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10.1 Scientific and Policy Relevance

The Kyoto Protocol of 1997 allows the industrialized countries (the so-called Annex B Parties) to lower the costs of meeting their greenhouse gas (GHG) emission targets, referred to as assigned amounts, by means of the Kyoto Mechanisms: Joint Implementation (JI) under Article 6, the Clean Development Mechanism (CDM) under Article 12 and International Emissions Trading (IET) under Article 17. There are several institutional differences between these market mechanisms. For instance, JI and the CDM are project-based flexible instruments in which an investor receives credits for the achieved emission reductions at the foreign host. These emission reductions are measured from a baseline which estimates future emissions at the project location if the project had not taken place. JI projects can be carried out in Central and Eastern Europe and CDM projects in developing countries. Annex B Parties can also trade parts of their assigned amounts among each other under IET. According to the Marrakesh Accords of 2001, a Party may authorize legal entities to transfer and/or acquire emissions under Article 17.

The international adoption of the Kyoto Mechanisms moved the political process to the implementation stage. In this stage, the details of their design have to be worked out and decided upon to make the mechanisms operational. For instance, JI and the CDM could be shaped by means of a multilateral approach in which investors pool their investments, by means of a bilateral approach between individual investor and host, or
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by means of a unilateral approach in which the host generates the credits on its own without foreign direct investment. IET could be shaped as government trading where only governments trade assigned amounts, as permit trading in which governments allocate emission ceilings to private entities and allow them to trade across national borders, or as credit trading in which a private entity can sell credits to another entity if it reduces emissions below the baseline of voluntary or mandatory environmental (energy-efficiency) standards.

However, various political barriers hinder the implementation of the Kyoto Mechanisms, including institutional problems, legal constraints and cultural objections. Some of these barriers have been taken and others not (yet) or only partly, while governments sometimes create additional barriers by posing new demands and by trying to reopen or reinterpret the international political agreements. Various authoritative organizations have marked an analysis of political barriers to implementing the Kyoto Mechanisms as a priority area for scientific and policy research, such as the Intergovernmental Panel on Climate Change (IPCC) (Banuri et al., 2001: 71), the Energy Research Centre of the Netherlands (ECN) (Sijm et al., 2000: 45) and the Dutch National Research Programme on Global Air Pollution and Climate Change (NRP) (Kok and Verweij, 1999: 10). This book carries out such research. The objective of this book is to identify and explain the political barriers that prevent or delay the implementation of the Kyoto Mechanisms, and to analyze under what conditions these barriers are (in)effective.

Special attention is paid to the political barriers and opportunities of international permit trading between private entities under IET Article 17, because it is the superior alternative according to neo-classical economic theory (e.g. Tietenberg et al., 1999; Nentjes et al., 2002). This theory considers permit trading to be more efficient and effective than all other (design variants of the) Kyoto Mechanisms. Permit trading is efficient: marginal abatement costs are equalized across firms and every unit of emission will have a price, since each unit has the opportunity of being sold. Government trading, however, is unlikely to entail fully cost-effective deals, because governments have incomplete information on the marginal abatement costs of their domestic emitters. Permit trading is also effective: when the economy grows, the demand for emission permits rises, but their supply remains constant as a result of the
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emission ceiling. The government will meet its emission target and the scarcity of environmental space will be reflected in a higher price for carbon-intensive products. Although credit trading could generate cost-savings, the supply of emission credits rises when the economy grows, since firms do not have an emission ceiling: if a firm expands its production, it is licensed to new emissions (as long as it meets the energy-efficiency norms, for instance) and the social costs of the additional emissions will not be fully reflected in the product price. Moreover, the baseline of JI and CDM projects is an estimate that will never occur and effectiveness is undermined if these counterfactual emissions are overestimated. Finally, permit trading is thought to have lower transaction costs than these credit-based approaches, not only because it is costly to establish a project baseline in an Eastern European or developing country, but also because each trade requires advance approval of the baseline, whereas permit transfers can be automatically registered and checked annually.

It is clear that permit trading ranks first in what might be called the ‘economic hierarchy’ of the Kyoto Mechanisms. Neo-classical economic theory would then expect that decision-makers choose this optimal design. However, it is a well-known phenomenon that this has not been the case (e.g. Bressers and Huitema, 1999; Russell and Powell, 1999). The economic hierarchy is not the ‘political hierarchy’ of the Kyoto Mechanisms: politicians have mainly favoured sub-optimal designs. On the international level, since 1995, governments have experimented with (mostly bilateral) pilot phase projects without formal crediting, called Activities Implemented Jointly (AIJ). International permit trading is not up and running. This would require, first, the development of national permit trading schemes. However, also on a national level, governments have tended to favour forms of credit trading in climate policy, such as the Netherlands, Germany and even the US, an early advocate of carbon permit trading (similar to their SO\textsubscript{2} allowance trading scheme) that withdrew from the Protocol in March 2001 and proposed to use voluntary climate measures under a GHG intensity target with the possibility of transferring registered GHG reductions between firms.

Nevertheless, the political hierarchy is moving, in a differentiated fashion, and can evolve over time. In 2001, Denmark not only established a three-year obligatory permit trading scheme for the power sector, but the European Commission also presented a proposal for a Directive on permit trading in the EU for large emitters to
start in 2005. Since 2002, the UK combines credit trading with a voluntary and subsidized opt-in for firms to engage in permit trading. Eventually, at least in theory, the political hierarchy could converge with the economic hierarchy. However, permit trading still faces many political obstacles (e.g. Ellerman, 1998) and remains to be controversial (e.g. Tietenberg, 2002). Depending on the conditions under which the political barriers in this evolution can be overcome, it remains an open question whether the superior alternative of permit trading will become dominant in the future.

The usual explanation for the problematic acceptability of permit trading is searched in the resistance by interest groups, such as the energy-intensive industry (e.g. Dijkstra, 1999). Despite its merits, and its (limited) empirical relevance, this public choice approach has at least two disadvantages. First, according to the IPCC, by focusing mostly on interest group preferences this literature tends to neglect the preferences and concerns of governments who ultimately decide which instruments will be used (Banuri et al., 2001: 49). Second, the few authors that do consider the preferences of bureaucrats and politicians, such as Nentjes and Dijkstra (1994), do not take into account the legal or cultural aspects of their preferences, for instance related to equity. Looking at equity is important (albeit not sufficient) to explain the political (un)acceptability of the Kyoto Mechanisms: to illustrate, in the international climate change negotiations at the end of the nineties, the governments placed equity third on the international political agenda concerning the Kyoto Mechanisms, followed by effectiveness and efficiency on the fifth and fourteenth place respectively (BAPA, 1998: 23). To be able to pay more attention to equity, attitudes, institutions, legal issues and allocation problems, as desired by several authors (e.g. Ellerman, 1998; Kuik and Gupta, 1996), we look beyond public choice in this book and concentrate on the resistance by governments from the interdisciplinary perspective of (1) institutional economics, (2) law and economics and (3) political science.

The application of (neo-) institutional (law and) economics and political science allows us to analyze, among other things, the institutional problems and (political) transaction costs of permit trading as well as the formal and informal (equity-related) constraints posed to its implementation by international and European law and political culture respectively. Moreover, by doing so, we try to meet the demand of those scientists in the fields of environmental economics and policy that have called for more
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co-operation between scientific disciplines (e.g. Siniscalco, 1999: 1226), such as between economics and political science (e.g. Bressers and Huitema, 1999: 192). Moreover, political science is considered necessary but rarely applied to analyze the acceptability of market instruments (e.g. Moll and Biesiot, 1995: 78). In addition, some authors have emphasized the importance of testing political barrier hypotheses in the field of climate change politics empirically (e.g. Wiener, 2000: 41) or call for more empirical research, for instance on political culture, in areas of law and economics in general (e.g. Mackaay, 2000; Licht, 2001). In this book we perform such empirical analyses, including an opinion study about (limiting) emissions trading among high-level officials from the environmental ministries of EU Member States and from the European Commission.

