

INTRODUCTION

Carbon taxes are an important tool in the policy arsenal to combat climate change. It is also true that the problem of emissions is, by its nature, one that is suited for solutions at a global level. However, as this essay elaborates, there are several difficulties – conceptual as well as practical – in a global carbon tax at a single rate. Hence, instead of a ‘global carbon tax at a single rate’, it may be worthwhile considering other design options (one of which is outlined in this essay) for introducing carbon taxes at a global level.

The first section of the paper briefly considers the theoretical foundation behind, and objectives of, carbon taxes. The first section also acknowledges that the problem of emissions is a global problem requiring coordinated solutions. The subsequent sections then turn to the form which that coordinated global response should take. The background discussed in the first section is directly relevant to the question of how carbon taxes on a global scale should be structured.

The second section shows that there are serious conceptual problems behind introducing a global tax at a single rate. The section focusses on ideas of inter-nation equity as well as the principles of common but differentiated responsibilities, to argue against such a global single-rate carbon tax. Drawing on the theoretical background from the first section, it also shows that by their very nature, carbon taxes require an element of flexibility which make a single global rate difficult.

Having concluded that a globally coordinated solution is necessary but that a global single-rate carbon tax may be problematic, the essay then turns to the theme of whether there is a workable solution at all for designing carbon taxes. The third section outlines how a different

solution – a global understanding for introducing carbon taxes, but without a single-rate global tax – is indeed a workable option, and a better solution than a single-rate global tax. The fourth section concludes.

I. CARBON TAXES: BASIS AND OBJECTIVES

At the outset, and for definitional clarity, it may be stated that a “carbon tax” is understood in this essay in the manner recently defined by the United Nations Committee of Experts on International Cooperation in Tax Matters and its Subcommittee on Environmental Taxation issues: “*a compulsory, unrequited payment to general government, levied on carbon emissions or its proxy that can confer a reduction in corresponding carbon-base (equivalent) emissions in the atmosphere and is characterised as having both environmental purpose and effect.*”¹

(A) THEORETICAL FOUNDATIONS

The theoretical foundations of carbon pricing instruments can be traced to the Professor Arthur Pigou’s theory of externalities.² Carbon emissions are an externality generated in the process of producing or consuming goods: if the externality has no ‘price’, the environmental costs will not be fully internalised by the relevant economic agent. Carbon pricing instruments are a mechanism for correcting this imbalance.³

Applying Pigou’s theory, a carbon tax should seek to price the precise marginal social cost of the emissions generated. However, determining the money value of the marginal damage is

¹ *United Nations Handbook on Carbon Taxation for Developing Countries* (2021: United Nations), 46.

² Pigou, *The Economics of Welfare* (1920: Macmillan).

³ UN Handbook (n.1), 34.

difficult.⁴ Empirical estimations of the social cost of carbon have resulted in an extremely broad range of results: from ten dollars to several hundred dollars per ton of CO₂.⁵ Estimating the marginal damage requires making assumptions and estimates about various factors which are not capable of determination with precision: the timing and extent of future damages, assumptions concerning adaptation as well as technological change, and the choice of what discount rate to apply to value future impacts.⁶

Professors Baumol and Oates have developed the ‘environmental pricing and standards approach’ partly as a solution to the difficulty of measuring the marginal damage.⁷ Instead of valuing marginal damage, the tax can be selected “*so as to achieve specific acceptability standards*”. In other words, the ‘acceptable’ standard of emissions is chosen; and a tax rate is imposed to incentivise emitters to adjust emissions until that acceptable standard is reached. This approach inherently involves a margin of error: Baumol and Oates refer to the “iterative adjustments”⁸ that would be needed to the tax rates, and accept that there is some inherent arbitrariness in the initial choice of the set of taxes.⁹

A different frame of reference is provided by Professor Harold Hotelling in his modelling of the taxation of exhaustible resources.¹⁰ This framework shows that an expectation of rising

⁴ Baumol and Oates, “The use of standards and prices for protection of the environment” (1971) 73 (1) *The Swedish Journal of Economics* 42, 43.

⁵ Tol, “Targets for Global Climate Policy: an overview” (2013) 37 (5) *Journal of Economic Dynamics and Control* 911 (survey of 75 studies which included a total of 588 estimates; see also: Kettner-Marx and Kletzan-Slamanig, “Carbon Taxes from an Economic Perspective” *WIFO Working Paper No. 554* (2018: Austrian Institute of Economic Research)).

