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# **Designing a Climate Agreement for the Reality of Self-interested and Short-term Oriented Nations**

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# Designing a Climate Agreement for the Reality of Self-interested and Short-term Oriented Nations

Arpad Cseh<sup>a</sup>

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## ABSTRACT

*The global and long-term nature of climate change conflicts with the reality of self-interested and short-term oriented nations. International negotiations have failed to reach an agreement that achieves effective mitigation, as this dual conflict has not been resolved. This paper proposes an alternative approach to international cooperation, one designed with the conflicting self-interests and short-termism in mind. Key elements of the proposed framework are: establishing a new international treaty and fund; determining a benchmark emission path for each country as well as a carbon price; paying countries annually through the fund for reducing emissions below their benchmark levels as opposed to penalizing them for higher emissions; financing the fund's annual payments by raising capital from private investors; and repaying the private capital in the long-term using contributions from participating countries. The benefits of this approach include that reaching an international agreement becomes more realistic, self-interest and short-termism are transformed from obstacles into drivers of climate change mitigation and additional financing is created to support the necessary investments. Cutting emissions, currently a burden to be shared among countries in a zero sum game, turns into an opportunity.*

**Keywords:** Carbon payment, UN climate negotiations, Climate change, Global warming, Carbon price, Private investor financing

## 1. Introduction

The United Nations Framework Convention on Climate Change (UNFCCC), an international treaty with the objective of limiting greenhouse gas emission to avoid dangerous climate change, was signed in 1992 and all members of the United Nations have ratified it. Notwithstanding the UNFCCC and the numerous attempts to achieve its objective during the past 24 years, we still do not have an international agreement that ensures effective climate change mitigation. The Paris Agreement, representing the latest approach to global cooperation, builds on voluntary contributions by countries and a future review process. However, the sum of individual contributions falls considerably short of the overall contribution needed to achieve the agreement's objective, the individual contributions are not binding and cannot be enforced, and there is no mechanism to ensure that future reviews and revisions of contributions will result in more meaningful emission cuts. Voluntary action has in no area succeeded to solve the problem of the undersupply of a public good especially in case of a global public good (Stiglitz 2015). Further, the Paris Agreement poses the risk that the appearance of success delays further efforts of the international community to find a more effective solution at a time when further delays can be ill afforded.

This failure of the international community is all the more striking if we consider that there is broad agreement on the scientific, economic and moral arguments for climate change mitigation. While many details and systematic interactions of the climate need to be better understood, there is general consensus within the scientific community that climate change is happening largely due to human actions and that it poses great environmental, social, political and economic risks (IPCC 2014). The economic benefits of earlier rather than later mitigation are also compelling. Delays rapidly increase

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the risks and future costs partly due to the accumulation of carbon in the atmosphere and partly due to the additional build-out of carbon intensive infrastructure and social structures in the meantime. The precautionary principle is another reason to limit climate change considering the uncertainties we face with regard to the exact path of climate change and its impact on people and ecosystems. Finally, the moral case for limiting climate change is also overwhelming. Future generations will inherit a profoundly different environment as a result of our actions, and we know that this will threaten the lives and livelihood of a large number of people, especially those living in poverty and in less developed countries. There are no moral justifications for ignoring this.

The premise of this paper is that an effective international agreement has not been reached, as two fundamental conflicts between the nature of climate change and our political and social reality have not been resolved. First, the atmosphere is a shared, global resource and its use is a perfect example of the issues described by the theory of the tragedy of the commons. The burden of climate change mitigation is born by those who act while the benefits are shared by everyone globally. In a world of self-interested nations this creates the problem of free riders and conflicting interests. Second, mitigation involves upfront costs, but the benefits materialize over a very long period – the time horizon for realizing most of the benefits would be around 50-100 years and beyond. This contrasts with the dominance of short-termism in politics, business and even individual choices, meaning that other issues take priority and climate change mitigation is pushed into the future. The focus of international negotiations has been to allocate the burden of mitigation among countries through a global cap-and-trade scheme and more recently through voluntary contributions. These approaches do not resolve these fundamental conflicts. Rather than their short-term self-interest, it appeals to the ambition, common responsibilities and long-term benefits of nations to achieve mitigation. This emphasis on costly commitments and their allocation among nations renders international cooperation and an effective agreement very difficult to achieve.

The aim of this paper is to outline and make the case for a climate agreement designed for the reality of self-interested and shortsighted countries and decision-makers. The framework proposed not only removes these obstacles, but also turns them into drivers of fast and effective climate change mitigation. Further, it creates additional financing provided by private sector investors to support investments in the abatement of carbon emissions.

