NOTE: These instructions (Session Type A) were used for both the Symmetric and Asymmetric treatments. For the Sidepayment treatment the instructions were modified as shown in the bracketed sections below.

EXPERIMENT INSTRUCTIONS

Session Type: A Date: _____ Location: _____

INTRODUCTION

You are about to participate in an experiment on the economics of decision-making. During the experiment you will be asked to make a number of decisions. Your earnings for the experiment will depend, in part, on the decisions you make combined with the decisions of other participants. During the experiment you will be asked to read a set of simple instructions, take a short quiz to test your understanding of the conditions of the experiment, and then participate in a number of experimental periods. Once the experiment concludes, you will be paid privately in cash. You are not allowed to communicate with anyone during the experiment. If you have any questions, please direct them to the researcher.

In the experiment you and another subject will compete to make an innovation. If you succeed and you counterpart fails, you will be the only seller of the product and will enjoy a higher payoff. If both you and your counterpart are successful, then your payoff will depend on the nature of competition in your market. If you fail, you will receive nothing from the sale of the product. The buyers of the good are simulated by the computer.

The payoffs you earn each period will be given in points. You will begin the experiment with _____ points and your gains / losses will be added to / subtracted from your balance. At the end of the experiment your total earnings of points will be converted to USD. To determine your earnings, divide the total number of points earned by _____ and round up to the next whole dollar.

The experiment will be made up of 16 periods.

STAGES

Each period has two stages: (1) the Decision Stage and (2) the Payoff Stage. These stages are described below.

(1) Decision Stage

In <u>each period</u> you will be randomly paired with another participant (your counterpart) to form an industry.

Initial Knowledge

Each industry will begin with a stock of initial knowledge. This initial knowledge will either be split equally between you and your counterpart or will be given entirely to one of you. The amount and distribution of initial knowledge will be announced to both participants.

Investment

In addition to initial knowledge, each participant has the opportunity to increase their level of knowledge, and therefore the likelihood of a successful innovation, by making an investment. Your level of investment can be any number between 0 and 1000 and is

guaranteed to raise your knowledge by the amount of your investment. However, unlike initial knowledge, there is a cost to investment knowledge. The cost is equal to the square of the amount invested divided by 2000. A table is included at the end of these instructions that gives the investment cost for a range of investment values.

> *Example 1: If you invest 400, your cost is 400 squared, or 160000, divided by 2000, or 80. If you invest 600, your cost is 360000/2000 or 180. If you invest 900, your cost is 810000/2000 = 450.*

Sharing

In addition to initial knowledge and knowledge from your own investment, you and your counterpart will be given the opportunity to share investment knowledge. This means that your counterpart will benefit from your investment and you will benefit from their investment. Any investment knowledge you gain will also go to your counterpart, and likewise, any investment knowledge your counterpart gains will go to you. Both you and your counterpart will be asked each period if you would like to share. You will have 30 seconds to make a decision. If both of you answer 'YES' to the sharing question then a sharing agreement will be in effect for that period. If either of you answers 'NO' then there will be no sharing in that period**. [Added for Sidepayment: In addition, sharing may involve making or receiving a payment to/from your counterpart.]** Both you and your counterpart will be informed of whether sharing will occur before you make your investment decision in that period.

> *Example 2: Suppose both you and your counterpart begin with initial knowledge of 150 that comes from an equal distribution of total initial knowledge equal to 300. Now suppose that you and your counterpart both agree to share investment knowledge. You invest 250 and your counterpart invests 200. Your total knowledge is initial knowledge of 150, plus your investment of 250, plus your counterpart's investment of 200, for a total of 600. Your counterpart finishes with total knowledge of 600 as well. Observe that your cost is based only on the investment you make of 250 (cost of 31.25).*

The order of events in this stage will be: (i) sharing decision, (ii) report of sharing results, and (iii) investment decision.

(2) Payoff Stage

Once all participants have entered an investment decision, results from that period will be displayed. You will have 30 seconds to review the results for each period. These results include your initial knowledge, your counterpart's initial knowledge, whether there is sharing or not, your investment, your total knowledge, your random number draw, your success, your counterpart's success, your gain, your cost, your payoff for the period, and your overall payoff.

Here are some details about the results and payoff calculations. First, your total knowledge is the sum of any initial knowledge you were given at the beginning of the period, any investment knowledge you gained by your investment decision, and any knowledge gained through sharing of investment knowledge by your and your counterpart's sharing decision. Second, a random number will be drawn to determine if your innovation has been successful. This number is equally likely to be any value between 0 and 1000. If your total level of knowledge equals or exceeds this number, then your innovation is successful. If your total level of knowledge is less than the number drawn, then your innovation is not successful. Note that you and your counterpart do not face the same random number. Hence, you may be successful and your counterpart may not even if you both have the same level of knowledge.

