Lecture: "Participation in the Carbon Market"

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Carbon Market Design:
Issues and Opportunities
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Summary

- Fixing quantities rather than prices requires embracing speculation.
  - Need short-selling, derivatives, hedge funds.
  - Integration of energy markets with investment banking.
- “Customs union” approach to pollution more effective than cap-and-trade.
  - Easier to focus on raising tax revenue.
- Manipulation and risk management issues important.
- Systemic risk issues are magnified with cap-and-trade.

Fluctuating Quantities or Volatile Prices?

- Laws of supply and demand continue to operate with emissions trading.
- Taxes on carbon allow quantities of carbon emissions to vary
  - Quantity variation makes prices less volatile.
- Fixed supplies of carbon permits force quantitative emissions targets to be hit.
  - This makes prices more volatile.
- Therefore, fixed supplies of permits in cap-and-trade system are likely to increase energy price volatility relative to regime of fixed tax rates on emissions.
- Regional cap-and-trade systems, by fixing quantities, “export” price volatility to others.
  - Makes speculation, short-selling, derivatives trading more important elsewhere.
  - Creates incentives for arbitrage across jurisdictions.

Which is Optimal: Taxes or Permits?

- Taxes (Pigovian) are optimal when the government can measure the marginal cost of emissions accurately.
  - But cannot accurately forecast the level of demand
  - Makes it easier for government to capture all of tax revenue
- Fixed permit supply is optimal when the government can measure accurately the appropriate level of emissions.
  - But cannot measure the marginal cost of emissions.
  - Also makes it easier for special interests to divert tax revenue into free allocations.
- Theoretical optimal policy may involve taxes which go up when consumption goes up.

Carbon taxes are probably more optimal than carbon permits

- Public policy can more easily measure marginal costs than optimal quantities.
- Governments need tax revenue.
- Avoids “export” of price volatility to others.
- Avoids arbitrage across jurisdictions.
- Avoids tendency of permit price volatility to explode near end of life of contracts.

Betting on Future Tax Rates

- Also theoretically possible to bet of future tax rates.
- Puzzle in the public finance literature that betting on public policy does not take place.
- Probably result of little hedging demand by dealers.
  - Same reason other derivatives markets do not have active trading, such as housing prices.
- But with taxes changing substantially every year, hedgers of long-lived projects would want to hedge tax rate risk.

Why Policy Focus on Quantities?

- Probably the result of Kyoto process.
- Kyoto process mandated quantity targets, not tax targets.
- Focus on quantities not optimal, since international coordination should equate prices across countries.

Customs Union Instead of Cap-and-Trade

- Customs Union logical due to "optimal tariff" arguments, free-rider problem, in addition to pollution arguments based on global warming.
  - Optimal tariff arguments more widely acceptable than climate change arguments.
  - Optimal tariff more relevant for oil than coal.

- The US: low energy taxes for historical political reasons.
- The West (EU, AU, CA, Japan): Cooperate to reduce emissions.
- Emerging Markets (China and India): Reluctant participants, less so now?
- Oil Producers (Mid-East, Russia, Nigeria, Brazil?): Will not cooperate.
- Poor countries: Will not participate.

How Customs Union Might Work

- The West requires participants to tax carbon at high rates (EU levels).
- Other countries have choice:
  - Tax carbon at high rates.
  - Pay tariffs designed to cover same costs.
- This would force US, China and India to join system:
  - No arguments over quantities, since similar tax rates would allow quantities to adjust.
- Oil producers have no incentive to join
- Poor countries might get exemption, implying subsidy

If Cap-and-Trade Implemented ….

- Electricity producers might choose to keep extra permits in inventory until near expiration.
- Arbitragers might build power plants and hedge with long-term input contracts, long-term output contracts, carbon permits, debt and equity financing.
  - These participants need investment banks, with credit arrangements important.
- Need speculators, short sellers, hedge funds to help create accurate prices.
- More efficient outcomes if markets for permits and related assets are transparent.

