

Trading in the 'Pit Market'

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Overview

■ Purpose of this talk:

1. Use experiments and experimental results as a vehicle for discussion
2. Explain what we mean by 'markets'
3. Derive theoretical predictions of market outcomes and explain the desirability of competitive markets
4. Discuss (briefly) the importance of trading institutions
5. Illustrate the impact of some government interventions on market outcomes

What is a market?

- “A place or institution in which buyers and sellers of a good or asset meet”. (Oxford Dictionary of Economics)
- Markets facilitate trade
 - Bring buyers and sellers together
 - Aggregation of information

Theoretical framework

Assumptions

- Optimization principle – people try to achieve the best deal they can.
- Units are homogeneous.

Definition

- Equilibrium – the price(s) where neither buyers nor sellers have an incentive to change their behaviour.

Demand side (buyers)

value	#
53	2
48	2
43	2
38	2
33	2
28	2



Supply side (sellers)

cost	#
39	2
34	2
29	2
24	2
19	2
14	2



Organizing trade

- Numerous ways of trading up to 12 units

Buyer's Values	Sellers' Costs
53	39
48	34
43	29
38	24
33	19
28	14

Organizing trade


- Numerous ways of trading up to 12 units
- **One way**
- 12 units traded
- Prices that can range from 15 to 52
- Gains from trade: **\$ 168**

Buyer's Values		Sellers' Costs
53	→	39
48	→	34
43	→	29
38	→	24
33	→	19
28	→	14

Organizing trade

- Numerous ways of trading up to 12 units
- **Another way**
- 10 units traded
- Prices that can range from 15 to 52
- Gains from trade: **\$ 190**

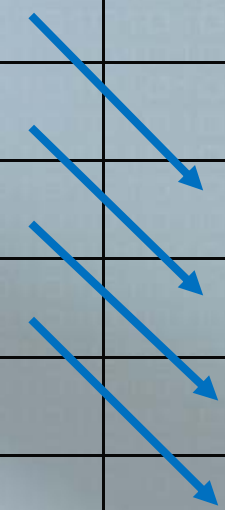
Buyer's Values	Sellers' Costs
53	39
48	34
43	29
38	24
33	19
28	14

The table shows a list of buyer values and seller costs. Red arrows point from the buyer's value column to the seller's cost column, specifically from 53 to 39, 48 to 34, 43 to 29, 38 to 24, and 33 to 19. The value 28 in the buyer's column has no arrow pointing to it.

Organizing trade

- Numerous ways of trading up to 12 units
- **Yet another way**
- 8 units traded
- Prices that can range from 15 to 52
- Gains from trade: **\$ 192**

Buyer's Values	Sellers' Costs
53	39
48	34
43	29
38	24
33	19
28	14



Organizing trade

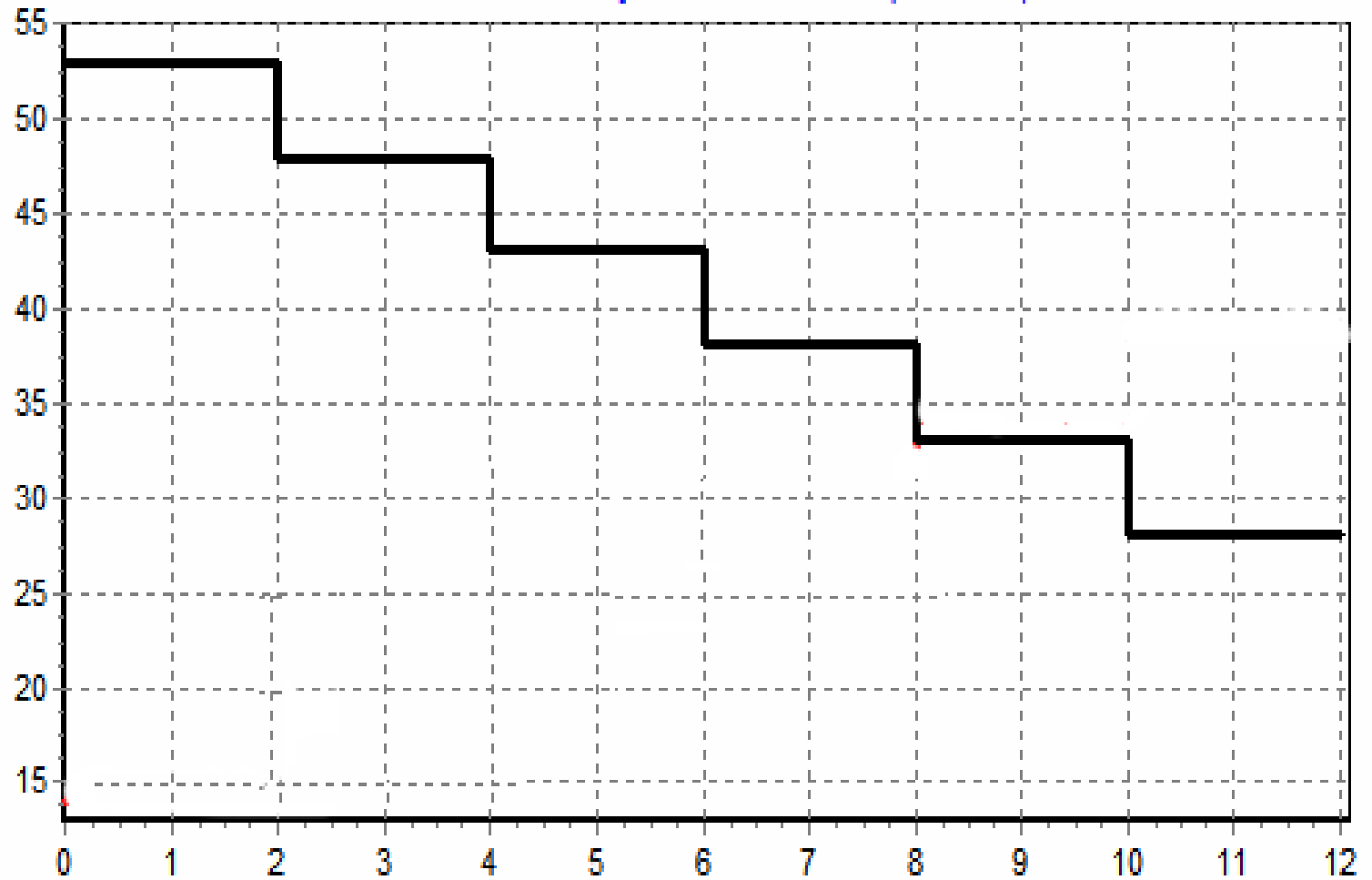
- This suggests that prohibiting high-cost sellers and low-value buyers from trading can be a good thing
- Of course, what is “high” and what is “low”?
- And how can we maximize the gains from trade when values/costs are private information?
- The price mechanism offers incentives to people to reveal their information.

Demand side (buyers)

value	#
53	2
48	2
43	2
38	2
33	2
28	2

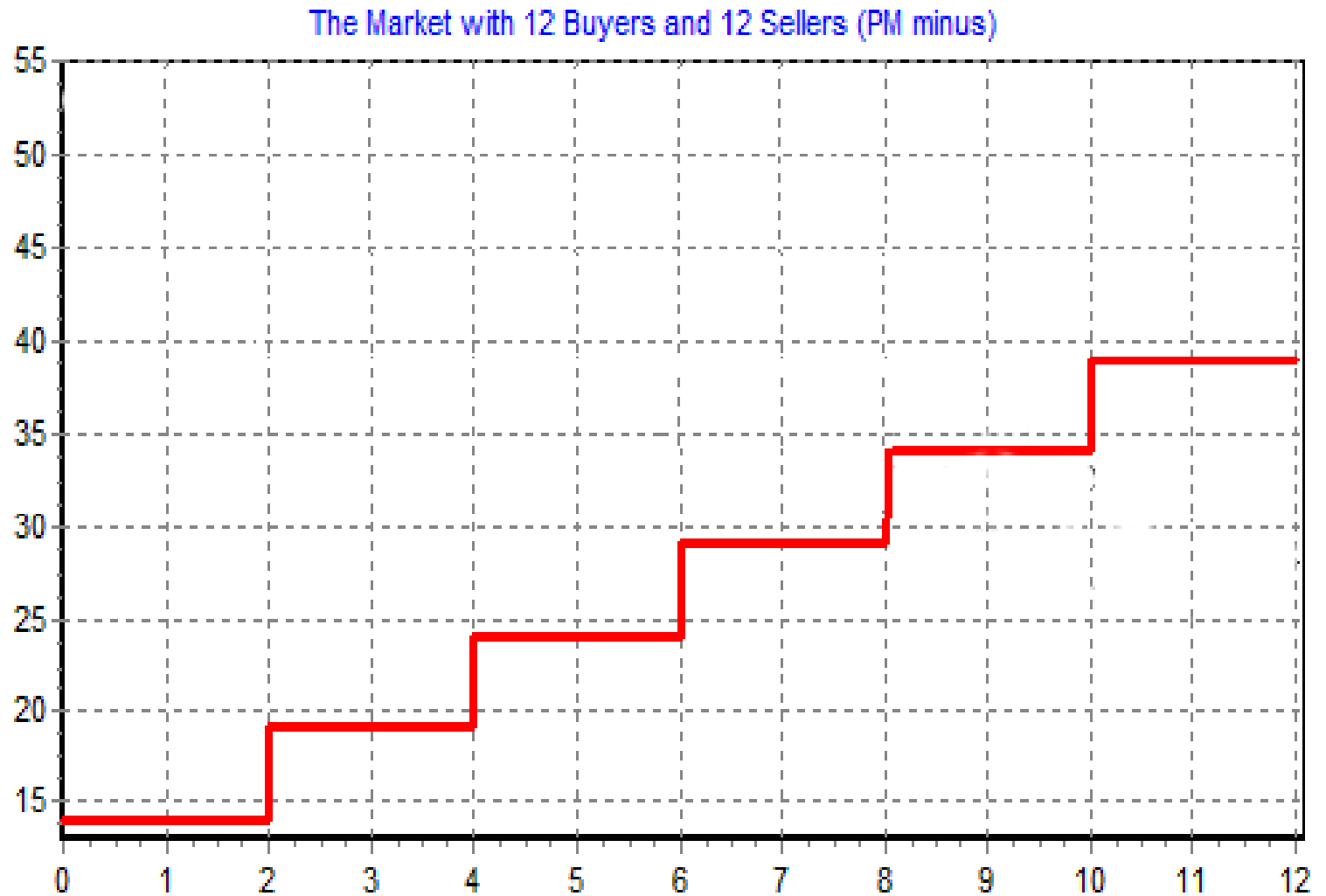


The Market with 12 Buyers and 12 Sellers (PM minus)



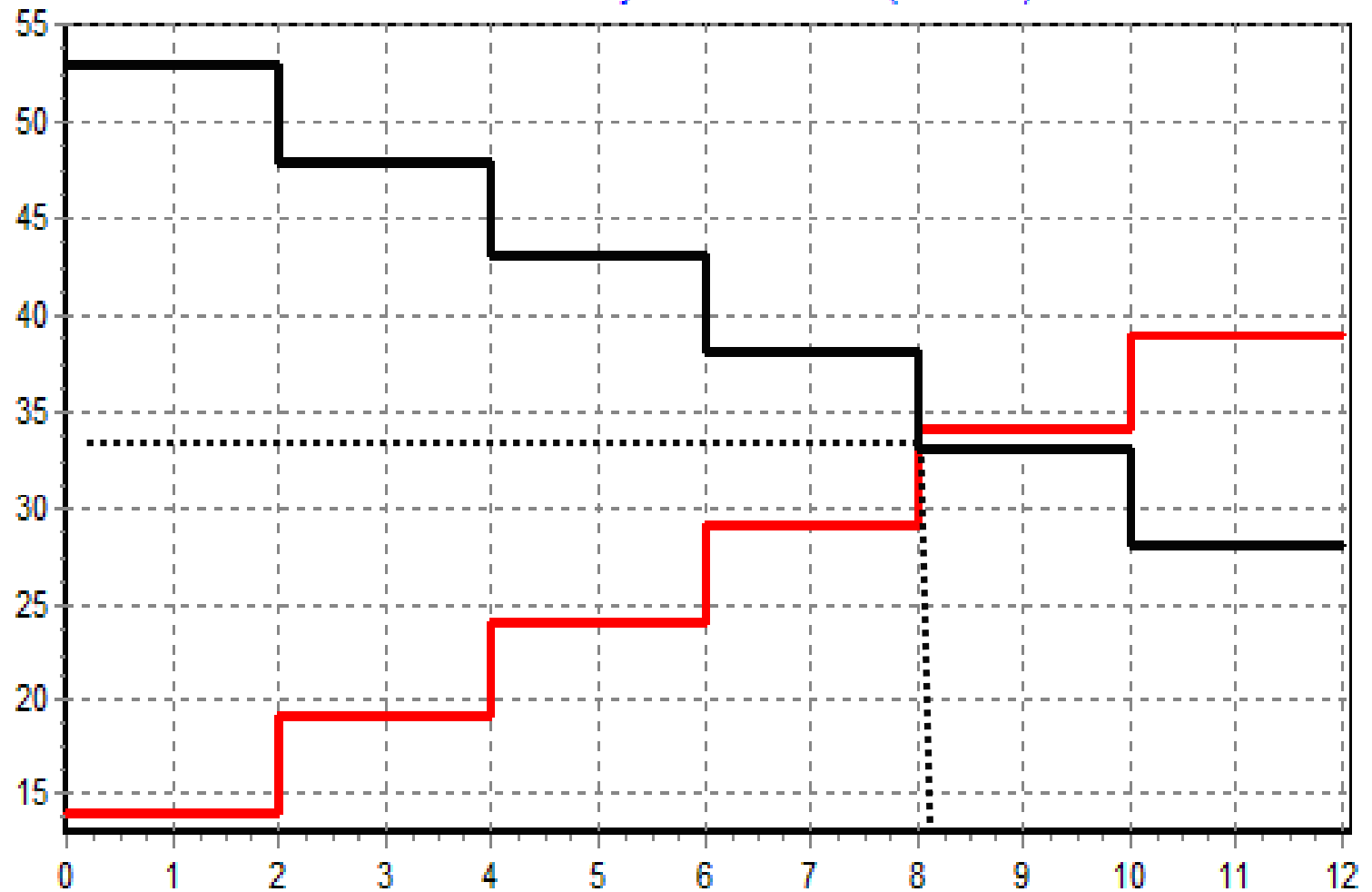
Supply side (sellers)

