“Dimming the Sun”: Does Unilateral Stratospheric Sulfate Injection Breach Jus Cogens?

by

Jonathan Weiss
J.D., University of Victoria, 2013
A.B., Harvard University, 2005

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Supervisory Committee

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Dr. Colin Macleod, (Faculty of Law and Department of Philosophy)
Co-Supervisor

Dr. Cindy Holder, (Department of Philosophy)
Co-Supervisor
Abstract

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“Stratospheric Sulfate Injection” (SSI) is an emergent technology that is meant to reduce global warming by blocking incoming sunlight, in particular, by injecting sulfate particles into the stratosphere. Once SSI gets started, it is necessary to keep injecting every 1-2 years; otherwise, the cooling effect will disappear and there will be sudden and potentially catastrophic global warming. Even though the effects are global, SSI can be deployed by a single state or small group of states acting alone and likely would be deployed in this way. There is currently no consensus among lawyers and judges as to whether such “unilateral” deployment of SSI would be legal under international law. The profession therefore requires a comprehensive study of the legal implications of unilateral deployment of SSI. To fill this gap, my thesis asks, “Does unilateral deployment of SSI breach international law?” Examining theories of international law, legal and political philosophy, and the science of SSI, I argue that deploying SSI unilaterally breaches a fundamental *jus cogens* (“compelling law”) norm of international law: the inherent right of self-defence. This norm entails a prohibition on what I call “perfect capture,” which happens when a foreign state appropriates and permanently monopolizes a domestic state’s responsibility to protect its population. Perfect capture violates the inherent right of self-defence because it represents a state’s renunciation of its capacity to make decisions affecting the survival of its population. Thus, insofar as it constitutes perfect capture, unilateral deployment of SSI grants a single state or small group of states more arbitrary power over the existential conditions of other states than is compatible with the premises of a pluralist international legal order.
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This thesis would not have been possible without the generous and thoughtful mentorship of my two Co-Supervisors, Prof. Colin Macleod and Prof. Cindy Holder.

The first part of this thesis’ title, “Dimming the Sun,” is a nod to Naomi Klein, This Changes Everything: Capitalism vs. The Climate (New York: Simon & Schuster, 2014), Ch. 8.
Dedication

To Ashley and my parents, for your gracious love, understanding, and support.
Chapter 1: Unilateral Stratospheric Sulfate Injection as a Moral and Legal Problem

1. Introduction

1.1 Unilateral SSI

Geoengineering, also referred to as climate engineering, is standardly defined as “the deliberate, large-scale intervention in the Earth’s climate system, in order to moderate global warming.”¹ There are two types of geoengineering: carbon dioxide removal (CDR) and solar radiation management (SRM). CDR removes carbon dioxide from the atmosphere. CDR techniques include afforestation; bioenergy with carbon dioxide capture and sequestration; biochar; enhanced weathering; and ocean fertilization.²

In contrast, SRM intentionally manipulates the quantity of solar radiation that is absorbed by the Earth. SRM techniques include: space shields or deflectors, stratospheric aerosols, cloud brightening, and planetary reflectivity modification.³

In this thesis, I will be concerned with SRM. The most prominent SRM proposal is stratospheric sulfate injection (SSI), which involves injecting sulfate aerosols into the stratosphere to reflect incoming sunlight back into space, thereby cooling the planet. SSI is predicted to be inexpensive and easy to deploy.⁴ Proponents of SSI call for the immediate development of governance mechanisms so that research into the technology

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² Shepherd et al., Geoengineering, passim.

³ Ibid., passim.

may begin soon.\textsuperscript{5} Others are hesitant to commence such research on the grounds that SSI is potentially hazardous for the planet or otherwise morally dubious.\textsuperscript{6} In particular, Alan Robock argues that SSI presents twenty physical and moral dangers: SSI may alter regional climates, allow ocean acidification to continue, deplete the ozone layer, disrupt plant growth, increase acid deposition, affect cirrus cloud formation, whiten the sky, provide less energy for solar power, be environmentally damaging to deploy, produce rapid warming of the planet upon termination of deployment, be irreversible, be susceptible to human error, undermine efforts to reduce greenhouse gas emissions, be financially burdensome, be subject to commercial interests, have military applications, conflict with international law, be subject to political manipulation, exceed humans’ moral authority, and have unpredictable effects.\textsuperscript{7}

In this thesis, I will be concerned with a particular kind of deployment of SSI: “unilateral” deployment of SSI. (I will hereafter refer to unilateral deployment of SSI as “unilateral SSI.”) Unilateral SSI is SSI that is managed by a proper subset of states so that not all “descriptively politically legitimate”\textsuperscript{8} states have equal, effective, and


\textsuperscript{8} I discuss descriptive political legitimacy in section 1.2 below.
democratic control over how the technology is managed. There can be unilateral SSI even if all descriptively politically legitimate states in the world consent to it; it is not their lack of consent that makes SSI unilateral, but their lack of control. The opposite of unilateral SSI is not “multilateral” but rather “omnilateral” SSI, in which every descriptively politically legitimate state has equal, effective, and democratic control over how the technology is managed.⁹ Omnilateral SSI requires the development of a deployment regime that not only coordinates all descriptively politically legitimate states but also satisfies a criterion of global democratic legitimacy.¹⁰ However, among descriptively politically legitimate states, there is a plurality of reasonable and unreasonable conceptions of the right and the good;¹¹ that is, there is wide and deep moral disagreement among states, rendering them at variance with one another on important matters of substance, including how to respond to climate change. For this

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⁹ Omnilateral SSI does not require the participation of future states, regardless of whether they are descriptively politically legitimate. Nevertheless, some have argued that there are clear obligations to future generations in international law: e.g., Edith Brown Weiss, In Fairness to Future Generations: International Law, Common Patrimony, and Intergenerational Equity (Tokyo: The United Nations University, 1989). Representatives of future generations can be instituted to give the future a voice in current deliberations. This may be feasible at the domestic level, insofar as, within a single society, the moral conceptions of future generations can be extrapolated from those of the present. However, it is unfeasible at the international level: future states are marked by wide and deep moral disagreement with respect to one another and even more so with respect to present states. Accordingly, the interests of future states are not sufficiently determinable for such states to partake effectively in a regime supporting omnilateral SSI.

¹⁰ I thank Prof. Cindy Holder for bringing this point to my attention.

¹¹ Brad R. Roth, “Sovereign Equality and Moral Disagreement: Premises of a Pluralist International Legal Order,” (Oxford: Oxford University Press, 2011), Ch. 2. Although I agree with Roth’s conception of “bounded pluralism” (see section 1.2 below), I disagree with some of the implications that he draws from this conception. In particular, Roth believes that bounded pluralism implies a very strong presumption against intervening in the affairs of other states, even when these states commit mass atrocities against their own people: Ch. 5. While I do not doubt that intervention is susceptible to abuse by state and private power, I believe that there is sufficient moral agreement under conditions of bounded pluralism to ground emerging norms such as the Responsibility to Protect, whereby non-military and sometimes military protection of a foreign population may be called for to prevent or stop genocide, war crimes, ethnic cleansing, and crimes against humanity. See, e.g., International Commission on Intervention and State Sovereignty, The Responsibility to Protect: Report of the International Commission on Intervention and State Sovereignty, accessed June 1, 2015, http://naulibrary.org/dglibrary/admin/book_directory/Political_science/4382.pdf. However, such protection must be limited and temporary, lest it amount to illegitimate foreign domination (see sections 2 and 3 below).
reason, a deployment regime for omnilateral SSI is not close to being developed. Thus, within the strict time constraints imposed by the exigencies of climate change, if SSI is deployed, it is likely to be unilateral SSI. Hence, I restrict my analysis to unilateral SSI. Note that many authors, while referring to unilateral SSI, do not use “unilateral SSI” but rather “SRM” or even simply “geoengineering.” To be precise, when paraphrasing these authors, I will use “unilateral SSI” unless it is manifest that they are referring to another kind of geoengineering.

1.2 Descriptive and Normative Political Legitimacy

I make a distinction between normative and descriptive political legitimacy. A state is normatively politically legitimate if and only if it has rightful legal authority over its population. A normatively politically legitimate state is reasonably just, and its laws create genuine legal obligations. In contrast, a state is descriptively politically legitimate if and only if its population believes that it is normatively politically legitimate (whether this belief is true or false). A population of a descriptively politically legitimate state “buys into” the state: It accepts, supports, and willingly participates in the state, acting as if its laws created genuine legal obligations (whether they do or not). Descriptive political legitimacy is a quantitative variable: The more a population believes a state to be normatively politically legitimate, the more the state is descriptively politically

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12 Other scholars make this distinction, e.g., Allen Buchanan and Robert O. Keohane, “The Legitimacy of Global Governance Institutions,” Ethics & International Affairs (2006), 405: “‘Legitimacy’ has both a normative and a sociological [i.e., descriptive] meaning. To say that an institution is legitimate in the normative sense is to assert that it has the right to rule – where ruling includes promulgating rules and attempting to secure compliance with them by attaching costs to non-compliance and/or benefits to compliance. An institution is legitimate in the sociological [i.e., descriptive] sense when it is widely believed to have the right to rule.” Likewise, in the context of SSI, Morrow, Kopp, and Oppenheimer, “Political Legitimacy,” 149: “Roughly, an institution is legitimate in the normative sense if it has the right to govern, and it is legitimate in the descriptive sense if it is widely believed to have the right to govern.” These authors are interested in using normative political legitimacy as the standard for critiquing and reforming “global governance institutions.”
legitimate. A state that lacks descriptive political legitimacy may be called a “quasi-state,” insofar as it may claim some of the rights, privileges, powers, and immunities of a state without actually possessing them.

I use descriptive rather than normative political legitimacy as the standard to define unilateral and omnilateral SSI because the international legal order is “boundedly pluralist.”\textsuperscript{13} It is boundedly pluralist insofar as states that have conflicting reasonable and unreasonable conceptions of the right and the good are able to coexist peacefully, equally, independently, and according to their own ways of life. They are able to do so because they have made a “principled deal,”\textsuperscript{14} which is the “fundamental premise”\textsuperscript{15} of the boundedly pluralist international legal order. The principled deal is a combination of consensus (based on moral principles) and compromise (based on material interests).\textsuperscript{16} Most actually existing states accept the principled deal, provisionally settling their otherwise wide and deep moral disagreement. The principled deal represents both an agreement on what can be agreed on under conditions of bounded pluralism and an agreement to disagree on what cannot be agreed on under these conditions. Hence, the principled deal includes a conception of descriptive political legitimacy, which depends on empirical facts that are accepted by most states; but not a conception of normative

\begin{footnotesize}
\begin{enumerate}
\item Roth, “Sovereign Equality,” 56-57, 71, 92, 125, 128-30, 273.
\item Ibid., 23.
\item Ibid., 57, 273.
\item Ibid., 23. This consensus is not to be confused with Rawls’ overlapping consensus. There are three reasons why this is so. First, Rawls’ overlapping consensus applies to a domestic society, not to the international community. Second, Rawls’ overlapping consensus is on a liberal conception of justice; my consensus is not necessary liberal and not merely of justice. Third, Rawls’ overlapping consensus is of reasonable comprehensive doctrines; my consensus is of reasonable and unreasonable conceptions of the right and the good. Moreover, the compromise part of the principled deal is not identical to Rawls’ \textit{modus vivendi}. Although both the compromise part and the \textit{modus vivendi} are temporary accommodations among self-interested parties, the \textit{modus vivendi}, like the overlapping consensus, operates at the domestic rather than the international level. See John Rawls, \textit{Political Liberalism}, Expanded Ed. (New York: Columbia University Press, 2005), 133-172.
\end{enumerate}
\end{footnotesize}
political legitimacy, which depends on value judgments that are contested by most states. Therefore, to be included in the principled deal (and so to be acceptable to most actually existing states), the definitions of unilateral and omnilateral SSI need to be in terms of descriptive rather than normative political legitimacy.

1.3 Framing the Problem

Although unilateral SSI would have global impacts, there is currently no treaty to prohibit it. Following Lin,17 I recognize six treaties that come close to doing so: the United Nations Framework Convention on Climate Change (UNFCCC),18 the Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (ENMOD),19 the Convention on Biological Diversity (CBD),20 the Convention on Long-Range Transboundary Air Pollution (LRTAP),21 the Montreal Protocol to the Vienna Convention for the Protection of the Ozone Layer,22 and the 1967 Outer Space Treaty.23 The UNFCCC’s ultimate objective is to “achieve…stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system”;24 however, the UNFCCC nowhere addresses intentional modification of the climate system for the purpose of counteracting

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21 Convention on Long-Range Transboundary Air Pollution, Nov. 13, 1979, 18 I.L.M. 1442 [LRTAP].
24 UNFCCC, Art. 2.
such interference, which means that it offers no guidance on whether SSI can or should be pursued. ENMOD requires parties “not to engage in military or any hostile use of environmental modification techniques having widespread, long-lasting or severe effects as the means of destruction, damage or injury to any other State Party”; however, ENMOD does not enjoin parties to refrain from SSI if they undertake the project for a purpose that is neither military nor hostile. The CBD obligates parties to “[i]dentify processes and categories of activities which have or are likely to have significant impacts on the conservation and sustainable use of biological diversity”; however, the CBD does not prohibit a global environmental intervention that does not have such impacts, which SSI may not have. LRTAP requires parties “to limit and, as far as possible, gradually reduce and prevent air pollution including long-range transboundary air pollution”; however, LRTAP, while imposing limitations on sulfur emissions to reduce acid precipitation, may actually allow parties to emit more sulfur than is required for effective deployment of SSI. Fifth, the Montreal Protocol’s purpose is “to protect the

26 ENMOD, Art. I.
28 CBD, Art. 7(c).
29 Lin, “International Legal Regimes,” 187. Insofar as it maintains global temperature at a baseline level, SSI may actually increase the conservation and sustainable use of biodiversity relative to a scenario where there is no SSI and climate change continues at its current pace. That said, this is true only if SSI, once implemented, does not terminate; if it does, then there will indeed be catastrophic damage to ecosystems. See Russell et al., “Ecosystem Impacts of Geoengineering: A Review for Developing a Science Plan,” AMBIO 41 (2012). But this suggests that the CBD would prohibit termination of SSI rather than deployment of SSI.
30 LRTAP, Art. 2.
31 Lin, “International Legal Regimes,” 195. It is thought that only a relatively small amount of sulfur in the stratosphere is required to reflect a large amount of sunlight. According to Keith, SSI “would require injecting about only one million tons of sulfur into the stratosphere each year to maintain the required amount of sulphate aerosol.” David W. Keith, A Case for Climate Engineering (Cambridge, MA: MIT Press, 2013), 67. In contrast, China alone already emits approximately 30 million tons of sulfur dioxide per year into the troposphere: Z. Klimont, S. J. Smith, and J. Cofala, “The Last Decade of Global
ozone layer by taking precautionary measures to control equitably total global emissions of substances that deplete it”;

However, the Montreal Protocol does not regulate stratospheric sulfur emissions, insofar as they “do not destroy ozone directly.”

Sixth, the 1967 Outer Space Treaty obligates parties to study and explore outer space only in such a manner “as to avoid [outer space’s] harmful contamination and also adverse changes in the environment of the Earth resulting from the introduction of extraterrestrial matter”; however, because the stratosphere is a layer of the planet’s atmosphere, stratospheric sulfate aerosols do not constitute extraterrestrial matter.

The fact that there is currently no treaty to prohibit unilateral SSI does not imply that unilateral SSI is legal under international law. In order for it to be legal, it cannot contradict what international law requires of states. This is because states are not only the “primary subjects of international law” but also the potential implementers of unilateral SSI. As the primary subjects of international law, states have various legal

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32 Montreal Protocol, Preamble.

33 Lin, “International Legal Regimes,” 196. There is a subtlety here. Stratospheric aerosols, while they do not deplete ozone directly, activate a process that eventually does deplete ozone. For this reason, Lin (196) writes: “[G]iven the potential for stratospheric aerosols to undermine the fundamental objective of the Protocol, the parties to the Protocol would likely take action to address [SSI] projects.” Still, this does not mean that the Protocol itself prohibits all emissions of stratospheric aerosols; it means only that parties operating in the spirit of the Protocol may voluntarily take it upon themselves not to produce such emissions.

34 1967 Outer Space Treaty, Art. IX.

35 Lin, “International Legal Regimes,” 197.

36 I thank Prof. Cindy Holder for making this point.

37 “States…are the backbone of the [international] community. They possess full legal capacity, that is, the ability to be vested with rights, powers, and obligations. Were they to disappear, the present international community would either fall apart or change radically.” Antonio Cassese, International Law, 2nd ed., (Oxford: Oxford University Press, 2005), 71. Emphasis in original.

38 This thesis does not contemplate the possibility of a non-state actor’s deployment of SSI. Although such a possibility is real, the situation is unlikely, insofar as a private actor (unless acting on behalf of a state) could easily be shut down by a state or other interested group. For an argument to this effect, see: Daniel

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rights and obligations. Legal requirements binding on states originate from one of the four sources of international law, as they are recognized by Article 38(1) of the Statute of the International Court of Justice (ICJ): first, “international conventions [i.e., treaties]”; second, “international custom, as evidence of a general practice accepted as law”; third, “the general principles of law recognized by civilized nations”; and fourth, “the judicial decisions and the teachings of the most highly qualified publicists of the various nations.”  

39. Law from any of the above sources may establish an obligation for a state to refrain from unilateral SSI.

The most likely source of such an obligation is a peremptory norm or *jus cogens* (“compelling law”). 40. Article 53 of the Vienna Convention on the Law of Treaties (VCLT) states: “[A] peremptory norm of general international law is a norm accepted and recognised by the international community of States as a whole as a norm from which no derogation is permitted and which can be modified only by a subsequent norm of general international law having the same character.” 41. That is, a *jus cogens* norm is so fundamental to the international legal order that it invalidates any treaty that conflicts with it. Such a norm prevails over positive law (including law that states make) and cannot be changed by it. It is universally binding on all states. Although the precise content of *jus cogens* is disputed, it is closely associated with conceptions of the right and the good that most states actually accept; relatively uncontroversial examples include the

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40. This is not to say that there is no other kind of law (in particular, customary international law) that prohibits unilateral SSI also. There very well may be; however, the determination of whether there is such law is left to another project. The argument of this thesis is simply that there is a peremptory norm that implies a prohibition of unilateral SSI. If there is another kind of international law to prohibit it, so much the better.

prohibitions of genocide, slavery, torture, apartheid, and wars of aggression. (I present a theory of *jus cogens* in chapter 2.) If unilateral SSI breaches *jus cogens*, then unilateral SSI is illegal under international law. This thesis thus asks the question, “Does unilateral SSI breach *jus cogens*?”

1.4 Summary of Argument

In the remainder of this introductory chapter, I lay the foundations for a comprehensive analysis of whether unilateral SSI breaches *jus cogens*; this analysis is carried out in chapters 2-3. To this end, I do five things. First, I introduce a theory of what I call “capture,” which happens when a domestic state’s responsibility to perform key functions for its own population is transferred to a foreign state. Second, I introduce a theory of freedom as non-domination, according to which freedom consists in not being dependent on the discretion of an external agent. Third, I define three subcategories of domination: bondage, in which an individual is dominated; subjection, in which a group is dominated; and capture, in which a state is dominated. Fourth, I identify an example of capture involving unilateral SSI, in which a powerful state captures a weak state under unequal bargaining conditions. Fifth, I compare and contrast this example with two examples of subjection involving unilateral SSI, in which future people and indigenous peoples are dominated. The purpose of introducing these two examples of subjection is to more clearly differentiate subjection from capture so that these two subcategories of domination, while ostensibly similar, do not get confounded.

These examples of capture and subjection, drawn from the philosophical literature on unilateral SSI, serve to highlight the normative foundations of capture and set the stage for my argument, in subsequent chapters, that unilateral SSI is in fact a violation of
a peremptory norm. The philosophers (Gardiner, Smith, and Whyte)\textsuperscript{42} from whom I draw these examples address the issue of whether unilateral SSI is \textit{moral}. Although they do not use the terms “capture,” “subjection,” or “bondage” as I do, they find that unilateral SSI is morally objectionable insofar as it constitutes domination. However, these authors do not address the issue of whether unilateral SSI is \textit{legal}. This issue is the subject of this thesis.

2. Capture

Central to this thesis is a theory of what I call “capture.” A domestic state (“captive”) is captured by a foreign state (“captor”) when a captive’s “responsibility to protect”\textsuperscript{43} its population is transferred to a captor. Capture may be either voluntary or involuntary. If it is voluntary, then a captive consents to being captured by a captor. If it is involuntary, then a captive does not consent to being captured by a captor. A captive transfers its responsibility to protect its population to a captor when it transfers an “existential function” to a captor. An existential function is a function that is necessary for the existence of a state’s population, regarded as a group of people who inhabit a defined territory over multiple generations.\textsuperscript{44} There are four existential functions in


\textsuperscript{43}“Responsibility to protect” here does not refer to the obligation that states have to militarily intervene in other states when these other states are unable or unwilling to protect their populations. Rather, it refers to the obligation that states have with regard to their own populations; states are accountable for their own populations in the way that I describe. This is consistent with a conception of “sovereignty as responsibility”: See, e.g., Luke Glanville, \textit{Sovereignty and the Responsibility to Protect: A New History} (Chicago: The University of Chicago Press, 2014).

\textsuperscript{44}This conception of a population accords with international law. Crawford comments, “The Montevideo Convention [on Rights and Duties of States] refers to ‘a permanent population.’ This criterion is intended to be used in association with that of a territory, and connotes a stable community.” James Crawford, \textit{Brownlie’s Principles of Public International Law}, 8th ed. (Oxford: Oxford University Press, 2012), 128.
modern states: the “constabulary function,” which is the provision of an effective police force and other systems of internal security; the “cybernetic function,” which is the provision of a communications network for the orderly flow of information; the “economic function,” which is the provision of a means of production and consumption of essential goods and services; and the “ecological function,” which is the provision of a habitable territory, including environment and climate. There are four corresponding types of capture: “constabulary capture,” “cybernetic capture,” “economic capture,” and “ecological capture.”

A potential example of constabulary capture involves the US drone strikes in the War on Terrorism in Yemen. The US is not at war with Yemen; rather, Yemen cooperates fully. Indeed, the President of Yemen claims that he personally pre-approves every US drone strike in his country. The drones target mainly Yemeni citizens who are suspected terrorists, in lieu of Yemen’s own police force. This is constabulary capture insofar as the provision of an effective police force and other systems of internal security have been transferred from Yemen to the US. A potential example of cybernetic capture involves the “Five Eyes” intelligence alliance comprising Australia, Canada, New

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45 According to climatologists, climate is not, properly speaking, ecological (i.e., pertaining to the relationships between living organisms and their natural environments) but rather geophysical (i.e., pertaining to the physical processes and properties of Earth). However, I am not using the climatological definition of “ecological” here. Rather, I use “ecological” to refer more broadly to anything pertaining to human beings’ natural home. This includes geophysical phenomena, such as the climate.


