Game 1

DOUBLE AUCTION MARKET

The First Market Experiment (Chamberlin, 1948)

- Chamberlin (1948) conducted the first market experiment with student subjects at Harvard.
  - He gave students cards with different values (for buyers) and costs (for sellers) to induce the demand and supply.

- Institution: How did the market work?
  - There were no set rules - studnts walked around and made deals with each other.
  - Anyone can talk to anyone. Prices were sometimes announced, but not always.

- What did Chamberlin find?
  - The market did not work like theory predicted (competitive market equilibrium).
  - More trades happened than the equilibrium quantity predicted by the model.

The Double-Auction Market Experiment (Smith, 1962, 1964)

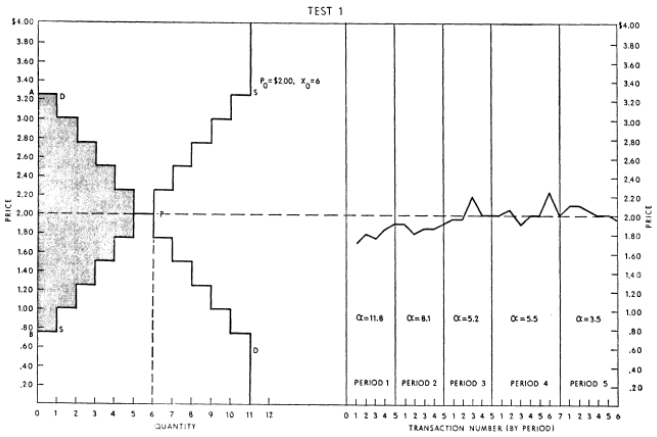
- Vernon Smith thought Chamberlin's experiment was not the appropriate setting for testing the theory of perfect competitive market.
  - Insufficient public information about prices

- What is a Double-auction market?
  - All bids, asks and transaction prices are publicly recorded
  - The institution in our Game 1.

- What did Smith find?
  - Double auction markets reached prices and quantities very close to the equilibrium outcomes!
  - Worked even with small groups (just 3 – 4 sellers).
  - Traders didn't need to know others' values or costs for the market to work well.



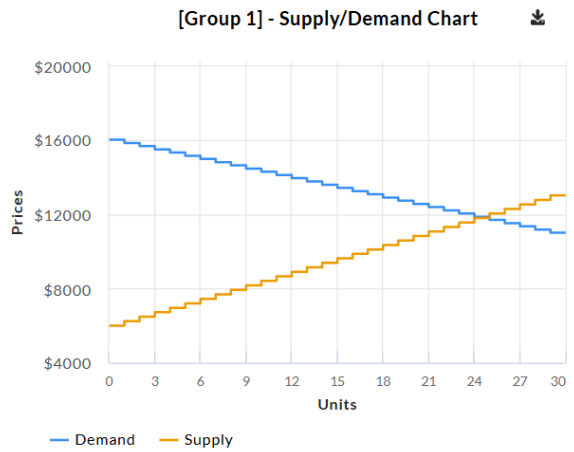
Vernon Smith (Nobel Laureate, 2002)

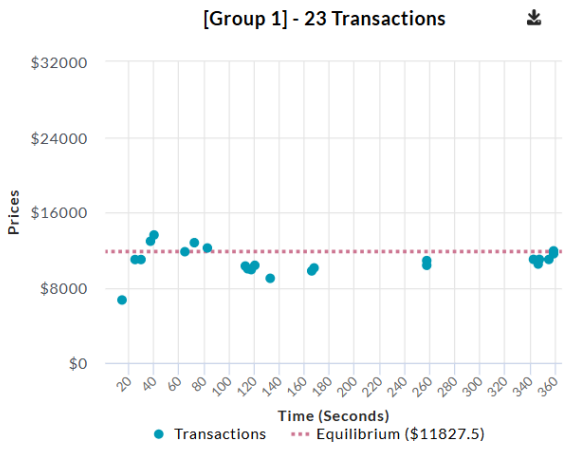


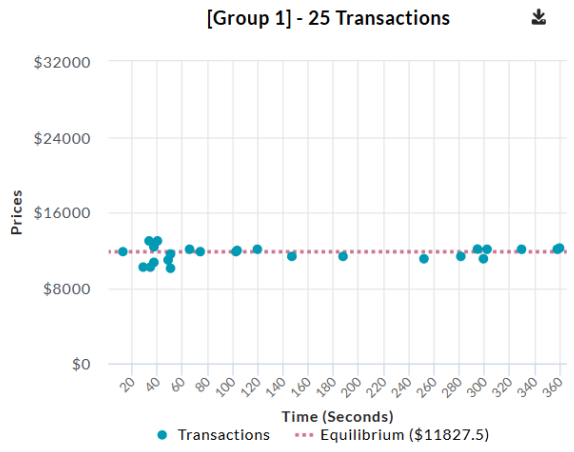
Source: Smith (1962)

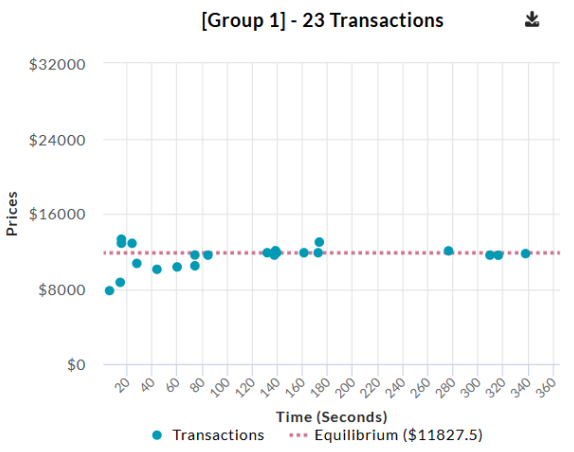
Friday – Group 1

Group 1







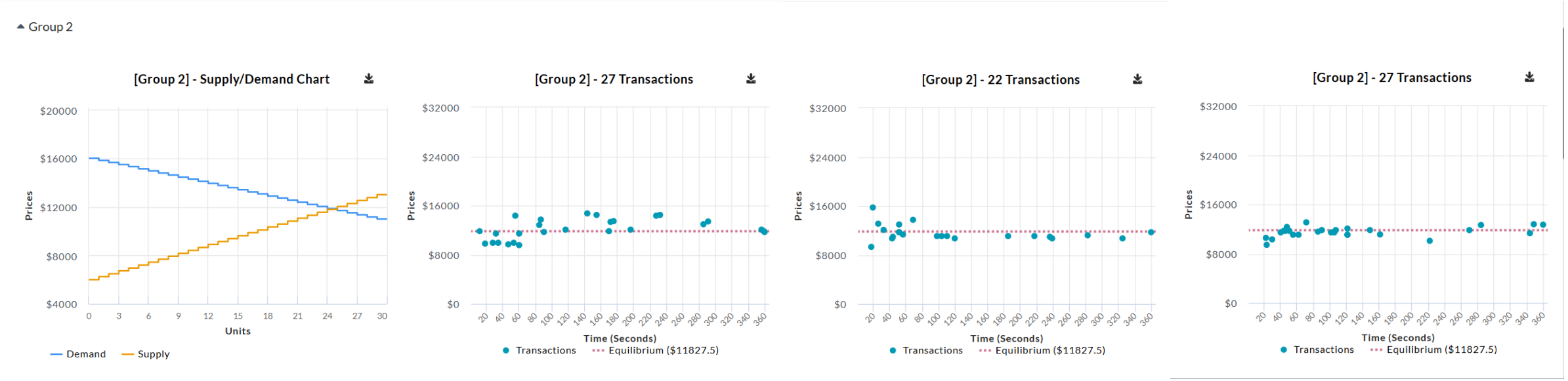


Period 1

Period 2

Period 3

Friday – Group 2



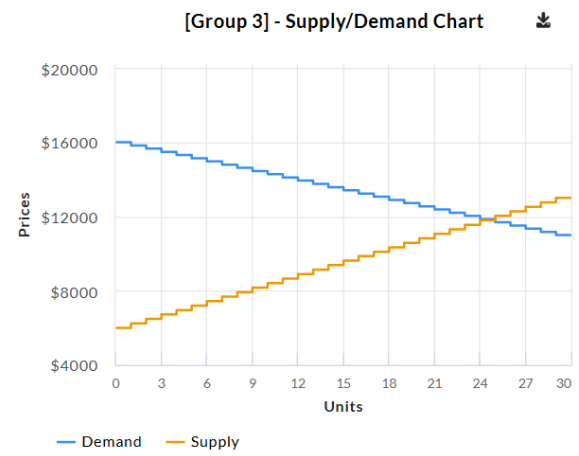
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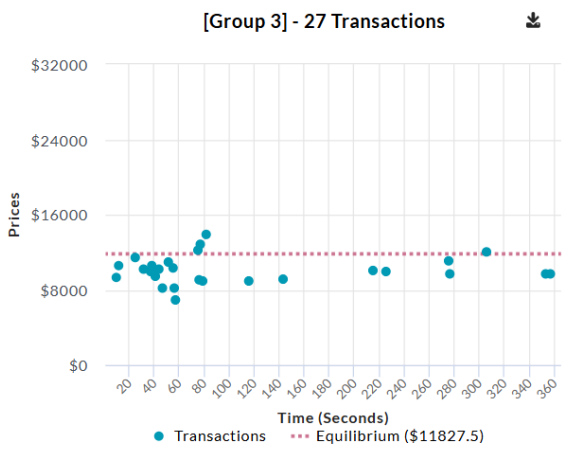
Period 2