cost	#
39	2
34	2
29	2
24	2
19	2
14	2



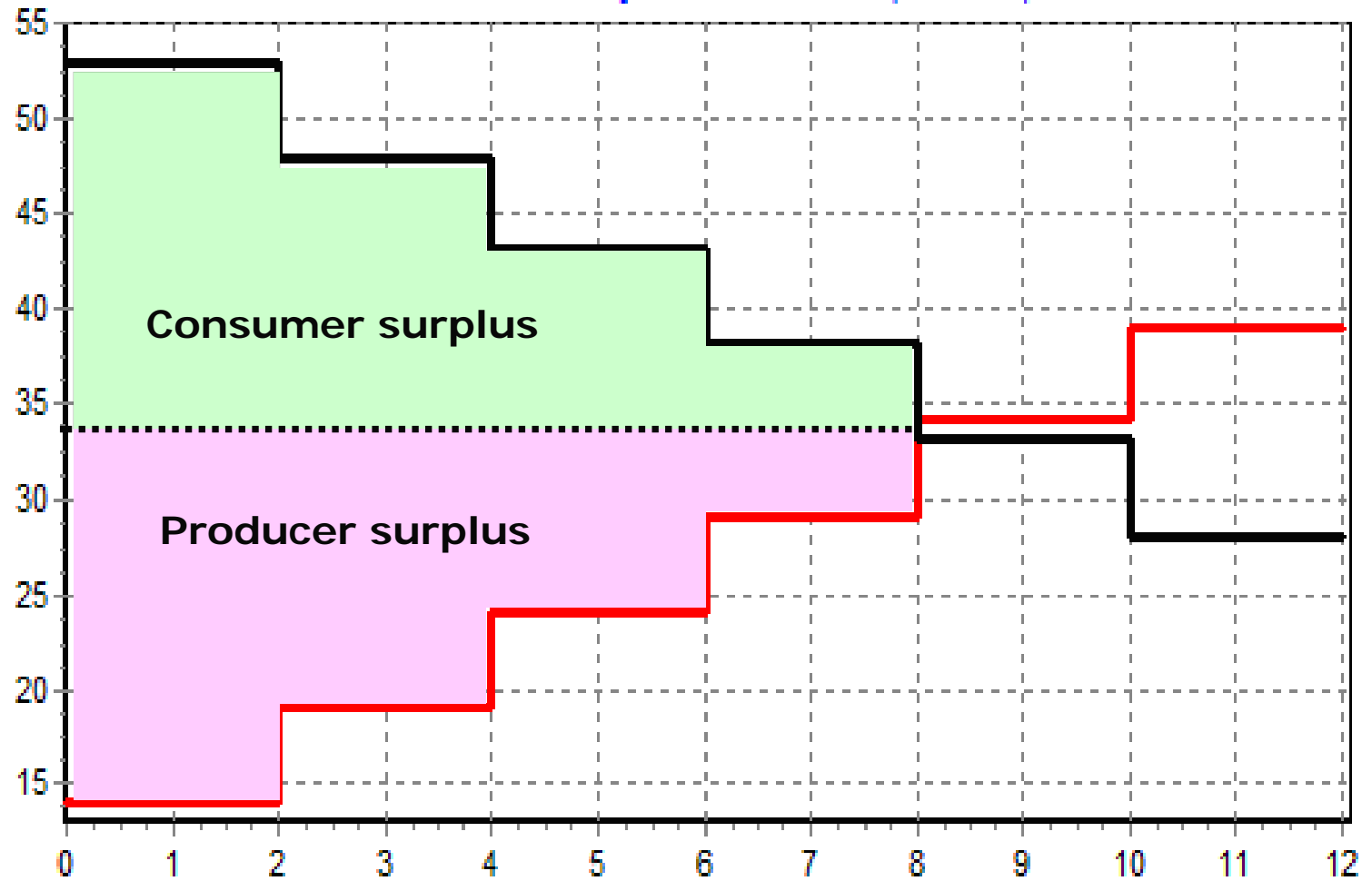
Market

The Market with 12 Buyers and 12 Sellers (PM minus)



Market

The Market with 12 Buyers and 12 Sellers (PM minus)



Market predictions

- Let p^* be the price where supply and demand curves cross.
- If $p > p^*$ \Rightarrow excess supply will tend to lower prices.
- If $p < p^*$ \Rightarrow excess demand will tend to raise prices.
- If $p = p^*$ there is no force to change the price.
- The market price (p^*) determines the quantity to be traded (q^*)

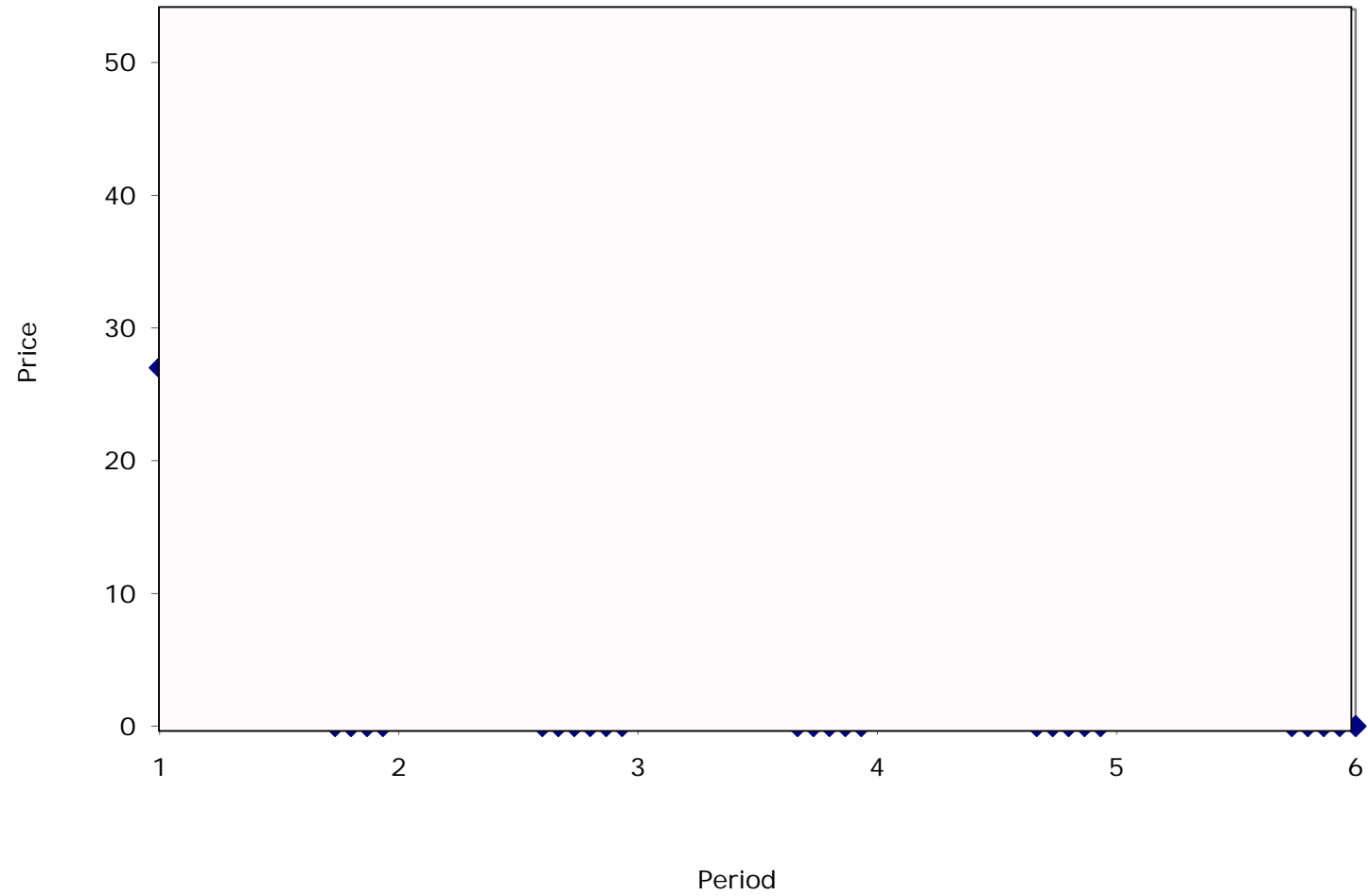
Organizing trade

- “[An individual is] led by an **invisible hand** to promote an end which was no part of his intention. Nor is it always the worse for the society that it was not part of it. By pursuing his own interest he frequently promotes that of the society more effectually than when he really intends to promote it.”
- Adam Smith
- Was Adam Smith right?

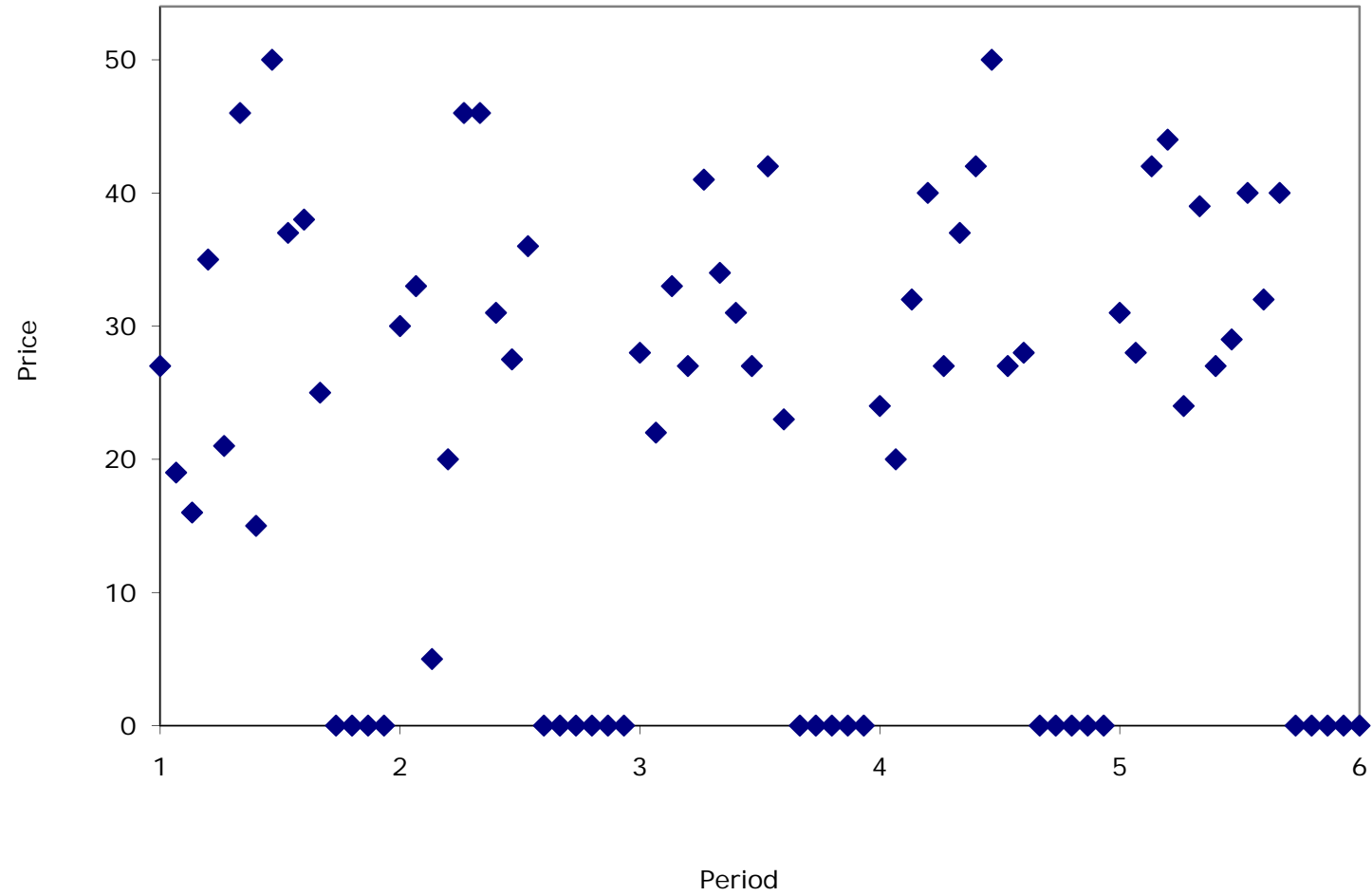
About experiment (1)

- Variant of first recorded experiment in economics (Chamberlin, 1948)
- Chamberlin found that market predictions don't work!
- I "predict" that the same will apply in our case (reasons will be explained).
- *Remember:* there should be a single price of 33.5 and 8 units traded

Experiment 1



Experiment 1



Behaviour in experiment (1)

Experiment 1

	1	2	3	4	5	All
aver. price	29.9	30.5	30.8	32.7	34.2	31.6
quantity	11.0	9.0	10.0	10.0	11.0	10.2
efficiency	88.0	96.9	85.9	88.5	90.6	90.0
convergence	12.0	12.3	7.0	8.9	6.7	9.4

- While on average prices are not far from the prediction, clearly the market is not converging to the equilibrium prediction.
- There are too many units traded.

