Regulating a Global Carbon Market

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Abstract

This purpose of this paper is to characterize the major challenges facing a regulatory process for a global carbon market and point out the tradeoffs that policymakers face in addressing these challenges. This is accomplished by first outlining the three basic roles of a regulatory process. The next section summarizes how the unique features of a global carbon market complicate the design and operation of the regulatory process. The fourth section highlights the tradeoffs policymakers face in addressing these challenges.

1. Introduction

The global market for carbon allowances was approximately $136 billion for 2009.[1] This market is forecast to be $2 trillion annually by 2020, if the United States and other industrialized countries participate.[2] Even small inefficiencies in the operation of a market this large can lead to substantial deadweight losses and income transfers, which emphasizes the need for effective regulatory oversight of the global carbon market. A comprehensive regulatory process that responds quickly to flaws in the market rules or detrimental market participant behavior will limit the potential deadweight losses and income transfers associated with these market inefficiencies.

Several features of the global market for carbon emissions allowances make effective regulation extremely challenging, and all of them can be traced to the need for an international regulatory oversight. First, the product sold is created by the governments participating in the global carbon market and each government has direct control over the quality of the product that it sells. In addition, each government has an incentive to degrade the quality of this product by under-estimating the amount of carbon emissions produced by domestic firms in order to protect these industries. This makes the compliance problem particularly challenging for a global regulator. Second, the regulatory process must oversee a market that covers virtually all of the countries in the industrialized world without the benefit of the formal legal foundation of any of those governments. For this reason, the regulator is likely to find it more difficult to compel individual market participants to take actions that are not in their financial interest, particularly if these actions are not in the interest of the domestic government where that market participant is located. Finally, industrialized countries differ substantially in terms of their approach to competition policy issues. Most industrialized countries have implemented formal competition authorities during the past twenty years and there are still significant differences across countries in how these authorities deal with issues crucial to regulating an international carbon market such as the excessive exercise of unilateral market power, abuse of market dominance, and market manipulation. These differences in perspective are likely to make it very difficult for an international carbon market regulator to achieve a consensus view on these important

[1] Chestney, Nina, "Hopes for $2 trillion global carbon market fade, Reuters, March 3, 2010.
[2] Ibid.

competition policy issues and which makes it difficult for the regulator to make a positive finding and implement penalties or sanctions for behavior that significantly degrades market efficiency.

This purpose of this paper is to characterize the major challenges facing a regulatory process for a global carbon market and point out the tradeoffs that policymakers face in addressing these challenges. This is accomplished by first outlining the three basic roles of a regulatory process for a global carbon market. The next section summarizes how the unique features of a global carbon market mentioned above complicate the design and operation of the regulatory process. The fourth section highlights the tradeoffs policymakers face in addressing these challenges.

2. Roles of Regulatory Process

There are three basic roles of a regulatory process: (1) disseminating information about market outcomes and market performance to existing and prospective market participants, (2) ensuring compliance with market rules, and (3) protecting against market participant behavior that significantly degrades market efficiency. Successfully fulfilling each role requires much greater regulatory authority and sophistication on the part of the regulator than the previous one. This logic implies that the appropriate regulatory framework is crucially dependent on the initial conditions in the industry and enabling legal framework. This section describes the minimal requirements for each aspect of the regulatory process.

2.1. Information Collection and Dissemination

A minimal requirement of any regulatory process is to provide "smart sunshine" regulation. To do this, the regulator must have access to all information needed to operate the market and be able to perform analyses of this data and release the results to the public. At the most basic level, the regulator should be able to replicate all allowance transactions, market participant-level carbon emissions, and the emissions compliance decisions of all market participants. This implies that each market participant and each emissions permit has a unique identifier so that the buyer, seller and specific allowances transacted can be recorded each time an emissions allowance changes ownership. With continuously updated information on actual emissions and the specific allowances used to offset those emissions, at each point in time the

regulator will know which market participant owns each allowance and whether that allowance has been used to offset emissions and is therefore retired. With this information, the regulator can also compute each market participant's retired and unused allowance holdings at any point in time.