Not only our topic and approach are relevant, but we have also taken the first steps to develop an innovative theoretical framework. Rather than focusing on vague terms like political ‘acceptability’ or ‘feasibility’, as most analyses of economic instruments for environmental policy have done in the past (e.g. Mullins and Baron, 1997; Jepma and Munasinghe, 1998; Koutstaal and Nentjes, 1995), we focus on political barriers and opportunities. The reason for this is that when governments have accepted and decide to use such an instrument, it still has to be effectively implemented. Analyzing the barriers in this process enables us not only to pay attention to political preferences (e.g. Moll and Biesiot, 1995), but also to political constraints (e.g. Goodin and Klingemann, 1996), including institutional, legal and cultural ones, which might prevent that (certain design variants of) the Kyoto Mechanisms are put into action. Therefore, we take the political barrier model as a starting point (e.g. Bachrach and Baratz, 1962). However, this traditional political science model, which sees the various stages of the political process (notably agenda-building, decision-making and policy-implementation) as potential barriers to policy-making, has been criticized for its weak theoretical basis. To enhance its theoretical foundations, we look at the aforementioned political barriers from a path dependence perspective. The analysis of path dependence is becoming increasingly popular in the literature on institutional evolution (Nelson and Sampat, 2001: 37) and political change (Pierson, 2000: 251). What is new is that we have developed an institutional lock-in theory based on this literature.
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Lock-in theory, which is also highlighted in a future research strategy document by the Netherlands Organization for Scientific Research (NWO) (Van den Bergh and Fetchenhauer, 2001: 30; 79), was initially developed in the literature on technological and economic change (e.g. David, 1985; Arthur, 1989). It shows why and when sub-optimal alternatives are difficult or impossible to replace (‘lock-in’) and when this is possible (‘break-out’) in the presence of a superior alternative, for instance by considering positive feedbacks, network externalities and set-up costs. North (1990) suggested to transform this evolutionary theory in such a way that it can be applied to study institutional change. This suggestion has been welcomed in institutional economics (e.g. Magnusson and Ottosson, 1997), law and economics (e.g. Field, 2000) and political science (e.g. Pierson, 2000) as a promising tool that deserves priority in research. We have taken up this challenge in this book by making some first moves to develop such a theory.

10.2 Political Barriers and Path Dependence

Unlike most literature on emissions trading, Haddad and Palmisano (2001) also took a much-needed evolutionary perspective by emphasizing the process of establishing GHG trading mechanisms and by focusing on implementation differences between permit trading and credit trading. However, although they mention Arthur’s work and pick up the terms ‘path dependence’ and ‘lock-in’, it should be emphasized that they do not apply (let alone elaborate) his particular evolutionary theory in the context of emissions trading. Furthermore, they restrict their analysis to issues of design and lobbying, without paying much attention to the impact of specific cultural and legal problems that contribute to the resistance against permit trading. Moreover, instead of making a normative claim that credit trading has ‘superior’ (adaptability and) fairness qualities like Haddad and Palmisano do, we have first nuanced the efficiency and effectiveness properties that make permit trading the superior alternative (thereby criticizing but also taking the neo-classical economic definition of superiority seriously) and then investigate on a detailed level, from a positive-theoretical perspective, barriers like ethical objections of political actors and equity-based provisions in international law.
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that contribute to the political resistance against full-scale implementation of permit trading.

Within political science, although many references are made to North in general, Pierson (2000) was the first and only one, to our knowledge, to follow North’s research advice to work out Arthur’s theory in an institutional context (without applying it to a particular subject like emissions trading). However, despite the merits of his approach and the validity of his general message, Pierson (2000) does not make explicit the nature of the analogies made to Arthur’s theory, does not make sharp analytical distinctions between the key concepts of the theory and tends to lump them together (for instance when he describes ‘increasing returns or path-dependent processes’ as ‘self-reinforcing or positive feedback processes’ (e.g. Pierson, 2000: 251; 263)) and, by focusing only on inertia, he does not systematically work out the conditions for (both) institutional (continuity and) change. We have tried to fill these analytical gaps in our book.

The administration costs of the government can be subdivided into the set-up costs of establishing an institutional arrangement (such as a policy instrument) and the running costs of continuing it. Set-up costs can be subdivided into sunk costs (of the existing arrangement) and switching costs (of a new arrangement). The former are not relevant for the decision itself whether or not to continue and extend the existing arrangement because they were made in the past, but switching costs are relevant when establishing a new one because they still have to be made. The perceived costs of switching to the superior alternative arise, for instance, from legal problems and cultural resistance. Of course, costs are not the nature of legal requirements or values themselves, but they do perform the role of switching costs when (and to the extent that) their content is unfavourable to change. Such switching costs play a more important role in issues of institutional change than in technological change, because institutions, in North’s (1990) framework, are in essence made up of legal (formal) and cultural (informal) constraints.

On a theoretical level, we have identified complete and incomplete analogies when transforming the techno-economic lock-in theory to an institutional setting. Contrary to what North (1990: 95, 103) and Pierson (2000) suggest, there is an incomplete analogy with increasing returns. Increasing returns is about production
quantities, but in an institutional context, average administration costs do not decline if policy-makers ‘produce’ more regulation or policy. What matters in the analogy is that differential administration costs decrease if the institutional scale increases, that is when decision-makers impose the existing instrument on more entities (horizontal scale increase) or incrementally improve its design (vertical scale increase). Such positive network externalities as well as learning effects (which lower the average costs of running the existing system) strengthen a lock-in. Not so much increasing returns, but rather other positive feedback mechanisms (among other things) help to explain an institutional lock-in. By considering not only set-up costs, but also the role of networks, learning, culture and perceptions, institutional lock-in theory (builds upon but) goes beyond transaction cost theory.

Institutional lock-in theory allows us to state more precisely why and when political barriers are (in)effective. The political barriers are defined by the conditions for an institutional lock-in. These conditions are the existence of a superior alternative (in our case permit trading), a problem-solving capacity of existing policy which is perceived to be increasing or stable, incomplete information and/or large switching costs. The political opportunities are defined by the conditions for an institutional break-out (which mirror those of a lock-in as long as they are reversible), namely a deteriorating problem-solving capacity of existing policy, the improvement of information quality and/or decreasing switching costs.

If policy-makers perceive current policy, despite its inefficiency, to be more or less effective, they will not pay much attention to the superior alternative (which, by definition, has lower running costs and may also have a higher problem-solving capacity). Building upon the distinction made by Liebowitz and Margolis’s (2000) between degrees of path dependence, it is necessary and sufficient for a second degree lock-in to occur that information about the superior alternative is absent or incomplete as well as insufficient to understand its characteristics and consequences. When decision-makers know and largely understand the superior alternative, but still do not choose it (which is the most interesting case), switching costs must be large for a third degree lock-in to occur. Whether this is also sufficient depends on the case: a lock-in becomes more likely when there are more self-reinforcing mechanisms at work (such as network externalities that lower the running costs of the dominant arrangement).
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For a break-out, there must be a known superior alternative (for instance only in the literature or in foreign policy settings). A (sudden) decrease in the problem-solving capacity of existing policy is required to make the dominant institutional arrangement become unattractive. The alternative must become known and understood (for instance by means of experiments) to overcome second degree lock-in. Perceived switching costs must be lowered to overcome third degree lock-in: this happens when legal problems are solved and when culture changes. The opposition of vested interests can be reduced, for instance by means of financial incentives, but this requires, which must be stressed, that the government is in favour of the switch and has no normative (or legal) objections against the superior alternative in the first place. The probability of a break-out becomes higher if and to the extent that more conditions for a break-out are fulfilled. A break-out actually comes about when set-up costs have become small enough to make the superior alternative (including its running costs) less expensive than the costs of continuing and/or extending the dominant institutional arrangement. However, such changes can take several years, or even decades, to materialize.

In general, North (1990: 89) observes that institutional change is ‘overwhelmingly incremental’. In particular, Bressers and Huitema (1999: 180) observe that new economic instruments for environmental policy are often based on existing legal instruments. This is reflected in the so-called ‘parallel institutionalization hypothesis’ (e.g. Ruiter, 2000), which contends that new institutional arrangements will exhibit a high degree of parallelism to the old arrangements. Institutional lock-in theory helps to explain why this is the case, for instance by considering (perceived) set-up costs and positive feedbacks. We have developed and applied this theory in the context of emissions trading. Permit trading imposes emission ceilings by explicitly (re)allocating property (or user) rights, but credit trading and JI use existing environmental policy as the baseline from which to calculate the (tradeable) emission reductions. The implication, to speak in Lindblom’s (1959) terms, is that the latter flexibility options are incremental, whereas permit trading is not. Institutional lock-in theory demonstrates why this is an advantage and what makes credit trading and JI easier to accept and implement in politics than permit trading.

Credit trading and JI are incremental options which make use of the sunk costs of existing policy as well as of the network and learning advantages it generates. Permit
trading faces relatively large switching costs because of the specific legal problems and cultural resistance that arise from its explicit (re)allocation of property (or user) rights. Nevertheless, we also stress that a break-out is possible if such problems and frictions are reduced. Moreover, incrementalism does not preclude permit trading, which can be implemented step-by-step by starting with only a few sectors first, but it does require a switch to a new institutional arrangement by establishing it from scratch, which is more costly than introducing flexibility into the existing institutional arrangement by means of credit trading.

We have studied the political hierarchy of the Kyoto Mechanisms, on the basis of law and economics and political science, by focusing on the formal and informal constraints to implement them. We have done this by analyzing the legal as well as cultural barriers and opportunities of these mechanisms, in particular with respect to the superior alternative of permit trading that ranks highest in the neo-classical economic hierarchy. However, in our book we have started to criticize this economic hierarchy, on the basis of (neo-)institutional economics, and nuance the superiority of permit trading by analyzing its institutional barriers and opportunities.