About experiment (2)

- Variant of experiment by Smith (1962) – Nobel laureate 2002.
- Smith argued that Chamberlin's market was too decentralized unlike real markets.
- Experiment (1) was even more decentralized.
- In fact it was hardly a market.
- Smith also introduced stationary repetition.
- He found that the predictions work remarkably well in a centralized trading institution.

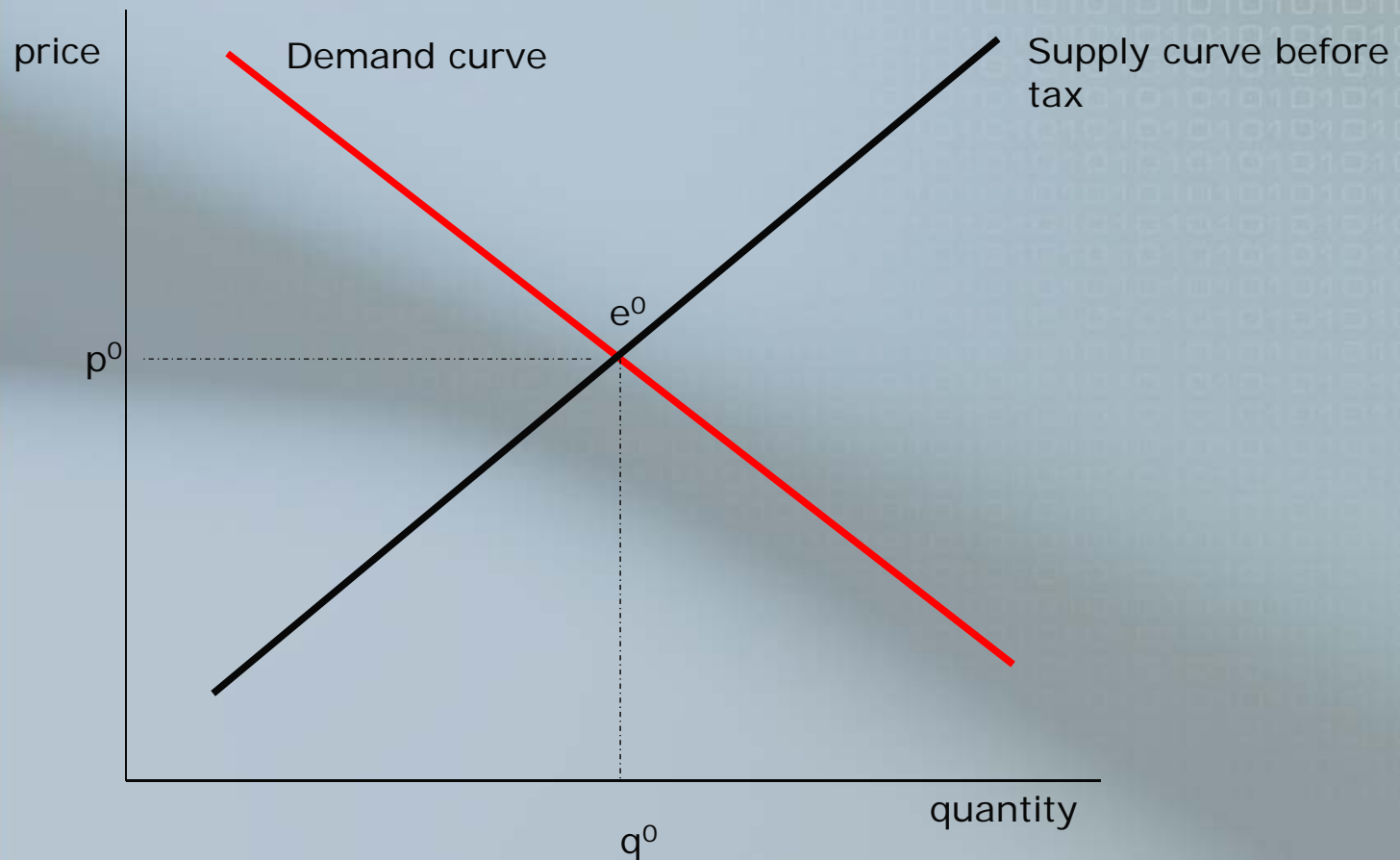
About experiment (2)

- Experiment (2) was less centralized than Smith's, but it should still have worked alright.
- Note also, that a tax was imposed on buyers in experiment (2).

Imposition of tax

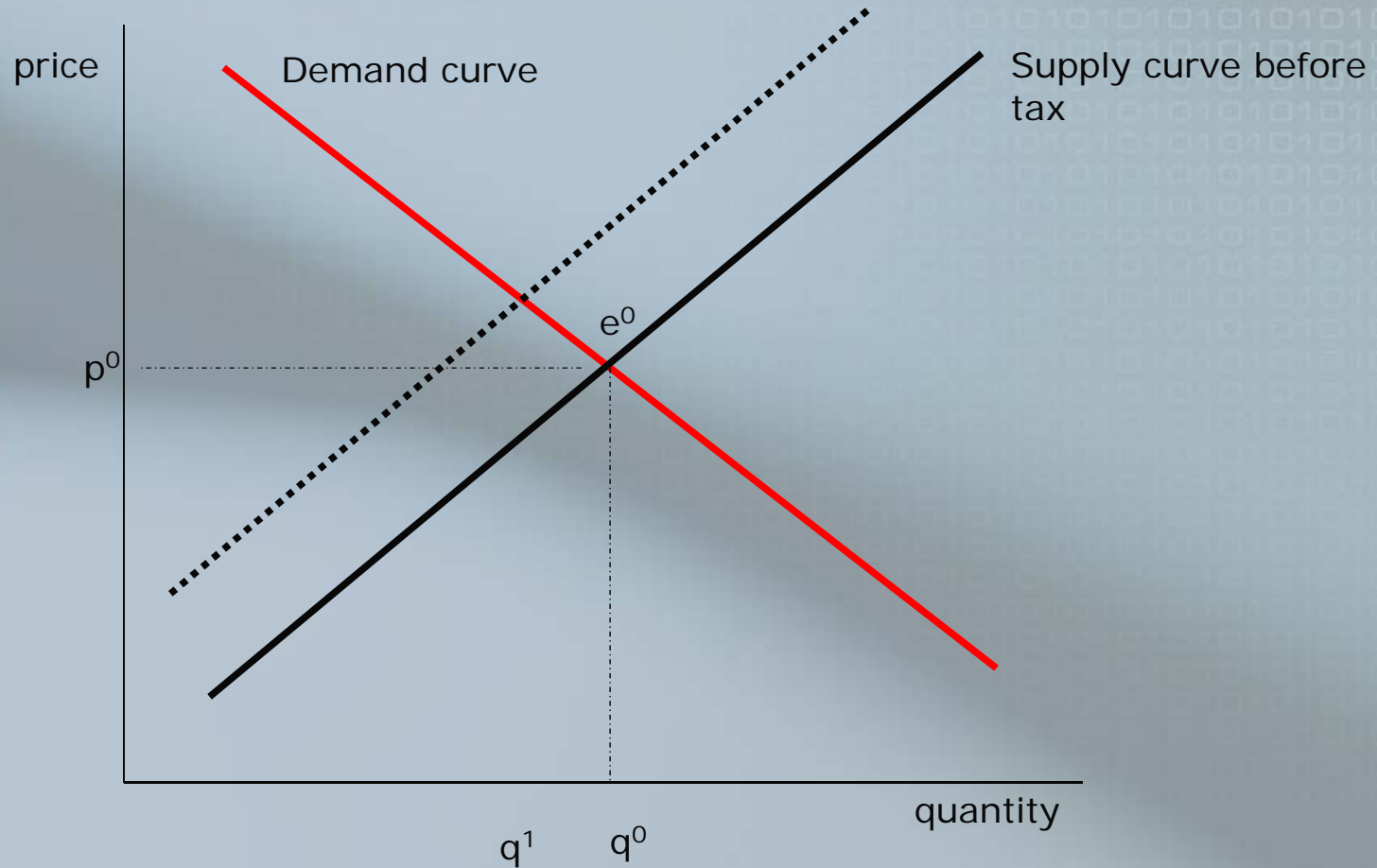
- Different taxes (direct-indirect, value-quantity, progressive-regressive etc.)
- We will consider effects of a quantity tax on sellers (see Stiglitz, 2000)
- Quantity tax – a tax levied per unit of quantity bought or sold
- For simplicity let's consider that there exist many buyers and sellers
- That is, demand and supply curves are straight lines

