Experimental Economics

Double Auction

Frieder Neunhoeffer

ISEG
Lisbon School of Economics & Management
Universidade de Lisboa

U LISBOA | UNIVERSIDADE DE LISBOA

Lifetime Earnings and the Vietnam Era Draft Lottery: Evidence from Social Security Administrative Records

By JOSHUA D. ANGRIST*

The randomly assigned risk of induction generated by the draft lottery is used to construct estimates of the effect of veteran status on civilian earnings. These estimates are not biased by the fact that certain types of men are more likely than others to service in the military. Social Security administrative records indicate that in the early 1980s, long after their service in Vietnam was ended, the earnings of white veterans were approximately 15 percent less than the earnings of comparable nonveterans. (JEL 824)

A central question in the debate over military manpower policy is whether veterans are adequately compensated for their service. The political process clearly reflects the desire to compensate veterans: since World War II, millions of veterans have enjoyed schooling. Regarding the general position of veterans, a member of the Twentieth Century Fund's Task Force on Policies Toward Veterans concludes that "Within any age group, veterans have higher incomes, more education, and lower unemployment rates

Outline for today

- Market institutions (Chamberlin vs Smith)

- A double auction market
  - Your experiment & Lab report 1

- Taxes and price controls (to be continued next class)

Main questions for today

1. What is a pit market and a double auction market?

2. What are the stylized experimental results in double market experiments?

3. What is a (un)binding price control?

4. What happens when a price control is imposed?

Market

Structure:

- Nr. of buyers and sellers

- values and costs

Market institution:

- full specification of the rules of trade

Market institutions: Posted-offer market

- Sellers **post** prices and buyers contact sellers if they wish to buy at a posted price.

  "Take-it-or-leave it"

- Price negotiation not allowed.

- Used in lab experiments to study retail markets.

- Asymmetry is common

  → often many buyers and few firms with market power

Market institutions: Pit market

- Chamberlin (1948)

- **Symmetric** institution and **less structured**

- Buyers and sellers mixed together and
  negotiate in pairs or in small groups:
  "trading pit/arena"

  Examples: flower auctions, fish markets, black markets…

- Transaction prices **sometimes** announced: **decentralized institution**

Pit market in the Lab: Example

- Buyers and sellers can negotiate trades with each other, either bilaterally or in larger groups.

Buyer values = [10, 10, 9, 8, 7, 6, 6, 5, 4]
Seller values (costs) = [2, 2, 3, 4, 5, 6, 6, 7, 8]

- When a buyer and a seller agreed on a price, they came together to the recording desk.

Buyer earnings = value-price
Seller earnings = price-cost

Demand side

HOW to construct the DEMAND CURVE?

From **buyer values** we get the **demand curve**

Buyer values=[10, 10, 9, 8, 7, 6, 6, 5, 4]

*What is the **maximum price** for trade to happen?*

How many units are bought at p=10?

If 9<p<10 how many units are bought?
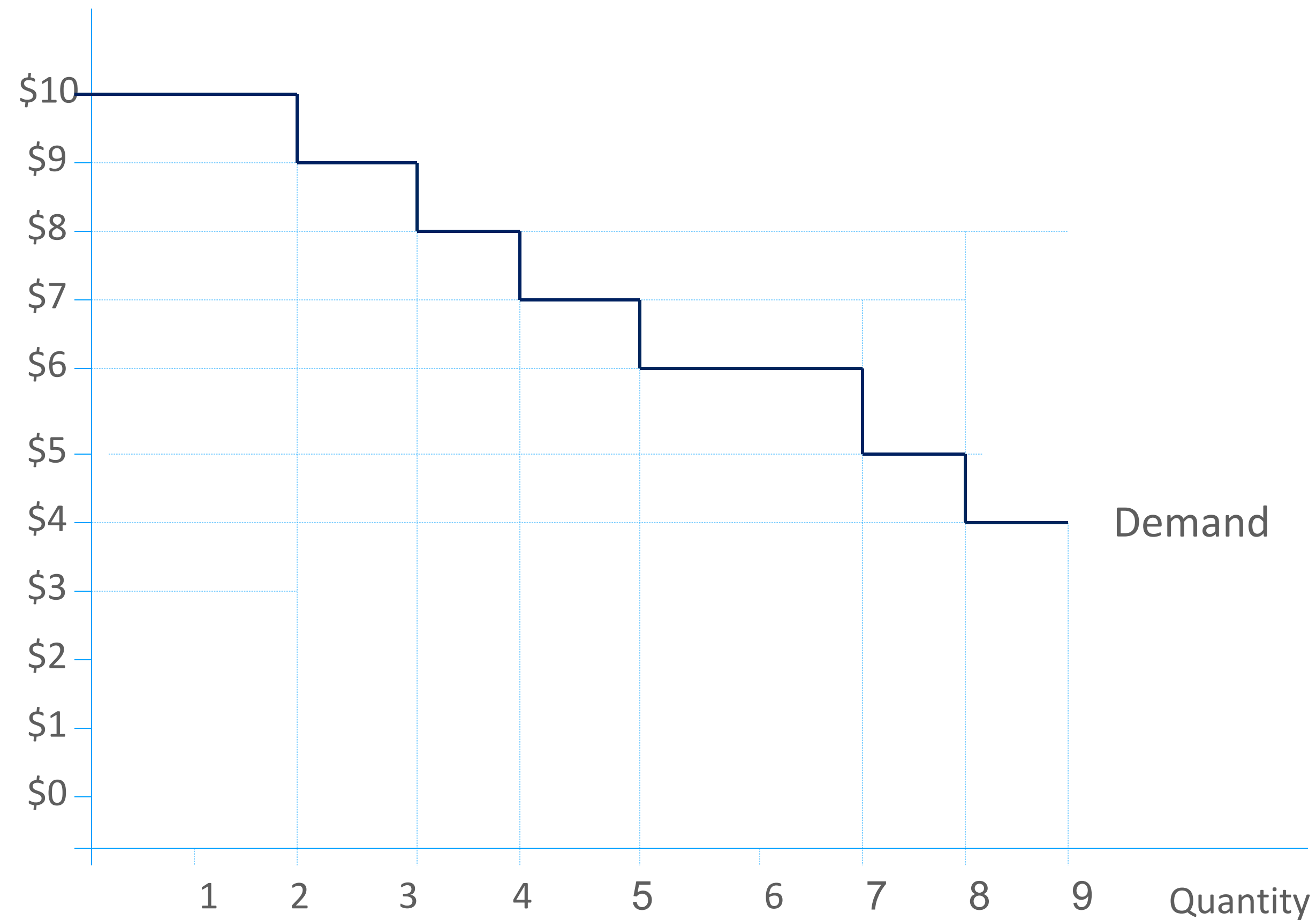
And if price equals to 9?