Although it would be desirable to collect information on allowance transactions prices, this information is unlikely to be available for all transactions because participants are not required to trade allowances in a centralized market that sets a single market-clearing price. Allowances could transact through barter arrangements between market participants where no explicit exchange of funds occurs between two or more parties. If market participants were required to report transactions prices for cash-traded allowances only and not for allowances transacted through barter arrangements, this could drive more transactions to barter arrangements, particularly when market participants would prefer not to reveal to the regulator the price at which a transaction occurred. For this reason, it may make more sense for the regulator to collect transaction price information from formal exchanges that set verifiable prices for transactions and explicitly recognize the limitations of this price information in any subsequent analysis.

There are a number of ways for the regulator to increase the "smart sunshine" value of the data it collects. First, it can use the data to perform analyses of market performance that are subsequently released to the public. For example, price-taking behavior by a participant in an allowance permit market would cause it to purchase allowances if its marginal cost of reducing carbon emissions is greater than the price of an allowance and sell allowances if its marginal cost of reducing emissions is less than price of an allowance. Because the regulator will know the identity of each party to an emissions transaction, the regulator can estimate the marginal cost of each participant reducing its emissions and compare that magnitude to the price of an allowance. This information can then be used to determine the extent to which each market participant behaves in a manner consistent with price-taking behavior.

The regulator can also compute an estimate of the competitive benchmark price for allowances under the price-taking assumption for all market participants. This price can be compared to actual prices to construct a measure of overall market performance. In an emissions allowance market with price-taking market participants, the price of an allowance is computed by stacking compliance costs from the highest to lowest, with the length of each step equal to the

that participant's quantity of carbon emissions. This is the market demand curve for emissions allowances. The competitive benchmark price is equal to the marginal cost of compliance at the level of emissions equal to the global cap.

Clearly, it would be a momentous task to compute a precise estimate of this competitive benchmark price. A piece of information that would allow the regulator to compute a rough, but useful, estimate of this magnitude is the technology that each market participant uses to produce carbon emissions. This information could be used to compute estimates of the marginal cost of compliance for each market participant. The regulator could coordinate with each country-specific carbon market regulator to obtain this information. For many industries, this information is already available to the country-specific regulator. For example, wholesale electricity regulators typically compile generation unit-level heat rate information on each of the units owned by each market participant.

The regulator should have the ability to request information from market participants on a confidential bias to perform more detailed analyses that may necessary for market rule enforcement actions that require more accurate or detailed data. This can be accomplished through provisions in the agreement that each market participant must sign to be able to take part in the global carbon market. The regulator should be subject to an economic cost-benefit test on these data requests. Specifically, it must be able to demonstrate with a reasonable degree of certainty that the expected benefit to the entire market from obtaining this data exceeds the cost it imposes on the market participant providing it. For example, as part of the regulatory process to investigate activities that degrade market efficiency, participants could be required to provide information about forward contracts and derivatives positions they have in the carbon allowance market. To enforce this data acquisition authority, the regulator also needs the ability to penalize market participants for failing to provide the requested data in the time requested. This penalty provision should be written into the agreement that each market participant must sign in order to take part in the global carbon market.

There is likely to be considerable debate among stakeholders and industrialized countries about how much data to release and how soon it should be released. A standard argument is that releasing data to the public will enhance the ability of market participants to exercise unilateral market power or take other actions which substantially reduce market efficiency. A counter-argument is that keeping data confidential or masking the identity of market participants severely

limits the disciplining value of public data release on the behavior of these entities. Under a system of masked data release, market participants can always deny that their transactions are the ones exhibiting the unusual behavior.

The primary value of public data release is that it puts all market participants at risk to explain their behavior to the public. A similar debate exists over how long the regulator should wait before releasing the data to the public. A long time lag between the date the data is produced and the date it is released to the public may increase the ability of market participants to coordinate their actions, but it also virtually eliminates much of the enormous potential "smart sunshine regulation" benefit of public data release.