⁶ Kettner-Marx and Kletzan-Slamanig (n.5); Pindyck, “The Climate Policy Dilemma” (2013) 7 (2) *Review of Environmental Economics and Policy* 219.

⁷ Baumol and Oates (n.4); also see: Oates and Baumol, “The Instruments for Environmental Policy”, in Mills (ed.), *Economic Analysis of Environmental Problems* (1975: NBER) 95.

⁸ Baumol and Oates (n.4), 45.

⁹ Baumol and Oates (n.4), 47

¹⁰ Hotelling, “The Economics of Exhaustible Resources” 39 (2) *Journal of Political Economy* 137. See also: Heal and Schenkler, “Coase, Hotelling and Pigou: The Incidence of a carbon tax and CO₂ emissions” *NBER Working Paper Series, Working Paper 26086* (2019: NBER).

taxes on fossil fuels may in fact lead to a “green paradox” – an *increase* in the present rate of consumption.¹¹

As subsequent sections of this paper show, the Baumol/Oates insight on the need for iterative adjustments as well as Hotelling’s insights about taxes on exhaustible resources are both relevant to the design of a global carbon tax. Before turning to that, however, it would be essential to highlight the objectives which a carbon tax could achieve.

(B) OBJECTIVES

Inherent in the working definition of ‘carbon taxes’ adopted in this paper is the idea that one of the policy objectives in introducing carbon taxes would be to reduce (or, at least, to incentivise the reduction of) carbon emissions. However, the reduction of emissions need not be the only objective behind carbon taxes. Other objectives may include revenue generation;¹² Revenue gains from explicit carbon pricing can be significant: a US\$50 per tonne CO₂ price in 2030 is estimated to generate revenues to the order of 1% or more of the GDP of several G20 countries.¹³ These can in turn be used for environmental purposes if so desired (including as funding mechanisms for programmes targeted against climate change),¹⁴ as well as for general redistributive purposes.¹⁵ At the same time, the objectives may sometimes conflict: the more a

¹¹ Sinn, *The Green Paradox: A Supply-side approach to global warming* (2012: MIT Press). See also: Dasgupta, Heal and Stiglitz, “The Taxation of Exhaustible Resources” in Hughes and Heal (eds.), *Public Policy and the Tax System: Essays in Honour of James Meade* (1980: Harper Collins).

¹² For a study about the current use of revenues generated through both carbon taxes as well as cap-and-trade schemes, see: Carl and Fedor, “Tracking global carbon revenues: A survey of carbon taxes versus cap-and-trade in the real world” (2016) 96 *Energy Policy* 50.

¹³ “Tax Policy and Climate Change, *IMF/OECD Report for the G20 Finance Ministers and Central Bank Governors* (2021).

¹⁴ Paul & Wahlberg, “Global taxes for global priorities” (2002) *Global Policy Forum* 1; Schwank et.al, *Global Solidarity in Financing Adaptation: A Swiss Proposal for a Funding Scheme* (2007), available at: <<https://www.news.admin.ch/news/message/attachments/10526.pdf>> (last accessed: 29 January 2022). See also: Estrada and Pistone, “Global CO₂ Taxes” (2013) 41 (1) *Intertax* 2.

¹⁵ Davies et. Al., “The possibilities for global inequality and poverty reduction using revenues from global carbon pricing” (2014) 12 *Journal of Economic Inequality* 363.

carbon tax is successful in reducing emissions, the less revenue it might generate.¹⁶ Some economists have proposed environmental taxes as means to obtain a “double dividend”:¹⁷ the first dividend is the positive environmental effect, while the second dividend is that the revenues from a carbon tax can also be used for financing “*reductions in incentive-distorting taxes such as income tax or corporation tax*”.¹⁸ However, the true nature of this “double dividend” would depend on the particular economy being considered and depends on the other extant taxes being levied in that economy as well.¹⁹

(C) THE NEED FOR A GLOBAL RESPONSE

There is a large body of literature on the desirability of introducing carbon taxes,²⁰ and there is also some empirical evidence to show that carbon taxes are indeed effective at reducing emissions.²¹ This is not to say that there are no problems with a carbon tax at all: however, the

¹⁶ UN Handbook (n.1), 26: “... where the tax rate is maintained, a reduction in emissions will reduce the tax base and affect revenue stability over time. To provide a growing incentive for emissions reduction, and to keep revenues stable, the tax rate should be revised periodically and possibly increased over time...”