Humanity has the resources, technology and ingenuity to limit climate change and the risks it poses. Successful international cooperation is, however, critical to live up to this potential.

## **2. A climate agreement designed with short-term self-interest in mind**

The outline of the proposed climate agreement is summarized in the following points.

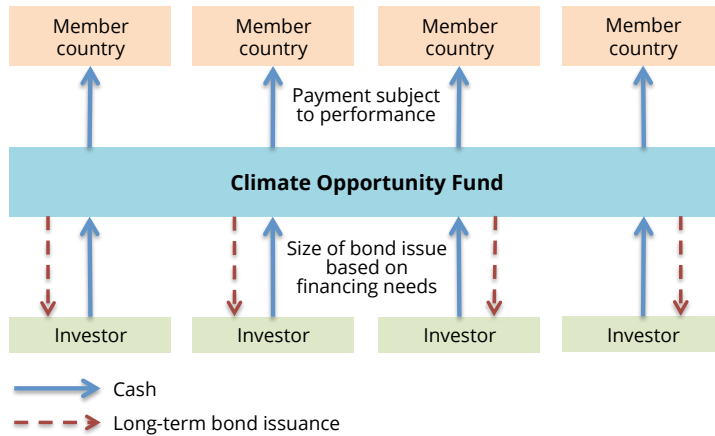
1. A new international treaty is agreed which establishes the Climate Opportunity Fund (also referred to as the Fund in the rest of the paper).
2. Any country can sign up to become a member of the treaty and the Fund. Participation is voluntary, but once a country is a member, the treaty is binding.
3. In addition to being voluntary, the treaty does not require participating countries to make a binding commitment to any emission level. As a result, countries face no potential penalties or other consequences irrespective of their emissions.
4. For each country the treaty determines a net greenhouse gas emission profile over time, the country's benchmark emission path (also referred to as the benchmark in the rest of the paper).
5. The treaty determines a carbon price per unit of net emission.
6. Countries can directly benefit from reducing their emissions below their respective benchmark through an annual payment from the Climate Opportunity Fund. The Fund's payment to each country equals the product of the carbon price and the number of units by which the country's actual net emissions are below its benchmark for the year in question (its emission saving).
7. The Fund finances the annual payments to participating countries by raising funds from private investors through the issuance of long-term bonds. The bonds offer a financial return to investors

in addition to representing a green investment.

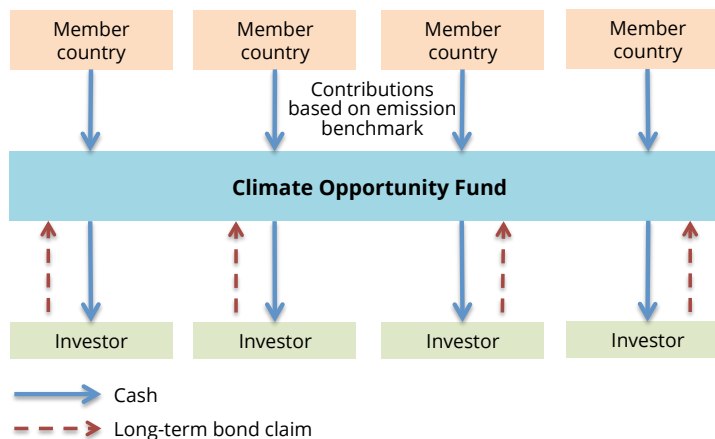
8. The bonds are the liability of the Fund, which is backed by the credit of participating countries similar to multi-lateral development agencies. The liabilities are repaid through contributions by participants in the future. The allocation of the Fund's long-term liabilities among countries is based on their share of carbon emissions under the respective benchmarks i.e. a country with ten times the benchmark emissions would be liable for ten times the liabilities of the Fund.

The following charts show the financial flows of the proposed framework.

**Figure 1. Financing of the Fund's annual payments**



**Figure 2. Financing of the Fund's long-term liabilities**



A simplified two-country example together with a more detailed discussion of the financing of the Fund's operations in section 5 illustrates how the Fund would work.

### 3. Agreeing benchmark emission levels for individual countries

The difficulty of agreeing an allocation of commitments among countries is one of the main reasons why an effective international agreement has not been reached yet. Determining the benchmark emission path for each country will likely remain a contentious issue under the proposed plan too, as there is no objectively fair way of setting them. However, under the framework outlined, reaching an agreement on individual benchmark emission levels is more realistic than under the current approach for the following reasons.

