Supplementarity and Compliance: How to Upgrade Confidence in the Kyoto System?

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Economic rationale of the supplementarity quarrel

One of the major challenges facing the negotiators at the 6th Conference of Parties (COP6) to the United Nations Framework Convention on Climate Change (UNFCCC) is that an agreement has to be found between **partners with different levels of concerns regarding climatic risks and different views of the cost of meeting the Kyoto targets**. A continuum of beliefs exists between two polar extremes: at one end, an environmental pessimism is associated with an economic optimism regarding the amount of negative cost abatement opportunities that can be concretized through political will; at the other end, an economic pessimism regarding these costs is associated with an environmental optimism grounded on the lower bounds of the assessments of climate damages. Negotiation postures will also be shaped by two other parameters: discrepancies in the assessment of the benefits from emissions trading (spread between national and open-trade prices), and differences in conceptions about the involvement of governments and enterprises in carbon trading.

Parties that are pessimistic about the costs of meeting their commitments through purely domestic efforts (typically JUSCANZ) want access to an international carbon market that

is as large as possible to lower their burden. In addition, the more pessimistic they are about the resulting world price of carbon (i.e., they anticipate a very high equilibrium price), the more reluctant they are to accept any form of restriction placed on this market. Conversely, Parties that are very optimistic regarding domestic abatement costs do not feel the same need for carbon trading, except as a tool for relaxing conjectural tensions. They perceive any emphasis on carbon trading as a symptom of a reluctance to curb domestic emissions trends, based either on the belief that global warming is not a serious threat, or on the fact that significant domestic measures face political constraints and/or high transaction costs. Carbon trading would indeed allow some parties to formally meet their commitment while staying embarked on carbon-intensive emissions trends that would endanger their capacity to make serious commitments for the second budget period. This risk is all the more severe as a large number of excess, so called "hot air" assignments are expected in Russia and Ukraine: if those assignments could enter a market without any restrictions, there would result a carbon price too low to trigger significant domestic policies. The same concern exists regarding the inclusion of carbon sinks in a trading system and in the Clean Development Mechanism (CDM). **The quarrel about supplementarity, that is how to ensure that carbon trading is supplemental to domestic action, originates in these differences in perception**; it fuels cross suspicions which have been proven to be a stumbling block of the post-Kyoto negotiation process.

For the economically pessimistic group, the supplementarity condition inserted in Articles 6.1 and 17 of the Kyoto Protocol leads to arbitrary limits on the use of flexibility mechanisms which will make compliance even more costly. However, **there are two key reasons for securing the supplementarity of flexibility mechanisms to domestic policies and measures.**

- **Available modeling results confirm the possibility of low world prices of carbon.** Six out of the thirteen models reported in the Energy Modeling Forum (EMF) Kyoto Study[1] give a price lower than $30 per ton during the first budget period in case of

[1] "The Costs of the Kyoto Protocol: a Multi-Model Evaluation", *The Energy Journal*, Special Issue, J. P. Weyant Ed., May 1999.

global trade, and another one even provides the same result without CDM (Annex I restricted trade). These figures are all the more intriguing as these simulations do not consider negative costs potentials, so-called no-regret strategies. Even though one can argue that they do not either account for various inflationary transaction costs, ***it is legitimate to assume that carbon prices may not rise quickly enough to trigger structural measures in sectors that have low turnover of capital stock***, such as transportation and buildings.

• On a more political ground, **developing countries are expecting developed countries to demonstrate their willingness to combat climate change**, as implicitly required by the UNFCCC on the ground of historical responsibilities, and may suspect them of using "hot-air" trading and "cream-skimming" (commonly understood?) YES behaviors in the use of CDM to meet their commitments with little real domestic effort. ***First-period demonstration costs should hence be weighed against the long-term economic and environmental benefits of an earlier involvement of developing countries in climate policies***.

Two possible ways of enforcing the supplementarity condition

This section explores ***ways to meet the supplementarity condition so that it does not add to the arguments of those who use the upper bound of abatement cost assessments[2] to refuse any provision to a free carbon trade or even argue against the ratification of the Protocol***. The two options considered hereafter seek also to avoid the providing of a higher rent per ton of carbon to countries with possible hot air, which would reinforce their capacity to behave as strong monopolies.