Period 3

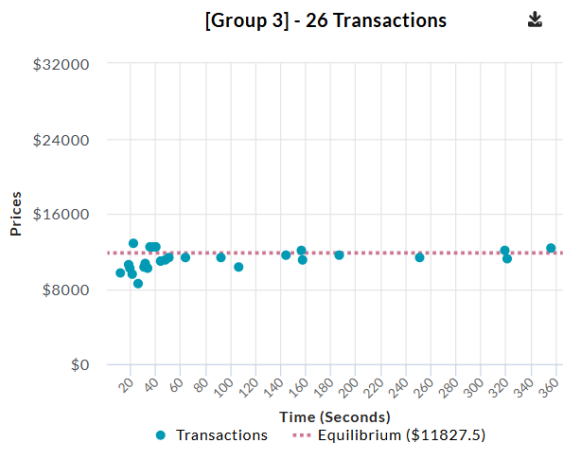
Friday – Group 3

▲ Group 3

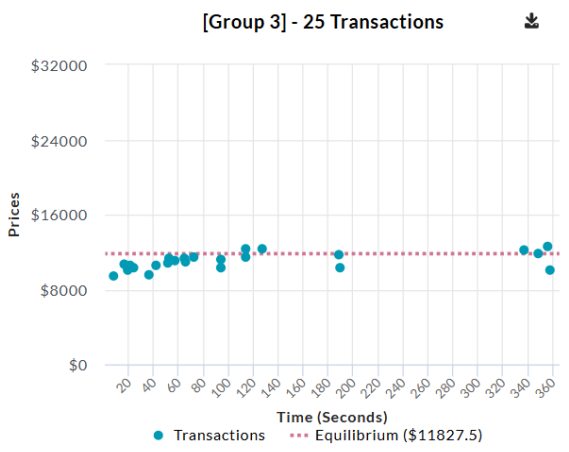




Period 1



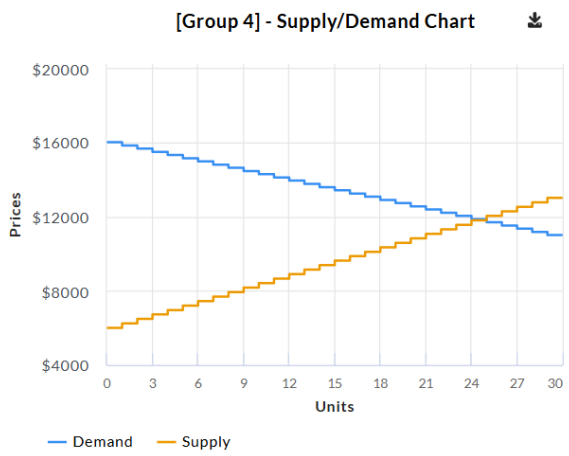
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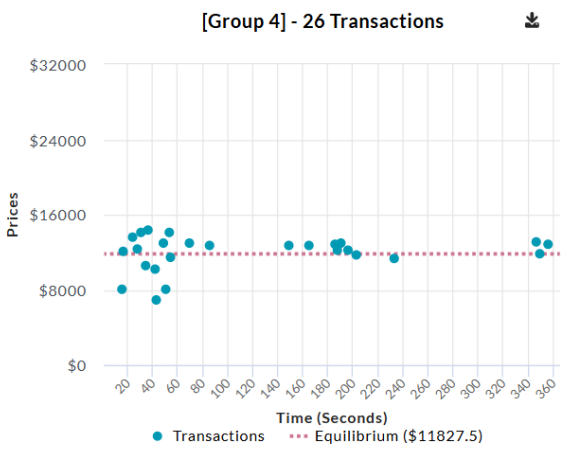


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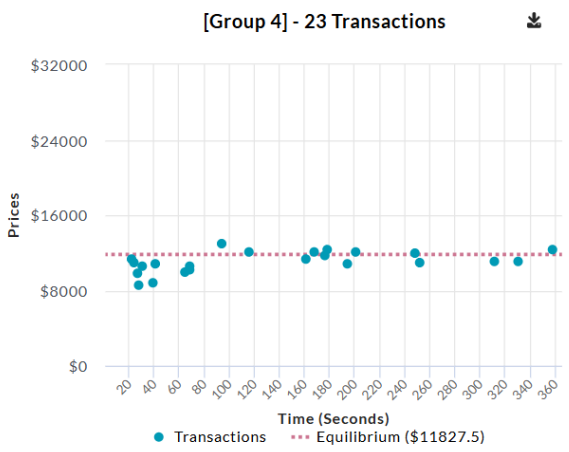
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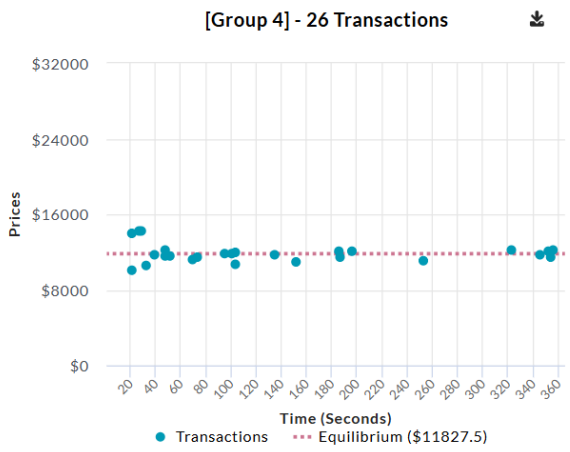




Period 1



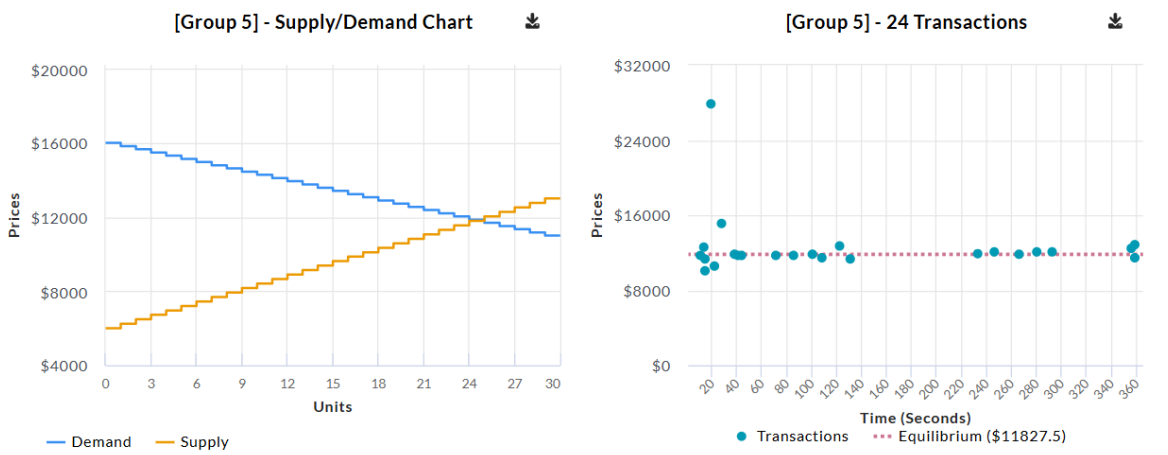
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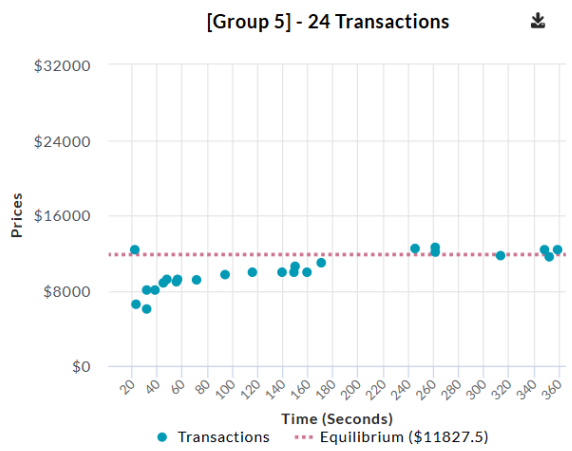
Period 3

Friday – Group 5

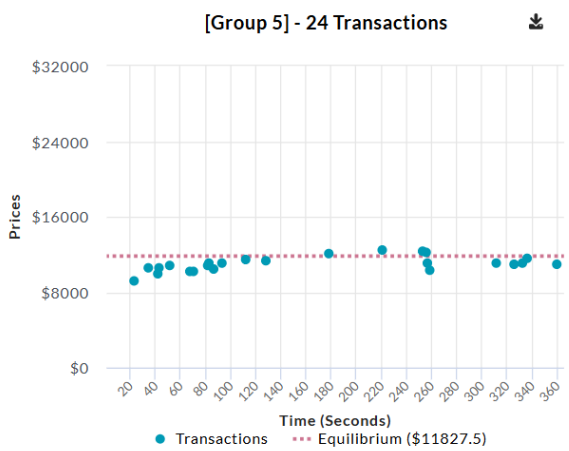
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Period 1

