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**Political Economy of Tradeable Permits – Competitiveness,
Co-operation and Market Power**

by

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FOREWORD

This paper was prepared by Frank J. Convery, Louise Dunne, Luke Redmond and Lisa B. Ryan (Department of Environmental Studies, University College, Dublin), for the OECD Global Forum on Sustainable Development: Emissions Trading and Concerted Action on Tradeable Emissions Permits (CATEP) Country Forum, held at the OECD Headquarters in Paris on 17-18 March 2003. The aim of the Forum was to bring representatives from OECD and non-OECD country governments together with representatives from the research community, to identify and discuss key policy issues relating to greenhouse gas emissions trading and other project based mechanisms for GHG emission reduction, such as Joint Implementation and the Clean Development Mechanism. The Forum also aimed to promote dialogue between the various stakeholder groups, and discuss policy needs in the design and implementation of tradeable emissions schemes. Forum participants included representatives from OECD and non-OECD governments, as well as from the research community. Those from industry and other institutions involved with emissions trading, joint implementation and clean development mechanism projects such as the European Commission and the World Bank were also represented.

The OECD Global Forums are one of the two pillars of the new architecture of the Centre for Co-operation with Non-Members, agreed upon by the Committee on Co-operation with Non-Members. The Global Forum on Sustainable Development (GFSD) provides a mechanism for achieving the OECD Ministers' outreach objective and will complement other work on sustainable development. Within the organisational framework of OECD, the GFSD will aim to facilitate a constructive dialogue between non-member and OECD economies on key issues on the sustainable development agenda.

This is the second of 3 synthesis papers presented by the Concerted Action on Tradable Emissions Permits (CATEP), a research network funded by DG Research of the European Commission, and co-ordinated by the Department of Environmental Studies, University College, Dublin. The papers highlight key issues identified in CATEP research to date and cover selected themes presented and discussed at CATEP workshops hosted respectively by Fondazione Eni Enrico Mattei in Venice (2001), University College, London in London (2002), the World Economics Institute in Kiel (2002), and FIELD, UNEP and CEC in Budapest (2003). The purpose of this paper is to synthesise papers and presentations on the theme: "political economy of tradable permits – competitiveness, co-operation and market power."

The ideas expressed in the paper are those of the authors and do not necessarily represent the views of the OECD or its Member Countries.

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1. INTRODUCTION

There is a consistent pre-occupation in the research literature on emissions trading with what configurations of trading arrangements are likely to be economically efficient both statically and dynamically, and – to a lesser extent – what is likely to be fair – who are the winners and the losers. Issues of environmental effectiveness are also addressed in this context.

Conversely, amongst the policy practitioners, there is little overt interest in economic efficiency, and not much treatment of fairness. There is a strong interest in implementability, and in environmental effectiveness. The presentations at the workshops reflected these parallel pre-occupations, and attempts were made by some to make a bridge between them. In this paper we review some of the papers and associated other literature that address these issues in political economy, with a particular emphasis on insights emerging as regards competitiveness, co-operation and market power.

Much of the relevant research emerging at the workshops was animated by either ex post analysis of existing programmes, or an ex ante analysis of ‘new’ emissions trading proposals, such as the proposal by the European Commission for a European Union (EU) wide scheme.¹ At our first workshop in Venice, in December 2001, Zapfel and Vainio (2001) presented a paper – ‘Pathways to European Greenhouse Gas Emission Trading’ – which mapped the at times surprising evolution of the emissions trading idea in Europe, the misconceptions that in the past and still to this day complicate progress, and conclude with a presentation of a coherent case for the creation of an EU wide greenhouse gas emissions trading scheme. They both work with the European Commission in DG Environment, and continue to be heavily involved in moving the emissions trading agenda forward. The Commission had released its proposals just two months earlier, in October 2001, following an intensive consultation process. This co-incidence of occurrence of the initiation of our workshop series with publication of these proposals was fortuitous, and provided a continuing deliberative thread to our workshops as they unfolded. The formal withdrawal from the Kyoto Process by the US added another dimension which was incorporated into the research agenda. Our brief did not confine us to climate change or indeed to Europe, but inevitably much of our focus was shaped by these developments.