Zealand, the UK, and the US. Australia has been covertly enlisting the US National Security Agency (NSA) to intercept, store, and analyze huge amounts of data directly from Australian citizens’ personal Internet and cell phone communications. Even though the NSA is doing this, it is meant for Australia’s national security. This is cybernetic capture insofar as the provision of a communications network for the orderly flow of information has been transferred from Australia to the US. A potential example of economic capture involves Nauru’s heavy dependency on foreign aid and offshore banking. In the past, Nauru, an island microstate, was able to generate wealth by exporting phosphate; when the phosphate deposits were exhausted, Nauru lost its only real means of production. It now relies on other countries, primarily Australia and Fiji, to supply practically its entire infrastructure. This is economic capture insofar as the provision of a means of production and consumption of essential goods and services has been transferred from Nauru to other states. I will argue in chapter 3 that an example of ecological capture is unilateral SSI, insofar as this involves the transfer of the provision of a habitable climate from a captive to a captor.

3. Freedom as Non-Domination

In capture, the captor has a special power over the captive. This special power is “domination.” According to Quentin Skinner, there are three broad theories of freedom in political philosophy: “freedom as self-realization,” “freedom as non-interference,” and

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49 Ibid., 122.


51 This includes remarkable quantities of prefabricated buildings (33% of all imports) and cement articles (10% of all imports). “Nauru,” Atlas of Economic Complexity, accessed May 22, 2015, http://atlas.cid.harvard.edu/country/nru/.
“freedom as non-domination.” 52 All three theories require that one have the capacity to choose among alternatives. 53 First, freedom as self-realization requires actualizing the intrinsic political or spiritual character of one’s true nature. 54 Second, freedom as non-interference requires that one not be interfered with. Here, interference may consist of an external agent’s interfering with a subject’s body through physical coercion; of an external agent’s interfering with a subject’s will though intimidation; or of subjects’ interfering with themselves through “passion,” “inauthenticity,” or “false consciousness.” 55 Interference forces or frustrates action, making it practically impossible to choose a given option. 56 Third, freedom as non-domination requires being a liber homo (“free person”) rather than a slave. 57 Subjects will be slaves if, due to their dependence on the discretion of an external agent, this agent could interfere with the subjects’ capacity to choose among alternatives, to the subjects’ own detriment. 58

To illustrate freedom as non-domination, Phillip Pettit employs the example of Helmer Thorvald and his wife Nora from Henrik Ibsen’s play A Doll’s House. 59 Th...
dotes on Nora. Because of his fondness for her, Thorvald does not make it impossible for Nora to choose among alternatives; he does not interfere with her body through physical coercion or with her will through intimidation. However, Thorvald possesses great legal power over Nora. If he wanted to, he could interfere with Nora. Hence, the fact that Thorvald does not interfere with Nora depends on Thorvald’s discretion. According to the theory of freedom as non-domination, Nora, though given free rein by her doting husband, does not enjoy the status of liber homo. Rather, she is a slave.

Expanding on Skinner and Pettit’s theory, I propose three categories of domination, each of which has its own particular moral as well as legal consequences: bondage, subjection, and capture. In each of these, there is an agent that dominates (“dominate”) and an agent that is dominated (“subordinate”). Bondage, subjection, and capture are differentiated by the type of subordinate. In bondage, the subordinate is an individual; in subjection, the subordinate is a group; in capture, the subordinate is a state. In bondage, subjection, and capture, the dominate may be an individual, group, or state. Thus, there are three kinds of bondage: individual dominate and individual subordinate (e.g., Roman slavery); group dominate and individual subordinate (e.g., sweatshop labor); and state dominate and individual subordinate (e.g., incarceration). Likewise, there are three kinds of subjection: individual dominate and group subordinate (e.g., religious cult); group dominate and group subordinate (e.g., patriarchy); state dominate and group subordinate (e.g., totalitarian regime). Finally, there are three kinds of capture: individual dominate and state subordinate (e.g., personal despotism); group dominate and state subordinate (e.g., state controlled by corporations); and state dominate and state

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60 I thank Prof. Cindy Holder for suggesting the terms “dominate” and “subordinate.”
subordinate (e.g., empire). In this chapter, I will be concerned with two kinds of subjection: group dominate and group subordinate; and state dominate and group subordinate. Moreover, I will be concerned with one kind of capture: state dominate and state subordinate.

Within the category of capture as state dominate and state subordinate, there is a further distinction between “perfect” and “imperfect” capture. In perfect capture, the existential function that is transferred by the captive to the captor is performed by the captor, so that, if the captor did not perform this function, no other state would perform it, not even one that exists in the future. In imperfect capture, the same existential function is performed by the captor, but, if the captor did not perform this function, another state would perform it, even if only one that exists in the future. (I discuss this distinction further in chapter 2.) I am not concerned to demonstrate that imperfect capture breaches jus cogens; on the contrary, I suggest that it may be completely legal under international law, as may be the case with many UN peacekeeping operations.\(^{61}\) Whereas perfect capture is inconsistent with the fundamental premise of the boundedly pluralist international legal order,\(^ {62}\) imperfect capture may be consistent with it. The remainder of my thesis is dedicated to establishing two premises: First, perfect capture breaches jus

\(^{61}\) These constitute imperfect constabulary capture insofar as there is a temporary and limited transfer of the provision of an effective police force and other systems of internal security from a domestic state to a foreign state. I thank Prof. Cindy Holder for suggesting this to me.

\(^{62}\) Due to the fact of reasonable and unreasonable pluralism about conceptions of the right and the good, states may disagree over whether the theory of freedom as non-domination is true. It might be wondered how it is then possible that the theory may support a jus cogens norm, which is universally binding. There are two responses. First, as mentioned above, the international legal order is characterized by wide and deep moral disagreement, not wide and deep legal disagreement. The theory of freedom as non-domination is a moral theory with legal implications. States may agree on the legal implications notwithstanding that they disagree on the moral theory. Second, even supposing that there is legal disagreement, it is possible that those who disagree with the legal implications of the theory of freedom as non-domination are wrong. Such states will still be bound by the prohibition entailed by the peremptory norm even though they disagree with it. I thank Prof. Colin Macleod for encouraging me to address these points.
cogens; second, unilateral SSI constitutes perfect capture (specifically, perfect ecological capture). Having established these two premises, I conclude that unilateral SSI breaches jus cogens.

4. SSI as Capture

According to Gardiner, the contemporary climate change crisis is “a perfect moral storm.”63 The perfect moral storm consists of four components. First, “the global storm”: Spatial “dispersion of causes and effects,” spatial “fragmentation of agency,” and “institutional inadequacy” combine to create a global Tragedy of the Commons.64 Second, “the intergenerational storm”: Temporal dispersion of causes and effects, temporal fragmentation of agency, and institutional inadequacy combine to create what Gardiner calls “the problem of intergenerational buck-passing,” that is, current generations’ passing on the costs of mitigating climate change to future generations.65 Third, “the theoretical storm”: Because climate change involves so many new and difficult issues, such as “intergenerational equity, international justice, scientific uncertainty, contingent persons, and the human relationship to animals and nature more generally,” humans currently do not have a moral or political theory that is adequate to the task of dealing with climate change.66 Fourth, “the problem of moral corruption”: People have trouble addressing climate change responsibly because they are inclined towards “distraction,” “complacency,” “selective attention,” “unreasonable doubt,”

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64 Ibid., 24.
65 Ibid., 32, 35
66 Ibid., 41.
“delusion,” “pandering,” and “hypocrisy.”

Gardiner applies his analysis of the perfect moral storm to a situation in which a small, weak, and poor island state becomes desperate for unilateral SSI to avert destruction due to rising sea levels. Gardiner breaks the problem into two questions: the “justificatory question,” which inquires into the conditions under which unilateral SSI is morally acceptable; and the “contextual question,” which inquires into the moral context in which unilateral SSI is researched and deployed. Gardiner states that the contextual question is more important than the justificatory question on the basis that, while it is always possible to conjure a situation in which unilateral SSI is morally acceptable, the perfect moral storm makes almost any argument for unilateral SSI morally suspect. Of the four storms, the intergenerational storm, in particular, the problem of intergenerational buck-passing, is the most pertinent to unilateral SSI. Intergenerational buck-passing leads to “parochial geoengineering,” where the current generation deploys unilateral SSI, avoiding short-term risks but creating risks for future generations. It may also lead to “predatory geoengineering,” where one state uses unilateral SSI to achieve short-term geopolitical advantages over opponent states. In the case of a small, weak, and poor island state, this state may be so desperate that “it may in effect assent to predatory and parochial geoengineering against [its] own people.” In which case, it is

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67 Ibid., 45.
68 Gardiner, “Desperation.”
69 Ibid., 28.
70 Ibid., 28.
71 Ibid., 30.
72 Ibid., 31.
73 Ibid., 31.
74 Ibid., 31. Emphasis in original.
possible that, as Gardiner puts it, “the desperate’s assent to geoengineering would constitute a show of profound subjugation - the acceptance or recognition of severe subservience or subordination to others.”

Here, translating into the terminology that I introduced above, Gardiner would say that it would constitute a show of profound “domination” (specifically, capture).

Gardiner uses two analogies to illustrate the “plight of the desperate” under parochial and predatory geoengineering. First, in the film, Sophie’s Choice, a Nazi officer demands that Sophie decide which of her two children, a boy and a girl, will be spared; if she does not choose, then the officer will kill both children. Sophie is put in a horrible situation, in which she must choose between two evils: select one of the children to be spared or have both killed. Analogously, a desperate state may have to choose between two evils: parochial or predatory geoengineering, on the one hand; or destruction due to rising sea levels, on the other hand. Gardiner’s point is that, just as Sophie is in a horrible situation, the desperate state would also be in a horrible situation. Moreover, the Nazi officer is morally blameworthy for putting Sophie in her situation. Likewise, a country that contributed to global warming puts the island nation in its desperate situation; consequently, it too is morally blameworthy. Gardiner writes, “To bring others to the point where, in desperation, they feel forced to accept an extreme form of

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75 Ibid., 31. Emphasis in original.
76 Ibid., 33.
77 Ibid., 32.
78 Ibid., 32.
79 Ibid., 32.
80 Ibid., 32.
domination is a morally horrifying prospect.” Here Gardiner’s use of “domination” matches the earlier definition; to be more specific, he also could have used “capture.”

Gardiner’s other analogy goes as follows. Joseph sets up a laboratory in his house, and this lab pumps toxic waste into Karla’s house. Joseph can prevent this from happening, but he elects not to do so. Karla gets very sick, but, unfortunately, she can do very little about it, as Joseph is very powerful. Karla appeals to Joseph for help, and Joseph agrees to help her, but only if she becomes his subject in his experiments. Gardiner says that this is a “morally horrifying” situation. Out of desperation, Karla may agree to Joseph’s conditions. But if she does, she seems not to be acting with freedom, dignity, or self-respect. Rather, no one would want to be her; she seems pitiable. Joseph is analogous to the rich states that have historically contributed to global warming and could have done otherwise. Karla is analogous to the poor, weak, island states that global warming has put on the precipice of destruction. As Joseph offered Karla the option of becoming his test subject, rich states offer desperate states the option of consenting to parochial or predatory geoengineering.

Gardiner thereby depicts capture, although he does not use this term. When a desperate state consents to parochial or predatory geoengineering by a rich state, the

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81 Ibid., 33.
82 Indeed, if it assumed that parochial and predatory geoengineering are irreversible and monopolistic, then Gardiner could have used “perfect capture.” Parochial engineering may be irreversible insofar as it is to the detriment of future generations; predatory geoengineering may be monopolistic insofar as it is to the detriment of geopolitical opponents.
83 Ibid., 32.
84 Ibid., 32.
85 Ibid., 32.
86 Ibid., 32.
desperate state gets captured by the rich state. That is, the desperate state is a subordinate, whose capacity to choose among options could be interfered with, to its own detriment, due to its dependence on the discretion of the rich state, which is its dominate. Note that Gardiner is concerned to address only the ethical aspects of what I am calling capture. He does not address its juridical aspects, which will constitute my primary concern in chapters 2-3.

5. SSI as Subjection

As discussed above, both subjection and capture are forms of domination involving a relation of domination between a dominate and a subordinate. Subjection differs from capture: in the case of subjection, the subordinate is a group; in the case of capture, the subordinate is a state. The primary difference between a group and a state is that only the latter claims to exercise a legitimate monopoly on the use of coercive force in a given territory. The following two examples of subjection involving future people and indigenous peoples elucidate the distinction between subjection and capture.

5.1 Future People

Smith describes a case, similar to Gardiner’s involving Joseph and Karla, in which Emma is the master of Harriet, a slave. Emma allows Harriet to do everything that she wishes; however, if Emma wanted, she could interfere with Harriet. Smith argues that, in this case, Emma dominates Harriet: Emma has arbitrary, structural power over

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87 Note that this does not imply that a state is defined or constituted by its claim to exercise a legitimate monopoly on the use of coercive force in a given territory (what is sometimes called “effective control”). Such a claim is not a sufficient condition of statehood, which means there may be a political community that makes this claim that is not a state. International law now tends to recognize criteria other than effective control that need to be met in order for a political community to qualify and be recognized as a state, such as the willingness to observe international law. See, e.g., Crawford, Brownlie’s, 115-165. I thank Prof. Cindy Holder for alerting me to this issue.

88 Smith, “Domination,” 47.
Harriet; there are no institutions to keep Emma’s power in check.\(^8^9\) Smith analogizes this to unilateral SSI, in which present people, who deploy unilateral SSI, dominate future people, who will be born into a world in which unilateral SSI is already deployed.\(^9^0\)

According to Smith, present people have two kinds of power over future people: “formal power” and “substantive power.”\(^9^1\) Present people have formal power insofar as they live prior to future people, and their actions, due to temporal cause-and-effect, inevitably affect future people’s choices.\(^9^2\) In contrast, present people have substantive power insofar as they possess technology that substantially alters the context of future people’s choices, for example, by creating a world in which there is substantial global warming.\(^9^3\)

While formal power is unavoidable and the same across all generations, Smith argues that, in the past, people’s substantive power was much less than it is today.\(^9^4\) In the past, there were internal checks on people’s substantive power for two reasons. First, technology was more primitive, having smaller and more ephemeral effects.\(^9^5\) Second, it was more difficult for people to harm future people without harming themselves; as technology was more primitive, the costs of implementing the technology were more immediate and could not readily be deferred to the future.\(^9^6\)

Whereas the costs of mitigation and adaptation\(^9^7\) are borne by present people and

\(^{8^9}\) Ibid., 48.
\(^{9^0}\) Ibid., 50.
\(^{9^1}\) Ibid., 50.
\(^{9^2}\) Ibid., 50-51.
\(^{9^3}\) Ibid., 51.
\(^{9^4}\) Ibid., 51.
\(^{9^5}\) Ibid., 51.
\(^{9^6}\) Ibid., 51.
\(^{9^7}\) The Intergovernmental Panel on Climate Change (IPCC), the leading authority on climate change, defines mitigation as: “A human intervention to reduce the sources or enhance the sinks of greenhouse gases
their benefits are shared by present and future people, when present people undergo mitigation and adaptation, they do not exercise a lot of substantive power over future people.\textsuperscript{98} In contrast, whereas unilateral SSI is an advanced technology whose costs to present people are small, but whose costs to future people are potentially large, when present people deploy unilateral SSI, they exercise a lot of substantive power over future people.\textsuperscript{99} Moreover, if there are no adequate institutional checks and balances to constrain present people’s deployment of unilateral SSI, this power is arbitrary, and, consequently, such deployment constitutes domination of future people.\textsuperscript{100} Further, Smith argues that, even if there were such checks and balances, unilateral SSI would still constitute domination because unilateral SSI amounts to “intrinsic domination.”\textsuperscript{101} That is, unilateral SSI blocks, but does not eliminate, climate change. This is because, if unilateral SSI were removed, climate change would resume. When present people deploy unilateral SSI, future people cannot remove it without resuming climate change. Unilateral SSI therefore locks future people into a certain path, as deviating from this path may prove too costly.\textsuperscript{102} And so unilateral SSI constitutes subjection, whereby one group (present people) dominates another group (future people).\textsuperscript{103}

\textsuperscript{98} Ibid., 55-56.
\textsuperscript{99} Ibid., 56.
\textsuperscript{100} Ibid., 56.
\textsuperscript{101} Ibid., 54.
\textsuperscript{102} Ibid., 57.
\textsuperscript{103} There are other puzzles associated with future generations, in particular, the “non-identity problem,” which goes as follows. Particular future people come into existence only because of the particular acts of present people. If present people act irresponsibility to make particular future people poorly off, these future people are still not worse off than they would be had the present people acted otherwise, because, in that case, these (GHGs).” (A “sink” of GHGs is a reservoir that gathers up and stores carbon; examples of sinks include forests, soils, and phytoplankton.) Edenhofer et al., eds. \textit{Climate Change}, 1266. The IPCC defines adaptation as: “The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects.” Ibid., 1251.
5.2 Indigenous Peoples

Kyle Whyte discusses whether the process for deciding whether to research and deploy unilateral SSI meets the criteria of “transparency and procedural justice” for indigenous peoples. Whyte argues that indigenous peoples need to consent to the research and deployment of unilateral SSI in order for these to go forward legitimately. The argument is presumably specific to indigenous peoples because of their special ancestral connections to landscapes that risk disappearing due to climate change; indigenous peoples, upon the disappearance of these landscapes, would be forced “either to respond under great hardship or migrate elsewhere.” Whyte examines an argument for the initiation of research into unilateral SSI, referred to as the “lesser of two evils argument.” This argument, as articulated by Stephen Gardiner, goes as follows: If there is no unilateral SSI, there will be catastrophic climate change; although both unilateral SSI and catastrophic climate change are “evils,” unilateral SSI is the lesser evil; therefore, we ought to start researching unilateral SSI now, in order to prepare the future people would not even exist (other future people would). This seems to suggest, paradoxically, that the irresponsible act is not really irresponsible, since it makes no one worse off than they otherwise would be. But the non-identity problem may be disposed of in the context of unilateral SSI. The pertinent moral issue is not whether unilateral SSI makes particular future people worse off than they otherwise would be, but rather whether unilateral SSI creates a future world that is good for any people to live in, whoever they happen to be. I thank Prof. Colin Macleod for calling my attention to this problem.

105 Ibid., 66.
106 Ibid., 65. It is questionable whether indigenous peoples are the only class of people who would suffer extreme hardship or else migrate pursuant to the degradation of their home environments. For instance, the same would appear to hold true of many women in developing countries. Nevertheless, it is important to discuss indigenous peoples precisely because they are “peoples” that are similar in some respects to states (e.g., in their self-identification as unified political communities) but different in other respects (e.g., in their relative incapacity to exercise a monopoly on the legitimate use of coercion within their territories). The point of discussing these examples of subjection is precisely to differentiate them from capture. If the subjected group is similar to a state, fine distinctions can be made. I thank both Prof. Cindy Holder and Prof. Colin Macleod for prompting me to discuss this issue.

107 Ibid., 66.
for deployment of unilateral SSI. Whyte is skeptical of this argument, for it reminds him of previous arguments in which settler colonial states have deprived indigenous peoples of their freedom in the name of an emergency that these states perceive to be imminent or inevitable. For example, during the twentieth century, the United States built twenty-nine dams on the Columbia River in order to protect industries that built weapons for use in the Cold War. As a result of these dams, many indigenous peoples lost their territories, which they needed to fulfill their basic needs and pursue their “traditional lifeways.” According to Whyte, the process by which the development of the dams was accepted deprived indigenous peoples, who were sovereign over their own territories, of their freedom; consequently, it was not legitimate.

Whyte distinguishes three approaches to consent: “the standards approach,” “the integrationist approach,” and “the partnership approach.” According to the standards approach, experts and scientists decide the technical parameters for research; stakeholders, including indigenous peoples, are brought into the process only to be consulted to determine ethical standards of research. According to the integrationist approach, local communities and indigenous peoples are consulted at an early stage and their traditional knowledges are integrated into the research agenda. According to the partnership approach, indigenous peoples are recognized as partners, who are sovereign

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109 I discuss this argument further in the epilogue, section 2.2.


111 Ibid., 68.

112 Ibid., 70.

113 Ibid., 70.

114 Ibid., 71-74.

115 Ibid., 71.

116 Ibid., 72.
over their own territories, in all decisions relating to research; notably, if indigenous people do not consent, then research cannot proceed legitimately.\textsuperscript{117} Whyte regards only the partnership approach as appropriate to indigenous peoples, effectively giving them a powerful voice in all unilateral SSI research.\textsuperscript{118} The partnership approach satisfies the only truly collaborative criterion of “free, prior, and informed consent (FPIC).”\textsuperscript{119} And so, assuming the partnership approach is not taken, unilateral SSI constitutes subjection, in which a state dominates a group, namely, an indigenous people.

6. The Road Ahead

In unilateral SSI, the proper subset of states that has control over SSI technology dominates descriptively politically legitimate states that do not have equal, effective, and democratic control over the technology. This proper subset has the capacity to interfere with the other states, contrary to their interests, notwithstanding that it may not actually interfere. Thus, it is not the interference that breaches \textit{jus cogens} but rather the capacity to interfere. This capacity to interfere, which amounts to domination, correlates with a kind of vulnerability. This vulnerability undermines the principled deal whereby states having conflicting reasonable and unreasonable conceptions of the right and the good may coexist peacefully, equally, independently, and according to their own ways of life. And so, ultimately, unilateral SSI breaches \textit{jus cogens} because it concentrates too much power in a proper subset of states to be consistent with the fundamental premise of the boundedly pluralist international legal order.

\textsuperscript{117} Ibid., 75.
\textsuperscript{118} Ibid., 75.
\textsuperscript{119} Ibid., 75. Whyte leaves unanswered the question of whether the legitimacy of research into SSI would require the FPIC of literally every sovereign nation, including every indigenous people, on the planet. This would seem to be too onerous a condition, both because it requires multitudinous participants and because it requires unanimity. I thank Prof. Colin Macleod for raising this point.
In chapter 2, I will argue as follows. In perfect capture, the captive loses the capacity to defend itself both from the captor and from third parties. Hence, the captive cannot exercise what is called in international law its “inherent right of self-defence.” But the “public order”\textsuperscript{120} theories of *jus cogens* imply that the inherent right of self-defence is a *jus cogens* norm. The public order theories are not only plausible and mutually consistent but also superior to alternative theories;\textsuperscript{121} hence, the public order theories are to be accepted as the best and truest account of peremptory norms. Because perfect capture deprives the captive of its ability to exercise its inherent right of self-defence, and this ability is a *jus cogens* norm, perfect capture breaches *jus cogens*.

In chapter 3, I will then argue as follows. The more a state performs an existential function (constabulary, economic, ecological, or cybernetic), the more it is descriptively politically legitimate. An act whereby a foreign state expropriates and permanently monopolizes a sufficient quantity of descriptive political legitimacy from a domestic state constitutes perfect capture. Performing the ecological function requires providing climatic factors (e.g., temperature, precipitation, crop yield and productivity, and terrestrial vegetation) that are susceptible to the influence of SSI. Unilateral SSI involves a nearly total and permanent transfer of the provision of these factors from a domestic state to a foreign state so that, but for the foreign state’s provision of these factors, these factors would not be provided, not even by a future state. And so unilateral SSI is an act


whereby a foreign state expropriates and permanently monopolizes a sufficient quantity of descriptive political legitimacy from a domestic state. Therefore, unilateral SSI constitutes perfect capture.