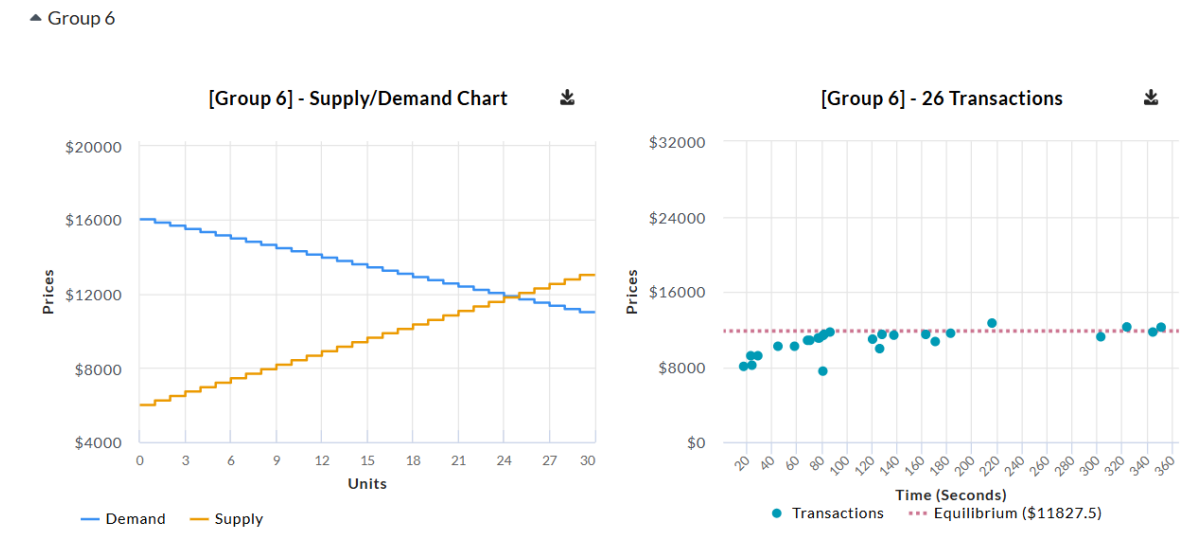


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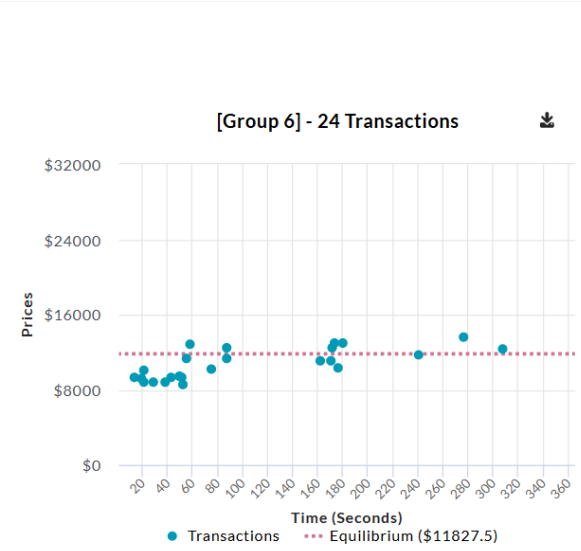


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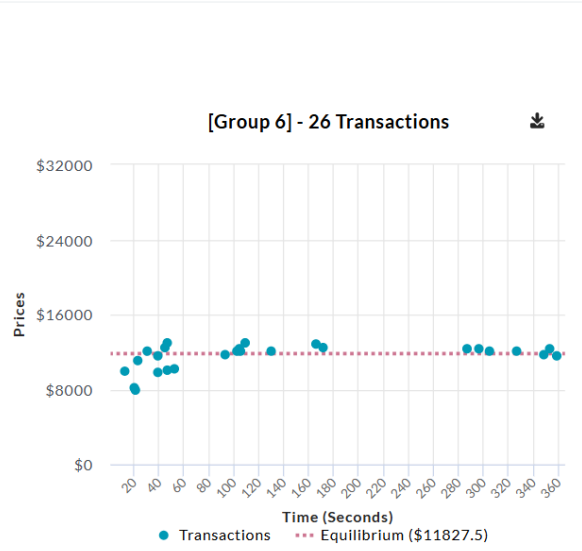
Friday – Group 6



Period 1

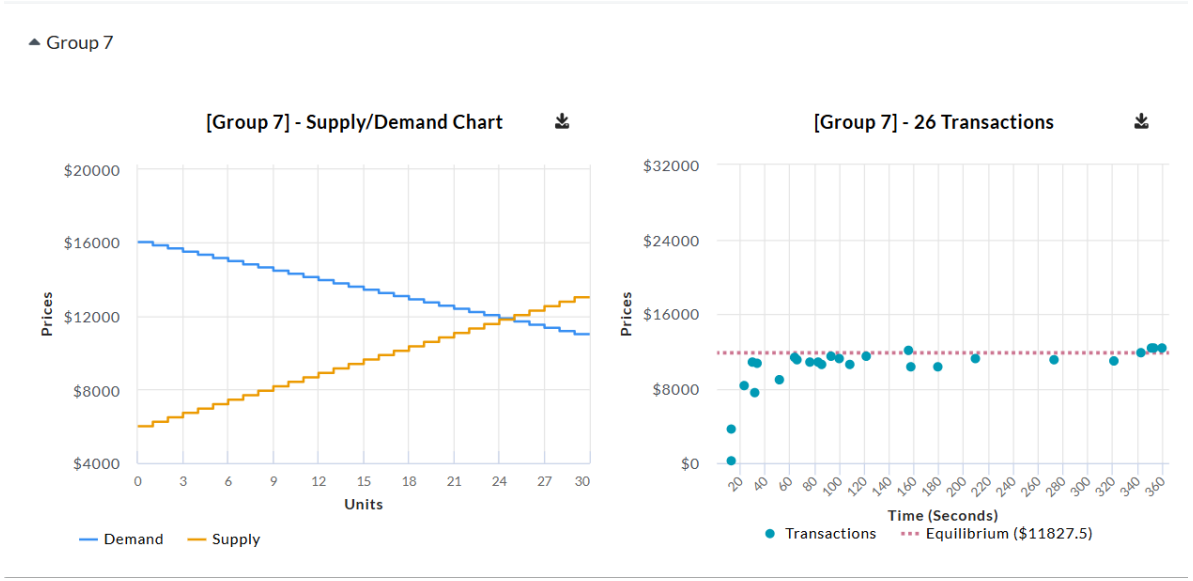


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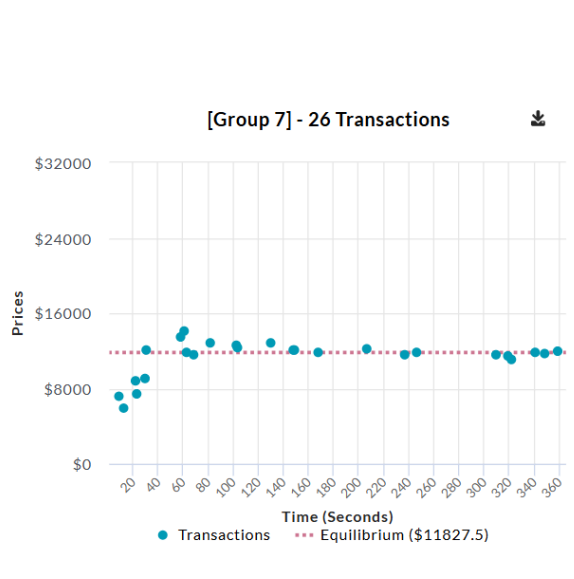


Period 3

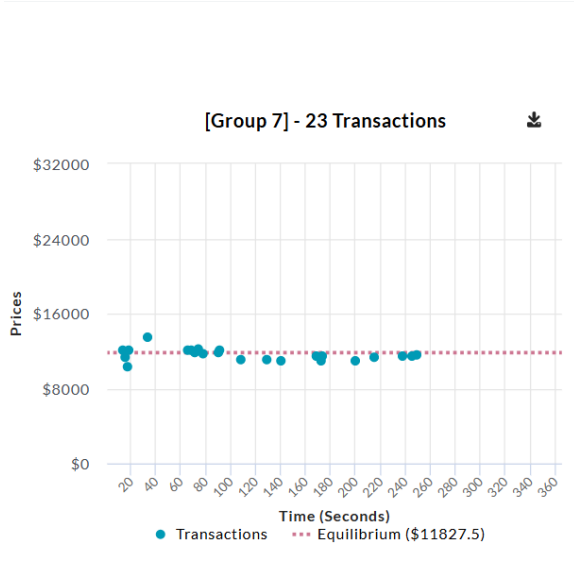
Friday – Group 7



Period 1



Period 2



Period 3

Fri: Overall Results

Key Observations:

Price Convergence: The average transaction price fluctuated slightly but stayed within a close range to the predicted prices.

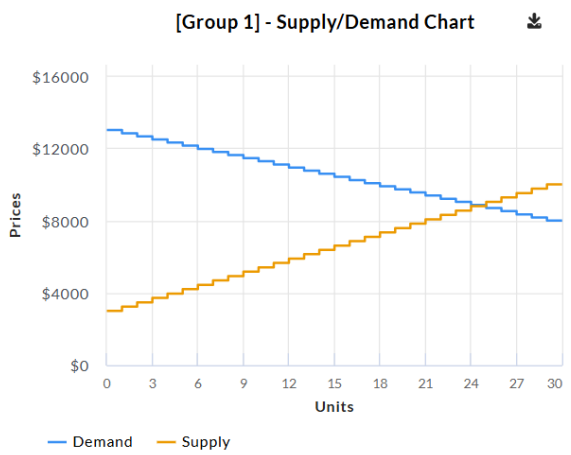
Quantity Transactions: The average quantity traded remained consistently near the equilibrium quantity of 25 units.

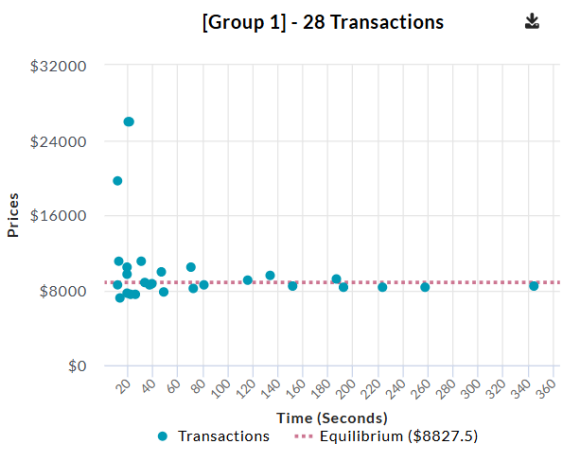
Market Efficiency: Market efficiency remained high and stable across all periods, demonstrating that buyers and sellers effectively maximized the total surplus

Overall, the market provided **strong evidence for the predictions of competitive equilibrium**. Transaction prices remained stable and closely matched the predicted equilibrium values. The quantity traded stayed consistently near the equilibrium level, and market efficiency was high and steady, indicating that participants effectively maximized total surplus in each period. These results show that **the market reached and maintained efficient outcomes with well-aligned predicte prices and quantities**.