First, the benchmarks are not legally binding and there are no potential penalties or direct transfers among countries. This should make the agreement more palatable from a political perspective and more easily implementable from a legal perspective for some countries.

Second, the sum of the individual benchmarks can exceed the desired global path without risking the success of the scheme. The payment mechanism creates incentives for every country to emit less than its benchmark, which means that – subject to the predetermined carbon price and the benchmark emission levels – total emissions are highly likely to be lower than the sum of the benchmarks. An agreement with higher emission benchmarks would be more acceptable for countries for a variety of reasons, not least because a higher benchmark creates the potential for receiving higher short-term payments from the Fund.

Third, the allocation of the Fund's long-term liabilities being linked to countries' overall emission benchmark implies that there is an offsetting long-term cost to negotiating a higher benchmark for a country, which reduces its incentive to maximize its benchmark emission path. Clearly, the smaller a country's share of overall emissions is, the lower the increase in its long-term liabilities relative to its potential gain of increased payments received. Hence, the smaller the country in terms of emissions, the less relevant this trade-off becomes. Given that China, the United States and the European Union are the largest contributors to global greenhouse gas emissions with respective shares of 23.1%, 11.8% and 8.7% in 2012 (EDGAR), this trade-off between higher benchmarks and higher future liabilities is most meaningful for these countries. Agreement on emission benchmarks among the three largest contributors – with a combined share of close to half of the global total – would be a great step forward towards a global agreement.

Fourth, as countries are not obliged to join the agreement and the emission benchmarks are not legally binding, countries could join in stages and an agreement to the benchmarks by all countries would not need to be secured at the same time. This reduces the risk of a small number of countries sabotaging or delaying an agreement or attempting to capitalize on such a threat to improve their negotiating position. Ideally, the agreement would set out the benchmark emission levels even for countries not joining and would create a credible mechanism to ensure that countries joining later will be subject to the same terms. This would reduce the risk of countries holding out in the hope of securing higher benchmarks or more favorable terms and would motivate them to join sooner rather than later in order to benefit from the Fund's payments as early as possible.

Fifth, and probably most importantly, through the possibility of receiving payments from the Fund, the framework creates strong incentives for countries to find an agreement and to join. In a world dominated by short-term thinking by decision-makers including governments, businesses as well as individuals, the short-term benefit of joining and making a profit on emission abatement will be attractive and an important motivation. This only requires that countries will be able to reduce emissions at a cost below the agreement's carbon price, and we do not have to rely on them taking into account co-benefits, the costs of avoided adaptation or pursuing altruistic actions driven by moral considerations. Depending on the policies they use in pursuing emission cuts, governments could of course generate additional revenues above those received from the Fund and this will likely form part of their calculations too. A carbon tax or a cap-and-trade system that charges for emission rights would be examples of such policies.

There is a strong case to use the Intended Nationally Determined Contributions (INDCs) countries submitted before the Paris Agreement as a starting point for determining the emission benchmarks. As countries themselves determined the INDCs, the argument that the emission levels they imply are unacceptable and should be increased is a difficult one to make. Of course, there can still be disagreements about the relative ambitiousness of the INDCs and about the different approaches used to arrive at them. These differences are relevant due to their impact on the potential emission savings of individual countries and their prospects for payments from the Fund. Another complication of using INDCs as a starting point is that INDCs do not prescribe emission levels for every year and even the

target year varies across INDCs. Most of them set a target for 2030, some set a target for 2025 and some set a target for both 2025 and 2030. On the other hand, delaying an agreement in the hope of finding a different and fairer approach to determine the individual benchmarks might not be worth the costs of further delays to climate change mitigation. Establishing the benchmarks based on INDCs would, of course, mean that the sum of emission benchmarks exceeds the desired emission level. However, as discussed above, under such a framework this does not necessarily lead to a failure of the agreement, as every country will be incentivized to reduce emissions below its benchmark.

#### **4. Determining the carbon price**

Setting the carbon price at the right level, on which payments to participants are based, will be essential to make the plan a success. It should provide a strong incentive for countries to join the agreement and subsequently to reduce emissions. Accordingly, it should be set with reference to the estimated cost of net carbon abatement across countries and the expected impact of a carbon price on emissions. The different circumstances of countries will likely mean that countries will end up with different abatement potential compared to their benchmark, as the price signal favors the more cost efficient emission reductions and facilitates economic efficiency.

