses; ⁺ $p < 0.1$, ^{*} $p < 0.05$, ^{} $p < 0.01$, ^{***} $p < 0.001$.**

	(1)	(2)	(3)	(4)	(5)	(6)
	Feedback	Feedback	Feedback	Shipped	Shipped	Shipped
Fill ratio	3.207*** (19.156)	3.204*** (19.520)	3.205*** (19.538)			
FB score seller	0.173*** (3.798)	0.186*** (4.133)	0.186*** (4.142)			
Uncertainty	-0.361+ (-1.821)	-0.382* (-1.973)	-0.326 (-0.946)	0.683 (0.782)	1.173 (1.234)	2.736 (0.935)
Period	0.007 (1.320)	0.005 (0.826)	0.005 (0.731)	-0.282** (-2.848)	-0.286** (-3.102)	-0.285** (-3.048)
Last FB received		0.005 (0.142)	0.013 (0.288)			
Uncertainty X Last FB			-0.017 (-0.223)			
Announced				0.312*** (4.081)	0.285*** (3.584)	0.281*** (3.583)
Last shipped quality				0.328*** (5.948)	0.311*** (5.580)	0.310*** (5.556)
Average seller fill ratio				55.111*** (12.272)	57.598*** (12.460)	57.534*** (12.581)
Own FB score				2.776*** (3.971)	2.630*** (4.033)	2.640*** (4.069)
Last received quality					0.064* (2.571)	0.075*** (4.628)
Uncertainty X last received quality						-0.021 (-0.482)
Intercept	0.163 (0.747)	0.179 (0.687)	0.153 (0.569)	-28.664*** (-3.734)	-31.342*** (-4.368)	-31.818*** (-4.308)
<i>N</i>	685	661	661	1227	1190	1190

Table 6: Random effects regressions with dependent variable feedback rating in models (1) to (3) and shipped quality in models (4) to (6). Periods 1-35; clustered standard errors at the matching group level; t statistics in parentheses; + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, * $p < 0.001$.**

Neither buyers nor sellers had any ID variables shown to each other; the only information buyers received about sellers were the feedback score and the number of ratings, which makes explicit reciprocity between traders difficult. The random effects regressions in Table 6 analyze whether there is implicit reciprocity in feedback giving and shipping quality decisions as subjects play within matching groups of six. Models (1) to (3) show that there is no significant influence of the last feedback a subject received in the role of a seller on the feedback rating he or she leaves as a buyer. The last received quality in the role of a buyer positively influences the shipped quality in the next round as a seller (models (4) to (6)). However, the effect is economically small (a change in the last received quality of 10

percentage points increased the shipped quality by about 0.7 percentage points). Moreover, our results mainly derived from treatment effects, and neither the effect of last received feedback nor the effect of last received quality differs between the treatments. We also note that the positive correlation might also reflect learning about the market norm for quality.

Feedback rating	Shortfill (50)	Shortfill (60)	Shortfill (70)	Shortfill (90)
Uncertainty	0.917** (2.871)	1.084** (3.217)	1.231*** (3.632)	1.349*** (3.546)
Fill ratio	9.463*** (9.811)	10.420*** (8.944)	13.064*** (8.458)	16.457* (2.376)
Announced	0.024* (2.123)	0.022+ (1.927)	0.015 (1.273)	0.009 (0.539)
Price	-0.001 (-0.432)	-0.005 (-1.368)	-0.005 (-1.439)	-0.006 (-1.546)
Period	-0.030** (-2.830)	-0.032** (-3.033)	-0.025* (-2.355)	-0.014 (-0.960)
Intercept	-7.868*** (-6.014)	-8.213*** (-5.969)	-10.248*** (-6.393)	-12.927* (-2.036)
<i>N</i>	260	242	224	108
Log likelihood	-370.5	-357.4	-334.7	-166.6

Table 7: Robustness checks for the random effects Tobit regressions with submitted feedback ratings (1-5) as dependent variable for cutoff values for the Shortfill category of 50, 60, 70, and 90%. Periods 1-35; t statistics in parentheses; + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, * $p < 0.001$.**

Silence	Shortfill (50)	Shortfill (60)	Shortfill (70)	Shortfill (90)
Uncertainty	0.704** (2.880)	0.714** (2.952)	0.668** (2.666)	0.522** (2.629)
Announced	0.004 (0.496)	0.002 (0.273)	-0.001 (-0.126)	-0.017+ (-1.703)
Fill ratio	2.640*** (4.016)	2.611** (3.210)	3.964*** (3.475)	-8.072+ (-1.784)
Price	-0.005* (-2.064)	-0.005* (-2.065)	-0.005* (-1.978)	-0.002 (-0.777)
Period	-0.005 (-0.766)	-0.003 (-0.422)	-0.003 (-0.434)	0.018+ (1.838)
Intercept	-2.605** (-2.826)	-2.485* (-2.500)	-3.438** (-2.839)	8.748* (2.137)
<i>N</i>	453	430	398	207
Log likelihood	-283.0	-272.2	-250.9	-133.1

Table 8: Robustness checks for the random effects Probit regressions for silence with 1 = no feedback given and 0 = feedback given as dependent variable for cutoff values for the Shortfill category of 50, 60, 70, and 90%. Periods 1-35; t statistics in parentheses; + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, * $p < 0.001$.**

	Feedback			Silence		
	Baseline	Uncertainty	<i>p</i> -value	Baseline	Uncertainty	<i>p</i> -value
Shortfill (50)	2.23	2.69	0.04	0.28	0.48	0.01
Vshortfill (50)	1.00	1.00	–	0.08	0.15	0.09
Shortfill (60)	2.32	2.80	0.02	0.29	0.49	0.02
Vshortfill (60)	1.04	1.00	0.13	0.08	0.17	0.20
Shortfill (70)	2.41	2.88	0.02	0.30	0.49	0.05
Vshortfill (70)	1.09	1.06	0.24	0.08	0.24	0.02
Shortfill (90)	2.74	3.67	0.01	0.35	0.55	0.03
Vshortfill (90)	1.33	1.67	0.10	0.13	0.35	0.01

Table 9: Robustness check for average feedback giving and rate of silence in the Shortfill and Vshortfill seller classifications groups for cutoff values for the Shortfill category of 50, 60, 70, and 90%. The *p*-values are derived from two-tailed Mann-Whitney U tests with data aggregated on the matching group level for periods 1-35 (10 independent observations in each treatment). One *p*-value could not be computed due to no variance on the feedback variable.

