CHAPTER 14

CARBON PRICING: FROM THE KYOTO PROTOCOL TO THE PARIS AGREEMENT

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1 INTRODUCTION

When fighting global warming, a necessary condition towards a low carbon economy is mitigation of greenhouse gas emissions (GHGs). In order to achieve this, the economic literature suggests the application of price instruments as a "better" way to make this transition faster and less costly from the social point of view.[2]

When facing a higher relative price of pollution, private agents will have to choose between paying to pollute or reducing pollution by comparing the marginal control cost with the price of pollution. All emissions presenting lower control costs when compared with the price of pollution shall be controlled. In this situation, the control trajectory would follow the path of lower cost among the agents and, therefore, lower aggregate cost for the whole economy. Consequently, agents with lower costs would have more control than agents with higher costs, and thus the cost of society aggregate control would be lower.

Moreover, those who control spend less with a unit of controlled pollution as their control cost is lower than the price of pollution. Those who do not control are forced to pay the price for uncontrolled pollution. Hence, agents who control pollution have a lower total control cost and become more competitive.

Therefore, polluters will maintain an interest in adopting cleaner production methods in order to reduce their cost of pollution, which creates a stronger dynamic incentive for environmental technological innovation. Hence, it is always more efficient to have an equal unit price for all emission sources, thereby ensuring equal incentives and encouraging cost-effective reductions and innovation.

This chapter assesses approaches in carbon pricing, from the adoption of the Kyoto Protocol to the proposals included in the Paris Agreement. In order to do so, it begins with a brief theoretical analysis on pricing instruments, making a

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2. That is, for the economy as a whole. The basic bibliography for the development of the theoretical and conceptual part of this section are CEBDS (2016) and Seroa da Motta (2008).

distinction between the carbon taxes system from the emissions trading schemes and project credit offsets. It then goes on describing the various forms of pricing developed under both the Climate Convention and voluntary modalities. The main experiences with the European Union Emissions Trading System (EU ETS) and the Clean Development Mechanism (CDM) are then analyzed in detail. The chapter then discusses market instruments that are recognized and regulated in Arts. 5 and 6 of the Paris Agreement and how they connect with existing experiences. Finally, opportunities for Brazil to further advance its excellence with the CDM are discussed, as well as the environmental and competitive advantages of other instruments.

2 CARBON PRICING

There are two approaches to setting a price to pollution. Directly, as a compulsory tax per unit issued; or indirectly, by the exchange of emission rights defined compulsorily. In both cases, the company decides the desired aggregate level of emissions and then sets the billing amount or, in the trading system approach, the distribution among the equivalent emission allowance.

In the case of carbon taxes, a value per unit of pollution is determined in such a way that the sum of the pollution reductions of each polluter results in the new aggregate level of control desired. In the trading system approach, regulators distribute emission rights that are equivalent to the desired aggregate level of emissions among pollutants, but allow those rights to be traded between them. This gives rise to a market for the trading of these rights and, consequently, trading prices for these rights.

Given that control decisions are based on the same marginal cost control curves, therefore, in the absence of uncertainty and transaction costs, both instruments generate the same price result and controlled amount. The difference is the initial restriction that is quantitative in the market and the price when using carbon taxes.

When there is uncertainty, one instrument may be preferable over the other. When uncertainty over control costs is greater than that of damage, that is, a more elastic damage curve with respect to emissions, and therefore, small variations in control quantities generate very sudden variations in damages, it would be more efficient to use quantitative controls such as market ones. When, on the other hand, control costs are more elastic to emissions and, therefore, costs vary greatly with the level of control, then taxes would be preferable to avoid sharp price variations in the emissions

trading approach. Another option would be hybrid systems in which price control is adopted within an emissions trading scheme to reduce the variability of the traded prices.

Transaction costs must also be considered. Transaction costs of carbon taxes, when using the current treasury system, might be smaller than in the emissions trading system, in which economic agents have to find out prices and enter into contracts and, therefore, other institutional arrangements, such as records and stock exchanges, will have to be developed. Moreover, transaction costs might restrict the scope of application of the emissions trading approach when involving many economic agents needing a high frequency of rights transactions, such as in the transportation and agricultural sectors.

Finally, it should be noted that the choice and formatting of these instruments has been strongly influenced by political economy factors, in which the participation and influence of regulated parties and regulators can overshadow these technical issues.