Clearly, the proposed scheme has the flexibility to use a dynamic carbon price such as a pre-determined price path or a price indexed to some variables. A dynamic approach or the periodic review of the carbon price might be necessary to adjust it in light of the abatement achieved or other lessons learnt during implementation. This flexibility will have to be balanced against the importance of predictability, which is an important feature of a successful carbon price given it serves as a price signal for long-lived investments. There has been much research into the cost of emission cuts and the impact of a carbon price (for example Gollier (2015)), and it is not the aim of this paper to explore the right carbon price level in detail.

It is worth noting that – in contrast to the current plans and proposals promoting a global carbon price (Cramton et al. 2015a) – participants will have a strong incentive to set the price at a sufficiently high level. As the Fund's payments effectively represent a financial transfer from future generations to the current one in order to support climate change mitigation, a higher carbon price means higher transfers to the present. As long as the premise of self-interested and short-term focused decision-makers holds, higher transfers received will be a motivation to use a higher carbon price. Accordingly, achieving a high enough carbon price does not rely on values or arguments balancing current costs and future benefits. In light of the slow progress over the past two and a half decades, this is an important advantage.

The carbon price will, of course, also be an important factor for the financing need of the Fund. This aspect of the proposal is discussed in more detail in the next section.

#### **5. Financing the operations of the Climate Opportunity Fund**

Attracting sufficient, low-cost private capital to finance the annual payments to participants will be critical for the success of the agreement. In turn, ensuring the Fund has strong credit based on the financial backing of participating countries will be important. This requires a robust political and legal framework as well as the financial strength of participants. The details of optimizing the attractiveness to private investors and the access to low-cost credit are beyond the scope of this paper. One option worth mentioning though is that it might be optimal for participants to collectively provide more than 100% of the required credit support. As an example, members could each provide a guarantee for 105% of their respective share of the Fund's liabilities. Beyond its credit strength, the Fund will also have to optimize the structure of its bonds to target various investor groups. Offering the benefit of a green, sustainable and socially responsible investment could be an additional attraction on top of the returns paid to investors. Finally, the operations of the Fund could be carried by a new organization or in partnership with an existing international organization such as the World Bank.

The long-term financial strength of the Fund under various scenarios will be another important consideration for private investors. Checks and covenants could be put in place in order to ensure that the finances of the Fund are sustainable irrespective of future developments. One example would be establishing a cap on total annual payments. If the sum of individual annual entitlements from the Fund exceeds this cap, all payments could be scaled back on a pro rata basis to comply with the annual cap. This could be achieved either by reducing the carbon price or by lowering the individual benchmarks on a pro-rata basis. Lowering the benchmarks is probably preferable to lowering the carbon price as the latter would reduce the marginal benefit of additional emission cuts for participants. A second mitigant to an unsustainable build up of debt by the Fund could be capping the Fund's liabilities to those relating to a certain period on a rolling basis. As an example, if this period would be set as 20 years, all liabilities that relate to the period preceding the past 20 years would always need to be repaid through contributions from participants as opposed to through new debt issuance. Such covenants would also mitigate the risks related to prediction errors, i.e. if the actual emissions and finances of the Fund turn out to be considerably different to expectations at the time of its establishment.

Importantly, neither of these covenants would significantly change the motivation of countries to join and to curb emissions. Based on experience, 20 years is more than long enough for decision-makers to heavily discount future obligations with the prospect of short-term gains. Similarly, even if an annual cap on Fund payments reduces the payment received by an individual country, any marginal reduction it can achieve will still secure it a larger share of the overall payments and hence larger receipts at the expense of other participants. It is worth noting that such a scenario bears similarity to the tragedy of the commons, but in this case the common resource that is overused is the Fund's annual payment pool. The incentive of countries is to cut emissions beyond the level that would maximize their collective short-term benefits defined as the sum of Fund payments less the cost of emission reduction.

The allocation of future liabilities among participating countries will be another important element of the agreement and the Fund's operations. This paper proposes allocating liabilities based on participants' benchmark emission level over time, which probably serves as a good proxy for a fair and effective allocation reflecting the size of countries, their contribution to climate change (at least on a forward looking basis) and their potential to benefit from the Fund's payments, which should be roughly proportional to their benchmark. This allocation could be further refined, for instance by applying different weights to benchmarks of different years or linking the allocation of liabilities to future variables and hence making it dynamic. Of course, a completely different allocation mechanism could also be considered.

Note that the Fund's liabilities and hence the required financial backing by participants remains contingent on countries reducing emissions to below their benchmark and the extent of future costs depends on the sum of these emission savings. In case future liabilities of countries could be structured in a way that keeps them off balance sheet for governments under the applicable accounting rules, this would provide an additional incentive for governments to join the agreement. Exploring this possibility is beyond the scope of the paper.