	Share of sellers		
	Baseline	Uncertainty	<i>p</i> -value
Shortfill (50)	19.48	50.78	<0.001
Vshortfill (50)	8.13	13.55	0.17
Shortfill (60)	18.10	48.60	0.00
Vshortfill (60)	9.51	15.73	0.16
Shortfill (70)	16.72	45.02	<0.001
Vshortfill (70)	10.89	19.31	0.17
Shortfill (90)	11.04	21.03	0.02
Vshortfill (90)	16.56	43.30	<0.001

Table 10: Robustness checks for share of sellers in the Shortfill and Vshortfill seller classification groups for cutoff values for the Shortfill category of 50, 60, 70, and 90%. The *p*-values are derived from two-tailed Mann-Whitney U tests with data aggregated on the matching group level for periods 1-35 (10 independent observations in each treatment).

	(1)	(2)	(3)	(4)	(5)
	Pr(Sale)	ln(Price)	Seller profit	Future seller profit	Buyer profit
Baseline treatment					
Feedback score	0.064*** (13.087)	0.054*** (7.242)	-1.574 (-0.656)	4.767* (2.107)	11.333* (2.192)
Number of ratings	-0.012+ (-1.894)	0.014** (2.583)	2.622** (2.755)	2.790+ (1.878)	-3.622* (-2.333)
Announced quality	0.003** (3.123)	0.006*** (5.227)	0.151 (1.099)	-0.194 (-1.261)	0.417 (1.469)
Period	-0.001 (-0.671)	0.002 (1.253)	0.573* (2.213)	-0.527* (-2.004)	-0.495 (-1.060)
Intercept		4.047*** (40.248)	22.537* (2.141)	52.162** (2.707)	-6.558 (-0.364)
<i>N</i>	608	560	560	507	560
Uncertainty treatment					
Feedback score	0.094*** (4.711)	0.070*** (7.664)	-3.130*** (-4.183)	3.625* (2.301)	19.969*** (13.753)
Number of ratings	-0.014 (-1.346)	0.007 (0.580)	2.484+ (1.671)	-2.036 (-1.471)	-3.882+ (-1.919)
Announced quality	0.003*** (4.762)	0.002 (1.403)	0.556*** (4.000)	0.026 (0.275)	-0.740** (-2.617)
Period	-0.002 (-1.203)	0.000 (0.026)	-0.007 (-0.024)	0.440 (1.611)	0.649 (1.485)
Intercept		4.387*** (33.818)	6.501 (0.609)	34.505*** (3.660)	36.398 (1.431)
<i>N</i>	571	515	515	465	515

Table 11: Effect of seller feedback score on outcome variables (Probability of sale, logarithm of price, seller profit in the current round, average seller profit in remaining rounds, buyer profit). Model (1) shows average marginal effects from a random effects Probit model, the remaining models show coefficients from random effects panel regressions. Standard errors are clustered on the matching group level. Periods 1-35; t statistics in parentheses; + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, * $p < 0.001$.**

2 APPENDIX B – SUPPLEMENTARY FIGURES

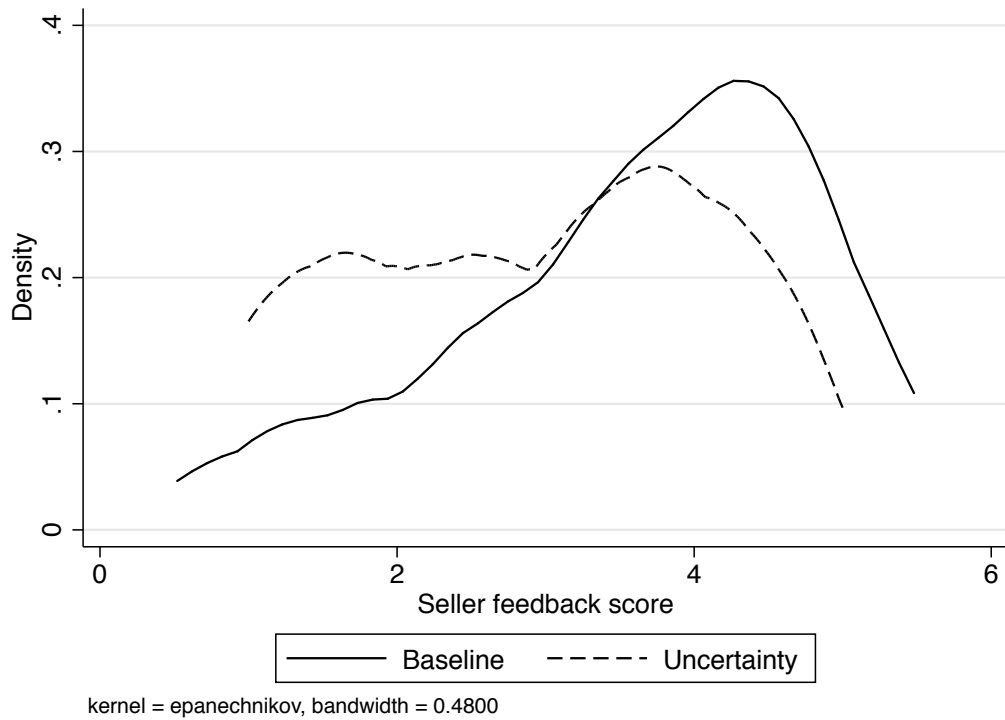


Figure 1: Kernel density estimates of seller feedback scores in subject's last round as a seller in both treatments. Data from periods 1–35.

