

Trading Recyclables Game

- ◆ Imagine you are one of about 40 firms in the recycling business.
- ◆ There are four product markets
 1. Plastics
 2. Metals
 3. Glass
 4. Paper
- ◆ Your upstream collectors have endowed you with 10 units of each product. You also have \$400 of liquid assets (cash) for trading in these four product markets.

Valuations

- ◆ You have also developed a network of clients that will buy all your stock at the end of the garbage collection/disposal period, say a week.
- ◆ At the end of the week you dispose of all your recycled material a unit (product specific) price or value that is given to you at the beginning of the game.
- ◆ Let's call the unit value of plastic units $V(\text{Plastic})$, and so on for the others. You sell each unit of plastic you own at $V(\text{Plastic})$ at the end of the week, and so on.
- ◆ Your values are independently drawn from a uniform distribution with support $[0,10]$.
- ◆ For example, if you draw $V(\text{Plastic}) = 9$ but $V(\text{Metal}) = 1$, then acquiring plastic is much more valuable than acquiring metal.

Value of the firm

- ◆ The initial value of your firm is:

$$\text{Cash} + 10^* [V(\text{Plastic}) + V(\text{Metal}) + V(\text{Glass}) + V(\text{Paper})]$$

- ◆ Your aim is to maximize the value of your firm at the end of the collection/disposal week.
- ◆ Let's call the units of plastic you have at the end of the game $Q(\text{Plastic})$. The value of your firm at the end of the collection/disposal period is:

$$\text{Cash} + V(\text{Plastic}) Q(\text{Plastic}) + V(\text{Metal}) Q(\text{Metal}) + V(\text{Glass}) Q(\text{Glass}) + V(\text{Paper}) Q(\text{Paper})$$