Imposition of tax



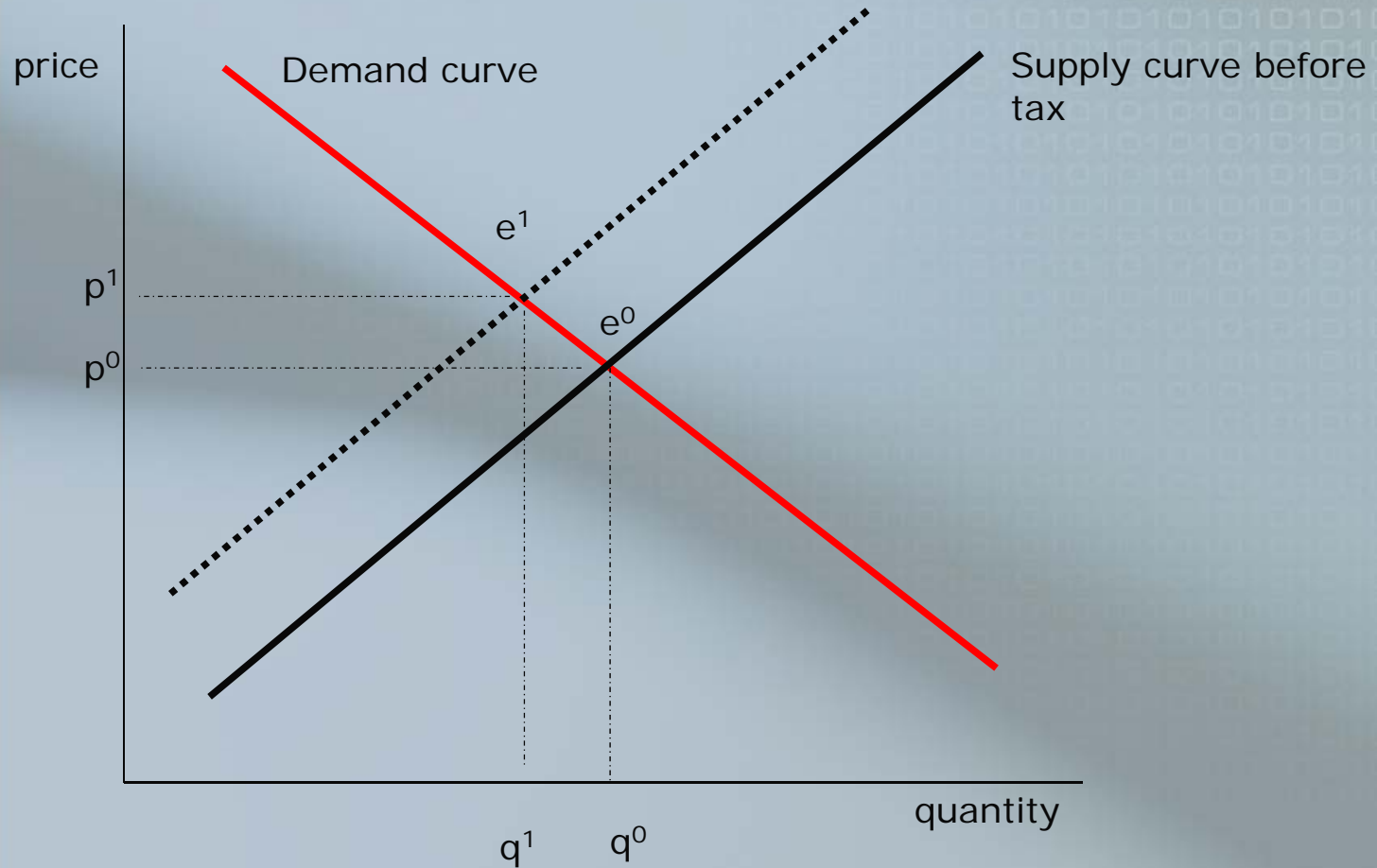
Example 1: Tax imposed on sellers

Imposition of tax



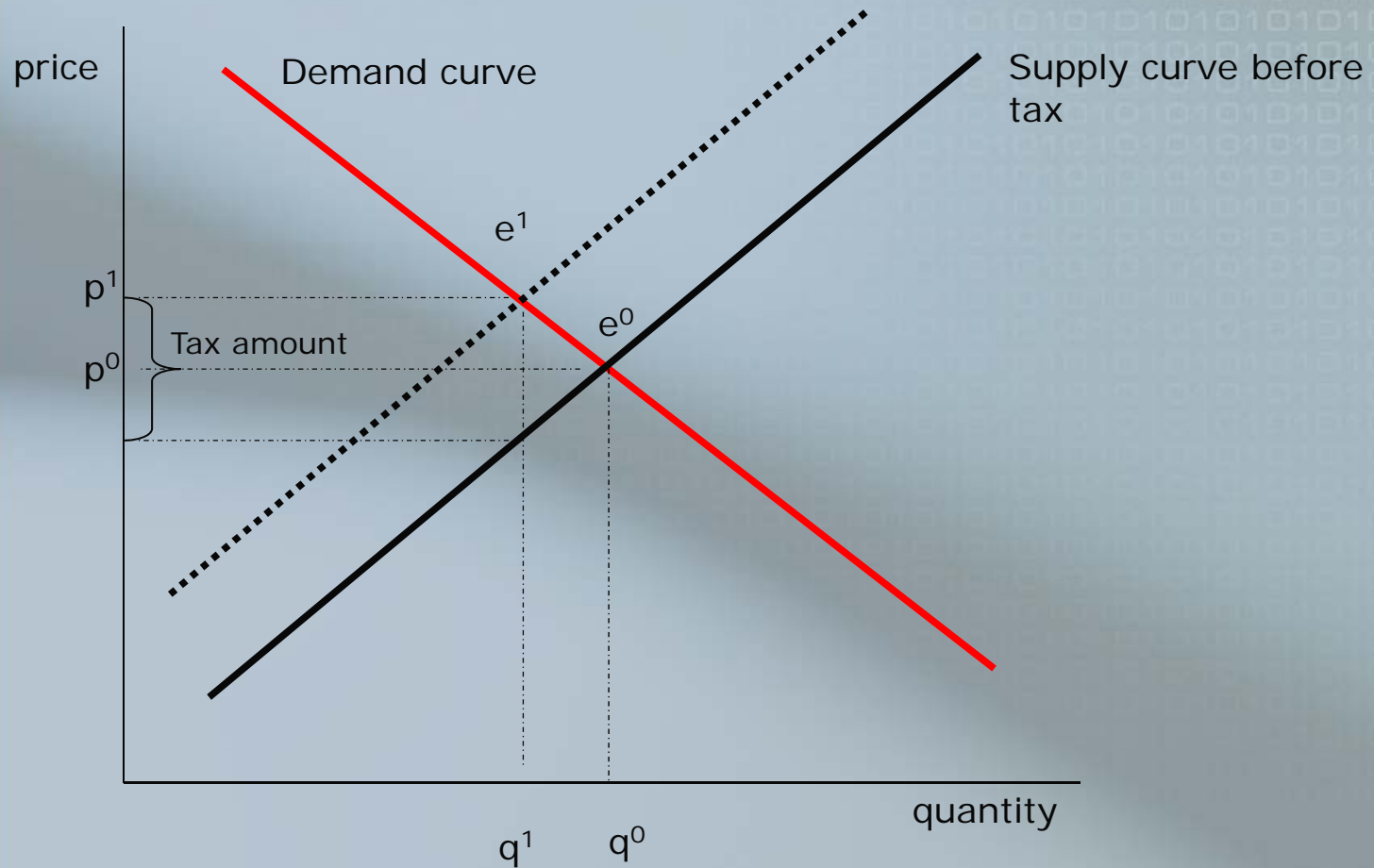
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Imposition of tax



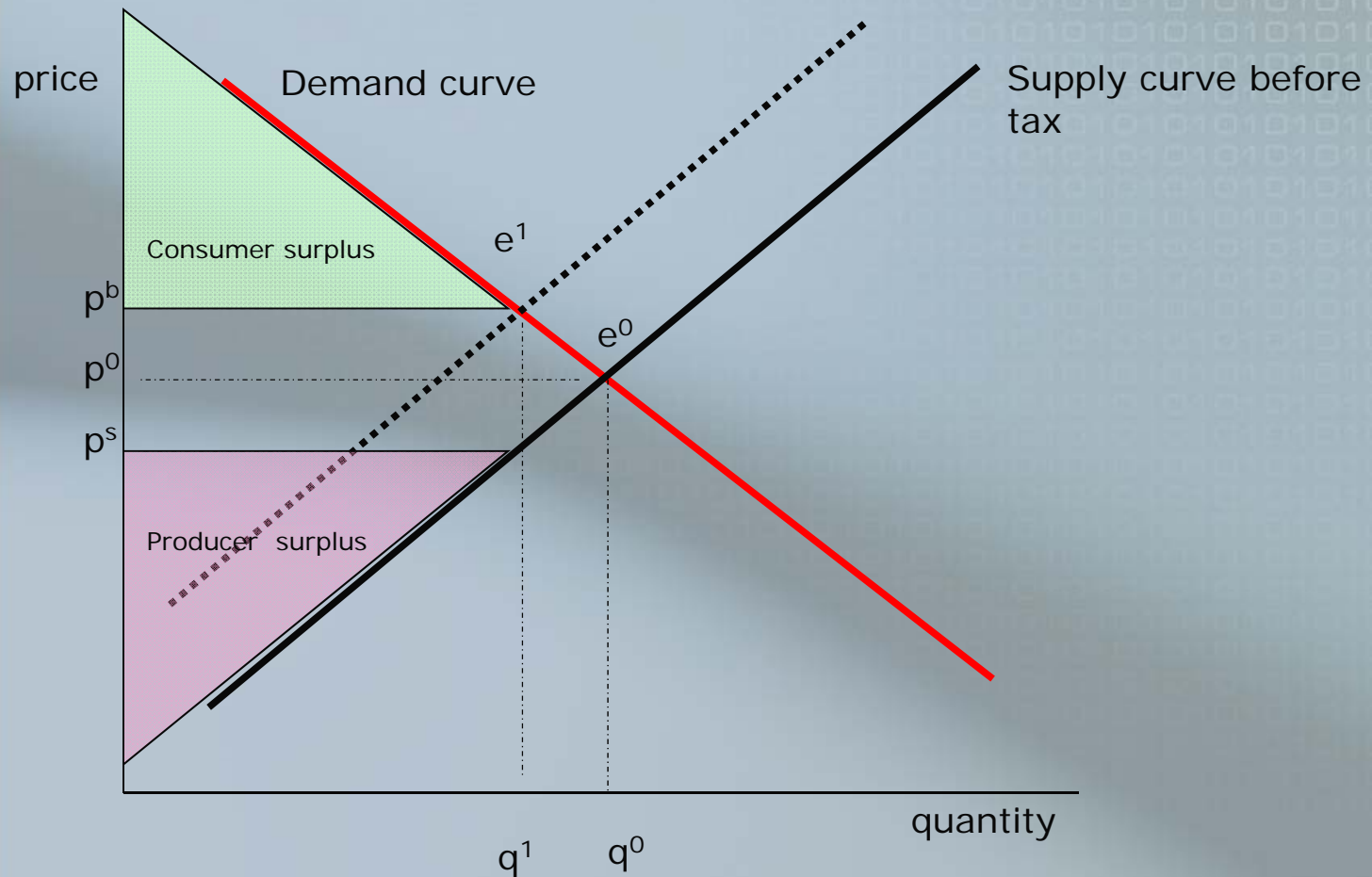
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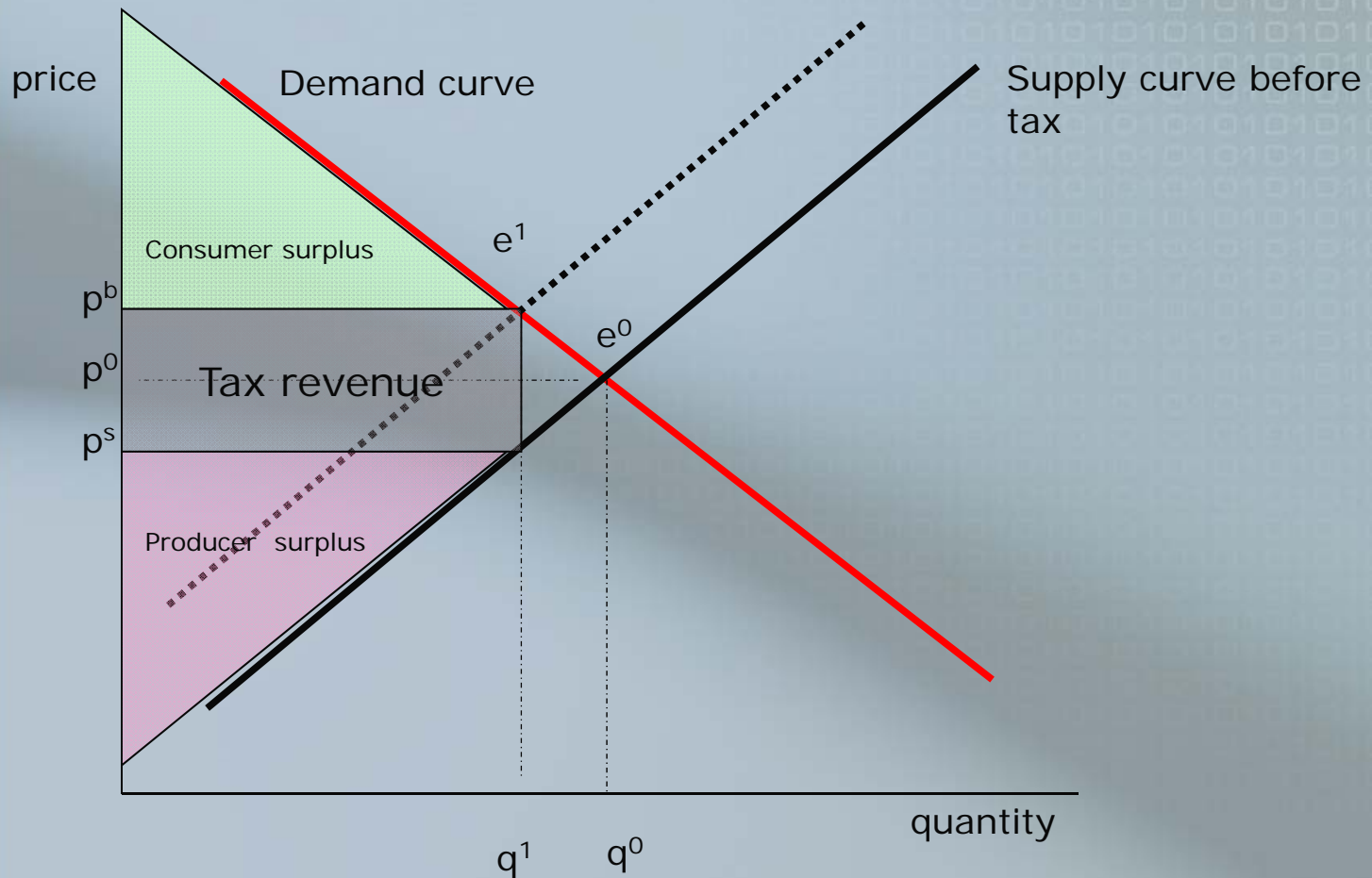
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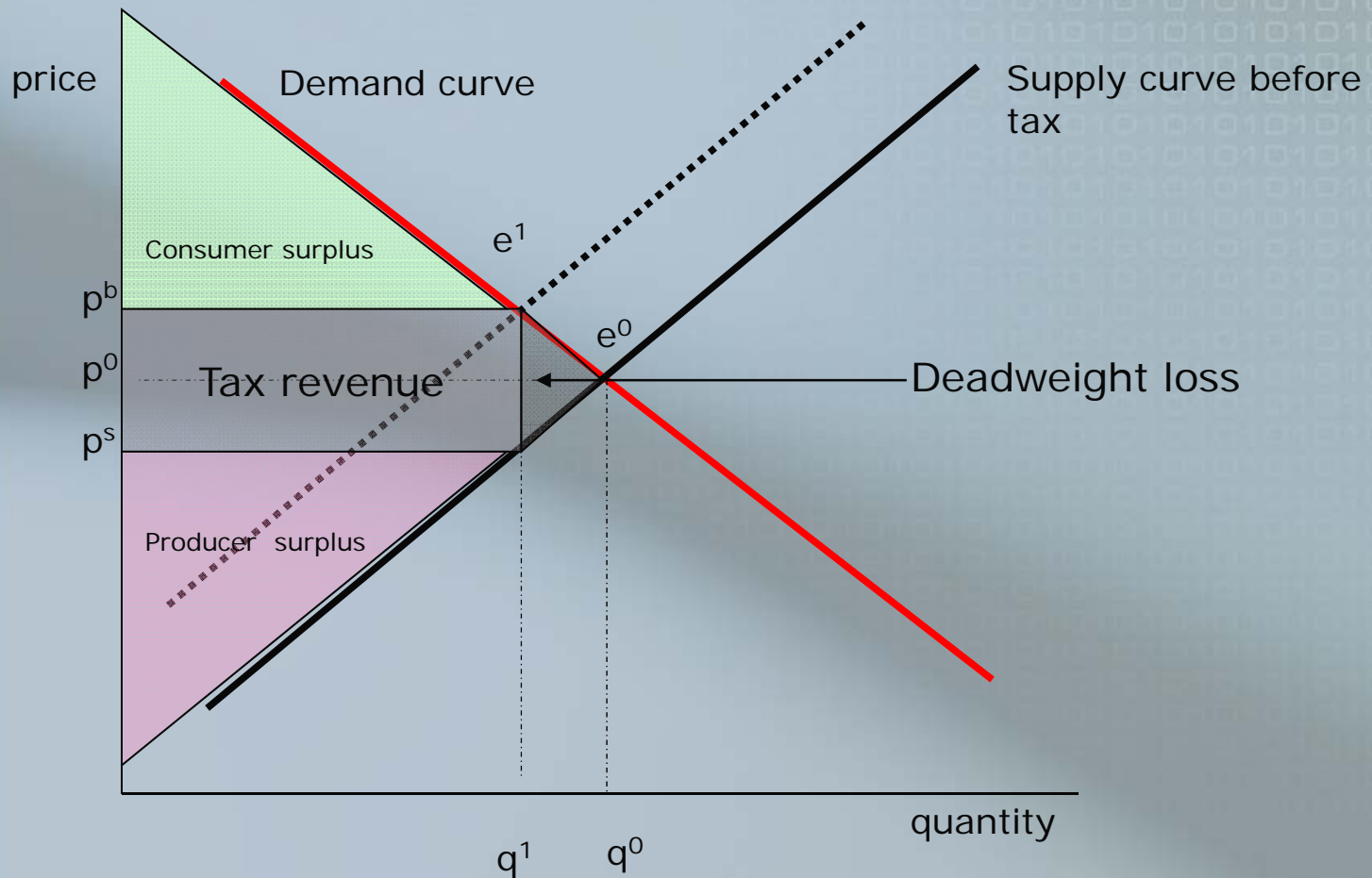
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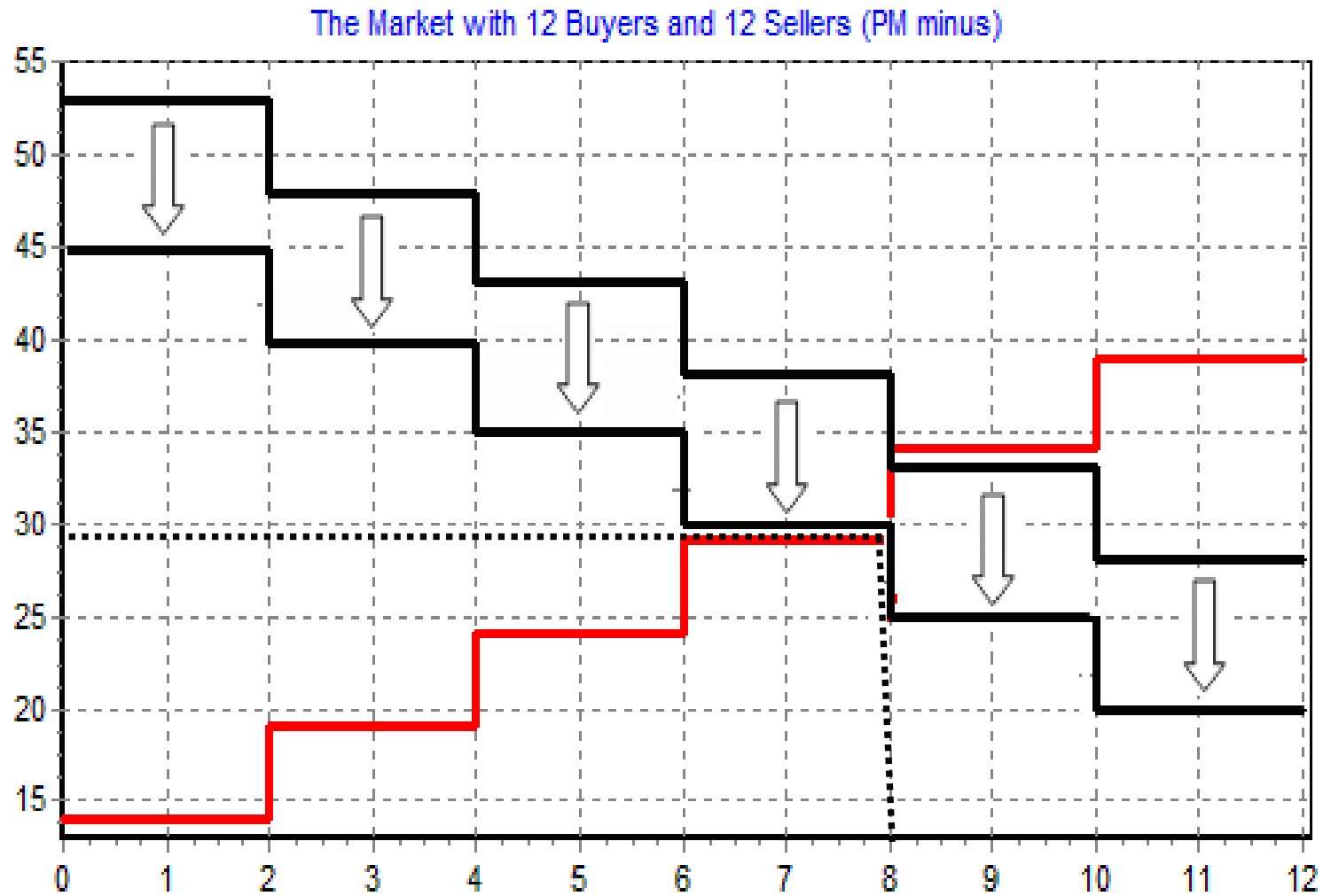
Example 1: Tax imposed on sellers