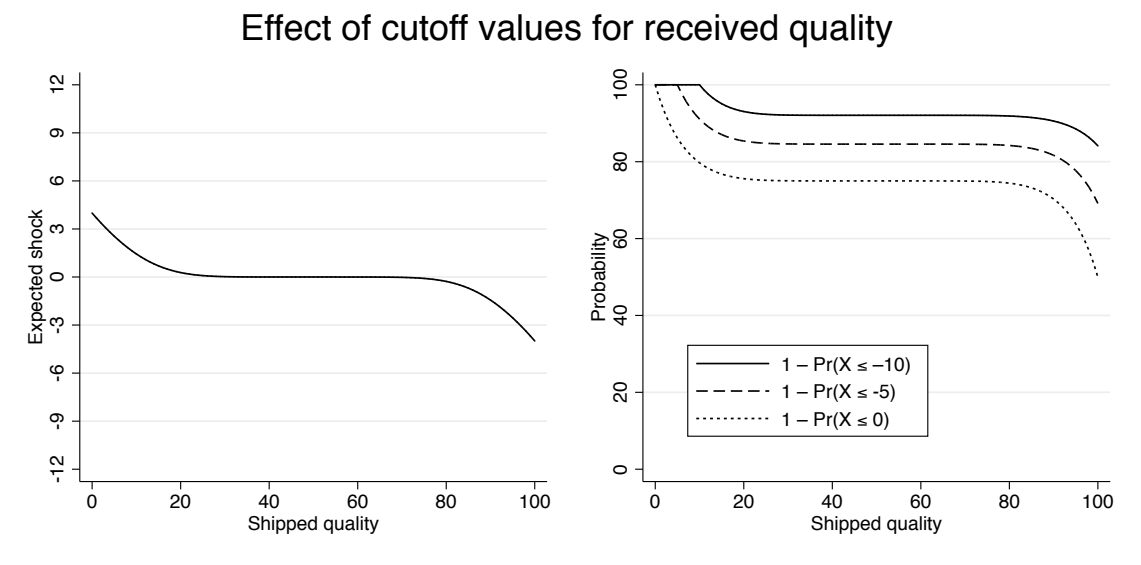


Figure 2: Effect of the cutoff of received quality at the boundaries of 0 and 100. The distribution of the shock at each level of shipped quality follows a truncated normal distribution with $\mu = 0$, $\sigma = 10$, a lower limit of 0 – Shipped Quality, and an upper limit of 100 – Shipped Quality. The shock only occurs in 50% of the cases. Left panel: Expected value of the shock. Right panel: Probability that the shock is not larger than -10, -5 and 0, respectively.