¹⁷ See: Jaeger, “The Double Dividend Debate” in Milne and Andersen (eds.), *Handbook of Research on Environmental Taxation* (2012: Edward Elgar Publishing) 211.

¹⁸ Pearce, “The Role of Carbon Taxes in Adjusting to Global Warming” (1991) 101 (407) *The Economic Journal* 938. This concept of “double dividend” has since been discussed in depth in the economic literature: for a summary, see: Kettner-Marx and Kletzan-Slamanig (n.5), 6-7.

¹⁹ Metcalf argues that idea of a strong double dividend, i.e., using carbon taxes to lower other taxes resulting in higher output and welfare, is not entirely convincing, although the revenue from carbon taxes could be used to mitigate dependence on other particularly distortionary taxes. In any case, the cost of reducing emissions is less than the cost of damage from climate change. See: Metcalf, *Paying for Pollution: Why a Carbon Tax is Good for America* (2019: Oxford University Press) 116-118.

²⁰ A detailed justification for carbon taxes in general (though not necessarily a global carbon tax at a single rate) is found, *inter alia*, in the following writings: Hsu, *The Case for a Carbon Tax: Getting past our hang-ups to Effective Climate Policy* (2011: Island Press); Metcalf (n.19); Falcao, *A Proposition for a Multilateral Carbon Tax Treaty* (2019: IBFD); Cooper, “Toward a real global warming treaty (the case for a carbon tax)” (1998) 77 *Foreign Affairs* 66. See also: Nordhaus, “To tax or not to tax: alternative approaches to slowing global warming” (2007) 1 *Rev. Envtl. Econ. & Policy* 26. A counterview arguing against carbon taxes in principle can be seen in a few publications, for instance, McGillis, “The Case Against a Carbon Tax” *IER Policy Paper* (2019: Institute for Energy Research). The arguments, with respect, appear to be a restatement of arguments already rebutted in the literature on the topic.

²¹ A review of the economic literature found that there is “widespread consensus that environmental taxes can deliver the first dividend”: first dividend refers to a “positive environmental effect through raising the prices of environmental harmful substances or activities and thus reducing demand...” Kettner-Marx and Kletzan-Slamanig (n.5), 6-7.

existing literature points to carbon taxes being an effective instrument for reducing emissions.²² Serious thought is required to be given to a proposal for introducing a carbon tax on a global scale. This is particularly given that climate change itself is a global problem and not a localised one: carbon emissions in one country do not have a social cost restricted territorially just to the geography of that country.²³ The problem is therefore one that requires a coordinated response at a global level.²⁴

Despite this, however, a global carbon tax at a single rate may not be the most promising solution. The next section of this paper turns to the problems with the idea and implementation of a global single-rate carbon tax.

II. THE PROBLEMS WITH A GLOBAL SINGLE-RATE CARBON TAX?

A global carbon tax at a single rate appears to have the distinct advantage of avoiding the problem of carbon leakage.²⁵ However, there are serious difficulties with such a tax which treats different countries and economies in an identical manner.

(A) COMPATIBILITY WITH FUNDAMENTAL PRINCIPLES OF ENVIRONMENTAL LAW: CBD

²² Some scholars note that “*economists are unified in extolling the virtues of a carbon tax*”: Hsu, “Carbon Taxes and Economic Inequality” *Harvard Law and Policy Review* (forthcoming), available on SSRN <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3760667> (last accessed: 30 January 2022); “Economists’ Statement on Carbon Dividends” *Wall Street Journal* (16 January 2019). See also: *Global Warming, Economic Dimensions and Policy Response* (1995: OECD), cited in Cuervo and Gandhi, “Carbon Taxes: Their Macroeconomic Effects and Prospects for Global Adoption – a survey of the literature” *IMF Working Papers WP/98/73* (1998: International Monetary Fund), 6.

²³ See: UN Handbook (n.1), 18. Several countries have undertaken unilateral carbon tax measures as part of the fight against climate change: see *Taxing Energy Use: Using Taxes for Climate Action* (2019: OECD) for details on some of the unilateral measures. See generally: Pistone and Ezcurra (eds.), *Energy Taxation, Environmental Protection and State Aids: Tracing the path from divergence to convergence* (2016: IBFD).

²⁴ “*Global problems require global solutions*”: Falcao (n.20).