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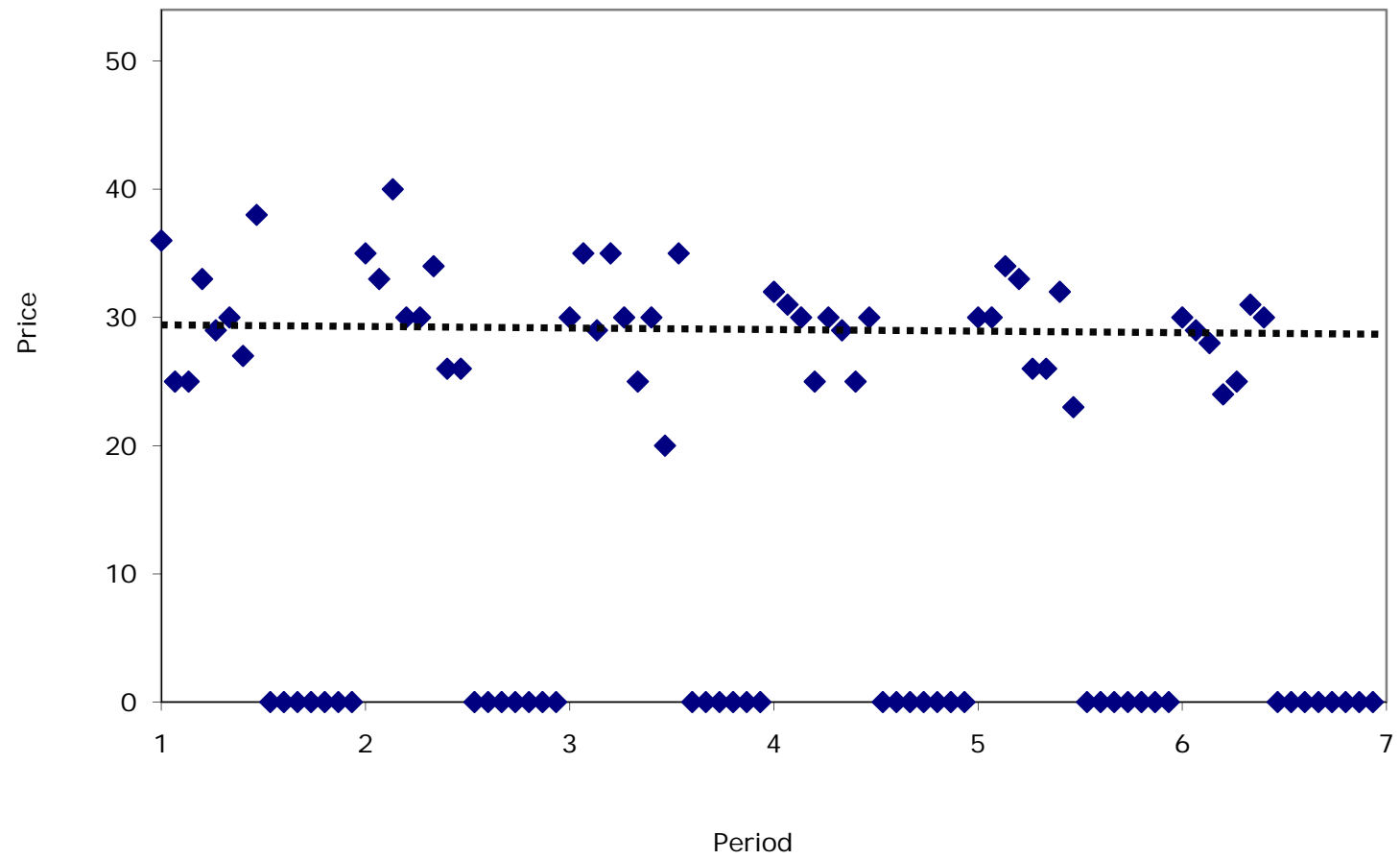


Example 1: Tax imposed on sellers

Tax in experiment 2



Experiment 2



Experiment 2

Experiment 2							
	1	2	3	4	5	6	All
aver. price	30.4	31.8	29.9	29.0	29.3	28.1	29.7
quantity	8.0	8.0	9.0	8.0	8.0	7.0	8.0
efficiency	96.1	100.0	89.1	96.1	96.1	95.3	95.4
convergence	4.7	5.0	4.7	2.5	3.6	2.8	3.9

- The theoretical predictions describe behavior in this experiment much better.
- Notice, that both prices and quantities are close to the equilibrium predictions.

What did we learn?

- Creating a market can increase efficiency.

Experiment 1

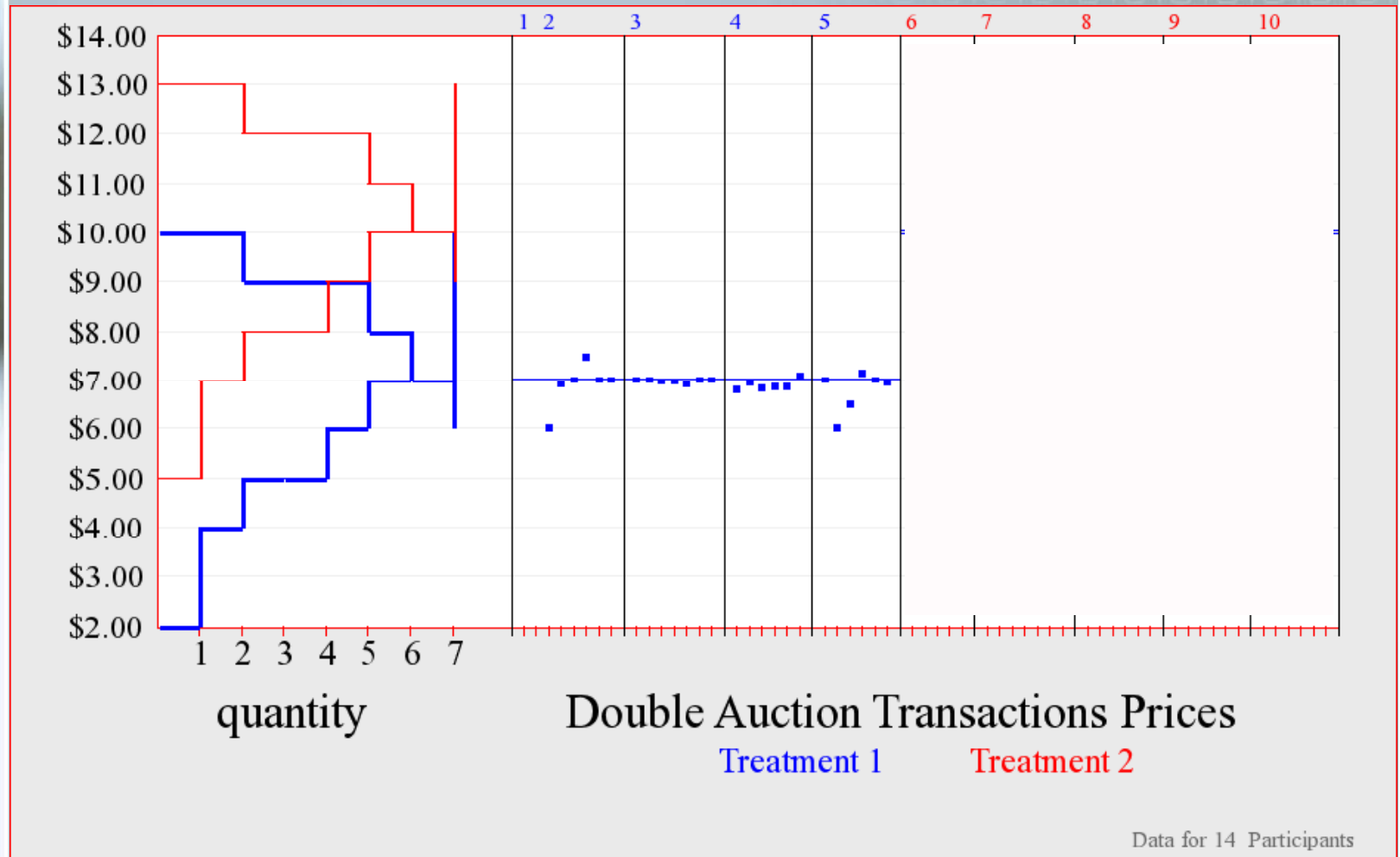
	1	2	3	4	5	All
aver. price	29.9	30.5	30.8	32.7	34.2	31.6
quantity	11.0	9.0	10.0	10.0	11.0	10.2
efficiency	88.0	96.9	85.9	88.5	90.6	90.0
convergence	12.0	12.3	7.0	8.9	6.7	9.4