In Venice, Egenhofer (2001) provided a very comprehensive ‘state of the art’ as regards the theory and (especially) the practise of emissions trading, and its links with other policy instruments, notably taxation. As regards the latter, he notes that ‘On a practical level, taxation increasingly is used as a stick to convince industry to accept cap and trade emissions trading programmes. Typically, firms accepting an absolute cap and participation in cap-and-trade programmes are exempted from environmental or carbon taxes as evidenced in the UK where companies accepting to participate in the ET scheme are exempted up to 80% of the UK climate change levy.’ The criteria applied in the evaluation of emissions trading are typified by the paper by Boemare and Quirion (2001). They assess the Commission’s proposal in some detail, and touch on 10 other schemes from a variety of perspectives, including number of participants and spatial coverage and permit allocation. For each theme, they set out the relevant theoretical framework and its implications, and then assess practise. The parts of their template which address competitiveness, co-

¹ ‘Proposal for a directive establishing a framework for greenhouse gas emissions trading within the European Community, European Commission,’ Brussels, October 23, 2001.

operation and market power provides a convenient framework into which to incorporate some of the relevant political economy issues that were addressed in the research literature presented at the workshops.

2. MARKET POWER AND COMPETITIVENESS

Language is important. In considering ‘competitiveness’ the meaning of the word in different fora deserves some discussion. When it is used by those in business, they tend to understand it as the conditions that will allow their own enterprises to thrive in domestic and international markets. But when economists think of ‘competitive conditions’ they mean the combination of macro and micro policies that will allow an economy overall to prosper – and an important pre-requisite in this respect is that more efficient enterprises should be facilitated and encouraged to take over or replace those that are less efficient. This linguistic distinction is important when we turn to this issue as regards emissions trading.

When permits are allocated, it is important that no one entity hold sufficient quantity to influence the price, and that no combination of permit holders combine with sufficient market power to influence price. As regards number of participants in the proposed EU scheme, Boemare and Quirion (2001) observe that ‘Standard theory suggests that, providing administrative and monitoring costs are not disproportionate, as many emitters as possible should be covered by the permit scheme’ on the basis that such numbers enhance the prospects of diversity in marginal abatement costs, and lowers the risk of excessive market power. But Sartzetakis (2002) points out that as we often live in a second best world; contrary to the typical presumption of economists and policy makers that competitive markets allocate emission permits efficiently, competition in the emission permits market cannot assure efficiency when the product market is oligopolistic.

Boemare and Quirion (2001) judge that the Commission proposals score well as regards number of participants and ensuing competitiveness. However, they note that coverage is partial – i.e. confined to a limited number of sectors, and that this requires that they go ‘downstream’ to the energy users, rather than ‘upstream’ to the energy producers and importers, and that there is no provision for voluntary ‘opt in’ by firms below the size thresholds and/or other sectors not initially included. Such ‘opt in’ could help further dilute any emerging market power. Note however that this proposition that the larger and more diverse the number of potential abaters the better is only true where the benefit yielded by each unit of abatement – e.g. one tonne of CO₂ equivalent – is the same without regard to where it is achieved, as is the case with greenhouse gas emissions. Morton and Atkinson (2002) model the expansion of regions to abate NO_x emissions and deposition in the Chesapeake region in the US. They conclude that – because abatement in the extended part of the region yields much lower benefits than those in the ‘original’ region – such expansion can reduce net benefits, as abatement migrates to the lower cost but less beneficial new areas.

It is interesting to note that, as the Commission’s proposal was considered by the Council of Ministers (representatives of Member States) the effective dilution of market power approved of by Boemare and Quirion was compromised in order to secure the agreement of the Member States. Specifically, in the scheme agreed by the Council of Ministers - but not yet (March 2003) approved by the European Parliament - there is a provision which allows for ‘opt out’ by installations or sectors, provided they meet their obligations otherwise, and ‘pooling’ whereby groups of installations can come together and be represented by a trustee who acts on their behalf. This typifies the tension between the idealised scheme as argued for by the research community, and the compromises which stakeholders perceive as being

necessary to secure progress. This conflict is even more acute in regard to the manners in which permits are allocated.

3. CARBON LEAKAGE AND COMPETITIVENESS

The issue of ‘carbon leakage’ – the increase in carbon or other greenhouse gas emissions in jurisdictions not ‘capped’ by the Kyoto Protocol or other provisions – received relatively little treatment in the workshops. Albrecht and Schoors (2002) note that when energy-intensive industries shift from developed countries to developing countries without emissions reduction obligations, this can facilitate some developed countries to realise their Kyoto targets. However, global greenhouse gas emissions and the threat of climate change remain unchanged. When relatively less efficient production technologies are used in developing countries, global emissions can even increase. This potential ‘competitive effect’ was an important underlying issue in shaping Canada’s decisions re whether to ratify the Kyoto Protocol, and in the design and implementation of its abatement programmes. Drexhage (2003) notes in this context that grandfathering is proposed for the Canadian emissions trading scheme, associated with commitments by the Canadian government to the oil and gas sectors that prices will not rise to more than \$CND15/tonne of CO₂ equivalent, and they will not have to improve energy intensity by more than 15%. The rationale for such concessions are fears that, in their absence, utilities may migrate to the US.

