LECTURE 8: TOPICS IN CAP-AND-TRADE

Lecture 8

14.42/14.420

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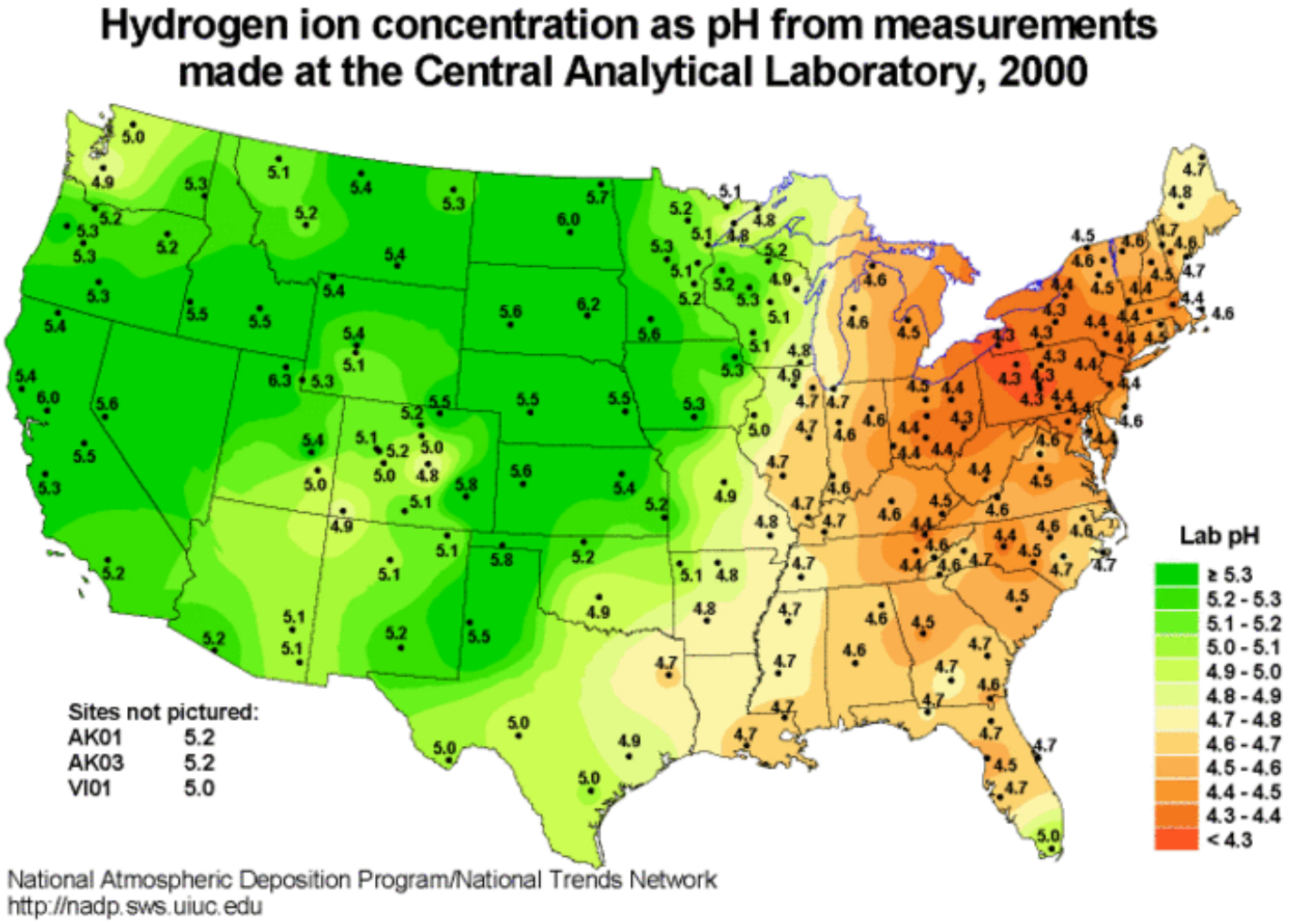
Topics in Cap-and-Trade

- Spatial and temporal differentiation
- Leakage
- Stock vs. flow pollutants
- Dynamic updating allocations
- Hybrid price and quantity: Escape valves

- Other things to mention:
  - Market Power
  - The business importance of certainty (compare to taxes)

