Leverage and Asset Prices: An Experiment. Appendix

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Appendix I: Equilibrium Analysis

NL-Economy

We solve the equilibrium by first guessing a regime, solving the system of equations that characterize it and finally, showing the equilibrium is genuine. The equilibrium regime in the NL-economy is characterized by the following system of equations:

$$p = qD_H^S + (1-q)D_L, \tag{1}$$

$$py = m^B + pa^B. \tag{2}$$

Equation (1) states that Sellers are willing to hold the asset since its price equals their asset valuation. Equation (2) states that Buyers choose zero final cash holdings and spend all their endowments on buying the asset. We solve these two equations for the two variables p and y. Finally, we need to check that the solution to the system is a genuine equilibrium. Given the equilibrium values and the parameters in Table 1, this is the case since the Buyers' expected asset valuation is greater than the equilibrium price, $q(750) + (1-q)100 \geq 190$, (so it is optimal for Buyers to spend all the cash on the asset).

L-Economy

The equilibrium regime in the L-economy is characterized by the following system of equations:

$$py = m^B + pa^B + \varphi, \tag{3}$$

$$y = 100, \tag{4}$$

$$\omega = 0, \tag{5}$$

$$\varphi = 100y. \tag{6}$$

Sellers sell all their asset endowment. Buyers choose zero final cash holdings, spend all their endowments on buying all the assets in the economy, and borrow to the maximum amount. Given the equilibrium values and the parameters in Table 1, this is a genuine equilibrium since Sellers' expected asset valuation is smaller than the equilibrium price, $q(250) + (1 - q)100 \leq 250$, (Sellers do not wish to hold the asset); and Buyers' expected asset valuation is greater than the equilibrium price, $q(750) + (1 - q)100 \geq 250$, that is, Buyers strictly prefer to hold the asset than cash (both types of agents are in a corner).

Appendix II: Parameter Choice

In this Appendix, we explain the choice of parameters in Table 1. These parameters ensure that there is a spread between equilibrium prices between the NL and the L-economy. More precisely the parameters ensure that the set of agents determining the price in the two economies is different. For example, if Buyers have a large enough cash endowment, m^B, so that they can afford to buy all the assets even in the NL-economy, obviously leverage would be irrelevant and asset prices could be the same across economies, regardless of the possibility of leverage. Moreover, if the leverage constraint is so tight (i.e., D_L, the maximum agents can borrow per asset, is small) that even if the Buyers borrow the maximum amount allowed, they are not able to afford all the assets in the economy, then the prices in both economies would be equal to the Sellers valuation. Since we are interested in the effect of leverage on prices we chose our parameters so that leverage would be relevant in the theoretical model. Obviously, as shown by the theoretical literature, this choice of parameters is robust (see for example, Fostel and Geanakoplos (2012, 2014).

We parameterized the model with large cash and asset endowments in order to generate differences in behavior across treatments that can be detectable in the laboratory.

Finally, the extreme choice of endowments simplifies the laboratory implementation considerably and is standard practice in the literature, see for instance Smith (1962). Note that since agents are risk neutral, the only relevant heterogeneity in order to generate our results is the difference in asset valuations not in initial endowments. We would obtain the same results (i.e, leverage increases asset prices) without giving all the cash to Buyers and all the assets to Sellers; whereas leverage would be irrelevant without difference in asset valuations.

Appendix III: The Matrix of Prices Faced by Subjects

Table A1 contains the price matrix that subjects faced in each round of the experiment (each column, containing 10 prices, corresponds to one round of the experiment). The same price matrix was used across the different treatments and sessions of the experiment.

Table A1: Price vector round by round

	Round														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	130	140	120	145	130	140	120	145	115	135	125	130	140	120	145
2	160	170	150	175	160	170	150	175	145	165	155	160	170	150	175
3	190	200	180	205	190	200	180	205	175	195	185	190	200	180	205
4	210	220	200	225	210	220	200	225	195	215	205	210	220	200	225
5	240	250	230	255	240	250	230	255	225	245	235	240	250	230	255
6	300	310	290	315	300	310	290	315	285	305	295	300	310	290	315
7	330	340	320	345	330	340	320	345	315	335	325	330	340	320	345
8	360	370	350	375	360	370	350	375	345	365	355	360	370	350	375
9	370	380	360	385	370	380	360	385	355	375	365	370	380	360	385
10	390	400	380	405	390	400	380	405	375	395	385	390	400	380	405

Appendix IV: Aggregate Results Including All the 15 Rounds of the Experiment

In this appendix we replicate Tables 6a, 6b, 7a, 7b, 8a, 8b including the data of the all the 15 rounds of the experiment.

Table A2: Average Equilibrium Prices in the Bullish Parameterization

	Average	S1	S2	S3	S4	S5	S6	S7	S8	S9
NL	220	223	205	215	208	230	208	224	232	236
L	259	244	254	260	242	256	256	287	266	268
$Spread$	39	21	49	45	34	26	48	63	34	32

Table A3: Average Equilibrium Prices in the Bearish Parameterization

	Average	S1	S2	S3	S4	S5	S6	S7	S8	S9
NL	192	185	186	207	191	181	199	178	207	197
L	232	234	233	238	237	238	248	238	208	268
$Spread$	40	49	47	31	46	57	49	60	1	71

Table A4: Per-subject Average Transactions in the Bullish Parameterization

	Average	S1	S2	S3	S4	S5	S6	S7	S8	S9
NL	53	54	45	62	66	49	56	52	45	49
L	68	73	61	70	78	69	70	56	70	68

Table A5: Per-subject Average Transactions in the Bearish Parameterization

	Average	S1	S2	S3	S4	S5	S6	S7	S8	S9
NL	55	53	54	61	69	59	53	46	52	50
L	68	77	60	75	76	70	70	64	66	57

Table A6: Buyers' Final Cash Holdings and Borrowings in the Bullish Parameterization

	Final Cash	Borrowing per Widget
NL	3,388	-
L	1,417	47

Table A7: Buyers' Final Cash Holdings and Borrowings in the Bearish Parameterization

	Final Cash	Borrowing per Widget
NL	4,414	-
L	2,504	36

Appendix V: Per-Round Prices and Quantities

This appendix reports the per-round equilibrium quantities and prices for the 9 sessions of the experiment.