Fischer (2001) addresses a related issue, namely the influence of different corporate tax regimes and transfer pricing arrangements on the decisions of multi-national countries as to where to concentrate their reductions. On the basis that their decisions are guided by where to maximise net profits, she concludes that: ‘For emissions policies between developed countries, taxes will certainly be an issue. Multinational firms will tend to locate their abatement activities in higher tax countries, repatriating profits to the lower-tax home countries (or shifting income to lower tax jurisdictions among subsidiaries). Without explicit and appropriate transfer pricing rules, as well as a clear price for emissions, many of the efficiency gains from flexible abatement location mechanisms may be lost to inefficient tax shifting.’ The influence of differential tax rates on decisions will become an issue for multi-nationals in the EU, as its trading scheme comes into effect in 2005.

4. ALLOCATION AND COMPETITIVENESS

Boemare and Quirion (2001) posit the distinction between auctioning – selling emission permits to the highest bidder – and giving them away for free, either on the basis of share of output, e.g. x permits per kWh for power plants (after first deciding on the allocation to each sector), or on the basis of an exogenous criterion such as share of historic emissions (‘grandfathering’). They note that ‘general equilibrium modelling has shown that the most cost-efficient way to allocate permits is to auction them and to use the revenue to cut pre-existing distortionary taxes,’ citing Goulder et al. (1999) in this regard.

But Tietenberg (2001) takes a more sanguine view, following in the tradition of Coase (1960). In effect he discounts the double dividend impact by arguing as follows: 'Whatever the initial allocation, the transferability of the permits allows them to ultimately flow to their highest valued uses. Since those uses do not depend on the initial allocation, all initial allocations result in the same outcome and that outcome is cost-effective.....It implies that with tradable permits the resource manager can use the initial allocation to solve other goals such as political feasibility or ethical concerns without sacrificing cost effectiveness.'

In addition to losing the double dividend, 'grandfathering' would provide incumbents – those in business at the time trading was initiated who qualified for an allocation – with an advantage over new entrants who would have to buy. While this would probably enhance the ability of the former to stay in business and indeed expand, it would damage an economy's overall competitiveness, as it could inhibit some potentially more efficient companies from entering the market. Where the free allocation is on the basis of a share of total output, then presumably new entrants get their allocation permit in effect at the expense of incumbents, as new slices are taken from the existing 'permit pie.' In sectors and economies that are growing rapidly, this could be a source of considerable uncertainty for firms.

In the European Union, the Competition DG has judged that the allocation method must treat all firms equally, including new entrants. This means that if incumbents get allocations for free, then new entrants must likewise get free allocation. There has been concern expressed that the existing EU States might suffer 'unfair competition' from Accession States some of whom will have greenhouse gas surplus to their requirements and might subsidise inward investment or domestic firms. The competition rules imply that it will be impossible legally for such discrimination to take place.

Boemare and Quirion (2001) argue that 'The choice of grandfathering in most systems is a direct consequence of the political influence of regulated firms in the policy process....indeed a lesson from positive political economy is that firms which risk an important loss are more likely to incur the costs of lobbying than households or firms which could benefit from a reduction in pre-existing taxes....' There appears therefore to be a conflict between the economic efficiency ideal on the one hand, and the political 'reality' on the other that encourages policy systems to provide free allocation.

Pezzey (2002) argues that three variables – cost minimisation (traditional economic efficiency), information efficiency (incorporating transactions costs) and political acceptability – must all be considered in the design and implementation of emission trading schemes. In his terminology, maximum 'efficiency' means achieving a given carbon reduction goal at minimum total cost to a country, 'informational efficiency', is minimising a scheme's costs of administration, transactions, monitoring and enforcement, and 'sufficiently acceptable' means commanding enough political support to be passed into law by a country's legislature.

The three goals - (total) efficiency, acceptability and equity - can obviously conflict. Acceptability differs from equity, because welfare losses concentrated among a few firms result in far more political pressure than the same dollar losses spread over millions of people as consumers.

The principle of acceptability - which is subject to test in the political marketplace - is to compensate roughly for the net costs of carbon control. In practice, Pezzey (2002) conjectures that acceptability probably requires a political principle of approximately compensating for the profit that an industry loses because of carbon control. Grandfathering to fossil fuel industries while reducing total carbon use would give these industries large monopoly profits which would overcompensate for their losses. Pezzey recommends a hybrid system, with compensation requiring much less than half of total carbon permits to be free. He proposes that the remaining auction revenues should be partly recycled as lower rates of conventional taxation and partly given as lump sums to households. He argues that consumers also deserve compensation for higher prices of fuel and carbon-intensive products. As regards new entrants, he makes

the case that free permits do not significantly distort competition by creating barriers to entry as long as the proportion of free permits is chosen to compensate for the costs of carbon control, and if this proportion is not altered to discriminate against foreign rather than domestic ownership of firms, or in favour of public rather than private ownership.