Spatial Differentiation: Rain pH in 2000



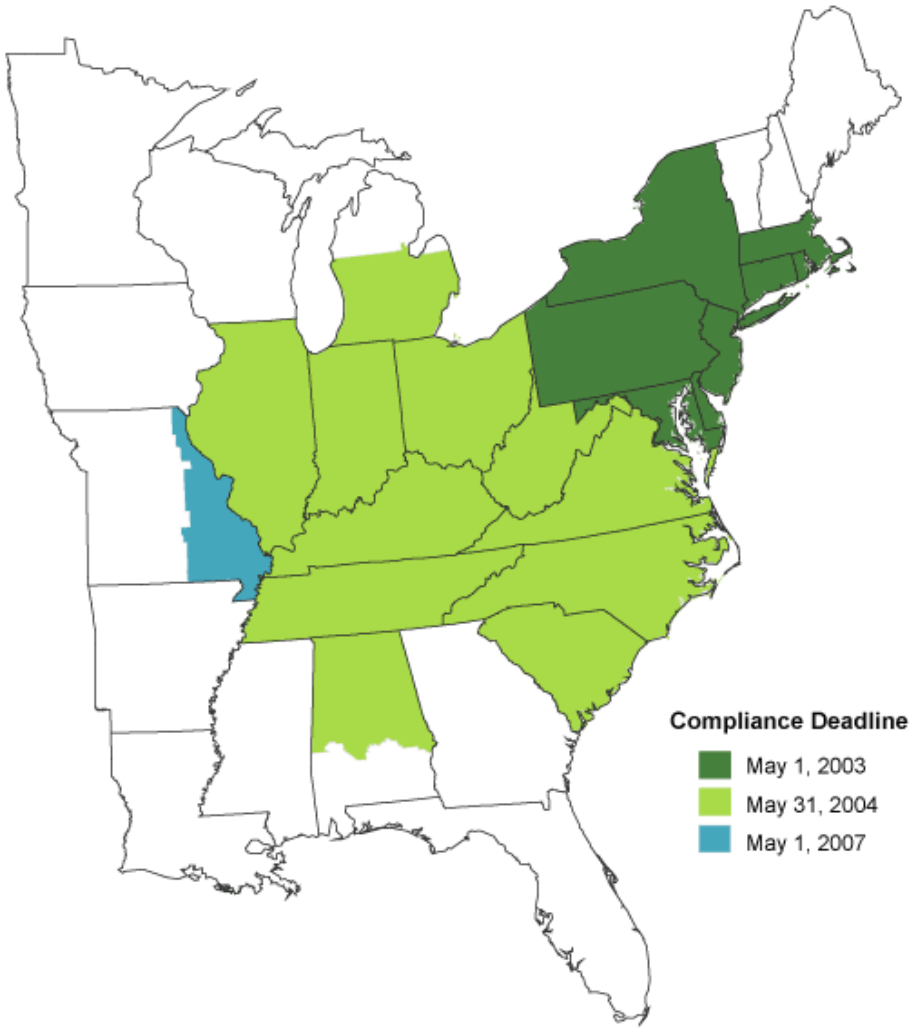
Leakage

- Leakage is when an emissions control program confined to one area causes an increase in emissions outside that area.

- Examples:
  - California Pavley Bill and nationwide CAFE Standards
  - NOx SIP Call
  - Greenhouse gas cap-and-trade programs

- Are these all a problem?

NOx SIP Call States



Dynamic Updating

- Problem in allowance allocations: Some firms grow or shrink over the years of an emissions trading program. Is it “fair” to base allocations on
  - E.g. Kyoto Protocol bases allocations on year 1990 emissions!
- Common proposal: Dynamic updating: base allocations in year t on emissions in a recent year, say t-1.

- Question: Is this a good idea? Why/why not?

Dynamic Updating: Setup

- Two period game.
- Pollution cap-and-trade program with total emissions E_T allowed per period
- Equilibrium allowance prices = τ_1,τ_2
- No banking/borrowing, assume no time discounting
- N homogeneous firms
- Period 2:
  - $\pi_j=\pi_0+\alpha E_{j2}-\beta E_{j2}^2/2+\tau_2\cdot(A_2(E_1)-E_2)$
    - A=Allocations
    - E=Emissions
    - α,β=Parameters of marginal cost of abatement function
- Overall Profits:
  - $\pi_j=\pi_0+\alpha E_{j1}-\beta E_{j1}^2/2+\tau_1\cdot(A_1-E_1)+ \tau_2\cdot A_2(E_1)+\{\text{Other second period stuff}\}$

Dynamic Updating: Takeaways

- Dynamic updating raises the allowance price in the first period but does not distort emission abatement.
- Higher allowance prices do, however, distort input prices and thus product market prices
- And when firms can borrow allowances from the second period, there will be over-emission.

- Potential exam question: “Show the conditions under which dynamic updating of allowance allocations leads to inefficiency.”

Hybrid Prices and Quantities

- Safety valves and price floors are commonly discussed to reduce volatility in allowance markets.
- E.g. Bingaman-Specter (2007) “Low Carbon Economy Act” had a safety valve of $12/ton CO2 for 2012, rising to $30/ton in 2030.
- Waxman-Markey had something similar.
- Does this improve efficiency?

Other Topics

- Market Power
  - What happens if there is a firm with market power in the allowance market?
  - Is this a worry in the Acid Rain Program?
- Business importance of certainty
  - Uncertain allowance prices make it very difficult for firms to make investment decisions
  - This may cause them to delay investments (hysteresis/option value).
  - If risk averse, allowance price risk affects their investments as well
  - A carbon tax eliminates this price risk
  - This does not solve regulatory uncertainty

Takeaways for Today

- When do we prefer cap-and-trade vs. taxes vs. Command and Control?

14.42 / 14.420 Environmental Policy and Economics

Spring 2011