Demand side

Buyer values=[10, 10, 9, 8, 7, 6, 6, 5, 4]

A buyer with valuation of 9 is willing to buy at 9 and buyers with valuations equal to 10 are also willing to buy at p=9.

And if price equals to 8?

Demand curve

Supply side

HOW to construct the SUPPLY CURVE?

From **seller costs** we get the **supply curve**

Seller values=[2, 2, 3, 4, 5, 6, 6, 7, 8]

*What is the **minimum price** for trade to happen?*

How many units are sold at p=2?

If 2<p<3 how many units are sold?
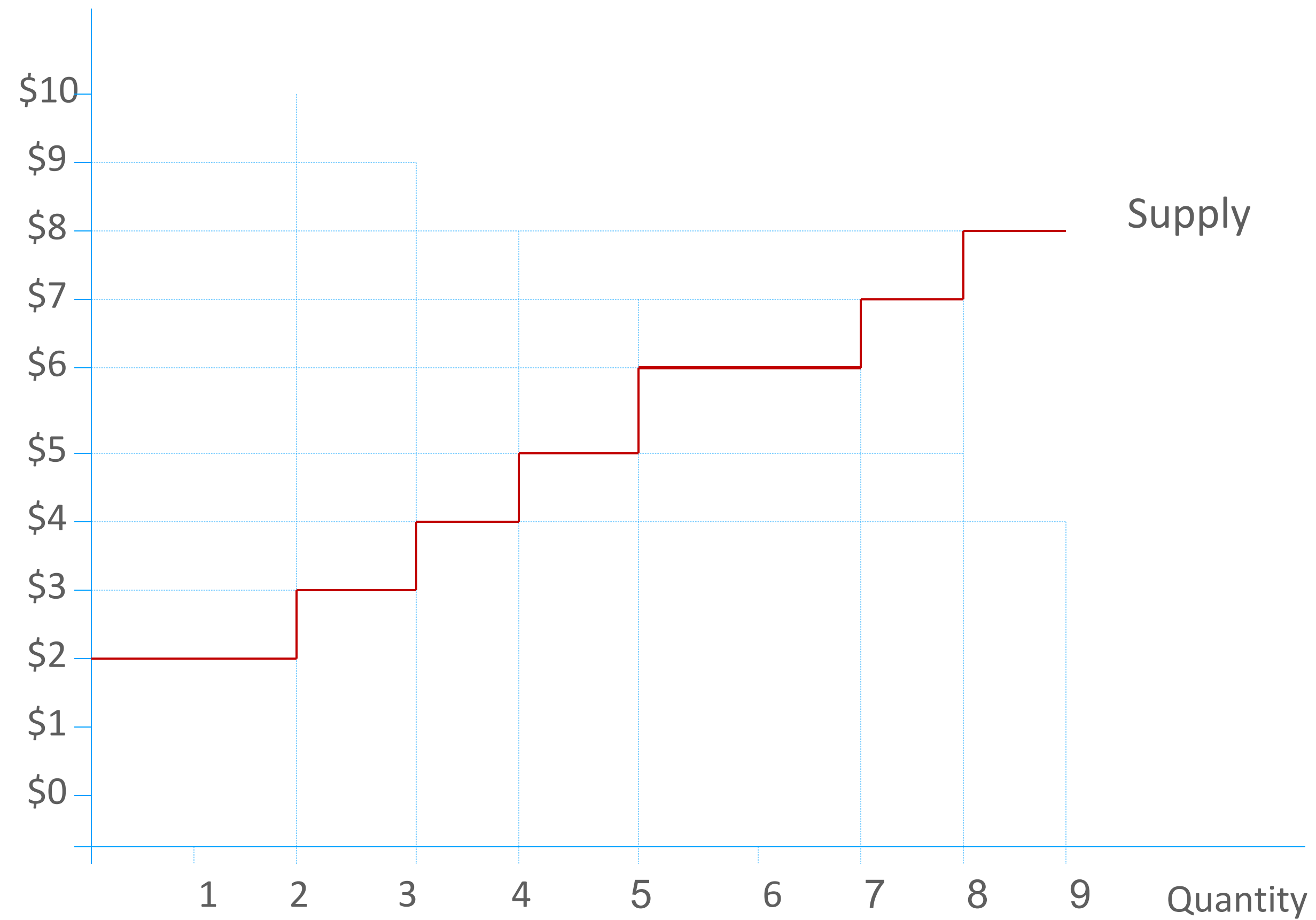
And if price equals to 3?