10.3 **Institutional Barriers and Opportunities**

A famous technological example of the survival of a sub-optimal design is the study by David (1985) who argued that the QWERTY keyboard is inferior compared to its alternatives, such as the allegedly more efficient keyboard designed by Dvorak. As part of the explanation why the QWERTY keyboard persists despite the superiority of the Dvorak keyboard, Liebowitz and Margolis (2000) argue that the latter keyboard was in fact not as superior as David (1985) claimed. In a similar fashion, as part of the explanation why permit trading does not rank first in the political hierarchy of the Kyoto Mechanisms, we have criticized and nuanced the economic hierarchy by demonstrating that the environmental and economic advantages of permit trading over the other Kyoto Mechanisms are not as straightforward as neo-classical economics suggests.
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Environmental effectiveness

One element of the theoretical superiority of permit trading is that it is considered to be more environmentally effective than the other flexible instruments (e.g. Tietenberg et al., 1999). We have nuanced this traditional view in environmental economics by analyzing not only the institutional barriers that undermine the effectiveness of emissions trading, but also the institutional opportunities that improve the effectiveness of JI and the CDM.

Our institutional economics approach makes a distinction between a formal and an ethical interpretation of environmental effectiveness. Formally, effectiveness is achieved if the official aggregate emission target is attained. Ethically, effectiveness is achieved if aggregate emissions are reduced below the official target by refraining from those economically attractive actions that are legally possible but that would result in higher emissions or less emission reductions than without those actions.

JI and the CDM face the micro-baseline problem of estimating future emissions at the project site in the absence of the project. Traditional environmental economics analysis is right to conclude that these mechanisms do not guarantee effectiveness on an (inter)national level. For instance, if future emissions are overestimated by setting the baseline too high, emission reductions will be credited that have not in fact occurred. However, neo-classical analysis does tend to neglect or underestimate the following institutional opportunities to improve the effectiveness of the micro-baseline (e.g. Jepma et al., 1998).

Firstly, ex post baseline corrections can be applied. This means that baselines are adjusted during the project if the actual circumstances deviate significantly from the ex ante baseline assumptions. The advantage is that it increases the likelihood that generated credits are based on real emission reductions. The disadvantage is that it raises transaction costs by magnifying uncertainty about the amount of credits the project will generate. Secondly, baselines can be standardized. Although firms may enter JI and the CDM as ‘free-riders’ (by trying to get credits for projects that would have been implemented anyway for commercial reasons), standardization means that project partners have less possibilities to claim more credits by inflating baseline emissions. Another advantage is that it reduces transaction costs, because it will not be
necessary anymore to construct a baseline for each individual project. This transaction cost advantage makes standardization politically more acceptable than baseline adjustments (as demonstrated by the Marrakesh Accords in which the former was actually mentioned). Moreover, an element of ex post baseline corrections can be introduced by verifying the standardized baselines after some period and adjust them on environmental grounds if necessary.

We have also emphasized that emissions trading, contrary to the standard view, has a baseline problem of its own. Several economists assume that the emission ceiling for a country is (or should be) set lower than its macro-baseline of business-as-usual emissions (e.g. Anderson et al., 1999). However, this assumption is not met in the reality of the Kyoto Protocol. There is a gap between the emission ceiling and projected business-as-usual emissions for some countries, such as the Russian Federation and the Ukraine. If they sell their surplus, it will lead to what is called hot air trading. This means that assigned amount units, which would otherwise have remained surplus in the first commitment period, are mobilized and used to cover emissions that would not have been allowed in the absence of emissions trading. This is not possible in JI projects that involve reductions relative to actual emissions (provided that the micro-baseline is correct).

Several neo-classical economic studies recognize the existence of hot air, but do not regard it as problematic, arguing that hot air is an allocation aspect that neither affects efficiency nor formal effectiveness. They take an ex ante perspective on the negotiations (in which the targets are not seen as given) and show that hot air is a side-payment (or ‘bribe’) to make the emission ceiling acceptable for some countries. The negotiating behaviour of governments from CoP3 (the third Conference of the Parties) to CoP7 demonstrates that this is actually the case. Moreover, without the hot air, the assigned amounts might have been less stringent to an extent that exceeds the volume of hot air in the Kyoto Protocol. However, institutional economics analysis also applies an ex post perspective on the negotiations by taking the targets as given. It recognizes that hot air trading does not affect formal effectiveness, but also shows that it disturbs effectiveness in its ethical interpretation, because it makes overall emissions higher with than without emissions trading. This nuances the traditional view that emissions trading is perfectly effective. Moreover, hot air is an institutional feature that becomes an
institutional barrier to get emissions trading up and running once actors view hot air as problematic and start to block the implementation of the scheme. This actually happened when the EU proposed, after the targets were negotiated, to limit hot air by restricting trading.

In their model, Klaassen and Nentjes (2002) show that buyer liability improves effectiveness (compared to seller liability) if buyers have a stronger willingness to comply than sellers and if the enforcement system is weak. They also argue that these conditions are likely to prevail under the Kyoto Protocol. The adoption of buyer liability would then strengthen compliance incentives by discouraging buyers to purchase tons of emission reductions from countries that appear to be heading towards non-compliance, but it would raise transaction costs by creating price uncertainty until the moment that compliance is checked. Under seller liability (as currently in place), buyers are more likely to become active in the market because they do not bear this risk. The issues of ex post micro-baseline corrections and liability design also illustrate that, even in the realm of economic instruments for environmental policy, choices that imply some trade-off between the economy and the environment cannot be avoided.

We have demonstrated that inherent environmental uncertainties are not restricted to abatement projects, but may also be present in emissions trading systems. Our conclusion that permit trading is not as effective and the other Kyoto Mechanisms are not as ineffective as neo-classical economists contend, is one part of the explanation why permit trading does not rank first in the political hierarchy of the Kyoto Mechanisms.

Cost-effectiveness

After considering environmental effectiveness, we turned to cost-effectiveness. Although tradeable permit schemes are efficient, we have nuanced the economic hierarchy by arguing that their potential for cost-savings becomes smaller when only a few sectors are included to gain step-by-step experience. Furthermore, on an international carbon trading market where the Kyoto Mechanisms compete, as they can all be defined in dollars per tonne of CO\textsubscript{2}-equivalent, it may be cheaper for a buyer to purchase certain (JI or) CDM credits, for instance resulting from forestry projects, than
purchasing emission permits. However, several institutional restrictions on the use of various of such low-cost projects have been created, such as limits on the use of sinks, mainly for environmental and political reasons. This shows that some design features serve policy goals other than cost-effectiveness (such as environmental integrity) and make particular Kyoto Mechanisms less cost-effective than would have been possible. The necessity to make such trade-offs constitutes an additional institutional barrier to implementing the Kyoto Mechanisms.

A downstream permit trading scheme that directly includes both large and small emitters is most efficient, but it would also involve high administrative costs to monitor many traders. To cope with this institutional problem, we build upon Koutstaal (1997) and present a ‘downstream trading and upstream monitoring’ design that keeps administrative costs low by concentrating the monitoring activities on the level of fossil fuel producers and importers (upstream), and by distributing the permits to large and small emitters and using chipcard technology for households and car drivers (downstream). Nevertheless, politicians could decide to include fewer sectors in the trading scheme than assumed in the permit trading ‘blue-print’ to facilitate incremental change and administrative learning. One economic implication of such institutional considerations is, again, that the potential for cost-savings becomes smaller. An example is a mixed trading scheme, as initially proposed by the EU in a Green Paper (COM, 2000), that allocates tradeable permits to large emitters, but not to small emitters (such as households and car drivers) who are regulated by other instruments, such as energy-efficiency standards, carbon taxes or voluntary agreements.

Including banking under JI (currently not allowed) and enlarging the legal scope for sinks under the CDM (currently restricted) are institutional opportunities that would lead to lower costs per unit of emission reduction. We have provided numerical illustrations of this by adjusting emissions reduction cost data (using simple mathematical formulas) of 94 AIJ pilot phase projects. These data have been derived from the Uniform Reporting Formats (URFs) of 1998 submitted by AIJ project partners to the FCCC Secretariat. This undeniably poses a substantial limitation to our analysis here, because the uncredited AIJ projects are not fully representative of credited JI and CDM projects, but the advantage is that we study a large number of projects empirically instead of studying cost-effectiveness only theoretically or only in a few empirical case.
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studies. Nevertheless, the relevance of our calculations, to use a citation of Manne and Richels (1998: 22), ‘lies more in insights than in numerical values’.