Experiment 2

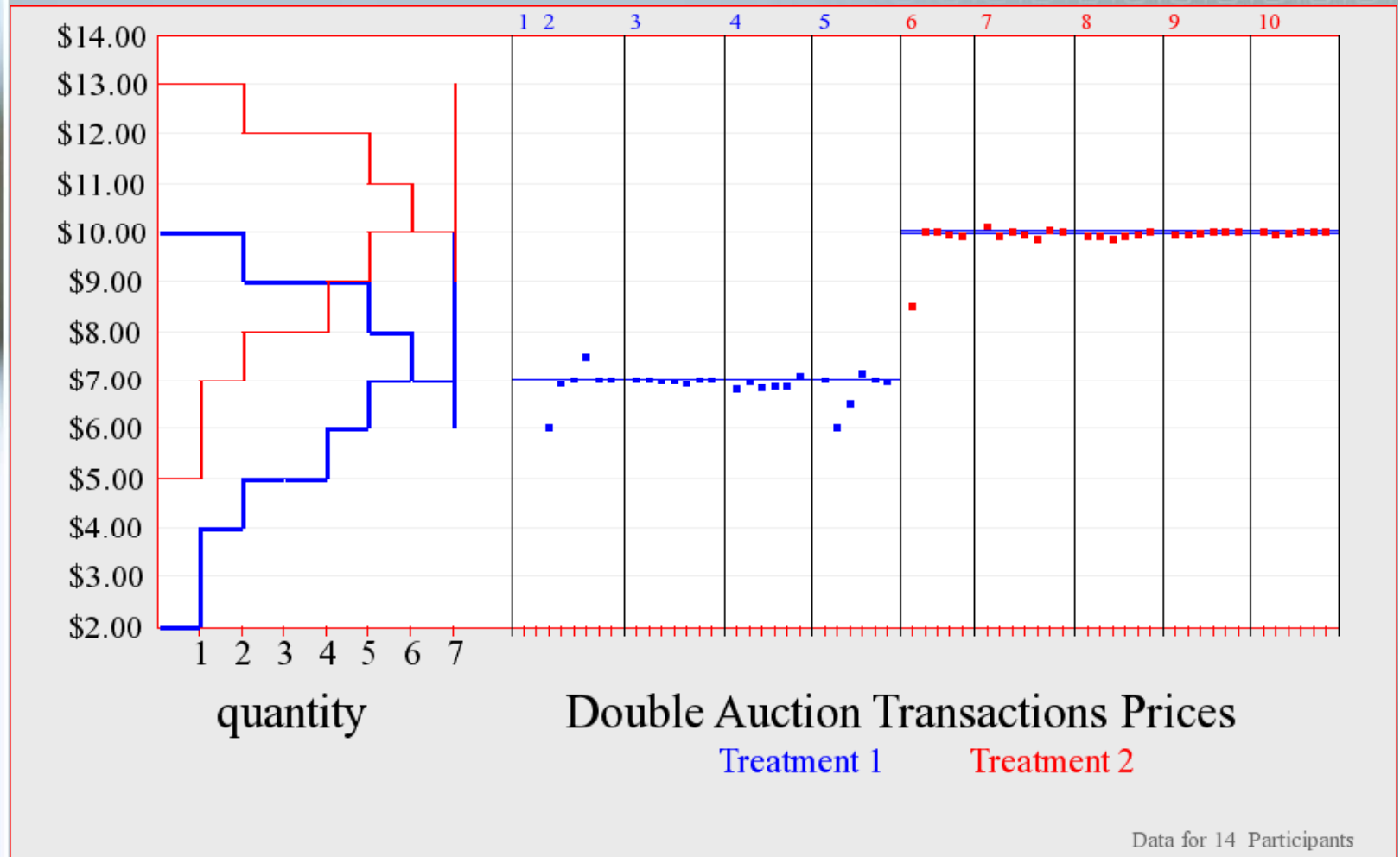
	1	2	3	4	5	6	All
aver. price	30.4	31.8	29.9	29.0	29.3	28.1	29.7
quantity	8.0	8.0	9.0	8.0	8.0	7.0	8.0
efficiency	96.1	100.0	89.1	96.1	96.1	95.3	95.4
convergence	4.7	5.0	4.7	2.5	3.6	2.8	3.9

- The trading institution is as important as the 'structural' characteristics.

A computerized Double-Auction market



A computerized Double-Auction market



Price Controls

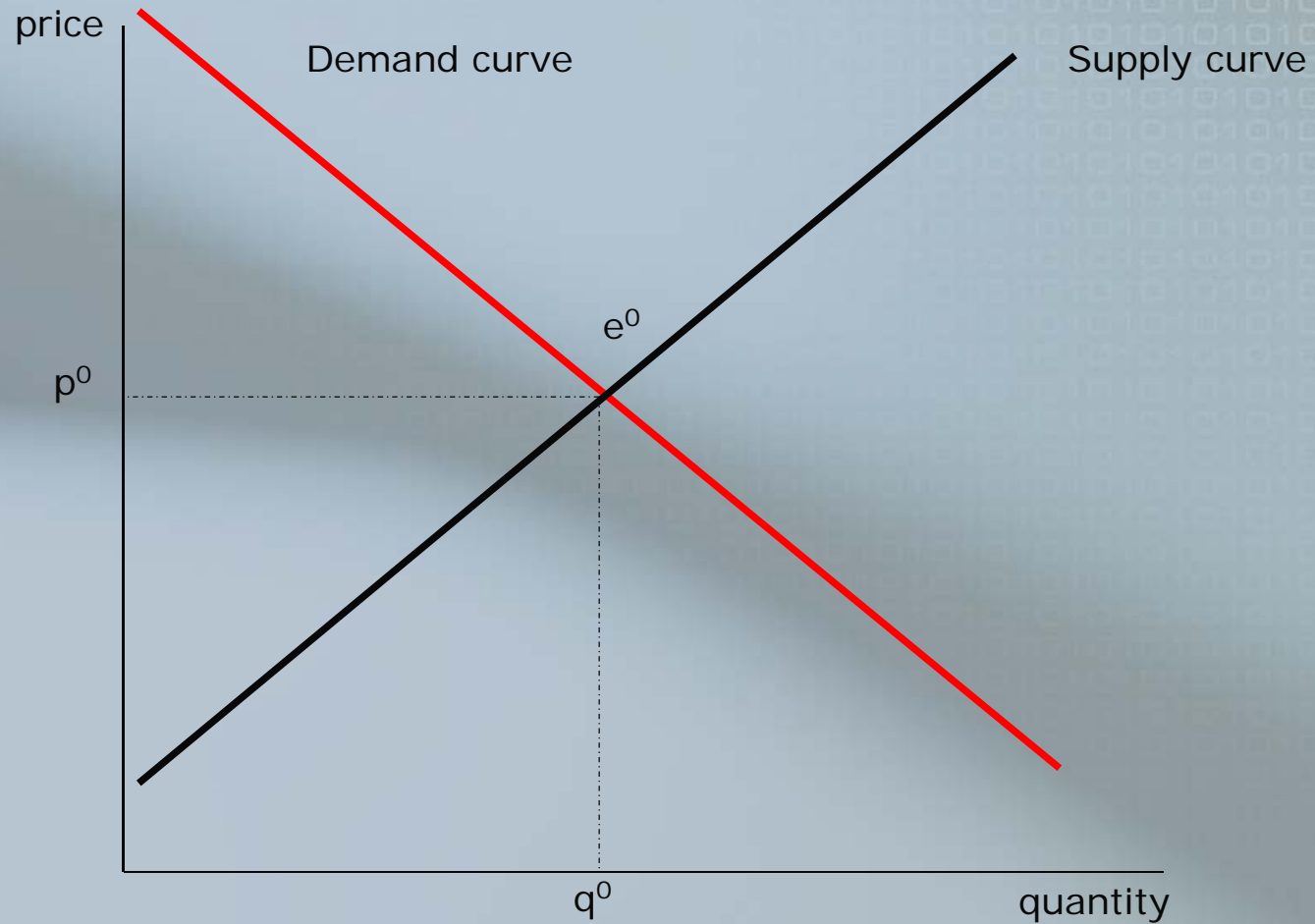
- Term 'price controls' refers to the imposition of a price floor, i.e. minimum price, or a price ceiling, i.e. maximum price.
- Recent example in Australia minimum wages in the labour market.
- What is the effect of such a policy?

Price Controls

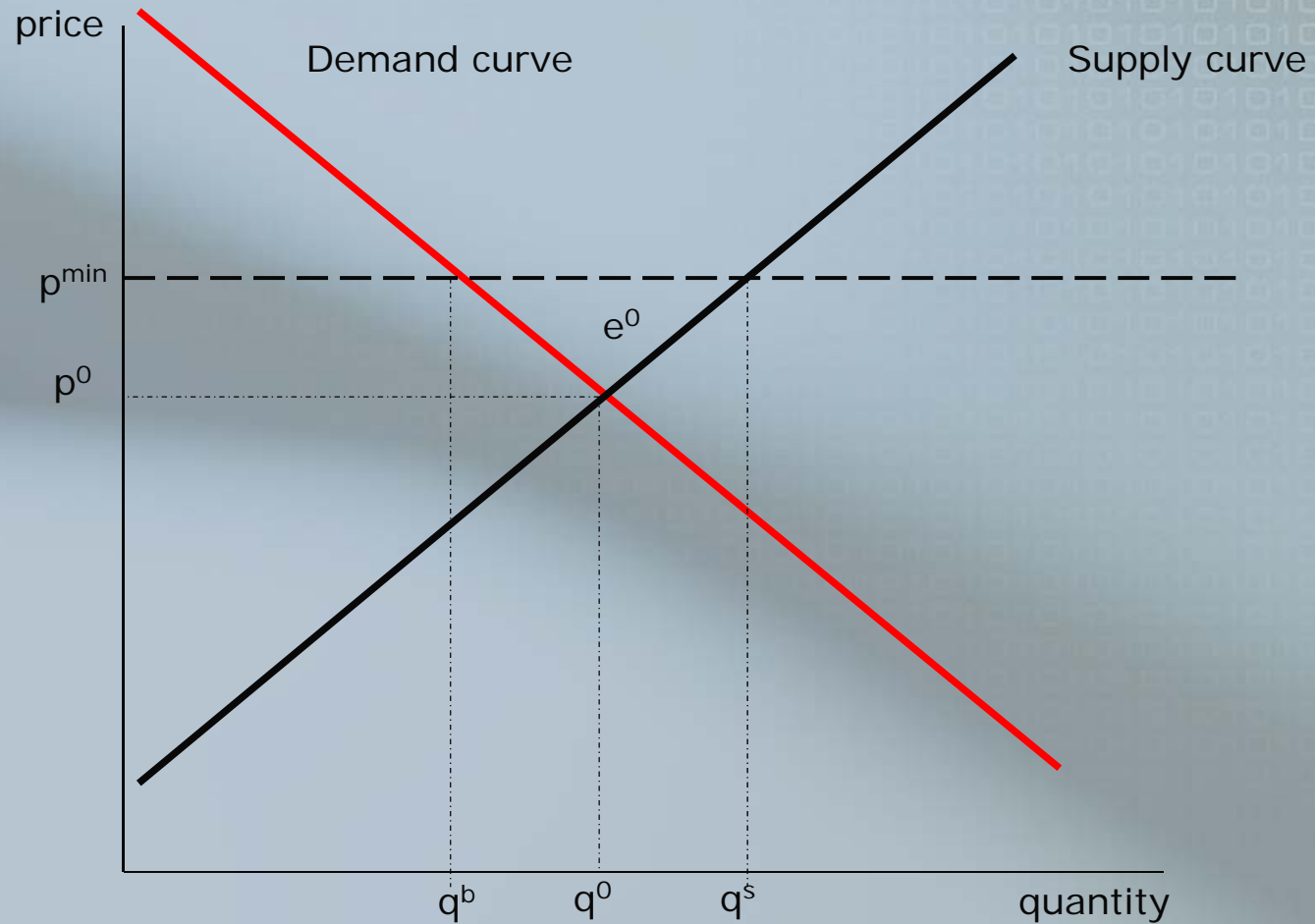
- We saw that competitive markets maximize efficiency by exhausting all *gains from trade*.
- A price floor (like a price ceiling) will prohibit some of the trades and thus lower efficiency.