If sound, these arguments establish that unilateral SSI breaches *jus cogens*. This is the main conclusion of this thesis. In the epilogue, I proceed to examine the practical implications of this conclusion, asking the question, “Should all states conclude a treaty to prohibit SSI research?” Notwithstanding that SSI research may contribute to the advancement of scientific knowledge, I will argue that states should conclude such a treaty, insofar as it is very likely that SSI research will achieve unilateral SSI. To be sure, a treaty is not required to make unilateral SSI illegal; because it breaches *jus cogens*, it is already illegal. However, the proposed treaty would codify the law on this issue, making the law clearer, more formal, more precise, more public, and more accessible. It would consolidate international opinion on the matter, providing a common basis for the creation of new laws and institutions.


Chapter 2: Perfect Capture as Breaching Jus Cogens

1. Introduction

1.1 Recapitulation

Previous philosophical inquiries into unilateral SSI (involving desperate states, future generations, and indigenous peoples), while attentive to the ethical dimensions of the phenomenon, have failed to address its juridical dimensions, in particular, whether unilateral SSI is legal under international law. While there are several multilateral treaties (e.g., UNFCCC, ENMOD, CBD, LRTAP, the Montreal Protocol, and the 1967 Outer Space Treaty) that are potentially relevant to certain environmental aspects of SSI, there is currently no written international law that settles the issue of whether there is a universal obligation in international law to refrain from unilateral SSI.\(^\text{122}\) However, this issue would be settled if it could be shown that unilateral SSI breached jus cogens, a peremptory norm of international law from which no derogation is permitted. Accordingly, the central question of my thesis is: “does unilateral SSI breach jus cogens?” I argue that unilateral SSI does indeed breach jus cogens and so is illegal under international law. My argument depends on two premises: first, perfect capture breaches jus cogens; second, unilateral SSI constitutes perfect capture. In this chapter, I argue for the first premise. In chapter 3, I argue for the second premise.

\(^{122}\) In chapter 1, I mentioned that this thesis leaves open the possibility that there may be customary international law that establishes an obligation to refrain from unilateral SSI. Whether there is such law is an investigation better suited to another project. However, customary international law will not necessarily establish a universal obligation. This is because of the “persistent objector doctrine”: a state that has persistently objected to a rule of customary international law is not legally bound by the rule. Crawford, Brownlie’s, 28. If there were a rule of customary international law to prohibit unilateral SSI, a persistent objector could exempt itself from the rule. In contrast, a peremptory norm always establishes a universal obligation. This is important: the boundedly pluralist international legal order cannot be protected by anything less than a universal obligation because only one state acting alone is required for unilateral SSI.
1.2 Perfect vs. Imperfect Capture

Recall the distinction between perfect and imperfect capture. In perfect capture, the existential function that is transferred by the captive to the captor is performed by the captor, so that, if the captor did not perform this function, no other state would perform it, not even one that exists in the future. Hence, perfect capture is monopolistic and irreversible. In imperfect capture, the same existential function is performed by the captor, but, if the captor did not perform this function, another state would perform it, even if only one that exists in the future. Hence, imperfect capture is substitutable and reversible. There are two types of imperfect capture: type 1 and type 2. In type 1, the other state that would perform the existential function if the captor did not perform it is the captive itself. In type 2, the other state is a foreign state other than the captor. The distinction between perfect and imperfect capture is important. In perfect capture, the captive depends on the continuing functioning of a unique captor. In imperfect capture, the captive depends on the functioning of some captor, but this captor may be different from a previous one. For this reason, in perfect capture, the captive is much more vulnerable to its current captor than it is in imperfect capture. Insofar as it is common knowledge that there can be no substitute for the captor in perfect capture, the captor has more bargaining power over the captive than it does in imperfect capture. Thus, the power asymmetry between states is greater in perfect capture than it is in imperfect capture.

The following three cases of capture exemplify the distinction between perfect capture and the two types of imperfect capture. Suppose that a captive requires a system

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123 By “continuing functioning,” I am referring to the continuing performance of the captor’s existential functions. Without this, the captor’s people would lack essential constabulary, economic, ecological, or cybernetic services that are required for their existence in their home territory. In other words, in perfect capture, the captive depends on a unique captor’s remaining a state rather than a quasi-state.
of mass surveillance to identify terrorists, and these terrorists constitute a real existential threat to the population. However, the captive does not have the capacity to operate such a system. Moreover, only one captor has this capacity, and this capacity is forever uniquely the exclusive property of the captor. The captive asks the captor to operate the system on its behalf. In such a case, the cybernetic function is performed by the captor, so that, if the captor did not perform this function, no other state would perform it, not even a future one. This constitutes perfect capture. Second, suppose that a captive has the capacity to operate a system of mass surveillance. Nevertheless, the captive asks a captor to operate the system on its behalf. However, the captive has resolved to operate the system in case the captor stops doing so. Thus, the cybernetic function is performed by the captor, but, if the captor did not perform this function, the captive would perform it. This constitutes imperfect capture type 1. Third, suppose that a captive, as above, asks a captor to operate a system of mass surveillance on its behalf, but there is another foreign state that can perform the same function. Moreover, the other foreign state has agreed to operate the system in case the captor stops doing so. Thus, the cybernetic function is performed by the captor, but, if the captor did not perform this function, the other foreign state would perform it. This constitutes imperfect capture type 2.

The captive is significantly more vulnerable in perfect capture than in imperfect capture. In perfect capture, since the captor monopolistically and irreversibly performs the existential functions for the captive, the captor itself needs to function at a certain level in order for the captive to function; in imperfect capture, since another state (either another foreign state or the captive itself) can resume performance of the existential functions for the captive when the captor stops performing these functions, the captor
does not need to function at a certain level in order for the captive to function. Thus, in
perfect capture, if the captive undermines the functioning of the captor, the captive
undermines its own functioning; in imperfect capture, if the captive undermines the
functioning of the captor, the captive does not necessarily undermine its own functioning,
inasmuch as another state can substitute for the captor. An important difference between
perfect and imperfect capture is that, in the former, the captive must forever secure the
captor’s vital interests in order to secure its own, whereas, in the latter, the captive may
ignore or even oppose the captor’s vital interests and still remain secure in the long-
term.124

This places different constraints on a captive’s possible response to a captor’s
“encroachment,” which refers to one state’s interference with another state’s vital
interests, specifically, its ability to make decisions concerning the performance of
existential functions for its population.125 In perfect capture, when the captor encroaches
on the captive, the captive cannot respond by undermining the functioning of the captor,
lest it undermine its own functioning. In imperfect capture, it can respond by
undermining the functioning of the captor without undermining its own functioning. The
upshot is that perfect capture (but not imperfect capture) involves such a concentration of
power in a captor that the captor becomes effectively immune from certain

124 But there are cases of imperfect capture also in which a captive’s security depends on safeguarding the
captor’s interests. They are just limited in time and scope. For instance, in the 1960s, East Germany was
imperfectly captured by the USSR. During this time, East Germany depended on the continuing functioning
of the USSR to maintain its own descriptive political legitimacy. It would have been highly self-damaging
for East Germany to attempt to undermine the USSR’s vital interests under these circumstances. I am
indebted to Prof. Cindy Holder for this example.

125 An encroachment may be intentional or unintentional. An intentional encroachment is an act whose
intended effect is to interfere with another state’s vital interests, for example, when a state uses armed force
against another state. An unintentional encroachment is an act whose intended effect is not to interfere with
another state’s vital interests but which produces a side-effect that interferes with these interests, as when a
state builds a port abutting another state that draws environmentally hazardous oil tankers to the waters off
the other state’s coast. I thank Prof. Cindy Holder for this example.
countermeasures in case the captor encroaches on the captive. This is dangerous insofar as a captor may abuse this power. Moreover, it implies that the captive has lost the capacity to defend itself effectively against the captor’s encroachments.

In addition, in perfect capture, a captive is unable to defend itself against third-party encroachments. Even supposing that the captor is benevolent and provides adequate protection from third-party encroachments, it is never the captive but always the captor that pursues countermeasures and decides when to pursue them. In perfect capture, a captive simply loses its capacity to pursue countermeasures. If the ability to pursue countermeasures in self-defence is a necessary condition of being recognized as a state by the international community (I will argue that this is so), then the captive loses one of its qualifications to be a state. This poses a problem insofar as the purpose and intention of capture is not to extinguish the statehood of the captive but rather simply to assist it in the performance of one of its existential functions. Hence, the international community will be inclined to continue to regard the captive as a continuously existing state, albeit one that is unusually dependent on another. This contradiction between the juridical facts and the expectations of the international community is indicative that perfect capture violates a norm that this community already takes for granted. In this chapter, I will argue that this norm, which is the inherent right of self-defence, has a peremptory character.

1.3 Inherent Right of Self-Defence

The lack of a captive’s capacity to defend itself effectively in perfect capture has consequences in international law. Article 51 of the UN Charter reads:

Nothing in the present Charter shall impair the inherent right of individual or collective self-defence if an armed attack occurs against a Member of the United
Nations, until the Security Council has taken measures necessary to maintain international peace and security. Measures taken by Members in the exercise of this right of self-defence shall be immediately reported to the Security Council and shall not in any way affect the authority and responsibility of the Security Council under the present Charter to take at any time such action as it deems necessary in order to maintain or restore international peace and security.\(^{126}\)

This text indicates that states have an inherent right of self-defence. However, “inherent right of self-defence” needs to be interpreted. The text does not imply that the inherent right of self-defence ceases to exist once the Security Council has taken measures necessary to maintain international peace and security. For I will show that this contradicts the traditional definition in international law of the legal criteria for statehood. It is safe to assume that Article 51 of the UN Charter should not be interpreted as representing a break from such a traditional definition, insofar as the Charter, a treaty ratified by most countries in the world, in great part codifies a lot of already widely accepted and well-established precepts of international law.\(^{127}\)

According to Alder, early legal scholars (e.g., Ayala, Grotius, Gentili, Vitoria, Pufendorf, Vattel, and Wolff) held that the right to use war for self-defence was a manifestation of state sovereignty that was ultimately based on the sovereignty of the

\(^{126}\) Charter, Art. 51.

\(^{127}\) Commenting on Article 51, the International Court of Justice (ICJ) stated in *Military Activities in and against Nicaragua Case (Nicaragua v. United States of America)* [1986] I.C.J. Rep. 14 at para. 181: “[F]ar from having constituted a marked departure from customary international law which still exists unmodified, the Charter gave expression in this field to principles already present in customary international law….The essential consideration is that both the Charter and the customary international law flow from a common fundamental principle outlawing the use of force in international relations.”
human individual. Alder claims that “to explain the origin of a state’s right to use war as being its sovereignty, early scholars described this right as an extension of man’s natural right to use war (or force) to revenge wrongs committed against him personally, to settle his disputes and to defend himself.” In other words, these scholars posited that the same law of nature gave individuals and states alike the right to defend themselves from external encroachments. Further, Alder contends that these scholars “viewed the sovereign right to use war [in self-defence] as a necessary aspect of a state’s collective organisation.” In other words, there could not be a state worthy of the name that did not have this right. Moreover, the right to wage war in self-defence enabled the state to establish itself in the community of nations: “For instance, Wolff considered the ability of the sovereign state to defend itself from armed force ultimately measured its power and ability to survive within the developing system of the Law of Nations.” The right to self-defence preceded the formation of the Law of Nations and was necessary for its formation. And so the inherent right of self-defence was regarded by early legal scholars as a criterion of the legal recognition of a politically community’s statehood; of course, it was not the only principle of the “legal sanctity of a state” (e.g., a state had to be juridically equal to other states and forbid intervention by other states in its internal affairs), but it was an essential one nonetheless.

While any argumentum ab auctoritate is susceptible to a logical fallacy, it is

129 Ibid., 2-3.
130 Ibid., 4.
131 Ibid., 4.
132 Ibid., 22.
133 Ibid., 6.
typically permissible in law, insofar as the authorities are held to be persuasive. I contend that the early legal scholars are persuasive authorities and that their opinions safely may be accepted as true statements of the law. Nevertheless, although these authorities provide evidence that the inherent right of self-defence is a necessary manifestation of statehood, precedes international law, and is partially constitutive of it, they do not settle the matter of whether the inherent right of self-defence is a peremptory norm.

Further, it is not as though the inherent right of self-defence does not interact with other rights that are recognized in international law. For instance, the inherent right of self-defence is closely related to the right to self-determination. Crawford asserts that “self-determination is a principle concerned with the right to be a state.” Exercising this right may take the form of “secession, association in a federal state, or autonomy or assimilation in a unitary (non-federal) state.” Adopting a similar perspective, Shaw states that “[t]he principle of self-determination provides that the people…may freely determine their own political status.” This may include “any…political status freely decided upon by the people concerned.” As Shaw indicates, the right-bearer of the right to self-determination is a “people.” According to Cassesse, to exercise the right, a people must be oppressed by one of three actors: “a colonial State, an occupying Power,

134 Indeed, there is a legal maxim, *Argumentum ab auctoritate est fortissimum in lege* (“An argument drawn from [persuasive] authority is the strongest in law”). This maxim is traceable to Edward Coke in his *Commentary upon Littleton* (1628). See Neil Duxbury, *The Nature and Authority of Precedent* (Cambridge: Cambridge University Press, 2008), 34. Coke was referring to caselaw as an authority, but, in international law, there is no reason not to extend the principle to precedent jurists (such as Ayala, Grotius, Gentili, Vitoria, Pufendorf, Vattel, and Wolff) unless there is clear evidence that their opinions have been superseded by later or more important sources of law.

135 Crawford, *Brownlie’s*, 141. Emphasis in original.

136 Ibid., 141.


138 Ibid., 257.
or a State refusing a racial group equal access to government.\textsuperscript{139} Moreover, Cassese holds that, when the conditions for exercising the right to self-determination are realized, an oppressed people has a “legal licence to use force for the purpose of reacting to the forcible denial of self-determination” by the oppressor.\textsuperscript{140} Cassese’s use of “reacting” suggests that the people’s use of force is a defensive response to the offensive use of force by the oppressor. If so, the right of self-determination implies a right to use force in self-defence, albeit limited to against one of three kinds of aggressor (colonial, occupying, or racist).

1.4 Overview

In the remainder of this chapter, I review in detail two related “public order” theories of \textit{jus cogens}: Verdross\textsuperscript{141} and Orakhelashvili’s.\textsuperscript{142} These theories are similar insofar as they posit that a treaty is void if it is contrary to the fundamental moral commitments of the international community as a whole. These commitments are understood to constitute an “international public order.” I then synthesize Verdross’ and Orakhelashvili’s theories and show that, despite some superficial appearances to the contrary, they are in fact consistent with the theory of capture. I also review two other theories: Criddle and Fox-Decent’s “fiduciary theory,”\textsuperscript{143} and May’s “moral minimalist” theory.\textsuperscript{144} While this is by no means an exhaustive review of all the possibilities, these theories are perhaps the most philosophically inclined, current alternatives to public order.

\textsuperscript{140} Ibid., 63.
\textsuperscript{141} Verdross, “Forbidden Treaties”; Verdross, “Jus Dispositivum.”
\textsuperscript{142} Orakhelashvili, \textit{Peremptory Norms}.
\textsuperscript{143} Criddle and Fox-Decent, “Fiduciary Theory.”
\textsuperscript{144} May, \textit{Crimes}; May, \textit{Global Justice}. 
theories. Accordingly, I distinguish the fiduciary theory and the moral minimalist theory from the public order theories and subject the former to a critique. Verdross’ and Orakhelashvili’s theories imply that the inherent right of self-defence has a peremptory character. Having established that perfect capture violates this right, I conclude that perfect capture breaches *jus cogens*.

2. Exposition of Public Order Theories

2.1 Verdross

Verdross considers the problem of treaties that conflict with “general international law.”

Verdross writes, “[I]t is the quintessence of norms of this character that they prescribe a certain, positive or negative behavior unconditionally; norms of this character, therefore, cannot be derogated from by the will of the contracting parties.”

Verdross distinguishes two groups of *jus cogens* norms. The first group comprises “different, single, compulsory norms of customary international law.”

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145 Verdross, “Forbidden Treaties,” 571.
146 Ibid., 571.
147 Ibid., 571.
148 Ibid., 571-2. Whereas Verdross wrote this article in 1937, work to draft the Vienna Convention on the Law of Treaties (VCLT) by the International Law Commission (ILC) of the United Nations did not begin until 1949. Recall that Article 53 of the VCLT states: “A treaty is void if, at the time of its conclusion, it conflicts with a peremptory norm of general international law. For the purposes of the present Convention, a peremptory norm of general international law is a norm accepted and recognized by the international community of states as a whole as a norm from which no derogation is permitted and which can be modified only by a subsequent norm of general international law having the same character.” It is apparent that Verdross anticipated the Vienna Convention’s definition quite well.
149 Ibid., 572.
provides three examples of such norms: states cannot prevent other states from navigating on the high seas; states cannot prevent other states from occupying and annexing land that is not claimed by any other state (*terra nullius*); and states cannot prevent other states from navigating through other states’ territorial waters. Verdross describes the second group as follows: “This second group consists of the general principle prohibiting states from concluding treaties *contra bonos mores* [“against good morals”]. This prohibition, common to the juridical orders of all civilized states, is the consequence of the fact that every juridical order regulates the rational and moral coexistence of the members of a community. No juridical order can, therefore, admit treaties between juridical subjects, which are obviously in contradiction to the ethics of a certain community.” Verdross asserts that the general principle prohibiting states from concluding treaties *contra bonos mores* is valid in international law because “the general principles of law recognized by civilized nations” are valid in international law.

“Civilized nations,” particularly their courts’ decisions, agree on what treaties are *contra bonos mores*. Verdross asserts that inspecting such decisions reveals that “everywhere such treaties are regarded as being *contra bonos mores* which *restrict the liberty of one contracting party in an excessive or unworthy manner or which endanger its most important rights*.” This view presupposes “a juridical order guaranteeing the rational and moral coexistence of the members,” which is the “goal of all positive

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150 Ibid., 572.
151 Ibid., 572. Note that Verdross’ use of “rational and moral coexistence” is consistent with my conception of the international legal order, which is boundedly pluralist insofar as states that have conflicting reasonable and unreasonable conceptions of the right and the good may coexist peacefully, equally, independently, and according to their own ways of life.
152 Ibid., 573.
153 Ibid., 574.
154 Ibid., 574.
Verdross disposes of the objection that, because different states have different conceptions (e.g., democratic, fascist, or socialist) of the rational and moral coexistence of its members, they cannot universally agree on what treaties are *contra bonos mores*. He asserts that all states regard treaties as “immoral” that contradict “the ethics of the [international] community.”

According to Verdross, whether a treaty is *contra bonos mores* depends on the “moral tasks that states must accomplish in the international community.” These moral tasks are based on “the universal ethics of the international community.” This means “the ethical minimum recognized by all the states of the international community” that leaves aside “those particular tasks of the state represented only by particular regimes.”

Verdross lists four moral tasks: “maintenance of law and order within the states, defense against external attacks, care for the bodily and spiritual welfare of citizens at home, protection of citizens abroad.” A treaty whereby a state is prevented from accomplishing one of these tasks in the international community is *contra bonos mores* and so void.

Given his criteria for whether a treaty is *contra bonos mores*, Verdross specifies four such treaties. The first is “[a]n international treaty binding a state to reduce its police

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155 Ibid., 574.
156 Ibid., 574. States’ agreement on what treaties are *contra bonos mores*, notwithstanding wide and deep moral disagreements over important matters of substance (e.g., political ideology), represents part of the principled deal that constitutes the fundamental premise of the pluralist international legal order.
157 Ibid., 574.
158 Ibid., 574.
159 Ibid., 574.
160 Ibid., 574. Emphasis in original.
161 Ibid., 574. Emphasis in original.
162 Ibid., 574.
or its organization of courts in such a way that it is no longer able to protect at all or in an adequate manner, the life, the liberty, the honour or the property of men on its territory.”163 The second is “[a]n international treaty binding a state to reduce its army in such a way as to render it defenceless against external attacks.”164 Concerning such a treaty, Verdross remarks, “It is immoral to keep a state as a sovereign community and to forbid it at the same time to defend its existence…. [I]t would be immoral to oblige a state to remain defenseless.”165 However, this does not apply to protectorates, as the protecting state is obligated to defend the protected state from external encroachments.166 Nor does it apply if a state effectively guarantees the existence of another state, as the guarantor is obligated to defend the other state from external encroachments.167 The third is “[a]n international treaty binding a state to close its hospitals or schools, to extradite or sterilize its women, to kill its children, to close its factories, to leave its fields unploughed, or in other ways to expose its population to distress.”168 The fourth is “[a]n international treaty prohibiting a state from protecting its citizens abroad.”169 However, a treaty is not contra bonos mores if it merely transfers the responsibility for protecting

163 Ibid., 574.
164 Ibid., 575.
165 Ibid., 575.
166 Ibid., 575. Crawford writes, “Protection of one State by another is one of the oldest features of international relations. Grotius regarded an ‘unequal alliance’, with one State having rights of ‘protection, defence and patronage’ over another, as quite consistent with the sovereignty of the latter: a view which was shared by virtually all the classic writers.” James Crawford, The Creation of States in International Law, 2nd ed. (Oxford: Clarendon, 2006), 286. Protectorates were common during the period of European colonization. See Antony Anghie, Imperialism, Sovereignty and the Making of International Law (Cambridge: Cambridge University Press, 2005), 87-90.
167 Ibid., 575. I am not aware of any special significance attached to such a “guarantee” in international law. However, it must mean something different from “protectorate,” since Verdross distinguishes this word. I assume that it simply refers to a treaty whereby one state contracts to protect another state in such a manner that the other state does not actually become a protectorate; hence, it forms a lesser relation than a protectorate.
168 Ibid., 575.
169 Ibid., 576.
these citizens from one state to another.\footnote{Ibid., 576.}

Verdross addresses an important objection to his identification of the four treaties contra bonos mores. This objection goes as follows: international law recognizes debellatio, which is the termination of war by way of complete destruction of a belligerent in which typically the belligerent loses its sovereignty;\footnote{As Korman puts it, debellatio involves “the complete extinction of the political existence of the conquered state.” Sharon Korman, *The Right of Conquest: The Acquisition of Territory by Force in International Law and Practice* (Oxford: Clarendon, 1996), 9. Verdross was writing in 1937, before the UN Charter was signed in 1945. Aznar-Gómez writes, “From 1945 onwards, debellatio is expressly forbidden by international law. As is widely known, it is a principle of current legal order that ‘[n]o territorial acquisition resulting from the threat or use of force shall be recognised as legal.’ This rule is one of the building blocks of the general principle prohibiting the use of force in international relations.” Mariano Aznar-Gómez, “The Extinction of States,” in *Evolving Principles of International Law: Studies in Honor of Karel C. Wellens*, ed. Eva Rieter and Henri de Waele, 25-52 (Leiden: Martinus Nijhoff), 40.} it also recognizes the ability of a state to conclude a treaty by which it merges itself in another state;\footnote{Cassese states that, in merger, “all the merging States become extinct and at the same time give birth to a new legal subject.” Cassese, *International Law*, 77. Unlike debellatio, merger appears to be legal under international law, even after the Charter. For instance, in 1990, the Republic of Yemen (North Yemen) and the People’s Democratic Republic of Yemen (South Yemen) merged into one state, the Republic of Yemen, which the international community currently recognizes. See James Crawford, *The Creation of States in International Law*, 2nd ed. (Oxford: Clarendon, 2006), 705-706.} these acts are greater or more general than any referred to by the four treaties; hence, the four treaties are valid.\footnote{Ibid., 576.} Verdross has a counterargument, which goes as follows: debellatio and one state’s merging itself in another state are not greater or more general acts than any referred to by the four treaties; rather, the relation between the acts is something other than that of being greater or more general; this is because, “[i]n the case of the extinction of a state, the nationals of the extinguished state become, indeed, the nationals of the new state and care for their welfare is transferred to the new community.”\footnote{Ibid., 576.} What matters, according to Verdross, is whether there is a community that takes care for the welfare of the relevant human beings, which means a community
that is able “to fulfill the universally recognized tasks of a state.” It does not matter whether this community is an old state (prior to *debellatio* or merger) or a new state (subsequent to *debellatio* or merger).