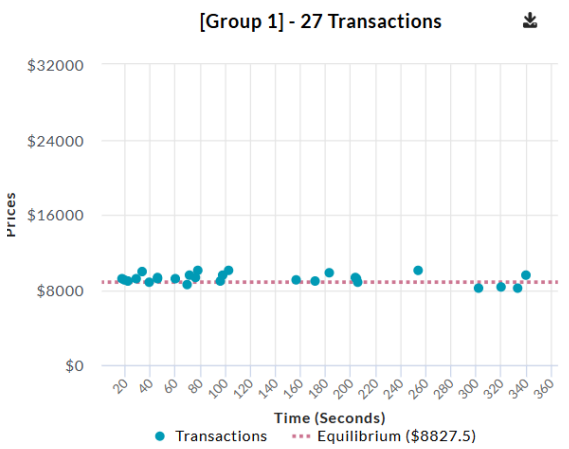
Wed (am) – Group 1

Group 1

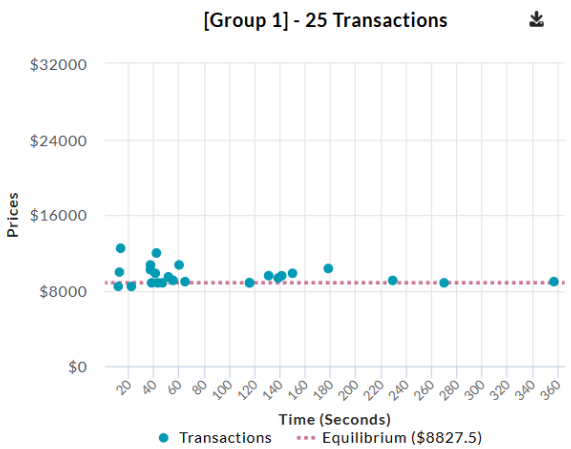




Period 1



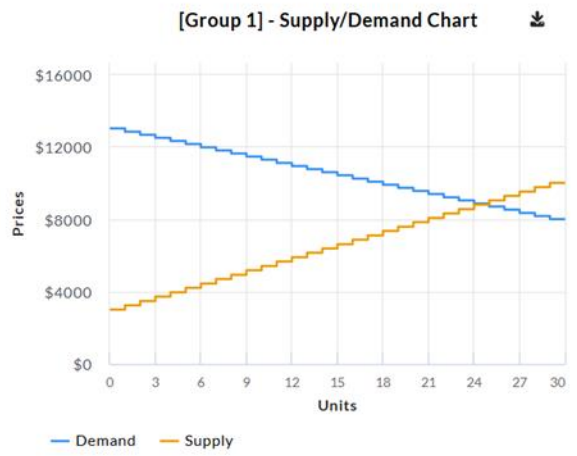
Period 2

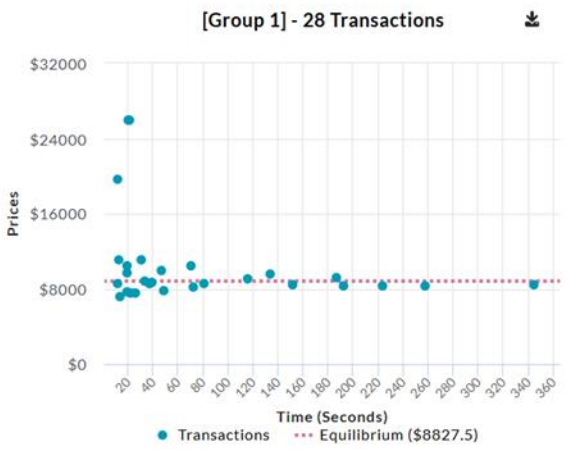


Period 3

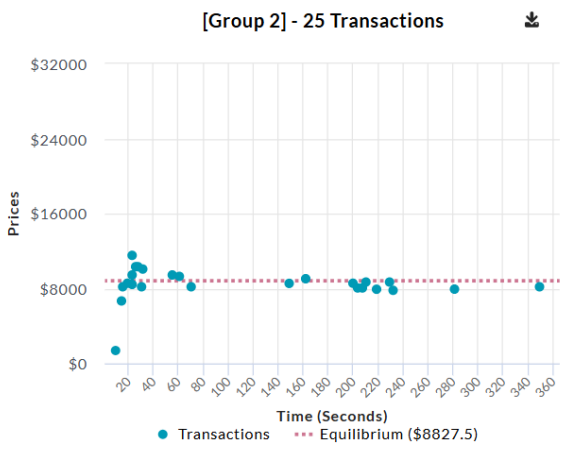
Wed (am) – Group 2

Group 1

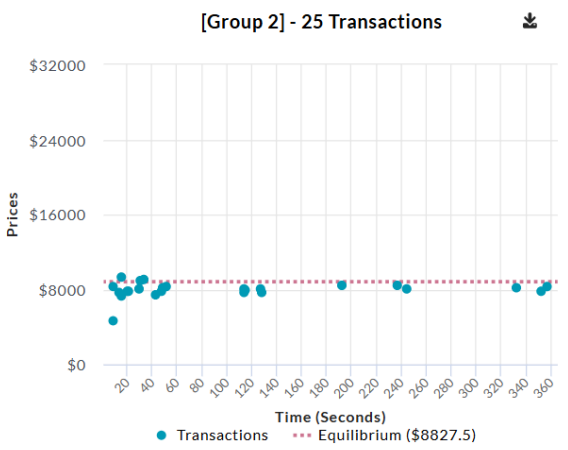




Period 1



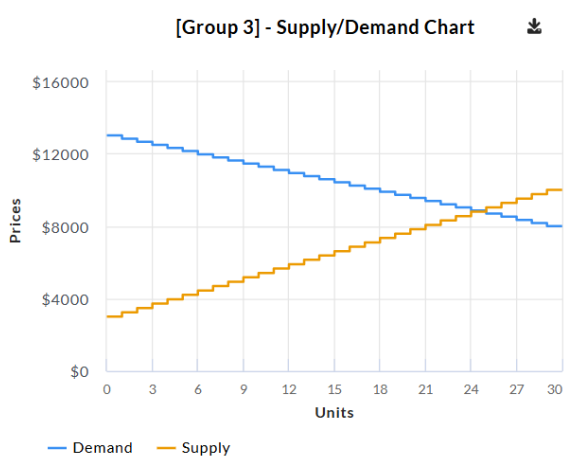
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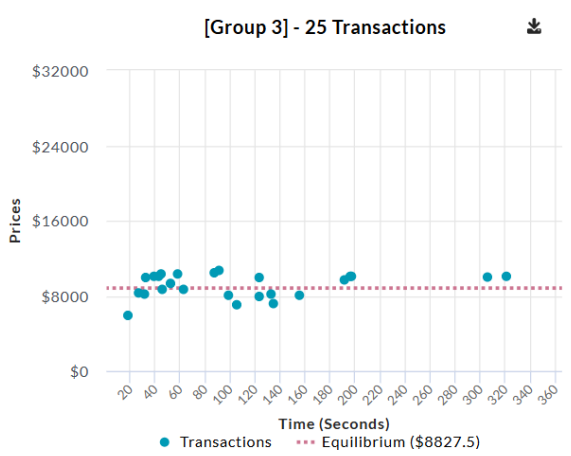


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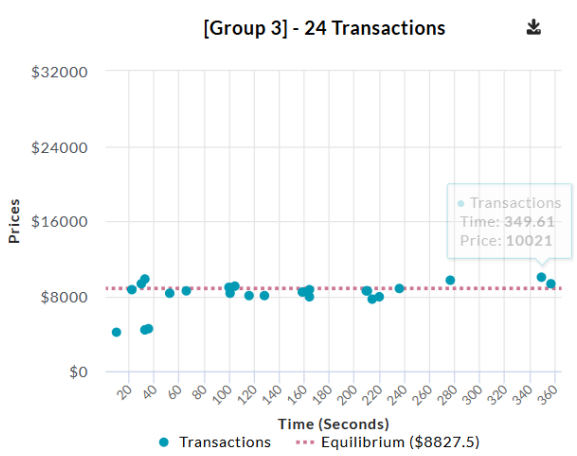
Wed (am) – Group 3

▲ Group 3

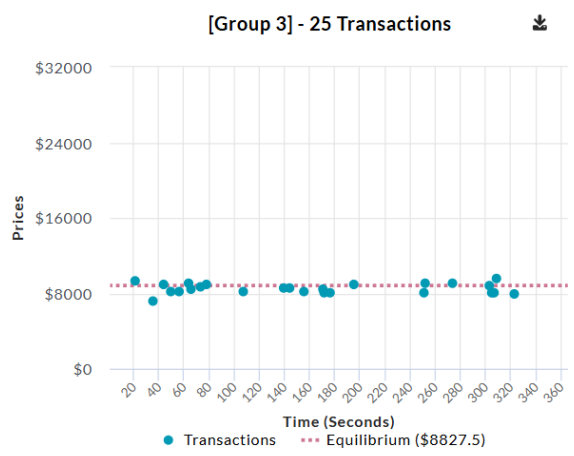




Period 1



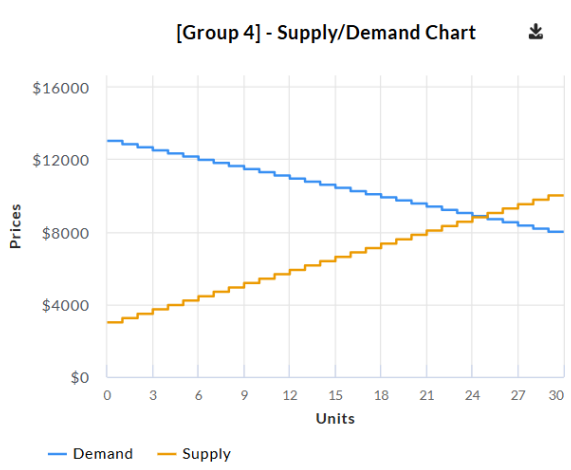
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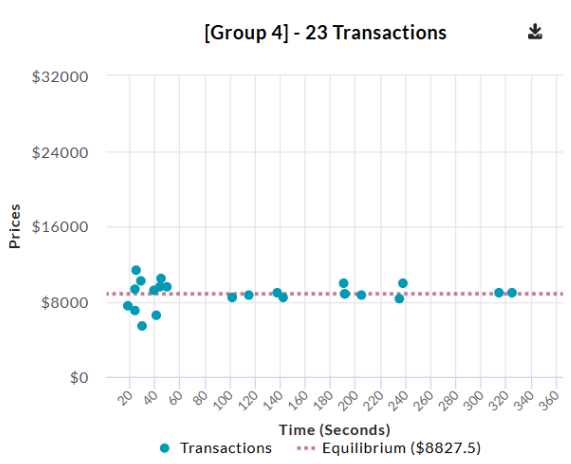