Table A8: Round by Round Prices for the Bullish Parameterization

Session 1				Session 2			
Round	NL	L	Spread	Round	NL	L	Spread
5	210	240	30	5	210	300	90
6	220	220	0	6	200	220	20
7	200	230	30	7	200	320	120
8	225	255	30	8	175	255	80
9	195	285	90	9	195	225	30
10	195	245	50	10	245	245	0
11	205	235	30	11	235	295	60
12	240	240	0	12	240	240	0
13	200	250	50	13	200	250	50
14	230	230	0	14	230	290	60
15	225	225	0	15	175	255	80

Session 3			
Round	NL	L	Spread
5	240	300	60
6	200	250	50
7	230	230	0
8	205	225	20
9	225	285	60
10	245	305	60
11	205	235	30
12	210	300	90
13	220	250	30
14	200	230	30
15	225	255	30

Session 4			
Round	NL	L	Spread
5	210	240	30
6	200	250	50
7	230	230	0
8	175	255	80
9	195	285	90
10	215	245	30
11	235	235	0
12	240	240	0
13	200	220	20
14	200	230	30
15	205	225	20

Session 5			
Round	NL	L	Spread
5	240	300	60
6	220	220	0
7	200	290	90
8	225	225	0
9	225	285	60
10	245	245	0
11	235	235	0
12	240	300	60
13	220	250	30
14	230	290	60
15	225	255	30

Session 6			
Round	NL	L	Spread
5	210	240	30
6	200	250	50
7	230	290	60
8	205	255	50
9	225	285	60
10	215	245	30
11	205	235	30
12	190	240	50
13	220	250	30
14	200	290	90
15	255	255	0

Session 7				Session 8			
Round	NL	L	Spread	Round	NL	L	Spread
5	240	240	0	5	240	240	0
6	220	310	90	6	250	250	0
7	200	230	30	7	230	290	60
8	255	315	60	8	225	255	30
9	225	315	90	9	225	285	60
10	215	305	90	10	215	305	90
11	235	235	0	11	235	295	60
12	240	300	60	12	240	300	60
13	220	250	30	13	250	250	0
14	200	230	30	14	230	290	60
15	225	315	90	15	225	255	30

Session 9			
Round	NL	L	Spread
5	240	240	0
6	220	310	90
7	230	230	0
8	225	255	30
9	285	315	30
10	245	305	60
11	235	295	60
12	240	300	60
13	250	250	0
14	230	290	60
15	225	255	30

Table A9: Round by Round Prices for the Bearish Parameterization

Session 1			
Round	NL	L	Spread
5	190	240	50
6	200	220	20
7	150	230	80
8	205	225	20
9	175	225	50
10	165	215	50
11	185	235	50
12	210	240	30
13	170	220	50
14	180	230	50
15	175	225	50

Session 2			
Round	NL	L	Spread
5	210	240	30
6	170	200	30
7	230	290	60
8	145	255	110
9	195	225	30
10	215	195	-20
11	155	235	80
12	130	190	60
13	200	220	20
14	230	320	90
15	175	255	50

Session 3			
Round	NL	L	Spread
5	210	240	30
6	200	220	20
7	230	290	60
8	175	205	30
9	225	225	0
10	245	245	0
11	205	235	30
12	190	210	20
13	200	220	20
14	180	230	50
15	175	205	30

Session 4			
Round	NL	L	Spread
5	190	210	20
6	170	250	80
7	180	230	50
8	175	255	80
9	195	195	0
10	195	245	50
11	205	235	30
12	210	240	30
13	220	220	0
14	200	230	30
15	205	225	20

Session 5			
Round	NL	L	Spread
5	190	240	50
6	140	220	80
7	180	290	110
8	205	205	0
9	175	225	50
10	195	215	20
11	185	235	50
12	160	210	50
13	140	220	80
14	180	230	50
15	175	205	30

Session 6			
Round	NL	L	Spread
5	210	240	30
6	200	220	20
7	230	290	60
8	205	225	20
9	225	225	0
10	215	245	30
11	185	235	50
12	190	210	20
13	220	250	30
14	180	230	50
15	205	255	50

Session 7			
Round	NL	L	Spread
5	160	240	80
6	220	310	90
7	120	230	110
8	225	315	90
9	175	285	110
10	195	215	20
11	185	235	50
12	190	240	50
13	170	220	50
14	120	230	110
15	225	255	30

Session 8			
Round	NL	L	Spread
5	210	240	30
6	220	220	0
7	200	230	30
8	225	225	0
9	195	225	30
10	195	245	50
11	205	235	30
12	190	300	110
13	220	220	0
14	180	230	50
15	205	225	20

Session 9			
Round	NL	L	Spread
5	190	190	0
6	200	170	-30
7	180	200	20
8	205	205	0
9	225	225	0
10	165	195	30
11	205	205	0
12	190	190	0
13	220	220	0
14	180	200	20
15	205	225	20

Table A10: Round by Round Quantities for the Bullish Parameterization

Session 1				Session 2			
Round	NL	L	Difference	Round	NL	L	Difference
5	60	79	19	5	51	51	0
6	54	84	30	6	43	64	21
7	49	79	30	7	52	43	-9
8	57	79	22	8	43	58	15
9	55	49	-6	9	43	57	14
10	64	70	6	10	48	64	16
11	67	68	1	11	31	53	22
12	58	76	18	12	39	60	21
13	53	76	23	13	50	59	9
14	56	82	26	14	55	61	6
15	52	83	31	15	51	79	28

Session 3				Session 4			
Round	NL	L	Difference	Round	NL	L	Difference
5	56	68	12	5	67	78	11
6	63	79	16	6	62	81	19
7	61	67	6	7	56	78	22
8	70	77	7	8	80	75	-5
9	60	69	9	9	69	64	-5
10	53	62	9	10	62	70	8
11	69	63	-6	11	62	87	25
12	64	60	-4	12	59	80	21
13	63	83	20	13	65	81	16
14	70	74	4	14	66	66	0
15	61	74	13	15	56	80	24

Session 5				Session 6			
Round	NL	L	Difference	Round	NL	L	Difference
5	41	47	6	5	55	63	8
6	48	61	13	6	52	75	23
7	57	72	15	7	46	66	20
8	58	76	18	8	55	79	24
9	31	68	37	9	50	81	31
10	50	66	16	10	49	78	29
11	57	60	3	11	53	74	21
12	43	68	25	12	68	68	0
13	48	79	31	13	55	68	13
14	55	69	14	14	60	66	6
15	48	61	13	15	55	71	16

Session 7				Session 8			
Round	NL	L	Difference	Round	NL	L	Difference
5	55	61	6	5	45	66	21
6	58	52	-6	6	48	72	24
7	49	70	21	7	60	65	5
8	48	58	10	8	28	78	50
9	53	57	4	9	46	64	18
10	60	55	-5	10	40	64	24
11	45	68	23	11	42	66	24
12	58	59	1	12	38	59	21
13	46	67	21	13	51	78	27
14	50	65	15	14	46	69	23
15	52	52	0	15	37	76	39

Session 9			
Round	NL	L	Difference
5	54	65	11
6	57	55	-2
7	45	63	18
8	51	66	15
9	50	64	14
10	49	65	16
11	58	59	1
12	43	56	13
13	58	68	10
14	44	61	17
15	33	92	59

Table A11: Round by Round Quantities for the Bearish Parameterization

Session 1			
Round	NL	L	Difference
5	59	67	8
6	34	77	43
7	48	65	17
8	41	81	40
9	48	74	26
10	55	73	18
11	46	85	39
12	52	69	17
13	54	68	14
14	62	97	35
15	45	82	37

Session 2			
Round	NL	L	Difference
5	61	61	0
6	55	58	3
7	62	58	-4
8	59	59	0
9	54	69	15
10	51	64	13
11	52	59	7
12	48	48	0
13	61	52	-9
14	43	54	11
15	66	88	22

Session 3			
Round	NL	L	Difference
5	62	70	8
6	64	88	24
7	48	68	20
8	66	85	19
9	65	69	4
10	57	66	9
11	60	76	16
12	61	69	8
13	53	80	27
14	75	76	1
15	78	88	10