Verdross claims that arbitration tribunals and courts are required to take judicial notice of the fact that treaties *contra bonos mores* are void and produce no valid obligations; they cannot order states to comply with the contents of such treaties. This is so even if no party makes a complaint. Moreover, this judicial notice does not make the treaty invalid but rather recognizes it as already being invalid: “The statement that the contents of a treaty are immoral has, therefore, no constitutive, but simply a declaratory character; it states that no obligation with such contents has ever come into existence…. For never can the immoral contents of a treaty really become law no matter how often it may borrow the external form of the law.” For this reason, states do not have to wait for formal pronouncements of the invalidity of treaties *contra bonos mores*. They are permitted simply to ignore the terms of such treaties. However, if the immorality of a treaty is contested, this is a legal dispute, which is necessary to refer to an arbitration tribunal or court.

In a later work, Verdross adds to these ideas in light of new developments in international law. Verdross notes that the Charter of the United Nations introduced a

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175 Ibid., 576.
176 Ibid., 577.
177 Ibid., 577.
178 Ibid., 577.
179 Ibid., 577.
180 Ibid., 577.
181 Ibid., 577.
182 Verdross, “Jus Dispositivum.”
group of “inter-connected rules” having the character of *jus cogens* that deal with the use of force.\(^{183}\) He identifies three such rules. The first, from Article 2(4) and Article 51, is that Members are prohibited “from the threat or use of force unless in individual or collective self-defence.”\(^{184}\) The second, from Article 2(3), is that Members are required to “settle their international disputes by peaceful means.”\(^{185}\) The third, from Article 2(5), is that Members are required to assist the United Nations “in any action that it takes in accordance with the Charter and to refrain from giving assistance to any state against which a preventive or enforcement action has been taken.”\(^{186}\) Verdross writes, “It is clear that these rules exist in the common interest of all humanity. Therefore bilateral or multilateral treaties concluded in violation of these norms are void.”\(^{187}\) Verdross believes that these rules, which are “the fundamental principles of the Charter,” “are valid for the entire international community.”\(^{188}\)

### 2.2 Orakhelashvili

Orakhelashvili assumes that there is a “hierarchy of norms in international law.”\(^{189}\) Peremptory norms prevail over lesser norms.\(^{190}\) They do so “not because the States have so decided but because they are intrinsically superior and cannot be dispensed with through standard inter-State transactions.”\(^{191}\) Orakhelashvili considers that

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\(^{183}\) Ibid., 60.

\(^{184}\) Ibid., 60.

\(^{185}\) Ibid., 60.

\(^{186}\) Ibid., 60.

\(^{187}\) Ibid., 60.

\(^{188}\) Ibid., 62.

\(^{189}\) Orakhelashvili, “Peremptory Norms,” 7.

\(^{190}\) Ibid., 8.

\(^{191}\) Ibid., 8.
peremptory norms “operate as a public order” that protects the legal system from the effect of “laws, acts, and transactions” that are “fundamentally repugnant to it.”

Orakhelashvili believes that this concept is not only analogous to the concept of domestic public order but also is consistent with “the decentralized character of the international legal system,” by which he means the absence of a constitution or legislature.

Public order invalidates certain principles of law. Orakhelashvili writes, “[T]he function of public policy in national legal systems is to prevent, due to some public interest factors, the otherwise permissible legal outcomes from having their effect either by nullifying contracts against good morals or by refusing to apply foreign laws that are unacceptable to the conceptions of the forum’s legal systems.”

Public order is “indispensable to every legal system.” Although different legal systems differ in their definitions of public order, there is a “common minimum denominator”: The application of public order involves “a value judgment.” In all jurisdictions, public order nullifies results that are thought to be immoral in these jurisdictions. Accordingly, Orakhelashvili holds, “Public order may refer both to the rules of positive law and generally recognized principles of morality which are not necessarily part of positive

192 Ibid., 10.
193 Ibid., 11.
194 Ibid., 11.
195 Ibid., 12.
196 Ibid., 13-14. To be clear, this “common minimum denominator” is not a consensus on moral matters but rather a commonality that all definitions of domestic public order share. Nevertheless, Orakhelashvili believes that all domestic public orders involve a consensus on moral matters, what he calls here “a value judgment.” This suggests the possibility that not only the international community but also domestic societies are boundedly pluralistic, whence the international level mirrors the domestic, and vice versa. That is, in domestic societies there is another principled deal, a combination of consensus and compromise, which provisionally settles otherwise wide and deep moral disagreement among citizens having conflicting reasonable and unreasonable conceptions of the right and the good. While I do not wish to attribute this notion to Orakhelashvili, I believe that it is consistent with his theory.
197 Ibid., 14.
law.” Insofar as these principles are open-ended, the criteria to identify the scope of public order are open-ended. For this reason, it is unfeasible to enumerate all of the norms of public order, notwithstanding that all of them safeguard a forum from the effects of acts, which are carried out either within or outside the forum, that are contrary to the forum’s fundamental interests and sentiments.

Orakhelashvili notes that the international legal system is “decentralized”: International law is made by “legal persons” (in particular, states) that can consensually change the law. For this reason, “a norm cannot become part of [international] public order through legislation.” Rather, international public order “operates as a matter of necessity and factors other than State will are necessary to comprehend this phenomenon.” Orakhelashvili takes this to suggest that “consensual positivism” (the doctrine that all international law is based on the consent of states) is inappropriate to understanding peremptory norms. He considers the “natural law doctrine of classical international law” (according to which some international law transcends the consent of states) as an alternative, in which case, *jus cogens* “embodies natural law propositions applicable to all legal systems.” Orakhelashvili adduces Wolff, Vattel, and the Trials of the Major War Criminals at Nuremberg as sources in support of the proposition that

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198 Ibid., 14.
199 Ibid., 15.
200 Ibid., 15. That it is impracticable to list all the norms of public order does not imply that some of them cannot be identified. As is made clear below, Orakhelashvili identifies many such norms and holds that there have a common moral basis: namely, the fundamental moral interests and sentiments of the international community as a whole regarded as distinct from the bilateral or individual interests of states.
201 Ibid., 36.
202 Ibid., 36.
203 Ibid., 36.
204 Ibid., 36.
205 Ibid., 36.
“[t]he concept of _jus cogens_ requires re-examination of the positivist approach.”206 But what matters to Orakhelashvili is not whether _jus cogens_ “is part of natural law” but whether _jus cogens_ “is of such a character as to prevail over positive law.”207 Thus, the re-examination of the positivist approach “does not necessarily entail the reversion to the classical natural law approaches, but rather requires consideration of the character and effects of public order norms.”208

Orakhelashvili makes a distinction between “structural” and “substantive” approaches to understanding the nature of the international legal order.209 According to structural approaches, _jus cogens_ is linked “to the norms and principles structural to or inherent in the international legal system and inseparable from it.”210 Examples of _jus cogens_ therefore include “_pacta sunt servanda_, recognition, consent, and good faith.”211 However, Orakhelashvili disagrees with this approach: “Not all rules which are important or even indispensable for the existence and operation of international law belong to the category of peremptory norms.”212 The structural approach is inconsistent with the concept of public order as safeguarding a community’s interest; moreover, it perpetuates a conception of international law that focuses unduly on the will and interests of states.213

206 Ibid., 37.
207 Ibid., 38.
208 Ibid., 38.
209 Ibid., 44.
210 Ibid., 44.
211 Ibid., 45. These norms pertain to treaties: in particular, that parties freely consent to treaties (“consent”); that they recognize them as legal instruments (“recognition”); that they must perform their obligations under them (“_pacta sunt servanda_”); and that they must do so with an honest intention to deal fairly (“good faith”). The VCLT articulates these norms throughout, e.g., in the Preamble: “Noting that the principles of free consent and of good faith and the _pacta sunt servanda_ rule are universally recognized...”
212 Ibid., 45.
213 Ibid., 47.
Instead, Orakhelashvili advocates the substantive approach: “Identification of the content of international public order as embodied in peremptory norms is only possible through identifying the substantive values and principles which are as fundamentally important to the international community as the principles embodied by national public orders are to national legal systems.” In other words, what makes a norm peremptory is its importance to a particular subject matter. Examples of *jus cogens* therefore include “prohibitions of aggression, genocide, slavery, as well as basic human rights and self-determination.”

Summing it up, Orakhelashvili writes: “In order to qualify as peremptory, a norm, while protecting a given actor, legal person or value, must safeguard interests transcending those of individual States, have a moral or humanitarian connotation, because its breach would involve a result so morally deplorable as to be considered absolutely unacceptable by the international community as a whole, and consequently not permitting division of these interests into bilateral legal relations.” He then proceeds to identify specific norms of international public order: the prohibition of the use of force, the principle of self-determination and its incidences, fundamental human rights, humanitarian law, and certain norms of environmental law. The prohibition of the use of force, “which is based on the UN Charter and related customary law,” is part of *jus cogens* because of the “fundamental importance of State interests to survive, exist

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214 Ibid., 46.
215 Ibid., 46.
216 Ibid., 50.
217 Ibid., 50-65.
independently and effectively protect its population."\textsuperscript{218} From this principle, Orakhelashvili deduces that the inherent right of a state to self-defence is part of *jus cogens*.\textsuperscript{219} Likewise, *jus ad bellum* (i.e., the criteria that must be met in order for there to be just cause to wage war) is peremptory.\textsuperscript{220}

Due to its “fundamental importance,” the right of peoples to self-determination is also part of *jus cogens*.\textsuperscript{221} Moreover, permanent sovereignty over natural resources, as an incidence of the right of peoples to self-determination, is part of *jus cogens*.\textsuperscript{222} Thus, “it is the very essence of the principle [of self-determination] that a State should be free to dispose of its natural resources in the exercise of its sovereignty.”\textsuperscript{223} This is the “normative core” that makes the principle *jus cogens*.\textsuperscript{224} Thus, any agreement for a state to waive its rights to decide on its own natural resources would constitute a derogation from the principle of self-determination.\textsuperscript{225} In an important footnote, Orakhelashvili says, “In addition, the contracts disposing the natural resources concluded by unrepresentative rulers are also invalid.”\textsuperscript{226} But he also says, “[S]everal peremptory norms, such as the

\textsuperscript{218} Ibid., 50. Orakhelashvili’s assertion of the fundamental importance of a state’s interests to survive and exist independently indicates his acknowledgment of one important aspect of the boundedly pluralist international legal order. Likewise, his assertion of the fundamental importance of a state’s interests to effectively protect its population indicates his acknowledgement of a state’s need to perform existential functions.

\textsuperscript{219} Ibid., 50-51.

\textsuperscript{220} Ibid., 51.

\textsuperscript{221} Ibid., 51.

\textsuperscript{222} Ibid., 52.

\textsuperscript{223} Ibid., 53.

\textsuperscript{224} Ibid., 53.

\textsuperscript{225} Ibid., 53.

\textsuperscript{226} Ibid., 53. This suggests that a treaty is invalid if it contracts for a captor to perform the ecological function for a captive, insofar as the captor is a ruler that does not represent the captive. Orakhelashvili’s statement seems to apply to both perfect and imperfect capture. This is different from my position, according to which such a treaty is invalid only if there is perfect capture. An imperfect captor may be unrepresentative; but I maintain that mere unrepresentativeness alone is not sufficient to make the act in breach of a peremptory norm; rather, the permanent and non-substitutable deprivation of the captive’s capacity to make decisions
prohibition of the use of force or the principle of self-determination itself, enable the
actor protected by a given norm to exercise the choice in performance of rights under that
norm."²²⁷ For instance, it would not contradict the prohibition of the use of force if one
state were to ask another state to intervene in an armed conflict, nor would it contradict
the principle of self-determination if one state were to merge with another state.²²⁸
Orakhelashvili suggests that the same applies to permanent sovereignty over natural
resources.²²⁹

Fundamental human rights, most of which involve individuals, are part of *jus
cogens*. These rights "protect not the individual interests of a State but the interests of
mankind as such."²³⁰ The right to life is part of *jus cogens*.²³¹ Orakhelashvili cites various
sources that claim that the following acts violate *jus cogens*: torture, summary execution,
disappearance, arbitrary detention, forced labor, murder, and slavery.²³² Likewise, the
principles of equality before the law, equal protection before the law, non-discrimination,
and non-refoulement are peremptory norms.²³³ Given the length of this list,
Orakhelashvili addresses the debate over whether all human rights or only some of them
are peremptory norms.²³⁴ He tends to agree with those who hold that only some of them
are. For instance, he quotes one author as suggesting that only basic norms, such as rights

²²⁷ Ibid., 53.
²²⁸ Ibid., 53.
²²⁹ Ibid., 53.
²³⁰ Ibid., 53.
²³¹ Ibid., 54.
²³² Ibid., 54.
²³³ Ibid., 54-55.
²³⁴ Ibid., 55.
to personal liberty, religion, equality, private life, and family life, are peremptory, as such
norms “are derived from [the] highest principles.” Nevertheless, Orakhelashvili says
that “[t]he argument that all human rights are part of jus cogens is not without merit,” for
the substantive criteria for identifying human rights that form part of jus cogens do not
“exclude that all human rights can be part of jus cogens.” These criteria are the same as
for identifying jus cogens in general, to wit: “(1) whether a right protects the community
interest transcending the individual State interests; (2) whether the derogation from such
right is prevented by its non-bilateralizable character.” Based on these criteria,
Orakhelashvili deduces that, in addition to civil and political rights, economic and social
rights, as they are articulated in the Universal Declaration of Human Rights, are
peremptory.

Moreover, certain norms of environmental law are peremptory. These are derived
from “[t]he principle of harm prevention” and protect “community interests, not merely
those of States inter se.” Specifically, they forbid “the large-scale pollution of the
human environment,” which involves “environmental harm not only with respect to other
States, but also with regard to the international community as a whole.” Thus, how a
state manages its own environment has not merely a “bilateral” or “transnational” but a
genuinely international effect.

235 Ibid., 56.
236 Ibid., 59.
237 Ibid., 59.
238 Ibid., 60.
239 Ibid., 65.
240 Ibid., 65.
241 Ibid., 65.
3. Synthesis of Public Order Theories

3.1 Common Elements

I propose a synthesis of the public order theories of Verdross and Orakhelashvili. Following Verdross, there are treaties that are *contra bonos mores*. Such treaties either "restrict the liberty" of states in an "excessive or unworthy manner" or endanger states’ "most important rights," which means that they prevent states from performing their four "moral tasks," namely, maintaining law and order within themselves, defending against external attacks, caring for the bodily and spiritual welfare of citizens at home, and protecting citizens abroad. This is an "ethical minimum," common to the international community, that guarantees the "rational and moral coexistence" of states. Following Orakhelashvili, the international community sets the parameters of international public order analogously to how a domestic community sets the parameters of domestic public order. International public order refers to principles of morality that reflect the "fundamental interests and sentiments" of the international community, and these prevail over positive law. While the content of *jus cogens* is open-ended, it is always determined by the substance of the right or interest that the norm protects. Given the above, there are many *jus cogens* norms. In particular, the inherent right of a state to self-defence is *jus cogens*. Consistent with Verdross and Orakhelashvili, I

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243 Ibid., 574.
244 Ibid., 574. Emphasis in original.
245 Ibid., 574.
246 Orakhelashvili, *Peremptory Norms*, 11
247 Ibid., 24.
248 Ibid., 15.
249 Ibid., 46.
250 Verdross, “Forbidden Treaties,” 574-575; Orakhelashvili, 50-51.
construe this right as a state’s right to defend its vital interests (specifically, its ability to make decisions concerning the performance of existential functions for its population) from another state’s encroachments.

3.2 Reconciliation with the Theory of Capture

Further analysis is required to reconcile Verdross’ and Orakhelashvili’s theories with the theory of capture. As we have seen, Verdross maintains that debellatio and merger do not breach jus cogens. Arguably, this could be taken to imply that perfect capture does not breach jus cogens. Perfect capture, which involves the transfer of an existential function from a captive to a captor, is in one respect like debellatio and merger, which result either in a state’s assuming the functions of a subjugated belligerent (debellatio) or a state’s assuming the functions of a voluntarily ceded state (merger). However, capture, which involves two states, is in another respect unlike debellatio and merger, which result in only one state. In capture, the international community recognizes the captor and captive as distinct international legal persons and as sovereigns over their own territory. This is the case neither in debellatio, which entails the loss of international legal personality and sovereignty of the subjugated state, nor merger, which entails the loss of international legal personality and sovereignty of the voluntarily ceded state. This is significant because logically only when there are two states is it possible for one state to threaten or undermine the vital interests of another. Thus, in capture, the captor can encroach on the captive. In contrast, following debellatio or merger, the resulting state can encroach on its own population, or it can encroach on a third-party state that was not implicated in the debellatio or merger, but it cannot encroach on the former state that was

implicated in this act, precisely because this state no longer exists. Consequently, while it makes sense to speak of an inherent right of a captive to defend itself, it makes no sense to speak of an inherent right of a subjugated belligerent or a voluntarily ceded state to defend itself. This is why, notwithstanding Verdross’ observation that international law recognized *debellatio* and merger as legitimate means of extinguishing sovereignty, it remains feasible to argue that a treaty contracting for perfect capture violates the inherent right of a captive to defend itself and, consequently, breaches a peremptory norm.

There is another issue in Verdross’ theory that the theory of capture needs to address. Consistent with the theory of capture, Verdross claims that a treaty is *contra bonos mores* if it makes a sovereign community unable to defend itself. However, Verdross denies that this applies to protectorates and situations in which one state guarantees the existence of another state. He believes that, in such cases, there is no problem because the state that is in need of protection gets protection from another state, whose duty it is to protect. This may be seen to challenge the theory of capture insofar as it is assumed that a perfect captor is a protector or guarantor. Such an assumption is *prima facie* plausible, for indeed a perfect captor protects the population of a captive and guarantees the performance of some of its existential functions. But a perfect captor is actually not a protector or guarantor. Although a protectorate or guarantee, like a captive, retains sovereignty and independent statehood, it is protected from third-party encroachments by the military power of its protector or guarantor. This implies that there is a third-party to which the captive may appeal for succor if the protector or guarantor, in

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252 Ibid., 576.
253 Ibid., 575.
254 Ibid., 575.
255 Ibid., 575.
a perversion of its duty, decides to encroach on the protectorate or guarantee. While this may describe imperfect capture, there is no such possibility in perfect capture because by definition perfect capture is monopolistic and irreversible. In perfect capture, there can be no substitute for the protection that a captor provides to a captive, even when the captor encroaches on the captive. Therefore, the vulnerability of a captive in perfect capture is categorically different from the vulnerability of a protectorate or guarantee. For this reason, the fact that protectorates and guarantees are recognized in international law does not imply that perfect capture does not breach *jus cogens*.

Like Verdross, Orakhelashvili makes some remarks that could be construed as inconsistent with the theory of capture. Orakhelashvili writes: “[S]everal peremptory norms, such as the prohibition of the use of force or the principle of self-determination itself, enable the actor protected by a given norm to exercise the choice in performance of rights under that norm: a State could invite another State to intervene; it could even decide to become part of another State, and none of these would contradict the relevant peremptory norms. The peremptory character of the above-mentioned norms has not been doubted because they give the protected actors the right to choose.”256 This seems to suggest that capture does not breach *jus cogens*. For voluntary capture, whether perfect or imperfect, involves a free choice on the part of the captive to be captured by the captor. If Orakhelashvili is correct, then a captive is able to contract away its performance of some rights under the prohibition of the use of force and the principle of self-determination. But the fact that this applies to some such rights does not imply that it applies to all such rights. In other words, the fact that peremptory norms are consistent with this ability to

choose does not imply that no rights under these norms are inherent in statehood. While Orakhelashvili mentions a state’s inviting another state to intervene and a state’s deciding to become part of another state, he does not mention the inherent right of a state to defend itself from external threats. This omission is telling. I contend that Orakhelashvili would claim that states cannot choose not to perform this inherent right when the legal conditions for the legitimate performance of this right are present. The reason is that it is against international public order for a state not to defend itself against external attacks when certain criteria, including *jus ad bellum*, are met. Hence, any treaty for contracting away the ability to exercise this right is void.

As against my contention, it may be objected that the inherent right of self-defence cannot actually resemble a duty. But according to Hohfeld, legal scholars conflate eight meanings of “right”: right, no-right, privilege, duty, power, disability, immunity, and liability. Thus, “right” may refer to duty. “The inherent right of self-defence” therefore may refer to an inherent duty of self-defence, this duty of course not being absolute but dependent on satisfaction of certain criteria, for instance, necessity and proportionality. Such an interpretation is consistent with not only Orakhelashvili’s comments above but also Verdross’ theory, which posits that to protect its citizens from external attack is an essential moral task of the state. In general, public order theory understands that the exercise of a right that is protected by a peremptory norm, when the failure to exercise this right is against international public order, is tantamount to the performance of a duty to the international community as a whole; for this community has

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257 Ibid., 53.
259 Verdross, “Forbidden Treaties,” 574.
a fundamental moral interest in what the right-bearer does. Moreover, this interpretation is consistent with the UN Charter. Article 1(1) indicates that one of the purposes of the UN is to “take collective measures for the prevention and removal of threats to the peace, and for the suppression of acts of aggression or other breaches of the peace.” Since the UN aspires to be universal, “collective” should be read in its broadest sense, as including all Members, including those presently under attack. These Members too are expected to be part of the effort. If so, they have a right that is properly speaking a duty to defend themselves against armed attack provided that certain conditions are met. As Verdross puts it, the UN’s rule on self-defence exists “in the common interest of all humanity,” not just the state to be defended.

4. Public Order Theories Distinguished

4.1 Criddle and Fox-Decent

Criddle and Fox-Decent explain *jus cogens* in terms of its relation to state sovereignty. To begin, they critique alternative theories of *jus cogens*, including public order theories. They write, “Public order theories, which view *jus cogens* as rules integral to interstate relations and international law’s wider normative agenda, … fail to illuminate which particular norms should be deemed peremptory or how *jus cogens* can be reconciled with state sovereignty.”

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260 *Charter*, Art 1(1).

261 Verdross, “Jus Dispositivum,” 60. Put another way, that states coexist peacefully, equally, independently, and according to their own ways of life depends on each state’s functioning at a certain level. When a state’s functioning drops below a certain level, it becomes a quasi-state. The lapse of a state into quasi-statehood disrupts the delicate balance among states that has evolved to protect this form of coexistence. For this reason, the international community has a definite moral interest in a state’s defending itself from encroachments.

