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critical analysis and perspectives

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Abstract

This paper investigates linking Emission Trading Schemes (ETSs) as a possible option to increase the effectiveness of the existing domestic or regional regimes and overcome the difficulties encountered in recent years by international climate change negotiations. For this purpose, the drivers and different types of possible linking arrangements are analysed along with their pros and cons, and the “necessary and optional features” for a successful linking are proposed.

Building on this analysis, the work proposes three selected options for linking ETSs, aiming at enlarging the scope of the existing domestic/regional regimes, ranging from multilateralism to bilateralism. Finally, particular attention is devoted to the proposal recently set forth by the World Bank of a system of “globally networked carbon markets”, which goes beyond the linking agreements planned, proposed and/or implemented so far.

Key words: Emission Trading Schemes, Linking, EU ETS, California Cap&Trade System, Regional Greenhouse Gas Initiative, Quebec Cap&Trade System, comparative analysis

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List of abbreviations and acronyms

CDM: Clean Development Mechanism;

CER: Certified Emissions Reduction;

CPM: (Australian) Carbon Pricing Mechanism;

EEA: European Environment Agency;

ETSs: Emissions Trading Schemes;

EU: European Union;

EU ETS: European Emissions Trading Scheme;

GDP: Gross Domestic Product;

GHG: Greenhouse Gas;

JI: Joint Implementation;

MRV: Measurement, Reporting and Verification;

MoU: Memorandum of Understanding;

UNFCCC: United Nations Framework Convention on Climate Change.

1. Introduction

Several Emission Trading Schemes (ETSs) have been developed in the last few years and are now in operation in many countries around the world. In recent times, a growing interest has arisen on the possibility of linking existing ETSs among them, as a viable opportunity for participating countries to increase the effectiveness of their own domestic or regional regimes. In such a context, the present paper provides an analysis of the main contents, features, drivers, pros and cons of linking, as well as the different types of possible linking. Then, assuming that only compatible and comparable ETSs may be linked, the “necessary and optional features” for linking different ETSs are identified and critically assessed. On such a basis, the paper identifies three concrete options for linking cap and trade schemes, providing a critical analysis of their feasibility, as well as of the main challenges and opportunities raised by them. Finally, a very recent proposal to establish a system of “globally networked carbon markets”, that is, connecting existing carbon markets through independent rating agencies and systems, is analysed as an additional opportunity, beyond the three linking options already proposed.

To this effect, the rest of the paper is structured as follows. Sections 4.2-4.5 focus on linking Emission Trading Schemes around the world. In such a context, more in detail, firstly, the concept of linking is clarified and the different types of linking and their characteristics are introduced. Secondly, the legal requirements for the establishment of a linking between different ETSs are identified. Thirdly, the drivers, as well as the pros and cons of linking are analysed, together with the necessary and optional features that shall ensure the compatibility and comparability of the ETSs to be linked. Building on such an analysis, Section 4.6 proposes three selected options for the linking of ETSs, aiming at enlarging the scope of the existing domestic/regional regimes and ranging from multilateralism to bilateralism. Finally, in Section 4.7, a recent proposal for the establishment of a system of “globally networked carbon markets” is critically assessed, as an additional opportunity. Section 4.8 concludes with some final remarks on the main findings of the analysis and on the prospective directions for ETS cooperation and coordination in the future.

2. Exploring different types of linking

In general terms, linking an ETS with another one aims at enabling operators subject to the first system to acquire allowances from the linked cap and trade scheme and to use them for compliance purposes within their domestic ETS. On the basis of its specific features, three main types of linking may be identified:

- (i) Unilateral direct linking;
- (ii) Bilateral or Multilateral direct linking;
- (iii) Indirect linking.

The three types of linking are described below, together with their main features and consequences for the ETSs involved, as well as with some relevant examples.

In the unilateral direct linking, the legislation in the “importing” ETS explicitly recognises allowances from the “exporting” ETS as eligible for compliance. However, since the link is unilateral it does not operate in both directions (i.e. if ETS A is unilaterally linked with ETS B, then ETS B allowances may be used within ETS A, but not vice versa).

The main consequence of the unilateral link is firstly an increased demand for allowances from the exporting scheme, making their price to increase. As a result of the alternative range of choice for the importing operators, the price for allowances in the importing ETS is expected to decline. Moreover, the respective ETS authorities may adopt rules to control, limit or otherwise manage the flow of allowances from the exporting ETS to the importing one, for example imposing a quota restriction or a charge on the allowances purchased from the linked ETS.

Finally, the exporting ETS authorities must authorise operators in the importing ETS to hold the exporting ETS' allowances and can decide to withdraw and reissue them if they are not used for compliance within a specified period (Burtraw et al. 2013).

One of the most common practices of unilateral linking occurs between ETSs and offset programmes. This is the case, for instance, of the EU ETS and its unilateral linking with the credits originating from Joint Implementation (JI) and Clean Development Mechanism (CDM) projects. Similarly, other relevant cap and trade schemes, such as the RGGI, the California cap and trade as well the Quebec cap and trade allow the use of credits produced from

national offset projects carried out in specific sectors, thus establishing a unilateral link with the offset projects generating these allowances.