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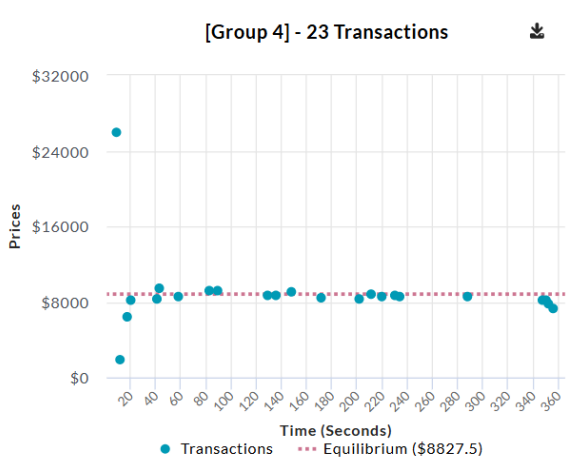
Wed (am) – Group 4

Group 4

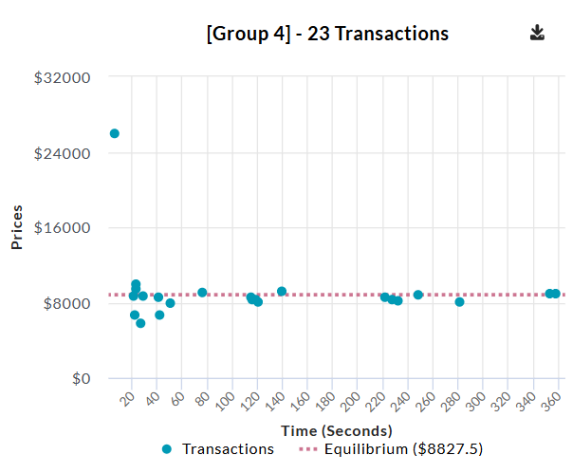




Period 1

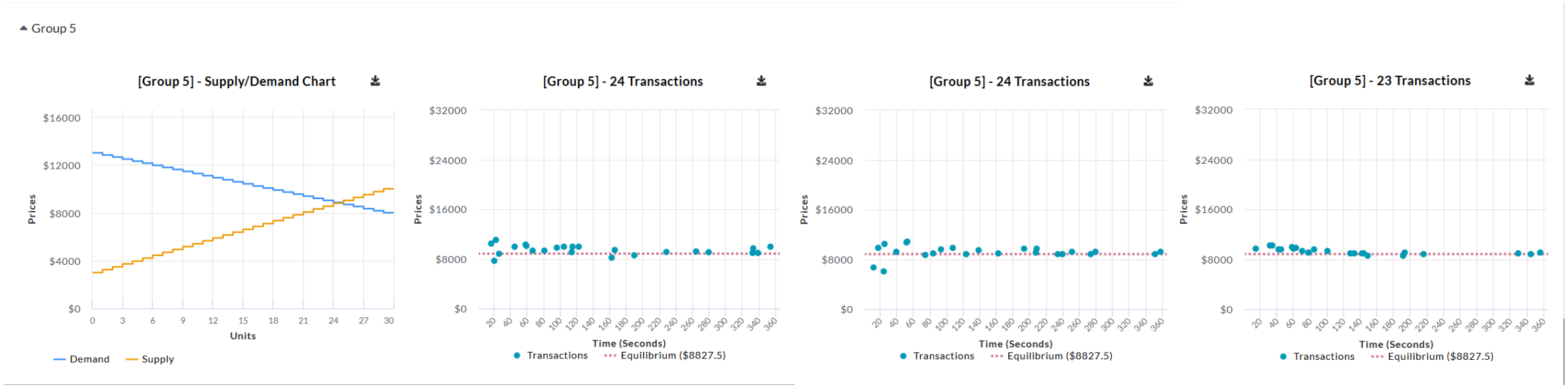


Period 2



Period 3

Wed (am) – Group 5



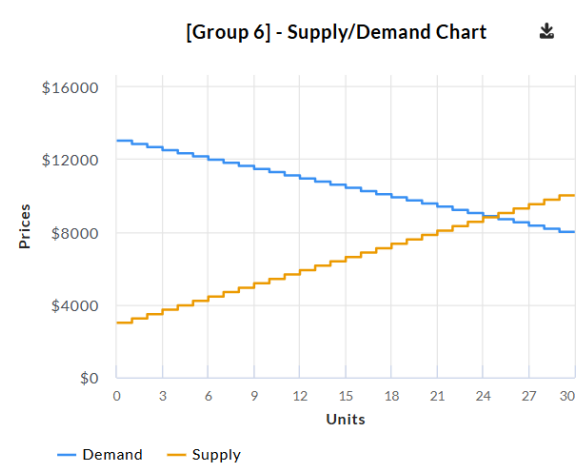
Period 1

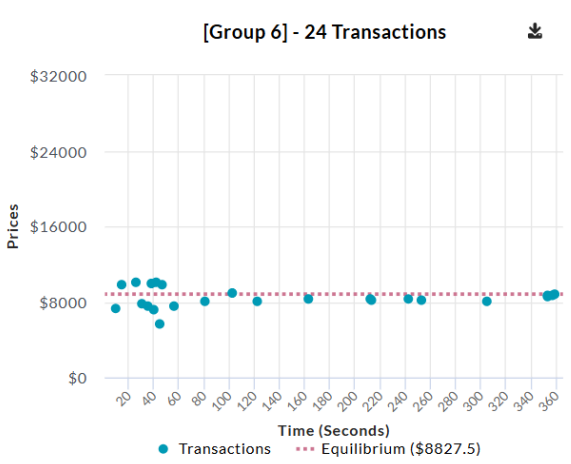
Period 2

Period 3

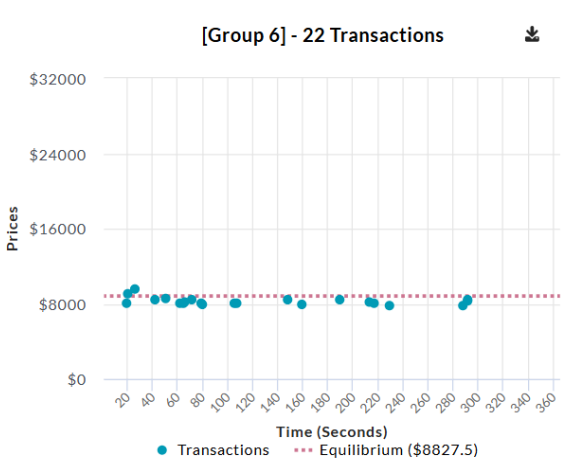
Wed (am) – Group 6

▲ Group 6

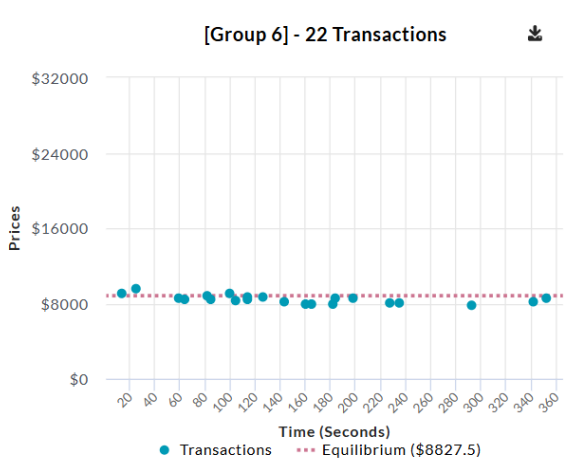




Period 1



Period 2



Period 3

Wed (am): Overall Results

Key Observations:

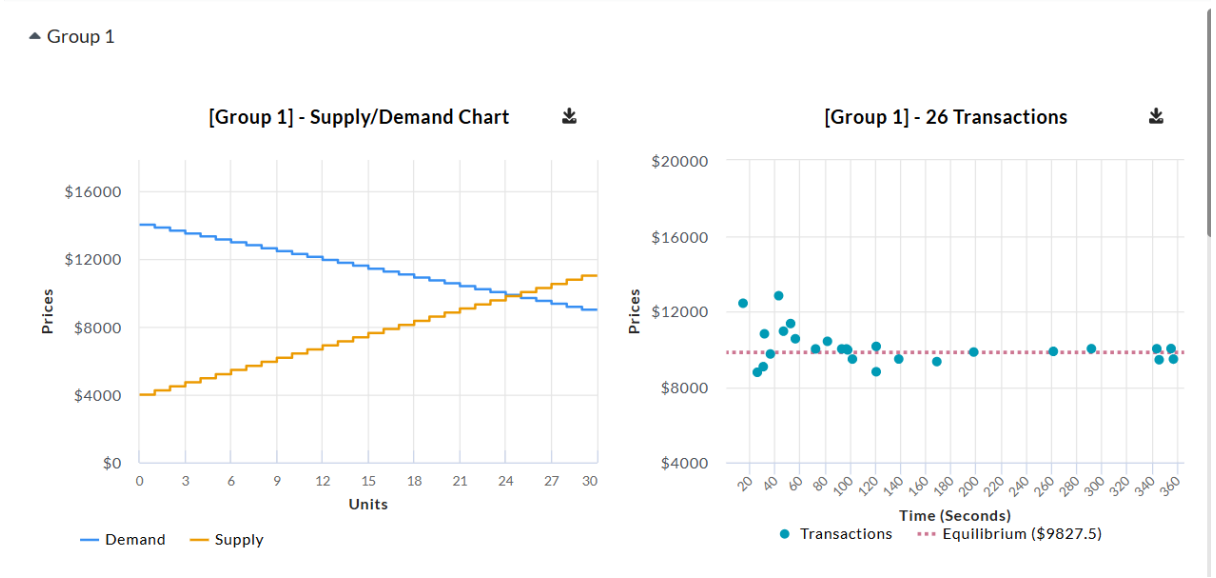
Price Convergence: Over the three periods, the average price moved closer to the initial equilibrium range, indicating improving price stability. The aggregate convergence improved from the first to the third period, showing that prices became more aligned with the predicted values over time.