Option A—a minimum price for any transaction. Imposing a minimum price leads in principle to a disequilibrium between the supply and demand of permits. This is

[2] Four of the EMF models provide marginal abatement costs higher than $200 per ton in the no-trade case for the United States, five for the European Union, nine for Japan, resulting in an average of respectively $332, $635 and $740 for the three more pessimistic results. The same pessimistic models provide an average of $155 and $84 for the price of carbon in the case of Annex I- and global trading respectively (compared with an average of $83 and $40 if all models are considered).

why some entity would have to be charged with the responsibility of levying a tax on exchanges to keep the carbon price higher than a pre-agreed level (minus a variation margin). This tax would play the same role as the discount rate used by central banks to regulate the demand and supply for money. The use of the revenues of this tax will be examined later on.

One prerequisite for enforcing this option is that the design of trading systems will provide the best guarantee of transparency and competitiveness, in particular for direct transactions among Party governments, to prevent fraud through bilateral transactions at a falsified price with hidden compensation.

Option B—a trading prerequisite of a minimum increase in an implicit indicator of the domestic carbon value. This indicator would be calculated on the basis of available International Energy Agency statistics; it could be the sum of the total purchase of energy (reported quantities multiplied by the reported prices of energy) divided by the total carbon content. Such an indicator is far from perfect because energy prices for the energy-intensive sectors are generally not publicly available. However, it provides a reliable proxy and captures, in a synthetic way, the increase in total "carbon productivity" through changes in energy supply and in the structure of energy demand. A Party would hence be deemed in compliance if it met its emissions targets ***and*** demonstrated that its indicator increased by an amount of $X/t. A provision should be made for incorporating in this indicator any of the cost items other than energy prices that affect the demand for energy services and are not reflected in energy prices, such as fiscal charges on car ownership or road pricing. An independent expert body would certify the accuracy of information on these additional items and assess its incremental impact on the cost of energy use.

Would a Party not comply with this supplementarity condition—namely would it meet its Kyoto target simply by importing permits and without enforcing strong domestic incentive structures to curb down its emissions—it would pay ***a compliance charge of $Y per ton*** (for example three times X).

These two options have different implications for the functioning of carbon markets and the degree of correlation between an international carbon price and domestic energy prices.

Under option A, the tax clears the market at price X without distorting the ranking of abatement options. It clearly ***puts a direct limit on the use of flexibility mechanisms*** by ruling out some of the abatement potential that would have been concretized in its absence. The impact on domestic action will be channeled in different manners depending on the involvement of governments in transactions. If industry only is concerned, the tax will be directly passed on to carbon users and governments will have an incentive to adopt any complementary policy consistent with the agreed-upon carbon price. If governments import permits, then they may either pass the international tax on to carbon users or "socialize" its burden in their budgets. Under the latter option, domestic energy prices may not incorporate the entirety of carbon prices but budget pressures will be exerted on governments to take up nonprice measures.

Under option B, countries will adopt any carbon-saving measure with a marginal cost equal to the agreed-upon value of carbon; this approach can be carried out either through pricing and non-pricing policy. For example, a shift from coal to gas, which would increase a country's carbon-value indicator, could be operated by removing current market imperfections without changing energy prices. Contrary to option A, ***option B does not automatically limit carbon trading.*** In principle, governments and businesses can import permits without any constraint with a resulting carbon price of $Z < X$. Governments can then adopt domestic measures to reach the prerequisite implicit carbon value, from a package of non price measures to a carbon tax higher than the world price of carbon (for example, allow their heavy industry to use carbon trading to avoid the risk of being penalized in international competition). In practice, however, this option ***puts an indirect limit on carbon trading*** since it leads to domestic measures at a higher cost than in its absence, and consequently lowers the demand for imported carbon.

Supplementarity tools within the COP6 package

The two options described above implicitly ***refute the idea that the supplementarity condition arbitrarily increases the cost of meeting the Kyoto targets***. Indeed, if the pessimists regarding abatement costs are internally consistent, they should assume that the constraints considered will never operate: a $30 or $40 per ton value is far lower than the average value for carbon given by the three pessimistic EMF models ($155 and $84, in the case of Annex I- and global trading respectively). The supplementarity condition would have an impact only if the price of carbon falls below for example $14 per ton, which is the average of the more optimistic of the models. It would then induce higher energy prices over the short term, but the resulting signal would be economically more consistent with the long-run marginal cost imposed by the GHG concentration targets. The additional short-term burden would then be fully justified by the gains, namely induced technical change over the long run and the earlier involvement of developing countries through a credible demonstration effect.