Session 4			
Round	NL	L	Difference
5	62	90	28
6	76	71	-5
7	72	82	10
8	74	68	-6
9	67	72	5
10	61	87	26
11	67	85	18
12	61	88	27
13	59	80	21
14	65	83	18
15	66	79	13

Session 5				Session 6			
Round	NL	L	Difference	Round	NL	L	Difference
5	56	58	2	5	55	77	22
6	73	76	3	6	62	81	19
7	63	64	1	7	45	55	10
8	61	69	8	8	48	69	21
9	64	84	20	9	50	77	27
10	61	75	14	10	56	67	11
11	65	83	18	11	42	59	17
12	51	75	24	12	52	74	22
13	73	73	0	13	58	76	18
14	50	83	33	14	48	63	15
15	55	80	25	15	48	65	17

Session 7				Session 8			
Round	NL	L	Difference	Round	NL	L	Difference
5	37	54	17	5	51	71	20
6	41	54	13	6	49	73	24
7	41	76	25	7	56	70	14
8	54	55	1	8	54	57	3
9	42	54	12	9	64	64	0
10	49	39	-10	10	57	67	10
11	59	73	14	11	53	51	-2
12	53	67	14	12	57	52	-5
13	43	76	33	13	48	62	14
14	51	74	23	14	50	65	15
15	35	63	28	15	55	70	15

Session 9			
Round	NL	L	Difference
5	57	46	-11
6	62	75	13
7	57	44	-13
8	63	54	-9
9	53	60	7
10	61	67	6
11	51	54	3
12	53	47	-6
13	59	54	-5
14	46	19	-27
15	55	66	11

Appendix VI: Risk Aversion and Shift in Demand

In this appendix, we prove that if agents are interior when borrowing is not available, they are also interior when borrowing is available.

Consider the following two problems. The first problem, NL, is the problem that a Buyer faces in the NL-economy.

$$\begin{cases} \max\limits_{y} & U(y), \\ s.t. & py \leq m \\ & y \geq 0. \end{cases}$$

The second problem, L, is the one that a Buyer faces in the L-economy.

$$\begin{cases} \max\limits_{y,\phi} & U(y,\phi) \\ s.t. & py \leq m + \phi \\ & \phi \leq D_{Low} y \\ & \phi \geq 0 \\ & y \geq 0 \end{cases}$$

Note that if y^* is an interior solution to NL and if U is strictly concave, y^* also solves L. From the Kuhn-Tucker conditions for the NL problem, we have that $U'(y^*) = 0$.

Since in the L-problem $\phi \geq 0$, y^* is feasible. By concavity, it is also optimal. Note that since we have only one good (cash), concavity can be interpreted as risk-aversion, even if subjects are not expected-utility maximizers. Therefore, risk-averse behavior cannot explain the shift in demand. Additionally, if U were strictly convex (risk-loving behavior), y^* cannot be an interior solution to the NL-problem. Therefore, risk-loving behavior cannot explain the shift in demand either.

Appendix VII: Statistical Tests on Quantities and Prices

In this Appendix, we report statistical tests on the difference between quantities and prices across treatments. We report two sets of tests, non-parametric (Appendix VII.I) and parametric (Appendix VII.2). The parametric tests are carried out through a panel regression; the results of the panel are also used to test for order effects.

VII.I: Non-Parametric Tests

For each session of each treatment, we compute the average price and quantity; and we obtain a sample of 9 observations (the per-session averages) for each treatment (4 samples overall). We compare these samples with a Wilcoxon sign-rank test and with a sign test. Table A12 reports the hypotheses being tested (columns 2 and 3) and the p-values for the two tests (columns 4 and 5).

Table A12: Non-Parametric Tests on Prices and Quantities.

	H_0	H_1	$Wilcoxon\ signrank\ p-value$	$signtest\ p-value$
$Bullish$	$P_{NL} = P_L$	$P_{NL} < P_L$	0.0020	0.0020
$Bearish$	$P_{NL} = P_L$	$P_{NL} < P_L$	0.0020	0.0020
L	$P_{Bull} = P_{Bear}$	$P_{Bull} > P_{Bear}$	0.0020	0.0020
NL	$P_{Bull} = P_{Bear}$	$P_{Bull} > P_{Bear}$	0.0020	0.0020
$Bullish$	$Q_{NL} = Q_L$	$Q_{NL} < Q_L$	0.0020	0.0020
$Bearish$	$Q_{NL} = Q_L$	$Q_{NL} < Q_L$	0.0039	0.0195
L	$Q_{Bull} = Q_{Bear}$	$Q_{Bull} < Q_{Bear}$	0.3672	0.2539
NL	$Q_{Bull} = Q_{Bear}$	$Q_{Bull} < Q_{Bear}$	0.1797	0.5000

VII.2: The Panel Regression and the Parametric Tests on Prices and Quantities

In this Appendix, we show the results of a fixed-effect panel estimation on per-round quantities and prices. The purpose of the panel analysis is threefold: i) testing for differences in prices and quantities between NL and L treatments (that is, replicating the results of Appendix VII.1 through a parametric method); ii) testing for learning in the experiment; iii) testing for the presence of order effects.

We first describe the results for quantities (Table A13). The dependent variable is the per-round per-capita quantity across all sessions and treatments.[1] The independent variables are: 1) a set of 10-round dummies (for rounds 5 to 15 of each session; coefficient omitted in the tables); 2) a set of 4 treatment-specific dummy variables; 3) an "NL-first" order-effect dummy, capturing those sessions in which the NL-treatment was run on the first day of the experiment; 4) a "*Bull*-first" order-effect dummy capturing those sessions in which, on both days of the experiment, the *Bull* treatments were run first. Errors are clustered at the session level.

Several comments are in order. First, there is no evidence of learning: all the round coefficients are insignificant (the p-value ranges from 0.11 to 0.84). Second, there is no evidence of order effects: both order dummies are insignificant, with a p-value of 0.54 (NL-first) and 0.83 (*Bull* first). Third, as table A14 shows, t-tests on the equality of the treatment dummies give us similar results to those we obtained with the Wilcoxon sign-rank tests. In particular, in both the *Bear* and *Bull* parametrization, the quantity increases significantly when we move from NL to L; in contrast, there is no shift in quantities in either L or NL when we move from *Bull* to *Bear*.

In Table A15 we report similar results for prices. The dependent variable is the per-round price. The dependent variables are the same as those in the quantity panel. As was the case for quantities, round effects are largely insignificant (the only exception is round 5 where the p-value is 0.07). Moreover, the two order effect dummies are not significant (p-values are 0.91 and 0.86 respectively); that is, there is no evidence of order effects in the panel. Finally, as table A16 shows, t-tests on the equality of the treatment dummies give us similar results to those we obtained with the Wilcoxon sign-rank tests. In particular, in both the *Bear* and *Bull* parametrization, the price

[1] As a robustness check we also ran two separate panels, one for the Bullish and one for the Bearish parameterization. The results are largely in line with those described in this appendix, and we do not report them for brevity's sake.

increase significantly when we move from NL to L; the price also increases, in both NL and L when we move from $Bear$ to $Bull$.