262 Criddle and Fox-Decent, “Fiduciary Theory,” 332.
the “integrity of international law as a legal system”; second, “the interests of the international community as a whole”; third, “international law’s core values”; fourth, “the peaceful coexistence of states as a community”; fifth, “the international system’s core normative commitments.”

(In support of the fifth, the authors quote Orakhelashvili.)

However, Criddle and Fox-Decent believe that there are “conceptual difficulties” with this account. They wonder how the international community can be injured when a state injures its own nationals, as in subjecting them to “slavery or racial discrimination”: “[I]t is unclear why the international community as a whole could claim a more particularized interest in intrastate human rights observance than either its constituent member states or the people who reside within them.”

Cridde and Fox-Decent address one way that public order theorists may address this conceptual difficulty. Such theorists may frame *jus cogens* as “constitutive of the international community itself.” Thus, Criddle and Fox-Decent cite three authors as arguing that *jus cogens* reflects a “purposeful global community of conscience.”

Cridde and Fox-Decent claim that public order theorists cite the UN Charter as evidence that there is an international community whose mission is to promote “human rights and the peaceful coexistence of states,” thereby constituting an international public policy.

However, Criddle and Fox-Decent remain unconvinced: “Public order theory does not

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263 Ibid., 344.
264 Ibid., 344. They quote Orakhelashvili, *Peremptory Norms*, 46: “The purpose of *jus cogens* is to safeguard the predominant and overriding interests and values of the international community as a whole…”
265 Ibid., 344.
266 Ibid., 345.
267 Ibid., 345.
268 Ibid., 345.
269 Ibid., 345.
illuminate the normative basis of peremptory norms, nor does it clarify which particular international norms should be deemed peremptory.”  

There are three reasons why this is so. First, public order theory is characterized by “circular reasoning,” insofar as its explanation of the nature and content of peremptory norms returns to the assertion that such norms are indispensable to international society. Second, public order theory, if it is not characterized by circular reasoning, depends on positivism or natural law theory. Third, public order theory does not address the “enduring paradox at the core of human rights discourse,” namely, the tension between “state sovereignty and individual dignity” in international law. 

Criddle and Fox-Decent propose a fiduciary theory of *jus cogens*. According to this theory, *jus cogens* is a necessary condition of a state’s internal sovereignty (its legitimate authority to exercise sovereign power over its own subjects) and its external sovereignty (its legitimate recognition by other states as being a sovereign actor internationally). States are analogous to parents, and a state’s people are analogous to children. Because children possess “the innate right of humanity” as “citizens of the

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270 Ibid., 345.
271 Ibid., 345.
272 Ibid., 345.
273 Criddle and Fox-Decent do not explicitly make this distinction, yet they assume it. Although distinct, internal and external sovereignty are complementary aspects of the same phenomenon. As Jackson puts it, “Sovereignty is one holistic idea with two conceptual facets: like two sides of a ship’s hull, inside and outside. The ship of state is sovereign internally: its crew and passengers are subject to the captain’s supreme authority. The ship of state is also sovereign externally: its independence is recognized or at least tolerated and not extinguished by other independent ships sailing on the ocean of world politics, each with its own captain, crew, and passengers. Supremacy and independence cannot exist separately. They can only be distinguished analytically. To change the metaphor: they are two sides of the same coin.” Robert Jackson, *Sovereignty: The Evolution of an Idea* (Cambridge: Polity, 2007), 12. However, Criddle and Fox-Decent come close to making this distinction when they distinguish between internal self-determination (i.e., participation in representative government) and external self-determination (i.e., freedom from foreign domination): Criddle and Fox-Decent, “Fiduciary Theory,” 33.
274 Ibid., 347.
world,” parents owe fiduciary obligations to their children. Likewise, because a state’s people have “agency and dignity,” a state owes fiduciary obligations to its people, in particular, it must comply with *jus cogens*.

The authors write, “[A] fiduciary principle governs the relationship between the state and its people, and this principle requires the state to comply with peremptory norms.” Criddle and Fox-Decent contend that their fiduciary theory is superior to public order theories in the justification of peremptory norms that protect human rights. As public order theories primarily focus on relations between states, they are inapt to account for the legal significance of the relations between states and their subjects; in contrast, the fiduciary theory takes these latter relations as its starting point, so they are better suited to the task.

Consequently, the fiduciary theory “provides a far clearer and more principled framework for inquiry into *jus cogens* than…public order theories.”

4.2 May

May directly addresses Orakhelashvili. May understands Orakhelashvili to be arguing that *jus cogens* norms are grounded in morality, in particular, “that [such norms] are instrumental in supporting the moral norm of public order in the international arena.” However, May believes that a principle is needed that is not only “broader” than public order but also “intrinsically valuable as partially constituting the rule of

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275 Ibid., 347.
276 Ibid., 347.
277 Ibid., 347.
278 Ibid., 348.
279 Ibid., 348.
280 Ibid., 368.
281 May, *Global Justice*, 121.
law.” He proposes “something like Mill’s harm principle” (i.e., the principle that the state should limit an individual’s actions only if they produce harm to another individual). Despite their differences, May agrees with Orakhelashvili that the universal scope of *jus cogens* indicates that it is ultimately grounded in morality. May also directly addresses Criddle and Fox-Decent. As May understands it, the fiduciary theory proposes that “vulnerability” is the source of *jus cogens*: because the state has made its people vulnerable, the state is required to protect them, and this means complying with *jus cogens*. But May believes that “considerable work needs to be done” if the fiduciary theory is to explain why some rights are protected by a peremptory rule while others, including some of those that are listed in the Universal Declaration of Human Rights, are not. May also wonders why vulnerability does not generate “less strenuous duties” than fiduciary ones. Nevertheless, May writes, “My view is most similar to the fiduciary theory.” He agrees with this theory in that he believes that *jus cogens* norms must “supply equal security.”

According to May’s theory, when states harm their citizens, they violate their “prime duty,” which is to keep their people safe. As in the fiduciary theory, the vulnerability of the people to their state creates “special obligations” of the state to their

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282 Ibid., 121.
283 Ibid., 121.
284 Ibid., 121.
285 Ibid., 122.
286 Ibid., 122-123.
287 Ibid., 123.
288 Ibid., 123.
289 Ibid., 123.
290 Ibid., 123.
people. May writes, “It is indeed consistent with such a view to see *jus cogens* norms as stipulating the specific duties that States have that arise from the common vulnerabilities of the citizens.” These duties derive from the fact that a state is generally prohibited from harming its citizens. However, May departs from Criddle and Fox-Decent in an important respect. Although May says that he has characterized the duties between soldiers and prisoners of war as being fiduciary in nature, he now wonders whether it is not more apt to describe the duties between states and their people as “one of stewardship.” The steward is required to hold the interests of the vulnerable at the same level as his or her own, whereas the fiduciary is required to hold their interests at a higher level than his or her own. Further, May claims that the fact that peremptory norms challenge state sovereignty can be explained by a perspective that emphasizes people’s vulnerabilities and states’ duties. From this perspective, breaching *jus cogens* is shown to undermine state sovereignty by making not only a state’s people but also the state itself less secure. As May puts it, “[*J*]us *cogens* norms are merely a reminder to States of what they need to do to secure their sovereignty by maintaining the only foundational duty that they have, to secure the *salus populi*, the safety of the people.”

May considers the prohibitions of aggression, apartheid, slavery, and genocide.
He suggests that these prohibitions are grounded in “the moral principle against the infliction of serious harm, especially to life or liberty, a variation on John Stuart Mill’s famous ‘harm principle’.”\textsuperscript{299} May maintains that this principle is “relatively uncontroversial,” especially when it is invoked to impeach acts that are “widespread” or “systematic.”\textsuperscript{300} In order for an act to violate a peremptory norm, a certain gravity of harm is necessary, namely, it must violate a “basic” right that protects “any minimally reasonable human life.”\textsuperscript{301} May also claims that some non-substantive or procedural norms are peremptory: “[I]t is just as important that serious harm be condemned as that serious unfairness also be condemned.”\textsuperscript{302} On such norm is habeas corpus, as it is integral to the rule of law. May therefore suggests that the harm principle may have to be expanded to include the rule of law, which means that serious unfairness would have to be regarded as a kind of harm.\textsuperscript{303} Accordingly, the rule of law may be construed “as advancing substantive liberties” or “as having value in itself.”\textsuperscript{304} In any case, such norms “seem to provide a minimal moral fairness in how people must interact with each other as fellow humans deserving of minimal respect,”\textsuperscript{305} and they “protect the integrity of any system of norms that lays claim to be a system of law.”\textsuperscript{306} For these reasons, May calls his account of \textit{jus cogens}, “moral minimalism.”\textsuperscript{307}

\textsuperscript{299} Ibid., 124-125.
\textsuperscript{300} Ibid., 125.
\textsuperscript{301} Ibid., 125.
\textsuperscript{302} Ibid., 126.
\textsuperscript{303} Ibid., 126.
\textsuperscript{304} Ibid., 126.
\textsuperscript{305} Ibid., 128.
\textsuperscript{306} Ibid., 176.
\textsuperscript{307} Ibid., 128. On the surface, May’s moral minimum resembles Verdross’ “ethical minimum.” Verdross, “Forbidden Treaties,” 574. Emphasis in original. However, whereas May’s moral minimum refers the
4.3 Critique

Criddle and Fox-Decent mischaracterize public order theories and treat them unfairly. For instance, they say that such theories “fail to illuminate which particular norms should be deemed peremptory.”308 This is patently untrue. As we have seen, based on his criteria for whether a treaty is contra bonos mores, Verdross identifies four such treaties: one that deprives a state of its police and its organization of courts, one that deprives a state of its army, one that exposes a state’s population to distress, and another that prohibits a state from protecting its citizens abroad.309 Likewise, although he says that there is “no exhaustive catalogue of peremptory norms,”310 Orakhelashvili identifies a very large number of such norms under five categories: the prohibition of the use of force, the principle of self-determination and its incidences, fundamental human rights, humanitarian law, and environmental law.311

Moreover, Criddle and Fox-Decent claim that public order theories fail to illuminate “how jus cogens can be reconciled with state sovereignty.”312 They do not specify whether they are referring to internal or external state sovereignty. If they are referring to internal state sovereignty, Verdross explains that a treaty whereby a state is prevented from accomplishing one of its moral tasks (i.e., “maintenance of law and order

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308 Criddle and Fox-Decent, “Fiduciary Theory,” 332.
310 Orakhelashvili, Peremptory Norms, 66.
311 Ibid., 50-65.
312 Criddle and Fox-Decent, “Fiduciary Theory,” 332.
within the states, defence against external attacks, care for the bodily and spiritual welfare of citizens at home, and protection of citizens abroad”) breaches a jus cogens norm. The moral tasks are clearly proper to internal state sovereignty. If Criddle and Fox-Decent are referring to external state sovereignty, Orakhelashvili explains that peremptory norms are fundamentally part of a “decentralized” international legal order in which the will of states makes and alters law but only within parameters set by the same order. Orakhelashvili therefore posits that peremptory norms are at the legal limits of external state sovereignty.

Cridde and Fox-Decent fault public order theorists for “circular reasoning” when they invoke peremptory norms’ indispensability to international society as an explanation of the nature and content of such norms. It is difficult to make sense of this comment. Perhaps they are saying that public order theorists explain indispensability to international society in terms of the same indispensability. This would indeed be circular. But this is not what public order theorists, such as Verdross and Orakhelashvili, do. Each explains peremptory norms’ indispensability to international society in terms of something that is logically independent of such indispensability. Verdross suggests that “the most essential and indispensable principles of law” would be excluded from international law if treaties could derogate from compulsory norms, but he explains that this is because compulsory norms guarantee the “rational and moral coexistence” of its members. Likewise, while Orakhelashvili acknowledges that peremptory norms are

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314 Orakhelashvili, Peremptory Norms, 11, 36.
315 Ibid., 345.
316 Verdross, “Forbidden Treaties,” 573.
317 Ibid., 572.
“fundamentally important to the international community,,” he also explains that this is because of the norms’ importance to a particular subject matter. For a similar reason, it is unclear why Criddle and Fox-Decent think that public order theory’s reliance on natural law theory is a bad thing. Public order theorists, particularly Verdross and Orakhelashvili, do not represent their theories as being necessarily inconsistent with natural law theory. On the contrary, they freely draw upon natural law ideas to explain peremptory norms, and this is illuminating inasmuch as these ideas are not inherent in the definitions of such norms.

Like Criddle and Fox-Decent, May seems to misconstrue public order. May believes that his version of Mill’s harm principle is “broader” than public order. But this is not so. Public order subsumes May’s version of the principle. According to Verdross, a treaty is contra bonos mores if it prevents a state from “care for the bodily and spiritual welfare of its citizens,” a moral task that involves doing no harm to these citizens. According to Orakhelashvili, the prohibition of the use of force is partially grounded in a state’s fundamentally important interest to “effectively protect its population,” which means doing no harm to its citizens. Further, May implies that public order is not “intrinsically valuable as partially constituting the rule of law.” Again, this is not so. Public order is intrinsically valuable, at least from the perspective of the international community, inasmuch as it impeaches treaties that are contrary to the

318 Orakhelashvili, Peremptory Norms, 46.
319 Ibid., 46.
321 May, Global Justice, 121.
322 Verdross, “Forbidden Treaties,” 574.
323 Orakhelashvili, Peremptory Norms, 50.
324 May, Global Justice, 121.
fundamental moral commitments of this community. Moreover, public order partially constitutes the rule of law. Verdross claims that a moral task of a state is the maintenance of law and order, which includes organizing the court system so as to protect citizens’ rights “in an adequate manner,”325 implying that what matters in this protection is not only substance but also procedure. Orakhelashvili, for his part, is explicit that peremptory norms include protections of procedural rights, which include equality before the law, equal protection before the law, non-discrimination, and non-refoulement.326

Although May attempts to explain why the international community as a whole has an interest in a state’s compliance with jus cogens norms, he fails to do so. The harm principle does not adequately characterize this interest. For what matters is not harm to the international community but rather the violation of this community’s fundamental moral commitments. Even if it is assumed that there is an “international harm principle,” according to which the international community is harmed if a heinous act is committed against a group or by a group,327 it still remains unexplained how it is that the international community can be harmed by the group-based quality of the act unless it is assumed that the community is concerned about these groups in some way. But this concern cannot be a function of the relations between a sovereign and its subjects: the international community, while partly composed of a multitude of sovereigns, is not itself

325 Verdross, “Forbidden Treaties,” 574.
326 Orakhelashvili, Peremptory Norms, 54-55.
327 May articulates the international harm principle thus: “Only when there is serious harm to the international community, should international prosecutions against individual perpetrators be conducted, where normally this will require a showing of harm to the victims that is based on non-individualized characteristics of the individual, such as the individual’s group membership, or is perpetrated by, or involves, a State or other collective entity.” May, Crimes, 83. Emphasis in original.
a sovereign. Rather, the concern that the international community has for the groups that are implicated in the international harm principle must be a moral concern. Moreover, this moral concern seems to be a kind of outrage at the mere fact that the act has happened, regardless of one’s relation to the act. In other words, the international community seems to take offence at the mistreatment of the victimized groups. But as Mill himself recognized, offence is not the same as harm. It is possible to offend someone without harming them. Such is the case when a peremptory norm is breached: the international community is offended but not harmed. It is of course meaningful to speak of an international harm principle if “international harm” is taken to include offence. This is similar to May’s tactic of expanding the concept of harm to include “serious unfairness.” But this Procrustean maneuver is arbitrary. Rather, it is better to call offence “offence” and account for it as being the result of a violation of international morality. Therefore, instead of an international harm principle, it is preferable to adopt the principle of international public order, as articulated by Verdross and Orakhelashvili.

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328 The boundedly pluralist international legal order is “anarchical”: there is no world sovereign that claims rightful legal authority over the community of states. In particular, the UN does not constitute a world sovereign. Although the UN has its own structure and organization, its main functions are performed by member states. As Wilkinson puts it, “It is…a mistake to judge the UN as an autonomous actor in the international system: it is in essence an intergovernmental forum constantly constrained by basic interstate disagreements and disputes both in the Security Council and the General Assembly.” Paul Wilkinson, *International Relations: A Brief Insight* (New York: Sterling, 2007), 111.


330 In the context of domestic criminal law, Joel Feinberg has articulated “the offence principle”: “It is always a good reason in support of a proposed criminal prohibition that it would probably be an effective way of preventing serious offense (as opposed to injury or harm) to persons other than the actor, and that it is probably a necessary means to that end…. The principle asserts, in effect, that the prevention of offensive conduct is properly the state’s business.” Joel Feinberg, *Offense to Others: The Moral Limits of the Criminal Law* (Oxford: Oxford University Press, 1985), ix. Emphasis in original. Here I may be seen as proposing an international analogue to Feinberg’s principle and extending it to breaches of peremptory norms: The prevention of offensive conduct is properly the international community’s business.

331 May, *Global Justice*, 126.
5. Conclusion

In this chapter, I have argued the following. First, in perfect capture, the existential function that is transferred by the captive to the captor is performed by the captor, so that, if the captor did not perform this function, no other state would perform it, not even one that exists in the future; for this reason, the captive loses the capacity to defend itself both from the captor and from third-parties, which means that it loses its inherent right of self-defence. Second, the inherent right of self-defence was regarded by early legal scholars as a criterion of the legal recognition of a politically community’s statehood, and, more recently, this right has been closely linked to the right of self-determination. Third, a synthesis of the public order theories of Verdross and Orakhelashvili implies that the inherent right of self-defence is a _jus cogens_ norm. Fourth, this synthesis is to be accepted as the best and truest approach to understanding and explaining peremptory norms, notwithstanding the competing theories of Criddle and Fox-Decent and May. From the above, I conclude that perfect capture breaches _jus cogens_.

Recall that the overall argument of my thesis is that unilateral SSI breaches _jus cogens_. There are two premises: first, that perfect capture breaches _jus cogens_; second, that unilateral SSI constitutes perfect capture. In chapter 3, I will argue for this second premise. Examining the science of SSI, SSI technologies that are currently under development, and global governance structures for regulating SSI, I will argue that unilateral SSI transfers a captive’s ecological function to a captor, so that, if the captor did not carry out this function, no other state would do so, not even a state that exists in the future. Specifically, in unilateral SSI, a captive permanently transfers its responsibility to provide a habitable climate (especially temperature, precipitation, crop
yield and productivity, and terrestrial vegetation) to a unique captor for which there can be no substitute. Whether voluntary or involuntary, this act is always impermissible under international law. In the epilogue, I will discuss the broader implications of this finding.
Chapter 3: SSI as Perfect Capture

1. Introduction
   The main argument of this thesis contains two premises: first, perfect capture breaches *jus cogens*; second, unilateral SSI constitutes perfect capture. In chapter 2, I argued for the first premise. In this chapter, I argue for the second premise. If both premises are true, then unilateral SSI breaches *jus cogens*. This settles the issue of whether unilateral SSI is legal under international law. It also adds to the content of *jus cogens*. According to the synthesis of the public order theories of *jus cogens* that I presented in chapter 2, a treaty breaches a *jus cogens* norm if it contradicts the fundamental moral interests and sentiments of the international community as a whole. One such norm requires that every state be able to exercise its inherent right of self-defence. Perfect capture breaches *jus cogens* precisely because it concentrates too much power in a single state for another state to exercise this right. My argument therefore presupposes a certain conception of what a state is and does.

   Recall that, in order to qualify as a true state (as opposed to a mere quasi-state), a state needs to have descriptive political legitimacy. That is, its population needs to believe that it has normative political legitimacy, which is rightful legal authority (whether this belief is true or false). In order to have descriptive political legitimacy, a state needs to perform all of the four existential functions (constabulary, economic, ecological, and cybernetic). Performance of these functions is a legal criterion of statehood.\(^{332}\) Perfect capture happens when an existential function is transferred from a

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\(^{332}\) Performing the functions of a state is merely one of many (disputed) legal criteria for statehood. According to Crawford, others include: having a population, a defined territory, a government, independence, a degree
of permanence, the willingness to observe international law, and sovereignty. Crawford, Brownlie’s, 128-135. However, all of these criteria are interrelated. It is, for instance, practically impossible to have a population without having a defined territory, or to perform the functions of a state without having a government.

333 The principle superficially resembles Robyn Eckersley’s conception of sovereignty, according to which “sovereignty carries with it not only the right to control and develop territory but also the responsibility to protect it, and… states’ responsibilities over their territories should be understood as fiduciary rather than proprietary.” Robyn Eckersley, “Ecological Intervention: Prospects and Limits,” Ethics and International Affairs 21 (2007), 294. However, Eckersley’s conception differs from mine. Eckersley posits that a state has a responsibility to protect a territory directly. In contrast, I posit that a state has a responsibility to protect a territory only insofar as this is necessary to protect a population.

334 These case studies may be regarded as natural experiments of history. As experiments, they study the relationship between an independent variable (i.e., a variable that an experimenter manipulates in order to determine whether it is a cause) and a dependent variable (i.e., a variable that an experimenter measures in order to determine whether it is an effect). In these case studies, the independent variable is failure to perform the ecological function; the dependent variable is loss of descriptive political legitimacy. These variables are continuous (i.e., present or absent in degrees) rather than discrete (i.e., either completely present or completely absent). As in any experiment, a lurking variable, which is correlated with both the independent and the dependent variable and is the true cause of the dependent variable, may obscure the true relationship between the independent and dependent variables, producing the appearance of causation between the independent and dependent variables where there is correlation only. Controlling for all lurking variables would involve going back in time to change only the extent to which there was failure to perform the ecological function. This is manifestly impossible. Consequently, these case studies do not establish with certainty a causal connection between failure to perform the ecological function and loss of descriptive political legitimacy. I admit this limitation. Nevertheless, the studies provide information that makes it appear more likely that there is such a causal connection. That is, they help to decide the question of the extent to which descriptive political legitimacy depends on performance of the ecological function. For this reason, they are instrumental to the argument that unilateral SSI constitutes perfect capture.
climate change, subjects no longer believed that the kings could provide water effectively; hence, their subjects stopped paying tribute to the kings, abandoned the city-states, and retreated into the forests. In the second section, I perform a case study of Haiti, whose descriptive political legitimacy depends on the government’s provision of forest cover; due to poor decisions made by the government and foreign powers, Haiti has experienced massive deforestation, which has ruined agriculture, polluted drinking water, and aggravated natural disasters, including tropical storms and earthquakes; consequently, hundreds of thousands of Haitians have left the country, and those who remain have little confidence in the government.

