# 1AC

### 1AC—Advantage

#### The current WTO patent system is locking in global cannabis monopolies.

Kellner 21 “Mitigating the Effects of Intellectual Property Colonialism on Budding Cannabis Markets” Hughie Kellner [Hughie Kellner came from the small farm town of Uvalde, Texas and received a bachelor’s degree in Physics from the University of Texas at Austin. Upon graduation from the Indiana University Maurer School of Law, Hughie will deploy his physics degree while prosecuting patents in the Frankfurt am Main, Germany office of Leydig, Voit, & Mayer. After Hughie’s first year at Maurer, he worked for a law firm in Thailand as a Stewart Fellow.] Indiana Journal of Global Legal Studies Vol. 28 #1 (Winter 2021) <https://www.repository.law.indiana.edu/ijgls/vol28/iss1/9/> SM

B. How the Patent Has Become a Tool for Globalization

The trade-offs have been deemed beneficial by most of the international community, judging by the WTO’s TRIPS Agreement, whereby any signatory must institute a patent system to their national order.57 This requirement was seen to advance the benefits that intellectual property brings to markets and provide assurance for companies who depend upon intellectual property (for our purposes, patents) that they will be protected.58 Thus, investment and commercial activity can now more easily flow into countries where before the lack of protection rendered prospective costs of business prohibitive.59

The TRIPS Agreement imposed strong, uniform requirements upon signatory countries that went a long way towards its goal of globalization, and unlike most international treaties, required enforcement mechanisms with teeth.60 The most relevant requirement here is that the member patent office examining the patent may not discriminate “as to the place of invention, the field of technology and whether products are imported or locally produced.”61 This requirement allows great freedom to engage in business within member countries, and prevents a patent office from giving any advantage to its own citizens that it would not give to a foreigner, unless allowed under other treaties.62 Further, if a patent is secured in the relevant country, a business does not need to set up a subsidiary within that country to obtain protection.63

To assist actors whose businesses cross international borders, the PCT was enacted by the World Intellectual Property Organization (WIPO) to reduce barriers when seeking protection for inventions.64 The PCT, while a treaty in name, acts more like an organization; as the WIPO describes the PCT:

The Patent Cooperation Treaty (PCT) assists applicants in seeking patent protection internationally for their inventions, helps patent Offices with their patent granting decisions, and facilitates public access to a wealth of technical information relating to those inventions. By filing one international patent application under the PCT, applicants can simultaneously seek protection for an invention in a very large number of countries.65

Importantly, filing an application to the PCT does not grant a patent international reach; the inventor must file a patent application and await approval in each jurisdiction they wish to pursue, and patents are still enforceable only in the countries where they are obtained.66 Rather, filing your invention to the PCT, and denoting the countries where you seek patent protection, means that the PCT will provide information on the timeframe and likelihood of a patent being granted in that jurisdiction, along with certain assistance that varies based on the jurisdiction sought.67

C. How Companies Can Utilize Patents Internationally

Both the TRIPS Agreement and the PCT reduce barriers to transferring business across national boundaries by easing the transference of the intellectual property needed. The PCT acts merely as a helping hand and information collection tool, while the TRIPS Agreement acts to ensure that intellectual property will operate largely the same from jurisdiction to jurisdiction and, importantly, will be protected with uniform minimum standards. Without commenting on the desirability of this uniform treatment throughout varying economies, it has never been easier for businesses to use their intellectual property to enter international markets.68 In fact, under the TRIPS Agreement and PCT, companies can file a patent in a country where they have no connections,69 acquire a patent, and simply license the technology to (or bring infringement suits against) companies in the member country without needing to ever establish a presence.70

Notably, the PCT and many countries’ patent systems require you to file your patent application within a restricted timeframe after it is first disclosed.71 Thus, this transportation of patent rights must be loosely simultaneous throughout jurisdictions. However, the fact still remains that sophisticated actors who utilize the protections of the TRIPS Agreement can now acquire a monopoly to practice an invention in any country that is a signatory to the TRIPS Agreement or PCT. This usually reaches far short of global domination since companies generally file only in jurisdictions where they expect the benefit of using the patent to outweigh the cost of applying for one.72 However, if the inventor files a patent in every country that has a viable market for that invention, especially if only a few markets exist, the inventor could create an economic climate close to a global monopoly.

#### Big pharma leverages cannabis patents to block out competition and secure monopoly – decks medical marijuana access

Barnett 20 Hailey A. Barnett [J.D. candidate 2020, Tulane University Law School; B.A. 2017, Communication, cum laude, Texas A&M University.], "High Risk, High Reward: Patent Law's Effects on the Medical Marijuana Industry," Tulane Journal of Technology and Intellectual Property 22 (2020): 125-164 <https://heinonline.org/HOL/LandingPage?handle=hein.journals/tuljtip22&div=8&id=&page=> SM

B. Cannabis Patents and Pharmaceutical Companies

Patent protection is a key component of the United States legal system. On principle, we should compensate and reward those who have rightfully invented something, as well as incentivize and stimulate further innovation. The marijuana industry has been historically composed of people who believe in the cause, the plant, and the health benefits it brings. Yet, many of the field's "new players" are getting involved with a specific 89 business purpose in mind. Cannabis patents are one way to normalize and bring the industry to the mainstream, but the winners in the patent system are often those who are first and have the most money.'90

It's no secret why everyone wants a piece of the marijuana industry pie: according to an April 2018 report by Grand View Research, Inc., the global legal marijuana market is projected to be worth $146.4 billion by 025.'9' The report additionally found that in 2016, medical marijuana emerged as the largest segment of the industry and is estimated to be valued at $100.03 billion by 2025.192

One way to obtain a monetary stake in the medical marijuana market is to use the patent process to acquire ownership over a particular strain and its seeds.' 93 This limited monopoly ensures that the patent holder "is the only one who can make or sell the product, or license other people to do so."'94 However, there are so many unanswered questions that surround IP protection of a federally illegal substance, it is unclear if the patents will be upheld.'9 5 If cannabis patents are upheld in federal courts, it is possible that a handful of companies could be in a position to demand licensing fees from the rest of the industry.1 96

This incentive is particularly appealing to major multinational pharmaceutical companies (Big Pharma) and is already being capitalized on today. For example, pharmaceutical firms are already seven of the top ten cannabis patent holders in Canada.' 97 These patents, filed prior to the country's full legalization of marijuana, would have been difficult to enforce prior to legalization.' 9 8 However, after Canada legalized marijuana on October 17, 2018, the patents became fully enforceable and gave the companies a key strategic advantage over non-patent holders in the ever- increasingly competitive market.' 99 The biggest concern is that Big Pharma companies will harness their powerful lobbies and seemingly bottomless payrolls to engage in patent blitzes. In other words, they will try to enlarge their patent portfolios and subsequent ownership of marijuana strains and their ancillary byproducts, such as oils, to marginalize competitors.

In the United States, the FDA plays a crucial role in approving and 201 regulating medications for public use. Big Pharma requires the FDA's approval to bring their products to the public market, and it's no secret that Big Pharma's influence on the agency has accrued over many decades and billions of dollars spent.2 0 2 The current FDA Commissioner Scott Gottlieb recently slammed Big Pharma and accused drugmakers of using "gaming tactics" to stall the introduction of generic versions of biologic drugs, "a move that cost the U.S. healthcare system billions of dollars last year. "203 One of these tactics is to engage in patent blitzes, or evergreening, right before a drug's patent protection (and subsequent market exclusivity 20 4 period) expires. "In the pharmaceutical trade, when brand-name companies patent 'new inventions' that are really just slight modifications of old drugs, it's called 'evergreening. "'205 Evergreening occurs because once a drugmaker's patent on a particular drug expires, the door is open for other producers to bring generic versions of the drug to market.206 Patents in patent blitzes are often granted for even the most trivial improvements and innovations related to existing drugs.207 The purpose of evergreening is two-fold: first, to extend the commercial dominance of brand-name drugs, and second, to tie up producers of the generic drugs in 2 08 costly, time-consuming litigation. Evergreening prevents a generic drug's market entry and further extends Big Pharma's monopolies.2 09

A prime example of recent evergreening is when Mylan hiked the price of its life-saving epinephrine injectable drug, EpiPen, by more than 400%.210 After Teva Pharmaceuticals gained approval from the FDA for the first generic version of EpiPen, Mylan sued them for patent infringement, although epinephrine alone was already a generic drug.2 1 Mylan settled and kept "Teva off the EpiPen market until 2015."212 Much like AbbVie's battle with AmGen over a generic version of the former's costly biologic drug Humira, Big Pharma's inclination to place company profits over the needs and desires of patients could continue with cannabis strain patents. 2 13 This will ultimately affect cost and access to medical marijuana products.