There are currently fifty-one national and subnational jurisdictions have already adopted carbon pricing, including some of Brazil's main economic trading partners. Of these jurisdictions, 25 have market approaches in place and 26 have tax approaches. In total, the two forms of pricing cover 20 percent of global emissions, with an annual value of US$ 82 billion—a sum that underscores the importance of recycling these resources within the sector. The carbon price levels vary widely, from US$ 1/tCO2e to US$ 139/tCO2e; but in 49 percent of cases, the prices are lower than US$ 25/tCO2e, and in 17 percent of cases they are lower than US$ 10/tCO2e. (World Bank, Ecofys and Vivid Economics, 2017). Although it is still a small percentage of the Parties involved in the Paris Agreement, there is a number of initiatives being planned, including in Brazil.[3] Out of these experiences, the best known and covering the largest number of countries is the one including the countries of the European Community.

3 The World Bank project Partnership for Market Readiness - PMR Brasil under coordination of the Brazilian Ministry of the Economy, available at: http://www.fazenda.gov.br/orgaos/spe/pmr-brasil.

3 THE EUROPEAN UNION CAP AND TRADE SYSTEM

As mentioned above, in emissions trading schemes, usually known as cap and trade (C&T), the maximum desired emissions quantities for all the economy is distributed among the agents (cap), for free of charge or auctioned, and economic agents may trade their individual emissions allowances.

The problem of company cost minimization is the same, whether allowances are allocated free of charge or auctioned; therefore, efficiency will remain the same, always resulting in the same equilibrium price. The free allocation, however, favors those who have received a greater proportion of their issuance needs and/or have a higher cost of control. The sale of allowances, for example, by auctions, do not have these distributive effects and can still generate tax revenues.

The cap and trade market for carbon pricing with the larger scale and duration is the European Union Emissions Trading System.[4] In the Kyoto Protocol, the then member-countries of the European Union (EU) committed to reduce their aggregate emissions of greenhouse gases by 8% below the 1990 levels in the period 2008-2012. This collective commitment has translated into differentiated national emission targets for each country in the community.

One of the instruments to achieve those goals was the European Union Emissions Trading System (EU ETS), created in 2005, which focused on the regulation of emissions from energy-intensive industrial sectors, such as electricity generation, cement, paper and cellulose. It has had three phases so far.

Phase I, 2005-2007, was an experimental stage, with a reduction target by 2%. Phase II, 2008-2012, established the target for the first commitment period of the Kyoto Protocol. Both phases distributed emissions allowances for free, according to national targets,[5] called EUA (emission unit assignments, of the EU ETS). Due to political pressure resulting from the fear of losing international competitivity, the distribution ended up favoring highly energy-intensive sectors with generous allocation, which resulted in an emissions' increase and high sales profits with the trading of the sector's allowances.[6]

4. The sulfur emissions market in the United States in the 1990s was the first large-scale experience with pollution rights markets and its success was inspiring for subsequent experiments, see, for example, Joskow, Schmalensee, and Bailey (1998).

5. Auctions were allowed, if the country wanted so, but only Denmark, Hungary and Lithuania used it to distribute a small part of their allowances. See Fazekas (2008) and Matthes and Neuhoff (2007).

6. See, for example, Martin, Muûls and Wagner (2016).

In phase III, 2013-2020, the final emissions target was 14% below the levels of 2005 (equivalent to 21% below the levels of 1990). In this stage, 40% of allowances were auctioned, and an emissions allowance reserve was created as a price stabilization mechanism.[7]

The impacts on trading prices were significant. They dropped from €30 per ton of CO_2 in 2005 to €10-09 until the 2008 crisis, when they plunged to less than €2. With the effects of the crisis fading, the new form of distribution and the perspectives of a new climate agreement, prices started to rise sharply again in 2012. €6 (Marcu, Elkerbout and Stoefs, 2016). Today EU ETS allowances are trade around €25.[8]

It is noted that when faced with an imposed target of GHG reductions, companies in the European Community would already have higher costs and, consequently, competitiveness loss. With the EU ETS, in turn, although there is still some loss of productivity and profit, there was a significant incentive to the growth of regulated companies when compared to the regulated ones.