Supply side

Seller values=[2, 2, 3, 4, 5, 6, 6, 7, 8]

A seller with a cost of 2 will sell at a profit and the seller with a cost of 3 can also sell.
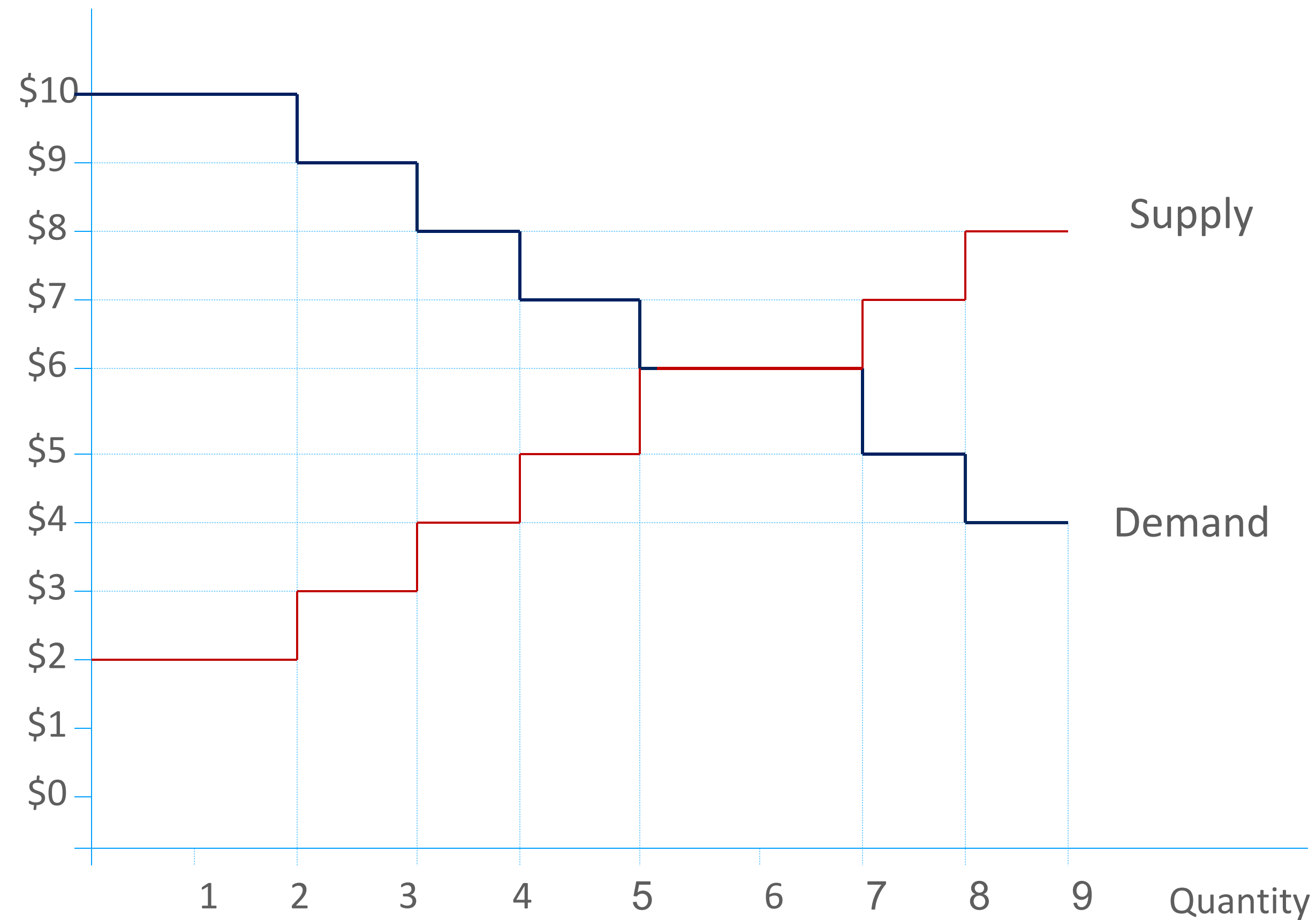
And if price equals to 4?

Supply curve

Theoretical predictions

P*=6
Q*=[5,7]

Quantity could have been as high as 9. **How?**

Example

> High-value buyers meet high-cost sellers
> Low-value buyers meet low-cost sellers

Values/Costs	Price
10/8	9
10/7	8.5
9/6	7.5
8/6	7
7/5	6
6/4	5
6/3	4.5
5/2	3.5
4/2	3

Efficient market

What does it mean?

Actual earnings of all participants = maximum possible earnings = total surplus

Efficiency is achieved when D=S

Chamberlin's results

What did he find?

■ High price dispersion in the first rounds

■ Too few trades relative to the equilibrium prediction

WHY?

Chamberlin's results

What did he find?