Thanks to shifting public opinion and state legalization, a growing number of cannabis patent applications have been filed with the USPTO and it is very likely they will be granted. Although marijuana remains illegal at the federal level, the premature filings signal hope that sometime in the near future, the federal government will reconsider its stance on cannabis, and make medical and recreational marijuana use legal from sea to shining sea.215

Companies with a large numb1er of cannabis strain patents, such as BioTech, could become an even bigger national player in the field of cannabis strain patents as they acquire more market share. Overall, if Big Pharma obtains exclusive rights to use, produce, and sell particular cannabis strains, together with their large influence over the FDA and other government regulatory bodies, they can control public access and maintain already robust profit margins.217

Not surprisingly, Big Pharma is not the only industry chasing profits from marijuana IP rights. Smaller breeders, including scientists who alter the plant for medicinal purposes, worry that large bioagricultural companies like Monsanto and Syngenta will hoard cannabis-based patents and deploy their massive economic power to position themselves as another dominant force in the market.218 in short, an open and accessible marketplace for cannabis products, especially for medicinal use, depends on tracking the patent activity of wealthy, powerful entities to ensure smaller entities are not marginalized.219

#### Monopolies kill cannabis biodiversity which throttles medical marijuana advances and industry innovation.

Barnett 20 Hailey A. Barnett [J.D. candidate 2020, Tulane University Law School; B.A. 2017, Communication, cum laude, Texas A&M University.], "High Risk, High Reward: Patent Law's Effects on the Medical Marijuana Industry," Tulane Journal of Technology and Intellectual Property 22 (2020): 125-164 <https://heinonline.org/HOL/LandingPage?handle=hein.journals/tuljtip22&div=8&id=&page=> SM

A. Biodiversity Implications for Cannabis Strain Patents

Biodiversity, or biological diversity, is an ongoing controversy in the marijuana patent industry. Like comprehensive research on the benefits and drawbacks of medical marijuana, "empirical analysis on biodiversity in the patent system is limited."2 2 2 Biodiversity is a broad term but is generally defined as "biological diversity in an environment as indicated by numbers of different species of plants and animals." 23 Increasingly, however, countries and companies are asserting IP rights in native flora, 224 impacting global biodiversity.

"Historical documents from around the world, some dating as far back as 2900 B.C., tell us that cannabis has lived alongside humans for thousands of years, cultivated for food, fiber, and fodder, as well as for religious and medicinal purposes." 2 5 The fear is that without a wide variety of cannabis strains available for breeding and growing, production and processing of the plant will inevitably consolidate into the hands of large conglomerates.22 6

The United States and Thailand are signatories to the Convention on Biological Diversity (Biodiversity Convention), a multilateral treaty committed to sustainable development. The Biodiversity Convention's goals include "conserving biological diversity, promoting the sustainable use of its components, and the fair use and equitable sharing of benefits from biological resources."228 The Biodiversity Convention requires signatories to enforce regulations on plant patent applications and mandates that new patent applications include the plant's genetic resources and evidence of local use if they seek to patent the plant in a certain country. This is the chief reason behind the Biodiversity Sustainable Agriculture Food Sovereignty Action Thailand's (Biothai) call for careful scrutiny of recently filed foreign cannabis patents in the country, as discussed in greater detail in the next Section.

Since medical marijuana is now legal for use and manufacture in Thailand, the mere implication that fabled Thai marijuana strains, such as "Northern Lights," could be available on the global market has generated 23 much buzz. 1 Like Cuban cigars or French champagne, Thai marijuana is known for its potency and quality.232 Thailand's marijuana is apure sativa landrace strain, meaning it is a local strain of cannabis that has adapted to Thailand's native environment and conditions over time. Environment plays a key role in the THC, CBD, and terpene quality and quantity and is part of what makes landrace strains so unique. For example, the marijuana plants and seeds that are indigenous to the tropical jungles of Thailand are bred to preserve their naturally occurring high THC levels.235

As more cannabis strain patents are granted worldwide, it is possible that growers will be increasingly dependent on seed makers that hold patents on certain types of seeds and methods used to produce them. As a result, growers will be subject to agreements and royalties and will be charged licensing fees for use of the seeds. A healthy number and variety 236 of available cultivars are vital for advancing cannabis legalization and the industry’s continued growth. From an agricultural perspective, the patent system encourages a consolidation and reduction of variety in order to enhance and maximize profits. This can be seen in today's staple crops, such as com, soy, and wheat, where fewer cultivars exist than they did decades ago.23 9 Other crops globally consumed today, such as fruits 240 and vegetables, are likely grown from patented varieties or cultivars. As a result, agricultural biodiversity has diminished due to the introduction and consolidation of genetically modified, patented varieties, and it is highly likely the cannabis industry could see a similar fate.24 1

Cannabis biodiversity will be threatened if there are fewer available cultivars and, thus, fewer strain options.2 42 Fewer available strains could also lead to limited consumer experiences and patient treatment options. This notion, coupled with already limited clinical and scientific research, could significantly throttle advances in medical marijuana availability and use.2 43 The corporatization of the industry, thanks to patent law, could see smaller growers and businesses merging into giant conglomerates, with 2 the profits being held in the hands of a very few. 4 In short, the "winners" of the cannabis patent wars will dominate the industry post-prohibition.2 45

Some argue that expanding strain patents could have the opposite effect and allow researchers and physicians to "correctly identifty], dos[e], and perhaps even personalize prescriptions for particular strains in the future" to treat specific ailments.24 6 Patents are a hallmark of innovation, and with wide access to more and better cannabis strains, there could be innovation advances in the industry as a whole.2 47 However, the reality is that cannabis patents are likely to be held by large corporations, given what we have seen before with the United States government and the FDA's involvement.24 8

Both medical marijuana patients and recreational marijuana users are strain-driven. While the current cannabis landscape is rich with hundreds of different varieties, strain patents could lead to a "locked genetic landscape where innovation becomes rare and costly."2 4 9 Further, a monopoly on the local strains of one country could have disastrous effects on that country's biodiversity and its rights to that biodiversity.2 50

#### Cannabis industry drives African econ recovery.

Kafeero 7/2 “Business is starting to trump morality in Africa’s cannabis industry” Stephen Kafeero is a Ugandan investigative journalist, He has practiced since 2010 contributing to different publications. He is an Open Society Foundation fellow for Investigative Journalism at University of Witwatersrand in Johannesburg and is a candidate for an MA in Journalism and Media Studies. July 2, 2021 <https://qz.com/africa/2028012/africas-cannabis-industry-is-set-to-boom-due-to-legalization/> SM

The prospect of legalized cannabis in Africa, unimaginable less than a decade ago, is accelerating, driven by the potential for much-needed revenue and the impact of the Covid-19 pandemic.

Generations of Africans have faced the wrath of colonial era and morality laws surrounding cannabis use, with many involved in cultivating and selling the plant jailed, forced to operate underground, or had their livelihoods destroyed. But as governments search for more sources of revenue, this once-closed space is opening up, albeit not necessarily for smallholder growers or local consumption.