Dividing the total amount of investment funds by the total emission reduction for each project yields an average cost figure per unit of emission reduction for AIJ projects in general of 46 $/tCO$_2$-eq. Including banking (‘early action’) for projects in Central and Eastern Europe would lower the credit costs for JI Article 6 projects (from 97 to 37 $/tCO$_2$-eq). Enlarging the legal scope to use sinks in developing countries would lower the credit costs for CDM projects (from 158 to 103 $/tCO$_2$-eq). Moreover, when considering only the low-cost options (by excluding AIJ projects with costs per unit of emission reduction of 100 $/tCO$_2$-eq and higher), the CDM appears to have a huge potential of cheap projects (9 $/tCO$_2$-eq with banking and without sinks), for instance compared to JI (26 $/tCO$_2$-eq without banking and with sinks). Allowing all types of forestry projects under the CDM would lower these costs even further (6 $/tCO$_2$-eq). However, the reader should keep in mind that credit costs are not credit prices, which will be determined by supply and demand.

The large economic potential of sinks illustrates the difficult trade-off that has been made by excluding forestry options largely from the CDM (CP, 2001a). Apparently, the CoP gave priority to environmental effectiveness. Use of sinks was limited, for instance because it does not facilitate technology transfer and because the perception dominated that the technical methodologies are not sufficiently developed to make sure that the carbon sequestration of maintaining existing forests is calculated and monitored adequately. Since CDM host countries do not have a national emission target, it was feared that allowing sinks, in particular CDM projects aimed at protecting existing forests, could lead to non-additional credits, thereby inflating the overall emission ceiling of Annex B Parties. Trade-offs between cost-effectiveness and other policy goals pose a barrier to decision-making and, once a decision is made, define the institutional constraints and thus the possibilities for cost-savings of the flexible mechanism involved.

We have demonstrated that the economy-wide theoretical cost-savings of permit trading will not be reached if politicians choose for a limited permit trading design in a trade-off with other policy goals, such as institutional learning, and that the CDM and JI, despite their institutional restrictions, include relatively cost-effective projects as
calculated on the basis of cost data from real-life AIJ projects. This nuances of the neo-
classical economic hierarchy of the Kyoto Mechanisms is another (albeit modest) part
of the explanation why permit trading does not rank first in the political hierarchy. A
different (and stronger) explanation can be found in transaction cost analysis.

*Market transaction costs*

The survival of sub-optimal designs, such as JI and the CDM, could not be explained by
neo-classical economic theory, which would expect that decision-makers choose the
superior alternative of permit trading. A potential next direction to search for an
explanation is provided by new institutional economics, which is usually associated
with transaction cost economics (TCE) as initiated by Williamson (1975). It builds upon
neo-classical economics and contends that the alternative with lowest transaction costs
in the market will survive. Market transaction costs are the costs of transferring property
(or user) rights between parties in a market. These costs include search costs,
negotiation costs, approval costs, monitoring costs, enforcement costs and insurance
costs (Dudek and Wiener, 1996). However, this neo-classical branch of transaction cost
theory is unable to explain that governments do not choose permit trading, because it is
considered to have lower transaction costs than the credit-based approaches (e.g.
Tietenberg et al., 1999). This is usually defended by arguing that credit-based
approaches like JI and the CDM require advance approval because of the baseline
problem, whereas permit transfers can be automatically registered and checked
annually.

We have criticized and nuanced this traditional transaction cost hierarchy of the
Kyoto Mechanisms in four ways. First, we have analyzed the institutional opportunities
that lower market transaction costs for credit trading, JI and the CDM. Second, we have
analyzed the institutional barriers that increase the market transaction costs of permit
trading. Third, we have presented an overview of empirical studies on the transaction
costs in credit and permit trading markets. Fourth, we have expanded the theoretical
analysis with a neo-institutional economics approach by considering the political
transaction cost of the Kyoto Mechanisms. Political transaction costs are the costs of
creating and defining property (or user) rights through political, administrative or
judicial decisions (e.g. North, 1990). These costs arise from setting up a market. Examples of such set-up costs are the costs of gathering and processing information, the costs of developing the required legal framework, the costs of (re)allocating property (or user) rights, and the costs of dealing with lobbying efforts and cultural resistance.

Next to learning effects, the market transaction costs of JI and CDM projects can be lowered (although they tend to raise set-up costs) by standardizing (baseline) procedures, strengthening institutional capacity-building and developing multilateral funds. In addition, a ‘fast’ track for JI projects has been created at CoP7 in 2001 to lower transaction costs. If a host Party has a reliable emission registration system (according to Protocol Articles 5 and 7), a host Party may verify reductions as being additional. Otherwise, verification must occur along a ‘slow’ track via the Article 6 Supervisory Committee more or less similar to the CDM project cycle. This makes CDM transaction costs relatively high, despite the cost-saving opportunities mentioned above, although baseline standardization could be applied to control these costs.

For reasons other than efficiency (such as environmental integrity or administrative transparancy), trading rules and market designs could be established that raise market transaction costs for international permit trading under IET Article 17. An example is buyer liability in which the permit buyer is liable for seller non-compliance. Despite its environmental advantages, as discussed before, it also raises transaction costs because the buyer must check whether the seller is in compliance or not. Another example (as discussed later on) is the proposal of the EU, now abandoned, to place a quantitative ceiling on the use of the Kyoto Mechanisms, for instance to restrict hot air trading, which would have required a pre-approval of each trade to make sure that a transaction does not fall behind that ceiling. This underlines once more that trade-offs between the economy and the environment must be made when implementing the Kyoto Mechanisms.

To facilitate incremental change and learning, politicians could also decide to start with a small market, for instance by allocating permits only to fossil fuel producers (upstream system) or to large emitters (mixed system). In principle, transaction costs increase as the number of traders decreases (e.g. Pearce, 1995; Stavins, 1995), although the transaction costs per tonne of carbon traded are lowered again if this also means that the size of the transactions becomes larger. If there are less potential traders (than in the
theoretical ideal of the downstream system), transactions are likely to occur less frequently, which makes the market ‘thinner’. This could increase price uncertainty on the market, which complicates the bargaining process between buyers and sellers and adds to their information and bargaining costs. It may then also be more difficult to find a suitable trading partner, although information facilities (such as a clearing-house) and brokers could reduce this potential problem.

The empirical studies reviewed have reported relatively high as well as relatively low transaction costs (roughly around 1 to 10% of the transaction value) for various types of emissions trading markets and emission reduction projects (e.g. Michaelowa and Stronzik, 2002; Hargrave et al., 1999b; Klaassen and Nentjes, 1997). Although the empirical evidence turned out to be both limited and mixed, it is also clear that the early credit-based emissions trading systems in the US as well as the experimental and international market for AIJ projects experienced higher transaction costs (sometimes even more than 20%) than the well-established and domestic SO\textsubscript{2} allowance trading market in the US (about 1%). These figures illustrate that design matters. Nevertheless, all of these data are difficult to compare systematically, for instance because each market has its own typical transaction costs and because different studies do not seldomly focus (implicitly) on different types of transaction costs (e.g. search costs versus approval costs). The transaction costs of pilot phase projects are likely to be an upper bound for the transaction costs of JI and CDM projects, because of the experimental character of AIJ and because of the aforementioned opportunities to lower such costs.

Our conclusion that market transaction costs need not be as low for permit trading and not be as high for JI and the CDM as standard environmental economics analysis assumes, is another part of the explanation why permit trading does not rank first in the political hierarchy of the Kyoto Mechanisms. The institutional argument becomes even stronger when looking at the political transaction costs of the various flexible instruments.
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Political transaction costs

From a neo-institutional economics perspective, the political transaction costs of setting up the Kyoto Mechanisms are relatively high for permit trading, because they largely replace existing environmental policy by explicitly (re)allocating property (or user) rights, whereas credit-based approaches have lower set-up costs because they can use existing environmental policy as the baseline from which to calculate the (tradeable) emission reductions. In general, political transaction costs are likely to increase if the regulatory instrument deviates more from the status quo (e.g. Rolph, 1983; Welch, 1983; Krutilla, 1999), for instance because this could intensify legal incompatibilities, cultural resistance and lobbying activities. In addition, North (1990: 51) suggests that political transaction costs are higher (and more difficult to measure) than market transaction costs. If this is also true for the Kyoto Mechanisms, then political transaction costs (instead of market transaction cost considerations) will dominate governmental decision-making and political developments, which helps to explain that credit-based approaches are more easy to implement than permit trading schemes.

In the rest of the book we have mainly analyzed the legal problems and cultural resistance that contribute to these political transaction costs by taking a step beyond transaction cost economics towards (neo-institutional) law and economics and political science. This is necessary because politics and historical evolution are more than transaction cost minimization (e.g. Magnusson and Ottosson, 1996: 351). Laws and culture may act as set-up costs, but the values and equity considerations that partly characterize them can not be analyzed in terms of costs alone. By considering not only the incremental role of transaction costs, in the form of set-up (sunk and switching) costs, but also of learning, positive network externalities and institutions in the form of values, the path dependence approach in general (and institutional lock-in theory in particular) builds upon but goes beyond transaction cost theory (e.g. Nooteboom, 2000: 105, 112). The analysis has been continued in a framework that is able to deal not only with the effectiveness and efficiency, but also with the equity impacts of the Kyoto Mechanisms. By doing so we have shifted from nuancing the economic hierarchy to explaining the political hierarchy of the Kyoto Mechanisms.
10.4 Legal Barriers and Opportunities

Although permit trading ranks highest in the economic hierarchy of the Kyoto Mechanisms, it appears to be relatively difficult to accept in politics. Legal barriers that are unique for permit trading and hinder its implementation add to the switching costs of this superior instrument and contribute to the institutional lock-in situation, whereas the legal opportunities to overcome these barriers could facilitate a break-out.