Quantity Transactions: The average quantity traded slightly decreased from 24.78 in the first period to 24.11 in the subsequent periods, maintaining closeness to the equilibrium quantity of 25 units.

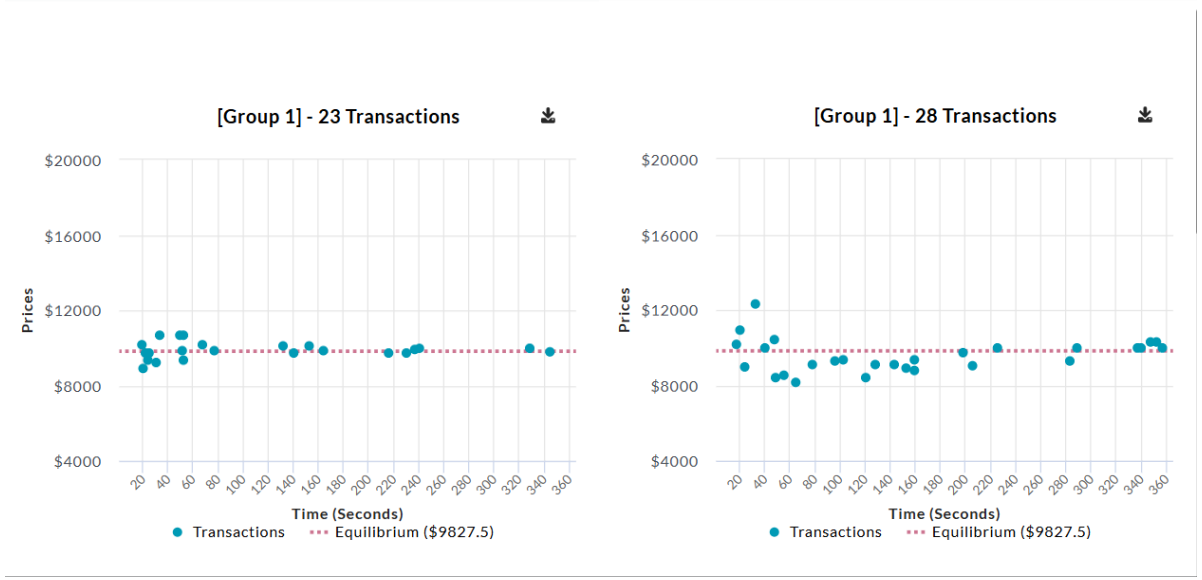
Market Efficiency: The average efficiency remained high, with a slight decrease from 0.94 in the first period to 0.92 in the second and third periods. This indicates that the market consistently achieved a high level of surplus, closely approaching the maximum possible efficiency.

Overall, the market demonstrated **effective convergence towards the predicted prices and maintained high efficiency across all periods**, with improvements in price alignment over time.