Developments in Western markets, where legalization is spreading rapidly, and the prospect of cashing in on the fast growing multi-billion dollar sector, are contributing to the sweeping reforms on the continent. At least 10 countries in Africa are enacting some form of legal framework for the product, while many others are pondering a move in a similar direction.

Legislators and preachers think licensing cannabis growing will make young people resort to marijuana consumption, but no one wants to invest millions of dollars to sell leaves to broke youth in the slum.

Africa’s legal marijuana industry could be worth as much as $7.1 billion by 2023 according to Prohibition Partners, a research and consulting firm specializing in the legal cannabis industry. This projection focused on the legal and regulated cannabis markets in South Africa, Zimbabwe, Lesotho, Nigeria, Morocco, Malawi, Ghana, eSwatini, and Zambia.

#### Ensuring a localized industry rather than foreign exploitation is key.

Fried 19 “The African Cannabis Economy” Carey Fried [Marketing VP at iCAN], October 10, 2019 <https://www.canna-tech.co/cannatech/african-cannabis-economy/> SM

Africa’s cannabis industry and the circular economy

Cannabis legalization trends are sparking hope. A kind of hope that flows from African government officials and decision-makers eager to explore the role of cannabis in driving economic development to global investors eager to realize the potential within the African cannabis economy. The rapid legalization of cannabis can be seen as a true opportunity to drive the circular economy forward.

“Cannabis has great potential in the ‘blue’ circular economy. This concept goes beyond “green” incentives that often contribute to higher costs for green solutions – compared to the hidden subsidies and environmental costs of petrochemical products.” Bruce Ryan, Founder of CannaSystems Canada

According to Mckinsey research compiled in “The Circular Economy: Moving from Theory to Practice”,

“Three major principles govern the circular economy: 1. Preserve and enhance natural capital by controlling finite stocks and balancing the flow of renewable resources. 2. Optimize resource yields by circulating products, components, and materials in use at the highest possible levels at all times. 3. Make the system more effective by eliminating negative externalities.”

What does this mean for African cannabis? Political and business leaders can choose to accept only the most sustainable and forward-thinking policy, research and best practices based on current trends in consumer behaviour. The 2018 Edelman Earned Brand study reveals that 64% of consumers around the world make purchases based on belief. Sustainable cannabis production can connect with a new generation of conscious consumers, and the future created by Africa’s cannabis economy can become accessible, affordable and equitable.

In order to find out more about the African perspective on cannabis and the circular economy, I spoke to Tando Matanda, a Zimbabwe-born, Cambridge educated social activist and venture capitalist. As Founding Director of investment advisory firm Zambezi Investment Fund, Tando is committed to setting the standard for sustainable production practices and high-quality medical cannabis, by utilising state of the art cultivation methods that leveraging the region’s agricultural ecosystems and ecological advantages. Members of the Zambezi Investment Fund are committed to creating shared value in the communities in which they operate.

“There is no better chance than with African cannabis to right the wrongs we have experienced and avoid the creation of yet another exploitative crop built on neo-colonial value-chains and structures.” -Tando Matanda

When our conversation began, Tando asked me to elaborate on how CannaTech plans to “seize this once in a lifetime opportunity in cannabis? How can we, together, create the first agricultural value chain that isn’t exploitative of developing countries and that truly empowers the people in these countries and regions?”

Part of this answer entails looking beyond the financial advantages of investing in a high-potential emerging market, and not dwelling excessively on the exemplary ecological conditions. We need to appreciate the potential of Africa and her countries to welcome a “blue wave” that will lead to a genuine “blue” circular economy. If we refine our approach and really connect with the needs of the people, including producers and consumers, affected by our cannabis ventures, we can leverage technology to turn the whole cannabis plant into regenerative revenue beyond just the financial numbers.

Laboratories, R&D facilities and infrastructure for logistics and traceability can not only increase product quality and buyer trust, but such resources can also minimize, or hopefully completely eliminate negative environmental impacts. Managing our impact on employees, customers and suppliers can further achieve the goals of a circular economy – and place cannabis innovation ahead of the curve when it comes to realizing the positive impact.

Tando continued with emphasizing the facts that, “‘We need to make sure that Africa is not just producing the raw material, or churning out commodity items that get shipped abroad with little value-addition. This is what we did for tobacco, which is why Zimbabwe is the fourth largest producer in the world and gets pennies in relation to the value of that industry. The agricultural trail of tobacco – pennies received for billions earned – cannot be adapted to the cannabis industry. That’s something Africa cannot afford to do again.”

African cannabis economy

For Matanda, this is about equitability. She wants to see the cannabis opportunity propel a conversation about driving wealth creation and access to it. She wants much of the value creation across Africa’s cannabis economy to benefit the continent itself, its natural environment, and its people.

She added that “we need to set a foundation for African cannabis to become an example of how a fair, equitable and transparent agricultural value chain operates. We need to leverage all the resources at our disposal, of which technology is but one, to illustrate a new standard.”

Exploring medical cannabis as a product cultivated and processed in Africa raises the question of where that supply will go. Economy-driven conversations suggest Africa, similar to Latin America, should become a supply hub. The potential for lower production costs, including those due to favourable climatic factors, is attractive to some. The role Africa will play in driving demand, however, is a lot more contentious.

With increased accessibility driving industry growth, Matanda suggests that consideration must be placed on how to ensure that African medical cannabis has a role in the continent’s future healthcare system: “In most nations, the dialogue around production is far ahead of that around its usage within the country. Both Zimbabwe and Lesotho have only legalized medical cannabis for export. So where does that leave the millions of patients who could benefit from accessing cannabis locally?”

Matanda continues by sharing that, “There should always be an allocated proportion for local demand, at a price that is affordable, which the government can set as needed. With a focus on value addition and R&D across the continent, we could ensure the development of strains, types and cannabinoids that reflect the needs of the local market.”

Meanwhile, she acknowledges that export is inevitable, “We live in a globalized world and a capitalist society, so it’s not particularly fair for it to be said that producer X must sell internally to local markets when export markets will be more lucrative. We must not, however, ignore the potential of the African market. Particularly given that this century Africa will see its population triple and account for 40% of the world – from 17% currently. This opportunity goes beyond THC and CBD, beyond pain and anxiety. Cannabis can, and does, change lives for the better. Antibacterial cannabinoids, for instance, will likely play a critical role in saving millions of lives across the continent, but we will need to have a long-term focus on value addition and research.”

#### That’s key to preventing terror.

Ray 1/11 “Does Africa Matter to the United States?” Charles A. Ray [a member of the Board of Trustees and Chair of the Africa Program at the Foreign Policy Research Institute, served as U.S. Ambassador to the Kingdom of Cambodia and the Republic of Zimbabwe] January 11, 2021 <https://www.fpri.org/article/2021/01/does-africa-matter-to-the-united-states/> SM

The population of African countries is also overwhelmingly young. Approximately 40% of Africans are under 15, and, in some countries, over 50% is under 25. By 2050, two of every five children born in the world will be in Africa, and the continent’s population is expected to triple. These developments have positive and negative potential impacts on the United States and the rest of the world. Young Africans have, for the most part, completely skipped the analog age and gone directly digital. Comfortable with technology, they form a huge potential consumer and labor market. If, on the other hand, the countries of Africa fail to develop economically and do not create gainful employment for this young population, then there is the risk that they will become a huge potential source of recruits to extremist and terrorist movements, which currently target disadvantaged and disenchanted youth.

Lack of economic opportunity, increased urbanization, and climate-fueled disasters will also contribute to movement of people seeking better lives, which will impact economies and security not only on the continent of Africa, but also the economic and security situations around the world. Nations, lacking adequate critical infrastructure, education, and job opportunities are ripe for internal unrest and radicalization. In particular, inadequate health delivery systems, when coupled with natural disasters, such as droughts or floods that limit food production, cause famine and mass movements of populations.

The Challenges for U.S. Policy

Prior to World War II, the U.S. policy towards Africa was not as active as it was toward Europe, Asia, or Latin America. During the Cold War, Africa policy was primarily viewed from a perspective of super-power competition. The end of the Cold War and the rise of international terrorism introduced this as a major component in U.S. Africa policy along with competition with a rising China and increased Chinese engagement in Africa.