²⁵ “*A coordinated, global approach to cutting emission would also reduce the extent to which some of the decrease in U.S. emissions resulting from a federal carbon tax would be offset by increases in emissions overseas—a phenomenon known as carbon leakage...*”: *Effects of a Carbon Tax on the Economy and the Environment* (2013: Congressional Budget Office) 14. The IMF has also suggested an “*international agreement on a coordinated adoption*” of a carbon tax as a means of eliminating “*the worry about the loss of competitiveness*”: Cuervo and Gandhi (n.22). It must be noted that “*no global environmental tax has been adopted so far, which makes it impossible to empirically assess the effects of such a tax on environmental protection...*” Pirlot, “*International Taxation and Environmental Protection*” in Brauner (ed.), *Research Handbook on International Taxation* (2020: Edward Elgar Publishing) 258, 260.

Foremost amongst the difficulties is this: a global carbon tax at a single rate would offend against inter-nation equity.²⁶ It would not be in accordance with the fundamental principle of common but differentiated responsibility, which forms the bedrock of the international environmental law regime. While international law is theoretically based on the sovereign equality of states, in fact, states differ significantly and differential treatment is widespread in the practice of states.²⁷ As a result, a fair legal order requires the differences between states to be considered.²⁸ The idea is that the sovereign equality of states must result in practical and substantive equality: not just formal equality.²⁹ This idea permeates the field of international environmental law as well.³⁰ In addition to the need to ensure substantive equality rather than formal equality (and therefore, the need to avoid treating equals unequally and also to avoid treating unequal equally), international environmental law also takes into consideration that certain states may have a greater responsibility historically for the increase in emissions.³¹ From these bases, the idea of “common but differentiated responsibilities” forms a core of environmental law at least since the 1992 Rio Declaration.³² The United Nations Framework Convention on Climate Change³³ enunciates the principle of “common but differentiated

²⁶ Inter-nation equity’s value in the context of international tax design in general has been highlighted in the work Professor Peggy Musgrave and Professor Kim Brooks. See: Musgrave, *Tax Policy in the Global Economy: Selected Essays of Peggy Musgrave* (2002: Edward Elgar Publishing) and Brooks, “Inter-nation equity: the development of an important but underappreciated international tax value” in Krever and Head (eds.), *Tax Reform in the 21st Century: A Volume in Memory of Richard Musgrave* (2009: Kluwer Law International)

²⁷ See generally: Rajamani, *Differential Treatment in International Environmental Law* (2006: Oxford University Press).

²⁸ See: Rajamani (n.27), chapter 2.

²⁹ Voigt and Ferreira, “‘Dynamic Differentiation’: The principles of CBDR-RC, Progression and Highest Possible Ambition in the Paris Agreement” (2016) 5 (2) *Transnational Environmental Law* 285.

³⁰ Voigt, “Equity in the 2015 Climate Agreement: Lessons from Differential Treatment in Multilateral Environmental Agreements” (2014) 4 *Climate Law* 50; Rajamani (n.27), chapter 5.

³¹ Principle 7 of the Rio Declaration acknowledges that states have made “different contributions to environmental degradation” and also that there are differences as to “the pressures their societies place on the global environment and of the technologies and financial resources they command”. Rio Declaration on Environment and Development, adopted by the UN Conference on Environment and Development, Rio de Janeiro (Brazil), 3–14 June 1992, UN Doc. A/CONF.151/26 (Vol. I), 12 Aug. 1992, Principle 7.

³² Principle 7, Rio Declaration (n.31).

³³ United Nations Framework Convention on Climate Change, New York, 9 May 1992 (in force 21 March 1994).

responsibilities and respective capabilities”, and indicates a ‘positive discrimination’³⁴ in favour of developing countries. The Kyoto Protocol³⁵ furthered the differentiation system, with only developed countries assuming binding and quantified mitigation commitments.³⁶ The negotiations for the Paris Agreement indicated the need to adopt a more nuanced manner of implementing the idea of differential treatment: the mandate³⁷ was to find a solution ‘under the UNFCCC’ which was also ‘applicable to all’.³⁸ One such nuanced approach was the Brazilian “concentric circles” approach: a dynamic approach that called for more stringent obligations on developed countries, while ensuring that developing countries move in the same direction more flexibly, over longer time periods.³⁹ Ultimately, the Paris Agreement is guided by the principles of the Framework Convention, including the principle of equity and common but differentiated responsibility and respective capabilities.⁴⁰ The manner in which these principles are applied is not by considering historical causality on a stand-alone basis, but together with country-specific capabilities and circumstances. The Paris approach to differentiation is a complex one: it considers criteria such as past emissions and also current and projected emissions, together with demographic criteria, financial and technical capabilities, opportunity costs etc.⁴¹ It also introduces the principles of highest possible ambition and progression.⁴² What these principles mean is that there may be procedurally as well as substantively more demanding obligations on

³⁴ Voigt and Ferreira (n.29), , 289.