In the bilateral or multilateral direct linking, the legislations of both ETSs involved mutually recognise their allowances as eligible for compliance under either of the two programmes, thus enabling a two way flow of allowances (i.e.: if ETS A and ETS B are directly mutually linked, then allowances from ETS A can be used within ETS B and vice versa). In case the mutual link is directly established between more than two different ETSs, the linking will become a direct multilateral one, whereby allowances from all the different ETS linked are reciprocally recognised as eligible for compliance. Bilateral (or multilateral) linking may be established by means of a bilateral/multilateral agreement between the countries involved or through reciprocal unilateral linking based on individual national legislation in each jurisdiction recognising allowances from the linked programme/s (Mehling and Haites, 2009). As a consequence of the bilateral/multilateral linking, the price of allowances within each scheme should tend to convergence.¹ However, in case one of the linked ETS had a heavier “political” weight, its own technical features (for example with regard to price collars) might tend to prevail on the others. Similarly, the determination of which of the linked ETSs will be a net buyer or seller will be a matter of both political decisions and economic circumstances (Burtraw et al. 2013).

So far, the only existing example of bilateral linking in operation is represented by the one between California and Quebec, which has been established by means of an international agreement signed by the Parties in 2013. Conversely, the RGGI is the only existing example of multilateral linking established by virtue of a Memorandum of Understanding (MoU) between the participating States, although it refers to a linking applying to a group of States belonging to the same Federal State (namely, the US), rather than to an international multilateral linking among fully sovereign and independent States.

Finally, in the indirect linking, whenever an ETS is (unilaterally or bilaterally/multilaterally) linked with another cap and trade scheme, the link indirectly propagates to all the ETSs or

¹ See Grull and Taschini (2012) for an analysis of the conditions under which bilateral links between schemes with price containment mechanisms may lead to price convergence.

offset programmes with which the latter is linked (if any) (i.e.: if ETS A is directly linked with ETS B and ETS B is directly linked with ETS C, then ETS A is indirectly linked with ETS C; or: if ETS A is directly linked with ETS B and ETS B is directly linked with the Kyoto Protocol CDM and JI -or other type of offset projects- then ETS A will also be indirectly linked with the Kyoto Protocol CDM and JI -or other type of offset programmes).

An example of indirect linking may be envisaged in case that two or more ETSs are already linked between them. As mentioned above, the only existing linking agreement in operation so far is the one between California and Quebec. In this case, therefore, an indirect linking may arise with regard to credits generated from offset projects carried out in one jurisdiction which are then transferred to the other jurisdiction in the framework of the direct bilateral linking.

3. The proper legal framework for linking

In order to establish a linking between existing ETSs, it is necessary to follow a proper legal framework. In brief, a linking may be established in two ways, either by means of a formal international agreement between the Parties involved or via a more informal Memorandum of Understanding (MoU).

The international agreement on the one hand seems to offer more advantages in terms of transparency, accountability, reliability and continuity over time, but on the other hand it is subject to stricter and more formal rules on interpretation, validity and negotiation process. Thus, an international agreement, on the one side, is characterised by a higher relevance and a more formal standing, but, on the other side, it may involve more burdensome and time-consuming negotiations, as well as a more complex application and interpretation.

Conversely, the MoU seems to be more flexible and characterised by a simpler structure and decision making process, but lacks the formality and evocative power of an international treaty, and may show laxer features, for example with regard to the risks of unilateral termination by one of the Parties.

In any case, both instruments seem to represent valid and effective international law tools for linking ETSs and both of them are suitable, in general terms, to create legally binding

obligations upon the signatory parties. Therefore, whether to choose the former or the latter instrument will largely depend on the existing political and economic situation and ultimately on the will of the Parties involved in establishing the linking.

The international agreement or the MoU which establishes the linking enables the importation of allowances from one ETS to another. Moreover, it may also provide rules or guidelines on specific issues of common interest to the linked ETSs, such as on monitoring, reporting and verification (MVR) procedures, on applicable timeframes (i.e. possible different stages to enact the linking or to make it unilateral or fully fledged), on pricing and possible collars, (i.e. price ceilings and floors), on quantitative, qualitative or temporal restrictions in the use of linked allowances, and on competent authorities involved in managing the linking. It may also be the case that the international agreement or the MoU simply determines framework provisions, leaving to the adoption of subsequent more detailed regulations, in the form of technical annexes or domestic laws of the Parties involved, the duty to determine the remaining relevant technical aspects. Anyway, once the international agreement or the MoU has been concluded, the signatory Parties shall implement it into their national legal system according to their applicable domestic legislation.

4. Linking ETSs: main pros and cons

One can identify at least the following three main reasons for linking, which refer to the political, economic and administrative spheres.

The first reason may consist in strengthening international cooperation with other countries and enhancing the political commitment towards a common effort to fight climate change. Indeed, the “ordinary expected” mitigation achieved under the national ETS may be potentially increased by widening and strengthening the system through linking with other ETSs. Moreover, linking a certain ETS with other cap and trade schemes may also be part of a broader cooperation between the countries involved in the linkage agreement, expanding also into other policies beyond the environmental one. In such a scenario, the main driver of the countries wishing to link their respective ETSs is establishing tighter relationships among them in several sectors, among which climate change, due to geographic proximity,

cultural affinity and other common interests, such as for instance commercial and trade policy interests. Therefore, the establishment of an ETS linkage may serve as a tool to promote or consolidate a broader cooperation project between the given countries. A country wishing to promote linking may also be driven by the strong will to take the leadership in devising market-based policies to reduce GHG emissions and in acting as a facilitator/guide to adopt these policies at international level.

