

International Permit Trading: Creating a Sustainable System

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1. Introduction

A fundamental problem with the Kyoto Protocol is the focus on achieving rigid “targets and timetables” for emissions reductions at any cost, rather than substantial reductions in emissions at reasonable cost, in spite of the enormous uncertainties surrounding climate change. The move away from uniform targets for every country was forced at the Kyoto meeting in late 1997 because uniform targets were correctly seen to be very inefficient and politically infeasible. A crucial but mostly ignored issue is that any fixed targets, **even differentiated targets**, are likely to be inefficient because we really don’t know what these will cost over the long period of time being discussed¹. Now that fixed targets have been enshrined in the Kyoto Protocol, negotiators are moving towards implementation of this Protocol using economic instruments, such as international permit trading, to achieve these targets as lowest cost given the constraints of the agreement. The problem with this second best approach to climate change policy is that, apart from being second best from an efficiency point of view, it is also likely that the administrative cost of proceeding along the Kyoto Protocol route of centralized control of emissions, is likely to be high. A more important problem however, is that the incentives embodied in the Protocol are not consistent with the ultimate sustainability of the regime under all possible future scenarios for

¹See McKibbin and Wilcoxon (1997a) and Kopp et al (1997) for arguments about the difference between price and quantity caps under uncertainty.

the world economy.

In a series of papers (McKibbin and Wilcoxon (1997a,1997b)) we have pointed out that a global emission permit trading system with caps on the number of permits (i.e. an explicit and binding emission target) is a dangerous way to move forward because, under some scenarios for the future evolution of the global economy, the Protocol may be abandoned due to economic and political problems. In an attempt to overcome the potential flaws in this scheme we have proposed an alternative policy that would achieve real greenhouse gas reductions without the potentially disruptive political and economic problems of a global permit trading scheme that is built around fixed targets and timetable. Our proposal is an approach that Richard Cooper (1996) has called “agreed actions” rather than an agreed targets approach.

This paper first outlines how a global permit scheme would work in theory and identifies potential problems. An alternative system which could still be implemented consistently with the Kyoto Protocol (but importantly without the fixed emission targets) is then outlined. I should stress that the problems identified for a global permit trading scheme may or may not cripple the scheme in the near term or at all, but under some circumstances global permit trading schemes are vulnerable to collapse because of reasons outlined below. The economic crisis in Asia has clearly illustrated how poorly the future can be predicted with any certainty, even over relatively short time frames. In climate change research the horizon is many decades and the uncertainties compound quickly. The success of any international policy regime should not be contingent on a particular prediction of the future but should be robust to a range of possible outcomes. In fact you really want international agreements to hold together precisely in the cases of extreme pressure. Sustainability of an international agreement for environmental or any other policy, can

only be achieved when the agreement provides clear incentives for all participants to adhere to the policy goals under a wide range of possible future scenarios. The main glue that currently binds the Kyoto Protocol together is political will which is fragile at best.

2. How Do Permit Systems Work?

The basic idea behind a tradable permit system is simple: any firm emitting carbon dioxide (or the carbon dioxide equivalent for a broader range of gases) would be required to own permits equal to the amount of carbon it produces. For example, a firm emitting one hundred tons of carbon would have to own one hundred permits. The permits would be allocated among countries by treaty, and it would be up to each government to decide how to distribute its permits domestically. Once distributed, the permits could be bought and sold without restriction on a world market. It would be illegal to burn fossil fuels without having purchased a permit, and it would be up to each government to enforce the treaty within its own borders.

Permit systems have three key features as a method of pollution control. First, they provide a firm upper bound on emissions. This feature of permits makes them attractive to those who believe that decisive action needs to be taken on climate change.

Second, because the permits can be traded, pollution abatement will be done at the minimum possible cost to the economy. Firms that can clean up cheaply will end up doing the abatement: they will be able to make a profit by cutting their emissions and selling their extra permits. Firms that find it very expensive to reduce emissions will buy permits instead.

Third, permits will ensure that the marginal cost of reducing carbon emissions is the same in all countries that participate in the scheme.

Presumably if a global permit system was implemented following the Kyoto Protocol, countries would be allocated an initial stock of permits equal to their targets. For example Australia would get 108% of 1990 emissions whereas the United States would get 93% of 1990 emissions. These would be allocated within countries and then firms could trade with each other in a global market. Given that the marginal abatement costs are estimated to vary across countries (see ABARE(1997) and McKibbin and Wilcoxon (1997c)) the permit price will be somewhere between the lowest and highest marginal abatement costs.

