NUTRIENT MARKETS RELATED TO AGRICULTURE AND WATER POLICY

Marc Ribaudo
Economic Research Service – USDA

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NRCS CEAP evaluation

• Assessment of conservation practice adoption indicates most cropland in need of additional treatment, particularly for nutrients loss
  – 86 % of cropland - Upper Mississippi River Basin
  – 87 % of cropland - Chesapeake Bay watershed
  – 82 % of cropland - Great Lakes watershed
  – 83 % of cropland - Ohio-Tennessee River Basin
Decision to adopt nutrient management practices

• Benefits
  – Reduce “excess” fertilizer use, thus saving money (private benefit)
  – Improve environmental quality (public benefit)

• Costs
  – More intensive management needs
  – Reduced cropland (more vegetative buffers)
  – Increased risk of insufficient nutrients

• Without government intervention perceived costs of nutrient management generally outweigh the private benefits
Policy approaches

• Technical assistance
• Financial assistance
• Regulation
• Taxes
• Emission markets
Economic questions

• How should resources be allocated to pollution abatement across sectors, locations, and time to achieve water quality goals at least cost?
• How do different policy instruments compare in their capacity to achieve water quality goals at least cost?
• How should goals be set to optimally balance economic benefits and costs?
Policy Design 101: Instrument choice

- **Perfect information**
  - Effluent taxes, effluent standards, and permit trading can all be designed to achieve the least cost solution

- **Imperfect information (asymmetric info.)**
  - *Effluent standards* will not satisfy efficiency rule (will not equalize marginal abatement costs)
  - *Effluent taxes* can satisfy efficiency rule but may miss the target (+/-)
  - Competitive *cap-and-trade* permit markets can satisfy the rule and achieve the target - why economists like cap-and-trade permit markets
Emissions trading

• Market organized around the government creation of a “good” called a discharge allowance
  – Time-limited permission to discharge a fixed quantity of pollutant
• Discharge allowance has characteristics of a private good
• Quantity of allowances equal to the cap allocated to regulated dischargers
• Allowances held by firms adjusted up or down through trades. Competitive trading will eliminate possible gains from trade, equalizing marginal abatement costs
Water quality trading

• Policy option that allows regulated firms to purchase discharge offsets from unregulated, low-cost abaters, such as agriculture
• Agriculture produces credits by implementing management practices such as nutrient management, manure management, conservation tillage, and riparian buffers to reduce nitrogen losses
How markets are expected to work

• Regulated point source seeks to purchase credits from low-cost nonpoint sources to meet permit without installing expensive technology
• Farmers are enticed by offers for abatement that are higher than their actual abatement costs
• Buyers and sellers “find” each other and complete a contract for a trade that benefits both parties
• Credits are certain and verifiable
Seems simple, but history raises questions

- Very few trades between agriculture and point sources have occurred to date in existing programs (4 programs out of 15)
- Various impediments to trade have limited market activity
Issues with demand

• Uncertain ability of nonpoint sources to deliver credits (practice effectiveness and weather)
• Legal liability for failure of agriculture to deliver expected credits
• Trading ratios to account for distance and uncertainty
• Locating potential suppliers (transaction costs)
Issues with supply

• Agriculture not regulated; little incentive to seek trades that may require increased scrutiny
• Uncertainty makes it difficult for farmers to estimate potential benefits
• Perceived risk by farmers of future regulations by entering trades (and admitting they are polluting)
• Baseline rules
• Time lags
• Administrative requirements
Baseline rules to ensure additionality can restrict supply
Time lags in delivery can be significant and vary across the landscape.

Source: Ken Staver, presentation to Chesapeake Bay Scientific and Technical Advisory Committee, September 14, 2011.
Allocation of abatement among sources over time
Markets with lags

• Forward markets essential to achieve efficient temporal allocation of abatement
  – Unlagged sources must know future credit prices to make efficient current decisions
• Spatial and temporal heterogeneity makes for very complex markets
  – Design problems for policy makers
  – Participation problems for market participants
Reducing impediments and carrying out market functions entails transaction costs

- Calculating appropriate trading ratios and time lags
- Research to reduce practice uncertainty
- Providing models for calculating credits
- Providing market structure to reduce cost of finding trading partners (i.e. clearinghouse)
- Monitoring water quality
- Validating credits
- Monitoring trades
- Enforcing contracts
Summary

• Current trading markets for nitrogen reductions from agriculture are driven by regulation
• Supply and demand issues have limited the number of trades in these markets
• Steps to address market impediments and to ensure market function increase market complexity and transaction costs