Table A13: Panel Regression, Per-Round Quantities

Q_{eq}	$Coefficient$	$Standard\ Error$	$p-value$
$Bull-NL$	57.2853	4.2361	0.000
$Bear-NL$	60.0058	5.1370	0.000
$Bull-L$	72.2634	4.0050	0.000
$Bear-L$	72.7651	4.4441	0.000
$NLFirst_{order}$	-2.4969	3.9058	0.541
$BullFirst_{order}$	-0.8302	3.8397	0.834
$Rounds$		omitted	
$Number\ of\ Obs = 396$		$R^2 = 0.9742$	

Table A14: Test for Differences in Treatment Dummies

H_0	H_1	$p-value$
$Bull-NL = Bull-L$	$Bull-NL < Bull-L$	0.0000
$Bear-NL = Bear-L$	$Bear-NL < Bear-L$	0.0009
$Bear-NL = Bull-NL$	$Bear-NL < Bull-NL$	0.8419
$Bear-L = Bull-L$	$Bear-L < Bull-L$	0.5940

Table A15: Panel Regression, Per-Round Prices

P_{eq}	$Coefficient$	$Standard\ Error$	$p-value$
$Bull-NL$	218.921	6.7580	0.000
$Bear-NL$	190.0321	6.2996	0.000
$Bull-L$	259.5271	7.7681	0.000
$Bear-L$	228.921	8.3239	0.000
$NLFirst_{order}$	0.5165	4.5313	0.912
$BullFirst_{order}$	-0.8471	4.5987	0.858
$Rounds$		omitted	
$Number\ of\ Obs = 396$		$R^2 = 0.9880$	

Table A16: Test for Differences in Treatment Dummies

H_0	H_1	$p-value$
$Bull-NL = Bull-L$	$Bull-NL < Bull-L$	0.0000
$Bear-NL = Bear-L$	$Bear-NL < Bear-L$	0.0001
$Bear-NL = Bull-NL$	$Bear-NL < Bull-NL$	0.0003
$Bear-L = Bull-L$	$Bear-L < Bull-L$	0.0007

Appendix VIII: Statistical Tests on Aggregate Demand and Supply Schedules

In the paper, we make statements about the relative position of aggregate demand and supply across treatments. We back these statements by conducting two sets of statistical tests: a set of non-parametric tests (Appendix VIII.I) and a set of parametric tests carried out through a panel data regression (Appendix VIII.2). The results of the two sets of tests are largely the same.

VIII.I: Non Parametric Test

In order to test for shifts of the demand curve across treatments, we first compute for each round of the experiment the sum of the quantities demanded by all Buyers for the prices for which Buyers' demand was elicited; for example, for the *NL-Bull* treatment, denote this sum by $Q_{i,j}^{D,Bull-NL}$, where (i,j) denotes the round and session. For each session, we compute the sum of $Q_{i,j}^{D,NL}$, across the 11 rounds; denote this quantity by $Q_j^{D,NL}$, where j denotes the session. Analogously, we compute $Q_j^{D,Treatment}$ for each of the other three treatments. In this way, we obtain a sample of nine observations (the per-session averages) for each treatment (four samples overall). We compare these samples with a Wilcoxon sign-rank test and with a sign test. We proceed in a similar way to test for shifts of the supply curve. Table A17 reports the hypotheses being tested (columns 2 and 3) and the p-values for the two tests (columns 4 and 5).

Table A17: Tests for Shifts in the Demand and Supply curves

	H_0	H_1	$Wilcoxon\ signrankp - value$	$signtestp - value$
$Bullish$	$D_L = D_{NL}$	$D_L > D_{NL}$	0.0020	0.0020
$Bearish$	$D_L = D_{NL}$	$D_L > D_{NL}$	0.0020	0.0020
L	$D_{Bull} = D_{Bear}$	$D_{Bull} \sim= D_{Bear}$	0.0040	0.0039
NL	$D_{Bull} = D_{Bear}$	$D_{Bull} \sim= D_{Bear}$	0.0078	0.0391
$Bullish$	$S_L = S_{NL}$	$S_L \sim= S_{NL}$	0.4258	0.5078
$Bearish$	$S_L = S_{NL}$	$S_L \sim= S_{NL}$	0.3008	0.1797
L	$S_{Bull} = S_{Bear}$	$S_{Bull} < S_{Bear}$	0.0020	0.0020
NL	$S_{Bull} = S_{Bear}$	$S_{Bull} < S_{Bear}$	0.0020	0.0020

VIII.2: Panel Regression, Parametric Tests for Shift in Demand and Supply, and Tests for Order Effects

We first describe the parametric tests for the demand curves; the tests for the supply curve are similar. In order to test for a shift of the demand curve through a parametric method, we run the following panel-data regression:

$$q^n_{i,j,z} = \alpha + \beta p^n_{i,j,z} + \gamma \left(p^n_{i,j,z}\right)^2 + \delta L_{dummy} + \epsilon^n_{i,j,z},$$

where $q^n_{i,j,z}$ is the n^{th} choice of subject i in round j of session z; $p^n_{i,j,z}$ is the corresponding price, L_{dummy} is a leverage dummy and $\epsilon^n_{i,j,z}$ is the error term. We estimate the model separately for the *Bull* and *Bear* parameterization. We cluster all the standard errors at the session level. In addition to the regressors above, we add as controls the two order-effect dummy variables described in Appendix VI.2 and 10 round-specific fixed effects.

In other words, we fit a quadratic demand function across all the observation in a given parameterization, and we test whether there is a statistically significant shift in the curve (H_0: $\delta = 0$) from the NL to the L treatment. We proceed in a similar way to test for shifts in the supply curve. Although we do not report all the regression's result for the sake of brevity, it is worth mentioning that: 1) β is always of the expected sign (negative for demand; positive for supply) and significant; 2) the round fixed-effects are never significant; and 3) the order-effect dummies are never significant. Tables A18-A21 show the results.

Table A18: Shift in the Aggregate Demand, the Bullish Parameterization

Q_S	$Coefficient$	$Standard\ Error$	$p-value$
P	-3.0685	0.1411	0.000
P^2	0.0046	0.0002	0.000
L_{dummy}	58.0511	2.6041	0.000
$Number\ of\ Obs = 1980$		$R^2 = 0.6384$	

Table A19: Shift in the Aggregate Demand, the Bearish Parameterization

Q_D	$Coefficient$	$Standard\ Error$	$p-value$
p	-2.6563	0.1918	0.000
p^2	0.0040	0.0003	0.000
L_{dummy}	45.3559	4.2317	0.000
$Number\ of\ Obs = 1980$		$R^2 = 0.6061$	

Table A20: Shift in the Aggregate Supply, the Bullish Parameterization

Q_S	$Coefficient$	$Standard\ Error$	$p-value$
P	0.5460	0.0455	0.000
P^2	-0.0006	0.0001	0.000
L_{dummy}	1.1668	1.1507	0.340
$Number\ of\ Obs = 1980$		$R^2 = 0.7359$	

Table A21: Shift in the Aggregate Supply, the Bearish Parameterization

Q_D	$Coefficient$	$Standard\ Error$	$p-value$
P	0.5118	0.0557	0.000
P^2	-0.0006	0.0001	0.000
L_{dummy}	1.2057	1.1441	0.323
$Number\ of\ Obs = 1980$		$R^2 = 0.6544$	

Appendix IX: Statistical Test for the Position of the Empirical Demand with Respect to its Theoretical Counterpart

