

This is a study in the economics of market decision making. The instructions are simple, and if you follow them carefully and make good decisions, you might earn a considerable amount of money, which will be paid to you via PayPal.

In this study we are going to simulate a market in which you and the other investors will buy and sell shares in a sequence of periods. You will be in groups of 8 participants for the duration of this study. Before each period you will be provided information which helps determine the value to you of any decisions you might make. You will have 3 seconds to review this information, but it will also be available during the period.

The money used in this market is called cash. All trading and earnings will be in terms of cash. At the end of the study your cash will be divided by 135 to determine how much you will be paid in \$US. Notice that the more cash you earn, the more dollars you will be paid.

There are two types of shares: x-shares and y-shares. Each period one type of share will have a share value of 100 and the other type of share will have a share value of 0. The method to determine which type of share has a value of 100 and which has a value of 0 is explained later, but only one type of share has a value of 100 in any period.

You can earn profit in the market in two ways: 1) from collecting the share value for all shares you hold at the end of the period and 2) from buying and selling shares. During each period you are free to buy and sell as many shares as you wish, provided you follow the market rules explained later.

To compute your total share earnings for a period, multiply the value per share of a given type by the number of shares of that type you hold at the end of the period and then sum these two amounts. That is:

$$\begin{array}{rcl} & \text{number of x-shares held} & \times \text{ value per x-share} \\ + & \text{number of y-shares held} & \times \text{ value per y-share} \\ \hline = & \text{Total share earnings} & \end{array}$$

Suppose, for example, that you hold five x-shares at the end of period 1.

If for that period the value of x-shares is 100 then your total x-share earnings in the period would be  $5 \times 100 = 500$  cash.

Suppose you hold 4 y-shares at the end of period 1.

If for that period the value of y-shares is 0, then your total y-share earnings in the period would be  $4 \times 0 = 0$  cash.

Your total share earnings would be  $500 + 0 = 500$  cash. This number would be recorded in your history table at the end of the period.

At the beginning of each period you are provided with an initial holding of shares. This is recorded in the “Your Holdings” table of the software. You may sell these if you wish or you may hold them. Selling a share increases your cash by the amount of the sale price. Similarly, you may buy shares. Buying a share reduces your cash by the amount of the purchase price. Thus you can gain or lose cash buying and selling shares. At the end of the period, you will collect the share values for the shares you have as described previously and then all of your share holdings are automatically sold to the experimenter at a price of 0.

In addition, at the beginning of each period you are provided with an initial amount of cash. This is also recorded in the “Your Holdings” table. Part of this cash amount is a loan from the experimenter that you will be required to pay back at the end of the period. The “Your Holdings” table will show you the amount of the loan you have to repay.

To summarize, at the beginning of each period you will be endowed with holdings of shares and cash. You are free to buy and sell shares as you wish according to the rules explained later. Your cash at the end of a period equals your initial cash plus the price of shares sold minus the price of shares purchased plus the value of shares held at the end of the period minus the loan repayment. This is your profit for the period.

### *Information about Share Values*

The value of a share depends on a computerized random draw. Before the study began, for each period, we drew a random number from one to thirty. If the number drawn was one through fifteen, the outcome of the draw is called x; if the number drawn was sixteen through thirty, the outcome is called y.

If the outcome is x, then the value of x-shares is 100 and the value of y-shares is 0.

If the outcome is y, then the value of y-shares is 100 and the value of x-shares is 0.

The outcome will be shown on everyone's screen at the end of the period.

Please note, each period there is a  $1/2$  chance that the outcome is x and a  $1/2$  chance that the outcome is y.

At the beginning of each period, before the trading market starts, one-half of the investors will receive a signal on their screen.

If the outcome is  $x$  then the signal will be:

The outcome is not  $Y \rightarrow Y$  shares are worth 0

If the outcome is  $y$  then the signal will be:

The outcome is not  $X \rightarrow X$  shares are worth 0

Whether you receive a signal or not is determined randomly. Whether other investors receive a signal is also determined randomly. But one-half of the investors will receive a signal that rules out one of the two possible outcomes for that period.

### *Trading and Recording Rules*

- 1) Anyone wishing to buy a share of a given type is free to submit an offer to buy (called a "bid") a share of a given type at a specified price. To submit a bid, type in the amount you are offering to pay for a given type of share in the box labeled "Bid."
- 2) Anyone wishing to sell a share of a given type is free to submit an offer to sell (called an "ask") one share of a given type at a specified price. To submit an ask, type in the amount at which you are offering to sell a given type of share in the box labeled "Ask."
- 3) Anyone is free to buy a share by accepting someone else's ask. To purchase a share by accepting someone else's ask, click the "Buy" button. Similarly, anyone is free to sell a share by accepting someone else's bid. To sell a share by accepting someone else's bid, click the "Sell" button.
- 4) When a bid or ask is accepted, a binding contract occurs for a single share. The contracting parties will have their holdings automatically updated.
- 5) When submitting a bid, you must submit a bid that is higher than the current highest bid. Similarly, when submitting an ask, you must submit an ask that is lower than the current lowest ask. Older bids and asks will remain visible temporarily, but can no longer be accepted. Only the most recent bid or ask can be accepted. Once there is an acceptance, all old bids and asks are removed.
- 6) Your holdings of shares and cash may never go below zero. Therefore, you cannot offer to sell a share if you do not have one in your holdings. Similarly, you cannot bid more than the cash in your holdings.
- 7) The market period will last for 200 seconds.