³⁵ Kyoto Protocol to the United Nations Framework Convention on Climate Change, Kyoto, 11 December 1997 (in force 16 February 2005).

³⁶ Voigt and Ferreira (n.29), 290.

³⁷ Decision 1/CP.17, ‘Establishment of an Ad Hoc Working Group on the Durban Platform for Enhanced Action’, UN Doc. FCCC/CP/2011/9/Add.1, 15 Mar. 2012, para 2: the mandate was to “*develop a protocol, another legal instrument or an agreed outcome with legal force under the Convention applicable to all Parties.*”

³⁸ Voigt (n.30).

³⁹ The Brazilian “concentric circles” approach can also be seen with the New Zealand “bounded flexibility” approach and the Swiss “circumstance-based” approach to give effect to ideas of differentiation. See: Voigt and Ferreira (n.29), 292.

⁴⁰ Paris Agreement, Paris (France), 13 Dec. 2015, Annex, Preamble, para 3.

⁴¹ Voigt and Ferreira (n.29), 294.

⁴² Voigt and Ferreira (n.29), 295.

developed countries, coupled with obligations to assist developing countries.⁴³ At the same time, the differentiations cannot be fixed for all time: a number of developing countries will become industrialised and start exerting greater pressure on resources; and it stands to reason that they should start assuming a greater share of the responsibilities as well.⁴⁴ In other words, ‘common but differentiated’ responsibly indicates that there must be some differentiation between states; yet, the differentiation must retain an element of flexibility and cannot be one set in stone for all time to come.

These aspects suggest that a global carbon tax at a single rate would be problematic. It would go against the underlying principle of common but differentiated responsibilities; and therefore, not be in keeping with the fairness norms which the current environmental law regime is based. To take just one example to illustrate this point, emission costs compared to economy size are higher in developing rather than developed countries,⁴⁵ and difference countries also face different abatement costs, implying that national contributions may need to be modulated.⁴⁶ As a result, a uniform global carbon tax would result in higher contractions to the economies of developing rather than developed countries.⁴⁷ Part of the reason for the difference here arises from historical reasons and the state of current development of certain developing countries. It is quite likely that a harmonised global tax would favour developed countries over

⁴³ See generally: Vinuales (ed.), *The Rio Declaration on Environment and Development: A Commentary* (2015: Oxford University Press).

⁴⁴ See: Ulfstein and Voigt, “Rethinking the legal form and architecture of a new climate agreement” in Todd et. Al., (eds.), *Toward a New Climate Agreement: Conflict, Resolution and Governance* (2014: Routledge) 183, 191.

⁴⁵ Nong et. al., “Greenhouse gas emissions vs Cos emissions: Comparative analysis of a global carbon tax: (2021) *Applied Energy* 298.

⁴⁶ Thalmann, “Global Environmental Taxes” in Milne and Andersen (eds.), *Handbook of Research on Environmental Taxation* (2012: Edward Elgar Publishing) 456.

⁴⁷ Nong et. al. (n.45).

developing countries,⁴⁸ as a result of being formally equal (being a single rate) but not substantively equal (without applying principles of differential treatment).

It could be argued that the entire point of the carbon tax would be to change the pattern of emission behaviour, and that principles of common by differentiated responsibilities can be satisfied by (say) a differential apportionment of the carbon tax revenues while maintaining a single-rate global carbon tax.⁴⁹ While this is an attractive argument, it may not be a fully workable solution in practice. It would raise some very difficult issues about how the revenues should be allocated as between states; and determining each country's "fair" share of revenue may be difficult. It would also require some check on the actual revenue usage: for, if a state were to be free to use the revenues to subsidise emission-causing industries, the purpose of the single rate carbon tax would in any case be difficult. Even if the formula for allocations were to be agreed upon, it would still leave questions of enforcement open.⁵⁰

(B) ADJUSTING FOR MULTIPLE OBJECTIVES

Furthermore, as noticed in the first section of this paper, a carbon tax can have multiple objectives in addition to reducing emissions. One of the objectives may be to generate revenues to fund other environmental protection institutions; however, another objective may be to generate funds for reducing the distortionary effects of other taxes (i.e., the idea of a "double dividend"). If one were to draw a lesson from the experience of working with Carbon Border

⁴⁸ See also: Peterson and Klepper, "Distribution Matters – Taxes vs Emissions Trading in Post Kyoto Climate Regimes" *Working Paper 1380* (2007: Kiel Institute for the World Economy) 3, cited in Estrada and Pistone (n.14), (footnote 10). For a more general discussion of environmental taxation and social justice in developing countries, see: Cottrell and Falcao, *A Climate of Fairness: Environmental Taxation and Tax Justice in Developing Countries* (2018: Vienna Institute for International Dialogue and Cooperation).