Given the difficulties to achieve a global agreement on climate change under the UNFCCC umbrella experienced in the last few years, linking of domestic ETSs may provide a viable “alternative” option to a troublesome international agreement on climate change. In other words, adopting a bottom-up approach as the one underlying linking domestic ETSs may represent a more feasible and realistic option compared to a top-down Kyoto-style approach to reduce global GHG emissions.

The second reason for linking may consist in pursuing a higher cost-effectiveness in fighting climate change. Linking ETSs offers the incumbent operators a wider range of compliance opportunities, opening up a broader reference market. Indeed, linking provides more flexibility and a variety of compliance choices to the operators subject to their national ETS, by giving them access to a foreign, linked market where allowances which may be offered at a lower price or at better conditions. Thus, linking may provide a more various range of compliance options to the incumbent operators, that may choose the means to comply with their reduction duties at the lowest cost available on the (enlarged) market. As a consequence, the most important economic benefit of linking ETSs is the potential reduction of the overall abatement costs that it can generate (cf. Krueger et al., 2007; Jaffe et al., 2009; Metcalf and Weisbach, 2012; Stranlund, 2016).² There are also other economic benefits provided by linking. In particular, by ensuring a certain degree of harmonization in regulating GHG emissions reductions in the jurisdictions involved, it consequently reduces the risks of leakage of economic activities towards countries with laxer standards and rules.

² Doda and Taschini (2015) examine the sensitivity of the benefits of linking to shocks that affect each jurisdiction and find that benefits may not be equally shared among linked systems. In particular, they point out that when the linked ETSs have different size the smaller ETS gets the larger share of the benefits, while the larger jurisdiction may end up being worse-off under linking than under autarky.

Finally, as to the regulatory and administrative pros, linking may spread positive effects over the climate change regulatory frameworks of the countries involved, since it offers to the regulators the opportunity to exchange lessons learnt and best practices in the cap and trade sector.

Despite the valuable advantages underlined so far, linking ETSs may also pose some disadvantages for the participating countries, if not properly regulated.

First of all, with regard to the political aspects, it should be underlined that an ETS linked to another one may be subject to the latter's influence, with regard to modifications in prices, rules and market behaviour of the incumbent entities. This may also involve some loss of sovereignty and control by each one of the involved ETS regulators.

Secondly, if not properly regulated, through clear rules and conditions, linking may also lead to a more difficult management of the connected regimes, as well as to an increased lack of accountability and transparency in the connected systems.

Thirdly, despite its benefits, linking may also lead to the so-called "*race to the bottom*" phenomenon, in case operators in the participating regimes were allowed to choose compliance options from the linked ETSs with lower environmental standards or laxer rules on sensitive aspects such as monitoring, reporting and verification procedures. In other words, it exists the risk that in some cases, a linking agreement may endanger the integrity of the market and, above all, may lead to achieving lower GHG emissions reductions than it would have occurred in a single, non-linked ETS.

Therefore, for a linking between ETSs to be effective and achieve adequate mitigation goals, it is of utmost importance to design and implement clear enforcement and procedural rules for the linkages.³

5. Linking ETSs: necessary and optional features

The existence of a political will to link their respective cap and trade schemes is the first and foremost condition needed for linking different ETSs. However, some other additional

³ See Stranlund (2016) for a review of the literature on compliance and enforcement in ETSs and an in-depth discussion of how linking can mitigate or exacerbate compliance and enforcement problems.

features appear to be necessary, while others should preferably occur but are not strictly needed, for the linking to be effective and successful. To this regard, a fundamental requirement for linking different ETSs is the existence of similar or equivalent rules and arrangements with regard to the most relevant technical aspects of the linked ETSs. This requirement may be identified as the “compatibility and comparability” of the ETSs involved and relates to the necessary degree of “harmonisation” between the existing regimes, which has been recognised as a fundamental condition for linking in the relevant literature (Ranson and Stavins, 2015; Burtraw et al, 2013; Freestone and Streck, 2009; Mehling and Haites, 2009, Mace et al., 2008). More in detail, in order to assess the “compatibility and comparability” of the ETSs to be linked, it is useful to identify the ETSs’ features that shall be compatible and comparable and to distinguish, among those, the ones that must be similar (“necessary features”) from the ones that should be preferably similar (“optional features”). To this effect, the following two paragraphs provide respectively a list and a brief analysis of the most relevant necessary and optional features for the establishment of proper linking between different ETSs.

5.1 Necessary features

In our view, the following features must be necessarily similar in order to enable linking between different ETSs:

- 1) GHG emissions cap;
- 2) Measurement, reporting and verification (MRV);
- 3) Enforcement procedures;
- 4) Allowance tracking system;
- 5) Price collars (floors & ceilings);
- 6) Banking & borrowing.

1) GHG EMISSIONS CAP: The existence of a determined cap in both/all the ETSs to be linked is a necessary feature. The caps should be clearly identified, compulsory and stringent. Moreover, caps should be preferably of the same nature (i.e.: both/all dynamic-adjustable or

fixed over time) in order to avoid excessively large impacts on the behaviour of incumbent operators in the market (Burtraw et al., 2013). The lack of a clear and concrete cap as well as the existence of different cap stringencies would represent a major obstacle for the establishment of a linking agreement between different ETSs. Linking systems with different stringencies of caps, for instance, will probably induce a flow of capital towards the lower price system, which may be politically unacceptable, especially for the more ambitious system. Moreover, it could induce the latter system to lower its target, thus possibly determining a race to the bottom.