A second potential benefit associated with public data release is that it enables third parties to undertake independent analyses of market performance. This is another aspect of smart sunshine regulation, because third parties may notice specific market performance problems before the regulator does. This use of the data argues against masking the identity of market participants. Assuming that the concerns with public data release enhancing the ability of market participants to coordinate actions had been addressed, it is difficult to determine what market efficiency-enhancing benefit results from masking the identity market participants.

An important aspect of the public data release question is the distinction between data that the regulator can request and receive from market participants and data that must be released to the public. There is a natural boundary between these two types of data. Any data that the carbon market operator requests from market participants or produces as a result of operating the trading system should be released to the public. Information about market a participant that is unnecessary to operate the trading system should not be released to the public. A prime example of information that does not need to be released to the public is the forward contract and derivative market position of a market participant. Although the forward market position of supplier can impact its short-term market behavior, knowledge of this type of information is not needed by the trading system to monitor allowance holdings, trading, and compliance between actual emissions and permit holdings.

2.2. Ensuring Compliance with Market Rules

The second role of a regulatory process is ensuring compliance with the market rules. This is typically enforced by the regulator having the ability to assess penalties and sanctions for

verifiable market rule violations. Both the costs of operating the market and the costs of participating in the market will be lower if all market participants are confident that the market rules will be obeyed and contractual commitments honored regardless of market conditions. Consequently, there is a clear market efficiency-enhancing benefit to reducing the costs of contract enforcement and the likelihood of market rule violations through a transparent penalty and sanctions process administered by the regulator.

There are four guidelines for determining penalties or sanctions for market rule violations. First, the basic penalty and sanction mechanism should focus on verifiable market rule violations. Determining a violation should involve minimal judgment on the part of the regulator. The basic penalties and sanctions process should not require a finding of intent in order to assess a penalty. Two examples of a market rule violations that could be covered by this provision are: (1) insufficient unretired allowances registered with the regulator relative to the total emissions a market participant has produced up to the compliance date, and (2) failure to submit complete information (buyer, seller and specific allowances transacted) about an allowance transaction within the required time interval following the actual exchange of allowances.

The second guideline is that the penalty associated with a market rule violation should be sufficiently high to make it unilaterally unprofitable for a market participant to violate the rule. Limiting the magnitude of the penalty to ordering the firm that violated the market rule to return the profits gained from their violation will not deter violations. Under this scheme, firms would have little to lose from violating rules because this may not be detected and, even if it is detected, they are not made any worse off than if they had followed the rules in the first place.

The third guideline is that the mechanisms for imposing penalties and sanctions should be set in advance and the relationship between a specific market rule violation and the size of the penalty assessed should be as transparent as possible. Making the relationship between a specific market rule violation and the penalties assessed as transparent as possible achieves two goals. First, it limits the opportunities for the regulator to exercise arbitrary discretion in setting penalties. Second, it allows market participants to formulate the best possible cost-benefit assessment associated with a specific market rule violation.

The fourth guideline is that the penalty associated with a market rule violation should not exceed the harm this market rule violation causes to all market participants. Excessive penalty

levels have a cost. They cause market participants to focus on avoiding being penalized for a market rule violation rather than on producing at least cost.

2.3. Protecting Against Harmful to Market Outcomes

The final role of an effective regulatory process deals with deterring behavior harmful to market efficiency. This is the most complex aspect of the regulatory oversight process to implement and involves a number of interrelated tasks. First, the regulator must determine when a market rule detracts from market efficiency and suggest and implement the necessary rule changes. Second, the regulator must also determine when behavior that may be unilateral profit-maximizing for one or more market participants causes enough harm to overall market efficiency to merit regulatory intervention. This task encompasses questions of market manipulation, abuse of market dominance, and excessive exercise of unilateral market power. Finally, the regulator must determine when significant enough harm occurs as a result of these actions to suspend market activities temporarily.