Before his first official trip to Kenya, U.S. President Barack Obama said, “Africa had become an idea more than an actual place . . . with the benefit of distance, we engaged Africa in a selective embrace.” This is probably an apt description of U.S. policy towards African nations despite the bipartisan nature of that policy. The United States, with the many domestic and international issues it has to cope with, can ill afford to continue to ignore Africa. Going forward, U.S. policy must include a hard-headed look at where Africa fits in policy priorities.

The incoming Biden administration will face a number of important issues and challenges as it develops its Africa policy. The most pressing issues are the following:

Climate Change: Climate change is an existential problem that affects the entire globe, but Africa has probably suffered more from the effects of climate change than other continents—and the problem will only get worse with time. In an October 2020 article, World Meteorological Organization (WMO) Secretary-General Petteri Taalas said,

Climate change is having a growing impact on the African continent, hitting the most vulnerable hardest, and contributing to food insecurity, population displacement and stress on water resources. In recent months we have seen devastating floods, an invasion of desert locusts and now face the looming specter of drought because of a La Nina event. The human and economic toll has been aggravated by the COVID-19 pandemic.

Climate change impacts water quality and availability, and millions in Africa will likely face persistent increased water stress due to these impacts. A multi-year drought in parts of South Africa, for instance, threatened total water failure in several small towns and had livestock farmers facing financial ruin. Another pressing climate-change issue is the need for protection of the Congo Basin rainforest. This 178-million-hectare rainforest is the world’s second largest after the Amazon and is currently threatened by agricultural activities in Cameroon, Central African Republic, Democratic Republic of Congo, Republic of the Congo, Equatorial Guinea, and Gabon. Countries in the Congo Basin need to address the preservation issue, while also enabling sustainable agricultural activities to ensure food security for the region’s population. In addition to the impact on global climate caused by destruction of the rainforest, such destruction also brings human populations into closer contact with the region’s animals, creating the risk of future animal-to-human transmission of new and possibly more virulent viruses similar to COVID-19, which will have a global impact. In a January 2021 CNN report, Dr. Jean-Jacques Muyembe Tamfum, who as a researcher helped discover the Ebola virus in 1976, warned of possible new pathogens that could be as infectious as COVID-19 and as virulent as Ebola.

Rule of Law/Mitigation of Corruption: A key to African development, given the increasing urbanization, population increases, and youthfulness of the continent’s population, will be an increase in domestic and international investment to build the industries that can provide meaningful employment and improved standards of living. In order for this to be successful, African nations will need to address the issues of rule of law and corruption. Investors will not risk money if the business climate comes with a level of political risk that is too high. Government leaders throughout Africa need to establish legislation that provides an acceptable level of security for investments and take action to curb the endemic corruption that currently discourages investment. Corruption in Africa ranges from wholesale political corruption on the scale of General Sani Abachi’s looting of $3-5 billion of state money during his five years as Nigeria’s military ruler to the bribes paid by businessmen to police and customs officials. The “tradition” of having to pay bribes, or “sweeteners,” drives away domestic investment and scares away foreign investment, leaving many countries mired in poverty.

Violent Extremism and Terrorism: A number of African nations are currently plagued with rising extremist movements. While primarily a domestic issue, the mass movement of people fleeing violence and the disruption of economic activity have the potential to negatively impact the rest of the world. African nations need regional responses to curb extremist and terrorist organizations, many of which are supported by international terrorist organizations, such as ISIS and al Qaeda. In addition, the underlying conditions that helped to create these movements must be addressed. Terrorist groups in Africa range from relatively large and dangerous groups, such as Boko Haram, a group in Nigeria that has received support from al Qaeda and that aims to implement sharia law in the country; Al-Shabab, an al Qaeda affiliate aiming to overthrow the government in Somalia and to punish neighboring countries for their support of the Somali regime; and Uganda’s Lord’s Resistance Army, a fundamentalist Christian group. Terrorist groups in the fragile political climate of Libya also pose a threat to sub-Saharan Africa.

#### Causes terrorist CBW usage.

Fyanka 20 Bernard B. Fyanka (epartment of History and International Studies, Redeemer’s University) (2020): Chemical, biological, radiological and nuclear (CBRN) terrorism: Rethinking Nigeria’s counterterrorism strategy, African Security Review, DOI: 10.1080/10246029.2019.1698441 (SGK)

The most commonly used non-conventional weapons are chemical or biological in nature. The long history of chemical and biological weapons usage dates as far back as 600 BC when, during a siege, Solon of Athens poisoned the drinking water of the city of Kirrha.44 More recently – starting with the use of mustard gas during the First World War – nations have acquired chemical and biological weapons easily, deploying them against enemies and their own citizens alike. For terrorist groups like Boko Haram, chemical and biological weapons are uniquely suited to their agenda and as such present very attractive alternatives to nuclear; they are extremely difficult to detect, cost effective and easy to deploy. Aerosols of biological agents are invisible to the naked eye, silent, odourless, tasteless and relatively easily dispersed. Most importantly they are 600 to 2000 times cheaper than other WMDs. Recent esti- mates place the cost of biological weapons at about 0.05% of the cost of a conventional weapon which could produce similar numbers of mass casualties per square kilometre. 45 The proliferation of chemical and biological weapons has proved to be very fluid over the past century due to advancements in technology. Production is comparatively easy via the commonplace technology that is used in the manufacturing of antibiotics, vaccines, foods and beverages, while delivery systems such as spray devices deployed from airplane, boat or car are widely available. Another advantage of biological agents is the natural lead time pro- vided by the organism’s incubation period (three to seven days in most cases), allowing the ter- rorists to deploy the agent and then escape before an investigation by law enforcement and intelligence agencies can even begin. Furthermore, not only would the use of an endemic infec- tious agent likely cause initial confusion because of the difficulty of differentiating between a biological warfare attack and a natural epidemic, but with some agents the potential also exists 46 for secondary or tertiary transmission from person to person or via natural vectors. Unlike their nuclear and radiological counterparts, biological and chemical weapons have been used for terrorism by both state and non-state actors. The challenges faced in preventing the use of these weapons through international control mechanisms include the increasing availability of larger quantities of substances, ease of use and most especially advanced tech- nological deployment facilities that portend a high risk factor to larger populations. Table 1 catalogues the use of biochemical weapons in warfare and by terrorists and other groups or individuals over the past century, offering concrete historical precedent and empirical grounds for the potential future actions of Boko Haram. The data shows consistent recourse to the use of these weapons, in spite of the chemical and biological weapons conventions out- lawing them. It can be seen that from the 1970s onwards there has been an increase in the use of biochemical weapons by religious cults and terrorist groups in pursuit of their agendas. The rise of Boko Haram and its ISIS affiliation could lead to a future where the use of biochemical weapons is the norm rather than the exception.

#### COVID incentivizes engineered bioterror- extinction

Walsh, 20 -- Axios Future correspondent [Bryan Walsh, "The coronavirus pandemic reawakens bioweapon fears," Axios, 5-14-2020, https://www.axios.com/coronavirus-pandemic-pathogen-bioweapon-45417c86-52aa-41b1-8a99-44a6e597d3a8.html, accessed 9-7-2020]

The coronavirus pandemic reawakens bioweapon fears

The immense human and economic toll of the COVID-19 pandemic only underscores the threat posed by pathogens that could be deliberately engineered and released.

Why it matters: New technology like gene editing and DNA synthesis has made the creation of more virulent pathogens easier. Yet security and regulation efforts haven't kept pace with the science.

What's happening: Despite some claims by the White House, overwhelming scientific evidence indicates that the novel coronavirus was not accidentally released from a lab or deliberately engineered, but naturally spilled over from an animal source.

That doesn't mean the threat from bioweapons isn't dire. Along with AI, engineered pandemics are widely considered the biggest existential risk facing humanity.