In theory, as Burtraw et al. (2013) have suggested, it would be possible to establish a linking that accounts for different cap stringencies by adopting an “allowance exchange ratio” between the linked systems (see also section 7 below). In practice, however, differences in the stringency of the emission caps (and consequently also in allowance prices) may hinder a linking agreement between two ETSs. In fact, as noted in the literature, the existence of different stringencies is likely to have influenced the Californian decision not to link either with the EU ETS or with RGGI (Ranson and Stavins, 2015). Notice, however, that linking might not necessarily require the presence of equal quantitative targets, but it can be based on the mutual recognition that the other ETS is sufficiently stringent, so as to ensure the necessary credibility to the overall linked systems.

2) MEASUREMENT, REPORTING AND VERIFICATION (MRV): The existence of a strong, compulsory MRV system in both/all the ETSs to be linked is a “must” feature. According to Burtraw et al. (2013), the existence of consistent methodologies for measuring emissions is probably the most important requirement to align and link different cap-and-trade systems. MRV are essential features of a well-designed, effective and reliable ETS, therefore, their lack would undermine the effectiveness and integrity of the ETS, similarly to the lack of a stringent cap.

3) ENFORCEMENT PROCEDURES: The existence of a robust set of enforcement rules to be implemented and penalties to be issued against non-compliant operators constitutes an essential element of an ETS. Indeed, it ensures legal certainty and enforceability of the ETS. Therefore, its presence in both/all the ETSs to be linked is a basic requirement of foremost

importance for the concrete effectiveness of the linked ETSs. Relevant differences in the enforcement rules would question the credibility of the linked systems and could seriously undermine the confidence in the systems. In our view, this applies also to different sanction systems that can have very different implications in terms of compliance costs for the operators being sanctioned.⁴

4) ALLOWANCE TRACKING SYSTEM: The existence of a registry system to track the issuance of the allowances, as well as their property and cancellation, is an essential feature of the ETSs, therefore in our opinion it represents also a sine qua non pre-condition for linking. In fact, it is necessary to ensure transparency and accountability in the entire life cycle of the allowances. Furthermore, a well-designed registry system prevents the risks of frauds in the issuance and purchase of the allowances, at the same time avoiding the risks of their double use and double counting. Finally, a particularly important aspect of the tracking system concerns public access to data, which can play a crucial role for proper linking. If systems have different rules on public access to data, firms in more restrictive jurisdictions may end up not exchanging allowances with counterparts in less restrictive jurisdictions to preserve their strategic information (Burtraw et al., 2013), thus hindering the functioning of the linked systems.

5) PRICE COLLARS (PRICE FLOOR AND CEILINGS): The introduction of price collars is widely debated in the literature (e.g. Burtaw et al., 2013, Stavins 2007; Sterk et al. 2009; Tuerk et al. 2009) for the implications that such measures may have both within single ETS and on the prospects of linking different ETSs. Decisions on price collars are difficult to be harmonised due to political acceptability, domestic priorities and different views concerning regulatory interventions on market mechanisms. However, the unilateral presence of a price floor or ceiling in one ETS would obviously affect the market dynamics in a linked one, thus leading to the propagation of such measures to the other markets. As argued by Burtraw et al. (2013, p.29), “there is a strong potential for differing floors to erode the environmentally integrity of

⁴ For example, given the existing sanctioning systems and the current prices in each ETS, a firm that was hypothetically found to emit 50 tons without having the necessary permits to cover them would have to pay around 5400€ under the EU ETS, about 2100€ in the Californian system while only about 800€ in the RGGI.

the linked programs. If they are not aligned, linking could undermine the value of previous investments and thereby the confidence of investors going forward.”

6) **BANKING & BORROWING:** Banking and borrowing are often invoked as a suitable instrument to reduce the compliance costs faced by the market operators. As Aldy and Stavins (2012, p.158) claim, “the flexibility to save an allowance for future use (banking) or to bring a future period allowance forward for current use (borrowing) can promote cost-effective abatement”, since it allows operators to perform trading across time. As for price collars, these cost containment measures are also difficult to align. However, the lack of harmonisation between linked ETSs on this issue may severely undermine the efficiency of a linking arrangement. For instance, if an ETS where no banking is allowed is linked to another ETS that allows banking, then compliance entities might change their permits portfolio and shift their allowances demand from the former to the latter ETS (Burtraw et al., 2013). Moreover, in an ETS that allows banking and borrowing the cap is defined de facto on cumulative emissions over a time period rather than on annual emissions. This can create an important disparity between the two ETSs (with and without banking and borrowing), that may prevent the proper functioning of the linking or its existence altogether. Therefore, in our opinion, the alignment of the linked ETSs on common rules for banking and borrowing plays a pivotal role for linking.

5.2 Optional features

Beside the necessary features just described, there are also some ‘optional’ features, which should not necessarily, but preferably, be similar in the various ETSs involved, in order to enable a successful linking between them:

- 1) Scope;
- 2) Compliance periods;
- 3) Allocation method;
- 4) Linking with offset programmes;
- 5) Carbon leakage rules.

1) SCOPE (COVERED SECTORS): The clear identification of the sectors covered by the ETS is a fundamental element for its correct functioning and for ensuring legal certainty. Correspondence in the scope of both/all the ETSs to be linked would be desirable in order to ensure a high degree of coordination and harmonisation and avoid unequal treatment between companies belonging to the same sector, but subject to different regimes, because they are located in different regions. However, such a feature is not a strictly necessary feature for establishing a linking. Differences in the sectors subject to each ETS may reflect their different role in the linked systems, therefore in our view a certain degree of freedom in the selection of the sectors to be covered by each ETS seems to be acceptable.