In the paper, we state that the empirical demand is to the left of its theoretical counterpart. In order to test for the statistical significance of the distance between empirical and theoretical demands, we ran a panel regression where the dependent variable is the difference between a Buyer's choice and its theoretical prediction. In the panel, we have one observation for each price presented to each Buyer in each round of each session; four panel regressions are ran separately for each treatment.[2]. The independent variables are: 1) a set of 10-round dummies (for rounds 5 to 15 of each session); 2) an "NL-first" order-effect dummy, capturing those sessions in which the NL-treatment was run on the first day of the experiment; 3) a "*Bull*-first" order-effect dummy capturing those sessions in which, on both days of the experiment, the *Bull* treatments were run first. Errors are clustered at the session level and are assumed to be negative log normal, to account for the fact that the empirical demand is always by construction to the left of the theoretical one (and so, the difference between the empirical demand and its theoretical counterpart is always negative). The constant in the panel regression measures the shift of the empirical demand with respect to its theoretical counterpart. Table A22 reports the constant for each of the treatment, and the p-value for the null that it is equal to zero.

[2]As a robustness check, we also ran one panel pooling all the observations from each treatment.

Table A22: Panel Regression on the Distance between Empirical and Theoretical Demand.

$Treatment$	$Coefficient$	$Standard\,Error$	$p-value$
$Bull-NL$	1.6598	0.3352	0.001
$Bear-NL$	1.8512	0.4038	0.002
$Bull-L$	2.5157	0.2228	0.000
$Bear-L$	3.6399	0.1707	0.000

Appendix X: Scatter-Plot Regressions

Table A23 reports the results of a regression of each subject's average borrowing per asset in the L-treatments (both Bullish and Bearish) on his average final cash holdings in the NL-treatments. Standard errors are clustered at the session level.

Table A23: Borrowing per Asset in the *Bull-L* treatment

$Loan_{widget}$	$Coefficient$	$Standard\,Error$	$p-value$
$Cash_f$	-0.00399	0.00079	0.001
$Number\,of\,Obs = 108$		$R^2 = 0.1727$	

Appendix XI: Instructions

Thank you for participating in today's experiment. You have earned a $5 show-up bonus for arriving on time. Whatever you earn in this session will be in addition to this $5. If you read the instructions below carefully, you have the potential to earn significantly more.

The experiment will be run over two days, today and tomorrow. You will be paid in cash at the end of tomorrow's experiment.

In the experiment you will earn Experimental Dollars (E$), which will be converted into cash (US Dollars) at the end of the experiment. For every 20,000 E$ you have at the end of the experiment you will be paid 1 US Dollar in cash.

You will participate in the experiment along with 11 other students. Neither before nor after the experiment will you receive any information about the identity of other participants. During the experiment, you are not allowed to talk to other participants or to use cell phones. If you have any questions, please raise your hand, and an experimenter will assist you.

The experiment consists of four parts: Part A, B, C and D. We will first distribute the instructions for Part A. You will read them, answer a brief questionnaire, and then you will start playing. After you finish playing part A, we will distribute the instructions for part B, and you will play part B. Tomorrow, you will play Part C and Part D.

Instructions for Part A

Overview

In today's experiment, you will buy and sell a product that we will call from now on a "widget." You will be able to buy or sell the widgets, by trading with the other participants.

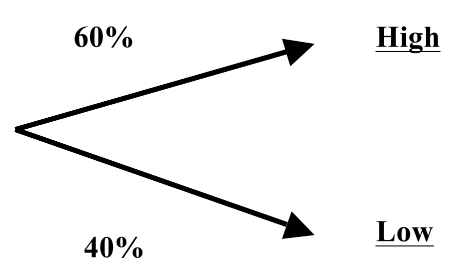
You will play 15 rounds with the same procedures. The first 4 rounds are for practice only, whereas the remaining 11 rounds will determine your final payment.

Description of the each round

The Final Value of the Widgets

The final value of the widgets can be **High** or **Low**. This is determined by randomly choosing a ball from a box with **6** red balls and **4** green balls. If the ball turns out to be red, the value of the widget is High; if the ball turns out to be green, the value of the widget is Low. Since there are 6 red and 4 green balls in the box, the chance of the value of the widgets being High is **60 percent**; the chance of the value of the widgets being Low is **40 percent**.

We can represent the final value of the widgets by the following picture:



The ball is extracted from the box **at the end** of each round.

In each round we choose the ball from a new box. There are always 6 red and 4 green balls in the box, so the chance of the final value of the widgets being High or Low does not depend on whether it was High or Low in the previous round.

Buyers and Sellers

At the beginning of each round, you are randomly assigned to be either a Buyer or a Seller. Half of the participants (6 students) will be Buyers, and half of the participants (6 students) will be Sellers. In each round, you see whether you are a Buyer or a Seller by looking at the left column in your screen.

Here is why whether you are a Buyer or a Seller matters.

a) At the beginning of the round Buyers are given cash and Sellers are given widgets:

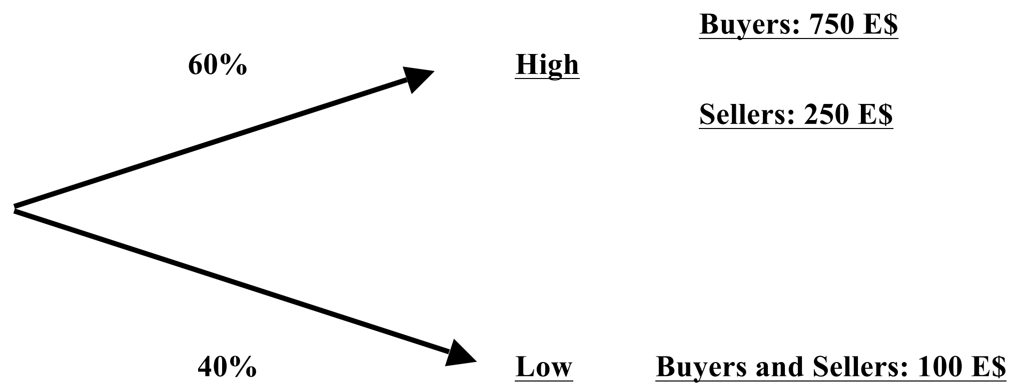
If you are a Buyer, you are given **15,000 E$**

If you are a Seller, you are given **100** widgets

b) Whether you are a Buyer or a Seller also determines the final value of the widgets for you.

When the value of the widget is Low, its final value is **100 E$** for both Buyers and Sellers.

However, when the value of the widget is High, its final value is **750 E$** for Buyers and **250 E$** for Sellers. We can represent the final value of the widgets by the following picture:



When the final value of the widgets is Low, it is the same value for both Buyers and Sellers; but when the value of the widgets is High, widgets pay more to Buyers than to Sellers.

How to buy or sell widgets

The column labeled "Price" of your computer screen displays an array of prices. **For each of those prices**, Buyers should indicate the number of widgets they want to buy and Sellers should indicate the number of widgets they want to sell. After you made your choices, you should press OK. You can see how the screenshot appears for both buyers and sellers in the attached leaflet.