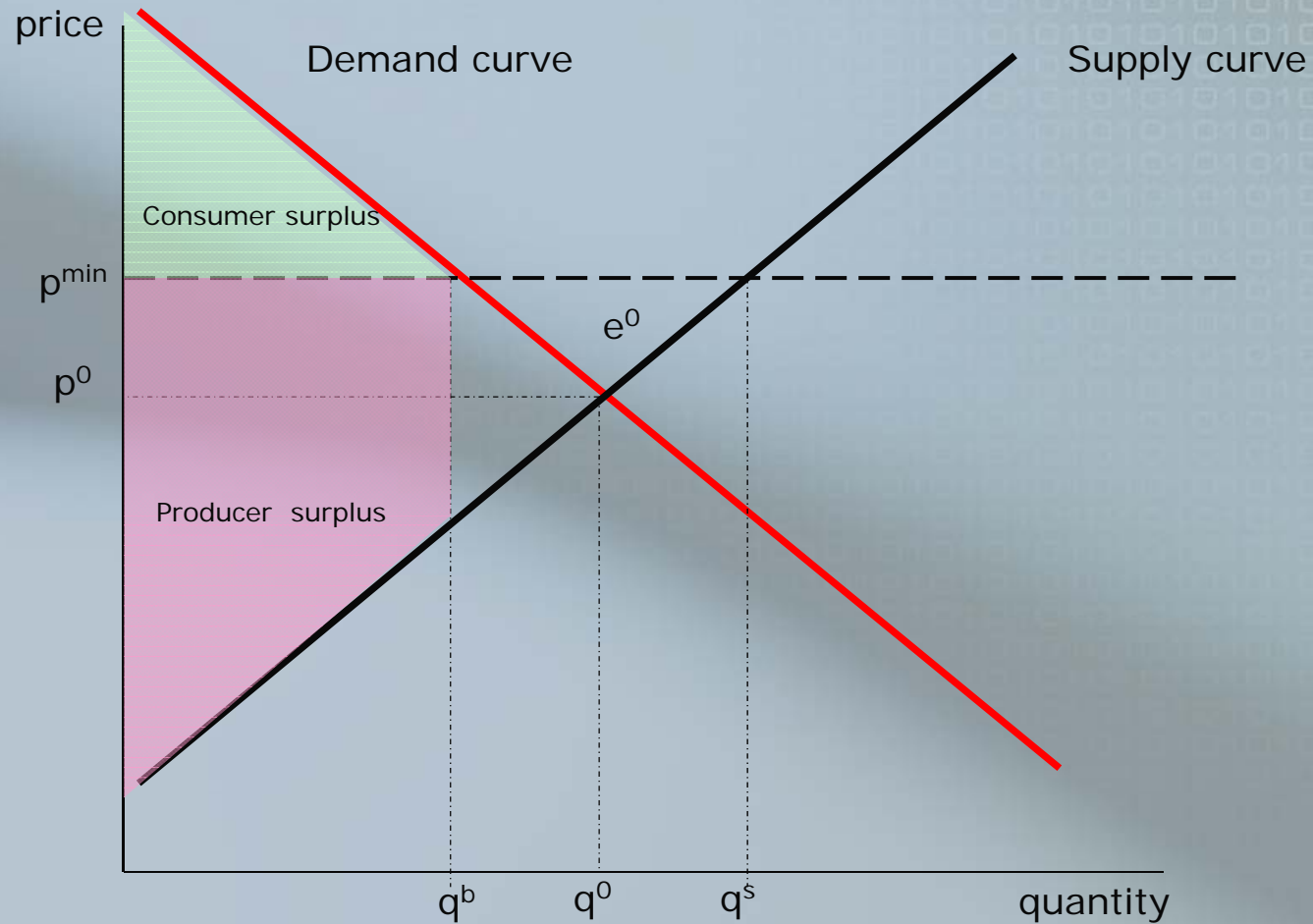
Price Controls



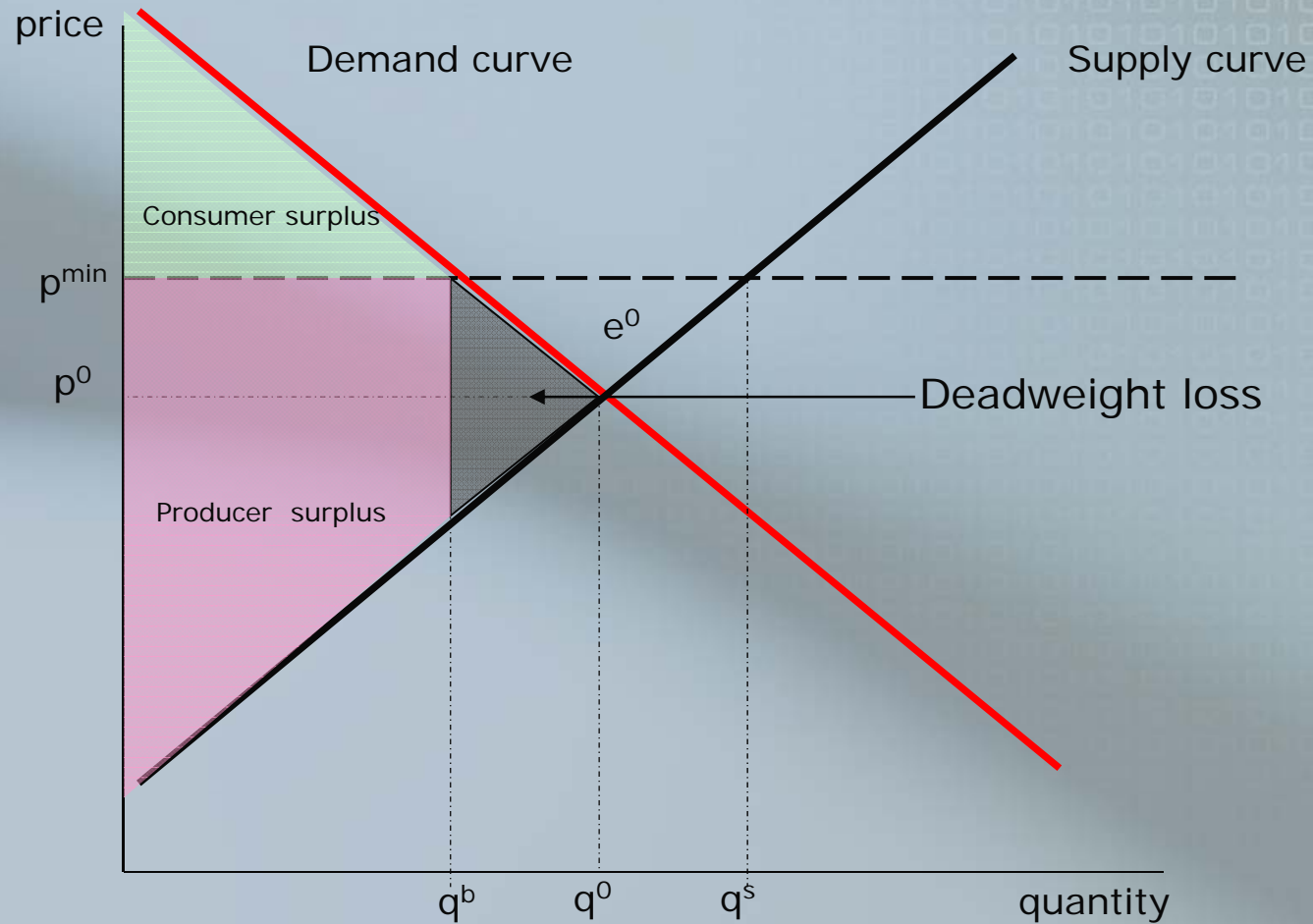
Price Controls



Price Controls

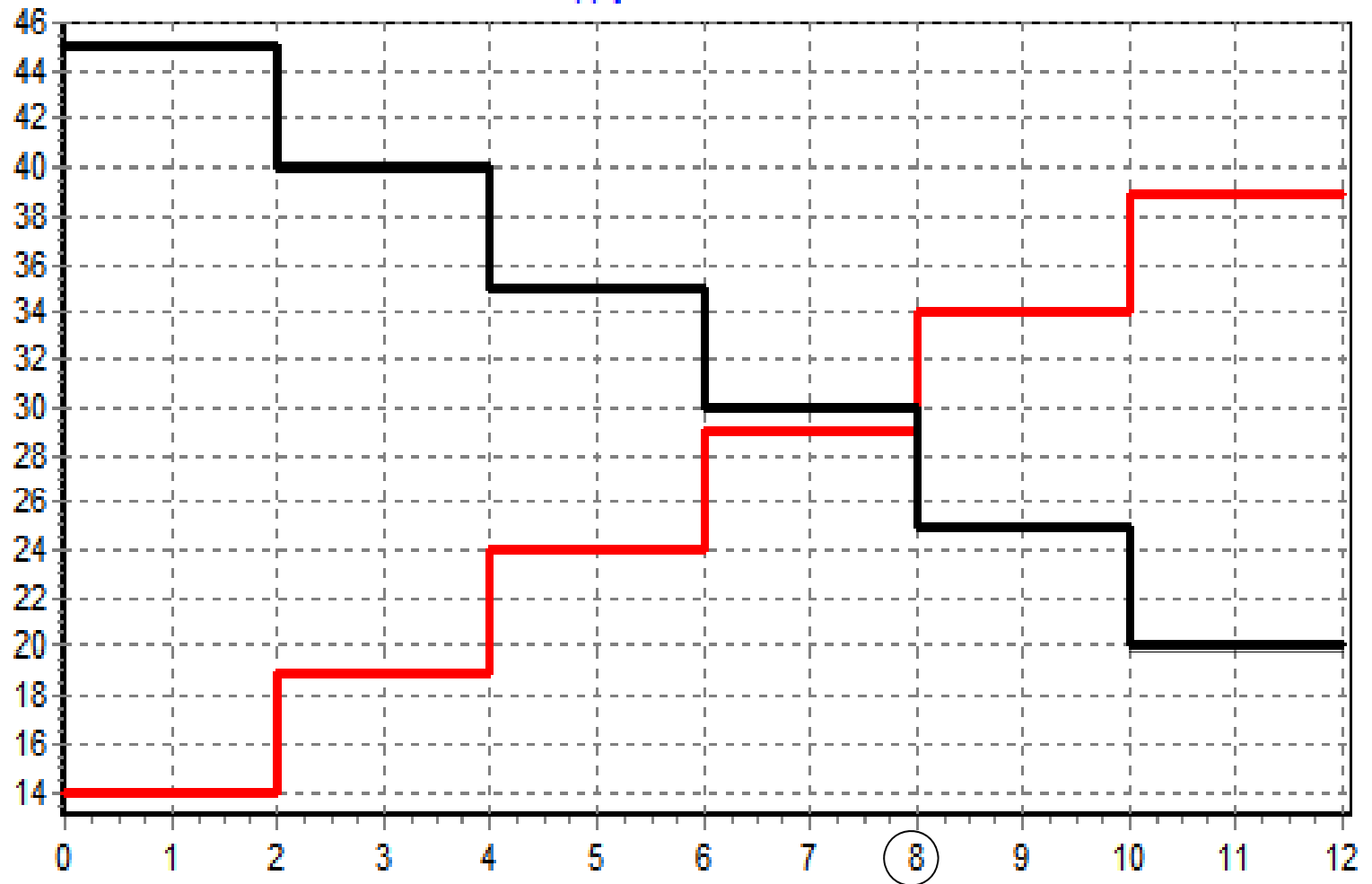


Price Controls



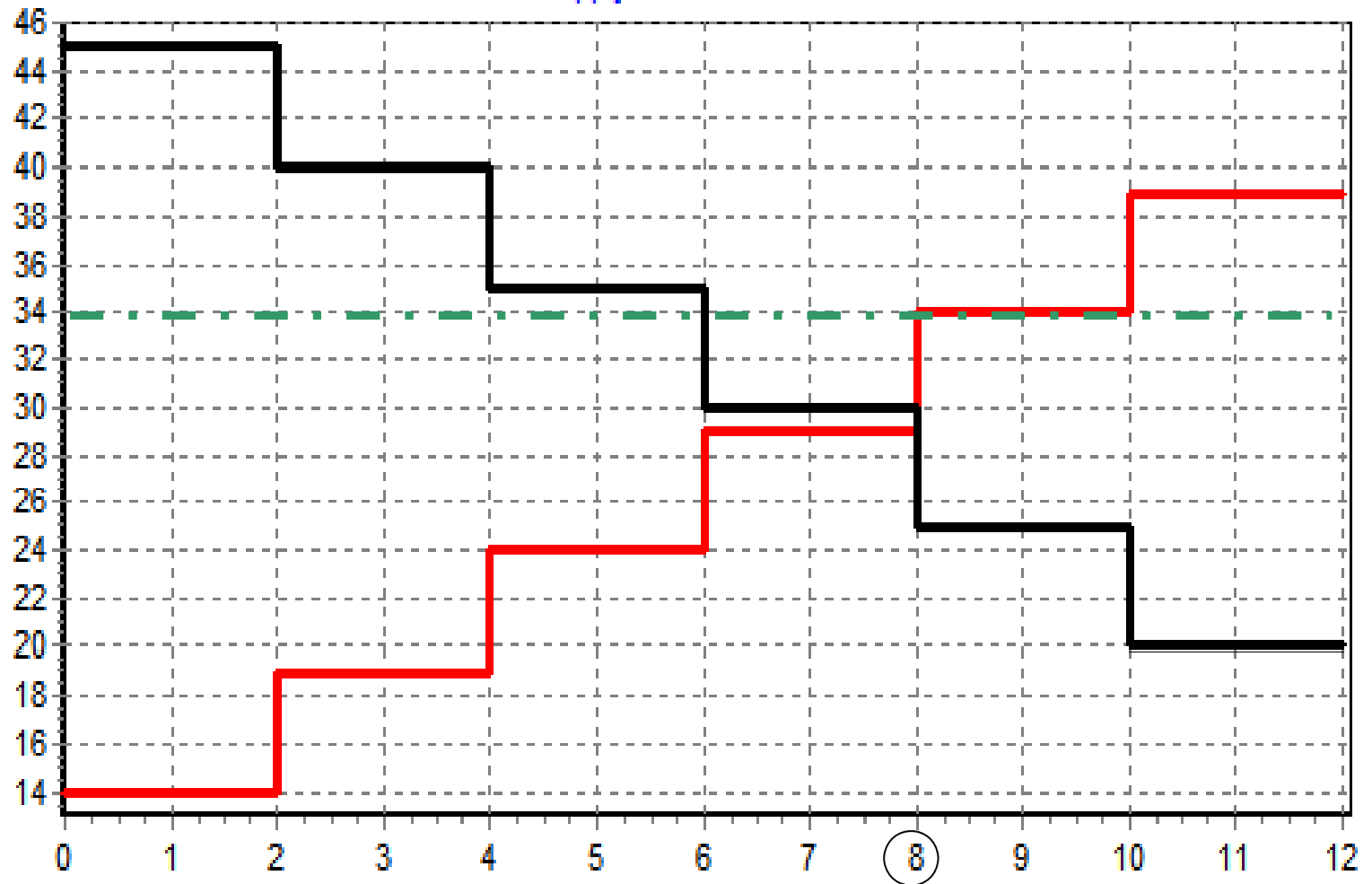
Experimental Results

"New" Supply and Demand Curves

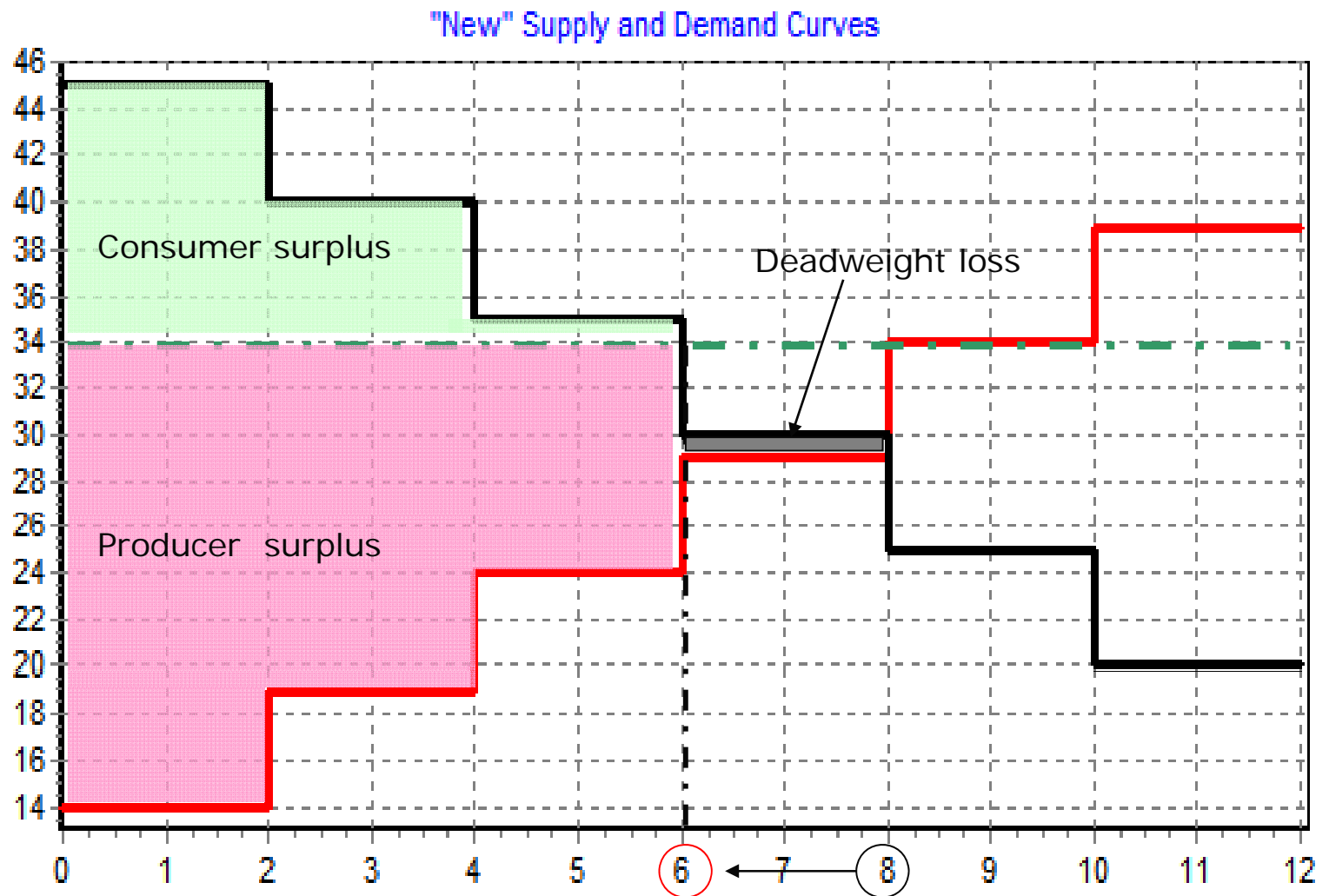


Experimental Results

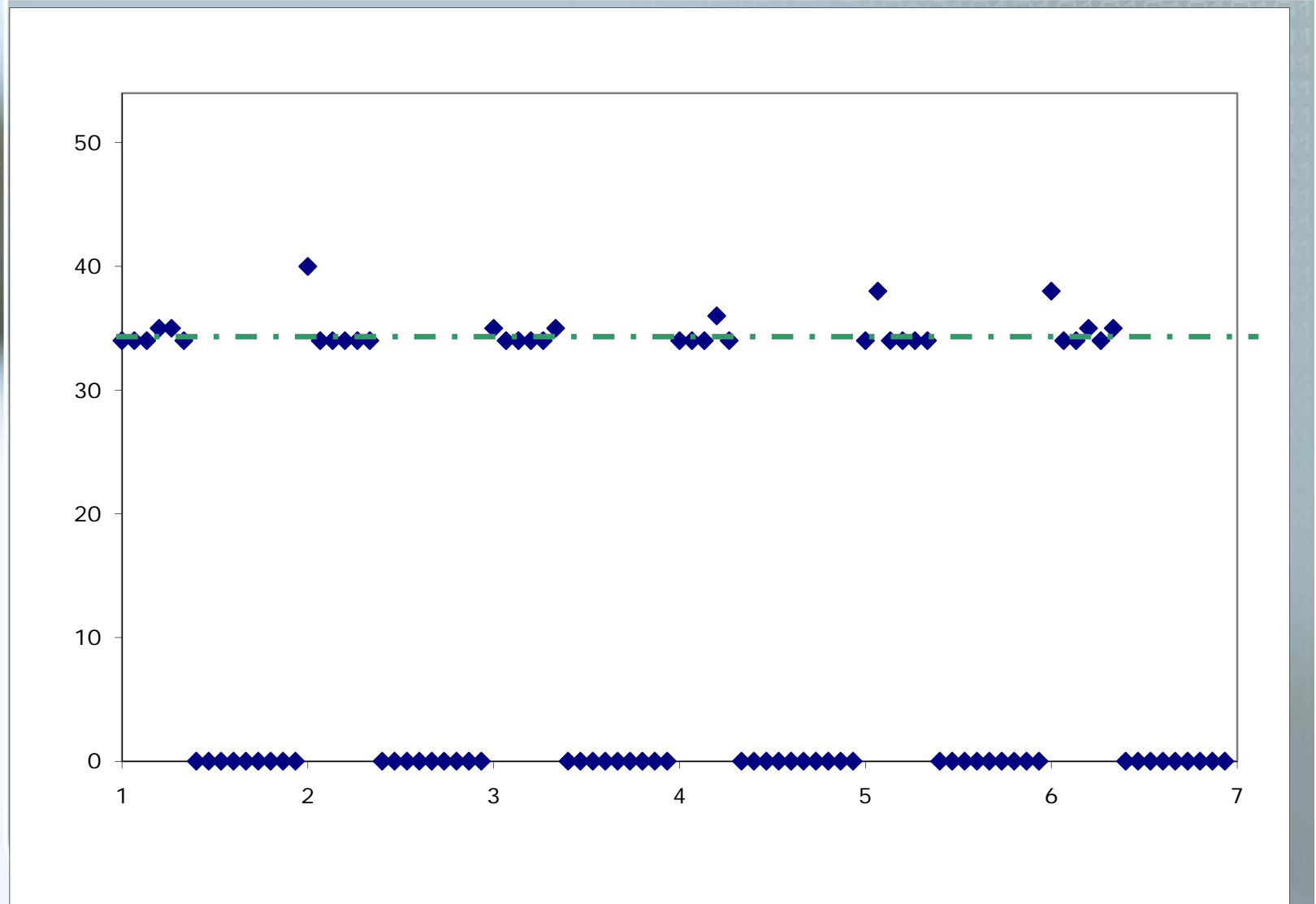
"New" Supply and Demand Curves



Experimental Results



Experimental Results



Experimental Results

Experiment 3

	1	2	3	4	5	6	All
aver. price	34.3	35.0	34.3	34.4	34.7	35.0	34.5
quantity	6.0	6.0	6.0	5.0	6.0	6.0	5.8
efficiency	59.4	71.1	82.8	78.1	94.5	55.5	73.6
convergence	4.9	5.9	4.9	5.0	5.4	5.7	5.2

- Prices and quantities traded are nicely predicted by theory.
- The introduction of a price floor of \$34 led to a substantial reduction in efficiency.
- The reduction was much higher than it could have been because some high cost sellers were able to trade.

Summary of what we learned

- Creation of markets can lead to gains from trade, lower prices, increases in efficiency.
- Markets can organize trade in an efficient way.
- Economic theory can help us predict market outcomes.
- Experiments can evaluate the effect of different institutions (i.e. details not captured by theory).