2.3.1. Formulate and Implement Efficiency-Enhancing Market Rule Changes

The regulator must determine which market rules detract from market efficiency and formulate and implement the appropriate market rule changes. The design of a carbon market is a process of continuous improvement, so the regulator must continually analyze and assess the market efficiency impacts of all market rules. Once it has identified a deficient market rule, the regulator must devise and implement the rule changes necessary to remedy this. This duty underscores the need for the regulator to have access to market data, the ability collect more data, and the expertise to analyze market performance using this data. This duty also underscores the importance of public data release so that market participants and third parties can perform their own analyses and provide input to the regulator on the appropriate market rule changes.

2.3.2. Protect Against Behavior Harmful to Market Efficiency

The regulator must protect market participants and downstream consumers of carbon intensive products against harmful market outcomes. Persistent behavior by a market participant that is harmful to market efficiency should therefore be subject to penalties and sanctions. However, in order to assess these penalties, the regulator must determine intent on the part of the market participant. This determination is essential to a finding of market manipulation or abuse of market dominance under existing competition policies of all industrialized countries. The

goal of this provision is to establish a process for the regulator to intervene to prevent a market meltdown, because conditions can arise when the unilateral expected-profit maximizing actions of certain market participants can result in enormous harm to downstream consumers. Kolstad and Wolak (2008) demonstrate how strategic behavior by participants in an emissions permit market can adversely impact prices in the downstream electricity market and result in significant wealth transfers from consumers to electricity producers in California. These sorts of wealth transfers can be prevented by a well-defined process for the regulator to intervene and penalize market participants for this sort of behavior.

2.3.3. Determine When Market Activities Can Be Temporarily Suspended

The regulator must have the ability to suspend market operations on a temporary basis when conditions warrant it. The suspension of market operations should only occur after a pre-specified administrative procedure have been followed and the only option available to the regulator to prevent significant harm to market efficiency is the suspension of market activities. A provision for suspending trading activities in the global carbon market may be necessary during conditions of extreme market uncertainty. Allowing enormous harm to be imposed on consumers or other market participants from further trading activity makes very little sense under these sorts of circumstances.

2.3.4. A Mechanism for Determining Intent to Harm Market Efficiency

The remainder of this section will describe a general mechanism for determining if a supplier engages in persistent behavior detrimental to market efficiency. The major difficulty associated with a prohibition on "behavior harmful to market efficiency" is that the regulator has to infer whether the market participant intended to harm market efficiency. It seems very unlikely that the regulator would have direct evidence of intent, particularly if there is a market rule that imposes significant penalties on the market participants that admit to engaging in this type of behavior.

A necessary first step in any process for determining intent is the ability to demand and receive information from market participants. This reinforces the need to pre-condition participation in the global carbon market on agreeing to provide, in a timely manner, all information necessary for the regulator to undertake an investigation of intent to impose significant harm to market efficiency. As discussed above, this agreement to provide information should be subject to the constraints that the information request is necessary to

undertake the current investigation and does not impose costs on the market participant that are out of line with the alleged harm that the market participant is imposing.

The regulator could implement the following multi-stage process for determining intent and imposing penalties commensurate with harm caused by these actions. It is counterproductive for the regulator to prohibit actions that are difficult to define and even more difficult to determine if they occur, such as gaming, market manipulation, or false scheduling. Prohibiting these ill-defined activities without first finding intent and significant harm will cause market participants to avoid behavior that often enhances market efficiency that might be interpreted by the regulator as a prohibited action.

The regulatory process for determining intent should recognize that it is extremely difficult to distinguish, without some exchange of information between market participants and the regulator, legitimate profit-maximizing behavior from actions that intend to harm competition and market efficiency. In addition, behavior that might be interpreted by some observers as gaming or market manipulation is often rendered unprofitable by the actions of other market participants. Consequently, these sorts of market efficiency problems can often be solved through public information provision, thereby eliminating the need for further action.

Thus, rather than prohibit a list of seemingly nefarious but nebulous actions, the regulator could instead adopt a general provision against behavior by any market participant that intentionally causes significant harm to market efficiency. A key feature of this market rule is a transparent process for identifying intentional behavior detrimental to system reliability or market efficiency. This could include a process for the regulator taking the actions necessary to stop this behavior or the harm that it causes. The focus of this process is on stopping as quickly as possible intentional behavior that the regulator determines causes significant harm to market efficiency.