A global permit trading scheme appears to be a very attractive way to implement the Kyoto Protocol. When run through global models, for many scenarios about the future, international permit trading performs well and clearly minimizes abatement costs in the longer run. However there are a number of potential problems identified below which are related to the nature of the adjustment path rather than the long run. These problems can be circumvented with an alternative approach outlined in section 4.

3. What Could Go Wrong in Practice?

Permit systems have worked well when used to control domestic environmental problems. The best-known example is the sulfur emissions trading scheme introduced by the 1990 amendments to the Clean Air Act. It has been a tremendous success: electric utilities, the principal industry affected by the program, have been able to reduce the cost of controlling sulfur emissions to one-tenth of the minimum cost projected when the act was adopted. For controlling carbon dioxide emissions in an international context, however, several practical problems arise that ensure that a treaty based on an international permit trading scheme would be very difficult to be

ratify or implement in the United States.

The first problem is that the Kyoto Protocol would force emissions back below 1990 levels and hold them there without regard to the costs and benefits of doing so. However, studies to date suggest that the global costs exceed the benefits, perhaps substantially. In a nutshell, current evidence does not give clear support to a policy of holding emissions constant let alone reducing emission significantly. The costs and benefits of the Kyoto targets are not known with much precision but most studies of costs of stabilization arrive at estimates that are higher than the highest estimates of benefits. Moreover, these costs would have to begin to be paid now in order to avert damages far in the future. Given these considerations, it is difficult to imagine that the U.S. Congress would ratify a treaty based on reducing below 1990 levels. There is, however, enough evidence to make a clear case for taking steps to slow the growth of emissions. A better policy would focus on this more modest goal.

A second problem with a global permit system is that it could generate large transfers of wealth between countries. This is not likely to be a problem for a system including only Annex I countries but becomes a more serious potential issue when the system is expanded to include the major developing countries. Supporters of a permit system regard the wealth transfer properties of the permit scheme as an advantage because it would allow developed countries to compensate developing countries for reducing their emissions. This would be a significant political problem for the US Congress. But more importantly this could put enormous stress on the world trade system. The balance of trade for a developed country importing permits would deteriorate substantially. This would lead to substantial volatility in exchange rates and distortions in the world trade system. Equally serious problems would be created for developing countries. Massive exports of

permits would lead to exchange rate appreciation and a decline or collapse in exports other than permits².

Another problem is that the permit revenue for developing countries comes with strings attached: much of it would have to be invested in improved energy technology in order to reduce emissions and free up the permits in the first place. This is unlikely to be an ideal strategy for long-term economic development and would make the policy unattractive to developing countries.

In fact, developing countries have been so unenthusiastic about the policy that the Kyoto meeting produced support for an umbrella group to trade emission permits (including Australia, New Zealand, Canada, Japan, Russia, Ukraine and the United States). However, this is a compromise that significantly weakens the main reason for having internationally tradable permits in the first place: the potential gain from trade in emissions rights between industrialized and developing countries. Permit trading would do little to lower abatement costs when the participating countries have fairly similar marginal abatement costs. Moreover, this umbrella system may not even reduce emissions because Russia and the Ukraine are well below their 1990 emission levels and would be able to sell their unused permits within the umbrella group. In that case the permit system would really amount to nothing more than an elaborate accounting mechanism for counting increases in emissions in countries like the United States against the 1990 allocation for Russia. There would be little or no overall reduction. But under a plausible alternative scenario in which Russia grows strongly between now and 2008, the demand for

² Economists call this problem when one sector of the economy (i.e. permit production) booms relative to other sectors, the Dutch disease or the Gregory effect.

permits within Russia would increase, sharply driving up the umbrella price of permits. This could add an ironic twist to an international permit policy: if Russia were to grow quickly, the United States could soon become the developed world's low-cost emissions abater. In that case the United States would be a net seller of permits, and the rest of the industrial world would end up paying it to reduce its emissions. Under the scenario outlined, this is exactly the outcome that efficiency would dictate but it would be politically deadly to the Kyoto Protocol in the United States. Most importantly serious greenhouse abatement will only occur in a system that includes developing countries and whatever emerges from negotiations post Kyoto should have this as the paramount objective.