The computer requires you to be consistent in your choices. For instance, if you write that you want to buy 40 widgets at the price of 300, **you are not allowed to buy more** than 40 widgets at a price of 330. The opposite is true for a Seller: if you want to sell 40 widgets at the price of 300, **you are not allowed to sell more** than 40 widgets at the price of 270.

How Buyers pay for widgets

In each round, Buyers are allowed to buy widgets with the cash that they have.

In the computer screen, to the right of the price column there is a column that shows the maximum number of widgets Buyers can buy for each price.

Suppose you are a Buyer and are deciding how many widgets to buy at the price 300. You can at most buy 50 widgets (300*50=15,000 E$, which is the cash Buyers have at the beginning of the round).

The final price

At which price does trading occur? **For each price**, we will sum up the number of widgets that all Buyers want to buy, and the number of widgets that all Sellers want to sell. We will choose the price for which the difference between these two numbers is the smallest. This is the **final price** in the round.

Example: Suppose that at the price of 300, each Buyer wants to buy 40 widgets, and each seller wants to sell 10. Therefore, at 300, all Buyers together want to buy 40*6=240 widgets, and all sellers together want to sell 10*6=60 widgets. The difference between amount bought and amount sold is 240-60=180. We compute this difference for all the other prices in the list, and **we choose the price for which the difference is the smallest (that is, the price for which the difference is the closest to zero). This is the final price in the round.**

You learn which is the final price **only after all participants have made their choices**. Therefore, at each price, you should indicate the number of widgets you want to buy or sell **as if** that price were the one at which transactions occur.

At the final price, each Buyer will buy (at most) the number of widgets he/she indicated he/she would buy at that price. Each Seller will sell (at most) the number of widgets he/she indicated he/she would sell at that price.

Why at most? Because sometimes you may not be able to buy or sell exactly the quantity you had indicated. It may happen that, at the final price, the number of widgets Buyers want to buy is larger (or smaller) than the number of widgets Sellers want to sell. In this case, we will reduce the widgets bought by Buyers (or sold by Sellers) by the same proportional amount. For instance, if the final price is 300 and the number of widgets sold by Sellers is 10% higher than the number of widgets that Buyers want to buy at this price, we will reduce the sale of each Seller by 10%.

The bonus

In each round, you are given a per-round bonus of 10,000 E$. The extra bonus is given only at the end of the round, and cannot be used to buy widgets. This bonus is in addition to the show-up bonus you received for arriving on time.

The end of the Round

After the final price is determined, buying and selling occurs automatically. A summary on your screen will indicate the price for the widget, and how many widgets you bought or sold. Then, the value of the widgets will be extracted from the box, and your payoff for the round will appear on the computer screen.

Your payoff is computed in the following way:

1) If you are a Buyer

   Your payoff = your remaining cash

   + (number of widgets you bought)*(final value of the widgets)

   + bonus

2) If you are a Seller

   Your payoff = the cash from selling the widgets

   + (number of widgets you did not sell)*(final value of the widgets)

   + bonus

Examples

1) Let's say the final value of the widgets is High, you are Buyer, and you bought 30 widgets at a price of 300. Your payoff is going to be

   Cash=15,000-300*30=15,000-9,000=6,000

   Final value of the widgets=750*30=22,500

   Bonus=10,000

   Final payoff in the round=22,500+6,000+10,000=38,500 E$

Note that you made money out of the purchase of widgets, since you bought for 300 something that is worth 750.

2) Let's say now you are a Seller and you sold 90 widgets (and kept 10) at a price of 150. The final value of the widgets is 100. Your payoff is going to be

    Cash=90*150=13,500

    Final value of the remaining widgets=100*10=1,000

    Bonus=10,000

Final payoff in the round=13,500+1,000+10,000=24,500 E$

Note that you made money out of the sale, since you sold for 150 something that is worth to you only 100.

The new round

After the first round ends, you will move to round 2, then to round 3 and so on. At the beginning of each round, you will be told whether you are a Buyer or a Seller and you will be given cash (if a buyer) or widgets (if a seller) to play in the round. Each round is independent: **you will never be able to use the widgets or cash from previous rounds**. Your per-round payoff only matters to compute your final payment in dollars.

After the game ends

After you have seen the payoff of the round, a new round starts. At the end of the 15^{th} round, part A ends, and we will distribute the instructions for part B.

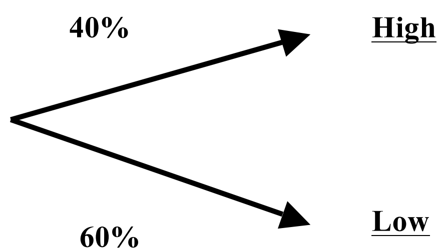
How is your final payment determined? For both part A and part B, we will discard the first 4 rounds, which are only for practice. Out of the remaining 22 rounds (11 for part A and 11 for part B), we will randomly draw 10 rounds (5 from part A and 5 from part B) and we will add your earnings from these randomly chosen 10 rounds. Finally, we will convert the earnings from E$ into US Dollars at the exchange rate of 20,000.

Tomorrow, after playing the second day of the experiment, you will be paid the sum of today's and tomorrow's earnings. This is the end of the instructions for part A. If you have any questions, please raise your hand and an experimenter will assist you.

<u>Instructions for Part B</u>

The experiment is exactly the same as in part A. The only difference is in the proportion of red and green balls that determine the final value of the widgets in each round. **Now, there are 4 red ball and 6 green balls in the box.**

Since there are 4 red and 6 green balls in the box, the chance of the value of the widgets being High is 40 percent (when before it was 60 percent); the chance of the value of the widgets being Low is 60 percent (when before it was 40 percent). We can represent this by the following picture:



As for Part A, Part B last for 15th rounds. When it ends, for both part A and part B, we will discard the first 4 rounds, which are only for practice. Out of the remaining 22 rounds (11 for part A and 11 for part B), we will randomly draw 10 rounds (5 from part A and 5 from part B) and we will add your earnings from these randomly chosen 10 rounds. Finally, we will convert the earnings from E$ into US Dollars at the exchange rate of 20,000.

Tomorrow, after playing the second day of the experiment, you will be paid the sum of today's and tomorrow's earnings. This is the end of the instructions for part B. If you have any questions, please raise your hand and an experimenter will assist you.

This is the second day of the experiment. Today you will play parts C and D.

As in yesterday's experiment, today you will earn Experimental Dollars (E$), which will be converted into cash (US Dollars) at the end of the experiment. For every 20,000 E$ you have at the end of the experiment you will be paid 1 US Dollar in cash.

You will participate in the experiment along with 11 other students. Neither before nor after the experiment will you receive any information about the identity of other participants. During the experiment, you are not allowed to talk to other participants or to use cell phones. If you have any questions, please raise your hand, and an experimenter will assist you.

Instructions for Part C

Overview

In today's experiment, you will buy and sell a product that we will call from now on a "widget." You will be able to buy or sell the widgets, by trading with the other participants.

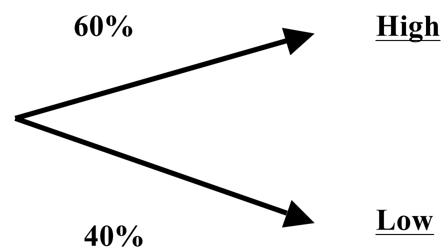
You will play 15 rounds with the same procedures. The first 4 rounds are for practice only, whereas the remaining 11 rounds will determine your final payment.