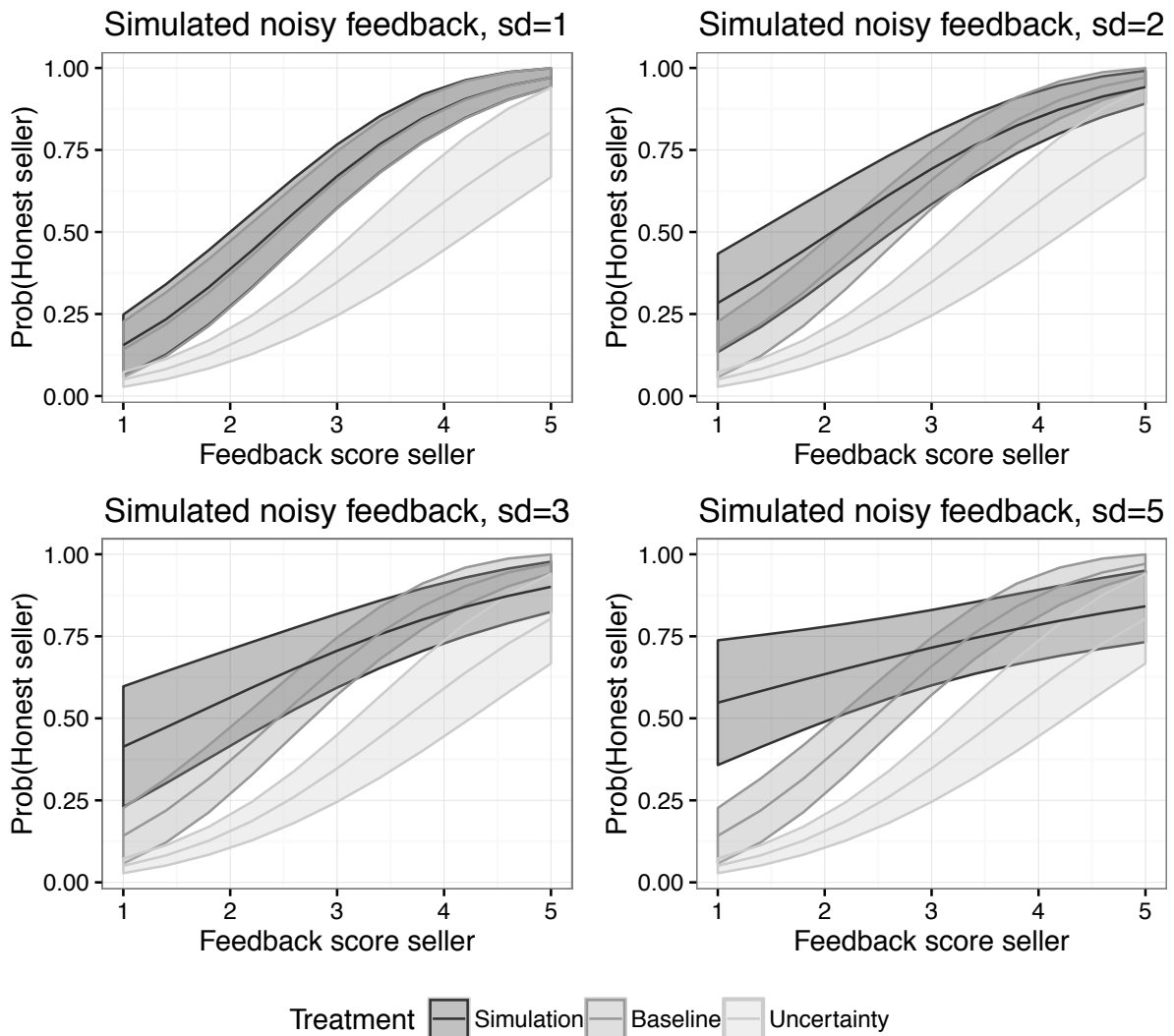


Figure 3: Monte Carlo simulation with 1000 iterations for noisy feedback giving in the Baseline treatment. Existing feedbacks were shocked with random draws from a normal distribution with mean 0 and standard deviation of 1 (2, 3, 5). Simulated ratings out of the rating scale were set to the closest admissible value. These noisy feedback ratings were used to calculate new seller feedback scores, based on which seller honesty was predicted. This process was iterated 1000 times, and the average predicted probabilities and upper and lower bounds for the confidence intervals are shown in the figure.

Figure 3 shows the predicted seller honesty for simulations with varying standard deviations. It can be seen that smaller standard deviations below 2 do not affect the prediction or increase the confidence interval to a large extent. The precision of the forecast decreases for standard deviations above 2, but very large noise is needed for the feedback score to become uninformative about seller honesty. However, even with a standard deviation of 5 (which equals the range of the feedback scale), the prediction does not decrease as in the Uncertainty treatment.

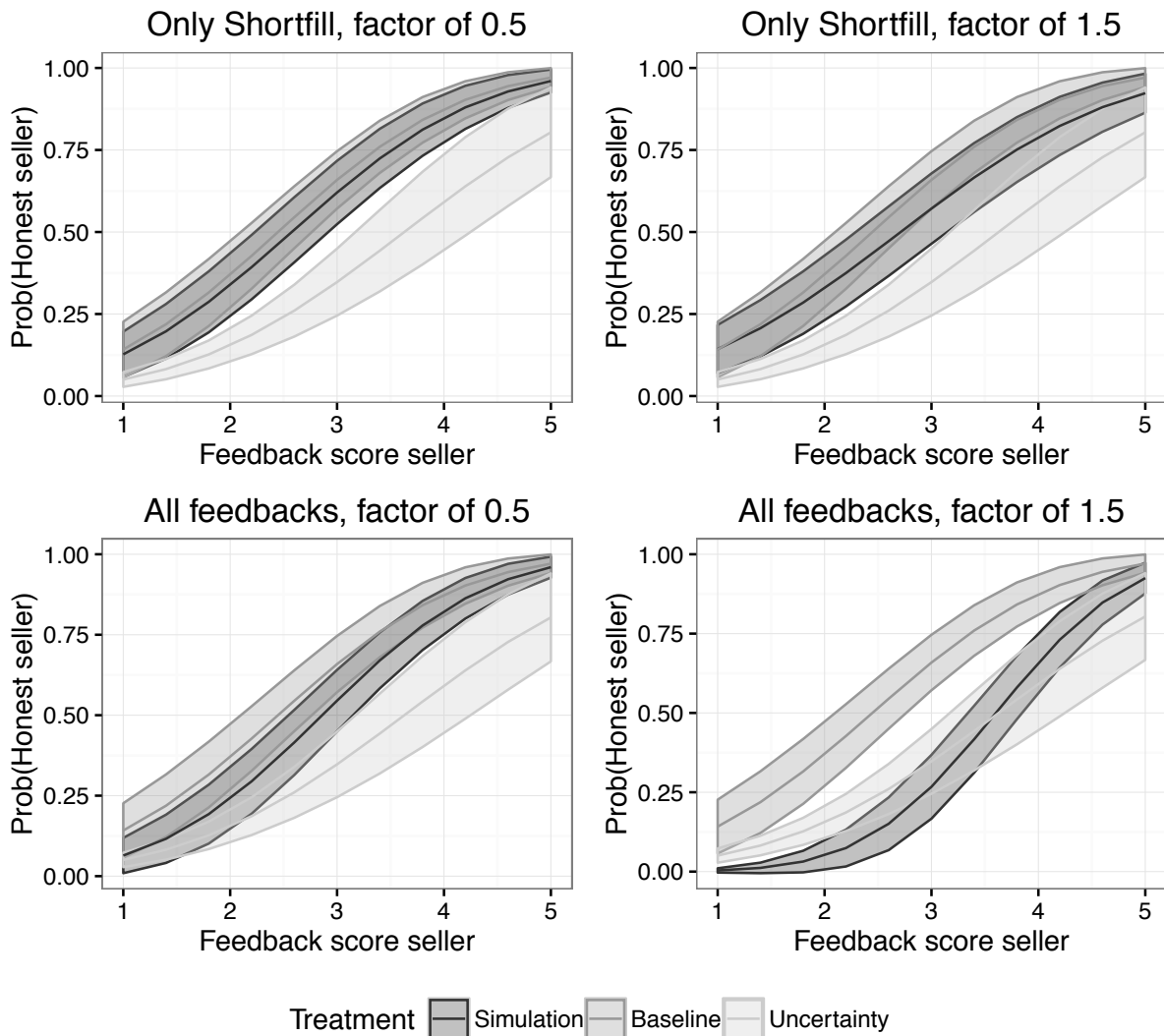


Figure 4: Monte Carlo simulation with 1000 iterations for lenient feedback giving in the Baseline treatment. For the upper panels, a factor of 0.5 (1.5) was added to all feedback ratings given for shortfilling sellers. For the lower panels, the same factor of 0.5 (1.5) was added to all feedback ratings given. Simulated ratings out of the rating scale were set to the closest admissible value. Based on these simulated ratings, seller feedback scores were recalculated and used to predict probabilities and upper and lower bounds for seller honesty. The figure shows the averages over all iterations.

