

Software Name: Simul1.exe

Description: Viewing the Simulation Live on Your Own Computer

You can get a better sense of the dynamics of the markets reported in this article, by looking at the actual simulations on your own computer by following the instructions given in this appendix. We also describe what you will see on your computer screen.

Reference:

Karim Jamal and Shyam Sunder, "Bayesian Equilibrium in Double Auctions Populated by Biased Heuristic Traders," Journal of Economic Behavior and Organization. 31 (1996), 273-91.

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How to Get the Software:

Download a copy of file simul1.exe and Simul1.pdf from the following web page:

<http://zi.gsia.cmu.edu/sunder/zisoft.html>

Store these files in your hard drive or other storage media.

Hardware Requirements:

IBM/clone 386 or better with VGA or Enhanced VGA monitor.

How to Run the Simulation:

1. Enter the directory in which file simul1.exe is stored, type simul1, and press the enter key.
2. In response to the first question, type 1, 2 or 3, depending on which simulation you wish to run (1 for bayesian traders, 2 for empirical bayesian traders, or 3 for biased heuristic traders) and hit the return key.
3. The program prompts you for the number of markets you wish to run, and the number of periods in each market. Enter a positive integer in response to each question, and press the enter key.
4. If you want the computer to pause after each full screen, respond 1 (yes), 0 (no) otherwise. It will always pause at the end of the summary screens.
5. All other parameters are picked by the computer as preset values or random draws. Sit back and enjoy the show. If you chose the pause option, press the return key whenever the simulation pauses to allow you to review the screen.

What You See on the Screen:

1. On the left hand of your simulation screen is a box with demand and supply functions. The quantity axis has the length of 19 (1 unit for each of the 19 traders in the market). The price axis is 0-200. The firm lines are the bayesian demand and supply functions; broken lines are the demand and supply functions derived from the assumption that the traders use representativeness heuristic. Green (brown) supply and demand functions correspond to periods in which the imperfect signal is Green (Brown). Please note that these are asset markets, and all traders are buyers as well as sellers; hence the symmetry of the demand and supply functions.
2. Firm horizontal green (brown) lines extending across the screen define the bayesian equilibrium price for Green (Brown) periods. Broken horizontal green (brown) lines extending across the screen define the representativeness heuristic equilibrium price for Green (Brown) periods.

3. Each transaction price is plotted to the right of the demand/supply box in green (brown) circles for periods when the signal is green (brown). At the end of a period, a vertical line is drawn to separate the data for one period from the next. When the screen is filled, the program pauses for you to hit the enter key on your keyboard before proceeding further (if you choose the pause option).

4. If you are running the biased heuristic traders, the circle for each transaction price is preceded by two vertical lines in green (brown) indicating the range of the individual current aspiration levels (CALs for bidding and asking) of all traders in the market. In addition, a horizontal tick mark on these lines indicates the mean of individuals CALs.

5. After completion of all periods of a market, summary statistics of that market appear on three screens. The program pauses at the end of each screen for you to hit the enter key before proceeding to the next screen. Hit enter key at the end of the final screen to terminate the program.

6. Please note that the three summary screens in this simulation give you market-by-market summary. In contrast, the figures in the published paper aggregate the results of the first two summary screens across one hundred such independently run markets.

7. The first summary screen shows the period-by-period mean and range of transaction prices for the market just completed. The color corresponds to the signal for the period and order is chronological. The demand/supply box and the horizontal lines for equilibrium price ranges are included for the purpose of comparison.

8. The second summary screen shows the efficiency of each period of the market you simulated on a 0-100 percent grid in chronological order. Color of the circle corresponds to the signal for the period.

9. The third summary screen shows the mean and standard deviation of its transaction across all green (brown) periods of the market you just finished simulating. Since there are a total of 19 traders in the market, each with endowment of one security, the expected trading volume is 10. Some periods will have fewer or more than 10 trades. Therefore this screen will show the mean and standard deviations of 1st through about 12th transaction price across all green (all brown) periods. Note that even if you run each market for, say, 100 periods, you will only see about 12-13 green and an equal number of brown means and standard deviations on this summary screen. The purpose of these statistics is to see if there is a tendency for transaction prices within trading periods to move in the direction of any of the benchmark equilibrium predictions indicated by the horizontal lines. The demand/supply box and the horizontal lines for equilibrium price ranges are included for the purpose of comparison.