⁴⁹ Pirlot, "How and Why a Global Carbon Tax could revolutionize international climate change law" *Oxford Business Law Blog* (19 October 2021): "... instead of being directly achieved through differentiated carbon prices across countries, the CBDR-RC principle could be achieved indirectly through the allocation of the revenue of a global carbon tax to developing countries..."

⁵⁰ Creation of a supra-national enforcement body runs challenges from the angle of sovereignty and enforcing compliance (especially in situations where tools such as sanctions etc. are not feasible) would be a difficult task: see Estrada and Pistone (n.14), 11, 13-14.

Adjustment Measures (CBAMs), it appears that CBAMs also may have multiple objectives; and not understanding the different objectives at play behind CBAMs may lead to confusion in the policy.⁵¹ Professor Pirlot has showed how the design features of CBAMs affect the types of purposes which the CBAMs can achieve.⁵² Similar lessons ought to be drawn to pricing instruments such as carbon taxes also. Different nations may sign up for a global carbon tax based on different importance being attached to various ends; and this may result in practical problems. For instance, a country which is banking of the “double dividend” theory would need to consider the precise nature of other domestic taxes whose distortionary effects are sought to be mitigated by the revenues from a carbon tax. Countries which rely on the “double dividend” theories or on the revenue generation potential may wish to revise rates consistently to ensure revenue stability to offset a fall in the tax base as emissions start reducing.⁵³ Countries which sign up for the tax with the main view of reaching a ‘desirable’ level of emissions may well wish to not let factors of revenue generation come into consideration while setting the tax rate. The multifarious objectives which a carbon tax may seek to achieve may well give rise to problems in the actual working of a global single-rate carbon tax. Lack of clarity on a cohesive objective may further reduce the efficacy in the working of such a global tax.

(C) INCOMPATIBILITY WITH THEORETICAL FOUNDATIONS

Further, the very nature of a carbon tax would militate against a single fixed rate. The Baumol-Oates approach⁵⁴ involves the possibility that the initial tax may not be at the ‘correct’ level to reach the desired emissions target. The ‘desirable’ emissions target itself may evolve over time. In these circumstances, the possibility of having to make iterative adjustments in tax rates is

⁵¹ Pirlot, “Carbon Border Adjustment Measures: A Straightforward Multi-purpose Climate Change Instrument?” (2021) *Journal of Environmental Law* 1.

⁵² Pirlot (n.51).

⁵³ This possibility is explicitly mentioned in the UN Handbook (n.1), 26.

⁵⁴ Baumol and Oates (n.4), 45.

built in to the very nature of the tax itself: there is necessarily an element of adjustment by “trial and error”.⁵⁵

Against this, it might be said that a global carbon tax at a *single* rate must not mean that the rate is *fixed* for all time to come. It could be proposed that instead of a single rate fixed for all time, the rate agreed could be such that it begins at a low rate but progressively increases over time (thus, there is a single rate, but that rate itself increases over time). However, this runs the risk of inviting the green paradox.⁵⁶ Following the Hotelling model,⁵⁷ incentives may be created for increasing the rate of emissions in the short term. Emissions arise out of fossil fuels, an exhaustible resource; declaring that rates would increase over time (in real terms) would shift the time-pattern of consumption to encourage more consumption in the short term.⁵⁸ Furthermore, the mere fact that rates change at pre-agreed intervals by a pre-agreed margin are not really “iterative”: the iterative process inherently requires flexibility of considering new facts (such as the actual effect on emissions) and adjusting rates accordingly.

It would be politically extremely difficult (if not impossible) to get nation states to regularly agree on changed rates every few years. And delegating the task of rates to an international organisation would raise very difficult issues of sovereignty. Once states enter into a treaty, they are already giving up part of their sovereignty; and hence, the mere invocation of “sovereignty” is not really an objection to a global tax.⁵⁹ However, the extent of sovereignty

⁵⁵ UN Handbook (n.1), 65.