Figure 4 shows further simulations for lenient feedback. The upper panels give the results where only the ratings for shortfilling sellers were increased by either 0.5 (the average difference in ratings between the Baseline and the Uncertainty treatments in this category) or 1.5. Due to the low number of transactions in this category in the Baseline treatment (6.18 percent), the effect on predicted seller honesty is small, but the direction is downward as in the Uncertainty treatment. The lower panels show the results for the same leniency factors added to all feedback ratings. Predicted seller honesty decreases for all levels of feedback scores but the highest. This can be accounted for by the comparatively high levels of honesty for sellers with a less-than-perfect feedback score in the Baseline treatment.

3 APPENDIX C – SIMULATION OF BASELINE FEEDBACK GIVING UNDER UNCERTAINTY

The purpose of this simulation is to estimate feedback giving of raters in the Baseline treatment and apply it to the transactions in the Uncertainty treatment to get counterfactual seller feedback scores without lenient feedback giving (in the sense of inflated or omitted ratings). We start with an explanation of the estimation procedure and proceed with describing the prediction of counterfactual feedback scores.

The estimation of feedback giving in the Baseline treatment consists of two parts: (i) whether a feedback rating is left or not, and (ii) the feedback rating itself in those cases where the buyer decided to leave a rating. For the first part, we estimate a Probit regression where the dependent variable is whether a rating was left or not. The second part is estimated with a Tobit regression with a lower limit of 1 and an upper limit of 5 to account for the bounds of the dependent variable, the actual rating that was left by the buyer.

The prediction of the counterfactual ratings requires an iterative approach, as the seller feedback score is used in the estimation process. For each transaction, we start with predicting whether counterfactual feedback is given using the Probit estimation. If feedback giving is predicted, we use the Tobit estimation to predict the actual rating. This predicted rating is rounded to full integers, as feedback ratings only consisted of integers from 1 to 5. Finally, the feedback score is updated using the predicted rating and written to the next row in the data. This process was repeated for all transactions. Note that at the beginning of the experiment, the seller has no feedback score. We use the first actual feedback *rating* the seller received as her feedback *score* for the purpose of predicting if and which feedback rating is left. If a rating is predicted, this rating is then used to calculate the feedback score in subsequent rows. The actual rating never enters the counterfactual feedback scores itself, it is only used for the prediction of the counterfactual rating.

We consider two specifications for the Probit and Tobit models (see Table 12). In the main body of the paper, we use models (1) and (3), as the predicted feedback scores for the Baseline treatment visually track the actual scores better. Figure 5 shows the predicted ratings and feedback scores using models (2) and (4), which include a cubic effect and an interaction between the fill ratio and the feedback score for the Probit regression, and the feedback score for the Tobit regression. The predicted rates of silence can be found in Table 13. While silence is lower in the prediction than in the Baseline treatment, the relative order between the seller classification groups is preserved: Fulfills and Shortfills are met with silence most

often, while buyers leave a rating more often in transactions in the Over- and Vshortfill categories.

	(1)	(2)	(3)	(4)
Received quality	0.012*	0.015**	0.056***	0.060***
	(2.312)	(2.790)	(5.883)	(5.233)
Overfill	ref.	ref.	ref.	ref.
Fulfill	-0.934***	-0.583*	0.908**	1.020*
	(-4.133)	(-2.066)	(2.595)	(2.564)
Shortfill	-0.836**	-0.275	-2.309***	-2.050***
	(-2.977)	(-0.541)	(-4.769)	(-3.351)
Vshortfill	-0.576	-0.977	-1.578	-1.516
	(-0.897)	(-0.903)	(-1.344)	(-0.906)
Received / Announced	-2.023*	16.528	3.301	4.677
	(-2.472)	(1.934)	(1.341)	(1.282)
RAS ²		-43.285*		
		(-2.164)		
RAS ³		26.146*		
		(2.257)		
RAS x Feedback score		-1.479		
		(-1.819)		
Feedback score	0.050	1.492		0.235
	(0.854)	(1.863)		(1.782)
Valuation	0.002	0.002*		
	(1.908)	(2.031)		
Period	-0.008	-0.009		
	(-1.243)	(-1.371)		
Constant	1.712*	-0.185	-3.200	-5.839
	(2.072)	(-0.136)	(-1.250)	(-1.468)
<i>N</i>	560	560	442	382
Log likelihood	-325.635	-318.087	-421.562	-344.904

Table 12: Regressions for the estimation of Baseline feedback giving. Model (1) and (2) are probit regressions where the dependent variable is whether a feedback rating was given or not. Models (3) and (4) are tobit regressions with the feedback rating as the dependent variable, a lower limit of 1, and an upper limit of 5. Periods 1-35; *t* statistics in parentheses; * $p < 0.05$, ** $p < 0.01$, * $p < 0.001$.**