The first step in this process is to identify behavior that is likely to harm to market efficiency and system reliability. Two findings are necessary for the process to continue to the next step. The regulator must first determine if this behavior is persistent and if it has the potential to impose significant harm. The next stage of the process involves alerting all market participants to the existence of this behavior and publicly disclosing the identity of the market participant engaging it. The goals of this stage of the process are to subject this market participant to public scrutiny and to provide all market participants with information that they

can use to take actions that attempt to render this behavior unprofitable. Public disclosure is key step in the process of determining intent because all market participants, including the market participant engaging in the behavior, know that the regulator has publicly stated that this behavior is harmful to market efficiency. Consequently, continued behavior by the market participant that imposes significant harm provides strong evidence in favor of a finding of intent.

In most cases, this stage of the process will put an end to the behavior or the harm it causes. However, in those instances when the actions are sufficiently profitable to the market participant or group of market participants that they continue to cause significant harm, the regulator should initiate a formal investigation of intent. To do this the regulator needs the ability to request and receive in a timely manner the information from the offending market participant necessary to make a credible determination of intent to impose harm. An important goal of this information gathering effort is for the market participant to provide information to the regulator showing that there is no direct causal link between its behavior and harm to market efficiency.

If the regulator's information gathering efforts reveal substantial evidence of a direct causal link between this market participant's behavior and the presumed harm, then the regulator will find that this market participant did intend to harm market efficiency. If there is an affirmative finding of intent, the regulator may need to collect additional information to determine the appropriate magnitude of penalties. The requirement to provide this information would be a contractual obligation between the regulator and each market participant that is a pre-condition for participation in the market. The regulator will therefore need the authority to impose penalties on this market participant for failure to comply with reasonable and necessary information requests in a timely manner.

As should be clear from the above discussion, the major focus of this process should be on eliminating the harmful behavior as soon as possible, not on assigning blame. Only when public disclosure of the actions and the regulator's own investigation fails to stop or eliminate the harm associated with a market participant's behavior does the regulator attempt to determine intent and assign penalties.

3. Challenges to Regulating a Global Carbon Market

Each role of the regulatory process described in the previous section is made considerably more complex by the fact that participants in a global carbon market are from all of the industrialized countries of the world. The governments of these countries have a strong incentive to protect their domestic firms from the costs of reducing carbon emissions. These governments are also likely to want to protect industries that are particularly important to the employment and economic growth goals of their countries. This is different from the case of a regulatory process that governs a single industry for that country, because this regulator is typically focused on protecting consumers from the profit-maximizing actions of firms.

The international regulator is likely to face opposition from both the market participant and its domestic government if it undertakes an enforcement action. Similar to other international regulatory authorities such as the World Trade Organization (WTO), because an international carbon market requires a formal agreement among all participating governments, the larger countries are likely to have a greater influence over the initial market design process and ongoing regulatory process. Any attempt to control global carbon emissions must include the largest countries (in terms of their total emissions), so the large emitters are likely to be able to make the global regulatory process favor their interests.

On the issue of information collection and release, market participants are likely to have a very effective ally in their domestic government when they attempt to evade the global regulator's desire to obtain the data necessary to do its job. One can easily imagine a domestic government arguing that releasing this data will raise competition policy or national security concerns in politically favored industries.

The regulator is likely to encounter similar resistance from the domestic government when it attempts to implement penalties or sanctions against a specific market participant or industry. Most country-level regulatory processes allow the regulated firms an opportunity to appeal penalties and sanctions set by the regulator though the courts. It is unclear precisely what the analogous process would be for penalties and sanctions implemented by the international carbon market regulator.

The greatest challenge faced by the global regulator will be in trying to bring an action against a specific market participant for engaging in behavior that degrades market efficiency. Besides the desire to favor its domestic firms over foreign firms, governments are likely to have

different views of what constitutes harmful behavior by a market participant because of differences in competition laws across governments. For example, the United States and the European Union have very different views of abuse of market dominance. The European Union competition policy sets a much higher standard of behavior for firms with dominant market positions than does the United States Department of Justice.