Figure 3 and Figure 4 illustrate the financing sources and uses of the Fund and countries through a two-country example based on the following assumptions.

1. The agreement comes into effect and the Fund starts operations in 2017.
2. The price of carbon is set at USD 50 per ton of CO<sub>2</sub>e in 2017 prices and is indexed at 2% p.a.
3. Total emission benchmarks assumed in 2030 are based on INDCs. Actual future emissions levels are assumed to be consistent with keeping global warming below 2 °C. This implies an emission reduction of 14 GtCO<sub>2</sub>e below the sum of unconditional INDCs by 2030 – 42 GtCO<sub>2</sub>e of actual emission compared with 56 GtCO<sub>2</sub>e (UNEP 2015). The example assumes that this reduction is reached in a linear fashion between 2016 and 2030.

4. Beyond 2030, this linear trend of increasing emission savings compared to benchmarks continues and that global emissions will be 34 GtCO<sub>2</sub>e below the benchmark levels by 2050. The 2050 emission level consistent with the 2 °C warming path with >66% probability is 23 GtCO<sub>2</sub>e (UNEP 2015). Accordingly, this emission savings assumption implies that the benchmark levels remain effectively flat until 2050 – increasing slightly from 56 to 57 GtCO<sub>2</sub>e p.a. from 2030 to 2050. Note that the carbon price and the emission reductions are independent in this example. Clearly, they are strongly linked in reality and this relationship would need to be considered when determining the carbon price and the financeability of the Fund.
5. Global nominal GDP is USD 80 trillion in 2016, which is conservative based on the 2014 estimate of USD 77.96 trillion (World Bank 2016), and that it will grow by 5% in nominal terms in the future.
6. Interest expense is assumed to be 2.5% p.a. Compared to current market conditions this implies a rise in interest rates.
7. The Fund is assumed to have an annual payment cap of USD 1,000 billion in 2017 indexed at 2% p.a. similar to the carbon price.
8. In order to limit an unsustainable build-up of the Fund's debt, liabilities (including related interest costs) incurred more than 20 years earlier are assumed to be repaid through contributions by participants as opposed to new debt issuance by the Fund.
9. Country A has twice the initial emission benchmark level of Country B and the two countries are responsible for all global emissions.
10. Country A's benchmark declines by 0.5 GtCO<sub>2</sub>e p.a. until 2030, by 0.25 GtCO<sub>2</sub>e between 2031-2040 and then is kept flat. Country B's benchmark is increased over time to mirror the reduction of Country A's benchmark so that the overall benchmark emissions remain unchanged. Note that in order to keep the calculations easier to follow, the two-country example keeps emission benchmarks flat at 54 GtCO<sub>2</sub>e p.a. and shows actual emissions at 20 GtCO<sub>2</sub>e in 2050. Gradually increasing benchmarks to 57 GtCO<sub>2</sub>e p.a. and reducing actual emissions to only 23 GtCO<sub>2</sub>e by 2050 would not change the financing flows and conclusions.
11. The example assumes that the actual emissions of both countries decline by the same amount in absolute terms (0.5 GtCO<sub>2</sub>e p.a.) relative to their benchmark emission path. Given the lower initial emissions of Country B, this assumption implies a larger cut by Country B relative to its emissions.



