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Lessons Learned from Cap-and-Trade Experience

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Key Points

- Well-designed cap-and-trade systems have proven to be environmentally effective and cost-effective.
- Successful cap-and-trade systems have had accurate emissions monitoring, significant violation penalties, and high compliance.
- Banking excess emissions reductions has been an important source of cost savings, and price collars can reduce price volatility.
- The use of "complementary policies," such as subsidies for renewables that aim to reduce GHG emissions, will generally raise the total cost of emissions reductions, reduce innovation incentives, and yield no net environmental gain.

Basic Lessons

Section 6 of the Paris Agreement provides for cooperation among Parties to meet their collective greenhouse gas (GHG) emissions reduction targets, including through linkage. The simplest way for this to occur is by linking cap-and-trade systems, although linkage of heterogeneous policies, including carbon taxes and performance standards, is also possible in principle.. Well-designed linkages between well-designed national (or sub-national) cap-and-trade systems can lower global mitigation costs and improve the functioning of national markets.

In order to provide information to policy-makers about the key attributes of well-designed cap-and-trade systems, we reviewed the available evidence on seven important cap-and-trade systems that aimed at pollution reduction.

Perhaps the most significant lesson from three decades of experience with cap-and trade systems is that cap-and-trade has proven to be environmentally effective and cost-effective in a variety of

settings. The more abatement costs vary among covered entities, the greater the superiority of these systems over traditional command-and-control regulation.

A second key lesson is that all successful cap-and-trade systems have had accurate monitoring of emissions and non-trivial penalties for violations. The result has been high levels of compliance. Because implementation of cap-and-trade systems generally involves little administrative discretion, there are fewer opportunities to evade compliance by challenging administrative decisions than under traditional command-and-control regulation.

Design Elements

Well-designed cap-and-trade systems contain a number of features aimed at reducing unnecessary price volatility. It is important that final rules be in place before the first compliance period. Otherwise, initial allowance price movements may largely reflect changing expectations regarding those rules and thus serve no useful purpose.

In several systems, the ability to bank allowances for later use has been an important source of cost savings. While there are obvious problems with allowing borrowing of allowances (which accordingly has never been done), the ability to bank provides a margin of intertemporal flexibility with positive economic and environmental consequences.

Changes in economic conditions can render caps non-binding (reducing incentives to invest in innovation) or drive prices to intolerable levels (risking political backlash). These problems can be mitigated by adding price floors and ceilings (that is, a price collar). The result is a hybrid, combining features of cap-and-trade and carbon tax systems. (A carbon tax is equivalent to a cap-and-trade system in which the ceiling and floor are equal.)

To implement a price floor, a central authority buys and retires allowances if the price falls below the floor. A ceiling is usually implemented by having a central authority issue incremental allowances if the price rises above the ceiling. These elements, especially a price ceiling, which eliminates a hard cap on emissions, may complicate linking cap-and-trade systems under Article 6.

Allowance Allocation

Free allocation of allowances can be used to build political support, generally without compromising the cost-effectiveness of the resulting system. Total social cost could be reduced, however, if allowances were auctioned and the proceeds used to reduce distortionary taxes. In practice, there is generally strong political pressure to earmark auction revenues to fund specific government programs, usually "green" programs, though sometimes these revenues are used for deficit reduction. (Revenue from carbon taxes has been much less likely to be earmarked for "green" spending.)

Leakage and Competitiveness

In the absence of a global cap-and-trade regime with equal allowance prices everywhere, producers of GHG-intensive products in high-allowance-price areas will become less competitive, and production and emissions will tend to shift from those areas. The importance of these competitiveness and leakage effects will vary among industries and with each system's geographic coverage. Competitiveness impacts can be mitigated by providing extra allowances to vulnerable firms based on past production. In contrast, unconditional grants of allowances do not affect competitiveness, because they do not affect marginal cost.

Interactions with Other Policies

Because of other market failures that affect GHG emissions, there can be a case for supplementing cap-and-trade with policies aimed at those failures – for instance, government investment in climate-related R&D. But there is apparent political appeal of "belt-and-suspenders" regimes that involve so-called "complementary policies" that target GHG emissions that are under the cap. Examples include the low-carbon fuel standard in California and subsidies for renewables in the EU.

Policies of this sort can have significant adverse economic and environmental effects. When they subsidize or require relatively expensive mitigation options (e.g., residential-scale solar generation), they raise total mitigation costs. Unless a price floor or ceiling is binding, those higher costs produce no environmental benefit. Moreover, by depressing the allowance price, they reduce incentives to invest in innovation that could lower future mitigation costs and

thereby make aggressive mitigation programs more attractive. Depressed allowance prices may have political appeal, but they are generally not in society's economic or environmental interest.

A Caution

The design of future cap-and-trade systems can benefit from three decades of experience with such systems in the U.S. and Europe. Most covered entities in those systems have been private firms, however, and it is not clear how cost-effective cap-and-trade would be when many are state enterprises, as, for example, in China. In general, the design of cap-and-trade systems needs to take careful account of the economic, political, and administrative environments in which they will operate.

Reference

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