Finally, one further problem with the Kyoto Protocol and any conventional permit trading system under a fixed target, is that no individual government would have any incentive to police the agreement. It is easy to see why this is so: monitoring polluters is expensive, and punishing violators imposes costs on domestic residents in exchange for benefits that will accrue largely to foreigners. There would be a strong temptation for governments to look the other way when firms were exceeding their emissions permits. For the treaty to be viable, however, each participating country would need to be confident that all of the other participants were enforcing it. It is clear that such a system would require an elaborate and expensive international mechanism for monitoring and enforcement.

All in all, an international permit system aimed at a fixed target for greenhouse emissions is unlikely to be politically viable in developed countries, could distort or compromise the world trade system, would be unattractive to developing countries, and would be difficult to monitor and enforce. It is an *impractical policy focused on achieving an unrealistic goal*.

4. A Better Alternative to a Global Emission Permit Scheme

Elsewhere³ we have advocated a policy that gets around the potential problems of a global permit trading scheme discussed above . In many ways our approach seems like a small movement away from the global permit scheme retaining many of the advantages but removing crucial problems. Despite the apparent similarities, philosophically our approach is a long way from the degree of centralization implicit in a global permit scheme which has very different political implications. Our proposal has become known as the McKibbin-Wilcoxon Proposal in the international debate but for whatever reason has been called the McKibbin Tax in the Australian debate (inappropriately in my view because we are not advocating a standard carbon tax). Our proposal, as originally designed, is an internationally coordinated system of national permits and emissions fees for carbon dioxide although it could easily be extended for carbon dioxide forcing equivalence so as to incorporate the 6 greenhouse gases identified in the Kyoto Protocol (carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆)) . Under this system, all emitters of these greenhouse gases would be required to own permits equal to their total emissions of these gases. Countries would be allowed to distribute a specified number of permits to their domestic users in any way they like, including handing them out for free. Additional permits could be purchased from each government by domestically located emitters at a stipulated international price, say \$US 10 per ton. In other words we advocate fixing the price of emissions and letting the market determine where abatement occurs. Because the total number of permits can rise if abatement turns out to be expensive, the policy has a built in safety valve that would limit the economic

³ McKibbin and Wilcoxon (1997a,1997b).

damage that the policy could inflict. Since the policy does not focus on achieving a specified target at any cost, it would be far more likely than a more rigid approach to be ratified by more countries. The key point is that the price of permits is internationally negotiated and held fixed between negotiations.

In practice how would our scheme work? Once a firm receives an initial allocation of permits from its government, the firm would have to decide whether to buy additional permits, sell some of its allocation, or stay with exactly the number it was given. If it does not buy or sell permits, it can continue with its existing practices at no additional cost (although there is a significant opportunity cost from not selling permits). If it needs to increase its carbon-emitting activities, however, it would have to buy additional permits at a price of \$10 per ton, giving it a clear incentive to avoid increases in emissions. At the same time, if the firm could reduce its emissions, the permit system would give it a strong incentive to do so: avoided emissions could be sold on the permit market at a price of \$10 per ton. For example, if an electric utility could shift some of its load from coal to natural gas for a cost of \$6 per ton of carbon, it could emit less carbon and make a profit of \$4 per ton by selling its excess permits. Indeed, many firms have claimed they are willing to undertake low-cost carbon abatement. The permit system we propose will reward firms for these endeavors. The more effort a firm puts into reducing carbon emitting activities at low cost, the higher its profits will be.

This policy is not simply a carbon tax as it is often portrayed. Only marginal emissions above the target are subject to a direct charge (the price of permits) but most of this is a transfer within industry rather than between industry and government. Indeed existing emitters are implicitly given subsidies to change their behavior because of the opportunity cost of continuing

with their activities is the permit price. If firms do nothing they are not subject to any direct cost increase but are awarded profit in proportion to their success at reducing emissions. New industry is not unfairly treated because the marginal costs for both old and new activities will be the same. Existing emitters receive lump sum compensation for the change in the value of existing capital stock that the permit system would cause. This compensation is proportional to how much abatement they achieve.