That's in part because a pathogen could be engineered in a lab for maximum contagiousness and virulence, well beyond what would arise through natural selection.

Case in point: a 2018 pandemic simulation put on by the Johns Hopkins Center for Health Security featured a fictional engineered virus called Clade X that combined the contagiousness of the common cold with the virulence of the real-life Nipah virus, which has a mortality rate of 40-75%. The resulting simulated global outbreak killed 150 million people.

COVID-19 isn't anywhere near that fatal, but the pandemic has shown the vulnerability of the U.S. and the world to biological threats both natural and manmade.

"Potential adversaries are of course seeing the same things we’re seeing," says Richard Pilch of the Middlebury Institute of International Studies. "Anyone looking for a radical leveling approach — whether a state actor like North Korea or a motivated terrorist organization — may be influenced by COVID-19 to consider pursuing a biological weapons capability."

Background: Bioweapons were officially banned by the Biological Weapons Convention in 1975, though North Korea is suspected of maintaining an offensive bioweapons program.

A particular concern about biowarfare and bioterror, though, is that many of the tools and methods that could be used to create a weaponized virus are largely indistinguishable from those used in the course of legitimate scientific research. This makes biotechnology "dual-use" — and that much more difficult to safely regulate without cutting off research that could be vitally important.

While earlier bioweapons fears focused on the possibility that a state or terror group could try to weaponize a known dangerous agent like smallpox — which would require somehow obtaining restricted pathogens — new technology means that someone could obtain the genetic sequence of a germ online and synthesize it in the lab.

"If you've been trained in a relevant technical discipline, that means you can make almost any potentially harmful agent that you're aware of," says Kevin Esvelt, a biologist at the MIT Media Lab and a member of the CDC's Biological Agent Containment Working Group. That would include the novel coronavirus that causes COVID-19, which was recently synthesized from its genetic sequence in a study published in Nature.

How it works: Currently, synthetic DNA is ordered through commercial suppliers. But while most suppliers screen DNA orders for the sequences of dangerous pathogens, they're not required to — and not all do, which means safety efforts are "incomplete, inaccurate, and insecure," says Esvelt.

Screening efforts that look for the genetic sequences of known pathogens also wouldn't necessarily be able to detect when synthetic DNA was being used to make something entirely novel and dangerous.

In the near future, desktop DNA synthesizers may be able to generate synthetic DNA in the lab, cutting out the need for commercial suppliers — and potential security screenings.

The democratization of biotechnology could unleash a wave of creativity and innovation, just as the democratization of personal computing did. But it also increases the number of people who could potentially make a dangerous engineered virus, whether deliberately or by accident.

#### Independently, economic decline causes Africa war

Tollefsen 17 [(Andreas Forø, Peace Research Institute Oslo (PRIO) and Ph.D. in Human Geography from the University of Oslo) “Experienced poverty and local conflict violence," Conflict Management and Peace Science, 12/21/17, <https://www.researchgate.net/publication/320740608_Experienced_poverty_and_local_conflict_violence>]

The present study’s empirical contributions seek to help rectify the inadequate measures of poverty that have come to characterize the literature. To begin with, the article improves our understanding of whether and where a local poverty–conflict nexus exists by deploying experiential data on individuals’ actual wellbeing—which I argue is more closely connected to people’s motives and rationale for taking up arms. Second, the article examines the sociopolitical context’s conditioning effect on the poverty–conflict nexus. This is achieved by including data on individuals’ perceptions surrounding the quality of their local institutions, the presence of group grievances, and local unemployment rates. These factors, I argue, are more closely linked to reasons for fighting than are common proxies such as night-time luminosity and estimates of economic activity, both of which are often derived from dividing GDP per capita by local population counts.

Poverty—a state in which individuals’ basic needs go unmet—has been shown to motivate people to join rebellions. Humphreys and Weinstein (2008), for instance, found that poverty predicted inscription in the Revolutionary United Front during Sierra Leone’s civil war. Barrett (2011) similarly saw how promises of loot lured the poor to enlist in the 1997– 1998 dispute in Nigeria’s local government area known as Toto. Combatants of the Toto conflict were also more likely to join the rebellion if they stood to gain personal protection, food, and shelter.

For the present study, I developed a dataset by aggregating survey responses from the pan-African Afrobarometer survey to subnational districts and combining the results with information on post-survey violent conflicts. The dataset consists of 4008 subnational districts, spanning 35 African countries. As most districts were only assessed once, thus restricting study of within-unit variation, survey responses were also aggregated to higher-order subnational regions, resulting in a dataset of 111 regions that were surveyed at least twice; this permitted a region-level fixed-effects model design.

Using a pooled cross-sectional dataset of districts, I found that high levels of poverty were linked to increases in local conflict-based violence. Districts with a large share of poor individuals, both in absolute terms and relative to country average, had a higher risk ofconflict than more affluent areas. This relationship held in a coarsened exact matching setup, as well as in a region-level fixed effects design with repeated measurements across time. While the results reveal a local poverty–conflict link, they do not aid in uncovering underlying mechanisms.

Using interactions models, I found that poverty increased the risk of conflict, although only where local institutions are weak. The results also show that poverty-stricken areas in which individuals strongly perceive group injustice have a greater risk of conflict than similarly impoverished regions with no aggrieved population. A departure from the local individual opportunity cost explanation, local economic opportunities do not seem to condition the poverty–conflict nexus. In sum, the results suggest that while poverty is significantly connected to conflict, high-quality institutions and inclusiveness of ethnic groups can prevent violence. Although a wide range of robustness checks and alternative model specifications were implemented, including matching and fixed-effects models, the issue of endogeneity could not be ruled out; doing so would require some kind of exogenous instrument, which I have been unable to identify.

The remainder of this article elaborates on the theoretical framework linking subnational poverty to local conflict-based violence. This is followed by a discussion of existing methods for measuring local poverty and their potential shortcomings. Next presented is the study’s research design and modeling strategy, followed by a discussion of empirical results. The conclusion considers the study’s limitations and proposes avenues for future research on poverty in locations that support rebel groups.

Poverty and conflict

A direct link

A connection between low income and risk of conflict is among the most robust findings in the literature on civil wars (Hegre and Sambanis, 2006). However, there is little consensus on the mechanisms through which poverty may produce conflict. Collier and Hoeffler (1998) claimed that low per-capita income lowers the opportunity cost of rebellion because when they have less to lose from taking up arms, poorer individuals become more inclined to rebel. Fearon and Laitin (2003) observed that poorer countries experience more conflict because they are unable to monitor and control all of their territory, thereby creating pockets of hospitable conditions for insurgents; Tollefsen and Buhaug (2015) identified a similar scenario at the local level.

#### Great power war

Yeisley 11 [(USAF Lieutenant Colonel Mark O. Yeisley, assistant professor of international relations at the School of Advanced Air and Space Studies, Maxwell AFB, Alabama. MA Colorado State, PhD in international relations from Duke University) “Bipolarity, Proxy Wars, and the Rise of China,” Strategic Studies Quarterly, Winter 2011, <https://www.jstor.org/stable/26270538?seq=1#metadata_info_tab_contents>] TDI

Bipolarity, Nuclear Weapons, and Sino-US Proxy Conflict in Africa

It is likely China will achieve economic and then military parity with the United States in the next two decades. China currently possesses 240 nuclear warheads and 135 ballistic missiles capable of reaching the United States or its allies; that number of nuclear warheads is estimated to double by the mid 2020s.43 As during the Cold War, a bipolar system in which war between the United States and China is too costly will lead to policy decisions that seek conflict resolution elsewhere.44 But why would China’s rising necessarily lead to geostrategic competition with the United States, and where would this most likely occur? Unlike the Cold War, access to strategic resources rather than ideology would lie at the heart of future US-Sino competition, and the new “great game” will most likely be played in Africa.