2) COMPLIANCE PERIODS: Setting clear and reliable compliance periods is an important design feature for any ETS, but having the same compliance periods in both/all the ETSs to be linked is not a "must". Two countries, for instance, could decide to organise their own ETS in compliance periods of different length due to internal administrative reasons and still find it profitable to link one another, given the fact that compliance is normally assessed on a yearly basis. The presence of the same compliance periods may represent, however, an important comparative advantage for a successful linking, as suggested by the fact that in the case of California and Quebec the compliance periods were coincident.

3) ALLOCATION METHOD: The existence of an equivalent system to allocate the allowances in both/all the ETSs to be linked represents a highly desirable feature since different allocation methods can generate inequalities between companies that buy permits at auctions and those that receive them for free, although the adoption of exactly the same allocation method is in principle not strictly necessary for linking (Climate Strategies, 2009; Freestone and Streck, 2009; Burtraw et al., 2013). However, the current trend in the existing ETSs shows that auctioning is the most common allocation method, albeit normally tempered with some exceptions for carbon leakage, since a well-designed auction can ensure cost-effectiveness, transparency and non-discrimination among the operators involved, while avoiding the larger number of permits allocated to big emitters and the possible wind-fall profits that can arise when permits are given for free on the basis of historical emissions.

4) LINKING WITH OFFSET PROGRAMMES: Some ETSs establish a direct link with offset programmes generating credits that can be used within those ETS for compliance purposes. The existence of the same rules on offset credits in both/all the ETSs is not a necessary element for linking, but it would represent a desirable optional feature. However, as already pointed out above, it should be recalled here that in case of linking between two or more different ETSs, whereas only one of them is directly linked with offset programmes, the other(s) will also become indirectly linked with them, as a result of the ETS linking agreement. The harmonisation of the rules on offset credits, therefore, is not strictly necessary a priori, but might occur as a consequence of the linking agreement.

5) CARBON LEAKAGE RULES: Addressing carbon leakage exposed sectors under an ETS may ensure against the risk of the so-called race to the bottom, and may prevent market distortion and loss of competitiveness. Most of the ETSs currently in force adopt carbon leakage rules as a common practice. In our opinion, the existence of carbon leakage rules in all linked systems is highly desirable, but not strictly necessary, since different rules in terms of carbon leakage exemptions are unlikely to determine significant delocalisation of production across countries. In fact, empirical studies generally find that environmental regulation is not a main driver of delocalisation (see Erdogan, 2014 for a survey of the literature). The same seems to apply to ETS as a specific example of environmental regulation (Martin et al., 2014a and 2014b; Borghesi et al., 2016), in particular given the relatively low market prices for carbon permits experienced in most ETSs so far.

Table 1: Necessary and optional features for ETSs linking

GHG EMISSIONS CAP	NECESSARY
MEASUREMENT, REPORTING AND VERIFICATION (MRV)	NECESSARY
ENFORCEMENT PROCEDURES	NECESSARY
ALLOWANCE TRACKING SYSTEM	NECESSARY
PRICE COLLARS (FLOORS & CEILINGS)	NECESSARY
BANKING & BORROWING	NECESSARY
ALLOCATION METHOD	OPTIONAL
SCOPE	OPTIONAL
COMPLIANCE PERIODS	OPTIONAL
LINKING WITH OFFSET PROGRAMMES	OPTIONAL
CARBON LEAKAGE RULES	OPTIONAL

As Table 1 shows, a certain degree of “compatibility and comparability” of the relevant ETSs is essential for a successful linking. In such a view, a few necessary and some optional features for a well-designed linking of different ETSs seem to emerge from the analysis performed above. Firstly, a stringent, determined cap is essential, together with a strong MRV system, relying on a reliable registry system, that helps preventing frauds. Secondly, setting price floors and ceilings in order to reduce the price volatility frequently observed in

the carbon market is also a necessary requirement, as well as adopting same rules on banking and borrowing to enable firms to adjust to unforeseen changes of the economic circumstances. Thirdly, the progressive shift towards auctioning, as the standard allocation system, without extending too much the sectors exempted, but at the same time addressing carbon leakage concerns, are desirable optional features which should be preferably, though not necessarily, harmonised. Finally, similarity or harmonisation between the respective scopes and compliance periods is not a necessary requirement, but rather represents a desirable optional feature.

6. Options for linking: a critical assessment

The lessons learned from the analysis conducted above may provide a useful benchmark for a critical assessment of the possible options for linking between ETSs at a maximum scale (global level) or at a minimum scale (multilateral or bilateral level). In this regard, the following three main alternative options for linking will be presented, which are meant to be read as a continuum from the more advanced one (option 1) to the less advanced one (option 3):

- 1) a global single ETS;
- 2) a multilateral agreement among regional/domestic ETSs;
- 3) one or more bilateral agreements between regional/domestic ETSs.

6.1. Option 1: a global single ETS

The first option consists in the establishment of a global single ETS, which could build on the existing domestic and regional ETS regimes, by upgrading them into a worldwide single ETS scheme. The creation of a global single ETS could be the evolution of the initial International Emissions Trading instrument, which was originally conceived under article 17 of the Kyoto Protocol as one of the key mechanisms for the fulfilment by the Parties of their commitments. While the original idea was to enable emission trading among Annex I Parties only, option 1 proposes its extension to all countries, so that a firm could exchange tradable permits with any other firm around the world.

