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Better-informed policymaking through a deeper understanding of economics.

Summary: Designing Successful Carbon Markets

Seminar by Professor Arthur van Benthem

There are a lot of developments happening right now in carbon markets in different parts of the world—from New Zealand to Canada and many points in between. As policymakers continue to explore cap-and-trade in the United States, there is much to learn about what does and doesn't work from these carbon markets already in place.

WHY PUT A PRICE ON CARBON?

In economic terms, carbon is an externality of production that levels certain costs to society at large, with regard to health care, the effects of climate change, etcetera. If no one directly pays for the cost of carbon emissions, companies will continue to produce emissions at an unchecked rate, resulting in ongoing negative effects. This is economically inefficient, meaning the gains to the polluting firms wind up being lower than the resulting cost to society as a whole. In order to correct for this market inefficiency, economists generally propose a price on carbon emissions. But how to do that is the sticky question.

SMART CARBON MARKET POLICY DESIGN

There are many different methods for reducing carbon emissions, some less expensive than others. Smart policy design would start with the more affordable abatement options before moving to the expensive ones. This sounds straightforward, but it actually isn't how many governments behave. Instead, governments often try to pick what they think is a winning strategy (for instance, fostering investment in afforestation or solar photovoltaics) and then create incentives to help that cherry-picked option succeed. Cap-and-trade automatically targets the cheaper options and leaves aside the more expensive abatement alternatives.

HOW DOES CAP-AND-TRADE WORK?

In theory, cap-and-trade is fairly simple. A government or regulator sets a limit (i.e., cap) on total emissions that an economy can produce. Allowances of equal value to the cap are distributed among the various firms within the economy. Firms need to make sure that for every ton of CO2 emissions they emit, they have the exact same amount of allowances. Firms can buy and sell allowances directly with each other (i.e., trade). At the end of the year, the total tons of emissions produced should equal the total number of allowances. Cap-and-trade is very cost-effective because it lets the firms themselves sort out who can reduce emissions most cheaply.

But there is a big gap between theory and practice, as the history of the European Union's Emissions Trading Scheme (ETS) makes clear.

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FIVE LESSONS FROM EUROPE

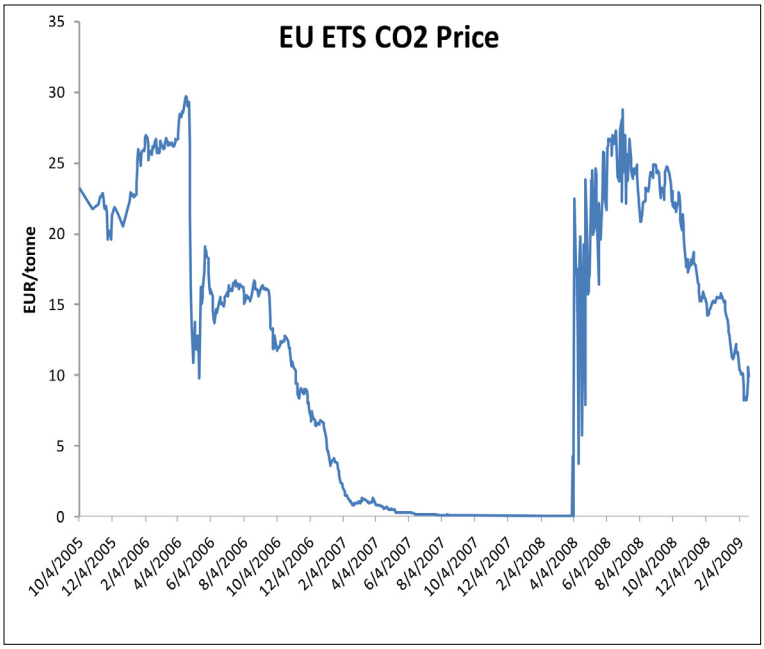
Lesson 1: Keep it simple—focus on the large polluters.