Example 3: Suppose the total amount of initial knowledge is 300 and there is equal distribution of that knowledge. This means that your initial knowledge is 150. Suppose you do not agree on sharing investment knowledge and that you invest 500 additional and your counterpart does the same. You will both have total knowledge equal to 650. Two random numbers are drawn that are equally likely to be any number between 0 and 1000. If the random number drawn for you is 652 and that for your counterpart is 648, then your counterpart is successful, but you are not.

Your payoff each period is the gain you earn minus any cost of investment. The gain you earn depends on the degree of competition in your market as well as the success or failure of innovation for both you and your counterpart. These are the possible cases:

- If **you are successful** and your counterpart is **not**, your gain is **1000** points.
- If **you are not successful**, your revenue is **0**.
- If **both you and your counterpart are successful** then your gain is **300** points.

Example 4: You and your counterpart each begin the period with initial knowledge of 150 and you agree on sharing investment knowledge. You invest 200 and your counterpart invests 100. In this case you each have total knowledge of 450. Your cost of investment is 20. If each of the random numbers drawn for you and your counterpart are below or equal to 450, then you are both successful and earn revenue of 300. ***[Added for Sidepayment: Furthermore, suppose that in agreeing to share investment knowledge you agreed to pay your counterpart 100.]*** *From this revenue you subtract your cost to find your payoff for this period. In this case, that calculation is 300 - 20 = 280.* ***[Modified for Sidepayment: In this case, that calculation is 300 – 20 -100 = 180.]***

Your payoff is private information. Your counterpart will never learn the payoff that you earned in any period.

The experiment will last about 1 hour. Once the experiment ends you will be called one at a time to leave the room and receive your payment. Since we are running a number of experiments, we would appreciate your cooperation in keeping your results to yourself.

Are there any questions?

QUIZ

1. Suppose total initial knowledge is 300 and that this knowledge is given all to you. You and your counterpart both say YES to sharing, so there will be sharing of investment knowledge. You choose to invest 400 and your counterpart invests 200. The random number draw is 367. Your counterpart is <u>not</u> successful in their innovation.

a) What is your total level of knowledge? _____
b) Is your innovation successful? _____
c) What is your cost of investment? _____
d) What is your final payoff? _____

2. Total initial knowledge is 300 and is distributed equally between you and your counterpart. You invest 200 and your counterpart invests 100. There is sharing of investment knowledge. The random number draw is 721. Your counterpart is not successful in their innovation.

a) What is your total level of knowledge? _____
b) Is your innovation successful? _____
c) What is your cost of investment? _____
d) What is your final payoff? _____

3. Your initial knowledge is 100 – this comes from an even distribution of initial knowledge of 200. Suppose you invest 300 and your counterpart invests 500. There is not sharing of investment knowledge. The random number draw is 119. Your counterpart is successful in their innovation.

a) What is your total level of knowledge? _____
b) Is your innovation successful? _____
c) What is your cost of investment? _____
d) What is your final payoff? _____

4. Suppose total initial knowledge is 50 and that this knowledge is given all to you. In addition, you choose to invest 500 and your counterpart invests 400. There is sharing of investment knowledge. The random number draw is 897. Your counterpart is successful in their innovation.

a) What is your total level of knowledge? _____
b) Is your innovation successful? _____
c) What is your cost of investment? _____
d) What is your final payoff? _____

INVESTMENT LEVEL AND COST OF INVESTMENT (0-1000 in 10 unit increments)

Investment	Cost	Investment	Cost	Investment	Cost
0	0.00	340	57.80	680	231.20
10	0.05	350	61.25	690	238.05
20	0.20	360	64.80	700	245.00
30	0.45	370	68.45	710	252.05
40	0.80	380	72.20	720	259.20
50	1.25	390	76.05	730	266.45
60	1.80	400	80.00	740	273.80
70	2.45	410	84.05	750	281.25
80	3.20	420	88.20	760	288.80
90	4.05	430	92.45	770	296.45
100	5.00	440	96.80	780	304.20
110	6.05	450	101.25	790	312.05
120	7.20	460	105.80	800	320.00
130	8.45	470	110.45	810	328.05
140	9.80	480	115.20	820	336.20
150	11.25	490	120.05	830	344.45
160	12.80	500	125.00	840	352.80
170	14.45	510	130.05	850	361.25
180	16.20	520	135.20	860	369.80
190	18.05	530	140.45	870	378.45
200	20.00	540	145.80	880	387.20
210	22.05	550	151.25	890	396.05
220	24.20	560	156.80	900	405.00
230	26.45	570	162.45	910	414.05
240	28.80	580	168.20	920	423.20
250	31.25	590	174.05	930	432.45
260	33.80	600	180.00	940	441.80
270	36.45	610	186.05	950	451.25
280	39.20	620	192.20	960	460.80
290	42.05	630	198.45	970	470.45
300	45.00	640	204.80	980	480.20
310	48.05	650	211.25	990	490.05
320	51.20	660	217.80	1000	500.00
330	54.45	670	224.45		