Description of the each round

The Final Value of the Widgets

The final value of the widgets can be **High** or **Low**. This is determined by randomly choosing a ball from a box with **6** red balls and **4** green balls. If the ball turns out to be red, the value of the widget is High; if the ball turns out to be green, the value of the widget is Low. Since there are 6 red and 4 green balls in the box, the chance of the value of the widgets being High is **60 percent**; the chance of the value of the widgets being Low is **40 percent**.

We can represent the final value of the widgets by the following picture:



The ball is extracted from the box **at the end** of each round.

In each round we choose the ball from a new box. There are always 6 red and 4 green balls in the box, so the chance of the final value of the widgets being High or Low does not depend on whether it was High or Low in the previous round.

Buyers and Sellers

At the beginning of each round, you are randomly assigned to be either a Buyer or a Seller. Half of the participants (6 students) will be Buyers, and half of the participants (6 students) will be Sellers. In each round, you see whether you are a Buyer or a Seller by looking at the left column in your screen.

Here is why whether you are a Buyer or a Seller matters.

a) At the beginning of the round Buyers are given cash and Sellers are given widgets:

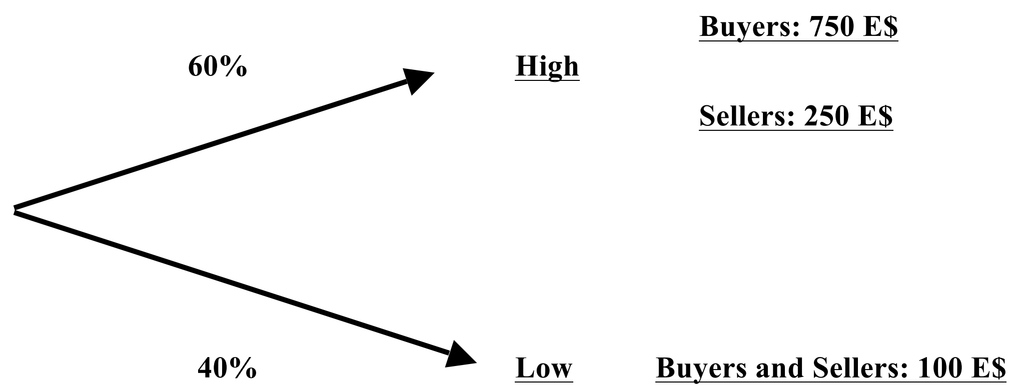
If you are a Buyer, you are given **15,000 E$**

If you are a Seller, you are given **100** widgets

b) Whether you are a Buyer or a Seller also determines the final value of the widgets for you.

When the value of the widget is Low, its final value is **100 E$** for both Buyers and Sellers.

However, when the value of the widget is High, its final value is **750 E$** for Buyers and **250 E$** for Sellers. We can represent the final value of the widgets by the following picture.



When the final value of the widgets is Low, it is the same value for both Buyers and Sellers; but when the value of the widgets is High, widgets pay more to Buyers than to Sellers.

How to buy or sell widgets

The column labeled “Price” of your computer screen displays an array of prices. **For each of those prices**, Buyers should indicate the number of widgets they want to buy and Sellers should indicate the number of widgets they want to sell. After you made your choices, you should press OK. You can see how the screenshot appears for both buyers and sellers in the attached leaflet.

The computer requires you to be consistent in your choices. For instance, if you write that you want to buy 40 widgets at the price of 300, **you are not allowed to buy more** than 40 widgets at a price of 330. The opposite is true for a Seller: if you want to sell 40 widgets at the price of 300, **you are not allowed to sell more** than 40 widgets at the price of 270.

How Buyers pay for widgets

In each round, Buyers are allowed to buy widgets not only with the money that they have, but also by borrowing from a bank.

How does borrowing work? **For each widget** that a Buyer buys, the bank is going to lend him/her **up to** 100 E$. Hence, for any given price, borrowing allows the Buyers to buy more widgets than if they could not borrow. At the end of the round Buyers will have to return what they borrowed.

In the computer screen, to the right of the price column, there are 4 columns that show the maximum number of widgets Buyers can buy for each price if: *i)* they do not want to borrow *ii)* if they want to borrow the maximum (100 E$ per widget), *iii)* if they want to borrow only 30 E$ per widget and *iv)* if they want to borrow only 60 E$ per widget.

Buyers will indicate on the screen how many widgets they want to buy for each of the prices in the list. **Obviously you are not limited to borrowing 0, 30, 60 or 100.** Suppose the computer tells you that you can buy 150 widgets when borrowing 30 and 214 when borrowing 60, you can decide to buy a number between 150 and 214. In that case, you will borrow something between 30 and 60 per widget.

The following example shows how borrowing increases how many widgets Buyers can buy. Suppose you are deciding how many widgets to buy at the price 300. If you do not borrow, you could at most buy 50 widgets (300*50=15,000 E$, which is the cash Buyers have at the beginning of the round).

If you borrow, for each widget you buy you can get up to 100 E$ in loans. Suppose you borrow 100 E$, i.e. the maximum amount per widget. This means that for each widget you buy, you only need to put down 300-100=200 E$ of your own cash. So with your 15,000 E$ of cash, you can now afford to buy 75 widgets (200*75= 15,000 E$), 25 more than if you did not borrow.

At the end of the round, you will have to repay your loan. Since you bought 75 widgets, you will have to repay 75*100=7,500 E$. If the value of the widgets turns out to be High (750 E$), your payoff is 750*75=56,250 E$ minus your 7,500 E$ loan, that is, 56,250-7,500=48,750 E$.

If instead you only borrow 60 E$ per widget, then for each widget you buy you need to put down 300-60=240 E$; with your 15,000 E$ of cash, you can now afford to buy 62 widgets (240*62=14,880 E$; you are left with 120 E$ of cash, which are not enough to be an additional widget), 12 more than if you were not allowed to borrow (but 12 less than if you had borrowed the maximum amount of 100 E$ per widget).

The final price

At which price does trading occur? **For each price**, we will sum up the number of widgets that all Buyers want to buy, and the number of widgets that all Sellers want to sell. We will choose the price for which the difference between these two numbers is the smallest. This is the **final price** in the round.

Example: Suppose that at the price of 300, each Buyer wants to buy 40 widgets, and each seller wants to sell 10. Therefore, at 300, all Buyers together want to buy 40*6=240 widgets, and all sellers together want to sell 10*6=60 widgets. The difference between amount bought and amount sold is 240-60=180. We compute this difference for all the other prices in the list, and **we choose the price for which the difference is the smallest (that is, the price for which the difference is the closest to zero). This is the final price in the round.**

You learn which is the final price **only after all participants have made their choices**. Therefore, at each price, you should indicate the number of widgets you want to buy or sell **as if** that price were the one at which transactions occur.

At the final price, each Buyer will buy (at most) the number of widgets he/she indicated he/she would buy at that price. Each Seller will sell (at most) the number of widgets he/she indicated he/she would sell at that price.