**Figure 3. Illustrative example of the financing of the Climate Opportuntiy Fund**

Year	Year	Emission reduction v bechmarks (GtCO2e)	Carbon price (USD/tCO2e)	Annual financing need (USD bn)	Annual cap (USD bn)	Financing from members (USD bn)	Cumulative debt incl interest (USD bn)	Global nominal GDP (USD bn)	Cumulative liability as % of global GDP
1	2017	1	50.0	50	1,000	0	50	84,000	0.1%
2	2018	2	51.0	102	1,020	0	153	88,200	0.2%
3	2019	3	52.0	156	1,040	0	313	92,610	0.3%
4	2020	4	53.1	212	1,061	0	533	97,241	0.5%
5	2021	5	54.1	271	1,082	0	817	102,103	0.8%
6	2022	6	55.2	331	1,104	0	1,169	107,208	1.1%
7	2023	7	56.3	394	1,126	0	1,592	112,568	1.4%
8	2024	8	57.4	459	1,149	0	2,091	118,196	1.8%
9	2025	9	58.6	527	1,172	0	2,671	124,106	2.2%
10	2026	10	59.8	598	1,195	0	3,335	130,312	2.6%
11	2027	11	60.9	670	1,219	0	4,089	136,827	3.0%
12	2028	12	62.2	746	1,243	0	4,937	143,669	3.4%
13	2029	13	63.4	824	1,268	0	5,885	150,852	3.9%
14	2030	14	64.7	906	1,294	0	6,938	158,395	4.4%
15	2031	15	66.0	990	1,319	0	8,101	166,314	4.9%
16	2032	16	67.3	1,077	1,346	0	9,380	174,630	5.4%
17	2033	17	68.6	1,167	1,373	0	10,781	183,361	5.9%
18	2034	18	70.0	1,260	1,400	0	12,311	192,530	6.4%
19	2035	19	71.4	1,357	1,428	0	13,976	202,156	6.9%
20	2036	20	72.8	1,457	1,457	0	15,782	212,264	7.4%
21	2037	21	74.3	1,486	1,486	82	17,581	222,877	7.9%
22	2038	22	75.8	1,516	1,516	167	19,369	234,021	8.3%
23	2039	23	77.3	1,546	1,546	256	21,143	245,722	8.6%
24	2040	24	78.8	1,577	1,577	348	22,901	258,008	8.9%
25	2041	25	80.4	1,608	1,608	443	24,638	270,908	9.1%
26	2042	26	82.0	1,641	1,641	543	26,352	284,454	9.3%
27	2043	27	83.7	1,673	1,673	646	28,039	298,677	9.4%
28	2044	28	85.3	1,707	1,707	753	29,693	313,610	9.5%
29	2045	29	87.1	1,741	1,741	864	31,313	329,291	9.5%
30	2046	30	88.8	1,776	1,776	979	32,892	345,755	9.5%
31	2047	31	90.6	1,811	1,811	1,099	34,427	363,043	9.5%
32	2048	32	92.4	1,848	1,848	1,222	35,913	381,195	9.4%
33	2049	33	94.2	1,885	1,885	1,351	37,345	400,255	9.3%
34	2050	34	96.1	1,922	1,922	1,484	38,717	420,268	9.2%

**Figure 4. Illustrative two-country example of the benefits and financial costs**

Year	Year	Country A benchmark emission (GtCO <sub>2</sub> e)	Country B benchmark emission (GtCO <sub>2</sub> e)	Country A actual emission (GtCO <sub>2</sub> e)	Country B actual emission (GtCO <sub>2</sub> e)	Country A payment received (USD bn)	Country B payment received (USD bn)	Country A contribution to Fund (USD bn)	Country A contribution to Fund (USD bn)
1	2017	36.00	18.00	35.50	17.50	25	25	0	0
2	2018	35.50	18.50	34.50	17.50	51	51	0	0
3	2019	35.00	19.00	33.50	17.50	78	78	0	0
4	2020	34.50	19.50	32.50	17.50	106	106	0	0
5	2021	34.00	20.00	31.50	17.50	135	135	0	0
6	2022	33.50	20.50	30.50	17.50	166	166	0	0
7	2023	33.00	21.00	29.50	17.50	197	197	0	0
8	2024	32.50	21.50	28.50	17.50	230	230	0	0
9	2025	32.00	22.00	27.50	17.50	264	264	0	0
10	2026	31.50	22.50	26.50	17.50	299	299	0	0
11	2027	31.00	23.00	25.50	17.50	335	335	0	0
12	2028	30.50	23.50	24.50	17.50	373	373	0	0
13	2029	30.00	24.00	23.50	17.50	412	412	0	0
14	2030	29.50	24.50	22.50	17.50	453	453	0	0
15	2031	29.25	24.75	21.75	17.25	495	495	0	0
16	2032	29.00	25.00	21.00	17.00	538	538	0	0
17	2033	28.75	25.25	20.25	16.75	583	583	0	0
18	2034	28.50	25.50	19.50	16.50	630	630	0	0
19	2035	28.25	25.75	18.75	16.25	678	678	0	0
20	2036	28.00	26.00	18.00	16.00	728	728	0	0
21	2037	27.75	26.25	17.25	15.75	743	743	45	37
22	2038	27.50	26.50	16.50	15.50	758	758	92	75
23	2039	27.25	26.75	15.75	15.25	773	773	141	115
24	2040	27.00	27.00	15.00	15.00	788	788	191	157
25	2041	27.00	27.00	14.50	14.50	804	804	244	200
26	2042	27.00	27.00	14.00	14.00	820	820	298	244
27	2043	27.00	27.00	13.50	13.50	837	837	355	291
28	2044	27.00	27.00	13.00	13.00	853	853	414	339
29	2045	27.00	27.00	12.50	12.50	871	871	475	389
30	2046	27.00	27.00	12.00	12.00	888	888	539	441
31	2047	27.00	27.00	11.50	11.50	906	906	604	494
32	2048	27.00	27.00	11.00	11.00	924	924	672	550
33	2049	27.00	27.00	10.50	10.50	942	942	743	608
34	2050	27.00	27.00	10.00	10.00	961	961	816	668
Total		1,009.75	826.25						
Allocation of liabilities		55.0%	45.0%						