- Even if trade occurred in an open arena, the offers and bids were not heard by everyone

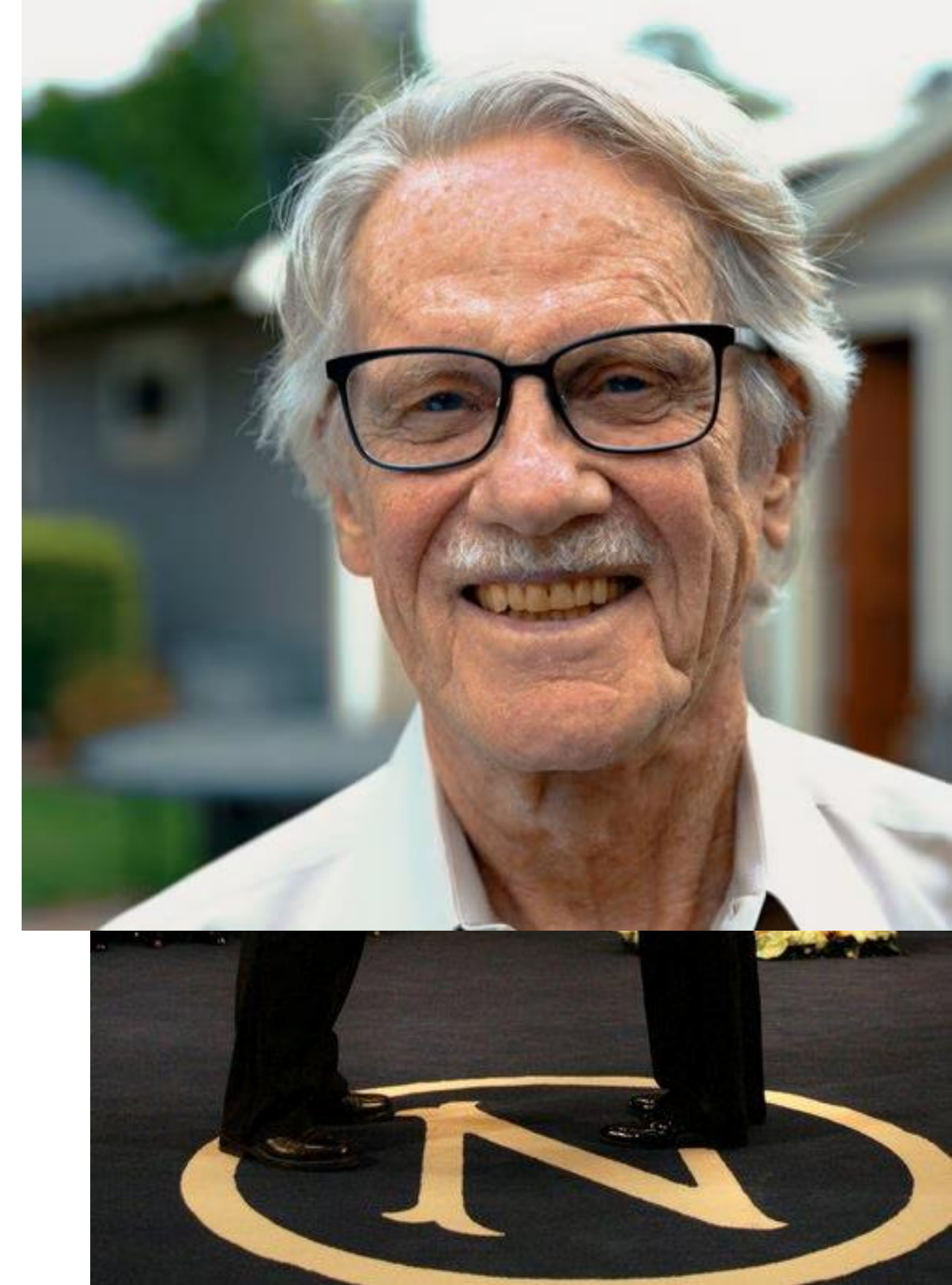- We can say, in the Pit market there was

Imperfect information

Vernon Smith's reaction

- Chamberlin's student

- Started thinking about an alternative institution that could **promote efficiency**