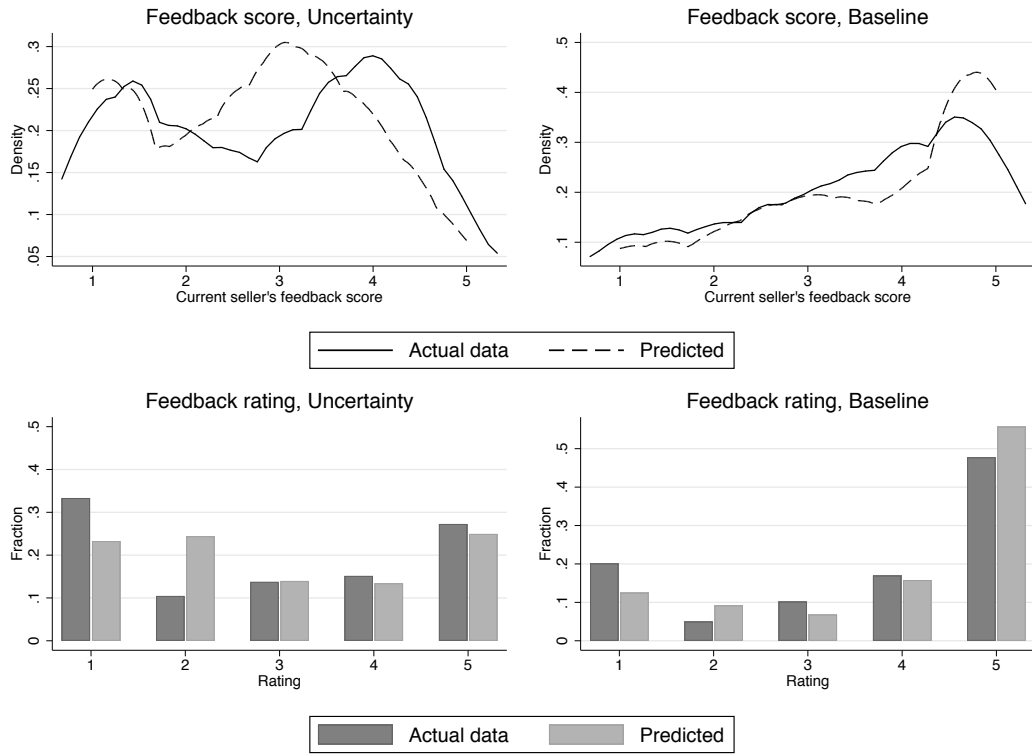


Figure 5: Predicted feedback giving and seller feedback scores using estimated feedback giving from the Baseline treatment. Prediction based on models (2) and (4) from Table 12.

	Baseline		Uncertainty	
	(1) and (3)	(2) and (4)	(1) and (3)	(2) and (4)
Overfill	0.00	0.00	0.00	0.00
Fulfill	7.99	8.51	4.71	5.88
Shortfill	1.04	8.33	0.44	6.67
Vshortfill	0.00	3.90	0.00	12.95
Overall	5.16	7.10	0.87	6.61

Table 13: Predicted rates of silence in each seller classification group for simulated Baseline feedback giving. Predictions from models (1) to (4) from Table 12.

4 APPENDIX D – INSTRUCTIONS

Instructions (Baseline)

Welcome and thank you for participating in this experiment. Take the time to read carefully the instructions. If you have any questions, please raise your hand and one of the supervisors will come to help you.

You can earn money in this experiment. The specific amount depends on your decisions and the decisions of other participants. In the experiment we use ECU (Experimental Currency Unit) as the monetary unit. All participants will be endowed with an amount of 1000 ECU. Profits during the experiment will be added to this account losses will be deducted. At the end of the experiment, the balance of the account will be converted from ECUs into Euros, and paid out in cash. The conversion rate is 100 ECUs are worth 1 Euro.

From now on until the end of the experiment, please do not communicate with other participants. If you do not comply with this rule we have to exclude you from the experiment and all payments.

The experiment is repeated for 45 periods. Participants are matched into groups of three. In each group, one participant is the **seller**, the other two participants are **bidders**. At the beginning of each period, the role and the group of each participant are newly randomly determined.

In each period, the seller offers one good which, if shipped in 100% quality, costs him 100 ECUs. Each of the bidders is assigned a valuation for the good, which lies between 100 and 300 ECUs. The valuation represents the value of the good for the winning bidder if he/she receives it in 100% quality (more about quality will be said below). The valuations of the two bidders will be newly randomly drawn in each period. When drawing a valuation, every integer value between 100 and 300 has the same probability to be selected.

Each period consists of four stages:

1. In the Announcement stage the seller **publicly and non-bindingly** (i.e., without commitment) announces a quality level he/she is going to deliver after the auction and **privately and bindingly** (i.e., with commitment) decides about the actual quality of the good he/she will ship.
2. In the Auction stage the two bidders may bid for the item offered by the seller. The bidder who submits the highest bid will win the auctioned good.
3. In the Transaction stage the seller receives the price, which has to be paid by the winning bidder, and the winning bidder receives the good in the previously determined actual quality.
4. In the Feedback stage the winning bidder may give feedback on the transaction, which is then made available to traders as average feedback rating in later periods.

In the following we explain the procedures of the four stages in detail.

4.1.1 Announcement stage

In the first stage of each period, sellers enter the **announced** quality and the **shipped** quality. The announced quality is non-binding and is made public to the two bidders in the same group **before** they submit their bids in the following Auction stage. The shipped quality is binding and is only revealed to the winning bidder, **but not until** the Transaction stage. The quality must be an integer between 0% and 100%. Each quality percent costs the seller 1 ECU. Thus, the costs for the seller for shipping the good are 0 ECU if the quality is 0%, 100 ECU if the quality is 100%, and $Quality * 1 ECU$ for intermediate values of quality. In case the product is not sold, the seller does not incur any costs.

4.1.2 Auction stage

In the second stage of each period, each bidder may submit a maximum bid for the good. On the bidding screen, the bidders see the following information: The **average feedback rating** of the current seller and the **number of feedbacks** this seller received in previous periods, the **announced quality**, and his own **valuation** in the current period. The average feedback rating is the average of all feedback ratings this seller received in previous periods. Furthermore, there is a hypothetical profit calculator where bidders can enter hypothetical prices and quality levels. The calculator displays the hypothetical profit for the entered values given the bidder's valuation in the current period.

