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Trade and Investment Strategy
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ASSIGNMENT 4

There are two questions. You may submit a group assignment of up to 4 but no more than 4 in the group will be permitted. I have no problem with larger groups (for example 5) churning over ideas in the initial discussion of the assignment, but please turn in distinct assignment material (say one group of 2 and another group of 3).

Question 1 *(7 points)*

Consider the landing games that the class played. The data set accompanying this assignment shows for each trader and each session in this class:

a) their valuation for each gate (up to two).
b) the number of gates they own when the session begins.
c) the total number of orders they submitted.
d) the total number of market orders they submitted.
e) how many transactions they made.
f) whether they owned more than two gates at the end of the session, which can be computed from the number of gates they own at the end of the session
g) whether this the last completed session they played.
h) their initial wealth
i) their final wealth
j) cash at the end of the session

1. *(2 points)* Define profits as final wealth (which includes cash) less initial wealth, that is i) minus h). Regress profits on the set of possible regressors b) through g) omitting f). Display the regression results. Are any of the coefficients significant?

Do any of them have a substantial quantitative impact? Did the traders improve their performance with experience? How much variation in profits is explained by this set of explanatory variables?

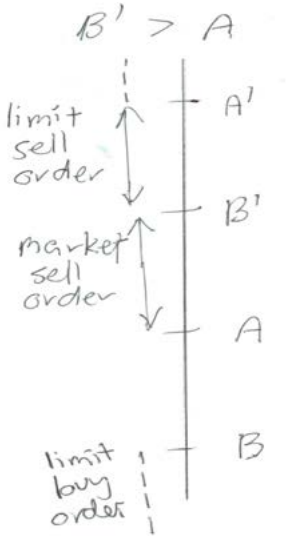
2. *(1 point)* Notice that the regression above does not include a), the valuation of each gate. That is because traders with very high valuations might make profits by buying gates, those with very low valuations might make profits selling gates, but those with middling valuations do not stand to gain much from trading. Construct two new variables defined as:
    a) the mean valuation of the traders' valuations *for each session.*
    b) the absolute deviation of a trader's individual valuation from the mean valuation *for each trader in every game played*.
    c) Show the distribution of this second variable over all the sessions.
    d) the total number of gates available in each session (by adding up the number of gates owned by the traders).

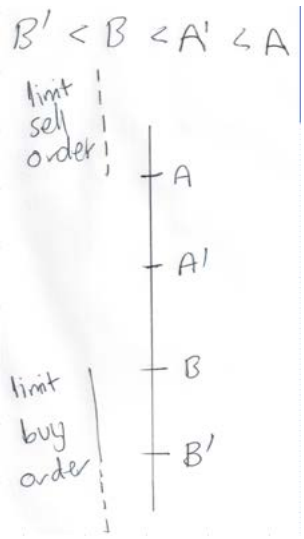
3. *(2 points)* Now add the two variables b) and d) constructed in part 2 of this question to the regression run in part 1 and run the regression again. Display your results. How do the other coefficient estimates change? Is there any support for the hypothesis that those traders with very low valuations can profit from selling their gates, those with very high valuations can profit from buying very high valuations, but those with valuations around the mean valuation cannot typically benefit much?

4. *(2 points)* Now pick two games that one or more of your team members played and solve for the competitive equilibrium using figures like the one shown on the second last slide of Lecture 5. Comment on your own trading given the competitive equilibrium prediction. (Note: we are **not** grading according to how well you played in this question, so please be dispassionate.)

Question 2 *(8 points in total, 2 points for each part)*

The two figures below are reproduced from class slides. They show potentially profitable options that guarantee no losses, available to a trader who is committed to rebalancing her books at the end of the trading session to achieve net zero change in her holdings. Recall B' stands for the current bid and B is the future bid known to the trader; A' and A are similarly defined asks.





Suppose the trader currently owns one unit of the stock that she currently values at V and will continue to value at V in the future. Assume B' < V < A'. She is contemplating three options:

(i) increasing her holdings of the asset by one unit;

(ii) selling her unit;

(iii) continuing to hold one unit..

That is after the spread changes to [A,B] she is only allowed to make market orders and after making those final market orders her holdings of the asset must be zero, one or two.

For each of the two illustrated scenarios ($B' > A$ and $B' < B < A' < A$) use figures like the ones above to illustrate and explain:

a) Should the trader place any market orders? If so, buy or sell? And when?
b) Should the trader place any limit orders now?
c) If so, what type, and where should they be placed?
d) How much expected profit would be made (including changes in asset value from net acquisitions)? Note that since you can't tell whether limit orders will transact or not, explain there is a probability that depends on where they are placed relative to the spread, and write down the expected profit as a function of that probability and the other variables.