⁵⁶ Sinn (n.11); Dasgupta, Heal and Stiglitz (n.11). This is also the difficulty with the solution proposed by Professor Richard Cooper for introducing a global tax at a uniform rate but permitting developing countries a longer period of time to introduce the tax: Professor Cooper posits a period of five years to be granted to developing countries (so that the period is not so long as to induce carbon leakage). See: Cooper, “A Global Carbon Tax?” *Commissioned Briefing Notes for the CIGI/CFGS L20 Project* (2004: Centre for International Governance Innovation). But even in that case, the incentives to accelerate the rate of emissions in that five-year window will increase; and the problems as to flexibility remain.

⁵⁷ Hotelling (n.10).

⁵⁸ Heal and Schenkler (n.10).

⁵⁹ Estrada and Pistone (n.14).

being given up may well be an important factor which determines whether a state is likely to enter into a treaty in the first place. Thus, it may be politically extremely difficult (and in some states, constitutionally impossible) to arrive at a multilateral agreement on taxing carbon taxes when the rate of those taxes can be modified by a delegate organisation without reference to the states at future points of time.

In view of this, it is suggested that a global carbon tax at a single rate would run into several difficulties. If there were no alternative global approach, then one might well want to support a global tax even with all the difficulties: however, as the next section shows, alternatives involving carbon taxes on a global level do exist. The purpose is not to present a fully worked-out model, but only to show that alternatives (involving carbon taxes) to a ‘global carbon tax at a single rate’ are not unimaginable.

III. IS THERE A BETTER SOLUTION? OUTLINES OF A WORKABLE DESIGN

(A) MINIMUM TAX LEVELS WITH ‘BENCHMARKING’ FOR ACTUAL RATES

Setting a global *minimum* rate of tax⁶⁰ through a multilateral treaty,⁶¹ while leaving the question of the actual rate of tax to individual countries, may perhaps be a solution to the difficulties outlined above. In addition to the minimum rate of tax, the treaty could also provide for a default

⁶⁰ The IMF has proposed an international carbon price floor. See: International Monetary Fund, *Fiscal Monitor: How to Mitigate Climate Change* 2019: International Monetary Fund). One recent proposal is stated to have two elements: (a) a small number of key large-emitting countries, and (b) the minimum price each commits to implement. See: Parry et. Al., “Proposal for an international carbon price floor among large emitters” *IMF Staff Climate Notes 2021/001* (2021: International Monetary Fund) (building on proposals of the IMF from 2019). Also see, Shome, “Environment Taxes and User Charges” in *Taxation History, Theory, Law and Administration* (2021: Springer) 243, 250 (“a case is made for the imposition of a minimum global tax”).

⁶¹ See Falcao (n.20). Dr. Falcao proposes (for example, in Chapter 10 of the book) for such a multilateral treaty where the minimum tax rate of developing countries would be at roughly a third of the rates for developed countries, while not proposing a maximum rate. The minimum rate is to progress at constant intervals. This is also a proposal which is in keeping with the objectives of common but differentiated responsibilities and progression; but the difference in the present paper’s proposal is in the form of introducing a single minimum rate with a benchmarking analysis to be conducted by countries for setting the actual rate. The details of this proposal would need to be worked out, but a broad outline is provided in this section. In any event, the present paper has only suggested this as a possible methodology as an alternative to a global tax at a single rate; and the framework provided by Dr Falcao is also one which would be preferable to a global tax at a single rate.

rule that the carbon tax is to be applied whenever the fuel (oil, gas, or coal) is extracted from the ground: in other words, there could be a universal mechanism of taxing on an upstream basis.⁶² The multilateral instrument setting the minimum threshold could also perhaps provide some broad guidelines for states to consider, in good faith, in setting the actual rates. This guideline could take the form of a benchmarking analysis, which would involve jurisdictions to consider the tax rate used in other countries as a “benchmark” for setting their own tax rates.⁶³ Such a benchmarking approach would also seek to reduce (while not entirely eliminating) carbon leakage; and the factors to consider for deciding on comparable jurisdictions as the benchmark could be set in the multilateral instrument (with an obligation on states to transparently disclose how they apply those factors and benchmarking in setting the actual domestic rates). As the UN Sub-committee notes, the relevant factors could include “(i) *policy objective*; (ii) *similar economies/politics*; (iii) *demographic factors*; (iv) *energy production*; (v) *geographic distribution*; (vi) *potential for coordination*, and (vii) *tax system...*”⁶⁴