The essential prerequisite for setting up such a system is that a global ETS agreement is signed at international level with the following three main features: i) setting up a global ETS regulator; ii) determining a worldwide cap; and ii) adopting a set of worldwide shared rules. The advantage of a global regulator would consist of ensuring uniformity of treatment for all operators on the carbon market, in particular in the enforcement of the same monitoring, verification and sanctioning rules. Moreover, the global regulator would adopt and implement a common set of rules for managing and operating the global ETS market, which would reduce the transaction costs that operators have to face due to the different norms and regulations applicable in the various jurisdictions.

This option, though theoretically very intriguing, presents, however, serious regulation and implementation problems. As far as regulation is concerned, it is hard to imagine the possibility of reaching an international binding agreement on the establishment of a global single ETS, given the difficulties experienced in the international climate change negotiations in the last few years (Montini, 2011; Bodansky, 2010). In fact, in recent years we have witnessed a substantial failure of the international climate negotiations to reach a binding agreement on a renewed Kyoto Protocol or another binding legal instrument for the post-2012 period. For a long time the only tangible result obtained was the approval at Durban in 2011 of a negotiating mandate to adopt a “protocol, legal instrument or agreed outcome with legal force” by 2015. While awaiting the results of the negotiations, the Parties agreed at Doha in 2012 to launch a very limited second commitment period of the Kyoto Protocol, confined to the participation of EU and a few other countries, which covers the period 2013-2020. Only recently, at COP-21 in Paris, the UNFCCC Parties managed to reach an agreement on the new climate change institutional and legal framework that should enter into force in 2020. The agreement concluded in Paris is certainly an important and promising step forward towards an enhanced international cooperation and the definition of more ambitious goals, despite the fact that it does not contain legally binding targets for the Parties (Montini, 2016). Therefore, on the basis of the experience gained in the international climate change negotiations, there seems to be no “political” room for the establishment of a global single ETS through the conclusion of an ad hoc international agreement. Anyway, even in the remote

case that a global single ETS might be established sometimes in the future, a global ETS regulator would face severe concrete problems for its implementation. In the first place, it is unclear how a global cap could be set up, given the large political disagreement on carbon reduction targets and means that still affects the international community. In the second place, it would be difficult to reach an agreement on how to allocate emission allowances among the Parties. In fact, alternative allocation criteria would lead to totally different outcomes. To provide an example, if allowances were allocated according to the population level of each country, this would create large disparities between large and small countries and could implicitly promote demographic growth, with its well-known negative side effects on the environment. A similar problem would occur if allowances were attributed on the basis of each country GDP level. This criterion would generate remarkable disparities between rich and poor countries, preventing the latter from growing due to the initial lack of permits that are needed to enhance their economic activities, as well as to the lack of financial resources to purchase the necessary permits. In this case, therefore, poor countries might end up in a poverty trap and would certainly reject the adoption of a similar criterion, as it would be perceived extremely unequal. Another possible approach would be to allocate allowances according to the pollution intensity reduction pursued by each country. Even this criterion, however, could have distortionary effects. In fact, a reduction in pollution intensity is perfectly consistent with a further increase in the polluting emissions as long as the latter grow more slowly than the GDP. It follows that this criterion might induce countries to give absolute priority to their income growth (with the consequent negative environmental effects that this may generate) rather than to the reduction of their pollution levels. These problems, that were already identified by Pearce et al. (1991) in their seminal contribution in the early nineties, are still unresolved. Therefore, more than twenty years later, the world seems to be still immature to embrace a global ETS.

6.2. Option 2: a multilateral agreement among regional/domestic ETS regimes

Considering that the conclusion of an international agreement on a top-down global ETS seem very unlikely, the second option to be explored consists in establishing a bottom-up

multilateral agreement among regional/domestic ETS regimes, based largely on the existing systems. This possibility would essentially consist in a multilateral linking of various regional or domestic ETSs. It is evident that option 2, compared to option 1, looks much more feasible, since in this case sovereign countries would not need to delegate all their competences to a global regulator. However, the interested countries would still need to sign an agreement for coordinating their existing domestic/regional ETS, in order to identify minimum common standards for the network to operate. In such a context, for instance, the necessary and optional features identified above would need to become a set of common rules to be agreed by the Parties of the multilateral linking agreement.

Nevertheless, one cannot disregard the difficulties that might arise, even in this case, in negotiating such an agreement. In the first place, although countries would not need to give up all their competences, they would still need to partially limit their sovereignty and revise their own regimes in accordance with the agreed common standards in order to establish the network. This would be likely to encounter some opposition in many countries, particularly at a time characterised by a crisis of the environmental multilateralism (Montini, 2011). Hence, although this second option would require a significantly more limited agreement than the one envisaged under the first option, the observed negative trend of multilateralism would also most probably affect the possibility of reaching such an international agreement on the establishment of a network connecting the existing domestic/regional regimes.

In the second place, the existence of numerous and remarkable differences among the existing ETSs might hinder the realisation of this option. In fact, the main ETSs currently operating in several jurisdictions around the world present remarkable differences in terms of price floors and ceilings, targets and length of compliance periods, sanctioning systems and so on. These differences, especially the ones related to the necessary requirements, appear difficult to overcome in the short run, as the urgency of the climate change issue would instead demand. For instance, setting a minimum common standard on the price floor would require beforehand its introduction in the EU ETS, where it is currently missing. Moreover, it would require a shared view among the regimes examined above on what is the

minimum acceptable allowance price. Such a shared view may be difficult to reach due to the large differences in the energy systems on which each regime relies and in the related energy prices. Similar considerations would most likely apply to the identification of a common emission target, which would require a rapid convergence towards a single objective and baseline that currently seems quite hard to reach.