The second, implicit advantage of this approach is that it would make supplementarity part and parcel of the compliance system and ***generate a compliance fund that could be used to improve the incentive of developing countries to actively participate in climate policies***. In the spirit of the pre-Kyoto proposal offered by Brazil, such an additional fund would provide a credible answer to the repeated request from developing countries to prevent any crowding out between funds for climate policies and overseas aid. It could be used in adaptation projects, or to upgrade the economic attractiveness of those CDM projects which have a longer payback period but are more consistent with the long-term development objectives of the host countries. How such an articulation between the CDM, a compliance fund and development policies could operate is beyond the scope of this paper (however, a basic discussion of this articulation can be found in the summary of the previous CIRED-RFF(? vs.RFF-CIRED) NO problem but C is alphabetically before R meeting on CDM, held September 1999 in Paris (www put the reference of the Rff server or Cired's adress…).

The supplementarity condition would be satisfied by setting a minimum carbon price or minimum carbon value, without any serious risks of increasing the rent per ton of traded hot air. However, ***the environmental, economic and political attractiveness of the resulting design is partly undermined by the existence of hot air, which could crowd out*** CDM projects. If this question remains unresolved, the resulting equilibrium may not be equitable enough for developing countries. Like any other tool for translating the supplementarity condition, our two options restrict the demand for imported carbon and, consequently, narrow the market for CDM projects. The proposed use of the revenue raised by the tax or compliance charge mitigates the fact that any decrease in demand for imported carbon will be offset by an increase in the share of hot air in carbon trading and a lower share of CDM projects. In blunt terms, under this recycling condition the two options would transform part of the hot air into real abatement in the developing world. However, this correcting effect may not be high enough and it is analytically interesting to explore the outcome of the system with and without a ***concrete ceiling placed on hot-air trading***.

One possibility would be to open to trade those of the QELROs that correspond to the difference between emissions in Russia and Ukraine during the budget period and those that would have occurred in these countries if they had stuck to the same carbon emissions/GDP ratio than in 1990. For Russia and Ukraine, this formula presents the advantages of preserving significant opportunities for carbon trading and providing a powerful incentive for undertaking carbon reductions or refurbishing their infrastructure. At the same time, it does not deprive the two countries of the benefits of the Kyoto agreements provided they are allowed to bank the unsold excess quotas.

The debate about hot air cannot be based solely on the supplementarity issue regardless of the equilibrium of the incentive structure. Some argue that, because the Kyoto Protocol cannot demand strict emissions limits regardless of costs, a safety valve should be added to the system to allow for extra allocation of quotas in case the Kyoto targets ultimately are proven too tight. Coupling this request with a minimum carbon price, or minimum carbon value, would calm the concerns of both the pessimists and the optimists

about abatement costs. However, the credibility of the system could be undermined if new tons of carbon are added to the aggregate Kyoto target, unless a very high price cap is adopted but that would contradict the objective of reducing pessimistic Parties' fears about abatement costs. To put a constraint on hot-air trading and to allow for such a safety valve within the limits of the "reserved" hot air would hence ensure the integrity of the Protocol during the first budget period as well as the credibility of further commitments.

In strict economic terms, coupling a ceiling with a floor on the carbon price provides a design that consistently recognizes the lessons from the price versus quantity coordination approaches in environmental affairs. Because of the uncertainty regarding abatement costs, a price coordination makes the level of effort by each partner observable, but provides no guarantee about the resulting emissions level because of the difficulty of predicting the response of the economic system with accuracy. In a quota coordination approach, the aggregate outcome is certain (provided a strict compliance system is enforced) but neither the reality of efforts by each partner is observable nor the equity of the burden sharing is secured. An hybrid approach would couple the advantage of quota based and price based coordination, with the emergence of economic information on the marginal cost of the aggregated target (the price of carbon). More specifically, since the future involvement of developing countries in a quota coordination approach entails the intrinsic risk of repeated waves of excess assignments of emissions permits, such an hybrid approach, far from representing solely a way to overcome current negotiation impasses, may be proven a robust system for securing an environmentally integer and economically sounded expansion of the Kyoto system.