1. If you want to participate in the auction, please submit a maximum bid. Your maximum bid is the maximum amount you are willing to pay for the offered good. Your maximum bid must be at least 100 ECUs, which is the minimum price, and must not exceed the current amount on your account. If you do not want to participate in the auction in the current period, click the "No bid" button.
2. The bidder who submits the highest maximum bid wins the auction. The price the winning bidder has to pay is equal to the second highest bid plus 1 ECU.

Exceptions:

- If only one bidder submits a bid, the price is equal to 100 ECU.
 - If both maximum bids are the same, the bidder who has submitted his/her bid first wins the auction. In this case, the price is equal to the maximum bid of the winning bidder.
 - If no bidder submits a bid, the product is not sold.
3. You may think of the bidding system as standing in for you as a bidder at a live auction. That is, the system places bids for you up to your maximum bid, but using only as much of your bid as is necessary to maintain your highest bid position. For this reason, the price cannot exceed the second highest bid plus 1 ECU.

The winner of the auction must pay the price to the seller and proceeds to the Transaction stage. The losing bidder earns a profit of 0 ECU in this period. In case the product is not sold, the seller and both bidders earn a profit of 0 ECU in this period.

4.1.3 Transaction stage

The seller receives the price and the winning bidder receives the good in the previously determined actual quality. The actual value of the good for the winning bidder equals the

quality of the good times his/her valuation for the good. Thus the actual value of the good for the buyer is 0 ECU if the quality is 0%, and equal to his/her valuation if the quality is 100%.

In equations:

The payoff in ECU for the seller in this period equals:

$$\text{Seller's Payoff} = \text{Auction price} - (\text{Quality} * 1 \text{ ECU})$$

The payoff in ECU for the winning bidder in this period is:

$$\text{Winning Bidder's Payoff} = [(\text{Quality} / 100) * \text{Valuation}] - \text{Auction price}$$

4.1.4 Feedback stage

After the Transaction stage the winning bidder decides whether or not he/she wants to submit a feedback on the transaction. Submitting a feedback costs 1 ECU. The feedback rating allows the winning bidder to give feedback on the following scale:

“Please rate the transaction on a five point scale (1 is the lowest rating and 5 is the highest rating).”

After the Feedback stage the period ends and a new period with newly matched groups begins as described above.

If you have any further questions, please raise your hand and one of the supervisors will come to help you.

Instructions (Uncertainty)

Welcome and thank you for participating in this experiment. Take the time to read carefully the instructions. If you have any questions, please raise your hand and one of the supervisors will come to help you.

You can earn money in this experiment. The specific amount depends on your decisions and the decisions of other participants. In the experiment we use ECU (Experimental Currency Unit) as the monetary unit. All participants will be endowed with an amount of 1000 ECU. Profits during the experiment will be added to this account losses will be deducted. At the end of the experiment, the balance of the account will be converted from ECUs into Euros, and paid out in cash. The conversion rate is 100 ECUs are worth 1 Euro.

From now on until the end of the experiment, please do not communicate with other participants. If you do not comply with this rule we have to exclude you from the experiment and all payments.

The experiment is repeated for 45 periods. Participants are matched into groups of three. In each group, one participant is the **seller**, the other two participants are **bidders**. At the beginning of each period, the role and the group of each participant are newly randomly determined.

In each period, the seller offers one good which, if shipped in 100% quality, costs him 100 ECUs. Each of the bidders is assigned a valuation for the good, which lies between 100 and 300 ECUs. The valuation represents the value of the good for the winning bidder if he/she receives it in 100% quality (more about quality will be said below). The valuations of the two bidders will be newly randomly drawn in each period. When drawing a valuation, every integer value between 100 and 300 has the same probability to be selected.

Each period consists of four stages:

1. In the Announcement stage the seller **publicly and non-bindingly** (i.e., without commitment) announces a quality level he/she is going to deliver after the auction and **privately and bindingly** (i.e., with commitment) decides about the actual quality of the good he/she will ship.
2. In the Auction stage the two bidders may bid for the item offered by the seller. The bidder who submits the highest bid will win the auctioned good.
3. In the Transaction stage the seller receives the price, which has to be paid by the winning bidder, and the winning bidder receives the good. The received quality may be different from the shipped quality. In each period and for each seller, there is a 50% probability that a random number is added to the shipped quality. This random number can either be positive or negative. On average this random number is zero. At the end of instructions we will explain in more detail how this random number is drawn.
4. In the Feedback stage the winning bidder may give feedback on the transaction, which is then made available to traders as average feedback rating in later periods.

In the following we explain the procedures of the four stages in detail.

4.1.5 *Announcement stage*

In the first stage of each period, sellers enter the **announced** quality and the **shipped** quality. The announced quality is non-binding and is made public to the two bidders in the same group **before** they submit their bids in the following Auction stage. The shipped quality is binding and determines the costs for the seller. With a probability of 50% a positive or negative random number is added to the shipped quality. This equals the received quality, which is only revealed to the winning bidder, **but not until** the Transaction stage. The quality must be an integer between 0% and 100%. Each quality percent costs the seller 1 ECU. Thus, the costs for the seller for shipping the good are 0 ECU if the quality is 0%, 100 ECU if the quality is 100%, and $Quality * 1 ECU$ for intermediate values of quality. In case the product is not sold, the seller does not incur any costs.

4.1.6 *Auction stage*

In the second stage of each period, each bidder may submit a maximum bid for the good. On the bidding screen, the bidders see the following information: The **average feedback rating** of the current seller and the **number of feedbacks** this seller received in previous periods, the **announced quality**, and his own **valuation** in the current period. The average feedback rating is the average of all feedback ratings this seller received in previous periods. Furthermore, there is a hypothetical profit calculator where bidders can enter hypothetical prices and quality levels. The calculator displays the hypothetical profit for the entered values given the bidder's valuation in the current period.