Wed (pm) – Group 1



Period 1

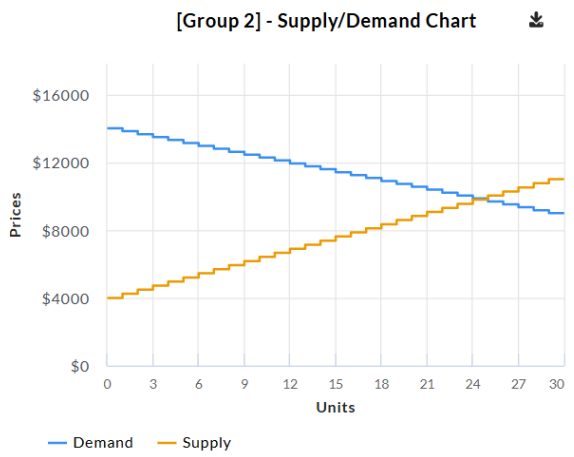


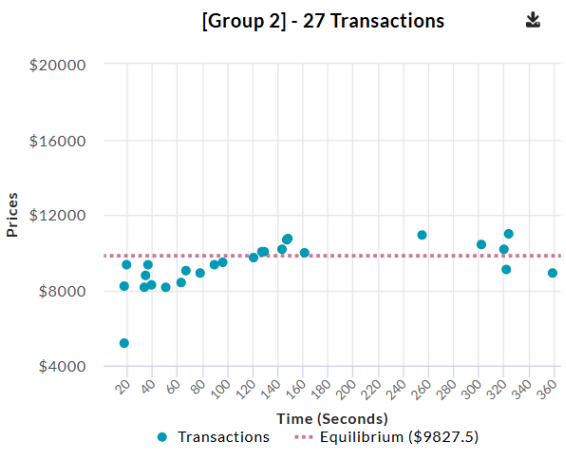
Period 2

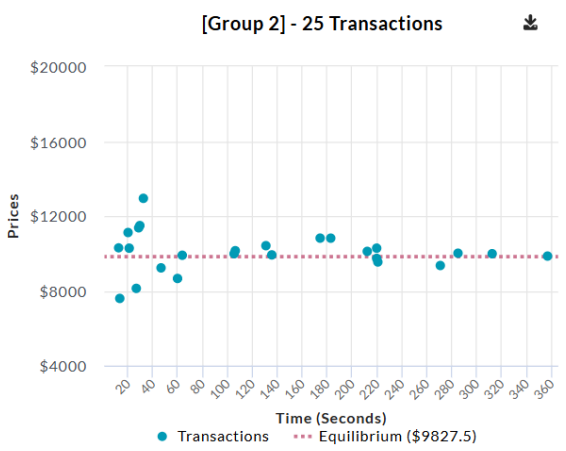
Period 3

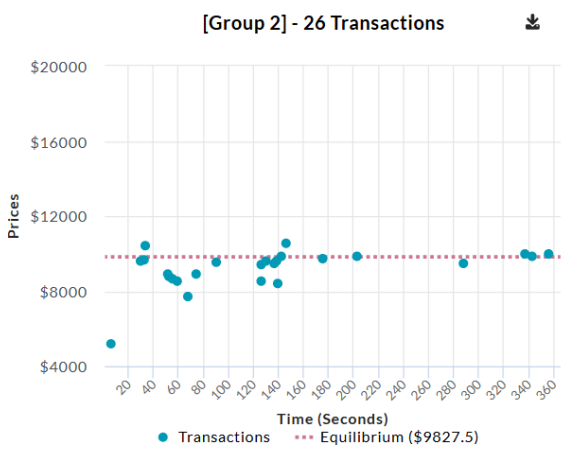
Wed (pm) – Group 2

▲ Group 2







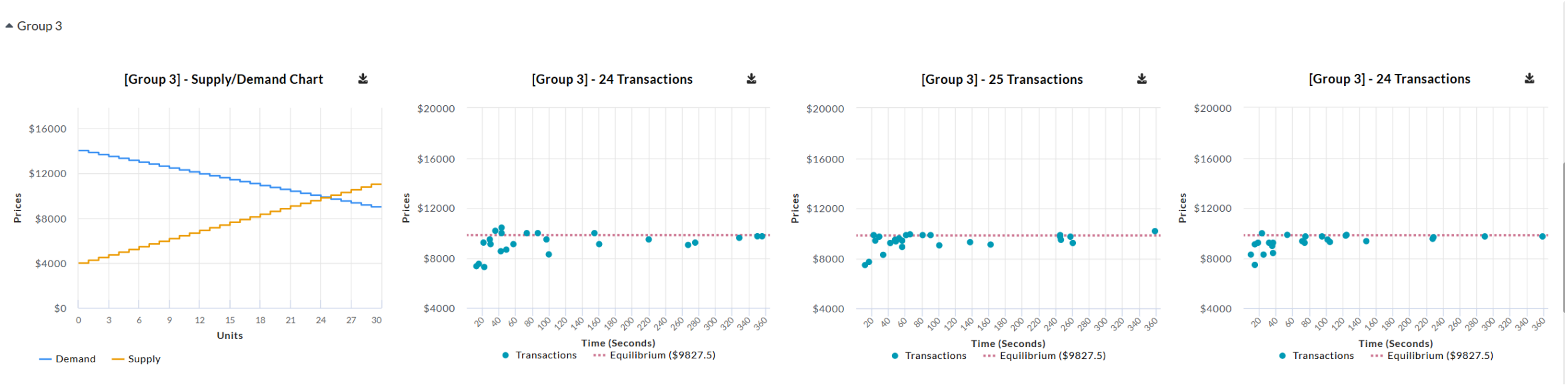


Period 1

Period 2

Period 3

Wed (pm) – Group 3

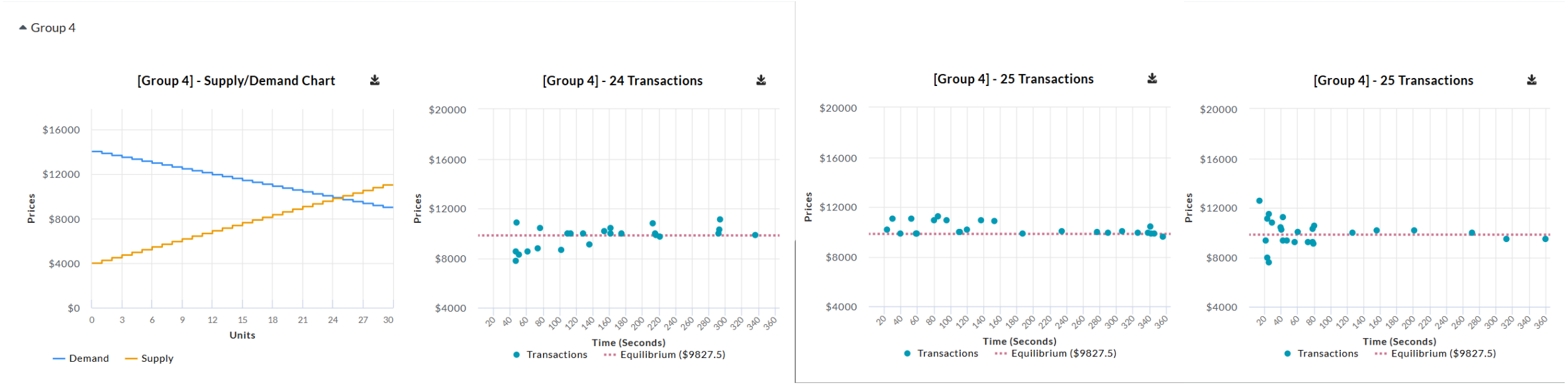


Period 1

Period 2

Period 3

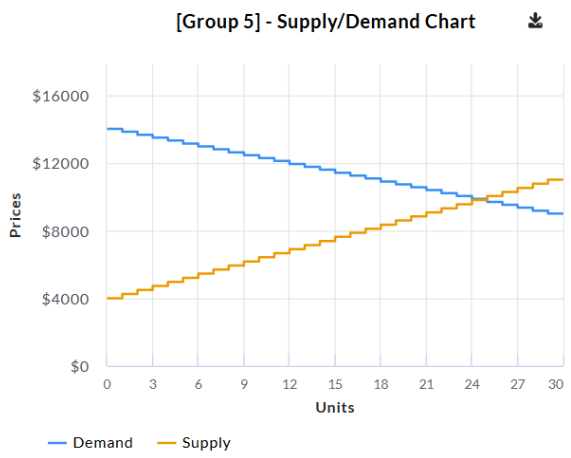
Wed (pm) – Group 4

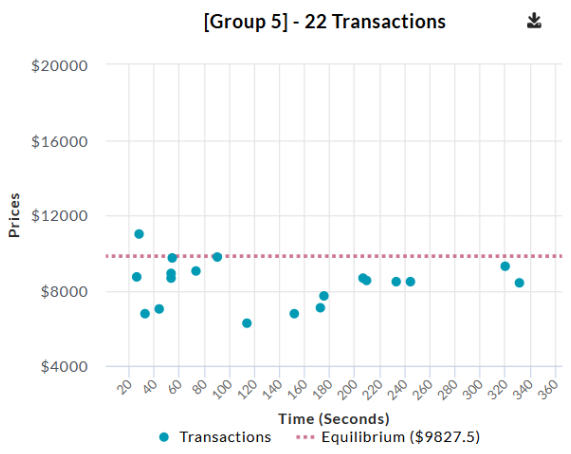


Period 1 Period 2 Period 3

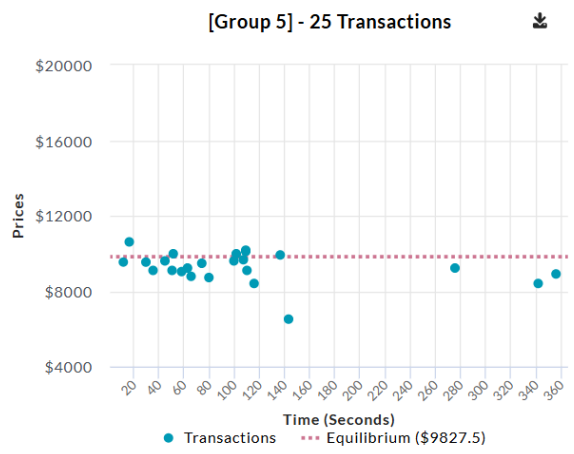
Wed (pm) – Group 5

▲ Group 5

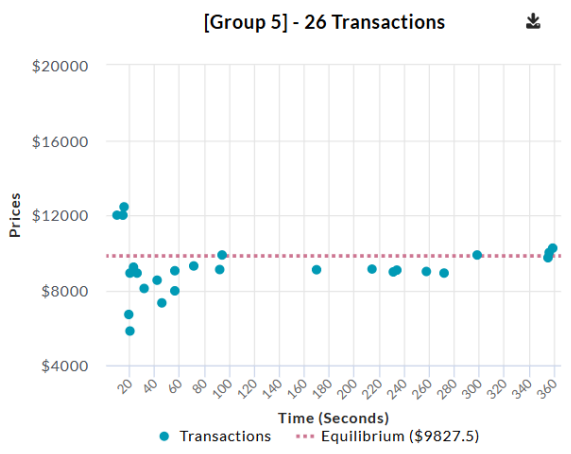




Period 1



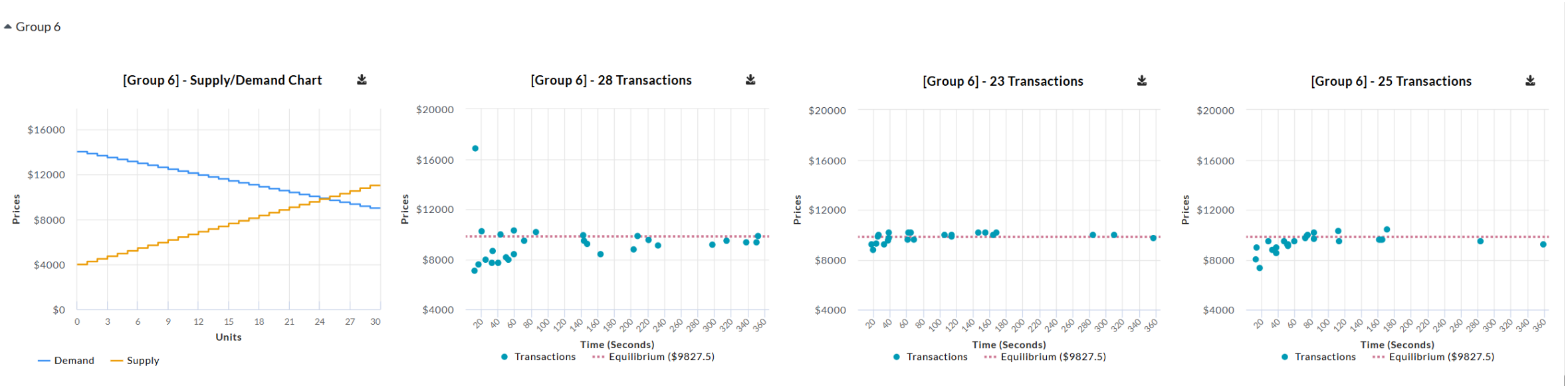
Period 2



Period 3

Wed (pm) – Group 6

▲ Group 6



Period 1 Period 2 Period 3

Wed (pm): Overall Results

Key Observations:

Price Convergence: The alignment of transaction prices with the predicted range improved from Period 1 to Period 2 and was maintained in Period 3.

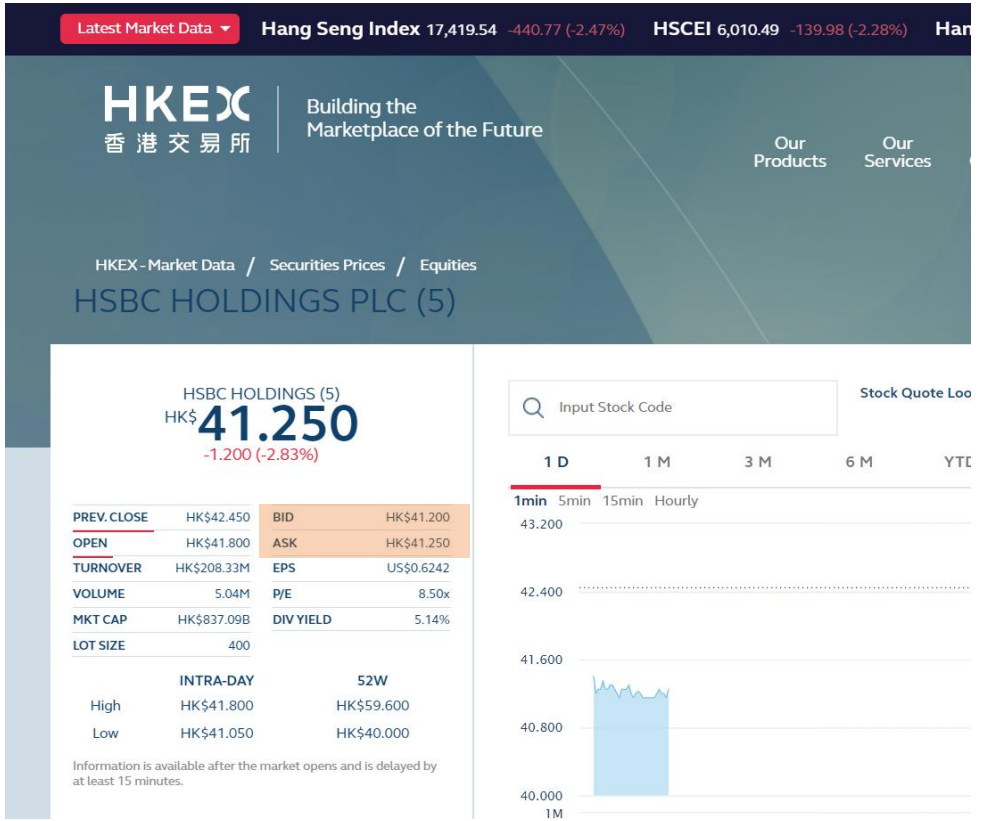
Quantity Transactions: The average quantity traded stayed close to the equilibrium quantity, with slight variations above and below 25 units