Quirion (2002) provides the first quantitative assessment of competitiveness impacts from a unilateral implementation of the European Commission allowance trading directive proposal for the iron and steel industry, and concludes that the impact of the Directive on competitiveness in this sector is minor. Under the Directive the author estimates that production drops by in the range of 0.1% to 4% (5% with the opt-out clause) and that profits undergo a significant loss only when the permits are auctioned. He estimates that the opt-out clause, if widely acted upon, could harm production and profit in the iron and steel sector.

5. EQUITY AND COMPETITIVENESS

The fairness or equity issues associated with allocation are also a subject of considerable research. The work of Bovenberg and Goulder (2000), US Congressional Office (2000) and Burtraw et al. (2001) all support Pezzey's view noted above that firms benefiting from 100 per cent free allocation will be better off than before the trading scheme was introduced. The fact that industry associations in a number of countries, e.g. the UK, have led the argument for the introduction of emissions trading with free allocation supports the view that they can see a range of merits in emissions trading, including perhaps some rent capture. But why then do some firms and industry associations oppose the introduction of emissions trading? This issue has come to the fore in the European Union where much of industry in Germany was antagonistic to the emissions trading scheme as proposed by the European Commission, although it included free allocation.

One explanation is the following: There can be a dichotomy between the predicted benefits likely to accrue to industry as a whole, and individual firms. The latter are typically risk adverse. They may agree that total benefits to industry in aggregate will be positive, but – until the allocations are made to individual firms – there is no guarantee that any individual firm will be better off. Another reason expressed by industry for antagonism to auctioning is the high degree of uncertainty about likely permit prices prevailing before the first auction takes place (Wrigglesworth, 2003). The relative incentive effects that lead firms individually and in aggregate to oppose the introduction of trading, and/or the auctioning of permits, deserves more research.

Where allocation is free, and this results in windfall gains to producers, there can be a policy response. The Montreal Protocol on Substances that Deplete the Ozone Layer called for a cap on chlorofluorocarbon (CFC) and halon consumption at 1986 levels, with reductions in the cap scheduled for 1993 and 1998, and full phase out by 2000. Consumption was defined as production plus imports minus exports. In the US, the EPA distributed permits to companies that produced or imported CFCs and halons, based on 1986 market shares, and they were allowed to trade. The latter provision produced substantial savings, relative to the costs that would have been incurred with command and control regulation. Congress coupled the marketable permit scheme with excise taxes on CFC production designed to capture the ensuing 'windfall gains.' The revenues were not earmarked to compensate households or other affected parties (from: 'The US Experience with Economic Incentives for Protecting the Environment,' US Environmental Protection Agency web site, 2002). This form of 'policy evolution' led some industry representatives at our

workshops to think more positively about auctioning, on the basis that a ‘windfall tax’ could prove much more financially onerous, and create more corporate uncertainty, than the auction. However, such views were ‘not for attribution.’

6. BASELINE AND CREDIT AND COMPETITIVENESS

Our discussion thus far has focussed on ‘cap and trade’ or allowance schemes, whereby an absolute ceiling is set and allowances allocated. In some jurisdictions, it is argued that for the sectors exposed to international competition, a ‘baseline and credit’ system should apply. Under the latter, a standard is set, e.g. amount of greenhouse gas emissions per unit of electricity produced, and as long as a firm does not exceed this standard, it is not required to hold permits. Tietenberg (2001) summarises the situation thus: ‘Despite their apparent similarity, the difference between credit and allowance-based trading schemes should not be overlooked. Credit trading depends upon the existence of a previously determined set of regulatory standards. Allowance trading does not. Once the aggregate number of allowances is defined, they can, in principle, be allocated among sources in an infinite number of ways. The practical implication is that allowances can be used even in circumstances: (1) where a technology-based baseline either has not been, or cannot be, established or (2) where the reduction is short-lived (such as when a standard is met early) rather than permanent.’

The Committee established to advise the Netherlands government on emissions trading proposed that a baseline and credit scheme – which they styled Performance Standard Rates (PSRs) - should apply to firms in the sectors exposed to international competition.

The Netherlands Committee distinguishes between firms in an exposed sector and firms in a sheltered sector. While the sheltered sector would be faced with an absolute cap on emissions, firms in the exposed sector would be subject to relative standards or PSRs (Performance Standard Rates). In this, they follow the practise followed in the UK, where this distinction characterises their domestic trading scheme.

In their assessment of the Netherlands Committee proposal, Kuik et al. (2002) note that emissions trading between the exposed and sheltered sectors is possible. They posit that the exposed sectors will profit from selling allowances to the sheltered sectors. Energy-intensive, export-oriented sectors could face a deterioration of their competitiveness, with a possible incentive for relocation of such production activity abroad.