The studies that have assessed the EU ETS indicate that, in addition to the fact that negative economic impacts are not that significant, the application of these instruments also generated positive effects. For example, even with the rise in the price of electricity, diesel and gasoline, when analyzing the performance of European companies before and after the creation of the ETS, most studies show that EU ETS has positively affected production, employment and investments of regulated firms, although in some countries a small loss of jobs has been observed. The effects on productivity and profit are ambiguous, with some studies showing both positive and negative variations.[9]

Despite that, the distribution of allowances was not free of controversies. Even if studies on EU ETS demonstrate that the benefits of auctioning revenues and reducing tax expenditures with exemptions would outweigh the costs associated with the loss of competitiveness due to leaks,[10] the transition to an auction system faced a high degree of rejection by regulated energy intensive companies. There has also been disagreement conflict over the use of proceeds raised with auctions, with regulated parties wanting them to return to their sectors in the form of credit subsidies and offsets, and regulators preferring greater flexibility in application such as reducing the overall tax burden of the economy or incentives for technological innovation.[11]

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7. For more details, see: https://bit.ly/2Kscf7V. Accessed on August 9th, 2017.

8 See at https://bit.ly/2sjSOXe, accessed on November 12th, 2019.

9. See, for example, Marin, Pellegrin and Marino (2018), Martin, Muûls and Wagner (2016) and Ellerman and Buchner (2007).

10. Carbon leaks is the situation in which companies move their production to other jurisdictions where the constraints of climate policies are less stringent and can therefore lead to an increase in aggregate greenhouse gas emissions.

11. See, for example, Bushnell, Chong and Mansur (2013) and Ellerman and Buchner (2008).

The experience with EU ETS indicates that although efficiency gains in a C&T market are relevant, generating them is not something trivial. On the other hand, the technical and institutional development obtained with EU ETS has been valid in other national markets and other forms of pricing, such as offset mechanisms.

4 OFFSET MECHANISM

A baseline and credit type scheme (B&C) is somewhat similar to the C&T system, as emissions below the baseline limit generate credits that can be sold to those that emit above the baseline limit, the so-called offset, of emissions with credits from other sources or companies.[12] The baseline is calculated by multiplying a scale measure of use or production by a required proportion of emissions for that scale.

For example, emission standards, indicating quantitative emission limits by some unit of mass or volume, may serve as a baseline. As a result, companies could meet this standard either by reducing their own emissions or by buying credits from other companies whose levels are lower than the standard.

For instance, the program to ban lead from gasoline in the US dates back to the 80s, and used a baseline and credit approach, based on a lead intensity standard per unit produced. If a refinery, for example, produced 100 gallons of gasoline, it would have the right to emit 110 grams of lead per gallon produced.

If the lead content of gasoline produced by the refinery was below the baseline, then the difference could be negotiated.[13] Recently, in Alberta, Canada, a credit and baseline system has been implemented that requires large emitters to reduce their emissions intensity by 12%, allowing this target to be met with offsets between the companies within the system and also with others outside it to reduce their emissions on a voluntary basis[14] (CDC, EDF and IETA, 2015).

There are other initiatives that are similar to credit and baseline systems, such as:

- Australia: Carbon Farming Initiative (CFI) and NSW Greenhouse Gas Reduction Scheme (GGAS) and NSW Energy Savings Scheme (ESS);
- China: Certified Emission Reduction Scheme (CCER);

12. *Offset* is a reduction in greenhouse gas emissions in one jurisdiction to compensate for emissions in another jurisdiction.
13. See, for example, Hahn (1989).
14. Or with payments that are equivalent to a climate fund.

- India: Perform Achieve Trade scheme (PAT);
- United States: California Air Resource Board Compliance Offsets.

There is also a joint credit mechanism (JCM) created by Japan to assist developing countries in their mitigation efforts towards technological diffusion. In this mechanism, emission reductions are also defined as the difference between baseline and project emissions based on previously established and supposedly conservative standards and parameters to provide more transparency but without the requirement to prove additionality.[15]

Another system for the negotiation of offsets will happen in the scope of the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), when airlines will be forced to buy offsets, or "emission units", to counterbalance their CO_2 emissions increase from international transport above the 2020 levels. From 2021 to 2026, CORSIA will only apply to international flights between countries that participate in the pilot phase on a voluntary basis. As at 2027, participation will be compulsory, except for some least developed countries, landlocked developed countries, and small island developing states.[16]

Although B&C schemes set a price on emissions, they differ from C&T schemes because there is no limit to explicit aggregate emissions, but there is an implicit limit equivalent to the sum of individual baselines. As a result, emissions vary with the level of aggregate production and, therefore, B&C performs differently from C&T in the long run since regulated companies have an incentive to expand production to generate more credits and consequently more emissions (Fischer, 2003 and Buckley, Mestelman and Muller, 2008).

The experiences created under the Kyoto Protocol are among the most developed experiences of international compensation mechanisms, with emphasis on the clean development mechanism.