  DOUBLE AUCTION

- Nobel Prize in 2002 for his work on market experiments
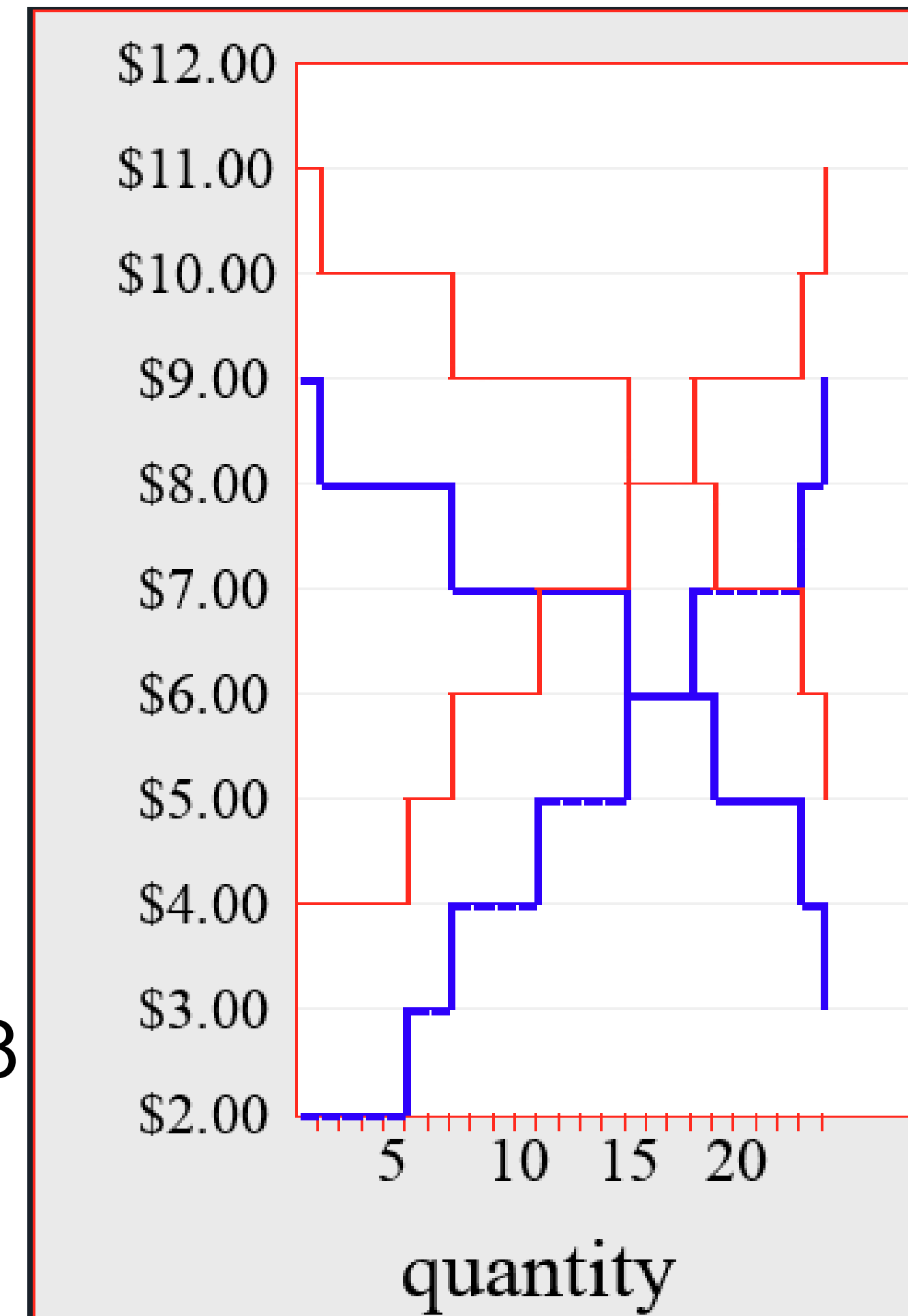
Lab report 1

- Questions about demand/supply curves?

- **And about exploring actual data?**

- What was the most difficult part?

- **Understanding the file?**

Lab report 1: Theoretical predictions

Questions 1, 2 & 5

- **Seller costs:**
  [5x $2, 2x $3, 4x $4, 4x $5, 3x $6, 5x $7, 1x $8]
- **Buyer values:**
  [1x $9, 6x $8, 8x $7, 4x $6, 4x $5, 1x $4]

- P*=$6
- Q*=15-18

- PS=5x($6-$2)+2x($6-$3)+4x($6-$4)+4x($6-$5)+2x($6-$6)=$38
- CS=3x($9-$6)+9x($8-$6)+7x($7-$6)+10x($6-$6)=$34
- Total surplus=CS+PS=$72
- Market efficiency=100%

Lab report 1: Working with data

Questions 3, 4 & 6

R#	Quantity (n) per round	Average price in $
1	16	6.22
2	16	6.23
3	17	6.11
4	16	6.03