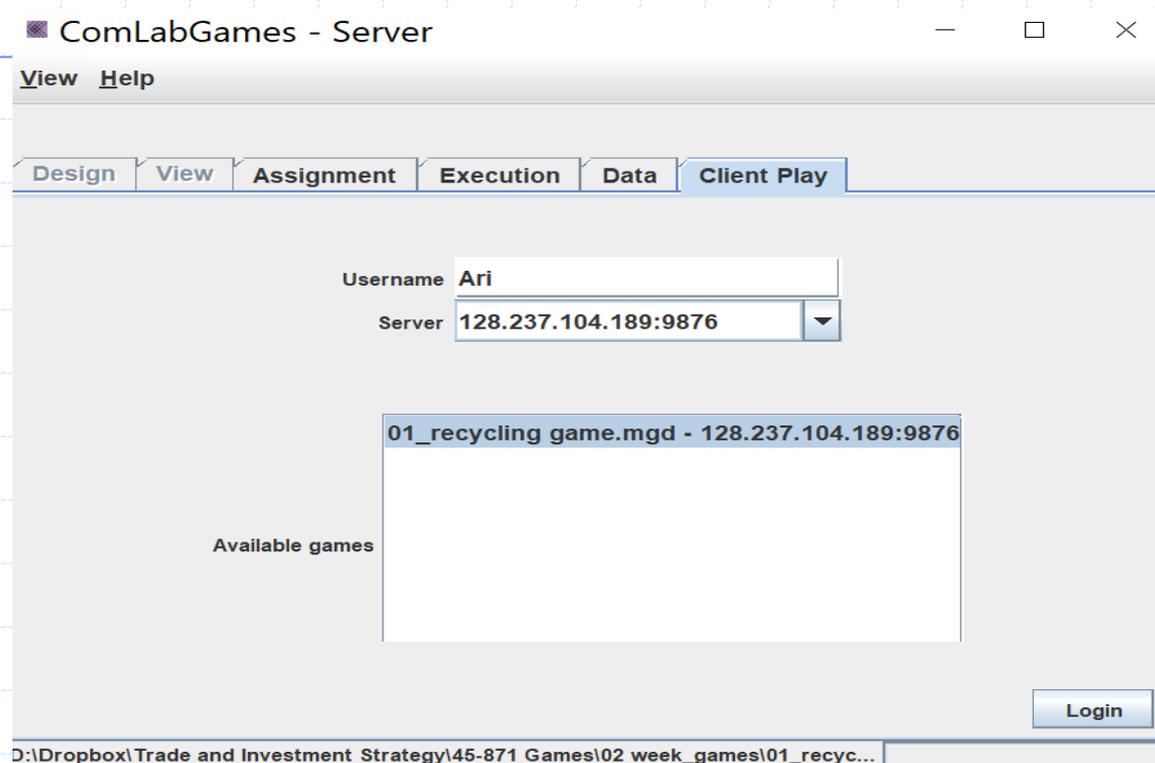
Login instructions

1. Click on Client Play
2. Click on Available games: "01_recycling game.mgd"



Continuing login instructions

1. Server address: 128.237.104.189 will appear automatically after selecting "01_recycling game". If not type 128.237.104.189 in .
2. Write a username.
3. Click on "Login".



Trading window before all subjects login

1. In each session sixteen subjects must login before any of them see a trading window.
2. Information about the number of subjects waiting to start the game is shown at the bottom left corner.

ComLabGames

Username: Ari Id: 12 Identity:

History

Name

View more history

Limit order book

Price	Quantity	Cumulative	Player id	Player type
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Cash

Duration: 600 Price: 0 Quantity: 1 Sell Buy

Summary data

Asset name	Valuation	Endowment	Sell orders	Buy orders	Bid (Quantity)	Ask (Quantity)	Trading price (Quantity)
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Subject's own limit orders

Price	Quantity	Revenue\Cost	Duration
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Transaction history

Price	Quantity	Buyer ID	Buyer Type	Seller ID	Seller Type	Time
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Waiting 15 of 16 subjects to start a session!

Round:

Trading window

1. To trade in a specific market like "Paper", click on that market (i.e. Paper).
2. The selected market is highlighted in blue in "Summary data".

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Username: Clara Id: 19 Identity: 3

Plastics

History	Name	19:20:19 (27)	19:20:18 (28)
Total Asset Value		718.61	0
Difference		0	0
Plastics		9.16	9.16

You know that you are trading in Plastic market if $V(\text{Plastics})$ appears in History and matches the Plastics valuation in summary.

Summary data	Asset name	Valuation	Endowment	Sell orders	Buy orders	Bid (Quantity)	Ask (Quantity)	Trading price (Quantity)
Plastics	Plastics	9.16	10					
Metals	Metals	8.21	10					
Glass	Glass	9.14	10					
Paper	Paper	5.35	10					

Plastic market is selected.

Player type:Firm (3)

Round: 1

ComLabGames
Username: Clara Id: 19 Identity: 3

Paper

History	Name	19:20:19 (152)	19:20:18 (153)
Total Asset Value		718.61	0
Difference		0	0
Paper		5.35	5.35

$V(\text{Paper}) = 5.35$ in History matches $V(\text{Paper})$ in summary

Summary data	Asset name	Valuation	Endowment	Sell orders	Buy orders	Bid (Quantity)	Ask (Quantity)	Trading price (Quantity)
Plastics	Plastics	9.16	10					
Metals	Metals	8.21	10					
Glass	Glass	9.14	10					
Paper	Paper	5.35	10					

Paper market was selected.

Player type:Firm (3)

Submit a price/quantity in a specific market

1. Select the market you want to trade in.
2. Type a price and quantity, and then click  to sell and  to buy.
3. The limit order book shows outstanding limit orders for a specific market.

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Username: Ar Id: 18 Identity: 2

Plastics

History	Name	19:20:19 (2...	19:20:18 (2...
Total Asset Value	663.36	0	
Difference	0	0	
Plastics	2.53	2.53	

Limit order book	Price	Quantity	Cumulative	Player id	Player type
	5	2	0	18	Firm (2)

Submitted sell order in Plastics market

Cash 400 Duration 600 Price 5 Quantity 2  

Summary data	Asset name	Valuation	Endowment	Sell orders	Buy orders	Bid (Quantity)	Ask (Quantity)	Trading price (Quantity)
Plastics	2.53	8	2 (10)				5 (2)	
Metals	6.93	10						
Glass	7.57	10						
Paper	9.31	10						

Subject's own limit orders	Price	Quantity	Revenue/Cost	Duration	
	5	2	10	582	X

Transaction history	Price	Quantity	Buyer ID	Buyer Ty...	Seller ID	Seller Ty...	Time
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Player type:Firm (2)

Round: 1

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Username: Clara Id: 19 Identity: 3