The example highlights that even in a scenario, where emission benchmarks are kept flat or rise slightly until 2050 (i.e. current INDC targets for 2030 are not revised 2050 targets are set at the same level too) and where actual emissions are cut to levels that are consistent with a 2 °C warming path based on a carbon price that rises from USD 50 to nearly USD 100 per ton of CO<sub>2</sub>e between 2017 and 2050, the Fund's total financing needs peak at a level below 10% of global GDP. This, of course, is a significant level of debt and in order to motivate countries to join and act, it has to be meaningful as they will be the beneficiaries of the annual payments. Of course, to the extent more ambitious benchmarks can be agreed, the financing requirements could be reduced. However, even this level could be financed by private investors, especially if we consider the gradual rise in the Fund's debt over 30 years. To put these financing requirements into perspective, global non-financial debt increased by USD 50 trillion during the six and half years between the fourth quarter of 2007 and the second quarter of 2014 (MGI 2015). This represents an approximately 25 percentage point increase as a proportion of global GDP.

The example also shows the potential impact on individual countries. While identical in absolute terms,

Country B's benefit from the Fund relative to its size as measured by emission levels is larger than Country A's benefit. Country B also receives half of the payments by the Fund, but its future contributions to the Fund would be only 45% of the total.

Finally, while this section focused on the costs of the proposed plan, it is important to keep in mind the difference between the financial and economic cost. The costs discussed above and shown in the example are financial costs, i.e. the payments that are made to participants to incentivize them to cut emissions as well as the related financing costs. The economic cost of climate change mitigation is the opportunity cost of the real resources used for the mitigation efforts, as they are not available to produce other goods and services. This distinction highlights the fact that, in contrast to financial costs, the economic costs are highly dependent on the state of the economy and the utilization of resources. In an environment where resources are idle or underutilized, which is what many economists consider the current situation to be – often describing it in terms of a structural shortfall of aggregate demand compared to the potential economic output, depressed real interest rates due to the imbalance between intended savings and investment, secular stagnation etc – the economic cost of climate change mitigation will be smaller than suggested by the financial costs. The fiscal multiplier, being also dependent on the utilization of resources, is a proxy indicator of the growth impact of additional spending or investment. There is evidence that fiscal multipliers are larger when monetary policy is constrained by the zero lower bound on nominal interest rates, the financial sector or the economy is weak, which are conditions that have characterized the post-crisis period (IMF 2013). Investing in climate change mitigation under these conditions might have a smaller economic cost (or even an economic benefit) with significant implications for the trade-off between climate change mitigation and economic welfare or growth. The financial costs would still be incurred, however their impact on welfare or on measures such as total debt as a percentage of global GDP could be partially or wholly offset by its positive impact on economic growth.

## **6. Other benefits and consideration**

The main advantages of the proposed design are that it makes reaching an effective international agreement more realistic than the current negotiating approach, it incentivizes countries to join, it incentivizes them to cut emissions and it provides additional financing from private investors. There are some other advantages and disadvantages discussed in this section.

The international agreement outlined allows complete flexibility in terms of the policy mix used by individual countries and focuses only on the net emission reduction achieved. This will be politically attractive. Countries could use carbon taxes, they could use a cap-and-trade system with allocation of emission rights either free or for a charge, they could use subsidies, administrative and regulatory measures and/or investments in new technologies. In addition to its political attractiveness, this flexibility will facilitate policy innovation and competition across countries to reduce emissions through optimal economic, institutional and technological solutions.

Further, the agreement does not require any enforcement, it does not rely on compliance with any policy or implementation guidelines, and it does not require additional monitoring or reporting beyond those of net emissions. This, again, should be an attractive feature from a political perspective. It sidesteps the challenges of enforcement in the case of sovereign states (Nordhaus 2015). Countries that cut emissions below their benchmark level receive payments from the Fund, those that do not, simply do not receive any payments.

One disadvantage of the proposal is that it requires a change in the status quo and the approach pursued to date. This, clearly, is a considerable challenge and it would take some time for the international community to change course. On the other hand, the failure of the efforts over the past two and half decades to find an effective agreement justifies a search for alternatives and tackling the status quo. Following the Paris Agreement of last December, there is a risk that very little progress will be made over the next five years in the hope that countries adjust to be in line with their non-binding

targets and that targets will be significantly revised in 2020. This is a highly risky course of action.