Rather than criticizing the economic hierarchy from an institutional economics perspective, as we have done above, a closer look is taken at the political hierarchy by analyzing the issue of initial permit allocation from the perspective of (neo-classical and neo-institutional) law and economics (as well as political science). Although various economists describe permit allocation as the most important political barrier to implementing permit trading (e.g. Ellerman, 1998; Endres, 1999), they find it difficult to explain this political phenomenon, because all permit allocation options have similar efficiency consequences (as the Coase Theorem learns). However, we have demonstrated that these options could have different legal consequences under WTO (World Trade Organization) subsidization law and under EC (European Community) state aid law when equity considerations are taken into account. We are the first to analyze both types of potential formal constraints systemically in an interdisciplinary positive-theoretical framework.

There are two possible permit allocation methods: emission sources have to buy the permits (auctioning) or they get them for free (grandfathering). We did not make a comparison between (the potential competitive distortions of) permit trading and credit trading, because there is de facto no choice between grandfathering and auctioning under credit-based approaches. A major issue is whether international differences in domestic permit allocation procedures will lead to competitive distortions. We have distinguished between two different definitions (or: interpretations) of the competitive distortion concept. According to neo-classical economics it is a distortion of efficient competition, according to neo-institutional economics it can also be a distortion of fair competition.

In the efficiency approach, assuming perfect competition, grandfathering does not distort competition. The reason is that not only auctioning, but also grandfathering
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entails costs for firms: grandfathered permits have an opportunity cost when they are used for covering the emissions of the permit owner (e.g. Grafton and Devlin, 1996; Nentjes et al., 1995). The opportunity cost is the revenue foregone by not selling the permits but using them in producing output. This opportunity cost, which is equal to the price for which the permit can be sold, must be included in the product price. Instead of using them, the firm could have sold the permits.

In the equity approach, grandfathering distorts competition when permits are auctioned abroad, because grandfathered firms are financially advantaged over their auctioned competitors. A grandfathered firm has more financial resources than a comparable auctioned competitor abroad (ceteris paribus), because grandfathering implies a capital gift. Although the lump sum-subsidy of grandfathering may not affect efficiency, it does affect equity because a comparable firm abroad which has to buy its permits has a higher cash outflow and hence less financial resources. This means that (fair) competition is distorted: the permit allocation itself leads to unequal changes of the financial positions and competitive relations (the ‘level playing field’) among comparable firms. The mere process of permit allocation gives the grandfathered firms a stronger financial position and thus an unfair financial advantage over their auctioned competitors abroad.

The standard view in environmental economics learns that the political acceptability of permit trading is (reduced by the financial burden of auctioning and) increased by the financial benefit of grandfathering for the energy-intensive industry (e.g. Dijkstra, 1998). However, this public choice approach does not explain why governments perceive permit trading with grandfathering as problematic (e.g. Dijkstra, 1998: 159). We have shown that part of the explanation can be provided on the basis of legal and equity considerations, first in the context of WTO law and then in the context of EC law.

WTO subsidies law

According to Articles 1 to 6 of the WTO Agreement on Subsidies and Countervailing Measures (ASCM) a ‘subsidy’ is deemed to exist if there is a financial contribution by a government which confers a benefit to a specific enterprise/industry and involves a
(potential) direct transfer of funds, or if government revenue that is otherwise due is foregone or not collected. An ‘actionable subsidy’ is deemed to exist if the subsidy causes adverse effects or serious prejudice to the interests of other WTO Members, such as injury to their domestic industry.

Grandfathering is not an actionable subsidy in the efficiency interpretation of competitive distortions. There is no benefit because of its opportunity costs and the auctioned industry abroad is not injured as grandfathering does not affect efficiency. However, grandfathering could be seen as an actionable subsidy in the equity interpretation of competitive distortions, because grandfathered firms have a stronger financial position than their auctioned competitors abroad. This means that grandfathered firms have a benefit, which could be seen as to affect the interests of the domestic industry in the country that uses auctioning. Moreover, grandfathering could imply that revenue otherwise due is foregone, because the government would otherwise have collected revenues in the alternative of auctioning.

If grandfathering would be regarded as a subsidy, it could in principle be exempted by labelling it ‘non-actionable’ on the basis of Article 8 of the ASCM. However, this is only possible if the assistance promotes the adaptation of existing facilities to new environmental requirements, provided (among other things) that it is a one-time non-recurring measure and that it is limited to 20 percent of the cost of adaptation. This stringent provision could imply that only a one-time allocation of grandfathered permits is allowed (not each year) and that some part of the permits must be auctioned as only a limited amount of permits can be handed over for free to firms.

This law and economics perspective is supplemented with a political science perspective that focuses on perceptions in politics. Instead of some ‘objective’ economic theory or equity principle, actors in the political process will make decisions based upon their ‘subjective’ perception about whether grandfathering can lead to competitive distortions and actionable subsidies. The fact is that concerns about competitive distortions with regard to emissions trading have actually been raised in the international climate change negotiations, for instance by the EU. Moreover, there is a perceived legal ambiguity about whether grandfathering constitutes an actionable subsidy (e.g. Parker, 1998), also within the WTO itself (e.g. Vaughan, 1999). These concerns have inspired a few (mainly European) authors to plead in favour of the
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international harmonization of permit allocation rules (e.g. Lefevere and Yamin, 1999), but most authors, in particular economists, do not support harmonization primarily by following the opportunity cost argument (e.g. Hargrave et al., 1999; Zhang, 1999). In the context of the FCCC, politicians have not formulated or adopted concrete proposals in favour of coordinating permit allocation yet, either because they expect it to be politically unacceptable or because they find it undesirable, for instance from a state sovereignty point of view.

EC state aid law

From the context of the FCCC, we have turned to the EU. Grandfathering and auctioning could have different legal consequences under EC state aid law when equity considerations are taken into account. The European Commission fears that if one Member State uses grandfathering, while another uses auctioning to allocate their permits to private entities, gratis allocation could be seen as to distort competition and lead to state aid concerns (e.g. COM, 2001a: 11; COM, 2000a: 5).

Article 87(1) on state aid as formulated in the EC Treaty determines that ‘(...) any aid granted by a Member State or through State resources in any form whatsoever which distorts or threatens to distort competition by favouring certain undertakings or the production of certain goods shall, in so far as it affects trade between Member States, be incompatible with the common market’. In addition, the European Commission (COM, 2000b) uses four criteria to determine whether or not a measure is to be regarded as state aid incompatible with the common market, namely: (a) state origin, (b) firm advantage, (c) specificity and (d) trade effect.

Grandfathering is not state aid in the efficiency interpretation of competitive distortions. Grandfathered firms are not favoured, because they have to include the opportunity costs of their permits in the product price. Moreover, trade is not affected, because grandfathering does not affect efficiency. However, grandfathering could be seen as state aid in the equity interpretation of competitive distortions, because the state favours specific firms by giving them a financial advantage over their auctioned competitors in another Member State. This affects trade, not in efficiency terms, but in financial terms by altering the level playing field between firms. Although there is not a
genuine transfer of resources from the government, the state origin criterion is also satisfied if the State will receive less revenues as in the case of grandfathering which amounts to giving the (hypothetical) auction revenue to the polluters (cf. Welch, 1983: 168). In this view, it is desirable, or even necessary, to harmonize permit allocation procedures (for which there are also more legal possibilities under EC law than under WTO rules (Vikhlyaev, 2001)).

If grandfathering is seen as degressive operating aid, the Community guidelines on State aid for environmental protection (OJ, 2001) suggest that 100% of the permits may be grandfathered in the first year, but it must have fallen to 0% by the end of the fifth year. If grandfathering is regarded as non-degressive operating aid, firms may receive no more than a certain percentage (for instance 50%) of their permits for free. In the first case, grandfathering can only be a transition phase (of at most five years) towards a fully auctioned scheme, in the second case only a limited part of the permits is allowed to be grandfathered.

Nevertheless, even if grandfathering would be regarded as state aid, it could in principle be exempted on the basis of both Article 87(3) and the aforementioned guidelines on state aid (OJ, 2001). These exemptions are broad compared to similar provisions under WTO subsidies law: state aid can be allowed if the aid promotes the execution of an important project of common European interest, remedies a serious disturbance in the economy of a Member State, facilitates the development of certain economic activities or areas, or it can be allowed if the European Council decides that the aid is compatible with the common market. Moreover, the aforementioned guidelines that were revised in 2001 place a stronger emphasis on cost internalisation than the previous guidelines of 1994, which seems to support grandfathering because of its opportunity costs.