Summary of what we learned

- Competitive markets work under very “disadvantageous” conditions
 - Few buyers and sellers (theory assumes that many more would be required)
 - Minimal informational requirements (i.e. each person only needs to know his/her value/cost)
- Government interventions can lead to inefficiencies.

Further reading

Microeconomics:

Varian, Hal. (1999) Intermediate Microeconomics – A Modern Approach, Norton & Co, New York.

Experimental Economics & Institutions

Kagel, J. and Roth, A. (1995) The Handbook of Experimental Economics, Princeton Univ. Press, New Jersey.

Davis, D. and Holt, C. (1993) Experimental Economics, Princeton Univ. Press, New Jersey.

Holt, Charles (1995) Industrial Organization: A Survey of Laboratory Research, in The Handbook of Experimental Economics, Princeton Univ. Press, New Jersey. (available on-line)

Further reading

- Falk, A., Fehr, E., Zehnder, C. (2006) Fairness Perceptions and Reservations Wages - The Behavioral Impact of Minimum Wage Laws, forthcoming in *Quarterly Journal of Economics*.
- Isaac, M., Plott, C. (1981) Price Controls and the Behavior of Auction Markets, *American Economic Review*, 71, 448-459.
- Stiglitz, Joseph. (2000) Economics of the public sector, Norton & Co.