In principle, the issue of sinks of greenhouse gases could also be dealt with in this system by allowing producers of sinks (land use changes, tree planting etc) to be awarded permits for their activities that they can then sell into the permit market. There are serious issues of measurement that need to be overcome to make sure the system is not debased but in principle a generalized McKibbin-Wilcoxon system would be possible. One key problem with the Kyoto Protocol is that emissions and sinks are added together whereas the two are very different. Once a power station burns coal carbon dioxide is emitted and stays in the atmosphere for a very long time. If a farmer plants a tree then while the tree grows it absorbs carbon dioxide. Once finished growing there is not a permanent reduction in emissions rates. If the tree is harvested or burns then the emissions sink is lost. To make the system workable there would need to be a monitoring program that ensures that sinks are maintained and appropriate charges imposed for sink destruction.

The McKibbin-Wilcoxon proposal as extended here has a number of advantages:

- The same price will be charged for each new permit in each country as well as for any permits that are traded in domestic permit markets. Thus, the marginal cost of reducing carbon emissions will be equalized within and across all countries that participate. This makes

the system efficient because the cheapest emissions reductions will be undertaken first.

Environmentalists and engineers often argue that many low-cost options are available for reducing energy demand. If so, these low-cost options will be exploited under this policy, and without needing to be specifically identified in advance by the government. On the household side, for example, the increase in energy prices will encourage households to demand more energy-efficient vehicles and appliances.

- The policy contains built-in mechanisms to encourage enforcement. Governments will have an incentive to monitor the system because they will be able to collect revenue from selling permits. Firms will have an incentive to monitor each other because any cheating by one firm would put its competitors at a disadvantage and would also affect the value of permits held by other firms.
- The system is flexible and decentralized. New countries can join by setting up their own permit system and agreeing to charge the stipulated world price for additional permits..
- Transfers associated with the permit system are largely between firms or between firms and households, rather than between the private sector and the government. It also minimizes transfers across borders, avoiding serious economic and political problems. Unlike the experience of the 1970s, increases in energy prices under this policy would not lead to massive transfers of wealth between countries.
- The policy also could be revised easily as more information becomes available. After setting up the system and agreeing on the price of permits, participating countries could meet every five years to evaluate the extent to which carbon emissions have been abated as well as to re-evaluate the extent of climate change and its consequences. If it becomes clear that more

action is required, the permit price could be raised. If climate change turns out to be less serious than it appears today, the permit price could be lowered. To minimize the costs of these price changes, future markets could be developed in permits so that risks are effectively shared.

Overall, the advantage of the McKibbin-Wilcoxon proposal for a domestically managed, but internationally coordinated, permit and fee system over the targets and timetables approach of the Kyoto Protocol is simply that our system is far more practical. It is more likely to be ratified by key countries because it limits the cost of compliance and does not require governments to commit themselves to achieving a given target at any cost. It is more likely to be acceptable to developing countries because it is not a Western controlled centralized system. It is transparent to households and firms globally because it spells out exactly how the policy will work, rather than specifying the target and leaving the policy undefined. It is more credible than a targets and timetables policy because it is not so draconian that countries will be tempted to renege under extreme future scenarios, and because the revenue from selling additional permits will give governments an incentive to enforce the agreement over time. There is also likely to be less opposition from existing industry because compensation is built into the system. Moreover, because it contains a built-in mechanism for limiting economic costs, the risk of setting ambitious emissions targets—which could significantly reduce economic growth if abatement proves to be expensive—is eliminated. This would remove the single most important obstacle to reaching a realistic international climate policy.

5. Summary

The Kyoto Protocol complicates the process of achieving a realistic approach to greenhouse gas abatement. It has created a great deal of uncertainty about how and whether countries are going to achieve the strict quantity targets that have been set by 2008 to 2012. The international community had an opportunity at Kyoto to put in place a credible instruments based approach that would begin to reduce emissions at low cost wherever possible, in addition to giving flexibility to the time frame and burden sharing arrangements. This opportunity was lost. Policy makers now have to turn to economic instruments within a target regime that has many potential risks. For the world economy it has presented many crucial challenges. The goal now should be to make the system that develops as de-centralized as possible and that has incentives for as many developing countries as possible to participate. The McKibbin-Wilcoxon decentralized system of domestically administered, but internationally coordinated, tradeable permit schemes with a fixed world price for permits, is a way forward that should be seriously considered if the world is going to realistically tackle global greenhouse emissions.

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