Despite Communist Party control of its government, China is not interested in spreading its version of communism and is much more pragmatic in its objectives—securing resources to meet the needs of its citizens and improve their standard of living.45 Some estimates show that China will overtake the United States to become the world’s largest economy by 2015, and rising powers usually take the necessary steps to “ensure markets, materials, and transportation routes.”46 China is the leading global consumer of aluminum, copper, lead, nickel, zinc, tin, and iron ore, and its metal needs now represent more than 25 percent of the world’s total.47 In contrast, from 1970 to 1995, US consumption of all materials, including metals, accounted for one-third of the global total despite representing only 5 percent of the world’s population.48 China is the largest energy consumer, according to the International Energy Agency, surpassing the United States in consumption of oil, coal, and natural gas in 2009.49 As the two largest consumers of both global energy and materials, the United States and China must seek foreign policy prescriptions to fulfill future resource needs. While the United States can alleviate some of its energy needs via bio- or coal-based fuels, hydrogen, or natural gas alternatives, China currently lacks the technological know-how to do so and remains tied to a mainly nonrenewable energy resource base. Since the majority of these needs are nonrenewable, competition of necessity will be zero-sum and will be conducted via all instruments of power.50

Africa is home to a wealth of mineral and energy resources, much of which still remains largely unexploited. Seven African states possess huge endowments of oil, and four of these have equally substantial amounts of natural gas.51 Africa also enjoys large deposits of bauxite (used to make aluminum), copper, lead, nickel, zinc, and iron ore, all of which are imported and highly desired by China. Recent activity serves to prove that China seeks greater access to natural resources in Africa by avidly promoting Chinese development in a large number of African nations. South Africa, the continent’s largest economy, has recently allowed China to help develop its vast mineral wealth; it is China’s number one African source of manganese, iron, and copper.52 Chinese involvement in Africa is not wholly extractive; the continent provides a booming export market for China’s goods and a forum to augment its soft power in the region by offering alternatives to the political and economic baggage that accompanies US foreign aid.53

Of primary interest is open access to Africa’s significant deposits of oil and other energy resources. For example, China has 4,000 military personnel in Sudan to protect its interests in energy and mineral investments there; it also owns 40 percent of the Greater Nile Oil Production Company.54 Estimates indicate that within the next few decades China will obtain 40 percent of its oil and gas supplies from Africa.55 Trade and investment in Africa have also been on the rise; trade has grown more than 10 percent annually in the past decade. Between 2002 and 2004, African exports to China doubled, ranking it third behind the United States and France in trade with the continent. Chinese investment is also growing; more than 700 Chinese business operations across Africa total over $1 billion. Aid and direct economic assistance are increasing as well, and China has forgiven the debt of some 31 African nations.56

Africa is thus a vital foreign interest for the Chinese and must be for the United States; access to its mineral and petroleum wealth is crucial to the survival of each.57 Although the US and Chinese economies are tightly interconnected, the nonrenewable nature of these assets means competition will remain a zero-sum game. Nearly all African states have been independent entities for less than 50 years; consolidating robust domestic state institutions and stable governments remains problematic.58 Studies have shown that weak governments are often prime targets for civil conflicts that prove costly to control.59 Many African nations possess both strategic resources and weak regimes, making them vulnerable to internal conflict and thus valuable candidates for assistance from China or the United States to help settle their domestic grievances. With access to African resources of vital strategic interest to each side, competition could likely occur by proxy via diplomatic, economic, or military assistance to one (or both) of the parties involved.

Realist claims that focusing on third-world issues is misplaced are thus fallacious; war in a future US-China bipolar system remains as costly as it was during the Cold War. Because of the fragile nature of many African regimes, domestic grievances are more prone to result in conflict; US and Chinese strategic interests will dictate an intrusive foreign policy to be both prudent and vital. US-Sino proxy conflicts over control of African resources will likely become necessary if these great powers are to sustain their national security postures, especially in terms of strategic defense.60

#### Nuke war causes extinction – Ice Age, famines, and war won’t stay limited

Edwards 17 [Paul N. Edwards, CISAC’s William J. Perry Fellow in International Security at Stanford’s Freeman Spogli Institute for International Studies. Being interviewed by EarthSky. How nuclear war would affect Earth’s climate. September 8, 2017. earthsky.org/human-world/how-nuclear-war-would-affect-earths-climate] Note, we are only reading parts of the interview that are directly from Paul Edwards -- MMG

In the nuclear conversation, what are we not talking about that we should be?

We are not talking enough about the climatic effects of nuclear war. The “nuclear winter” theory of the mid-1980s played a significant role in the arms reductions of that period. But with the collapse of the Soviet Union and the reduction of U.S. and Russian nuclear arsenals, this aspect of nuclear war has faded from view. That’s not good. In the mid-2000s, climate scientists such as Alan Robock (Rutgers) took another look at nuclear winter theory. This time around, they used much-improved and much more detailed climate models than those available 20 years earlier. They also tested the potential effects of smaller nuclear exchanges. The result: an exchange involving just 50 nuclear weapons — the kind of thing we might see in an India-Pakistan war, for example — could loft 5 billion kilograms of smoke, soot and dust high into the stratosphere. That’s enough to cool the entire planet by about 2 degrees Fahrenheit (1.25 degrees Celsius) — about where we were during the Little Ice Age of the 17th century. Growing seasons could be shortened enough to create really significant food shortages. So the climatic effects of even a relatively small nuclear war would be planet-wide. What about a larger-scale conflict? A U.S.-Russia war currently seems unlikely, but if it were to occur, hundreds or even thousands of nuclear weapons might be launched. The climatic consequences would be catastrophic: global average temperatures would drop as much as 12 degrees Fahrenheit (7 degrees Celsius) for up to several years — temperatures last seen during the great ice ages. Meanwhile, smoke and dust circulating in the stratosphere would darken the atmosphere enough to inhibit photosynthesis, causing disastrous crop failures, widespread famine and massive ecological disruption. The effect would be similar to that of the giant meteor believed to be responsible for the extinction of the dinosaurs. This time, we would be the dinosaurs. Many people are concerned about North Korea’s advancing missile capabilities. Is nuclear war likely in your opinion? At this writing, I think we are closer to a nuclear war than we have been since the early 1960s. In the North Korea case, both Kim Jong-un and President Trump are bullies inclined to escalate confrontations. President Trump lacks impulse control, and there are precious few checks on his ability to initiate a nuclear strike. We have to hope that our generals, both inside and outside the White House, can rein him in. North Korea would most certainly “lose” a nuclear war with the United States. But many millions would die, including hundreds of thousands of Americans currently living in South Korea and Japan (probable North Korean targets). Such vast damage would be wrought in Korea, Japan and Pacific island territories (such as Guam) that any “victory” wouldn’t deserve the name. Not only would that region be left with horrible suffering amongst the survivors; it would also immediately face famine and rampant disease. Radioactive fallout from such a war would spread around the world, including to the U.S. It has been more than 70 years since the last time a nuclear bomb was used in warfare. What would be the effects on the environment and on human health today? To my knowledge, most of the changes in nuclear weapons technology since the 1950s have focused on making them smaller and lighter, and making delivery systems more accurate, rather than on changing their effects on the environment or on human health. So-called “battlefield” weapons with lower explosive yields are part of some arsenals now — but it’s quite unlikely that any exchange between two nuclear powers would stay limited to these smaller, less destructive bombs.