Paper

History	Name	19:20:19 (24...	19:20:18 (24...
Total Asset Value	718.61	0	
Difference	0	0	
Paper	5.35	5.35	

Limit order book	Price	Quantity	Cumulative	Player id	Player type
	6	3	0	19	Firm

Submitted buy order in Paper market

Cash 382 Duration 600 Price 6 Quantity 3  

Summary data	Asset name	Valuation	Endowment	Sell orders	Buy orders	Bid (Quantity)	Ask (Quantity)	Trading price (Quantity)
Plastics	9.16	10	0 (0)				5 (2)	
Metals	8.21	10						
Glass	9.14	10						
Paper	5.35	10	3 (18)	6 (3)				

Subject's own limit orders	Price	Quantity	Revenue/Cost	Duration	
	6	3	18	584	X

Transaction history	Price	Quantity	Buyer ID	Buyer Type	Seller ID	Seller Type	Time
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Player type:Firm (3)

Round: 1

Trading window description

1. Limit order book shows all outstanding sell orders in red and all outstanding buy orders in green.
2. Summary data shows the bid (ask) in green (red).

ComLabGames
 Username: Manuel Id: 17 Identity: 1

Limit order book

Price	Quantity	Cumulative	Player id	Player type
7.2	2	0	17	Firm (1)
7	3	2	19	Firm (3)
6.1	4	5	17	Firm (1)
5	3	0	18	Firm
3.6	1	3	18	Firm
0.3	2	4	17	Firm

Summary data

Asset name	Valuation	Endowment	Sell orders	Buy orders	Bid (Quantity)	Ask (Quantity)	Trading price (Quantity)
Plastics	0.78	10					5 (2)
Metals	1.72	10					
Glass	8.92	10					
Paper	0.52	4	6 (38.8)	2 (0.6)	5 (3)	6.1 (4)	

Subject's own limit orders

Price	Quantity	Revenue/Cost	Duration	
7.2	2	14.4	577	x
6.1	4	24.4	560	x
0.3	2	0.6	588	x

Transaction history

Price	Quantity	Buyer ID	Buyer Ty...	Seller ID	Seller Ty...	Time

Player type: Firm (1)

ComLabGames
 Username: Manuel Id: 17 Identity: 1

Limit order book

Price	Quantity	Cumulative	Player id	Player type
7.2	2	0	17	Firm (1)
7	3	2	19	Firm (3)
5	3	0	18	Firm
3.6	1	3	18	Firm
0.3	2	4	17	Firm

Summary data

Asset name	Valuation	Endowment	Sell orders	Buy orders	Bid (Quantity)	Ask (Quantity)	Trading price (Quantity)
Plastics	0.78	10					5 (2)
Metals	1.72	10					
Glass	8.92	10					
Paper	0.52	4	8	2 (0.6)	5 (3)	7 (3)	

Subject's own limit orders

Price	Quantity	Revenue/Cost	Duration	
7.2	2	14.4	499	x
0.3	2	0.6	511	x

Transaction history

Price	Quantity	Buyer ID	Buyer Ty...	Seller ID	Seller Ty...	Time

Player type: Firm (1)

All valuation drawn from U(0,10) in each market

Sell orders show total outstanding quantity submitted by a subject and in the brackets, total value of all subject's (Manuel's) sell orders. There are six sell orders for \$38.8.

Buy orders show total outstanding buy orders, which is 2 for. Total value of all submitted buy orders is \$0.6 and is written in brackets.

Difference = updated asset value after a trade - previous total asset value

To delete an order click on "x". In our example sell limit order for 6.1 and q=4 was deleted

Trading

1. To buy/sell directly select the best order by clicking on the price of the order and click **Buy** / **Sell**.
2. Summary data and Transaction history show the executed order.