Embracing Cap-and-Trade Requires Embracing …

- Derivatives: Carbon permits are like derivatives
- Speculation: Needed for more accurate prices
  - May reduce volatility but perhaps not.
- Short-selling: Needed for speculators to make prices more informative, especially if producers have a long bias.
- Leverage: Intrinsic to arbitrage
  - Long power plant, purchase contract, permits, short sales contracts, cash.
- Hedge funds: Probably an appropriate structure for speculation

Carbon Permits are Like Derivatives

- Book-entry contract.
- Arbitrage relationships price permits relative to other input and output prices.
- Permits typically have option-like features.
  - Timing, supply, and expiration features make the options complicated and difficult to price.
  - Does anybody attending this conference know how to price the optionality inherent in permit trading?
- Net supply of permits adds up to zero, if initial allocation is that government owns all permits at initial date (100% of permits auctioned).

Why Speculators Needed

- Producers might tend to hold long positions due to aversion to being caught short.
  - Tends to put upward pressure on prices until close to expiration, when sell-off occurs.
- If one producer distorts prices, need other market participants to lessen distortions.
- Producers not in best position to forecast future demand.
  - Need investment banks, hedge funds, other speculators to bring such information into market.
  - Inaccurate prices probably imply slight lower price volatility in early life on contracts, very high volatility at end of life.
    - Holbrook Working paper on onion futures
    - Theory suggests speculation likely to increase volatility early in life of contract, reduce volatility overall.

Is Excluding “Speculators” Feasible?

- Decision to use permits is made endogenously.
  - A speculator may buy a power plant in order to be recognized as a non-speculator.
- A user of permits may make speculative bets …
  - Based on distorted forecasts for demand.

- Distinction between “hedgers” and “speculators” difficult to enforce.

Why Short-Selling Needed

- If producers hold “extra” permits, speculators need to hold net short positions to prevent price collapse near end of life of contract.
- Market makers typically hold intra-day short positions.
- Some arbitrage strategies will involve short positions.
  - In particular, permit arbitrage across different jurisdictions where permits are substitutable.
  - Also inter-temporal arbitrage between different permit delivery dates.

Role of Futures Markets

- Futures markets designed for active trading, not holding positions for long times.
- Long-term position-holding likely to involve banks.
  - Credit arrangements, capital requirements, risk management important
- Banks will want to keep trades and positions non-transparent.
  - Surveillance requires collection of data on prices for energy, permits, OTC contracts, OTC derivatives, credit arrangements.

Possibilities for Manipulation

- Cash Settlement:
  - Creates need for hedging which regulators believe looks like manipulation (incorrectly)
  - Creates opportunities for passive manipulation, which regulators do not observe easily.
- Corners and Squeezes:
  - If permits become cheap, would it be legitimate for a wealthy non-profit to purchase permits and not use them?
    - This is equivalent to standard corner in which buyer with long position holds assets off market, seeking a higher price
    - Since demand becomes inelastic near expiration, more scope for corners and squeezes near expiration of permit cycles.
- Political pressures to expand supplies of permits.
  - Especially if failing power companies with short positions threaten systemic risks.

Risk Management and Accounting Issues

- Utilities which supply electricity face difficult accounting issues when:
  - Consumers prices are regulated.
    - Efforts to insulate consumers from markets defeat purpose of markets but also make risk management and accounting issues bigger.
  - Producer prices are not supposed to be regulated.
  - Long term contracts exist for inputs and outputs.
  - Permits are traded and have value.
- Sound risk management will be difficult given accounting difficulties.
  - Likely to be accounting and risk management scandals.

Systemic Risk

- If permit trading integrated with banking, potential for systemic effects if bank fails when deals go bad.
- Potential systemic effects from failure of large power company.
- Problem exacerbated if banks or power companies fail when an energy crisis is hitting at the same time.
- Conclusion:
  - Energy markets pose substantial systemic risks.
  - Carbon trading probably increases these risks.
  - Insulating consumers form price shocks increases systemic risks even more.

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- Manipulation and risk management issues important.
- Systemic risk issues are large, even larger with cap-and-trade.