The Committee concludes that the extension of coverage to include small firms and private households would result in administrative burdens of monitoring and enforcing that would be excessive with millions of small end users. This latter argument was often made at the workshops, but the costs of not involving the public directly in the trading scheme were not quantified. A key limitation of emissions trading is that the public have little understanding of what it is and how it works, and in the longer term, this could prove to be an important limitation. We are perhaps a little too glib in dismissing the possibility of engaging the public directly on the basis that the costs will exceed the benefits, when the latter have not been quantified.

Kuik et al. (Ibid) conclude that the incompatibility of the proposed Dutch scheme with that proposed by the EU - including the division between the exposed and sheltered sectors, the trading system itself, the initial allocation of allowances and the role of electricity within the scheme – limit its value.

Koustaal et al. (2002) observe that one reason to explain the different approach taken in the UK and the Netherlands as compared with the EU is the fear of loss of competitiveness if industries are confronted with an absolute cap while these sectors in neighbouring countries are not. The Dutch proposal states explicitly that emission trading should not reduce the competitiveness of the Dutch industry, which is the main reason for the choice for relative targets in those sectors which are exposed to competition from abroad. In the reactions to the draft EU Directive on emissions trading, the UK has stated a preference for their own initiative while the Netherlands has indicated that they would prefer relative targets. This illustrates how uncoordinated local policy initiatives can result in a lock-in, even though there is an alternative co-ordinated policy at the international level. Their main conclusion is that trading with a relative cap is less efficient than trading with an absolute cap because a relative cap is a combination of a price on emissions and a production subsidy.

They also advert to the issue of double counting, if electricity emissions were to be addressed directly in some member states, and indirectly in member states which advocate relative targets, e.g. the UK and the Netherlands. Wrigglesworth (2003) strongly advocates the use of direct emissions as the charge point, on the basis that signals to producers and consumers need to be as direct as possible (market forces), longer term signals are very important for investment decisions and markets need the freedom to work efficiently and to gain critical mass – i.e. fungibility is essential.

7. COMPETITIVENESS AND TRANSACTIONS COSTS

If the costs of ‘doing the business’ - finding out what the prevailing price is, identifying possible buyers and sellers, making the transaction – are high as regards outlays of time and money, any trading scheme will be seriously and perhaps fatally weakened. And if it is, the efficiency and overall competitive advantages that a well functioning market yields will not accrue. Borregaard et al. (2001) noted that high transactions costs in the case of the particulates emissions trading market in Santiago Chile seriously undermined its potential effectiveness. Boom and Nentjes (2002) evaluate blueprints for two international emissions trading schemes between private parties, with a focus on minimising transactions costs. They note that these costs rise as permit allocation is shifted downstream from energy producers and importers (very few) to users. They discuss the administrative burden and observe that intricate systems increase the costs of setting up and maintaining the trading scheme. They cite Hargrave (1998) on the factors shaping the administrative burden:

- The number of regulated sources. The larger the number of sources the more information is needed in setting up the system.
- The availability of needed data. If the data is readily available, the previous point becomes less important.
- The level of reporting requirements and the level of monitoring needed. If reporting requirements are very intricate, the costs for the regulated sources are high. High levels of monitoring mean high costs for the monitoring authority.
- Proper accounting. Ideally, firms are only required to hold emission quotas for emissions of greenhouse gases, and only for domestic emissions.

They suggest that allocating the permits downstream – to achieve political acceptability – with monitoring upstream is a hybrid that reduces transactions costs.

It was noted by many researchers that the requirement in the Commission's trading scheme for each Member State to allocate permits via a 'National Allocation Plan' was likely to engender very high costs, a proposition that is supported by some US experience, notably that associated with the RECLAIM scheme in Southern California. In this scheme, the allocating authority considered dozens of alternative allocation formulas. The final allocations were based upon complicated formulas in which each facility received three sets of allocations of tons of NO_x and/or SO₂; a starting allocation for 1994; a mid-point allocation for 2000; and an ending allocation for 2003. The basic ton allocations are based upon multiplying an appropriate emissions factor, i.e. pounds per million Btu of energy input for each of the three years by a single value for historic throughput or usage that is determined by each facility's peak activity over the period from 1989 to 1992. The emission rates for each of the allocation years are based upon adopted rules, as of December 1993, for each facility. The 1994 allocations are supplemented by the offsets which facilities had obtained to comply with new source review requirements. In addition, facilities were given non-tradable credits for the first three years of the program if they reported 1987, 1988 or 1993 emissions were greater than their starting emissions (Harrison, 1999).