Price \$7 was selected and by clicking on **Buy**, the price at which buy order is executed is \$7 (i.e. the highest outstanding sell limit order price)

History			
Name	20:27:27 (1..)	19:20:18 (1..)	19:20:18 (1..)
Total Asset Val...	668.3	663.36	0
Difference	4.94	0	0
Paper	9.31	9.31	9.31

Limit order book					
Price	Quantity	Cumulative	Player id	Player type	
7	3	0	19	Firm (3)	
5	3	0	18	Firm	
3.6	1	3	18	Firm	

Summary data							
Asset name	Valuation	Endowment	Sell orders	Buy orders	Bid (Quantity)	Ask (Quantity)	Trading price (Quantity)
Plastics	2.53	8					5 (2)
Metals	6.93	10					
Glass	7.57	10					
Paper	9.31	10	0 (0)	4 (18.6)	5 (3)	7 (3)	

Subject's own limit orders			
Price	Quantity	Revenue\Cost	Duration
5	3	15	787842 x
3.6	1	3.6	787863 x

Transaction history						
Price	Quantity	Buyer ID	Buyer Ty..	Seller ID	Seller Ty..	Time
7	3	18	Firm (2)	19	Firm (3)	00:29:16

Player type:Firm (2)

Round: 1

Price \$7 was selected and by clicking on **Sell**, the price at which sell order is executed is \$7 (i.e. the highest outstanding buy limit order price)

History			
Name	00:29:17 (7)	20:27:27 (1..)	19:20:19 (1..)
Total Asset Val...	675.23	668.3	663.36
Difference	11.86	4.94	0
Paper	9.31	9.31	9.31

Limit order book				
Price	Quantity	Cumulative	Player id	Player type
5	3	0	18	Firm
3.6	1	3	18	Firm

Summary data							
Asset name	Valuation	Endowment	Sell orders	Buy orders	Bid (Quantity)	Ask (Quantity)	Trading price (Quantity)
Plastics	2.53	8					5 (2)
Metals	6.93	10					
Glass	7.57	10					
Paper	9.31	13		4 (18.6)	5 (3)	7 (3)	

Subject's own limit orders			
Price	Quantity	Revenue\Cost	Duration
5	3	15	787801 x
3.6	1	3.6	787823 x

Transaction history						
Price	Quantity	Buyer ID	Buyer Ty..	Seller ID	Seller Ty..	Time
7	3	18	Firm (2)	19	Firm (3)	00:29:16

Player type:Firm (2)

Round: 1

Trading in a different market

1. Summary data shows last trading price(quantity) for each market.
2. Transaction history shows all transactions for the selected market (in our example it shows "Glass" market)

ComLabGames
Username: Clara Id: 19 Identity: 3

Glass

History

Name	08:37:56 (25)	00:29:17 (29...)	20:27:27 (43...)
Total Asset Value	750.73	737.03	732.09
Difference	32.13	18.43	13.49
Glass	9.14	9.14	9.14

View more history

Limit order book

Price	Quantity	Cumulative	Player id	Player type
7.3	1	0	20	Firm (4)
6	2	0	17	Firm
5	6	2	19	Firm
4.1	3	8	18	Firm

Cash 345 Duration 80,000 Price 6.4 Quantity 5 Sell Buy

Summary data

Asset name	Valuation	Endowment	Sell orders	Buy orders	Bid (Quantity)	Ask (Quantity)	Trading price (Quantity)
Plastics	9.16	13					5 (2)
Metals	8.21	10					
Glass	9.14	15	0 (0)	6 (30)	6 (2)	7.3 (1)	6.4 (5)
Paper	5.35	7		0 (0)	5 (3)		7 (3)

Subject's own limit orders

Price	Quantity	Revenue/Cost	Duration	
5	6	30	79634	x

Transaction history

Price	Quantity	Buyer ID	Buyer Type	Seller ID	Seller Type	Time
6.4	5	19	Firm (3)	20	Firm (4)	08:37:56

Player type:Firm (3)

Round: 1

Price \$6.4 and quantity 5 was selected and by clicking on **Buy**, buyer (id = 19) bought glass from seller id = 20. Her cash decreased to \$345. Her current total asset value is $\$750.73 = 370 + 9.16 \cdot 13 + 8.21 \cdot 10 + 9.14 \cdot 15 + 7 \cdot 5.35$.

Summary page for trading game

ComLabGames - Client

Username: Simone Id: 20 Identity: 4

Player ID	Final Total Asset Value	Initial Total Asset Value	Difference	Q(Plastics)	Q(Metal)	Q(Glass)	Q(Paper)
17	519.38	519.38	0	10	10	10	10
18	675.23	663.36	11.86	8	10	10	13
19	752.57	718.61	33.97	13	10	16	7
20	611.62	599.47	12.15	9	10	4	10

Market Stage time limit: unlimited Round: 1 Continue

Player type: Firm (4)

Game is over!