### 1AC—Solvency

#### Plan – the member nations of the World Trade Organization ought to delay patent enforcement for cannabis.

Kellner 21 “Mitigating the Effects of Intellectual Property Colonialism on Budding Cannabis Markets” Hughie Kellner [Hughie Kellner came from the small farm town of Uvalde, Texas and received a bachelor’s degree in Physics from the University of Texas at Austin. Upon graduation from the Indiana University Maurer School of Law, Hughie will deploy his physics degree while prosecuting patents in the Frankfurt am Main, Germany office of Leydig, Voit, & Mayer. After Hughie’s first year at Maurer, he worked for a law firm in Thailand as a Stewart Fellow.] Indiana Journal of Global Legal Studies Vol. 28 #1 (Winter 2021) <https://www.repository.law.indiana.edu/ijgls/vol28/iss1/9/> SM

* Includes enforcement and duration

A simple solution to the problem is this: if a nation, or jurisdiction, provides for some new use of cannabis, be it medicinal, recreational, or scientific, the legislation or decision doing so should be accompanied by a law stating that patents may not be enforced as they relate to the subject matter legalized (cannabis strains, methods for ingesting/using, etc.) for some determinate amount of time, after which, patents may be acquired.105 This, at first glance, may seem to some patent attorneys to be a drastic solution as opposed to, for example, compulsory licensing106 or some other means that does not abscond with the rights demanded by international agreements. In support of my proposal, I will first explain why banning enforcement for a certain period yet keeping patent acquisition is desired, rather than banning patent acquisition altogether, as a means of highlighting the benefits that will accrue from the proposed change. Second, I will argue that imposing patent enforcement during the beginning stages of a jurisdiction’s cannabis market development is difficult to justify, as the incentives that patent enforcement are supposed to bring about already exist in great strength, leaving little for the patent sacrifice to provide.

\*\*Footnote 105: There are many aspects of this solution that this note will not address. One of those aspects is the exact duration. All that is addressed is that duration should be less than the full term of a patent for reasons advanced herein. Further, it is assumed that the exact suitable duration is better adjusted to the economic capabilities of the relevant jurisdiction than uniformly imposed. Another aspect is how the solution should be implemented. This effect, of a patent being filed but not yet enforceable for a significant portion of its term of protection, is not uncommon in the pharmaceutical world where a drug may take ten to fifteen, even eighteen years to get approved, and is only enforceable for the remainder of the twenty years since it was filed, leaving possibly two years to do. Therefore, the solution proposed may occur on its own in some medicinal cannabis markets that have long drug patent examination periods, such as Thailand, specifically. That is why the solution proposed does not come with a specified form of implementation; the same goal may be achieved through controlling varying means and portions of the patent application process.

#### The plan solves by reigning in monopolies without killing innovation.

Kellner 21 “Mitigating the Effects of Intellectual Property Colonialism on Budding Cannabis Markets” Hughie Kellner [Hughie Kellner came from the small farm town of Uvalde, Texas and received a bachelor’s degree in Physics from the University of Texas at Austin. Upon graduation from the Indiana University Maurer School of Law, Hughie will deploy his physics degree while prosecuting patents in the Frankfurt am Main, Germany office of Leydig, Voit, & Mayer. After Hughie’s first year at Maurer, he worked for a law firm in Thailand as a Stewart Fellow.] Indiana Journal of Global Legal Studies Vol. 28 #1 (Winter 2021) <https://www.repository.law.indiana.edu/ijgls/vol28/iss1/9/> SM

Patents may still be sought and possibly even acquired if the government so chooses. In this way, examiners will not introduce a new subject matter eligibility analysis changing the fundamental scheme of patentability. Rather, examiners will process the patent as normal, under conditions that actors within the patent system understand, reducing frustration with changing subject matter eligibility rules that are already ambiguous.107 Further, if the promulgating body determines that the window invalidating patent enforcement should be shorter than the patent term would last, there is a benefit for all actors involved. The reasoning supporting a patent enforcement ban rather than a patent acquisition ban rests on five principles.

First, the entity filing the patent will still receive monopoly protection for its invention, albeit with a shorter window than usual. Thus, the incentive to file a patent and disclose the invention to the public still exists, and in a lucrative market such as that for cannabis, a smaller window of monopoly can be compensated by the higher value of that window, which could bring the perceived benefit from a patent back to usual levels.108

Second, if the invention is conceived during the enforcement ban, patent acquisition would allow inventions to be processed just as patents. By allowing patent processing before and after the ban, the legal regime will reduce administrative costs and increase legal certainty.109 By comparison, a system where patent acquisition is prohibited until after the ban would only result in a complex scheme whereby prior use, prior art, and other novelty requirements are handled.

Third, if actors are utilizing technology under such currently unenforceable but soon-to-be enforceable patents, they will have clear notice when they must cease such infringing action, and either close their doors or develop a compliant way of doing business. Thus, actors in the market can establish themselves and then innovate their own means of carrying out business or license it from those who do. This is the exact action patents are meant to incentivize, innovating new solutions to problems, even if the problem here is merely a legal one.110

Fourth, after the cannabis market sustains established actors, the cannabis market may find that the benefits of promoting more actors in the market111—the purpose of barring patent enforcement—are once again outweighed by the value of the incentives that the patent system provides.112 Setting a time period for when patent enforcement will return ensures that the market is not devoid of the incentives once the initial “green rush”113 wears off.

Fifth, this solution bans foreign monopolies, not foreign participation. This solution does not inhibit foreign companies from moving their business to local markets if the legal regime allows.114 With the ability to move their intellectual property portfolio, foreign companies can still acquire a trademark and operate their business plan, benefitting from the experience acquired in the prior years of operation. Foreign participants, just like domestic participants, cannot monopolize their innovations, and are thus placed on an equal footing.

### 1AC—Framework

#### The standard is consistency with hedonic act utilitarianism

#### 1] Pleasure and pain are intrinsic value and disvalue – everything else regresses – robust neuroscience proves

Blum et al. 18 Kenneth Blum, 1Department of Psychiatry, Boonshoft School of Medicine, Dayton VA Medical Center, Wright State University, Dayton, OH, USA 2Department of Psychiatry, McKnight Brain Institute, University of Florida College of Medicine, Gainesville, FL, USA 3Department of Psychiatry and Behavioral Sciences, Keck Medicine University of Southern California, Los Angeles, CA, USA 4Division of Applied Clinical Research & Education, Dominion Diagnostics, LLC, North Kingstown, RI, USA 5Department of Precision Medicine, Geneus Health LLC, San Antonio, TX, USA 6Department of Addiction Research & Therapy, Nupathways Inc., Innsbrook, MO, USA 7Department of Clinical Neurology, Path Foundation, New York, NY, USA 8Division of Neuroscience-Based Addiction Therapy, The Shores Treatment & Recovery Center, Port Saint Lucie, FL, USA 9Institute of Psychology, Eötvös Loránd University, Budapest, Hungary 10Division of Addiction Research, Dominion Diagnostics, LLC. North Kingston, RI, USA 11Victory Nutrition International, Lederach, PA., USA 12National Human Genome Center at Howard University, Washington, DC., USA, Marjorie Gondré-Lewis, 12National Human Genome Center at Howard University, Washington, DC., USA 13Departments of Anatomy and Psychiatry, Howard University College of Medicine, Washington, DC US, Bruce Steinberg, 4Division of Applied Clinical Research & Education, Dominion Diagnostics, LLC, North Kingstown, RI, USA, Igor Elman, 15Department Psychiatry, Cooper University School of Medicine, Camden, NJ, USA, David Baron, 3Department of Psychiatry and Behavioral Sciences, Keck Medicine University of Southern California, Los Angeles, CA, USA, Edward J Modestino, 14Department of Psychology, Curry College, Milton, MA, USA, Rajendra D Badgaiyan, 15Department Psychiatry, Cooper University School of Medicine, Camden, NJ, USA, Mark S Gold 16Department of Psychiatry, Washington University, St. Louis, MO, USA, “Our evolved unique pleasure circuit makes humans different from apes: Reconsideration of data derived from animal studies”, U.S. Department of Veterans Affairs, 28 February 2018, accessed: 19 August 2020, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6446569/>, R.S.

**Pleasure** is not only one of the three primary reward functions but it also **defines reward.** As homeostasis explains the functions of only a limited number of rewards, the principal reason why particular stimuli, objects, events, situations, and activities are rewarding may be due to pleasure. This applies first of all to sex and to the primary homeostatic rewards of food and liquid and extends to money, taste, beauty, social encounters and nonmaterial, internally set, and intrinsic rewards. Pleasure, as the primary effect of rewards, drives the prime reward functions of learning, approach behavior, and decision making and provides the **basis for hedonic theories** of reward function. We are attracted by most rewards and exert intense efforts to obtain them, just because they are enjoyable [10].