In his very interesting exploration of the California water market, Hanneman (2001) concludes that the (modest) successes achieved – for example as regards water transfers involving Colorado River water - are a consequence of clear property rights assignment, a relatively small number of water users operating in a closed system, and few third party effects. He attributes failures in other areas to inadequate property right assignment, which in turn is at least in part a product of government failure. The State Water Resources Control Board has been captured by vested interests and fails in its primary task to clarify water rights.

8. COMPETITIVENESS AND SUPPLY AND DEMAND FOR PERMITS

The equilibrium price of permits is perceived by many firms as a key variable influencing their competitiveness. Where firms have been given their permit allocation for free, the higher the price, the greater the asset value of their permit holdings, but also the more they have to spend if they have to purchase permits. For firms in those countries widely perceived as being likely purchasers, this issue is of some moment. Pretel (2003) calculated the emission 'headroom' in the EU in terms of quantities likely to be available for sale, and the quantity that countries were likely to need to 'import', using EU data from 3rd National Communications to the United Framework Convention on Climate Change. These data show that requirements from the 'existing' EU countries for emission credits (scenario 'with measures') is approximately equal to the quantity in excess of domestic requirements that could be supplied from EU-A1 (Annex I countries soon to be EU). In the scenario 'with additional measures' the EU including accession countries could be a net supplier of credits. If accession goes as planned, this means that by the time trading starts in the European Union scheme post January 2005, the equilibrium price could be quite low. However, this depends on the range and extent of marginal abatement costs, the extent to which opt out and pooling inhibits market development, and the willingness of 'surplus' countries to supply credits.

Haites (2003) addresses the issue as to whether non-Kyoto Protocol (KP) parties should be allowed to trade with those Annex 1 countries that have accepted a cap on emissions. This is very relevant as regards the

equilibrium price that will emerge from trading, and in turn affects the position of firms faced with competition from countries such as the US who are non-ratifiers.

He argues that non-Kyoto Protocol parties can't be prevented from buying Kyoto Protocol permits, but Kyoto Parties can't buy non-Kyoto party permits. The McCain-Liebermann bill in the US Senate – to take effect in 2010 if enacted - proposes that 15 per cent of total emission permits be purchased from Kyoto Parties. This is only likely to happen if the Kyoto Protocol price is lower than the domestic price in the US. Non Kyoto Protocol parties will need to have an account in the Kyoto Protocol registry so that KP units can be transferred and cancelled. Khatib (2002) makes the familiar point that exclusion of developing countries from trading in the longer term is likely to prove fatal to the prospects for success in addressing global warming. He focuses on electricity generation in developing countries and documents the fact that much of it is coal based, and relatively inefficient, that it will account for 50 per cent of global electricity originating CO₂ by 2020, and that emissions trading extended to the developing countries is a pre-requisite for abating emissions from that source.

Borregaard et al. (2001) evaluate the record of Chile in mobilising markets to achieve resource and environmental objectives, including the use of emissions trading, a theme which is also addressed by Sancha (2003). They note that Chile is exceptional amongst developing countries in its use of markets to conserve environmental endowments, and ask: 'Does it matter that developing countries are hardly using market based instruments in managing their environmental endowments? To the extent that their absence encourages inefficiency and ineffectualness, the answer is 'yes'. To the extent that they give developed countries users of these instruments an advantage over developing countries, the answer is also 'yes'; it becomes one more disability to be overcome.'

Baron and Bygrave (2002) make the point that the major payoff to linking systems is to widen and deepen the market. However where there are cap and trade and baseline and credit (relative) schemes to be linked there are competitiveness issues for firms operating across systems; those firms covered by a relative target will be more competitive than those covered by an absolute target, and this could result in some movement of investment and production across countries.

An issue not much addressed at the workshops was the extension of emissions trading schemes to incorporate sequestration or offsets, and the renting of permits. An exception was the contribution by Sedjo et al. (2002) who advocate the integration of sinks into trading schemes, and provision for the short term renting of permits. These two measures would enhance competitiveness by improving flexibility, extending the range of opportunities for abatement and thereby reduce its cost.

van Steenberghe (2002) concludes that the non ratification by the US and the entry of Russia and the Ukraine into the supply market will not in fact result in low or zero prices for permits, because banking between commitment periods is allowed, and firms will seize the opportunity to buy up permits for the future, thereby supporting the price. The fact that the market is inter temporal will in his view prevent hot air suppliers from dominating the market. In this context, he assumes that the US will join Kyoto in the second commitment period.

9. ISSUES AND IMPLICATIONS RE US WITHDRAWAL FROM KYOTO

Since the decision by the US not to ratify the Kyoto Protocol, an emerging field of research focuses on how to induce its engagement.