Another problem with a design relying on voluntary participation and rewards instead of penalties is that some countries might decide not to join. As the financial costs of the Fund would need to be paid by members in the future, countries that opt-out could avoid these future costs and could still free-ride on the efforts of other countries over the long-term. As discussed above, this is mitigated partly by these countries also losing out on the short-term benefits. Public and international pressure could also be applied to ensure participation by countries. Finally, trade sanctions could be used against such countries with the justification to avoid exporting greenhouse gas emissions to them and to level the competitive playing field. Such trade sanctions can be effective (Nordhaus 2015) and can conform to WTO rules (Stiglitz 2006). Countries that join and fail to cut emissions would not need to be subject to the same trade restriction as by joining the agreement they would be contributing to the future financial costs.

Even though the proposed framework makes reaching an effective international agreement more realistic, the process of adjustment to a less carbon intensive economy and society will remain challenging and will require significant efforts. Nevertheless, an international agreement, strong incentives to curb emissions and the additional financing created by the Fund would make the implementation easier and more achievable.

As discussed earlier, the proposal involves a financial cost that needs to be repaid by participants in the future i.e. future generations. The proposal reflects the view that leaving a financial burden to future generations is preferable to leaving them an environmental burden especially if we act sooner rather than later and the financial burden can be minimized as much as possible. This solution also postpones the costs to more closely match the time benefits are realized, which by their nature will crystalize over the long-term. We now have decades of evidence that leaving future generations neither an environmental nor a financial burden – i.e. covering the financial cost of mitigation ourselves – is currently not a realistic option.

Clearly, many areas of the proposal need to be worked out and agreed in a lot of detail. Amongst others these include the legal framework, the institutional setup, the formula for allocating future liabilities across countries and over time, determining the right level of carbon price, and optimizing the attractiveness for private investors. Ensuring public and political support for such an approach will be critical. All these areas require further research, debate and action.

## **7. Conclusions**

The paper proposes an alternative design for international cooperation to mitigate climate change. The idea is to resolve the dual conflict between the nature of climate change and our political and social reality. Key elements of the framework include establishing a new international treaty and fund; determining a benchmark emission path for each country as well as a carbon price; paying countries annually through the fund for reducing emissions below their benchmark levels; financing the fund's annual payments by raising capital from private investors; and repaying the private capital in the long-term using contributions from participating countries.

There are a number of very important advantages of such a design. First, reaching an agreement that effectively mitigates climate change becomes easier and more realistic as the scheme's features are politically more palatable and offer short-term benefits to participants. Climate change negotiations are transformed from finding an agreement on sharing costly and burdensome actions among countries in a zero-sum game into creating a short-term opportunity for participants to profit from immediate payments.

Second, the self-interest of countries is turned into a driver for abatement. The individual cost and shared benefit that characterizes current mitigation efforts is turned upside-down and becomes the

combination of individual benefit and shared costs under this framework. By reducing emissions a country benefits in the form of getting paid by the Climate Opportunity Fund, while it is only responsible for a fraction of the future liability this creates. This shift could also be described using the concept of the tragedy of the commons. Today the common resource is the atmosphere and the free riders are the laggards, who expect to benefit from the mitigation effort of others. Under the proposed agreement the common resource is the Climate Opportunity Fund and the free riders are those saving most emissions and collecting most of the payments from the Fund.

Third, short-termism also becomes a driver for emission reduction. Countries and governments, politicians, businesses and individuals behind them get a short-term benefit in the form of immediate cash receipts in exchange for a long-term liability by joining the climate fund and cutting emissions. The payments received can be used in any way to deal with today's priorities, be it job creation, investment, energy independence, tax cuts, carbon emission reduction etc. History teaches us that politicians and people respond strongly to such incentives.

Fourth, additional financing is created which is raised from the private sector. Apart from their motivational impact, these funds can also help finance the necessary investment and adjustment.

Fifth, participating countries retain full flexibility and control over the policies they use. Apart from its political attractiveness, this creates room for policy innovation and competition in search of the most efficient solutions.

Finally, the challenges associated with the enforcement of international agreements are significantly reduced under this approach.

We have the means to tackle climate change. The current international approach, however, relies on the hope that this time the shared responsibility of countries and the long-term benefits will overcome their conflicting self-interests and short-termism. Based on the history of climate negotiations, this is a highly risky approach and we should find better alternatives.

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