Next to this law and economics analysis, a political science perspective is taken. The discretionary power of the European Council to decide – on the basis of a proposal by the Commission – that grandfathering is exempted from the state aid provisions means that a political decision will be pivotal to the issue of grandfathering. Financial and equity arguments are likely to play a role in such a decision, not only with a view to the historical relevance of the level playing field argument in European environmental legislation (Hargrave et al., 1999: 11) as well as in state aid policy (Cini and McGowan,
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1998: 158), but also considering the continuously recurring reference made by the Commission in its Green Paper on GHG emissions trading in the EC to ‘fair competition’, ‘conditions for equal competition’ and a ‘level playing field’ for firms (e.g. COM, 2000a; 12, 14, 15).

By applying the law and economics theory to the state aid cases of permit trading in Denmark and the UK, we also take an empirical approach as several authors desire (e.g. Mackaay, 2000). Interestingly, in its decisions of April 2000 and November 2001, the European Commission considered the grandfathering in Denmark and in the UK to be state aid by using the state origin criterion: the State foregoes revenue which could derive from auctioning the valuable permits (COM, 2000d; COM, 2001d). Nevertheless, the Commission exempted the aid in both cases by using environmental, economic, legal as well as political arguments: the grandfathering was allowed as state aid, among other things, by following EC Article 87(3)(c) on developing certain activities or areas and by stating a political desire to gain experience with and prepare for emissions trading. Although the Commission mentioned neither the impact of opportunity costs nor the desire for a level playing field, grandfathering was interpreted as a wealth transfer which could affect the equal treatment of firms. This sets a political (albeit not legal) precedent in the EU to interpret grandfathering in terms of equity.

The latter conjecture is also supported by the Commission’s proposal for a Directive on GHG permit trading in the EU (COM, 2001a) and the reaction on this proposal by the European Parliament (EP, 2002). The Commission proposed to harmonize the method of allocation, because without such harmonization, ‘competition may be distorted’ (COM, 2001a: 11), which is consistent with the equity view. In this matter, the European Parliament can block a decision by the Council because the codecision procedure applies. Although the Commission wants to postpone a decision on (harmonizing) permit allocation, the Parliament has proposed to make clear now that 100% auctioning will have to be used in all Member States during the period 2008-2012 (when legally binding targets come into effect) with a view to, among other things, the polluter pays principle. This perceived link between auctioning and the polluter pays principle also reflects the equity view, that focuses on the financial (and not the efficiency) aspects of permit allocation, for the following reasons.
Chapter 10

The law and economics analysis performed above can be used to shed more light on the issue whether grandfathering is compatible with the polluter pays principle, a cornerstone of European environmental law (that plays a much smaller role in the WTO (Vikhlyaev, 2001: 32)). There are problems of interpretation associated with this principle, for instance with respect to the question of who is the polluter and how to define costs (e.g. Steenge, 1997: 122). The European Commission (COM, 2000a: 18) explicitly stated that auctioning applies the polluter pays principle, because polluters literally pay for their pollution by means of purchasing the permits from the government. On the one hand, from an opportunity cost perspective also grandfathering is compatible with this principle: grandfathered firms do not pay for their emissions, but they have to include the opportunity costs of holding the permits in the product price and they do pay for their emission reductions. On the other hand, grandfathering can also be interpreted as a wealth transfer from the public to the polluters (e.g. Burtraw et al., 2001; Grafton and Devlin, 1996; Welch, 1983), which implies that the ‘public pays’ – or that the ‘government pays’ (Tietenberg, 1980) – by giving the polluters the revenues that the public (or the government) would have received in the case of auctioning.

Grandfathering could be seen as to conflict with the polluter pays principle and with the rules on state aid, depending on whether decision-makers take an efficiency or equity perspective. This kind of potential legal barriers and political complexities tend to add to the switching costs of permit trading. In an economic world without law and politics, grandfathering will not be seen as a distortion, because it does not affect efficiency. However, in a world where equity and level playing field considerations could play a role, the issues of competitive distortion, state aid and harmonizing domestic permit allocation methods gain potential relevance in developing an international or European carbon trading market. Nevertheless, there is an opportunity to overcome this potential barrier, because even then politicians could decide to allow grandfathering on efficiency or state sovereignty grounds, which would facilitate a break-out.

Rather than focusing on interest groups, we have directed our analysis at governments by explicitly analyzing the interface between politics, economics and law. Although grandfathering is financially more attractive and acceptable to firms than
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Auctioning, it is unclear whether grandfathering is also acceptable to governments because it could constitute an actionable subsidy under WTO law or state aid under EC law if it is seen as a distortion of fair competition. The potential role of equity as well as this perceived legal ambiguity add to the switching costs of permit trading, which makes this superior alternative politically less attractive to implement than neo-classical economics would expect, and contribute to the institutional lock-in situation. Equity also turned out to play an important role in the next part of the book that focuses on political culture in relation to government objections against emissions trading.

10.5 Cultural Barriers and Opportunities

After analyzing the formal constraints posed by WTO and EC law, the political hierarchy of the Kyoto Mechanisms was further explained from a political science perspective by analyzing the informal constraints that cultural objections pose to implementing emissions trading. Cultural barriers contribute to the institutional lock-in situation and cultural change provides an opportunity for a break-out. Culture can be operationalized in terms of values (e.g. Almond and Verba, 1965). Values, such as equity, engage moral considerations and can be defined as ‘conceptions of the desirable’ (Van Deth and Scarbrough, 1995: 28). Values are not directly observable, but attitudes are.

The set of attitudes researched, on the basis of a set of hypotheses that we have developed, consist of the opinions of high-level EU officials (from the environmental ministries of EU Member States and from the European Commission) about the European supplementarity proposal. This proposal was meant to elaborate those parts of the Kyoto Protocol which require that the Kyoto Mechanisms shall be ‘supplemental’ to domestic action (Articles 6.1(d), 12.3(b) and 17). Prior to CoP6 held in The Hague in 2000, the EU proposed to elaborate supplementarity by means of a quantitative restriction on the use of the Kyoto Mechanisms (EU Council, 1999). This proposal roughly implied that 50% of the Kyoto commitments should be achieved domestically. Although this self-imposed barrier to trade was largely rejected at CoP6 Part II held in Bonn in 2001 (as part of a compromise with countries like the US, Canada and Japan that pressed for unrestricted trading), an analysis of the EU proposal is still useful to lay
bare the underlying values of why some governments wanted to limit the Kyoto Mechanisms in general and permit trading in particular.

Theoretical analysis of attitudes

The EU proposed a quantitative restriction on the use of the Kyoto Mechanisms to prevent a situation in which the agreed emission targets would be met solely by means of trading greenhouse gases. To find out on a detailed level why the Europeans wanted to prevent such a situation, we have systematically elaborated – and criticized – various theoretical explanations of the EU proposal on complementarity in the form of sixteen hypotheses. Values are likely to play a significant role in explaining the EU position, not only because culture is important in explaining the attitudes of political actors (e.g. Van Deth and Scarbrough, 1995), but also because the proposal of the EU is likely to be against its economic interests (e.g. Capros et al., 2000).

By clustering the sixteen hypotheses ex post, it can be postulated – from a positive (not normative) perspective – that the EU wants to restrict trading (a) for environmental reasons (for instance to limit the use of hot air), (b) for political-normative reasons (for instance to achieve a more equitable outcome by preventing that the industrialized countries, which are historically responsible for climate change, ‘buy their way out’), (c) for political-strategic reasons (for instance to wield negotiating power during the bargaining process of the CoP with respect to elaborating the Kyoto Mechanisms) and (d) for technological-economic reasons (for instance to stimulate technological innovation by means of domestic action).

The attitudes of political actors are partly determined by values, such as equity. Attitudes do not only arise from social norms, but they are also influenced by other considerations, such as political-strategic ones (e.g. Van Deth and Scarbrough, 1995: 33). This is reflected in the aforementioned ex post clustering of hypotheses. The first two clusters created are based upon value-driven hypotheses: the cluster of environmental reasons reflects the so-called ‘green’ values on (improving) environmental integrity and the cluster of political-normative reasons reflects equity values. The other two clusters do not so much represent values, but rather include explanations for the initial EU position on complementarity in terms of negotiating
power and political pressure as well as in terms of technological and economic spill-over effects of trading emissions.

The official EU proposal on supplementarity was directed against unrestricted use of all Kyoto Mechanisms, not against one of them in particular (such as permit trading). However, it was shown that hypotheses 1, 11 and 12 on hot air, incrementalism and allocation problems respectively do not apply to JI and the CDM and are only relevant for permit trading under IET Article 17. As explained earlier, permit trading mobilizes the negotiated hot air (whereas projects generate real reductions if they are additional) and permit trading is a non-incremental policy option due to the allocation problem of (re)distributing property (or user) rights (whereas projects do not require an initial distribution of such rights before trading can begin).