Kempf et al. (2002) examine different strategies the Kyoto Protocol Parties could use to induce the United States to adopt a more stringent greenhouse gas target, on the basis that larger emissions reductions by the United States would lead to larger environmental benefits and smaller adverse impacts on firms in Annex B countries. Strategies to induce the United States to adopt a more stringent target might impose a cost on Annex B Parties, but as long as the cost of so doing is less than the cost of a comparable emission reduction for Annex B Parties, the strategy is viable.

They assess three strategies which could be employed to induce the United States to adopt a more stringent emission reduction, including a) possible trade measures b) Co-operative Research & Development c) Developing Country commitments. Of these, they conclude that co-operative R&D and getting developing countries to adopt national emissions limitation commitments equal to their business as usual emissions beginning in 2020 could prove to be useful strategies.

Klepper and Peterson (2002) analyse the impacts of the interaction between different participation structures, institutional set ups and strategic supply of hot air in international emission trading. Russia and the Ukraine have been allocated most of the hot air in the Kyoto Protocol; the permit allocation within the hot air countries is an important determinant of hot air supplies. Three institutional scenarios appear to be most realistic:

- The governments in these countries give emission permits to the domestic firms for free and isolate them from the international permit market while the governments themselves trade a certain percentage of the hot air on the world market;
- The governments sell a fixed amount of permits to foreign and domestic firms;
- The governments grandfather all emission permits to local firms that participate in international emissions trading.

The decision has considerable implications for the equilibrium price of permits. If governments control the supply, they are likely to act as a cartel and restrict supply in order to generate more revenue. If all permits are allocated to local firms, then - unless they also act as a cartel - the price could approach zero. However, there are also energy price effects and implications for intensive industry for the hot air exporting countries; a government that wishes to maximise welfare may make different allocation decisions, generally selling more hot air than would maximise revenues from this source. The impact of the US withdrawal is also addressed – the ensuing reduction in demand for tradable permits drives down the price, but the reduced abatement effort in the US drives up energy prices, and these spill over to affect behaviour globally. These insights are consistent with findings by Carraro et al. (2003) on the consequences of the US withdrawal from the Kyoto Protocol who conclude that this reduces the demand for emission permits and consequently induces a decline in the permit price, thus lowering the incentives to abate emissions and invest in climate friendly technologies in all countries. The lower permit prices after the US defection reduces Russia's benefits from participating in the Kyoto agreement. This provides additional incentives for Russia to use its increased bargaining power in climate negotiations. Co-operative R&D directed at reduced cost abatement and diffusion are discussed as strategies in this context.

With the withdrawal of the US from Kyoto, Quirion (2002) argues that the European Union allowances should be kept separate from Kyoto units, at least for the first commitment period, on the basis that if Russia and the Ukraine do not exercise monopoly power on the permit market, the equilibrium permit price may well fall to zero. He argues that, in such a situation, if European industries were allowed to fulfil their commitments by buying permits from foreign firms or governments, then the environmental effectiveness of the European Directive would most likely turn out to be insignificant.

If Russia ratifies, it is difficult to see it behaving in a manner that would see permit prices approach zero, so this apprehension may be over stated.

10. CO-OPERATION AND COMPETITIVENESS

The issue of co-operation between government and firms is raised by Takamura (2003). She notes that Japan is at an early stage in the development of an emissions trading scheme, and that there are two schemes being considered, one promoted by the Ministry of Environment, the other by the Ministry of industry (METI) Under the latter proposal, METI would subsidise half the investment needed by the companies to meet set targets, if such targets were achieved. This provision is driven also in part by concerns about competition from the US. She notes that the private sector is already starting to buy credits from Australia.

Salmons (2002) documents an interesting case of inter-firm collaboration in the 'bottom up' creation of a trading scheme by firms required to meet re-use and recycling targets vis a vis packaging. In the UK, the Environment Agency introduced Packaging Waste Recovery Notes (PRNS) as a standard form of evidence that recovery and recycle targets had been met, where the PRN specifies in effect what the amount of packaging delivered to reprocessors. To introduce flexibility, those obligated to meet targets started to trade these notes amongst themselves, an activity which was facilitated by the existence of a web based Environment Exchange which matches potential buyers and sellers, and executes transactions. This demonstrates that where there is an incentive to trade, and where a market can be created at low cost, it will happen, and the efficiency and convenience benefits are substantial. It also shows that a baseline and credit scheme – which this is – need not incur very high transactions costs.