5 INTERNATIONAL COMPENSATION

Most C&T and B&C schemes described above also accept offsets, generated in other jurisdictions, even if they do not have charges or markets. Jurisdictions that adopt reduction targets, even without charges or markets, can accept that the attainment of these goals is partially offset from other jurisdictions. In the case of climate agreement targets under the Climate Convention, there are mechanisms for this purpose.

15. See more details in Mizuno (2013).
16. See more details in Gehring and Phillips (2016) and at https://bit.ly/2N75AhQ. Access on July 12th, 2017.

The longest and most successful international offset experience is the Kyoto Protocol's flexibilization mechanisms. Considering that in this protocol, countries that are considered developed (Annex B Parties), have accepted emission caps, while others did not, three mechanisms were approved, namely:

1) International Emissions Trading (IET):[17] mechanism by which countries with emission caps, measured by assigned amount units (AAUs), may trade spare emission units with other countries that also have targets for reducing emissions.

2) Joint Implementation (JI):[18] credit mechanism, accounted as emission reduction units (ERUs), that encourages the creation of emission-reduction projects to transfer between countries with emission caps. Unlike the emissions trading scheme, credit comes from projects, and not spare emission units.

3) Clean Development Mechanism (CDM):[19] mechanism where credits result from the implementation of projects in countries with no emission caps that generate voluntary reductions, that are accounted as certified emission reduction (CER) credits.

In the CDM case,[20] in which the generating country does not have targets, credit accounting is more complex. First, the baseline must represent a scenario in which anthropogenic emissions would have occurred in the absence of the project. Second, the project must create additionality, that is, it must demonstrate that it is different from the baseline, meaning that not having the benefit of the CDM was not the most likely or profitable option, or that there were barriers to its implementation. Third, these reductions must be permanent. Finally, CDM projects must be aligned with sustainable development objectives.

Because compliance with these criteria is not trivial, the issuance of CER credits face a lengthy process of validation and verification from their initial proposal until they are endorsed by the CDM Executive Board under the Climate Convention. That is, the more rigid the process, the greater the resulting transaction costs and the less feasible the smaller projects. The World Bank, for example, has estimated that transaction costs, including project preparation costs, range from approximately US$ 0.02 for large industrial projects to US$ 1.2 per CER unit for smaller projects (World Bank, 2009).

17. International Emissions Trading (IET).
18. Joint Implementation (JI).
19. Clean Development Mechanism (CDM).
20. It is also mostly applied to Joint Implementation (JI) schemes involving Annex B countries that do not meet all the eligibility criteria, mainly, inventories that allow the monitoring of credit transactions.

However, the effort of the CDM Executive Board since the instrument's implementation in 2005 has been recognized to enhance the process' effectiveness and thus ensure the integrity of the environmental objectives without significantly affecting incentives to reduce emissions and the adoption of low carbon technologies (Gillenwater and Seres, 2011; Shishlov and Bellassen, 2012 and Michaelowa, 2014).

Where adherence may be temporary, the approach used was to define a special type of "temporary" credit with certified temporary emission reductions (tCERs). These additional units have been used for projects in afforestation and reforestation activities, but projects that reduce emissions from deforestation reduction and forest degradation have been prevented from generating CDM credits. Later, an approach to reducing emissions from deforestation and forest degradation (REDD) was created under the Climate Convention for these activities.

Moreover, the European Community prohibited the use of afforestation and reforestation CERs in EU ETS. Besides, contentious issues of additionality and adherence have been used for each CER-purchasing country to create barriers to CDM transactions within their countries by discriminating by both transaction volume ceiling and eligible activity. In addition to forestry activities, there are also restrictions in the EU ETS for certain types of gases (HFC-23 and N_2O, for example) and additional requisites for hydro power plants.

There are, however, economic reasons for these barriers, particularly for forestry projects. These are due to the fear of local companies that the availability of cheap CERs generates a high price differential in relation to their control costs[21] to the detriment of the demand for local technologies and often allowing an abnormal rent to the issuers of CERs (Gillenwater and Seres, 2011; Shishlov and Bellassen, 2012 and Michaelowa, 2014).

So much so that, whatever the CDM credit, in the EU ETS, for example, there is a maximum quota of CERs that is allowed to enter the market.