The above discussion implies that virtually all of the power of the global carbon market regulator to fulfill the three roles of the regulatory process will come from the country-specific carbon market regulators. These entities usually have the legal authority to request, receive and release data from domestic market participants and impose penalties and sanctions and undertake competition law violations against domestic market participants. Consequently, the effectiveness of the global carbon market regulatory process will depend on the effectiveness of the least effective country-specific carbon market regulator.

4. Tradeoffs in Addressing Challenges to Global Regulator

Because the global carbon market regulatory framework will be the result of a negotiated agreement between governments and will heavily rely on the cooperation of the country-specific regulatory processes to operate, virtually all aspects of the global regulatory process must be implemented with the initial inter-governmental agreement. Making changes in the regulatory framework will be extremely difficult because virtually any change will benefit some countries and harm others and this will create strong resistance to change. This logic implies that the designers of the global carbon market regulatory process face a tradeoff between locking-in a more effective, but less adaptive to changing market conditions, regulatory process or an initially less effective, but perhaps more flexible regulatory process.

One approach to dealing with this tradeoff is to focus the global regulatory process primarily on the "smart sunshine" component of the regulatory process and work to develop the other two roles of the regulatory process over time. The logic behind this strategy is that without the ability to gather data, request additional data, and the expertise to analyze this data and release the results to the public, it is not possible to carry out the other two roles of the regulatory process. By enacting strong data access and request policies at the beginning of the global carbon market, the regulator can begin the process of establishing regulatory credibility and begin to take on the other two roles of the regulatory process.

Because the regulator does not have the benefit of a strong legal framework for implementing its decisions, at least initially, the regulator will have to rely on the "court of public opinion" rather than a court of law to ensure its decisions are enacted. Specifically, the regulator will need to present data analysis and economic arguments in an accessible manner to convince the public at large that its recommendations should be implemented. Different from a country-specific regulator backed by a domestic court of law, a global carbon market regulator must have the support of enough member country governments to ensure that the ones that do not support the decision will continue to remain in the international carbon market agreement.

This logic implies that the global regulator faces the tradeoff between attempting to implement an ambitious set of decisions that may ultimately lead to conflicts or even withdrawal from the global carbon market by some countries or a less ambitious set of decisions that the regulator can be confident of implementing. Given the importance of precedent in virtually all country-level regulatory processes, a strategy that attempts to establish the credibility and expertise of the regulator in the public mind by successfully implementing less ambitious decisions initially seems superior. As regulator establishes greater credibility and expertise through successfully implemented decisions, it can take more ambitious goals with a greater likelihood of success.

This process emphasizes that the global regulatory process should focus on continuous improvement by focusing on prospectively identifying market design flaws or market participant behavior that significantly degrades market efficiency in advance before significant wealth transfers begin to occur. Once a small wealth transfer turns into a large wealth transfer it can become very difficult for the global regulator to implement the needed market rule change or threaten the penalties and sanctions necessary to stop a market participant or set of market participants from engaging in this behavior. Consequently, by focusing the data collection and analysis efforts on identifying and correcting small problems that may develop into larger ones, the global regulator can continue the process of building a reputation for prudent decisions that will be useful to have if unexpectedly large market efficiency problems ever arise.

4. Conclusions

An effective regulatory process for the global carbon market is a key ingredient to its ultimate success. Particularly, during the early stages of the market, the regulator will most

likely spend a significant fraction of its time trying to convince governments and country-level regulators that certain market participants in their countries may be taking actions contrary to the goals of carbon market. Consequently, it is essential that the global regulatory process start with access to the best available data and economic analysis. In addition, this analysis must also be effectively communicated to as wide an audience as possible because the global regulator will often have to make its case in the court of public opinion rather than in any formal court of law in order to build the necessary credibility to serve all of the roles of the global regulatory process.

References

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