Empirical analysis of attitudes

The sixteen hypotheses have been tested empirically by analyzing (a) the content of twelve EU documents, (b) the opinions of fifteen high-position officials from the environmental ministries of EU Member States and from the European Commission, gathered by means of a questionnaire, and (c) the bargaining behaviour of the EU at CoP6 Part I and II. The opinion analysis is directed at EU officials who received our questionnaire in either March, June or September 2000 prior to CoP6 Part I that was held in The Hague in November 2000 (the text of the questionnaire can be found in the Appendix).

Although the level of non-response is 63% (15 of the 41 questionnaires sent were returned), the questionnaires which have been received contain detailed information and come from almost every country in the EU as well as from the Commission. Still, the number of officials approached is limited and the non-response is considerable, so that only tentative conclusions can be drawn. Moreover, high-level officials are not politicians. Although these officials are likely to have had an influence on their Ministers, because they prepare their decisions, as well as on the negotiations, because Ministers and high-level officials met several times during CoP6 to continue negotiations in closed meetings (e.g. Hanks et al., 2001c: 2), future empirical research could establish to what extent key officials in the EU actually had such an influence.
Opening the ‘black box’ of European climate politics by means of the aforementioned research set-up has produced some new data and confirms that the EU is no unitary actor. The most surprising result of our empirical study was that the EU environmental bureaucracy is internally divided on the supplementarity issue, because 40% of the key officials from different Member States declares (in a personal capacity) to disagree with the official EU proposal decided upon by their Ministers to restrict the use of the Kyoto Mechanisms. In addition, the official EU documents principally mention hot air to explain the EU position on supplementarity, whereas Peter Vis reflecting the views of the European Commission sees compliance (with a view to strengthening the targets of a second commitment period) as the major reason to restrict emissions trading. From this perspective, it is remarkable that the vast majority of the key EU officials interviewed do not so much refer to hot air or compliance, but rather to equity as the primary motivation behind the EU proposal to prevent that industrialized countries ‘buy their way out’.

Our empirical analysis based on the ex post clustering of hypotheses assigns the first rank to environmental reasons (such as hot air) and the second rank to political-normative reasons (such as equity) behind the EU proposal on supplementarity. Political-strategic reasons (such as negotiating power) also play a role, albeit a smaller one, whereas technological-economic reasons (such as secondary benefits) are the least important. This demonstrates empirically that the so-called ‘green’ values on (improving) environmental integrity, reflected in the cluster of environmental reasons, as well as equity values, reflected in the cluster of political-normative reasons, play a significant role in explaining the desire of European policy-makers to quantitatively restrict the use of the Kyoto Mechanisms. Equity turned out to be more important in explaining the EU position than usually thought in the literature on emissions trading and supplementarity: the European officials interviewed see (the individual hypothesis of) equity as the most important explication behind the EU proposal to restrict trade and our more broader ex post clustering of hypotheses assigns the second rank to political-normative reasons that includes equity. The empirical relevance of equity values and environmental values underline that political culture, followed by political-strategic considerations, is the primary explanation behind the EU proposal on supplementarity.
Conclusion

An additional empirical test is performed on the basis of two theoretical clusters of hypotheses which supposedly express the EU’s objections against permit trading (the hypotheses on hot air, incrementalism and allocation problems respectively) and its objections against all Kyoto Mechanisms (all remaining hypotheses, including those on equity and negotiating power). It appears that the first rank is assigned to objections against all Kyoto Mechanisms (such as equity) and the second rank to objections against permit trading (such as hot air) to explain the EU proposal on supplementarity.

At first sight, this means that the Europeans primarily developed their proposal to restrict the use of all Kyoto Mechanisms, rather than just one of them. However, some observations must be made to nuance this conclusion. First, we have been able to identify specific objections against permit trading, not against any of the credit-based approaches in particular. Second, the difference between the calculated scores for the different types of objections found is not high. Third, one of the arguments against permit trading, namely the hot air hypotheses, turned out to be highly relevant, ranking first in the content analysis of EU documents and second in the opinion analysis of key EU officials. Fourth, in their proposal, the EU wanted to exempt JI and CDM projects from a limit on supply (EU Council, 1999). This makes it reasonable to conclude that objections against permit trading are not a dominant, but still a significant factor to explain the initial wish of the EU to quantitatively restrict the use of all Kyoto Mechanisms.

The withdrawal of the US from the Kyoto Protocol in March 2001 forced the EU down on its knees, because other countries could now make a credible threat to withdraw as well if the EU would continue to insist on restricting the use of flexible instruments. As a result the EU accepted the unspecified requirement that domestic action shall be a ‘significant element’ of Annex B countries’ climate policy (CP, 2001a: 7). The Europeans were also more willing to make compromises for political-strategic reasons, namely to show the world that it does not need the US to obtain international (environmental) co-operation.

Most respondents, that answered our questionnaire before the US withdrew from the Kyoto Protocol, claimed that the EU proposal to restrict trade was not intended to wield negotiating power. However, this can be doubted for various reasons. For instance, previous EU proposals, like its proposal dating from 1997 to make
industrialized countries reduce 15% of their GHGs, were also intended (and used) as bargaining tools, as recognized by the EU itself (COM, 1997: 18). Moreover, an interesting finding of our empirical study is that there is a difference when the EU officials are asked about negotiating power in general terms and in specified terms. In general terms most officials state that the EU proposal on supplementarity was not intended to wield negotiating power, but in specified terms several of them acknowledge that the proposal was in fact intended to put pressure on the US and the Russian Federation.

*Cultural change and equity*

If cultural values (such as equity) can act as a barrier to implementing the Kyoto Mechanisms, cultural change is one of the opportunities to overcome this barrier and facilitate a break-out. We have stressed beforehand that our research was not designed to find cultural change: key EU officials were only interviewed once, for instance. However, developments like the Commission proposal of 2001 for a Directive on permit trading for large GHG emitters in the EU seems to confirm the idea of Stavins (2002: 15) that ‘market-based instruments have moved center stage’. We have argued that this view is largely correct, but also misses some crucial points.

First, attitudes (which are observable) have changed, but this does not mean that values (which are unobservable) have changed as well or that market-based instruments have gained in acceptance as a result of cultural change. We have hypothesized that the attitudes of policy-makers in the EU have changed as a result of internal pressures (like the permit and credit trading experiments in Denmark and the UK) and as a result of external ‘shocks’ (like the US withdrawal), which has set in a process of cultural change (and not the other way around).

Second, although ethical objections against the concept of market-based instruments have declined, which suggests that one cultural barrier is overcome, equity arguments have continued to resurface when it comes to their design and implementation. For instance, the reaction of the European Parliament to the proposal for a Directive suggested a link between the polluter pays principle and auctioning as the preferred starting points of a harmonized permit allocation (EP, 2002), which
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reflects the equity differences between auctioning and grandfathering (as discussed before). This and other examples of the ‘reccurrence of equity’ suggest that cultural change is not completed and widespread. It not only confirms that equity ‘(...) continues to be at the core of [climate] policy debates’ (Shogren and Toman, 2000: 16), but it also underlines that institutional as well as legal barriers and trade-offs do not disappear, although they may become less difficult to overcome when culture is changing (e.g. Licht, 2001: 149-150).

Third, the view that market-based instruments have moved ‘center stage’ (Stavins, 2002: 15) underestimates that some market-based instruments have moved more to the center than others as a result of the path-dependent developments discussed in this book: the variant of (project-based) credit-trading, which is inferior according to (neo-classical) economic theory, has proven to be more acceptable (so far) than the theoretically superior variant of permit trading. Instead of making a normative claim that credit trading is more equitable, we have made a positive-theoretical claim (confirmed by some empirical data) that credit trading is more compatible with equity constraints posed by law and culture.

We have demonstrated that there is some cultural resistance against the Kyoto Mechanisms in general and against permit trading in particular, which adds to the switching costs and contributes to the institutional lock-in situation. Nevertheless, the attitudes of policy-makers are changing and time will tell whether and when cultural change is strong enough to provide sufficient opportunity for a break-out.

10.6 Future Climate Policy

The future of the Kyoto Protocol is uncertain yet hopeful. According to Article 25, the Protocol shall enter into force when at least 55 Parties to the FCCC, including Annex B Parties that account for at least 55% of total CO₂ emissions of industrialized countries in 1990, have ratified it. Although the first condition is met (more than 55 Parties have now ratified the Protocol), the second condition for entry into force came under pressure when the US, responsible for about 36% of total Annex B emissions, withdrew from the Protocol in March 2001. Nevertheless, the EU, Japan as well as some Nordic and Eastern European countries have ratified it, already representing about 36% of total
Annex B emissions. Canada and Australia (making a contribution of about 5% to these emissions) are reluctant to ratify, but ratification of the Russian Federation and other Eastern European countries, accounting for about 22% to these emissions, is sufficient to secure entry into force: in that case, about 58% of total Annex B emissions would be covered (see JIQ, 2002: 13). These former Soviet countries are likely to ratify (which was also signalled by Russian Prime Minister Kasyanov (see Financial Times, 2002)), because they can sell hot air under IET Article 17 and attract investments under JI Article 6.