6.3. Option 3: one or more bilateral agreements between regional/domestic ETSs

The difficulties highlighted above, with regard to the establishment of a global single ETS as well as a multilateral agreement among regional/domestic ETSs, seem to pave the way for a third option to be considered in the present context, namely the establishment of one or more bilateral agreements between interacting regional/domestic ETSs. In such a case, the interested Parties might try to develop partnerships and transitional arrangements, with a view to promote the adoption of bilateral linking agreements with other countries that have similar ETSs in place.

In this sense, as pointed out above, so far, the only existing example of bilateral linking in operation is represented by the agreement between California and Quebec, which has been established in 2013. Other attempts to reach similar agreements between other ETSs turned out to be unsuccessful so far. In particular, it ought to be recalled here that the preliminary attempt of linking the EU ETS with the Californian ETS started in 2011 encountered significant obstacles, mainly due to the concern raised by each jurisdiction of losing control over the allowance price as well as over the regulation of the system. For instance, while the EU allows the use of CDM credits, but not forest credits, the opposite applies to California (Zetterberg, 2012).

These political and regulatory barriers may explain why the EU and California moved apart, looking for alternative partners. In particular, the EU boosted its search for a bilateral agreement with Australia, aiming at connecting and enabling trading between their respective schemes. A shared understanding on linking the EU ETS and the Australian emissions trading scheme was concluded in 2012 (European Commission 2012). According to the preliminary agreement, a unilateral direct linking between EU and Australia should

have been in force from mid-2015, whereby European units could be used for compliance with obligations under the Australian Scheme. This should have paved the way for the full two-way bilateral linking to be started in July 2018. However, the developments in the Australian political scenario following the 2013 elections marked a turning point in the negotiations and blocked the implementation of the planned agreement, as the Australian Government decided to repeal its own ETS legislation altogether.

It should be noted that despite the unsuccessful attempts described above, the EU is still quite open to the possibility of signing some linking agreements with other partners. Moreover, there might be other countries around the world that have an ETS already in operation or are currently aiming at establishing such a regime that might be willing to explore some linking possibilities for their national ETSs in the near future. This could be a feasible way to lay the foundations for the development of a series of bilateral agreements between regional/domestic ETSs. If two or more bilateral agreements were then linked together or if a country concluded several bilateral agreements playing a pivotal role in connecting its own partners, this could then possibly evolve in the long term into a multilateral agreement between regional/domestic ETS regimes (Option 2) or into a global single ETS (Option 1). Thus, if one imagines that California – that is already linked to Quebec – reached a bilateral agreement with another country which has its own national ETS (say, China, that is expected to set a country-wide ETS in the near future), this would automatically create a multilateral agreement among the three countries or regions. This could then potentially evolve into a global ETS if the number of countries entering such a multilateral agreement was subsequently extended, thus progressively moving from option 3 to option 2 up to option 1. Given the rapid spread of the ETSs worldwide, this possibility cannot be excluded a priori. In fact, if China -following the pilot projects currently in place- will introduce its own national ETS in the next few years, the country-wide Chinese ETS will certainly become a very attractive partner for bilateral linking agreements, due to its foreseeably giant dimension and growth perspectives. In such a case, the country that will lie at the intersection of several bilateral agreements will play a pivotal role and most probably take the lead in the creation of a hypothetical global market.

In any case, the potential benefits deriving from a bilateral linking or from a series of bilateral agreements between regional/domestic ETSs, such as the one envisaged above, deserve a careful evaluation, for the purpose of our analysis. In fact, one cannot completely disregard the risk that the benefits arising from the enlargement of the market could be counterbalanced by the higher administrative costs deriving from the need to coordinate different jurisdictions. Moreover, the allocation criteria should be harmonised if market competition is to be preserved. Otherwise, less stringent allocation criteria in one jurisdiction would end up favouring installations based in that jurisdiction at the expense of those located in another. In the absence of a basic core of common standards and appropriate coordination, this might lead to a race to the bottom in environmental terms, since each jurisdiction would be prone to protect the interests of their domestic players, by promoting or tolerating over-allocation. In such a scenario, one cannot disregard the possibility that multinational firms might be tempted to relocate their installations to less stringent jurisdictions, thus giving rise to unexpected carbon leakage between developed countries. Finally, although the enlargement of the ETS market may improve competition and reduce abatement costs, it may also increase price volatility due to imitative behaviour in the financial market. In fact, the well-known phenomenon of herd behaviour (namely, the observed tendency of individuals in a group to mimic the choices of others rather than decide on their own) that characterises many financial markets and has played a major role in triggering the recent global crisis, may occur also in this field, since the ETS is itself a financial market.

Despite the existing shortcomings highlighted above, in our opinion reaching a series of “imperfect” bilateral agreements between various ETSs in the near future, and extending the experience beyond the only one between Quebec and California, would be probably better than waiting for a “perfect” bilateral agreement in the long run. This would generate mutual learning from different regulatory experiences in the ETSs context and would create the necessary know-how to improve bilateral agreements and avoid the potential problems described above.