Double Auction Transactions Prices

Treatment 1   Treatment 2

Data for 16 Participants
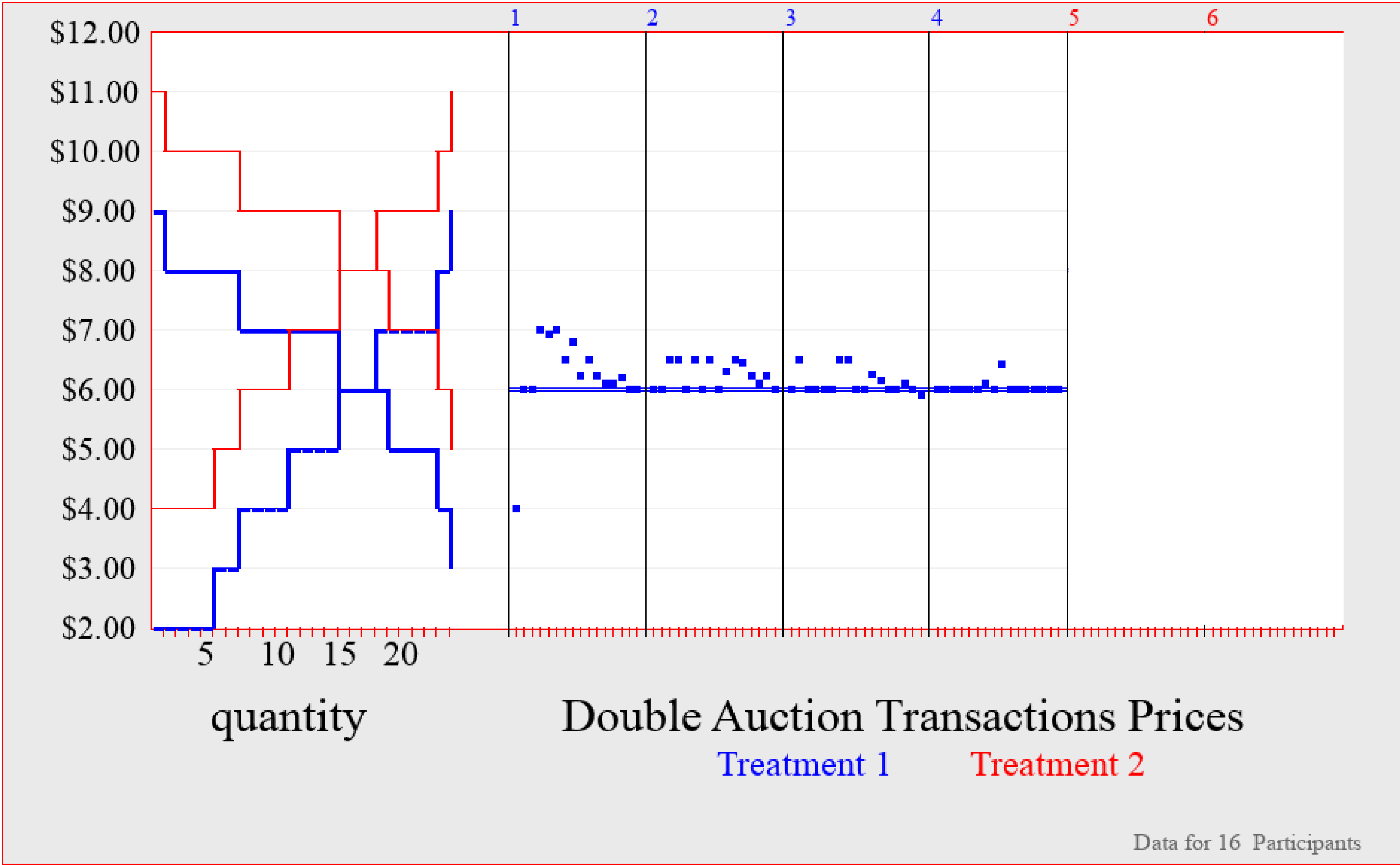
Pilot

R#	Quantity (n) per round	Average price in $	Market efficiency in %	Price dispersion
1	9	5.70	72.5	.473
2	12	5.16	90.2	.049
3	14	6.85	94.1	.039
4	16	7.10	100	.010

Double Auction Transactions Prices

Treatment 1   Treatment 2

Data for 16 Participants
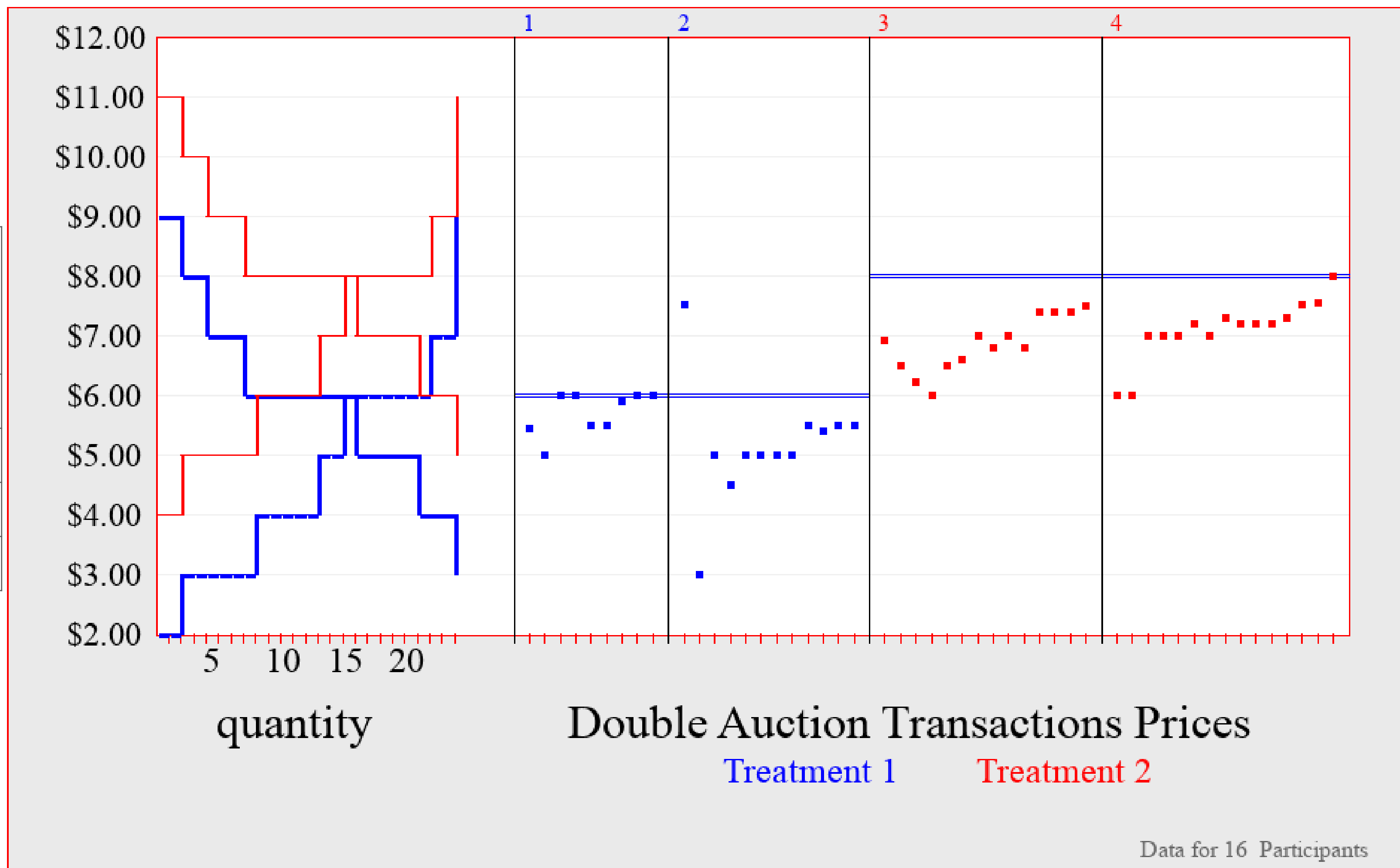
"Price controls and the behavior of Auction Markets: An Experimental Examination"
(AER, 1981)