For the first commitment period 2008-2012, the Kyoto Mechanisms are available for industrialized countries to lower the costs of reducing emissions, with restrictions on the use of sinks. Developing countries do not have emission targets and can attract income and technology for sustainable development via CDM projects. Industrialized countries and countries with economies in transition may use JI, whereas international emissions trading between firms could be made available only for eligible countries that have domestic tradeable permit schemes with strong monitoring and enforcement structures.

The future of market-based climate policy is likely to be a differentiated one. Although all Kyoto Mechanisms must be embedded in an adequate institutional framework, it could be argued that permit trading, in a sense, has the strongest institutional requirements, followed by credit trading, which is, in its turn, followed by JI and the CDM. Permit trading irrevocably requires emission caps, but credit trading (and unilateral JI) can already be applied in those industrialized (and Eastern European) countries, or for those industrial sectors, that have energy-efficiency targets (instead of emission caps) and that have the financial capacity to self-invest in reductions and produce credits. If this financial capacity is lacking, as in some Central and Eastern European countries, (bilateral) JI can be applied so that a foreign investor from an industrialized country is attracted to produce the credits, which brings climate policy and clean technology to countries with economies in transition. The environmental policy for that host firm or sector is used to calculate the project baseline. Multilateral or bilateral (JI or) CDM projects can be used when no (clear) environmental policy has been defined (yet) for firms in the host country whatsoever.
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This means, for instance, that permit trading is likely to become available only for a few countries or sectors and that credit-based approaches have the potential to be implemented in a larger group of countries or sectors. However, if Annex B countries use credit trading instead of permit trading, for instance for the energy-intensive industry, they run the risk of failing to meet their emission targets: when the economy grows, the supply of permits would remain constant (because firms operate emission ceiling), but the supply of credits would rise (since firms have an energy-efficiency target, for instance). Such (differentiated) schemes have been proposed, however, for instance in the Netherlands and Norway (albeit with different designs).

For a second commitment period, starting in 2013, those least poor and most polluting developing countries that would be willing to accept binding (growth) targets in the future, could host JI (instead of CDM) projects. Moreover, previously ineligible (as well as new) Annex B countries that have improved their monitoring and enforcement over time could be allowed, if desirable, to let their firms engage in permit trading across national borders. In the long term, this would facilitate the development of an efficient and effective international carbon trading market with sound private sector participation.

Permit trading ranks low in the political hierarchy of the Kyoto Mechanisms, but it is climbing up. As cultural change appears to have set in, actual developments have come closer to the conditions for a break-out: the benefits of this economically superior alternative have become better known, the effectiveness of existing policy has come under increasing pressure, information on permit trading has been improved and those switching costs that are caused by cultural resistance seem to have decreased. However, it is unclear when the turning point for a break-out will be reached – and whether it will be reached at all. The switching costs of permit trading arising from institutional, legal and cultural barriers continue to be considerable and credit trading remains the incremental option that generates positive feedbacks by building upon existing environmental policy. Whether recent developments in climate policy are likely to strengthen the lock-in or cause a break-out must be determined in future research.
10.7 Future Research Agenda

This book has generated many possible directions for future research. We mention four of them.

The first (and most urgent) question for future research, that is relevant for both climate scientists and policy-makers, concerns the evolution of emissions trading programs. It is common knowledge that some credit trading schemes for air pollution in the US have been replaced over the years by permit trading systems. Based on this American experience as well as based on the theoretical superiority of permit trading, Tietenberg and Victor (1994), the UNCTAD (1995) and Ellerman (1998) believe that (project-based) credit trading schemes for CO₂ emissions can and should evolve, either or not via government trading, into international permit trading schemes. Today, some (of these) authors even make a stronger claim. Tietenberg (2002: 17) writes that ‘(...) we would not currently have “cap and trade” programs if we had not proceeded first to implement credit trading programs [which] served as a training ground for the various stakeholders (...)’. Also Haddad and Palmisano (2002: 444) describe permit trading as a long-term goal that is only achievable when a sufficient stock of experience has been accumulated on the basis of credit trading regimes.

Institutional lock-in theory, however, hypothesizes that this is not necessarily the case. Other, less efficient paths are possible in reality. If policy-makers start with (project-based) credit trading, it could evolve into permit trading only if the conditions for a break-out are met, but our core message is that it could also become locked-in, for instance as a result of learning and network externalities that lower administration costs (government level) and as a result of stakeholders with vested interests that lobby against change, such as the industry that prefers performance standards to emission caps (firm level). From a positive-theoretical perspective, the possibility of an institutional lock-in would nuance the claim made by the aforementioned authors. From a normative perspective, the possibility of an institutional lock-in could be a warning against creating credit trading in industrialized countries and against setting up an institutional framework, not only for JI projects in those Central and Eastern European countries where environmentally regulated firms (might soon or already) have the capacity to self-finance in reductions, but also for CDM projects in the relatively prosperous
developing countries that do not (yet but might soon) belong to Annex B. More research is necessary to test this institutional lock-in hypothesis. We must find out whether and when establishing credit trading schemes facilitate or hinder a switch to permit trading systems in climate policy.

This brings us to the second issue for possible future research. Institutional lock-in theory is an innovative theory that is still under construction. The implication is that more research must be conducted to further elaborate the key concepts as well as the theoretical relations between them. On a theoretical level, we have explicitly used the analogy concept as a meta abstraction to translate lock-in theory from a techno-economic to an institutional context (which is common but usually hidden and implicit in the path dependence literature). This led to the formulation of conditions for lock-in and break-out. However, other meta theories could be searched and applied to find out whether they provide more insight into these conditions (or even lead to additional or different ones). On an empirical level, more practical research should be carried out, both within and outside the field of climate policy, to find out whether our institutional lock-in theory holds or needs adjustments based on the data produced (in accordance with the so-called ‘empirical cycle’). Our theoretical and empirical focus in this book with respect to lock-in was mainly on switching costs and more attention could be paid, for instance, to the existence and magnitude of positive network externalities in relation to decreasing (differential) administration costs or to the role of (decreasing) problem-solving capacities. In general, additional empirical research must shed more light on the question whether lock-ins are ‘rare or nonexistent’ (Liebowitz and Margolis, 2000: 995) or, on the contrary, whether an ‘endless number’ of such lock-ins can be listed (Magnusson and Ottosson, 1997: 3). Current developments in climate policy show a differentiated picture, with permit trading being planned in some and credit trading in (most) other countries and sectors, and time will tell whether those credit trading schemes created will lock-in or not.

A third topic for possible future research is the harmonization of permit allocation in an EU-wide GHG emissions trading scheme. A potential problem in the case of harmonized regulation that requires auctioning, as desired by the European Parliament for the first commitment period, is that a Member State that wishes to deviate by allocating permits for free causes a distortion of fair competition in favour of
its own industry, leading to state aid if equity considerations are considered to be relevant, as we have seen above. A potential legal solution is to demand harmonized regulation that requires grandfathering for all Member States in the first commitment period: an EU country that wishes to deviate by auctioning permits then only causes a distortion of fair competition detrimental to itself, which is allowed according to Article 97 of the EC Treaty. However, one of the possible drawbacks, if level playing field considerations are perceived to be relevant, is that grandfathering could still be seen as to conflict with the polluter pays principle (because it can be interpreted as a wealth transfer from the public to the polluters, which implies that the ‘public pays’ by giving the polluters the revenues that the public would have received in the case of auctioning). Consequently, this legal opportunity needs to be explored further.

The fourth direction for possible future research concerns the attitudes of European policy-makers towards emissions trading. Our chapters about the EU proposal to elaborate complementarity by placing a quantitative ceiling on trade have been successful in formulating and testing various hypotheses on such attitudes empirically. The discussion of the results, in turn, can be used to formulate new hypotheses, which can be tested by means of additional empirical studies. We mention two examples here. The first hypothesis is that although incrementalism and allocation issues hardly played a role in the proposal for a cap on international trade according to the EU officials interviewed, these issues will come to figure more prominently in their resistance, if any, to implementing permit trading in Europe (as proposed by the Commission), because the two major reasons mentioned by these officials against implementing full-scale trading on an international scale, namely to prevent that industrialized countries ‘buy their way out’ and/or buy hot air, largely disappear when it comes to implementing full-scale trading within the EU itself. The second hypothesis, already mentioned above, is that the attitudes of policy-makers in the EU towards emissions trading have changed as a result of both internal pressures (such as studies on and experiments with trading) and external ‘shocks’ (such as the US demand for trading and the US withdrawal from the Protocol), which has set in a process of cultural change (in favour of the acceptance of market instruments for environmental policy) and not the other way around, making cultural change not the cause, but the result of attitude change. Attitudes towards
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emissions trading have changed, but more research is necessary to find out whether and to what extent related cultural values have changed as well.