We will now explain the layout of your computer screen.

The upper portion of the screen displays the market for x-shares and the market for y-shares. Notice that there are separate markets for each type of share.

Example

In this example, the current bid for an x-share is 25. You could sell an x-share at a price of 25 by clicking on the “Sell” button.

The current ask for an x-share is 67. You could offer to sell an x-share for less than 67 by typing a price in the blank box beside the “Ask” button and then pressing the “Ask” button.

Period:1Time Remaining:28

Market X

Asks

Id	Price
6	67

Buy

Ask

Bids

Id	Price
8	25

Bid

Sell

Legend

Yellow square

Ask

Green triangle

Bid

Black circle

Contract

Market Y

Asks

Id	Price
----	-------

Buy

Ask

Bids

Id	Price
----	-------

Bid

Sell

Legend

Yellow square

Ask

Green triangle

Bid

Black circle

Contract

Your Information

Your Id: 3

Starting Probability of Each Outcome

X:1/2

Y:1/2

Your Signal

You did not receive a signal

Share Values

X:0 or 100

Y:0 or 100

Your Holdings

Trade #	Price	Buy/Sell	Shares		
			X	Y	Cash
-	-	-	2	2	4500

Loan: 4500



The left lower portion of the screen displays Your Information. This includes 1) the probability the random drawing held before the study began resulted in the outcome being x or y; 2) the signal you receive, if you receive one; and 3) the value of an x-share and a y-share given the information you have.

Example

In this example, the signal is Not Y. This means the outcome is X. Therefore, x-shares are worth 100 and y-shares are worth 0.

Period:1Time Remaining:84

Market X

Price

200

180

160

140

120

100

80

60

40

20

0

0

50

100

150

200

Time

Asks

Id

Price

Buy

Ask

Bid

Id

Price

Sell

Bids

Ask

Bid

Contract

Market Y

Price

200

180

160

140

120

100

80

60

40

20

0

0

50

100

150

200

Time

Asks

Id

Price

Buy

Ask

Bid

Id

Price

Sell

Bids

Ask

Bid

Contract

Your Information

Your Id: 8

Starting Probability of Each Outcome

X:1/2

Y:1/2

Your Signal

The Outcome is Not Y  
→  
Y shares are worth 0

Share Values

X:100

Y:0

Your Holdings

Trade #	Price	Buy/Sell	Shares		
-	-	-	X	Y	Cash
			2	2	4500

Loan: 4500

Example

In this example, there is no signal. Therefore, you know there is a 1/2 chance the outcome is x in which case x-shares are worth 100 and y-shares are worth 0. You also know there is a 1/2 chance the outcome is y in which case x-shares are worth 0 and y-shares are worth 100.

Keep in mind that in each period half of the traders will get a signal and the other half will not get a signal.

Period:1Time Remaining:148

Market X

200

180

160

140

120

100

80

60

40

20

0

0

50

100

150

200

Asks

Id

Price

Buy

Ask

Bid

Id

Price

Sell

Bids

Ask

Bid

Contract

Market Y

200

180

160

140

120

100

80

60

40

20

0

0

50

100

150

200

Asks

Id

Price

Buy

Ask

Bid

Id

Price

Sell

Bids

Ask

Bid

Contract

Your Information

Your Id: 1

Starting Probability of Each Outcome

X:1/2

Y:1/2

Your Signal

You did not receive a signal

Share Values

X:0 or 100

Y:0 or 100

Your Holdings

Trade #

-

Price

-

Buy/Sell

-

Shares

X

2

Y

2

Cash

4500

Loan: 4500

The lower right portion of your screen shows Your Holdings.

Example

In this example, you have 2 x-shares, 2 y-shares, and 4500 in cash. You can also see that the Loan amount is 4500.

Keep in mind that your profit at the end of a period equals your initial cash plus the price of shares sold minus the price of shares purchased plus the value of shares held at the end of the period minus the loan repayment.

Period:1Time Remaining:28

Market X

Asks

Id Price

Buy667

Ask

Bids

Id Price

825

Sell

Market Y

Asks

Id Price

Buy100

Ask

Bids

Id Price

100

Sell

Your Information

Your Id: 3

Starting Probability of Each Outcome

X:1/2

Y:1/2

Your Signal

You did not receive a signal

Share Values

X:0 or 100

Y:0 or 100

Your Holdings

Trade #	Price	Buy/Sell	Shares X	Y	Cash
-	-	-	2	2	4500

Loan: 4500

There will be several market periods. Your PayPal payment will be based on the sum of your earnings from all periods plus the \$7 payment for showing-up on time for this study.

If you have any questions, please raise your hand.

Otherwise, please remain silent.

The study will begin shortly.