10. After the third summary screen, the simulation continues to the next market if you have asked for more.

Parameters of the Simulation:

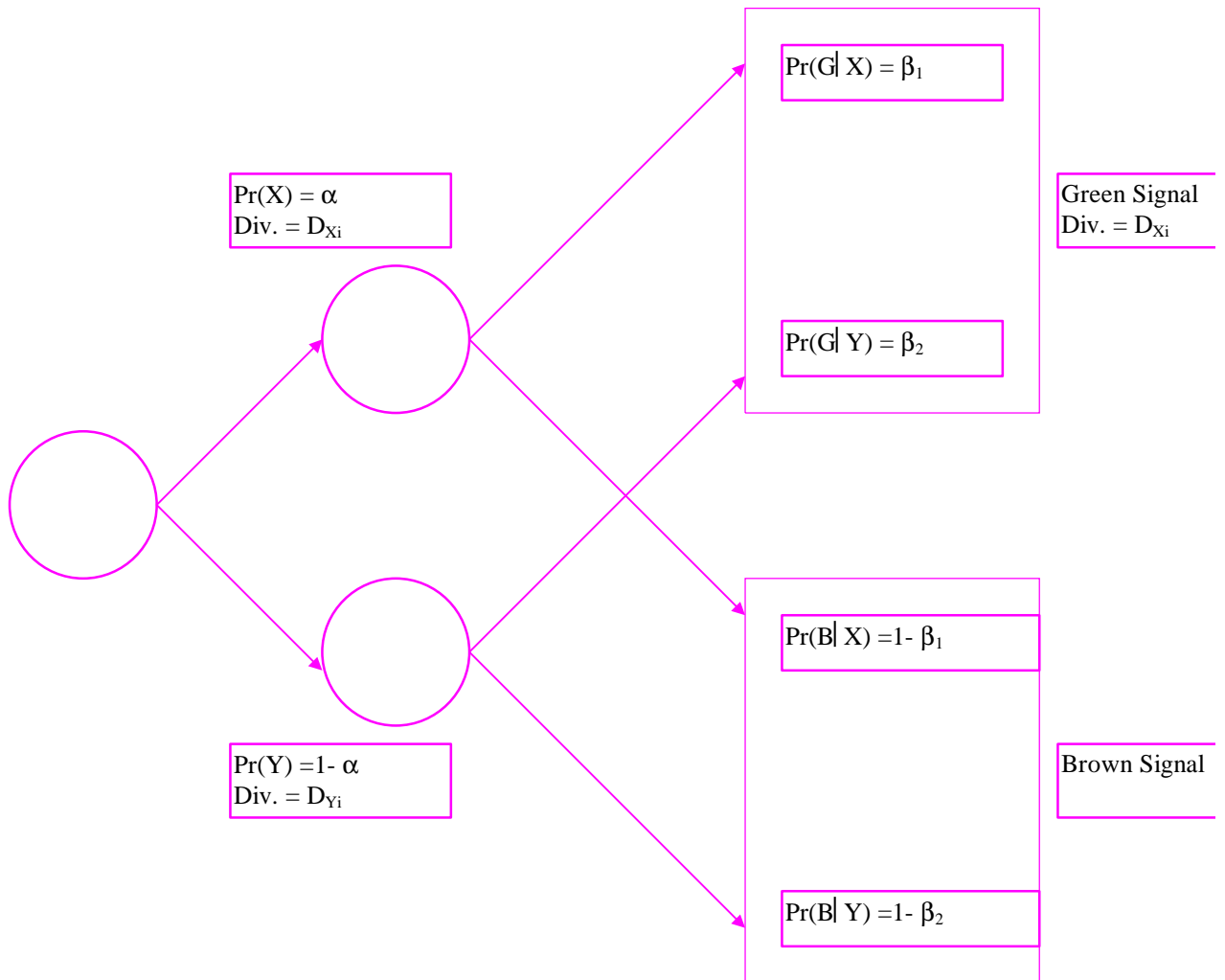
Distributions of various parameters of the simulation are given in the text of the paper. Other parameters are as follows:

Number of traders	19
Number of iterations each period	5,000

Table 1
Design Parameter for Simulations

<i>Parameter</i>	<i>Value or Distribution</i>
Number of Markets	100
Number of Periods in each Market	100
Number of Traders in each Market	20
Number of Iterations per Period	3,000
Dividend in State X (D_{Xi})	$\sim U(0,140)$
Dividend in State Y (D_{Yi})	$\sim U(60,200)$
Base Rate Prob. (X) (α)	$\sim U(0.3,0.7)$
Prob. (Signal G X) (β_1)	$\sim U(0.7,0.9)$
Prob. (Signal G Y) (β_2)	$\sim U(0.1,0.3)$
Transaction Price Adaptive Parameter (γ)	$\sim U(0.01,0.1)$
End-of-Period Dividend Adaptive Parameter (δ)	$\sim U(0.02,0.2)$

Figure 1
Uncertainty and Information Structure of the Market





Microsoft Excel
Chart



Microsoft Excel
Chart

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