The European Union's Emissions Trading Scheme is currently the largest carbon trading system in the world. Established in 2005, the ETS was a response to the Kyoto Protocol, when all the different European countries agreed to cut emissions. One rule that the EU got right was to keep it manageable and focus on heavy industry and power generation, as these include the relatively few firms that are responsible for a large percentage of emissions.

Lesson 2: Get the cap right—the cap determines everything and is the most important decision in a cap and trade system.

In 2005, the ETS emissions certificates were trading at an average of €25 per ton. While it is difficult to know exactly what the social cost of carbon emissions is, €25 is on the low end of the range but in the correct order of magnitude. But in a single week in 2006, the price on CO2 collapsed from €30 to €10 very quickly, and ultimately crashed to zero.

What precipitated this price collapse was that prior to 2005, the EU commission had to guess what CO2 emissions were across Europe. It turned out their guess was incorrect. In 2006, for the first time, third-party auditors measured the emissions of all the firms in the ETS and the emissions were much lower than the market expected. The price plummeted as the entire market realized it would be very easy to comply with the cap.



Lesson 3: Allow for banking—saving excess allowances for use in future compliance periods.

Banking, where firms can store certificates for future use, can help prevent the kind of price crash that occurred in the ETS. Firms will bank their allowances if they believe the price of abatement will increase in the future. Regulators are in favor of banking because firms decrease their emissions in the short-term, rather than use their allowances, and the allowance price remains consistent over time. While saving allowances is encouraged, borrowing on future certificates is very risky and is almost never allowed.

Lesson 4: Sell a large share of allowances at auction.

The EU had initially given away allowances for free, leading to windfall profits for firms that then traded on their certificates. While firms passed the CO2 price onto their customers, they never paid for their allowances, which led to excess profits. Instead, at least some portion of the allowances should be auctioned to the highest bidders via quarterly auctions. On average, firms lose and consumers gain from revenues generated by the auction, as well as from cleaner air. Who specifically benefits from the revenues will depend on how they are spent. Whether allowances are auctioned or given away for free does not matter for total emissions—the cap is fixed. It only matters for how the costs and benefits of the program are split between consumers and firms.

Lesson 5: A cap and trade system needs an auction price floor as well as a price cap.

Even after lowering the cap, allowing for banking, and giving away fewer allowances for free, among other reforms, the ETS carbon market still was not functioning well. Prices were still low, in the €5 per ton range—too low to spur any clean tech innovation. So the EU ultimately added a system that acts similar to a price floor. With a price floor, allowances are sold at auction and cannot be sold below a given minimum price. At the end of the auction, if some allowances remain unsold, they are destroyed, in effect reducing the cap. Removing allowances from the system ensures the price will never go below whatever floor you want to have. On the other hand, it is important that prices don't go too high either. A carbon market must not be overly aggressive if it wants to stay politically stable.

After fifteen years of trial and error, the ETS system has returned to an average price of €25 per ton of CO2 and the EU has a cap-and-trade system that works reasonably well.

CONCLUSION

Policymakers looking to expand and improve the carbon trading systems that exist in the U.S. should heed the lessons of the ETS example. But even if a carbon market is well designed, garnering public support often comes down to the question of how revenues from the market should be distributed. There is, however, no model for revenue distribution that is ideal in all circumstances. For instance, Washington state introduced a carbon tax ballot initiative in 2016 that centered on a "revenue-neutral" carbon tax, but the lack of "clear winners" contributed to its defeat by a margin of 59-41. A revised attempt in 2018 pitched it as a "cap-and-invest" initiative that would spur clean-tech investment, but it too failed, though by a smaller margin. In the meantime, Canada has authorized a national carbon tax that functions as a "cap-and-dividend" scheme, where the revenues get rebated to consumers—a model similar to that used in the 2019 Energy Innovation and Carbon Dividend Act, currently before Congress. What revenue arrangements will be politically palatable in the U.S., whether nationally, regionally, or locally, remains unclear.