7. Beyond linking? Risks and opportunities of the ETS financialisation

In order to realize the potential benefits of a global carbon market (i.e. larger market size, improved price predictability, cost efficiency, etc.), the World Bank has recently proposed a new possible option that goes beyond linking as described above (Fuessler and Herren, 2015). This proposal consists in “networking carbon markets”, namely, connecting carbon markets through independent rating agencies and systems. According to the World Bank proposal, the latter would rate environmental integrity and climate change mitigation value of carbon assets in the international markets and then convert ratings into carbon exchange rates. All international trading would then be registered in an International Settlement Platform that would possibly act as clearing house for the whole system.

According to the World Bank (2015), such a proposal could present some advantages with respect to the recently proposed one-way or two-way ETS linking systems. In particular, while linking with ETSs that have inappropriate verification may harm the environmental integrity and credibility of one’s own ETS, the rating of carbon assets by independent agencies would preserve environmental integrity, providing a transparent approach that is able to address risk and uncertainty. Moreover, while linking ETSs might reduce national control over domestic climate change policies, connecting carbon markets through exchange rates would respect countries’ sovereignty (allowing each jurisdiction to choose the appropriate level of trading in which to engage), and would encourage participation, possibly triggering a race to the top through modifications in the exchange rates.

Although the World Bank proposed system is certainly very interesting, one should not undervalue the risks associated with involving rating agencies in a carbon market, assigning them a pivotal role in the fight against climate change. The recent financial crisis, in fact, suggests that a misevaluation by rating agencies may have serious consequences, possibly causing a “domino effect” that may end up damaging the stability of the whole system.

The possible existence of fluctuations in the carbon exchange rates, moreover, might hamper the stability of carbon markets, increasing the role of expectations and speculative attacks which could lead to enhanced price volatility. In our opinion, therefore, this proposal –though certainly very appealing, particularly for the active and constructive role assigned to the

private sector – should be taken with much caution, as it could lead to a larger financialisation of carbon markets that might set them apart from the environmental targets they should pursue.

8. Conclusions

The present paper has focused on linking Emission Trading Schemes (ETSs) as a possible option to overcome the difficulties encountered by international climate change negotiations over the last few years and increase the effectiveness of the existing domestic or regional regimes. In such a context, the main contents, features, drivers, pros and cons of linking, as well as the different types of possible linking arrangements have been analysed. Then, assuming that only compatible and comparable ETSs may be linked, the “necessary and optional features” for any successful linking have been identified and critically assessed.

Building on these premises, the attention has mainly focused on three possible options for linking among ETS at a global or at an international level, namely i) a global single ETS; ii) a multilateral agreement between regional/domestic ETS regimes; iii) one or more bilateral agreements between regional/domestic ETS regimes. In the context of such an analysis, it has emerged an observable trend towards a decrease in environmental multilateralism. Multilateralism seems to have lost momentum, and this has obvious implications concerning the feasibility of the different options for connecting ETS schemes via a global agreement, a network of multilateral existing regimes and/or a series of bilateral agreements. Despite the promising results emerged from the COP-21 in Paris, the difficulties experienced in recent years in the international climate change negotiations make the establishment of a worldwide ETS very unlikely at the moment. A similar, though less severe, problem may arise in the attempt to build a global network of regional/domestic ETS regimes. For this reason, the development of a series of bilateral agreements aimed at creating interacting ETS blocks seem the most viable option (if not the only option which is really feasible) towards scaling up the existing ETS regimes as an intermediate step towards a worldwide application. In fact, the development of a series of bilateral agreements between regional/domestic ETS regimes (option 3) may represent a highly desirable solution for the near future, as it could provide

the foundations for the establishment of a network of multilateral ETS agreements (option 2) in the medium term, that might hopefully evolve into a global ETS (option 1) in the longer run. Finally, beyond the three linking options listed above, a recent World Bank proposal aimed to establish a system of “globally networked carbon markets”, that is, connecting existing carbon markets through independent rating agencies and systems, has been presented and critically analysed as an additional opportunity. In this regard, despite the possible advantages that may derive from networking carbon markets, it has been noted that there might be some risks associated with involving rating agencies in a carbon market, assigning them a pivotal role in combating climate change. The recent financial crisis, in fact, suggests that a misvaluation by rating agencies may have serious consequences, possibly causing a “domino effect” that may end up damaging the stability of the whole system. Therefore, in our opinion, while the World Bank proposal deserves particular attention for its innovative character, it still needs a more careful evaluation and an appropriate design in order to avoid the risk that a larger financialisation of carbon markets may hamper the achievement of the environmental targets that should accompany the fight against climate change.

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THE ABSTRACT OF THE PROJECT IS:

The research programme will integrate diverse levels, methods and disciplinary traditions with the aim of developing a comprehensive policy agenda for changing the role of the financial system to help achieve a future which is sustainable in environmental, social and economic terms. The programme involves an integrated and balanced consortium involving partners from 14 countries that has unsurpassed experience of deploying diverse perspectives both within economics and across disciplines inclusive of economics. The programme is distinctively pluralistic, and aims to forge alliances across the social sciences, so as to understand how finance can better serve economic, social and environmental needs. The central issues addressed are the ways in which the growth and performance of economies in the last 30 years have been dependent on the characteristics of the processes of financialisation; how has financialisation impacted on the achievement of specific economic, social, and environmental objectives?; the nature of the relationship between financialisation and the sustainability of the financial system, economic development and the environment?; the lessons to be drawn from the crisis about the nature and impacts of financialisation? ; what are the requisites of a financial system able to support a process of sustainable development, broadly conceived?

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