11. CONCLUSIONS AND FUTURE WORK

A general conclusion is that there is a lively, committed and rapidly growing community of researchers focusing on emissions trading, who are responsive to emerging needs and realities. A few key conclusions and themes that emerged as regards political economy, co-operation and market power are the following:

- The importance of scope and scale in reducing costs and enhancing effectiveness. As individual country schemes in Europe – actual or proposed - were analysed in the context of an EU wide scheme, the benefits of the latter become clear.
- The tensions between key and typically very influential stakeholders, who generally prefer: voluntary schemes, with ‘opt out’ provisions; baseline and credit (relative targets) vs. cap-and-trade (absolute targets); and free allocation of permits, and the literature on economic efficiency which emphasises the merits of cap and trade, obligatory participation, and auctioning of permits. An important merit of research is to highlight the tradeoffs and costs involved in meeting the ‘realities’ of stakeholder interests. In the context of the proposed EU scheme, Council of Ministers agreed to opt out, but only for the pilot phase, the scheme is cap and trade, and allocation is free, but this is being challenged by the European Parliament.
- The non-participation of the US in the Kyoto process casts the shadow of ‘carbon leakage’ over the actions of all the Kyoto participants, but it is especially evident in the case of Canada and Japan. How to engage with the US to limit the damage was a focus of a number of contributors. The continuing engagement of US scholars in the network is an important contribution to maintaining links and mutual awareness.
- Permit allocation is a preoccupation of many researchers. The costs of free allocation are systematically documented, as follows:
 - lack of comprehensiveness in coverage, as to include all carbon sources, notably transport and households, would make the price rises and associated rent capture overt, and this would cost politically, i.e. a second best design, excluding these consumers, is imposed from the outset;
 - secondly, the revenues generated by auctioning are foregone, and these could be used to reduce other distorting taxes, thereby yielding a double dividend, and/or used to help those who are adversely affected;
 - thirdly, new entrants may be disadvantaged relative to incumbents, if they have to pay for permits;
 - fourthly, since free allocation involves distributing valuable assets, substantial transactions costs must be incurred in deciding on who is to get the allocations.
- But it is also acknowledged that once the permits are allocated, the trading system thereafter ‘identifies’ the most cost effective abatement combinations, unless there are other distortions in the market place. There is an emerging research field, which is likely to grow, which focuses on ‘hybrid’ systems that capture some of the rent yielded by the allocation process which can be used to compensate losers etc., but allows sufficient value to stay with participating stakeholders to encourage them to engage.
- There is a seeming paradox here: if the financial benefits of free allocation are so manifest and potentially substantial, why do some firms and industry groups - notably in the EU context, in Germany – oppose emissions trading? There is here also an emerging research agenda.
- ‘Fairness’ is an important public value, and perceptions are as important as reality. Research has made good progress in painting the broad picture as regards permit allocation, but there is a much wider and in some ways richer agenda that deserves researching.

- The case for cap and trade instead of baseline and credit is convincingly made by many researchers, but it is also clear that the latter is both efficient and appropriate if some conditions are met. There is a need for more research to examine these nuances, and clarify under what circumstances such baseline and credit has comparative advantage.
- The human impulse to trade is ever present. The emergence of ‘unofficial’ trading markets – as for example the trade in packaging waste recovery notes in the UK, which emerged spontaneously but was then sanctioned and encouraged officially - are important straws in the wind of an idea that could have ever widening application. This also deserves further research.
- Transactions costs – the costs of ‘doing the trading business’ broadly defined – are an important and valuable research preoccupation. It was very high transactions costs that thwarted many of the initial US trading schemes, hindered the full development of water markets in California (associated with inadequate assignment of property rights and institutional failures in this regard) and particulates trading in Santiago Chile. The lessons of these experiences seems to have been internalised at both research and policy level in Europe. But the ‘high transactions cost’ case is used also to support ‘upstream’ allocation of permits, and against distribution of same downstream to householders, without relevant documentation of the potential costs and benefits involved, an area where research could elucidate.
- Clearly the price of permits is a product of supply and demand, and this in turn is an important competitiveness consideration. The impact of the US opting out, and of hot air from Russia and the Ukraine, on price is the subject of considerable research, with a debate ongoing between partial equilibrium advocates who focus exclusively on permit markets, and general equilibrium analysts who incorporate the effects of changing energy prices and other variables. There is also some gaming work of varying formality, which focuses on the strategic options facing all participants but especially Russia. This issue is so crucial that it warrants continuing research.
- The need to engage effectively with those developing countries that have not accepted a ‘cap’ is well documented – unless it happens, the attempts to address climate change will fail. A separate paper is devoted to the linkage of trading with the other flexible mechanisms, but the potential for expanding trading itself, so that, for example, China and India are inside the trading tent, deserves specific attention. A number of researchers conclude that, notwithstanding the implementation of the other flexible mechanisms, unless this is achieved, we will fail. This is a crucially important topic for research.
- There was relatively little treatment in our meetings of multi pollutant policies – e.g. linking greenhouse gas, particulate and acid precursor trading schemes.
- Likewise the issue of linking of trading with sequestration, offsets etc is a research agenda that deserves attention.

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