In the third section, reviewing the scientific literature, I show that SSI is predicted to affect the most important climatic factors on which the descriptive political legitimacy of states depends: temperature, precipitation, crop yield and production, and terrestrial vegetation. If a foreign state were to control these factors and maintain them at a level that is optimal for another state, it would perform the ecological function for this state. This would constitute ecological capture. In the fourth section, I explain that unilateral SSI, once implemented, would be practically impossible to transfer to another state. Reviewing the literature on path-dependence (whereby it is easier to continue an initial course of action than switch to an alternative course of action), socio-technical lock-in (whereby it is difficult to replace an established technology), and techno-politics (whereby a technology inherently requires a certain kind of political arrangement), I argue that unilateral SSI centralizes, monopolizes, and crystallizes control of the technology in a state or small group of states. This suggests that the act in question would be specifically perfect ecological capture, which breaches *jus cogens*, rather than
imperfect ecological capture, which may not breach *jus cogens*.\(^{335}\)

2. **First Case Study: The Maya**

2.1 **Maya Geography and History**

In this section, I show that, when the ancient Maya kings failed to perform the ecological function (specifically, the provision of water), they lost descriptive political legitimacy.\(^{336}\) The ancient Maya homeland spanned what are now southeastern Mexico, Guatemala, Belize, and the western areas of Honduras and El Salvador. The homeland is divided into three regions that had different climates. Going from north to south, they were: the northern lowlands, which were hot and dry; the southern lowlands, which were hot and wet; and the southern highlands, which were cool and dry.\(^{337}\) Climate was a key factor in Maya history. Over many centuries, Maya civilization flourished and declined depending on variable climatic conditions.\(^{338}\)

Maya history is generally divided into three periods: the Preclassic (2000 BCE - 250 CE), the Classic (250 CE - 950 CE), and the Postclassic (950 CE - 1521 CE). The Classic period began with the appearance of large city-states in the southern lowlands; it

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\(^{335}\) To recall, in imperfect ecological capture, performance of the ecological function is transferred from the captive to the captor in such a way that at least one state other than the captor is able to resume performance of the function in the event that the captor terminates its own performance. In which case, the captive, while temporarily dependent on the captor, is not permanently dependent on it. A treaty to implement imperfect ecological capture may not violate a peremptory norm because the level of vulnerability involved may not be enough to amount to a serious threat to international public order.

\(^{336}\) This establishes a correlation between a prior event (failure to perform the ecological function) and a subsequent event (loss of descriptive political legitimacy). This correlation may occasion the *Post hoc, ergo propter hoc* ("after this, therefore because of this") fallacy, whereby the prior event is assumed to be the cause of the subsequent event simply because of its priority. This fallacy must be avoided. Instead, it is here inferred from the historical facts that the most probable cause of the loss of the Maya kings’ descriptive political legitimacy was their failure to perform the ecological function. The fact that the two events happened in close succession is further evidence in support of this inference.


continued as the Maya civilization reached the apogee of its social, political, and economic development; and it ended with the Classic Maya Collapse (830 CE - 950 CE), one of the most dramatic political and demographic implosions in human history, in which the Maya abandoned many of their cities, leaving behind spectacular architectural trappings of royal political authority, such as stelae and temples.  

### 2.2 Classic Maya Collapse

Given the magnitude of the Classic Maya Collapse, its causes have been the object of much scholarly attention for decades. Speculated causes include foreign military conquest, loss of long distance trade routes, class conflict, population overshoot, spread of infectious disease, deterioration of agricultural conditions, and drought. The theory that drought was a major cause is gaining wide acceptance in the scientific community.

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347 There are three notable paleoclimatic studies in support of this theory, each of which correlates unusually dry conditions in the Maya homeland with the time of the Classic Maya Collapse. First, analyzing oxygen isotope and sediment composition data from Lake Chichancanab in Mexico, Hodell et al. found that the period between 800 CE and 1000 CE was the driest interval of the last several thousand years: David A. Hodell, Jason H. Curtis, and Mark Brenner, “Possible Role of Climate in the Collapse of Classic Maya Civilization,” *Nature* 375 (1995). Second, analyzing bulk titanium content from the Cariaco Basin off the northern coast of Venezuela, Haug et al. found that there were intense droughts around 810 CE, 860 CE, and 910 CE: Haug et al., “Climate and the Collapse of Maya Civilization,” *Science* 299 (2003). Third, analyzing stalagmite data from Yok Balum Cave in Belize, Kennett et al. found that there was a dry period
However, Shaw argues that, while drought was a cause of the Classic Maya Collapse, it could not have been the only cause.\footnote{Justine M. Shaw, “Climate Change and Deforestation: Implications for the Maya Collapse,” \textit{Ancient Mesoamerica} 14 (2003).} Cities in the southern lowlands were abandoned, while cities in the northern lowlands continued to prosper.\footnote{Ibid., 157.} Moreover, even within the southern lowlands, cities in the west were abandoned, while those in the east continued to prosper.\footnote{Ibid., 157.} Thus, the drought seems to have impacted different cities differently. As Shaw puts it, there is a “mosaic of climate change and cultural effects.”\footnote{Ibid., 157.} Shaw hypothesizes that this mosaic was caused by anthropogenic deforestation. By increasing temperatures and decreasing evapotranspiration, anthropogenic deforestation reduced precipitation.\footnote{Ibid., 157.} Thus, anthropogenic deforestation may have aggravated the drought. Due to local environmental factors, this effect was more severe in the southern and western areas than in the northern and eastern areas.\footnote{Ibid., 162-163.} Shaw’s hypothesis is supported by two subsequent studies employing climate models. First, Oglesby et al. found that if Mesoamerica, which included the Maya homeland, had been completely deforested, there would have been up to a 30% reduction in precipitation during the wet season than if the same area had been completely covered with evergreen tropical

\footnote{Kennett et al., “Development and Disintegration of Maya Political Systems in Response to Climate Change,” \textit{Science} 338 (2012).}
Second, Cook et al. estimated the actual deforestation in Mesoamerica prior to 1500 CE and compared it to a simulation based on “natural forest and vegetation cover”; they found that deforestation resulted in up to a 15% decrease in annual precipitation; moreover, they compared this result to paleoclimatic records of precipitation changes and found that deforestation may have been responsible for up to 60% of the total drying during the Classic Maya Collapse.

Classic Maya politics were dependent on the availability and control of water. In the hinterland, non-hierarchical forms of cooperation between small units of sedentary farmers emerged as an adaptation to the spatial dispersion of aguadas (ponds) and bajos (swamps). In contrast, in the cities, hierarchical forms of government between kings and large subject populations developed as a result of the monopolization of water control systems. Thus, the ecological function that the Maya kings were responsible for performing was providing water for their subjects. When they could no longer perform this function because of droughts that were caused by a combination of anthropogenic deforestation and regional climate change, the Maya kings lost their descriptive political legitimacy, as evidenced by the fact that their subjects abandoned their cities and their

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356 Ibid., 2.

357 Ibid., 3.


In section 4 below, I show that in fact SSI is predicted to cause droughts of the kind that brought the Classic Maya Collapse.

3. Second Case Study: Haiti

3.1 Haiti’s Environmental Crisis

A satellite image of Hispaniola, the second-largest island in the Caribbean, depicts a stark border between two countries: Haiti in the West and the Dominican Republic in the East. Haiti is brown; the Dominican Republic is green. This image reflects the fact that Haiti has 3% forest cover, while the Dominican Republic has 23% forest cover. It was not always this way. In 1923, Haiti had almost 60% forest cover. Since then, there has been massive deforestation, which in all likelihood has caused soil erosion, loss of fertile land, lowering of water tables, flooding, landslides, species extinction, and climate change. As there were few trees to prevent rainwater from flowing down mountains and inundating underlying settlements, deforestation aggravated the four tropical storms (Fay, Gustav, Hanna, and Ike) that battered Haiti in 2008,

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361 Lucero, Gunn, and Scarborough, “Climate Change.” This is an inference based on the measurement of several independent and dependent variables. The independent variables include anthropogenic deforestation, regional climate change, and drought; the dependent variables include drought and subjects’ abandonment of Maya kings’ cities and their projects. Drought functions as both an independent and a dependent variable. It is an independent variable with respect to subjects’ abandonment of Maya kings’ cities and their projects; it is a dependent variable with respect to anthropogenic deforestation and regional climate change. Here anthropogenic deforestation is taken as a measure of failure to perform the ecological function, while subjects’ abandonment of Maya kings’ cities and their projects is taken as a measure of loss of descriptive political legitimacy.


364 Ibid, 22.

harming hundreds of thousands of people and damaging critical infrastructure.\textsuperscript{366}

Moreover, there is evidence that deforestation was a contributing physical factor of the 2010 earthquake that killed 230,000 people and displaced 1.5 million others.\textsuperscript{367} Given that the neighboring Dominican Republic, which had approximately the same environment prior to European settlement,\textsuperscript{368} has been able to avoid these calamities, Haiti’s pronounced deforestation represents a failure of the state to perform the ecological function for its population.\textsuperscript{369}

3.2 Haiti’s History

Haiti has an extensive history of political and economic strife that explains this failure. As the International Crisis Group, a non-governmental organization that researches violent conflict, puts it: “The catastrophic state of the environment [in Haiti] is closely related to the country’s deep-seated institutional, political and governance problems. Coherent national socio-economic development policies have been mostly absent, due to management and political limitations and the narrow interests of those


\textsuperscript{368} Diamond notes that there were some differences in the environment between the two countries. He writes: “Because the wind-bearing rains come mostly from the east, rainfall decreases from east to west, and the western (Haitian) side of the island is drier. It is also steeper, with thinner and less fertile soils, and without the broad Cibao Valley in the Dominican Republic’s center, which contains the island’s most fertile soils and most productive land for agriculture.” Jared Diamond, “Intra-Island and Inter-Island Comparisons,” in \textit{Natural Experiments of History}, ed. Jared Diamond and James A. Robinson (Cambridge, MA: Belknap, 2010), 123. However, Diamond does not believe that these differences were great enough to account for the current environmental differences between Haiti and the Dominican Republic.

\textsuperscript{369} This here assumes that the Dominican Republic is similar in all relevant aspects to Haiti other than performance of the ecological function. In other words, the comparison with the Dominican Republic is intended to be an experiment that controls for lurking variables. Of course, the Dominican Republic is different from Haiti in many ways. However, it is also similar to Haiti in many ways. Accordingly, if there is a significant difference in descriptive political legitimacy between the two countries that is correlated with a significant difference in performance of the ecological function, and if a causal connection between these two variables is plausible, then the inference that descriptive political legitimacy depends on performance of the ecological function is supported.
holding economic power, thus contributing to the problem. The extreme environmental vulnerability also stems from the state’s institutional weakness and poor governance, especially at the local level.\textsuperscript{370}

Haiti, now the poorest state in the Western Hemisphere, was once Saint-Domingue. It had the moniker, “Pearl of the Antilles,” on account of its being France’s wealthiest and most profitable slave colony.\textsuperscript{371} At one point, it produced approximately 40% of Britain and France’s sugar and 60% of their coffee.\textsuperscript{372} Deforestation began early. During the heyday of the colonial period (1711-1789), forests were cleared and burned to make room for plantations, while timber was exported to Europe.\textsuperscript{373}

Following a century of hasty political turnovers between governor-generals, emperors, kings and presidents, Haiti underwent a series of presidential coups between 1911 and 1915. Out of a combination of humanitarian zeal and a desire to protect its business and security interests, the US, which had not recognized Haiti’s independence until after the American Civil War, invaded and occupied Haiti from 1915 until 1934.\textsuperscript{374} In 1926, the US established the Haitian American Development Corporation, which cultivated sisal, a plant that required the clearing of forests on 14,000 acres of land.\textsuperscript{375}

\textsuperscript{373} Diamond, “Intra-Island,” 125.
The US built infrastructure and restructured the economy. With professed good intentions, it also attempted to install a democratic system of government. However, this system was short-lived. Upon the departure of US troops, the democratically-elected President Sténio Vincent created a new constitution, consolidated his power, and adopted an authoritarian style of rule that would be shared by his successors, in particular, Élie Lescot. In an abortive attempt to develop rubber plantations, Lescot cleared over 100,000 hectares of land, chopping down nearly a million fruit trees.

After a cycle of elections and coups, the dictator François Duvalier, also known as “Papa Doc,” came to power in 1957. Paranoid, Papa Doc, having disbanded the army and the police, created a rural militia (the Tonton Macoute), which he authorized to extort, torture, rape, and murder his political opponents. Fearing that guerrilla fighters from the Dominican Republic would attack, Papa Doc ordered the clearing of forests. Further, Papa Doc oversaw the clear-cutting of an ancient pine forest, Forêt des Pins, at the hands of a US Company. After Papa Doc died in 1971, his son, Jean-Claude Duvalier, also known as “Baby Doc,” succeeded him to the presidency. Although

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376 Schmidt, Occupation, 13. The US occupation of Haiti, whereby the US assumed Haiti’s economic function, is an example of capture (specifically, imperfect capture, since it was substitutable and temporary). As this occupation exacerbated Haiti’s deforestation problem, this example illustrates the principle that capture, whether perfect or imperfect, is inconsistent with maintaining the descriptive political legitimacy of the captive, insofar as it interferes with its performance of an existential function. I thank Prof. Cindy Holder for making this point.


381 “Ezili Danto.com.”
ostensibly slightly less repressive than his father, Baby Doc’s economic policies further aggravated Haiti’s environmental ruin. A corrupt playboy with a lust for cars and women, Baby Doc solicited foreign aid, which he used to fill his own foreign bank accounts. Baby Doc multiplied the number of sweatshops for the manufacture and export of apparel to US free markets, thereby spurring massive migration to the slums of the capital, Port-au-Prince. As impoverished peasants chopped down more wood to make charcoal to sell in the big city, Haiti’s deforestation problem worsened.

3.3 Haiti vs. The Dominican Republic

The case of Haiti demonstrates the close connection between the state and the ecological function. There is a positive feedback loop: A deficient state leads to a failure to perform the ecological function, and a failure to perform the ecological function leads to a deficient state. The story of Haiti’s forests could have been otherwise. Haiti could have followed the path of the Dominican Republic. Although the latter country also was ruled by dictators, Dominican dictators implemented environmental policies that were diametrically opposed to those implemented by Haitian ones. Cases in point are Rafael Trujilo (President of the Dominican Republic from 1930-1938 and 1942-1952) and Joaquín Balaguer (President of the Dominican Republic from 1960-1962, 1966-1978, and 1986-1996). Trujilo expanded and created natural reserves, established the first national park, instituted a guard to protect forests, restricted the slash-and-burn technique, and

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382 Galván, Dictators, 102.
384 Robert Fatton Jr., Haiti: Trapped in the Outer Periphery (Boulder: Lynne Rienner, 2014), 76-77.
386 Diamond, Collapse, Ch. 11; Diamond, “Intra-Island.”
restricted the logging of pine trees. Likewise, Balaguer banned commercial logging, closed sawmills, delegated protection of forests to the armed forces, made illegal logging a crime, and reduced demand for Dominican timber by opening the market to wood and gas imports. The upshot is that Haiti is much poorer than the Dominican Republic, not just environmentally but also economically and demographically. In 2013, the nominal per capita GDP of Haiti was $819; that of the Dominican Republic was $5,879. Moreover, whereas Haiti had a net migration rate of -6.9% in 2012, the Dominican Republic had a net migration rate of -1.98% in the same year.

Haiti is a contemporary analogue of the Maya. Whereas the descriptive political legitimacy of the Maya depended on the provision of water, the descriptive political legitimacy of Haiti depends on the provision of forest cover. Deforestation in Haiti is so severe that it is causing an environmental collapse, particularly the worsening of natural catastrophes, which it is the responsibility of every state to prevent and mitigate. In short, deforestation has undermined the Haitian state’s descriptive political legitimacy.


Ibid., 343-344.


It is clear that, according to my conception, sovereignty entails this responsibility. In addition, scholars have presented arguments that sovereignty entails this responsibility on utilitarian, deontological, virtue ethical, contractarian, human rights, and paternalistic grounds: Timothy Beatley, “Towards a Moral Philosophy of Natural Disaster Mitigation,” *International Journal of Mass Emergencies and Disasters* 7 (1989); Naomi Zack, *Ethics for Disaster* (Lanham, MD: Rowman & Littlefield, 2009).

Kivland makes a related point. In great part due to Haiti’s inability to deal with natural catastrophes (in particular the 2010 earthquake), a slew of NGOs and UN personnel have intruded into Haiti’s domestic sphere and essentially have taken over the day-to-day operations of the government. Consequently, Haitians are confused about “the locus of sovereign authority” and now “perceive and experience ‘statelessness’.” Chelsey L. Kivland, “Unmaking the State in ‘Occupied’ Haiti,” *Political and Legal Anthropology Review* 35 (2012), 248. If Kivland is correct, the “occupation” of Haiti by these foreign governance bodies represents imperfect ecological capture. It is imperfect because these bodies are substitutable and may leave Haiti at any point. This is different from unilateral SSI.
4. SSI’s Effects on Climate

4.1 Scientific Studies

In this section, I argue that SSI would involve control over climatic factors on which the descriptive political legitimacy of states, including the Maya city-state and Haiti, depends. There are two major studies suggesting that SSI would likely create massive droughts over large areas of the world. First, Trenberth and Dai examined the global environmental effects of the Mount Pinatubo eruption that occurred in 1991 in the Philippines.\(^{393}\) This eruption released millions of tons of sulfur aerosols into the stratosphere, simulating SSI. The authors found that, from October 1991 to September 1992, there was a significant slowing of the hydrological cycle.\(^{394}\) In particular, there was a significant decrease in precipitation over global land areas as well as a “record decrease” in continental freshwater discharge into the ocean.\(^{395}\) Assuming that these changes were associated with the stratospheric aerosols that resulted from the eruption, the authors concluded, “Creating a risk of widespread drought and reduced freshwater resources for the world to cut down on global warming does not seem like an appropriate fix.”\(^{396}\)

Second, Robock, Oman, and Stenchikov ran two computer simulations.\(^{397}\) In the first, they simulated deployment of SSI from a tropical location; in the second, they simulated it from an Arctic location. They found that, regardless of the location, SSI


\(^{394}\) Ibid., 4.

\(^{395}\) Ibid., 1.

\(^{396}\) Ibid., 5.

would disrupt the Asian and African summer monsoons.\textsuperscript{398} Inasmuch as billions of people on two continents depend on rains from these monsoons, if these monsoons were disrupted, there would be severe water shortages.\textsuperscript{399} Having documented some of the possible side effects of SSI on regional climate, the authors stated, “Whether we should use [SSI] as a temporary measure to avoid the most serious consequences of global warming requires a detailed evaluation of the benefits, costs, and dangers of different options.”\textsuperscript{400}

Notwithstanding that SSI may reduce precipitation, if it coincides with an increase in atmospheric carbon dioxide concentration, SSI may have beneficial effects on crop yield and production. To test this hypothesis, Pongratz et al. performed three global climate simulations: the first had a climate that was similar to today; the second had a climate with twice the atmospheric carbon dioxide concentration of today and consequently a higher temperature than today; and the third had a climate with not only twice the atmospheric carbon dioxide concentration of today but also the same temperature as today.\textsuperscript{401} The second and third simulations represented the near future if anthropogenic carbon dioxide emissions continued at rates “projected for scenarios of strong economic growth within this century.”\textsuperscript{402} But whereas the second simulation represented the absence of SSI, the third represented the presence of SSI sufficient to keep the temperature to today’s level despite a doubled atmospheric carbon dioxide concentration. The authors considered the combined impact of temperature, precipitation,

\textsuperscript{398} Ibid., 1.
\textsuperscript{399} Ibid., 1.
\textsuperscript{400} Ibid., 13.
\textsuperscript{402} Ibid., 101.
and atmospheric carbon dioxide concentration on the yield and production of maize, wheat, and rice all over the world. They found that, across most latitudes, yield and production of all three crops was greater in the third simulation than in either the first or the second simulation.\(^{403}\) This occurred because, where SSI was present, there was no additional heat stress, and the increased atmospheric carbon dioxide concentration enhanced plant productivity.\(^{404}\) Nevertheless, the authors cautioned, “[A]lthough [SSI] may allow beneficial effects of CO\(_2\) fertilization at a comparatively low level of climate change, the potential for such approaches to reduce the overall risks is still far from established.”\(^{405}\)

Further, there is evidence that SSI may increase plant growth even if it does not coincide with an increase in atmospheric carbon dioxide concentration. Two groups of investigators have observed that, following the 1991 eruption of Mount Pinatubo, there was a decrease in the rate of growth of the atmospheric carbon dioxide concentration due to an increase in terrestrial vegetation, which served as a carbon sink.\(^{406}\) One of the explanations for the increase in terrestrial vegetation is that the stratospheric aerosols that resulted from the eruption increased diffuse solar radiation, which enhanced the capacity of plant canopies to photosynthesize.\(^{407}\) If this explanation is correct, then SSI may not only reduce global warming but also decrease the atmospheric carbon dioxide

\(^{403}\) Ibid., 103.
\(^{404}\) Ibid., 101.
\(^{405}\) Ibid., 104.
concentration, thereby countering anthropogenic emissions. However, Robock warns, “While an increased carbon sink would be a benefit of [SSI], the effect would be felt differentially between different plant species, and whether it would help or hurt the natural ecosystem, or whether it would preferentially favor weeds rather than agricultural crops, has not been studied in detail yet.”  

4.2 Usurpation of the Ecological Function

The foregoing studies indicate that SSI would likely decrease temperature but increase drought, crop yield and production, and terrestrial vegetation. As the effects of SSI are planetary in scale, every state in the world would experience changes of one kind or another. The principle stands that every actually existing state has an ecological function to perform that is related to temperature, drought, crop yield and production, and terrestrial vegetation. Given that SSI affects each of these factors, a foreign state that controls SSI affects the ecological function of every state, either by performing the function itself or thwarting the performance of the function. For instance, that SSI would increase terrestrial vegetation suggests that a foreign state deploying unilateral SSI may perform Haiti’s ecological function, which centers on providing forest cover, on Haiti’s behalf. It also suggests that the foreign state, by abstaining from unilateral SSI, would

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409 That is, these are features of all ecosystems in which all actually existing states are located. Of course, there may be exceptions. For example, Vatican City is a state under international law; it is entirely surrounded by the city of Rome; consequently, it is not immediately located in an ecosystem of which crop yield and production or terrestrial vegetation are important features. However, these exceptions are trivial enough that they do not disprove the general principle.

410 This assumes that increasing terrestrial vegetation entails increasing forest cover in Haiti. Such an assumption, although it cannot be verified here (as it is an empirical matter), is not implausible.
disrupt this ecological function.\textsuperscript{411} Because there is usurpation of the ecological function by a foreign state, unilateral SSI involves ecological capture. It remains to be determined whether this ecological capture is perfect or imperfect. In what follows, I argue that the technological basis of SSI entails that it is perfect.

5. Technological Basis of Perfect Capture

In this section, I argue that SSI technology is inherently monopolistic and irreversible, meaning that, if SSI constitutes ecological capture, it constitutes perfect ecological capture (as opposed to imperfect ecological capture). This is important to establish insofar as, in chapter 2, I argued that perfect capture breaches \textit{jus cogens}, but I did not argue that imperfect capture does the same. Indeed, imperfect capture may not breach \textit{jus cogens} inasmuch as it does not entail the deprivation of a state’s ability to exercise its inherent right of self-defence. In imperfect capture, another state can perform the existential function that the captor currently performs; this other state, which may even be the captive itself, can substitute for the captor at any time. This substitutability confers on the captive the ability to exercise its inherent right of self-defence because it can stop its dependence on the captor at any time either by performing the existential function itself or having another state to do so.\textsuperscript{412} Therefore, in imperfect capture, there may be no prohibited concentration of power in a single state or corresponding

\textsuperscript{411} To be more specific, it would allow the already existing disruption of the ecological function to continue. But this does not make a difference to the analysis of capture. For capture, as a form of domination, requires only the capacity to interfere; it does not require actual interference. Therefore, when a captor allows the already existing disruption of the ecological function to continue, it is still a manifestation of capture, since the captor could interfere at any time.

