

Toskar

- 1990 Clean Air Act,
- 1) Title IV goal to reduce SO_2 annual emissions to half the 1980 level by 2000.
 - 2) Starting in 1995, a list of electricity generators would need a permit (a "pollution allowance") for each ton of SO_2 emitted.
 - 3) Allowances are issued by the EPA to the polluters, every year, and they have a "vintage." Vintage = first year it can be used. Don't expire. Can be freely traded.
 - 4) Allocation of 1995 vintage allowances made sometime between 1990 and 1992. Each generator seems to have been given allowances = 1990 emissions (approx.). Over time, total allowances ratcheted down.

2.8% of each year's allowance held back for EPA's March auction. Companies get the revenue.

Also, anyone with an allowance they want to sell can put it into the auction, but they will be sold after the ones the EPA held back to sell.

First auction 1993, for 1995 vintage.

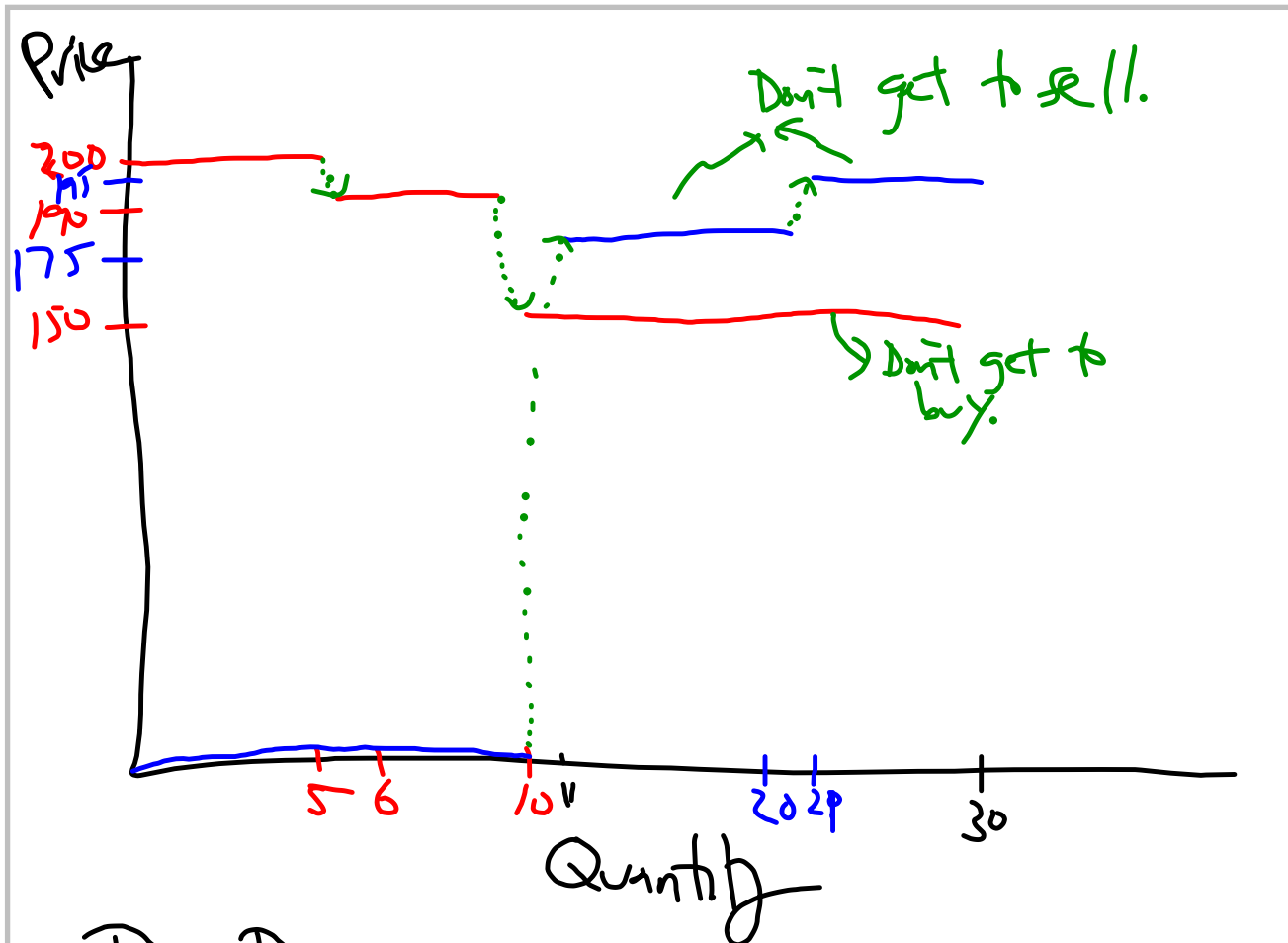
In later years, ran "spot" auction and "7 year advance" auction.

5) By mid 1994, an efficient market for bilateral trades had developed, and the EPA auction was a very small part of transactions for permits.

1) Figure 1, prices in bilateral trades.

2) Table 1, quantities sold at auction vs. in bilateral trades.

3) Workings of the EPA auction: over time, D curve gets very flat, S curve very steep. People know ahead of time (roughly) what the permits are worth.



In this picture, the EPA sells all 10, some at 200 and some at 190.

Externality creates a problem
in estimating the "impact"
of de-worming intervention.

	Time 1	Time 2
Treatment	750 ill	250 ill
Control	750 ill	600 ill

Suppose 1000 people in each group.

If no externality, do the following:

Reduction of $750 - 250 = 500$ ill
because of treatment and other factors

Reduction of $750 - 600 = 150$ ill
because of other factors.

⇒ Treatment itself causes a reduction
of $500 - 150 = 350$

With an externality, the "control"
Isn't really a control, it also benefits
from the treatment. Some of its
reduction of 150 is also due
to the treatment. Underestimating
the benefit of the treatment.

75 primary schools.

Created 3 groups of 25
at random.

1998: Group 1 treated,
Groups 2-3 untreated.

1999: Groups 1 & 2 treated,
Group 3 untreated.

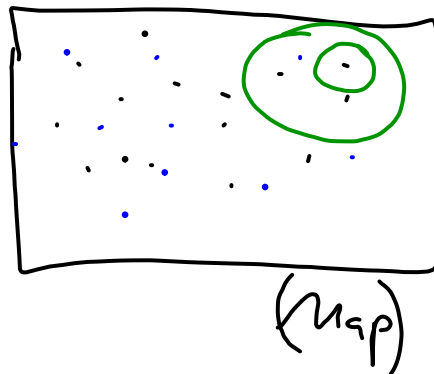
Equation (1) is the key equation.

$$Y_{ijt} = \alpha + \beta_1 \cdot T_{1it} + \beta_2 \cdot T_{2it}$$

Outcome measure for kid (j) in school (i)
at time (t) .

$$+ \dots + \sum_i (Y_{it} \cdot N_{dit})$$

externality



- treatment
- control.