R. MARK ISAAC   AND   CHARLES R. PLOTT

"Experimental economics research shows that small institutional adjustments can make a big difference."

"no other branch of science can claim success in identifying principles that govern something as complex as a multiple market system with human participants"
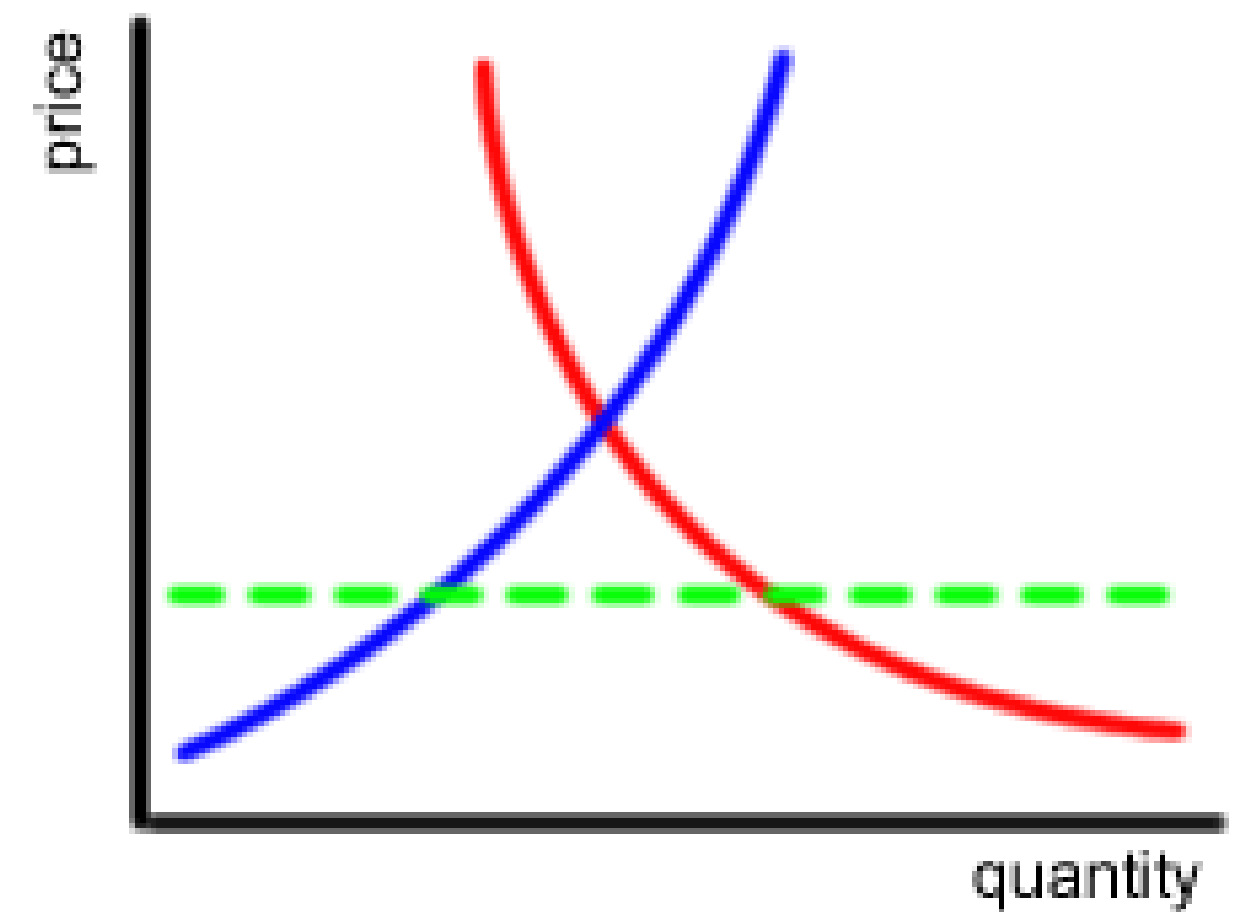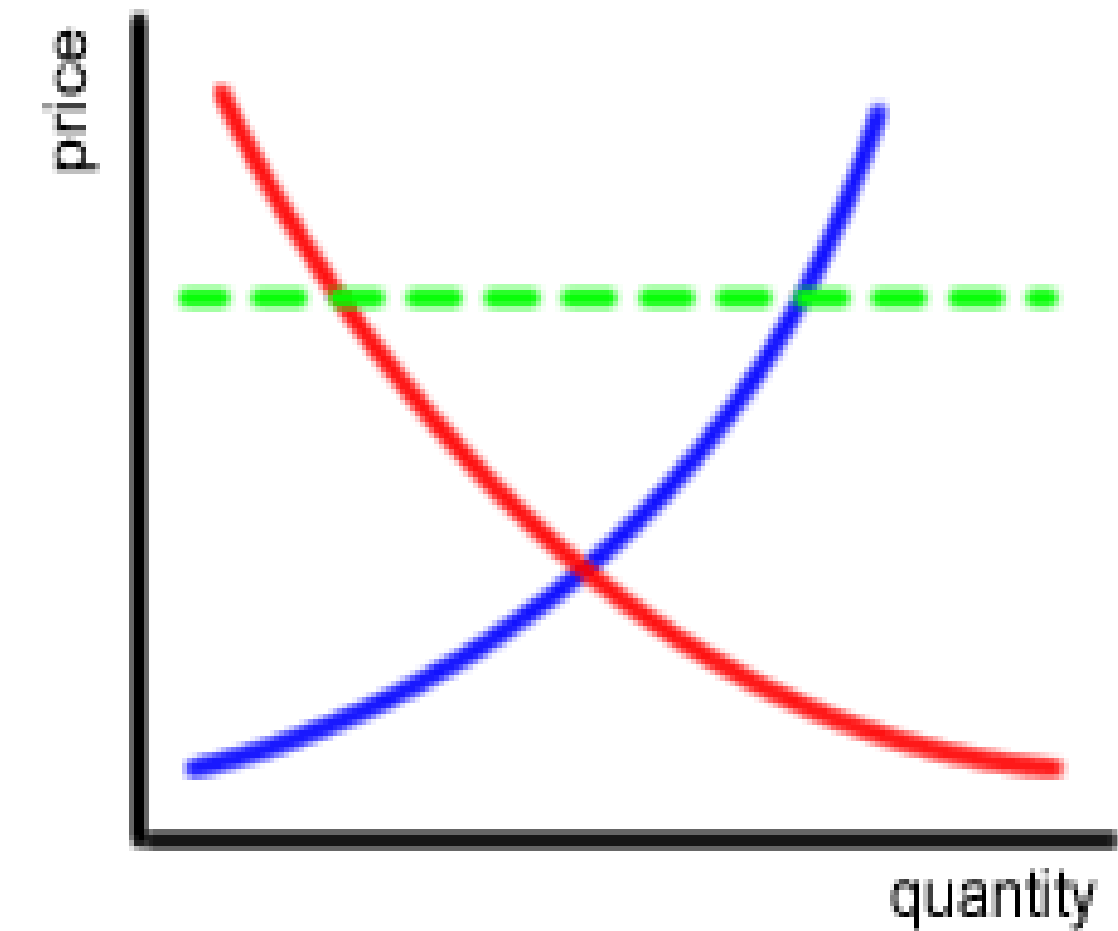
Price controls