Market Efficiency: Consistently high efficiency across all periods reflects the market's ability to maximize surplus

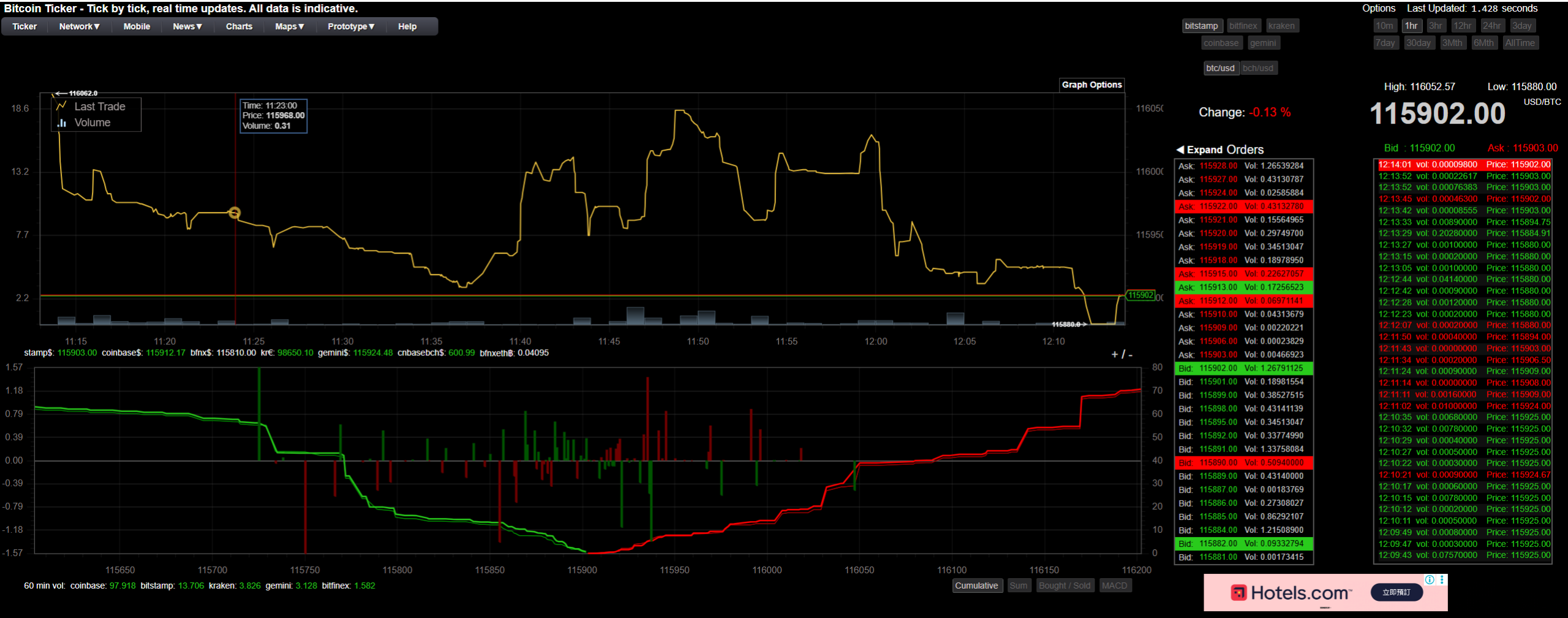
Overall, the market demonstrated **strong convergence towards predicted prices** and **maintained high efficiency** throughout the trading periods. The **quantity traded remained near the equilibrium level**, affirming the market's capacity to self-regulate effectively

The Double-Auction Markets in the Real World

- Most major stock exchanges, such as New York Stock Exchange (NYSE) and Hong Kong Exchange (HKEx), use the double-auction market.
  - When you buy or sell stocks, your order joins an open list of bids and asks, just like our experiment!



The Double-Auction Markets in the Real World



Posted-Offer Market Experiments (Davis and Williams, 1982, 1986)

- What is a posted-offer market?
  - Sellers pick prices and posts them for everyone to see.
  - Buyers can take it or leave it – no bargaining!
  - Used by most real-life stores (e.g. supermarkets, online shopping).



- How does the experiment work?
  - Each sellers chooses a price (and how many units to sell at this price).
    - The price (but not the quantity) are made public for everyone.
  - Buyers are called up one by one in random order.
    - Each buyer can by as much as they want at any of the posted prices.

PO vs. DA Market?

Ketcham, Smith & Williams (1984)

- What the experiments show?
- Posted-offer markets move towards the predicted equilibrium price, but it takes time ("slower convergence").
  - Mainly due to the inability of sellers to revise prices during a trading period.
- Efficiency (how well the market works) is usually lower in PO markets, especially at the beginning.

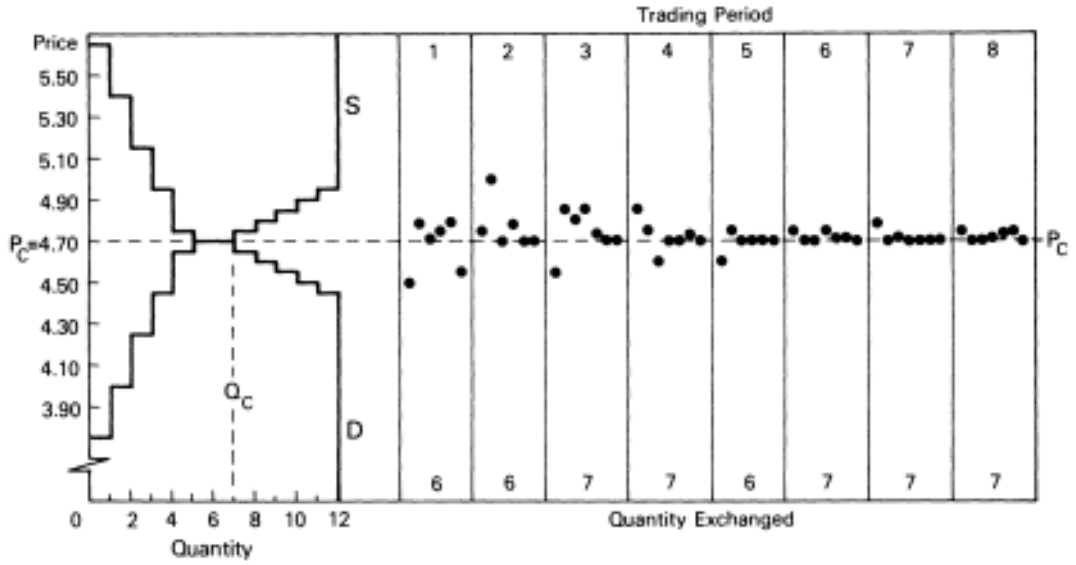


FIGURE 3
Double auction 2DA 24

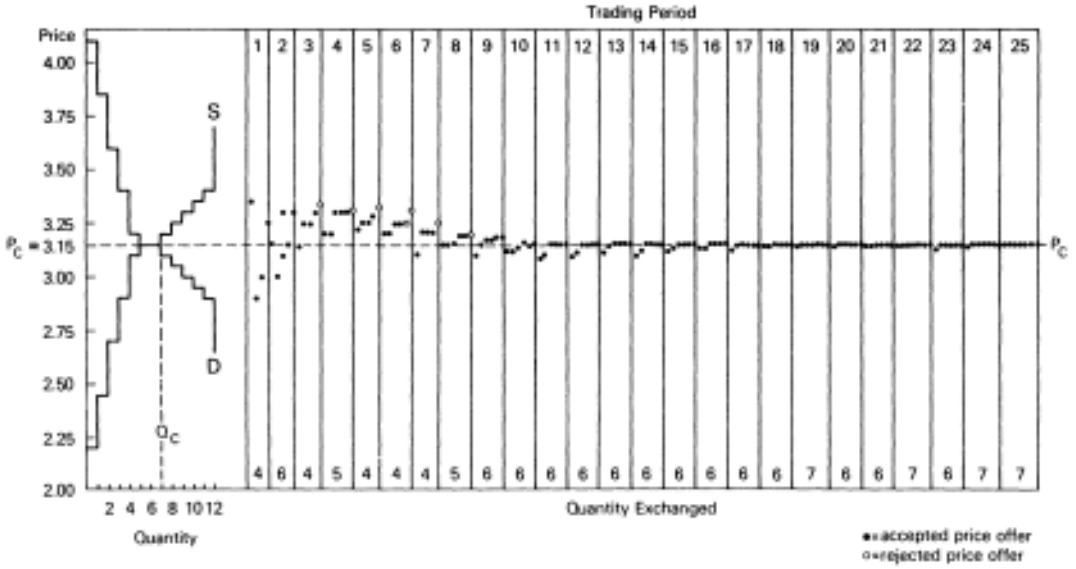


FIGURE 4
Posted offer PO7i

Why Use a Posted-Offer Market?

- Posted-offer markets **lower transaction costs** (both time and effort)

- In many markets, the cost of negotiating every sale is HIGH compared to the value of what's being sold!
  - Do you want to do double-auction for buying a coffee?