\textsuperscript{412} The other state may be an ally or another encroaching captor, but, in imperfect capture, there will always be another state. By definition, if there is no other state available to resume performance of the function, then it is not imperfect capture. Even if the other state is another encroaching captor, the captive is able to exercise its right of self-defence: It may do so against its former captor as soon as the new captor resumes performance of the function. In theory, this process can be repeated with new captors as many times as there are different states. The same does not hold true of perfect capture because in this form of capture the captive is stuck with the same captor essentially forever.
deprivation of power in another state that would be contrary to the fundamental premise of the boundedly pluralist international legal order.

5.1 Termination Effect

Recall that the termination effect refers to the rapid and potentially catastrophic climatic changes that would supposedly follow upon the cessation of SSI once it has been implemented for an extended period of time. To study the termination effect, Jones et al. compared 11 different climate models to determine the degree of overlap between their predictions of the world’s climate that would “result from the sudden termination of [SSI] after 50 years of offsetting a 1% per annum increase in CO₂ concentrations.”¹⁴³ They found that the models agreed on certain points but disagreed on others. When SSI was terminated, the models agreed that global-mean temperature would increase rapidly, with models showing a temperature increase of about 1-2 degrees centigrade within a decade;¹⁴⁴ they also agreed that temperature would increase the most over land, high latitudes, and in the Northern Hemisphere.¹⁴⁵ Further, the models agreed that global-mean precipitation would increase rapidly, especially at middle and high latitudes, but would decrease in several areas at low latitudes.¹⁴⁶ Although the models agreed that there would be rapid sea-ice loss at both the Arctic and the Antarctic, they did not agree on the distribution of the loss in the Antarctic.¹⁴⁷ Moreover, the models did not agree on “net primary productivity” (which measures the rate of flow of carbon across terrestrial

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¹⁴⁴ Ibid., 9744.

¹⁴⁵ Ibid., 9744.

¹⁴⁶ Ibid., 9749.

¹⁴⁷ Ibid., 9750.
vegetation); five models showed no significant change, four showed a slowdown, and one showed acceleration.\textsuperscript{418} The authors concluded, “All the models…agree that significant climate change would ensue rapidly upon the termination of [SSI], with temperature, precipitation, and sea-ice cover very likely changing considerably faster than would be experienced under the influence of rising greenhouse gas concentrations in the absence of [SSI].”\textsuperscript{419}

Likewise, McCusker et al. posited that a rapid temperature change of one degree centigrade per decade or greater, such as described by Jones et al., “would substantially affect human and ecological systems, whose resilience would be limited by rates as small as a few tenths of a degree per decade.”\textsuperscript{420} In particular, McCusker et al. hypothesized that abrupt termination of SSI would result in declines in crop yields and biodiversity.\textsuperscript{421} Using a climate model that is different from the ones that Jones et al. used, McCusker et al. predicted the spatial variation of temperature and precipitation over land that would ensue upon such a termination. The authors found that the global average annual temperature increased rapidly, while temperatures in regions where there already is substantial food insecurity, such as Sub-Saharan Africa and South Asia, increased significantly more rapidly than the average.\textsuperscript{422} Further, termination of SSI produced more extreme summer weather events in vulnerable regions, particularly in the tropics.\textsuperscript{423}

\textsuperscript{418} Ibid., 9745.
\textsuperscript{419} Ibid., 9751.
\textsuperscript{421} Ibid., 2.
\textsuperscript{422} Ibid., 2-3.
\textsuperscript{423} Ibid., 4.
Moreover, the same regions that experienced heat stress also experienced reductions in precipitation.\textsuperscript{424} The authors used another climate model to determine how long SSI would have to be sustained in order to avoid an abrupt increase in global average temperature upon its termination. They found that, unless there were strong efforts to reduce greenhouse gas (GHG) emissions, in order to offset the effects of elevated GHGs, SSI would need to remain in place for as long as GHGs were in the atmosphere.\textsuperscript{425} However, once they are emitted, GHGs take thousands of years to leave the atmosphere.\textsuperscript{426} Thus, the authors remarked that “the large-scale use of [SSI] to mask business-as-usual GHG emissions could lead to a scenario wherein [SSI] must be maintained for millennia, else risking a large and uncertain level of rapid global warming upon any unanticipated cessation.”\textsuperscript{427} This suggests that, once a state or small group of states has commenced unilateral SSI, it will have to maintain deployment for a very long time.

\textbf{5.2 Path-Dependence and Socio-Technical Lock-In}

Cairns examined two closely-related properties of technological systems by which the implementation of SSI may prove to be irreversible: path-dependence and socio-technical lock-in.\textsuperscript{428} Path-dependence refers to the fact that, once a course of action has been pursued, it is easier or less costly to continue pursuing it than to switch and pursue an alternative course of action, notwithstanding: first, that contingent events brought

\begin{itemize}
  \item \textsuperscript{424} Ibid., 4.
  \item \textsuperscript{425} Ibid., 7.
  \item \textsuperscript{426} Ibid., 7.
  \item \textsuperscript{427} Ibid., 7.
  \item \textsuperscript{428} Rose C. Cairns, “Climate Geoengineering: Issues of Path-Dependence and Socio-Technical Lock-In,” \textit{WIREs Climate Change} 5 (2014).
\end{itemize}
about the initial course of action; second, that these events were disproportionately small compared to the results of the initial course of action; and third, that the results of the initial course of action may be inferior to those of an alternative course of action. Socio-technical lock-in refers to the fact that a technology that results from a path-dependent process is resistant to change and excludes other possible technologies. Cairns provides an example of socio-technical lock-in: the private motor car, which, over the past century, has been seamlessly integrated into the social and economic activities of billions of people. Cities have been designed and vast transport systems have been created specifically to support the private motor car, making it costlier to switch to other, putatively superior transportation technologies, in particular, less carbon-intensive public transportation.

In relation to SSI, Cairns distinguishes between three kinds of socio-technical lock-in: technical, social, and cognitive. Technical lock-in refers to the fact that SSI technologies would have to remain in place in order for there not to be a termination effect. Social lock-in refers to the fact that SSI would depend on capital-intensive physical infrastructure, creating sunk costs and consequent vested interests in the

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429 Accordingly, Cairns quotes Pierson as describing path-dependence as follows: “Specific patterns of timing and sequence matter; starting from similar conditions, a wide range of social outcomes may be possible; large consequences may result from relatively small or contingent events; particular courses of action, once introduced, can be almost impossible to reverse.” Paul Pierson, “Increasing Returns, Path Dependence, and the Study of Politics,” *American Political Science Review* 94 (2000), 251.

430 As Cairns puts it, “Lock-in is a way of conceptualizing the outcomes of path-dependent processes, and describes how particular technologies – through their co-evolution with social, institutional, cultural, and political systems – may become resistant to change, ‘closing down’ or constraining possibilities for the development of alternative (possibly superior or more socially/environmentally desirable) socio-technical configurations.” Cairns, “Climate Geoengineering,” 650.

431 Ibid., 650.

432 Ibid., 650.

433 Ibid., 651.

434 Ibid., 651.
Cognitive lock-in refers to the fact that how the problem of SSI is framed conditions peoples’ understanding of the problem and what to do about it. Cairns notes that even researching SSI may increase the probability that SSI will be implemented, adducing Jamieson’s points that there may be a “cultural imperative” according to which anything that can be done should be done and that some technologies develop “a life of their own that leads inexorably to their development and deployment.” Thus, path-dependence and socio-technical lock-in describe features of SSI whereby the technology, once implemented by a state or small group of states, will crystallize, become resistant to change, and exclude substitutes.

5.3 Autocratic Techno-Politc

Szerszynski et al. explore the “social constitution” of SSI, arguing that this constitution may be incompatible with liberal democratic politics. The presupposition of their argument is that technology can have political effects. Following Winner, they make a distinction between a technology’s being “made political” and a technology’s being “inherently political.” A technology can be made political “by being deliberately designed, or unconsciously selected, in order to produce a particular set of political consequences.” For example, a new manufacturing plant is made political insofar as it

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435 Ibid., 651.
436 Ibid., 651.
441 Ibid., 2810. See also Winner, “Do Artifacts,” 124-125.
is used by management to destroy a labor union. In contrast, technologies can be inherently political “in that they require, or are at least strongly compatible with, a certain way of organising social relations around that technology, or even in society at large.”

Likewise, if a technological system is inherently political, its adoption “unavoidably brings with it conditions for human relationships that have a distinctly political cast - for example, centralized or decentralized, egalitarian or inegalitarian, repressive or liberating.” For example, the atom bomb is inherently political insofar as it requires governance by a centralized, hierarchical chain of command.

Szerszynski et al. argue that SSI is inherently political insofar as it necessitates autocratic governance. The authors note that SSI is deployed “at the planetary level,” decisions are made “over considerable timescales,” its use is highly sensitive, its effects are “highly mediated,” climate modeling is complex, its idioms are “opaque,” and it relies on a “limited number of techniques and sites of implementation.” For these reasons, the authors contend that there will be “closed forms of decision-making,” “little opportunity for opt-out or dissent,” “a closed and restricted set of knowledge networks,” dependence on “top-down expertise,” “little space for dissident science or alternative perspectives,” “minimally distributed and personally remote” expertise, “imposed and pervasive” solutions, control by “a centralised structure,” and closure “to influences that

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443 Ibid., 2810.
447 Ibid., 2812.
that might disrupt its smooth functioning. The authors therefore conclude that the social constitution of SSI is not only incompatible with democratic pluralism but also “in tension with the current, broadly Westphalian, international system based on national self-determination.” Thus, the inherent politics of SSI imply that the technology requires governance by a single state or group of states and a lack of substitutability or mid-stream transferability to other states.

6. Conclusion

The objective of this chapter has been to demonstrate that there is an ecological function, that the performance of this function is necessary for descriptive political legitimacy, that SSI usurps this function, and that this usurpation is irreversible and non-substitutable. The case study involving the Maya illustrates how water management may be central to a state’s ability to retain loyal subjects, even to the extent that a whole civilization may fall at the onset of a drought due to regional climate change and anthropogenic deforestation. Likewise, the case study involving Haiti illustrates how forest management interacts with the ability of elites to hold onto power and how anthropogenic deforestation can not only undermine the authority of corrupt leaders but

448 Ibid., 2812.

449 Ibid., 2812. One could go further and claim that the Westphalian system is based not only on national self-determination but also on the closely related norm of the inherent right of self-defence. That said, it is better to characterize the current international legal system as “boundedly pluralist” rather than “Westphalian.” Although the principle of sovereign equality is still foundational (e.g., it is affirmed in Article 2(1) of the UN Charter), the principle of non-intervention in the internal affairs of other states is being relaxed. This is because sovereignty is evolving from a shield to a responsibility: Glanville, Sovereignty as Responsibility. Witness the recent emergence of the Responsibility to Protect norm, which denies absolute Westphalian sovereignty. See, e.g., International Commission, Responsibility. The Responsibility to Protect is consistent with the fundamental premise of the boundedly pluralist international legal order because pluralism affirms that that there is an international political morality, however provisional, for intervention to protect human rights and international security. However, such intervention cannot amount to perfect capture, lest it breach a peremptory norm.
also compound their corruption, leading to what is essentially a failed state. But this argument is not restricted to the Maya and Haiti; nor is it restricted to water and forest cover. These case studies illustrate the principle that for every state there are climatic factors that the state needs to manage properly in order to be regarded by its population as having rightful political authority.

Not all climatic factors are equally important to all states; depending on local ecology, a factor that is critical for one state may not be for another state. However, there is no state that is so liberated from its local ecology that there is no factor that is critical for its descriptive political legitimacy. What is more, there are some factors that are critical for all states, and these happen to be precisely the ones that scientific studies predict would be directly affected by SSI: temperature, precipitation, crop yield and production, and terrestrial vegetation. A manager of SSI would be able to manage these factors in lieu of other states. Since managing these factors would usurp the ecological function, this would constitute ecological capture. Because of path-dependence, socio-technical lock-in, and the inherent autocratic politics of SSI technology, the state or group of states that would implement the technology would have to continue implementing it,

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450 Fatton objects to the use of the term “failed state” to describe Haiti, as he believes that this perpetuates the notion that Haiti needs to be under the political tutelage of others. Instead, he prefers to say that neoliberal planners have placed Haiti in the “outer periphery.” He makes a good point: Haiti’s predicament has been caused not only by domestic factors but also by predatory foreigners, including the US occupiers from 1915-1934 and governments and multinational corporations in recent years seeking to profit from Haiti’s cheap labor. Fatton, *Trapped*. Be that as it may, I use “failed state” because it is in common usage and “outer periphery” presupposes too much of Fatton’s theory.

451 This does not imply that a state, or any other centralized form of control, is necessary for the management of climatic factors. On the contrary, empirical studies have shown that decentralized, self-organizing, and self-governing institutions are effective at managing common pool resources, including water and forests: e.g., Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action* (Cambridge: Cambridge University Press, 1990). This opens up the possibility that the international community (which is decentralized, self-organizing, and self-governing) also may learn to manage a very important common pool resource, namely, the atmosphere. But this likely will mean working at multiple levels of government simultaneously. See Elinor Ostrom, “Polycentric Systems for Coping with Collective Action and Global Environmental Change,” *Global Environmental Change* 20 (2010).
and control could not readily be passed to another state or group of states. Hence, unilateral SSI constitutes perfect ecological capture. In chapter 2, I argued that perfect capture breaches *jus cogens*. I therefore conclude that unilateral SSI breaches *jus cogens*. In the following epilogue, I examine the moral and legal implications of this conclusion.
Epilogue: A Multilateral Treaty to Prohibit SSI Research?

1. Introduction

1.1 Prohibiting SSI Research

The primary objective of this thesis has not been to recommend particular laws but rather to add to the understanding of international law generally. Even if this already represents an advancement of the understanding of international law, it is important to explore its practical implications. The nature of the subject matter requires that this be done. Breaches of *jus cogens* are very serious. There are three reasons why this is so. First, breaches of *jus cogens* are manifestly and grossly unjust. Second, they hurt more than their immediate victims; that they occur at any time or place offends the fundamental moral interests and sentiments of the international community as a whole. Third, they compromise the integrity of the international legal order; they undermine the descriptive and normative political legitimacy of the people and institutions that perpetrate, permit, or fail to prevent them. Because breaches of *jus cogens* are so grave, states are morally and legally obligated to prevent them. Accordingly, in this epilogue, I recommend a way for states to minimize the probability that unilateral SSI will occur.

Specifically, I ask the question: given that unilateral SSI breaches *jus cogens*, should states conclude a multilateral treaty to prohibit SSI research? I will argue that, insofar as

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452 To be clear, this is a moral “should” in the sense that I am proposing a moral obligation for states to conclude a multilateral treaty to prohibit SSI research. Hence, unlike in previous chapters, where I made statements as to what the law is, in this epilogue, I suggest what the law *ought to be*. This does not presuppose the legal positivist thesis that there is no necessary connection between law and morality, nor does it presuppose the natural law thesis that an unjust law is not a true law. Rather, the investigation of this epilogue is compatible with both of these theories. It accepts that the law may contain moral elements, whether by contingency or necessity, but it acknowledges that not every moral prohibition is a positive legal prohibition and that some law reform or lawmaking may be necessary in order to bring positive law in line with true morality.
SSI research increases the probability that unilateral SSI will occur, states should conclude a multilateral treaty to prohibit such research.\textsuperscript{453} This is so notwithstanding that such research may contribute to the advancement of scientific knowledge. This is not a statement of the law but a policy recommendation. It is addressed to both domestic and international legal communities as well as the scientific community, whose cooperation will be required to define the terms of the agreement.\textsuperscript{454}

Unilateral SSI cannot occur presently inasmuch as no one (as far as the academic community knows)\textsuperscript{455} has assembled SSI deployment technology. The closest attempt to do so was the 2012 Stratospheric Particle Injection for Climate Engineering (SPICE) project.\textsuperscript{456} This project was intended to deploy a 1-kilometer hose tethered to a balloon with a pipe, which was supposed to spray 150 liters of water into the atmosphere.\textsuperscript{457} SPICE researchers cancelled the experiment because of a conflict of interest pertaining to a patent application, which was for an “apparatus for transporting and dispersing solid particles into the Earth’s stratosphere” by “balloon, dirigible, or airship.”\textsuperscript{458} Despite the cancellation of this experiment, SPICE researchers continue to conduct research into SSI.

\textsuperscript{453} It is beyond the scope of this epilogue to recommend the particular terms of a multilateral treaty to prohibit SSI research. The objective of this epilogue is rather simply to establish that all states should, as a moral matter, conclude such a treaty.

\textsuperscript{454} “Scientific advisors play at least five roles in the environmental treaty-making process. They are trend spotters, theory builders, theory testers, science communicators, and applied-policy analysts…Scientists need to be brought into the informal and formal networks surrounding each treaty-making effort with a clear sense of their obligations.” Lawrence E. Susskind and Saleem H. Ali, \textit{Environmental Diplomacy: Negotiating More Effective Global Agreements}, 2nd ed. (Oxford: Oxford University Press, 2015), 81-83.

\textsuperscript{455} There is of course the possibility that a state, corporation, or rogue actor has assembled such technology in secret. However, this cannot be addressed here.


\textsuperscript{457} Ibid.

\textsuperscript{458} Ibid. See also Daniel Cresssey, “Cancelled Project Spurs Debate Over Geoengineering Patents,” \textit{Nature} 485 (2012).
deployment technology.\textsuperscript{459} Thus, SPICE researchers may assemble such technology in the near future. If they do, the probability of unilateral SSI will increase greatly.

There is an important difference between omnilateral and unilateral SSI. Recall that, in omnilateral SSI, all descriptively politically legitimate states have equal, effective, and democratic control over the management of the technology; in contrast, in unilateral SSI, there is at least one descriptively politically legitimate state that does not have such control, for only one perfect captive is needed for there to be perfect capture. In this thesis, I have not shown that omnilateral SSI breaches \textit{jus cogens}. Omnilateral SSI does not constitute perfect capture because it involves no transfer of an existential function from a descriptively politically legitimate domestic state to a foreign state. For this reason, it is safe to assume not only that omnilateral SSI does not breach \textit{jus cogens} but also that, since there appears to be no law to regulate it, it is currently legal under international law.

SSI research is “dual-use”:\textsuperscript{460} it may achieve a legal purpose (omnilateral SSI) as well as an illegal purpose (unilateral SSI). Given the importance of complying with the law, I contend that whether states should conclude a treaty to prohibit SSI research depends on four factors: (a) the probability that it will achieve the legal purpose, (b) the probability that it will achieve the illegal purpose, (c) the benefits of achieving the legal


\textsuperscript{460} The conventional use of the term “dual-use” is slightly different from the one here. “Dual-use” is commonly used to describe certain “well-intentioned scientific research,” particularly biochemistry and genetics, that may achieve morally bad (not necessarily illegal) purposes as well as morally good (not necessarily legal) purposes. Michael J. Selgelid, “Governance of Dual-Use Research: An Ethical Dilemma,” \textit{Bulletin of the World Health Organization} 87 (2009), 720. Authors in this field tend not to make a distinction between morality and legality. See also John Forge, “A Note on the Definition of ‘Dual Use’, \textit{Science and Engineering Ethics}, 16 (2010).
purpose, and (d) the costs of achieving the illegal purpose. The greater (a) and (c), the more reason there is for states to conclude a multilateral treaty to prohibit the research; the greater (b) and (d), the less reason there is for states to do so. Further, I assume a precautionary measure: if the benefits of achieving the legal purpose are unknown, then they are assumed to be low; conversely, if the costs of achieving the illegal purpose are unknown, then they are assumed to be high.

Consider waterboarding, which, as a form of torture, breaches jus cogens. In waterboarding, victims are laid supine and tied down to reclining platforms; cloths are placed over their faces, and water is poured on the cloths, creating the sensation of drowning. There may be research into waterboarding (e.g., to determine what degree of recline creates the most frightening sensations of drowning without killing the victim). There is a very high probability that such research will achieve waterboarding; there is a very low probability that it will achieve a legal purpose; the benefits of achieving a legal purpose are unknown, so, by the precautionary measure, they are assumed to be low; the costs of waterboarding are very high. Consequently, states should conclude a multilateral treaty to prohibit the research.

This is a simple cost-benefit analysis based on expected utility theory, i.e., the theory of rational choice under conditions of uncertainty. A rational decision consists of maximizing the expected utility that is associated with each choice, and this is a matter of multiplying the probability of an outcome by the utility of the outcome associated with this choice. It is a standard approach to decision-making in the social sciences. See, e.g., Michael Allingham, *Choice Theory: A Very Short Introduction* (Oxford: Oxford University Press, 2002), Ch. 3.


In fact, there appears to have been systematic testing of waterboarding technology by two psychologists, Dr. John “Bruce” Jessen and Dr. James Mitchell, who worked as CIA contractors. In December 2014, the United States Senate Select Committee on Intelligence reported that Jessen and Mitchell “developed the list of enhanced interrogation techniques [including waterboarding] and personally conducted interrogations of some of the CIA’s most significant detainees using those techniques. The contractors also evaluated whether the detainees' psychological state allowed for continued use of the techniques, even for some detainees they themselves were interrogating or had interrogated.” See Robert Windrem, “CIA Paid Torture Teachers More Than $80 Million,” *NBC News*, December 9, 2014, accessed May 23, 2015, http://www.nbcnews.com/storyline/cia-torture-report/majority-americans-believe-cias-harsh-interrogation-tactics-were-acceptable-n269211. This example shows how sometimes research into a technology blends in seamlessly with implementation of the technology. In section 3 below, I explore arguments to the effect that such is the case with SSI.
treaty to prohibit waterboarding research. I contend that this policy recommendation accords with the fundamental moral interests and sentiments of the international community as a whole, despite the fact that some states may not believe that waterboarding is immoral.464

Given that the international system is characterized by a plurality of reasonable and unreasonable conceptions of the right and the good; that there are overwhelming temptations for individual states to free-ride on the contributions of other states; and that climate change imposes strict time constraints on remedial action, the deployment regime for omnilateral SSI is not close to being developed. This means that the probability that SSI research will achieve omnilateral SSI is very low. Because the benefits of omnilateral SSI are unknown, by the precautionary measure, they are assumed to be low. In contrast, since unilateral SSI breaches jus cogens, the costs of unilateral SSI are very high. What remains to be determined is the probability that SSI research will achieve unilateral SSI. In this epilogue, I make this determination.