Price ceiling: legal limit on how **high** the price of a product can be.

Price floor: legal limit on how **low** the price of a product can be.

Price ceilings and price floors are common in all markets.

Examples: house renting market
price cap (ceiling),
milk price (floor)

Standard prediction

- If controls are not binding, i.e., price ceiling at or above the equilibrium or a price floor at or below the equilibrium, should **have no effects** on the market

- If controls are binding, i.e., price ceiling below the equilibrium or price floor above the equilibrium, then the **market achieves an inefficient p-q outcome.**

Alternative hypothesis

- If non-binding controls have an effect, it is possible that controls act as a focal point.

- E.g., sellers, by focusing on a non-binding ceiling, may be able to tacitly collude to keep prices above the equilibrium.

Isaac & Holt experiment

- Each session consisted of an auction market with
  - 4 sellers
  - 4 buyers

- Values and costs induced like in Smith experiment

➢ Double auction

Isaac & Holt experiment

- The examined institutions feature a series of price ceilings and price floors.

- 12 sessions including the following institutional modifications
  - no controls
  - controls at equilibrium (price ceiling at EQ, price floor at EQ)
  - non-binding controls
  - binding controls

Isaac & Holt experiment

Focused on 4 aspects of market behavior

1) <u>Price level</u>: average price of a trade during a period

2) <u>Market volume</u>: number of trades during a period

3) <u>Market efficiency</u>: actual sum of subjects' earnings divided by the theoretical maximum

4) <u>Responses to institutional modifications</u> (i.e., price controls imposed, removed, or changed)

Isaac & Holt experiment: Results

i. controls at the competitive equilibrium cause market prices to diverge from the competitive equilibrium.

ii. removal of non-binding controls induces change in market prices.

iii. inefficiencies induced by binding controls are greater than predicted by the standard application of consumer's surplus analysis.

iv. adjustment of prices after binding controls are removed result in an initial discontinuity or "jump" rather than a continuous adjustment.

Question 1

Economists use the term "double auction" to refer to

a) simultaneous auctions of two different goods with different qualities.

b) market rules that allow both buyers and sellers to initiate trade offers with bids and asks (respectively).

c) markets that have buyers and sellers.

d) market rules that allow up to two seller offers ("asks") to be accepted simultaneously by buyers.

Question 1

Economists use the term "double auction" to refer to

a) simultaneous auctions of two different goods with different qualities.

b) market rules that allow both buyers and sellers to initiate trade offers with bids and asks (respectively).

c) markets that have buyers and sellers.

d) market rules that allow up to two seller offers ("asks") to be accepted simultaneously by buyers.

Question 2

True or False?

When competitive markets are working in equilibrium demand and supply curves have the identical shape.

Question 2

True or **False**?

When competitive markets are working in equilibrium demand and supply curves have the identical shape.

NEXT CLASS

Experiment 2 in the computer room F2 202!!!