1. If you want to participate in the auction, please submit a maximum bid. Your maximum bid is the maximum amount you are willing to pay for the offered good. Your maximum bid must be at least 100 ECUs, which is the minimum price, and must not exceed the current amount on your account. If you do not want to participate in the auction in the current period, click the "No bid" button.
2. The bidder who submits the highest maximum bid wins the auction. The price the winning bidder has to pay is equal to the second highest bid plus 1 ECU.

Exceptions:

- If only one bidder submits a bid, the price is equal to 100 ECU.
 - If both maximum bids are the same, the bidder who has submitted his/her bid first wins the auction. In this case, the price is equal to the maximum bid of the winning bidder.
 - If no bidder submits a bid, the product is not sold.
3. You may think of the bidding system as standing in for you as a bidder at a live auction. That is, the system places bids for you up to your maximum bid, but using only as much of your bid as is necessary to maintain your highest bid position. For this reason, the price cannot exceed the second highest bid plus 1 ECU.

The winner of the auction must pay the price to the seller and proceeds to the Transaction stage. The losing bidder earns a profit of 0 ECU in this period. In case the product is not sold, the seller and both bidders earn a profit of 0 ECU in this period.

4.1.7 Transaction stage

The seller receives the price and the winning bidder receives the good. With 50% probability the received quality is equal to the shipped quality and with the counter-probability of 50% the received quality is equal to the shipped quality plus the positive or negative random number. The actual value of the good for the winning bidder equals the quality of the good times his/her valuation for the good. Thus the actual value of the good for the buyer is 0 ECU if the quality is 0%, and equal to his/her valuation if the quality is 100%.

In equations:

The payoff in ECU for the seller in this period equals:

$$\text{Seller's Payoff} = \text{Auction price} - (\text{shipped Quality} * 1 \text{ ECU})$$

The payoff in ECU for the winning bidder in this period is:

$$\text{Winning Bidder's Payoff} = [(\text{received Quality} / 100) * \text{Valuation}] - \text{Auction price}$$

4.1.8 Feedback stage

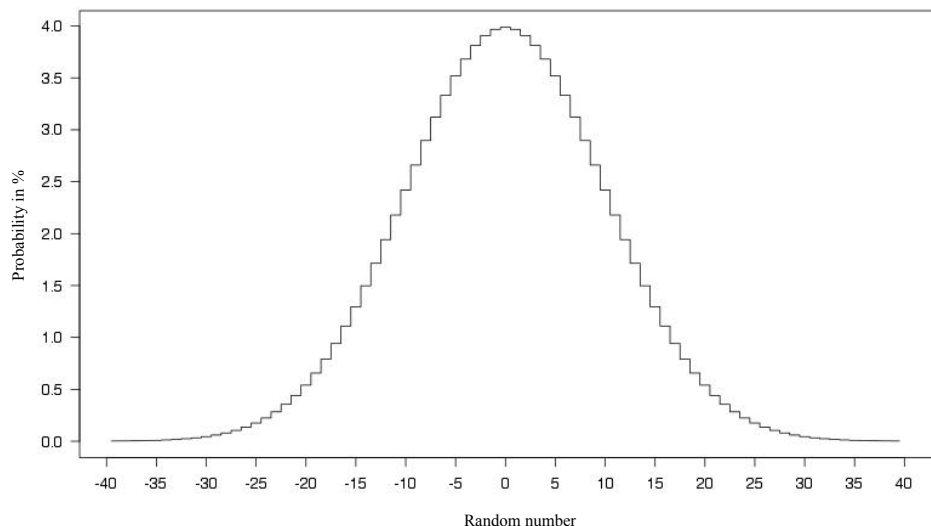
After the Transaction stage the winning bidder decides whether or not he/she wants to submit a feedback on the transaction. Submitting a feedback costs 1 ECU. The feedback rating allows the winning bidder to give feedback on the following scale:

“Please rate the transaction on a five point scale (1 is the lowest rating and 5 is the highest rating).”

After the Feedback stage the period ends and a new period with newly matched groups begins as described above.

Random number

As explained before, the received quality equals the shipped quality determined by the seller plus or minus a random distortion term. This random distortion term takes on only integer values and is drawn in such a way that on average it equals zero and negative and positive values are equally likely. In the figure you see for each value between -40 and 40 how likely it is that the distortion term equals this value.



The figure reveals that smaller distortions (positive as well as negative) occur more often than larger ones and values around 0 occur most often. The probability that the distortion is exactly equal to zero is about 4%. Loosely speaking this means that in about 4 of 100 cases the distortion term will be exactly equal to 0. The area below the line displays the probability that the distortion term falls in a particular range. For example, the probability that the noise term is in between -15 and 15 is about 88%.

In 50% of the cases (in 50 of 100 cases) the distortion term will be between -7 and 7 .

In 75% of the cases (in 75 of 100 cases) the distortion term will lie between -12 and 12 .

In 95% of the cases (in 95 of 100 cases) the distortion term will lie between -20 and 20 .

For participants with knowledge of statistics: the distortion terms are drawn from a normal distribution with mean 0 and standard deviation 10. It does not matter if this does not mean anything to you: it only matters that you understand "qualitatively" how often different values of the distortion term occur.

There is a very small probability that the noise term is smaller than -40 : in 3 of the 100.000 cases the value is smaller than -40 . Likewise, there is a very small probability that the noise term is greater than 40: in 3 of the 100.000 cases the noise term is greater than 40 (you cannot infer this from the figure).

Each seller's distortion term is independently determined in the way described above. This means that the noise term in a seller's signal is (very likely) different from the noise terms in the signal of the other sellers. It also means that a noise term in the one period does not depend on the noise terms in any other period.

Because quality cannot be lower than 0% or higher than 100%, the sum of the shipped quality and the distortion term is capped at 0 (100) if it is lower (higher) than 0 (100).

If you have any further questions, please raise your hand and one of the supervisors will come to help you.