1.2 Overview

This epilogue is divided into four sections. In the first section, reviewing the literature on the ethics and governance of SSI research, I show that proponents and opponents of such research agree that there is a very high probability that such research will achieve unilateral rather than omnilateral SSI. In the second section, I consider two arguments to the effect that effective SSI research necessarily involves full-scale deployment because anything less than full-scale deployment would not yield accurate

464 This is to be expected under conditions of bounded pluralism: states have wide and deep moral disagreement, rendering them at variance with one another on important matters of substance, including the morality of waterboarding. Nevertheless, despite this disagreement, there is a consensus among most states on these matters. Accordingly, I contend that, while there are may be few notable outliers, most states accept that waterboarding is immoral.
information; this means that, if there is “unilateral SSI research” (i.e., SSI research in which not all descriptively politically legitimate states have equal, effective, and democratic control over the management of the tests), then there is unilateral SSI deployment. In the third section, I address the distinction between basic and applied research and argue that SSI research is better characterized as applied, which means that there is no excuse to shield it from a multilateral treaty. In the fourth section, I conclude with a policy recommendation: because (a) there is a very low probability that SSI research will achieve omnilateral SSI, (b) there is a very high probability that such research will achieve unilateral SSI, (c) the benefits of omnilateral SSI are low (because unknown), and (d) the costs of unilateral SSI are very high, states should conclude a multilateral treaty to prohibit such research. This treaty, which would be analogous to one to prohibit waterboarding research, would protect the fundamental moral interests and sentiments of the international community as a whole.

2. Proponents and Opponents of SSI Research

2.1 Proponents

Caldeira and Keith believe that SSI research should commence soon to ensure that “damaging options are not deployed in haste” in a climate emergency. They believe that such research can identify ways in which SSI is dangerous as well as beneficial. Caldeira and Keith propose a SSI research program that divides those who are charged with developing the technology from those who conduct the environmental assessments. They propose “red team/blue team, wherein one team is tasked with

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465 It is beyond the scope of this epilogue to specify the terms of such a treaty, in particular, whether there should be any exceptions to the prohibition. Such a task is left to another project.

466 Caldeira and Keith, “Climate Engineering Research.”

467 Ibid., 61.
showing how an approach can be made to work, and another team is tasked with showing why the approach cannot produce a system that can actually diminish environmental risk at an acceptable cost.\textsuperscript{468} Further, they propose a research program with three phases: Phase 1, centering on “exploratory research”;\textsuperscript{469} Phase 2, involving “small-scale field experiments”;\textsuperscript{470} and Phase 3, developing a “deployable system.”\textsuperscript{471} The authors acknowledge that, while the main problem in abating greenhouse gas emissions is coordinating multifarious actors towards a common goal, the main problem in SSI is ensuring that no state or small group of states unilaterally deploy SSI.\textsuperscript{472} However, they believe that there probably should be a “bottom-up approach,” whereby knowledge and experience is developed on the ground before international standards and agreements are made.\textsuperscript{473}

Parson and Keith believe that currently no progress can be made on the governance of SSI research because there are two opposing camps.\textsuperscript{474} On the one hand, there are non-governmental organizations and scientists who are concerned that there will be deleterious environmental impacts and that research will quickly lead to deployment.\textsuperscript{475} On the other hand, there are those who repudiate controls on research because they hold that such concerns are “exaggerated” and that there should be “freedom of inquiry”; these people believe that SSI research should be treated no

\textsuperscript{468} Ibid., 61.
\textsuperscript{469} Ibid., 61.
\textsuperscript{470} Ibid., 62.
\textsuperscript{471} Ibid., 62.
\textsuperscript{472} Ibid., 62.
\textsuperscript{473} Ibid., 62.
\textsuperscript{474} Parson and Keith, “End the Deadlock.”
\textsuperscript{475} Ibid., 1278.
differently from other scientific research and that “existing regulations” are sufficient.\textsuperscript{476} The authors believe that research should proceed in the near future because SSI may be needed someday and that, unless research is done now, humankind will be unprepared.\textsuperscript{477}

To “end the deadlock”\textsuperscript{478} between the two camps, Parson and Keith propose research governance that advances four aims: First, “letting low-risk scientifically valuable research proceed”; second, “giving scientists guidance on the design of socially acceptable research”; third, “addressing legitimate public concern about reckless interventions or a thoughtless slide from small research to planetary manipulation”; fourth, “ending the current legal void that facilitates rogue projects.”\textsuperscript{479}

Morrow, Kopp, and Oppenheimer present an ethical framework for SSI research that includes three principles: First, the “Principle of Respect,” according to which the “global public’s consent” is necessary to commence research; second, the “Principle of Beneficence and Justice,” according to which infringements on the basic rights of persons must be minimized, and the costs and benefits must be distributed fairly across “persons, animals, and ecosystems”; third, the “Principle of Minimization,” according to which experiments must be conducted on the smallest possible scale.\textsuperscript{480} The authors analogize SSI research to biomedical research, but they recognize a significant difference: Whereas in biomedical experiments subjects give their consent individually, in SSI experiments the whole world is involved automatically.\textsuperscript{481} The authors therefore suggest that SSI

\textsuperscript{476} Ibid., 1278.
\textsuperscript{477} Ibid., 1279.
\textsuperscript{478} Ibid., 1278.
\textsuperscript{479} Ibid., 1279.
\textsuperscript{480} Morrow, Kopp, and Oppenheimer, “Political Legitimacy,” 148.
\textsuperscript{481} Ibid., 148.
experiments are legitimate only if there is a legitimate “global governance institution” to regulate such experiments. They believe that such an institution must have the consent of all democratic states and of “the larger, less illegitimate non-democratic states,” such as China and Russia. It must also deliver benefits without violating human rights. Most important, it must manifest the “epistemic virtues” of transparency and accountability, as the institution could not be legitimate “if the global public had no effective way to monitor and sanction [its] activities.”

Long, Loy, and Morgan admit that there is as yet little knowledge concerning the effectiveness of SSI technology and its side effects, which may be “profound.” Despite these concerns, they believe that SSI research “must start now.” The authors ask how to start research, in particular, whether early experimentation should occur before or after the establishment of governance structures for research. They are against a moratorium on research, since this “would push research underground and towards private funding where risky experiments may proceed ungoverned.” But they are also against not having any governance at all, since this would mean that “experiments might be conducted with no more than usual research governance.” Instead, they hold that

483 Ibid., 151.
484 Ibid., 151.
485 Ibid., 151.
487 Ibid., 30.
488 Ibid., 30.
489 Ibid., 30.
490 Ibid., 30.
governance and “small-scale, low-risk” outdoor experimentation must “co-evolve.”

They call on governments not only to fund such experimentation but also to develop a governance framework for it.

Although seemingly promising, these four proposals do not go far enough to ensure that SSI research is not used for unilateral SSI. First, in Caldeira and Keith’s “red team/blue team” approach, the team that searches for faults in SSI does not assess whether it conforms to international law; although they are concerned to avoid deployment of SSI by a single state or small group of states, Caldeira and Keith believe that SSI research should commence before the legality of such research is assessed. Second, Parson and Keith want to allay opponents’ concerns that research will quickly lead to deployment, and they want to avoid rogue projects; however, their attitude is that bans and restrictions are barriers to scientific progress and should be surmounted. Third, although Morrow, Kopp, and Oppenheimer require a normatively politically legitimate global governance structure before research proceeds, their criterion of legitimacy is inadequate insofar as all descriptively politically legitimate states (not just the normatively politically legitimate and “the larger, less illegitimate, non-democratic” ones) need to participate in order to forestall unilateral SSI. Fourth, Long, Loy, and Morgan are concerned to avoid privately funded tests that go ungoverned, but they do not guard against the possibility that even research that has co-evolved with governance may be used for an illegal purpose. Indeed, the effect of all four proposals is to increase the probability that unilateral SSI will be deployed.

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491 Ibid., 30.
492 Ibid., 30.
493 Morrow, Kopp, and Oppenheimer, “Political Legitimacy,” 151.
2.2 Opponents

Hamilton addresses the injunction that, despite concerns about the unintended consequences of SSI, “we should at least do the research.” Hamilton states that this injunction is problematic because “[i]t rests on a string of questionable assumptions and a naive understanding of the world that owes more to the quaint ideal of the white-coated scientist dispassionately going about the process of knowledge generation than it does to reality.” There are five questions, which, according to Hamilton, need to be answered satisfactorily before research is conducted. First: Who should do the research? Second: “[W]ho should pay for the research?” Third: “Should the research be transparent, or should it be secret?” Fourth: Who should “impose ethical standards,” “oversee all global research,” and have a “say in where research funds are spent and how research is governed?” Fifth: “Who should own the results of the research?” Hamilton worries that definite answers to these questions are not forthcoming. In particular, he is concerned that scientists, investors, and politicians could manipulate the political system and that a “slew of patents” relating to SSI technologies has already been issued. In sum, “[T]he call to ‘do the research’ entrenches a situation in which [SSI] is often carried out by the wrong people, for the wrong reasons and with no oversight, and in the process is creating a lobby group that is likely to press for deployment because it is in its financial or

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494 Clive Hamilton, “No, We Should not.”
495 Ibid., 139.
496 Ibid., 139.
497 Ibid., 139.
498 Ibid., 139.
499 Ibid., 139.
500 Ibid., 139.
professional interests to do so."  

Robock asks whether SSI research is ethical. Similar to Hamilton, Robock contends that the development of SSI technology may produce a “commercial enterprise with an interest in self-preservation” and may lead to the development of weapons “to control the weather and climate of potential enemies.” Moreover, Robock questions SSI research on the basis that it may divert resources from more productive endeavors, including the search for methods to mitigate climate change. However, Robock does not think that all SSI research should be banned. He makes a distinction between indoor and outdoor experiments. He does not think that indoor research should be regulated, provided that this research is purely for the pursuit of scientific knowledge. However, he believes that outdoor research has potentially hazardous effects on the environment and that, once it is commenced, outdoor research would tend to expand in scale towards full deployment. For this reason, he concludes that outdoor research should be prohibited until an appropriate governance structure is in place.

Gardiner scrutinizes what he calls the “arm the future argument,” which goes as follows. Efforts to reduce greenhouse gas emissions will not succeed to prevent a climate catastrophe; both a climate catastrophe and geoengineering are evils; SSI is the

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501 Ibid., 139.
502 Alan Robock, “Geoengineering Research.”
503 Ibid., 227.
504 Ibid., 226.
505 Ibid., 227. Robock is here referring to “basic research” as opposed to “applied research” (which is what he would suppose outdoor experiments would be). In section 4 below, I question the appropriateness of the distinction between basic and applied research in the context of SSI.
506 Ibid., 228. See Section 3 for an elaboration of this argument.
507 Ibid., 228.
508 Stephen Gardiner, “Arming the Future.”
lesser evil; given the option between a climate catastrophe and SSI, people should choose the latter; but people can choose SSI only if research into the technology begins now; therefore, such research should begin now, so as to “arm the future.” Gardiner does not find this argument convincing. In particular, he believes that, even if SSI is the lesser evil, it nonetheless may be a “marring evil,” which refers to “a negative moral evaluation of an agent’s action (or actions), that is licensed when the agent (justifiably) chooses the lesser evil in a morally tragic situation, and which results in a serious negative moral assessment of that agent’s life considered as a whole.” Gardiner claims that it may be a “special kind of moral wrong” to put people in a situation where they must decide between a greater evil and a lesser evil that is nonetheless marring. Gardiner suggests that SSI research may do precisely this.

Furthermore, Winter holds that “deployment and large-scale research of [SSI] must be prohibited from the outset.” He argues that an instrument for the oversight of SSI would either be impossible or ineffective. This is because of the uncertainty inherent in the project. Winter makes a distinction between two kinds of uncertainty. Further research can reduce the first. In contrast, further research cannot reduce the second “because of the vast complexity of the issue.” Where there is the second kind of uncertainty, research cannot succeed, inasmuch as it will never be able reliably to predict

509 Ibid., 285.
510 Ibid., 301.
511 Ibid., 302.
512 Winter, “Climate Engineering.”
513 Ibid., 288.
514 Ibid., 288.
515 Ibid., 288.
the real-world effects of the phenomenon under study. Moreover, Winter holds that there is a “legal foundation” for his “policy recommendation” to prohibit SSI research. He believes that the best candidate for such a foundation is customary international law. Winter argues that customary international law does two things. First, it requires states to mitigate climate change and treat SSI only as a last resort. Second, it imposes a “due diligence requirement,” according to which the amount of knowledge that is needed before deploying SSI is proportional to the amount of damage that SSI may cause. However, Winter maintains that the due diligence requirement cannot be met because “the [needed amount of] knowledge cannot be obtained.”

These authors are concerned that SSI research will lead to unilateral SSI. Hamilton and Robock worry that actors may manipulate the political system and lobby to deploy SSI in spite of good reasons not to do so. Gardiner recognizes that doing research now may put future people in a position where they are overwhelmingly tempted to perform a bad act. Finally, approaching my position, Winter maintains that customary international law requires that states mitigate climate change rather than test SSI and that the law imposes a due diligence standard that proponents of SSI cannot meet due to ineluctable ignorance of the effects of the technology. Moreover, these authors’

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516 Ibid., 288.
517 Ibid., 288.
518 Ibid., 288.
519 Ibid., 288.
520 Ibid., 288-289.
521 Ibid., 289.
522 The main difference between Winter’s argument and mine is that, whereas his is based on customary international law, mine is based on jus cogens. This is not to say that I deny Winter’s conclusion. There may very well be rules and principles of customary international law that prohibit SSI research. However, the identification of such rules and principles is not the purpose of this thesis.
arguments are consistent with the proposition that states should conclude a multilateral treaty to prohibit SSI research. However, none of these authors claim that SSI research should be prohibited because it is likely to lead to a breach of *jus cogens*.

3. Research as Deployment

3.1 Arguments

Some scholars believe not merely that SSI research would lead to full deployment but that any effective SSI research itself would actually have to constitute full deployment. For instance, Martin Bunzl claims that, according to the standard scientific model of technological development, there is a path from research to deployment that contains a series of stopping points going from less realistic to more realistic conditions. Each stopping point is an opportunity to assess the costs and benefits of the technology. But this process can happen only if “our object of interest is reasonably modular or encapsulated,” that is, the technology to be deployed is comprised of multiple discrete units that can be separated and tested in isolation. Bunzl uses a medical example: When testing a drug, researchers expose subjects to a small dose first, and then gradually increase the dosage. But Bunzl believes that, unlike drugs, one “cannot encapsulate part of the atmosphere and it is too complex to be able to build a realistic non-virtual model at scale.” Only mathematical models of the atmosphere are possible, but, due to the complexity of the phenomenon, there is no reason to believe that they are

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524 Ibid., 2.
525 Ibid., 2.
526 Ibid., 2.
527 Ibid., 2.
Thus, it is impossible to make generalizations about the whole of the atmosphere based on a study of its parts, which means that knowledge of SSI’s real-world costs and benefits cannot be obtained except by deploying SSI at a global level.

Whereas Bunzl’s argument is more conceptual, Robock et al.’s argument that “geoengineering cannot be tested without full-scale implementation” is primarily based on scientific knowledge of the workings of the atmosphere, volcanos, and climate models. Like Bunzl, Robock et al. address the supposition that, notwithstanding that all testing of SSI would affect large parts of the planet, it would be possible to test SSI with small interventions to determine whether there would be any negative side effects with larger interventions. The authors argue that there are two reasons why this supposition is false. First, an aerosol cloud needs to be sufficiently thick to have a measurable effect on the planet’s climate; consequently, it would be necessary to keep injecting aerosols into an already existing aerosol cloud. The authors write, “Such effects could not be tested except at full scale.” Second, natural climatic variability would drown out the effects of small injections. They cite a model simulation showing that temperatures could be reduced by injections equaling one 1991 Mount Pinatubo eruption every four years and that such injections would reduce the African and Asian monsoons. But

528 Ibid., 3.
530 Ibid., 530.
531 Ibid., 530.
532 Ibid., 531.
533 Ibid., 531.
534 Robock, Oman, and Stenchikov, “Regional Climate Responses.”
studies\textsuperscript{536} of other volcanic eruptions show that if the injections were significantly less, the effect on the monsoons could not be distinguished from noise. Hence, Robock et al. claim, “The only way to separate the signal from noise is to get a large signal from a large forcing, maintained for a substantial period.”\textsuperscript{537} Robock et al. suggest that an aerosol cloud would have to be sustained in the stratosphere “for the next few decades” in order to reduce anthropogenic climatic forcing.\textsuperscript{538} Accordingly, they write, “Such an experiment would essentially be implementation of [SSI].”\textsuperscript{539}

3.2 Analysis

While Bunzl and Robock et al. argue that effective testing and deployment of SSI are identical, they are not concerned to make a distinction between unilateral and omnilateral SSI. There would be no breach of \textit{jus cogens} if the testing were omnilateral, that is, if every descriptively politically legitimate state had equal, effective, and democratic control over the management of the test. This would simply amount to omnilateral SSI, which, it is assumed, is currently legal. However, for the same reasons that omnilateral SSI is highly unlikely in the short-term, omnilateral testing of SSI is highly unlikely in the short term: The values and interests of descriptively politically legitimate states differ greatly, with some more and others less favourably inclined to


\textsuperscript{537} Ibid., 531.

\textsuperscript{538} Ibid., 531.

\textsuperscript{539} Ibid., 531. MacMynowski et al. attempt to refute Robock et al.’s analysis. MacMynowski et al., using a climate model, argue that small-scale deployment may yield some valuable information. However, even they concede that many uncertainties associated with large-scale deployment could not be resolved by small-scale deployment: In particular, tests lasting “several decades or longer” would be necessary in order to determine how regional water systems would be affected. Douglas G. MacMynowski et al., “Can We Test Geoengineering?” \textit{Energy & Environmental Science} 4 (2011), 5044.
cooperate on a complex scientific project, let alone partake in a potentially irreversible global environmental intervention. Consequently, it may safely be assumed that any test will exclude at least one descriptively politically legitimate state, making such a test unilateral rather than omnilateral. In which case, assuming that Bunzl and Robock et al. are correct, the test will amount to perfect capture of at least one state. No matter what the intended purpose of such a test, this suffices to make the test in violation of a peremptory norm. This means that international law already prohibits it, independent of whether all states conclude a treaty to prohibit it.

That there may be already enough resources in the law to prohibit SSI research does not contradict the proposition that states should conclude a treaty to prohibit such research. One of the recognized functions of a treaty – for instance, the Rome Statute of the International Criminal Court⁵⁴⁰ – is to codify pre-existing *jus cogens*.⁵⁴¹ The Rome Statute establishes that the crime of genocide, crimes against humanity, war crimes, and the crime of aggression are within the jurisdiction of the International Criminal Court.⁵⁴² It did not make these crimes illegal; as breaches of peremptory norms, they were already illegal. But this does not mean that there was no value in making the Rome Statute. The treaty clarified the law, and one of its purposes was to prevent these crimes.⁵⁴³ If SSI

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⁵⁴¹ Portilla writes: “Treaties may codify pre-existing *jus cogens* norms, or help in their formation…. The Rome Statute has codified and criminalized pre-existing peremptory rules of international law…. If the international community of states broadly considers the rules against launching aggressive war or the prohibitions against genocide and torture, slavery, forced disappearance and racial discrimination as *jus cogens* norms – offenses that are criminalized in accordance with the ICC Statute – one can argue that, *mutatis mutandis*, all acts constituting crimes against humanity, when committed as part of a widespread or systematic attack against civilians, and war crimes, when committed only as part of a state or organizational policy, were pre-existing *jus cogens* norms at the time the final draft of the Rome Statute was agreed.” Juan Carlos Portilla, “Amnesty: Evolving 21st Century Constraints Under International Law,” *The Fletcher Forum of World Affairs* 38 (2014), 179-180.

⁵⁴² Rome Statute, Art. 5.

⁵⁴³ Ibid., Preamble.
research entails full-scale unilateral deployment of SSI, the same applies to a multilateral treaty prohibiting SSI research.

4. Basic vs. Applied Research

One may object that I have unfairly ignored the distinction between basic and applied research. As this objection goes, there is a kind of SSI research that is basic and so should not be prohibited by a treaty. According to Calvert, basic research refers to “research that is directed solely toward acquiring new knowledge,” whereas applied research has a “more practical objective.”

However, Calvert argues that “basic research” is a term that scientists use to protect their interests, in particular, to represent their activities as autonomous and so shield themselves from the interference of policymakers.

Calvert surveyed a large number of scientists and found that they “described in surprisingly frank terms how research could be portrayed as either basic or applied depending on the situation.” She found that how the research is portrayed is largely determined by what representation will attract the most funding. Therefore, the distinction between basic and applied research is more a negotiable matter of semantics (what Calvert calls “boundary work”) than an independent reflection of reality.

If Calvert is correct, scientists researching SSI may characterize their work as basic to avoid the multilateral treaty that I have proposed as instrumental to protecting the international community from a breach of a peremptory norm. This would be comparable

545 Ibid., 208, 214-215.
546 Ibid., 209.
547 Ibid., 207.
548 Ibid., 214.
to defining research into waterboarding techniques as “basic.” This goes beyond simply redefining “torture” as “enhanced interrogation.” Even if researchers acknowledge that waterboarding is torture, they could argue that testing the effects on human physiology and behavior of waterboarding constitutes basic research.\(^{549}\) Perhaps such a test would yield information (e.g., relating to the human fear response) that would be of general interest to psychology independent of any application. Even so, it should not be characterized as basic research. There is an overwhelming likelihood that, regardless of researchers’ intentions, the test will be used for torture. Indeed, the test may constitute torture in and of itself. There are good reasons to believe that SSI is like waterboarding in these ways. Hence, it is inappropriate to characterize any SSI research as basic; it is by its very nature applied.

5. Conclusion

In addition to its physical and environmental risks, which are predicted to be significant, SSI is legally hazardous. Although omnilateral SSI is legal, there is a very low probability that it will occur. There are many descriptively politically legitimate states in the world. As long as one of them does not have equal, effective, and democratic control over the management of the technology, SSI is unilateral. This involves the transfer of an existential function – the ecological function – from a descriptively politically legitimate state to a foreign state; due to the termination effect, path-dependency, and socio-technical lock-in, this transfer is irrevocable on any meaningful timescale. Hence, unilateral SSI constitutes perfect capture. Because perfect capture violates the inherent right of self-defence, it breaches \textit{jus cogens}, a very serious act that

\(^{549}\) As far as I am aware, there is no evidence that Drs. Jessen and Mitchell actually made this argument. By all appearances, these psychologists knew that the CIA would use their research for what they called “enhanced interrogation.”
must be prevented even at a high cost.

In this epilogue, I have explored the practical implications of the finding that unilateral SSI breaches *jus cogens*, asking whether states should conclude a multilateral treaty to prohibit SSI research. The answer to this question, as we have seen, depends on four factors: (a) the probability that such research will achieve omnilateral SSI, (b) the probability that it will achieve unilateral SSI, (c) the benefits of omnilateral SSI, and (d) the costs of unilateral SSI. The literature on the ethics and governance of SSI research shows that proponents and opponents of such research agree that, if this technology is used, it will almost certainly be used for unilateral SSI rather than omnilateral SSI. Moreover, there is good reason to believe that, if research were to yield valuable information about the effects of SSI, such research would be unilateral and would itself amount to full-scale, unilateral deployment. I conclude that, because: (a) there is a very low probability that SSI research will achieve omnilateral SSI, (b) there is a very high probability that such research will achieve unilateral SSI, (c) the benefits of omnilateral SSI are low (because unknown), and (d) the costs of unilateral SSI are very high, states should conclude a multilateral treaty to prohibit SSI research.
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