Finally, the experience with the CDM exemplifies the difficulties of B&C systems. Although it requires a dynamic, evolutionary and fairly rigorous process to determine the baseline and additionality, this determination is not free from errors and uncertainties. Therefore, the CDM has been criticized for poor environmental integrity, high transaction costs and complex governance. When non-additional projects are erroneously accepted, the effect may be an increase in overall net emissions. The CDM mechanism has been, therefore, the object of several analyzes[22] that still point at weaknesses in the application of these criteria. Current estimates

21. This restriction appears to have reduced the impact of transaction prices on that market. Nazifi (2010) evidences that CER values do not affect the US, when coming directly from the EU ETS, it is the other way around. CER prices are anchored in US prices, probably because CER transactions are limited in the EU ETS and thus have no scale to lead prices.

22. See, for example, Warnecke, Day and Tewari (2015), Spalding-Fecher et al. (2012) and Schneider (2009).

indicate that the environmental integrity of CDM projects has improved over time, and their performance over transaction and governance costs has improved significantly since 2009, especially as of 2011. Standardization has begun with a boost (Michaelowa, 2014; Warnecke, Day and Tewari, 2015).

Experience with the CDM is a clear indication of the technical and institutional complexity in order to guarantee the environmental integrity of offsetting instruments. However, the results of this experience have been perfected over time, and can now contribute to the scope and scale of such mechanisms.

6 PRICING INSTRUMENTS IN THE PARIS AGREEMENT

Notwithstanding the difficulties discussed in the previous B&C and C&T initiatives highlighted above, these experiences generated a technical and institutional basis that encourages us to continue the evolution and the adoption of these instruments, as well as allows other pricing systems to be considered, as expressed in Arts. 5 and 6 of the Paris Agreement.

The discussion below is about how Art. 5 reinforces past deliberations on reduction of emissions by deforestation and forest degradation, Art. 6 encourages international cooperation with pricing instruments.

6.1 Art. 5 of the Paris Agreement

Since deforestation accounts for more than 15% of global GHG emissions, there is an interest in funding mechanisms for reducing emissions from deforestation and forest degradation. Art. 5 of the Paris Agreement reinforces the REDD decisions already agreed under the Climate Convention. This article contains two paragraphs. The first emphasizes the decision to encourage actions to conserve and improve sinks and reservoirs of greenhouse gases, including forests, as appropriate.

The second paragraph encourages measures to implement and support, together with results-based payments, the guidelines and decisions that have been already approved for activities related to emissions reductions from deforestation and degradation, and also conservation, sustainable management and sustainable forest management and increased forest carbon stocks in developing countries. It also includes joint mitigation and adaptation approaches for integrated and sustainable management of forests, reaffirming the importance of encouraging the other benefits in addition to non-carbon benefits associated with such approaches.

The technical issues in the implementation of REDD approaches are the same as those we have seen in the CDM regarding the baseline and additionality for afforestation and reforestation related to the timing of the credits. The possibility of such an approach generating a very large supply at very low costs reinforces the identified fears of reducing the attractiveness of local stocks and therefore likely to be subject to limiting quotas for offset.

6.2 Art. 6 of the Paris Agreement

Art. 6 directly addresses the provisions of market and non-market mechanisms, procedures and protocols for cooperation among countries in implementing the agreement. In this study, we will stick to market-based ones.

The first paragraph acknowledges the voluntary cooperation among countries in implementing their NDCs in order to allow for greater ambition in their mitigation and adaptation actions to promote sustainable development and environmental integrity. The ensuing paragraphs refer to voluntary cooperation modalities.

Paragraphs 6.2 and 6.3 describe the international transfers of mitigation outcomes that are the result of cooperative approaches, known as international transfer of mitigation outcomes (ITMO). These transfers are "mitigation results" that may result from any mechanism, procedure or protocol without the need for approval by the CMA, which is the body that oversees the implementation of the Paris Agreement.

Despite that, these provisions require these provisions require ITMO accounting to follow the CMA guidelines and hence rules that are yet to be defined, and should, in principle, be guided to avoid double counting and create records that can be tracked in transactions (Marcu, 2016; IETA, 2016; Gehring and Phillips, 2016).

Although the introduction of accounting metrics for ambition goals in mitigation and adaptation actions, sustainable development and environmental integrity can add a degree of complexity and uncertainty, ITMOs are instruments that only require the approval of the parties involved.