(B) COMPATIBILITY WITH UNDERLYING ENVIRONMENTAL PRINCIPLES, AND THE OVERALL PRACTICABILITY

This approach would keep in mind the principles of common but differentiated responsibility and respective capabilities, while including a degree of flexibility and having aspirational overtones as well. This is in keeping with the ideas of “highest possible ambition” and “progression” as well. Such an approach will also help states alleviate concerns of regressivity: it could perhaps be said that carbon taxes will have an impact on energy prices (indeed, they are designed to have that effect), and that might be regressive in terms of the effect on the less

⁶² For the justifications behind this approach, see Falcao, “Taxing Carbon: Time for a Multilateral Approach” in Mehta et. Al., (eds.) *Tax Justice and Global Inequality: Practical Solutions to protect developing country revenues* (2020: Comparative Research Project on Poverty / Zed Books); see also: Falcao (n.20).

⁶³ See: UN Handbook (n.1), 68.

⁶⁴ UN Handbook (n.1), 69.

well off.⁶⁵ However, the flexible approach presented here will allow states to juxtapose carbon taxes into the overall structure of their domestic tax systems,⁶⁶ and the regressivity is a factor that can be taken care of in considering the progressivity of the domestic tax system as a whole.⁶⁷ This approach will not completely do away with carbon leakage:⁶⁸ but CBAMs could be implemented.⁶⁹ This is again a matter which could be left to individual countries; perhaps with a rider in the multilateral instrument that such measures need to be reflective of any actual carbon leakage seen empirically.

A multilateral instrument of this nature is within the realm of possibility. The scheme for a multilateral instrument particular to carbon taxes has also been studied in the scholarly literature.⁷⁰ The recent OECD efforts in the BEPS project have resulted in a multilateral instrument; and an agreement on “minimum” tax is no longer seen – as Pillar 2 discussions indicate – as being politically infeasible. Accordingly, it is suggested that it would be worthwhile making efforts towards a multilateral instrument on carbon taxes, setting out a mandatory minimum tax rate together with standards for a benchmarking analysis for individual states to set the actual rate above the minimum.

⁶⁵ West and Williams, “Estimates from a Consumer Demand System: Implications for the incidence of environmental taxes” (2004) 47 *Jour. Env'tl. Econ. And Mgmt.* 535.

⁶⁶ This aspect is an important element in designing a carbon tax even domestically: see, for instance, Metcalf and Weisbach, “The Design of a Carbon Tax” (2009) 33 *Harvard Environmental Law Review* 499 (on the need for adjustments in other taxes to ensure distributional neutrality).

⁶⁷ It should also be recognized that to what extent carbon taxes are indeed regressive is a topic of debate. For instance, Hsu argues that carbon taxes hurt the owners of fossil fuel industries more than they hurt consumers: Hsu (n.22). In any case, the more flexible approach suggested here is more easily compatible with the re-distributional aims which nations may have.

⁶⁸ Professor Nordhaus suggested the idea of a “Climate Club”, where a coalition of willing countries implements a carbon tax which imposing a general tariff on non-participants. See: Nordhaus, “Climate Clubs: Overcoming free-riding in international climate policy” (2015) 105 *American Economic Review* 1339. The present proposal can be thought of as multiple carbon clubs, but more in accordance with underlying principles such as common but differentiated responsibility, highest possible ambition, and progression.

⁶⁹ This is consistent with the model proposed by Dr. Falcao: Falcao (n.20), Chapter 1.

⁷⁰ See Falcao (n.20).

IV. CONCLUSION

After having considered the theoretical foundations of carbon taxes, and after having acknowledged the global nature of the problem of climate change which makes global solutions preferable to unilateral measures, this essay has considered the forms in which a global carbon tax may be implemented. A global carbon tax at a single rate indeed sounds like an attractive idea. However, there are several difficulties with such a tax. Reconciling such a tax with some principles at the heart of the international environmental law order is difficult. The implementation of a global tax is also not likely to be as flexible as may be needed for an instrument of this type. A preferable solution will be not a global single-rate carbon tax, but rather a multilateral convention mandating a *minimum* level of carbon tax together with increased rates being decided by individual states along certain benchmarking factors. Such an alternative formulation is conceptually more defensible than – and would be at least as practicable (if not more so) as – a global single-rate carbon tax. Therefore, this essay offers grounds for supporting such alternative formulations, rather than supporting a global carbon tax at a single rate.

- Mihir Naniwadekar