Why at most? Because sometimes you may not be able to buy or sell exactly the quantity you had indicated. It may happen that, at the final price, the number of widgets Buyers want to buy is larger (or smaller) than the number of widgets Sellers want to sell. In this case, we will reduce the widgets bought by Buyers (or sold by Sellers) by the same proportional amount. For instance, if the final price is 300 and the number of widgets sold by Sellers is 10% higher than the number of widgets that Buyers want to buy at this price, we will reduce the sale of each Seller by 10%.

The bonus

In each round, you are given a per-round bonus of 10,000 E$. The extra bonus is given only at the end of the round, and cannot be used to buy widgets. This bonus is in addition to the show-up bonus you received for arriving on time.

The end of the Round

After the final price is determined, buying and selling occurs automatically. A summary on your screen will indicate the price for the widget, and how many widgets you bought or sold. Then, the value of the widgets will be extracted from the box, and your payoff for the round will appear on the computer screen.

Your payoff is computed in the following way:

1) If you are a Buyer

    Your payoff = your remaining cash

    + (number of widgets you bought)*(final value of the widgets)

    + bonus

    – loan repayment

    where the final term is there because you need to repay the amount you borrowed for each widget you bought.

2) If you are a Seller

    Your payoff = the cash from selling the widgets

    + (number of widgets you did not sell)*(final value of the widgets)

    + bonus

Examples

1) Let's say the final value of the widgets is High and you are Buyer. You bought 60 widgets at a price of 300, and you borrowed 50 E$ per widget. Your payoff is going to be

Cash=15000-(300-50)*60=15,000-15,000=0

Loan repayment=50*60=3,000

Final value of the widgets=750*60=45,000

Bonus=10,000

Final payoff in the round=45,000-3,000+10,000=52,000 E$

2) Let's say now you are a Seller and you sold 90 widgets (and kept 10) at a price of 150. The final value of the widgets is 100. Your payoff is going to be

    Cash=90*150=13,500

    Final value of the remaining widgets=100*10=1,000

    Bonus=10,000

Final payoff in the round=13,500+1,000+10,000=24,500 E$

Note that you made money out of the sale, since you sold for 150 something that is worth to you only 100.

The new round

After the first round ends, you will move to round 2, then to round 3 and so on. At the beginning of each round, you will be told whether you are a Buyer or a Seller and you will be given cash (if a buyer) or widgets (if a seller) to play in the round. Each round is independent: **you will never be able to use the widgets or cash from previous rounds**. Your per-round payoff only matters to compute your final payment in dollars.

After the game ends

After you have seen the payoff of the round, a new round starts. At the end of the 15^{th} round, part C ends, and we will distribute the instructions for part D.

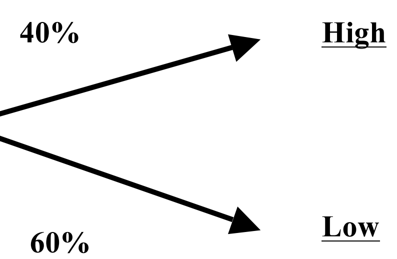
How is your final payment determined? For both part C and part D, we will discard the first 4 rounds, which are only for practice. Out of the remaining 22 rounds (11 for part C and 11 for part D), we will randomly draw 10 rounds (5 from part C and 5 from part D) and we will add your earnings from these randomly chosen 10 rounds. Finally, we will convert the earnings from E$ into US Dollars at the exchange rate of 20,000.

After playing part D, yesterday's and today's earnings will be summed up, and you will be paid in cash. This is the end of the instructions for part C. If you have any questions, please raise your hand and an experimenter will assist you.

<u>Instructions for Part D</u>

The experiment is exactly the same as in part C. The only difference is in the proportion of red and green balls that determine the final value of the widgets in each round. **Now, there are 4 red ball and 6 green balls in the box.**

Since there are 4 red and 6 green balls in the box, the chance of the value of the widgets being High is 40 percent (when before it was 60 percent); the chance of the value of the widgets being Low is 60 percent (when before it was 40 percent). We can represent this by the following picture:



As for Part C, Part D last for 15^{th} rounds. When it ends, for both part C and part D, we will discard the first 4 rounds, which are only for practice. Out of the remaining 22 rounds (11 for part C and 11 for part D), we will randomly draw 10 rounds (5 from part C and 5 from part D) and we will add your earnings from these randomly chosen 10 rounds. Finally, we will convert the earnings from E$ into US Dollars at the exchange rate of 20,000.

After finishing playing part D, we will sum today's and yesterday's dollar earnings and pay you in cash. This is the end of the instructions for part D. If you have any questions, please raise your hand and an experimenter will assist you.

The Buyers' Screenshot

Round

1 of 1

Remaining time [sec]: 120

You are a **BUYER.**

You have **15000** in cash

Widget Value if **HIGH** : **750**

Widget Value if **LOW** : **100**

You are in **Part A.**

	Price	Maximum number of widgets you can buy	Number of widgets you want to buy
1	**130**	115	
2	**160**	93	
3	**190**	78	
4	**210**	71	
5	**240**	62	
6	**300**	50	
7	**330**	45	
8	**360**	41	
9	**370**	40	
10	**390**	38	

For each of the above prices, you should indicate the number of widgets you want to buy. When you are done, click *OK*.

OK

The Sellers' Screenshot

Round

1 of 1

Remaining time [sec]: 120

You are a **SELLER.**

You have **100 widgets.**

Widget Value if **HIGH** : **250**

Widget Value if **LOW** : **100**

You are in **Part A.**

	Price	Maximum number of widgets you can sell	Number of widgets you want to sell
1	**130**	100	
2	**160**	100	
3	**190**	100	
4	**210**	100	
5	**240**	100	
6	**300**	100	
7	**330**	100	
8	**360**	100	
9	**370**	100	
10	**390**	100	

For each of the above prices, you should indicate the number of widgets you want to sell. When you are done, click *OK*.

OK

The Buyers' Screenshot

Round

1 of 1

Remaining time [sec]: 117

You are a **BUYER.**
You have **15000** in cash
Max you can borrow: **100**
Widget Value if **HIGH** : **750**
Widget Value if **LOW** : **100**
You are in **Part B.**

	Price	Maximum number of widgets you can buy				
		If you don't borrow	If you borrow: 30	60	100	Number of widgets you want to buy
1	**130**	115	150	214	500	
2	**160**	93	115	150	250	
3	**190**	78	93	115	166	
4	**210**	71	83	100	136	
5	**240**	62	71	83	107	
6	**300**	50	55	62	75	
7	**330**	45	50	55	65	
8	**360**	41	45	50	57	
9	**370**	40	44	48	55	
10	**390**	38	41	45	51	

For each of the above prices, you should indicate the number of widgets you want to buy. When you are done, click *OK*.

OK

The Sellers' Screenshot

Round

1 of 1

Remaining time [sec]: 117

You are a **SELLER.**
You have **100 widgets.**
Widget Value if **HIGH** : **250**
Widget Value if **LOW** : **100**
You are in **Part B.**

	Price	Maximum number of widgets you can sell	Number of widgets you want to sell
1	**130**	100	
2	**160**	100	
3	**190**	100	
4	**210**	100	
5	**240**	100	
6	**300**	100	
7	**330**	100	
8	**360**	100	
9	**370**	100	
10	**390**	100	

For each of the above prices, you should indicate the number of widgets you want to sell. When you are done, click *OK*.

OK