Moreover, there is no reference to additionality in Paragraphs 6.2 and 6.3, and if this is the case, international transfers of any type of mitigation outcomes would be possible, and not only those with B&C systems. Therefore, other forms of offset, such as EUA, REDD and JCM, would be recognized by the provisions of paragraphs 6.2 and 6.3 (Marcu, 2016; Gehring and Phillips, 2016).[23]

Paragraphs 6.4 and 6.7, in turn, establish a mechanism to "contribute to greenhouse gas emission mitigation and support sustainable development", known as sustainable development mechanism (SDM) or emissions mitigation mechanism (EMM). Its creation was initially thought of in the Brazilian proposal as an improved CDM (Brazil, 2014). To that end, in this Brazilian proposal, the mechanism would incorporate the modalities, procedures and methodologies of the CDM to continue to allow the negotiation of CERs.[24]

23 Although such authors acknowledge that this limitation, B&C's approach, appears in some preliminary versions of the Paris Agreement.

24 For a more detailed discussion on the differences and similarities between the CDM and SDM, please refer to Greiner et al. (2017).

Inspiration in the CDM has shifted to the text of the Paris Agreement as paragraph 4 (a) highlights the promotion of GHG emissions mitigation in order to strengthen sustainable development. And in paragraph 4 (b), much like to the CDM, the mechanism should encourage and facilitate participation in greenhouse gas emissions mitigation by authorized public and private entities.

The Brazilian proposal (Brazil, 2014) also provides that the mechanism is established in order to assist mitigation efforts of target countries and to assist developing countries in implementing project activities with the aim of reducing GHG emissions or increasing removals by sinks. Thus, all countries could emit SDM certified emission reductions, and the scope could cover a wide range of activities, including those associated with sinks (Marcu, 2016; IETA, 2016).[25]

Paragraph 6.4 (c) seems to confirm this possibility, as it refers to mitigation activities and the reduction of emission levels by the generating country, reaffirming in paragraph 6 (d) the fact that the SDM should "provide global mitigation in global emissions". Thus, along these lines, it would be possible to include a wide range of activities, including forestry ones, such as the REDD mechanism (Marcu, 2016).

Finally, paragraph 7 provides that the CMA must adopt rules, modalities, and procedures for the SDM. That is, unlike ITMO, the SDM will depend on the CMA's authority and not just the wishes of the stakeholders.

As discussed earlier, ITMOs contemplate a non-restrictive scope in which other mechanisms could be recognized. This broad scope also seems to be accepted for SDM. However, the coverage of these instruments under the SDM may be more attractive by the very mark required by the CMA. Although the SDM process may be less flexible and with higher transaction costs, the carbon transacted through the SDM may be more valued in trades (Marcu, 2016).

7 FINAL COMMENTS

Although the parties involved have not reached a consensus on the opportunity to create a global market, the Paris Agreement progresses and consolidates the experiences of carbon pricing, such as the CDM mechanism and the REDD approach. Because of the diversity of such instruments, not even the adoption of all these pricing options would specifically create an international regulated market, like EU ETS. However, once implemented, the negotiations of these instruments will signal with various prices that will certainly influence the mitigation decisions of each jurisdiction or sector insofar as they will affect the regulated or implicit prices of carbon previously practiced.

25. Although the Brazilian proposal mentions trade in CERs, the regulation of this mechanism and its procedures are still under discussion.

There is a range of opportunities for Brazil to expand its NDC's financing options and the expansion of mitigation measures. In addition, if not as important, they may generate benefits of technological innovation and protection of biodiversity.

One of these opportunities is the integration of REDD and SDM. A proposal developed by Costa et al. (2017) would be an instrument called "Integrated REDD". It proposes the creation of distinct, but complementary, markets in which REDD+ would be associated with balanced portfolios with the inclusion of other non-forest projects, such as the SDM mechanism. Such an association could, for example, be regulated by a balance between REDD credits and other types of credit setting a maximum percentage of REDD+ credits. This distinction would protect prices and demand for these credits. Consequently, and equally important, the impact of demand for REDD+ would be very low and would avoid volatility in markets for other types of offsets. With this, the financial resources would flow to the forest sector as to other sectors of the economy, thus contributing to the process of innovation and decarbonization of the economy.

In short, there are many experiences with carbon pricing that have been adopted in many jurisdictions. The most significant were the EU Emissions Trading Scheme and the CDM, both under the Kyoto Protocol. Many others have been adopted on a voluntary or subnational basis. However, as discussed here, the Paris Agreement broadens these opportunities and creates incentives to recognize them within the protocols and procedures of the Climate Convention.

Consequently, the implementation of these instruments will contribute to reducing the cost of mitigation in all jurisdictions, which will help achieve the goals of the Paris Agreement. For Brazil, it is the opportunity to further advance its excellence under the CDM and now capture the environmental and competitive advantages of REDD as well.

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