Pleasure is a passive reaction that derives from the experience or prediction of reward and may lead to a long-lasting state of happiness. The word happiness is difficult to define. In fact, just obtaining physical pleasure may not be enough. One key to happiness involves a network of good friends. However, it is not obvious how the higher forms of satisfaction and pleasure are related to an ice cream cone, or to your team winning a sporting event. Recent multidisciplinary research, using both humans and detailed invasive brain analysis of animals has discovered some critical ways that the brain processes pleasure [14].

Pleasure as a hallmark of reward is sufficient for defining a reward, but it may not be necessary. A reward may generate positive learning and approach behavior simply because it contains substances that are essential for body function. When we are hungry, we may eat bad and unpleasant meals. A monkey who receives hundreds of small drops of water every morning in the laboratory is unlikely to feel a rush of pleasure every time it gets the 0.1 ml. Nevertheless, with these precautions in mind, we may define any stimulus, object, event, activity, or situation that has the potential to produce pleasure as a reward. In the context of reward deficiency or for disorders of addiction, homeostasis pursues pharmacological treatments: drugs to treat drug addiction, obesity, and other compulsive behaviors. The theory of allostasis suggests broader approaches - such as re-expanding the range of possible pleasures and providing opportunities to expend effort in their pursuit. [15]. It is noteworthy, the first animal studies eliciting approach behavior by electrical brain stimulation interpreted their findings as a discovery of the brain’s pleasure centers [16] which were later partly associated with midbrain dopamine neurons [17–19] despite the notorious difficulties of identifying emotions in animals.

Evolutionary theories of pleasure: The love connection BO:D

Charles Darwin and other biological scientists that have examined the biological evolution and its basic principles found various mechanisms that steer behavior and biological development. Besides their theory on natural selection, it was particularly the sexual selection process that gained significance in the latter context over the last century, especially when it comes to the question of what makes us “what we are,” i.e., human. However, the capacity to sexually select and evolve is not at all a human accomplishment alone or a sign of our uniqueness; yet, we humans, as it seems, are ingenious in fooling ourselves and others–when we are in love or desperately search for it.

It is well established that modern biological theory conjectures that **organisms are** the **result of evolutionary competition.** In fact, Richard Dawkins stresses gene survival and propagation as the basic mechanism of life [20]. Only genes that lead to the fittest phenotype will make it. It is noteworthy that the phenotype is selected based on behavior that maximizes gene propagation. To do so, the phenotype must survive and generate offspring, and be better at it than its competitors. Thus, the ultimate, distal function of rewards is to increase evolutionary fitness by ensuring the survival of the organism and reproduction. It is agreed that learning, approach, economic decisions, and positive emotions are the proximal functions through which phenotypes obtain other necessary nutrients for survival, mating, and care for offspring.

Behavioral reward functions have evolved to help individuals to survive and propagate their genes. Apparently, people need to live well and long enough to reproduce. Most would agree that homo-sapiens do so by ingesting the substances that make their bodies function properly. For this reason, foods and drinks are rewards. Additional rewards, including those used for economic exchanges, ensure sufficient palatable food and drink supply. Mating and gene propagation is supported by powerful sexual attraction. Additional properties, like body form, augment the chance to mate and nourish and defend offspring and are therefore also rewards. Care for offspring until they can reproduce themselves helps gene propagation and is rewarding; otherwise, many believe mating is useless. According to David E Comings, as any small edge will ultimately result in evolutionary advantage [21], additional reward mechanisms like novelty seeking and exploration widen the spectrum of available rewards and thus enhance the chance for survival, reproduction, and ultimate gene propagation. These functions may help us to obtain the benefits of distant rewards that are determined by our own interests and not immediately available in the environment. Thus the distal reward function in gene propagation and evolutionary fitness defines the proximal reward functions that we see in everyday behavior. That is why foods, drinks, mates, and offspring are rewarding.

There have been theories linking pleasure as a required component of health benefits salutogenesis, (salugenesis). In essence, under these terms, pleasure is described as a state or feeling of happiness and satisfaction resulting from an experience that one enjoys. Regarding pleasure, it is a double-edged sword, on the one hand, it promotes positive feelings (like mindfulness) and even better cognition, possibly through the release of dopamine [22]. But on the other hand, pleasure simultaneously encourages addiction and other negative behaviors, i.e., motivational toxicity. It is a complex neurobiological phenomenon, relying on reward circuitry or limbic activity. It is important to realize that through the “Brain Reward Cascade” (BRC) endorphin and endogenous morphinergic mechanisms may play a role [23]. While natural rewards are essential for survival and appetitive motivation leading to beneficial biological behaviors like eating, sex, and reproduction, crucial social interactions seem to further facilitate the positive effects exerted by pleasurable experiences. Indeed, experimentation with addictive drugs is capable of directly acting on reward pathways and causing deterioration of these systems promoting hypodopaminergia [24]. Most would agree that pleasurable activities can stimulate personal growth and may help to induce healthy behavioral changes, including stress management [25]. The work of Esch and Stefano [26] concerning the link between compassion and love implicate the brain reward system, and pleasure induction suggests that social contact in general, i.e., love, attachment, and compassion, can be highly effective in stress reduction, survival, and overall health.

Understanding the role of neurotransmission and pleasurable states both positive and negative have been adequately studied over many decades [26–37], but comparative anatomical and neurobiological function between animals and homo sapiens appear to be required and seem to be in an infancy stage.

Finding happiness is different between apes and humans

As stated earlier in this expert opinion one key to happiness involves a network of good friends [38]. However, it is not entirely clear exactly how the higher forms of satisfaction and pleasure are related to a sugar rush, winning a sports event or even sky diving, all of which augment dopamine release at the reward brain site. Recent multidisciplinary research, using both humans and detailed invasive brain analysis of animals has discovered some critical ways that the brain processes pleasure.

Remarkably, there are pathways for ordinary liking and pleasure, which are limited in scope as described above in this commentary. However, there are **many brain regions**, often termed hot and cold spots, that significantly **modulate** (increase or decrease) our **pleasure or** even produce **the opposite** of pleasure— that is disgust and fear [39]. One specific region of the nucleus accumbens is organized like a computer keyboard, with particular stimulus triggers in rows— producing an increase and decrease of pleasure and disgust. Moreover, the cortex has unique roles in the cognitive evaluation of our feelings of pleasure [40]. Importantly, the interplay of these multiple triggers and the higher brain centers in the prefrontal cortex are very intricate and are just being uncovered.

Desire and reward centers

It is surprising that many different sources of pleasure activate the same circuits between the mesocorticolimbic regions (Figure 1). Reward and desire are two aspects pleasure induction and have a very widespread, large circuit. Some part of this circuit distinguishes between desire and dread. The so-called pleasure circuitry called “REWARD” involves a well-known dopamine pathway in the mesolimbic system that can influence both pleasure and motivation.

In simplest terms, the well-established mesolimbic system is a dopamine circuit for reward. It starts in the ventral tegmental area (VTA) of the midbrain and travels to the nucleus accumbens (Figure 2). It is the cornerstone target to all addictions. The VTA is encompassed with neurons using glutamate, GABA, and dopamine. The nucleus accumbens (NAc) is located within the ventral striatum and is divided into two sub-regions—the motor and limbic regions associated with its core and shell, respectively. The NAc has spiny neurons that receive dopamine from the VTA and glutamate (a dopamine driver) from the hippocampus, amygdala and medial prefrontal cortex. Subsequently, the NAc projects GABA signals to an area termed the ventral pallidum (VP). The region is a relay station in the limbic loop of the basal ganglia, critical for motivation, behavior, emotions and the “Feel Good” response. This defined system of the brain is involved in all addictions –substance, and non –substance related. In 1995, our laboratory coined the term “Reward Deficiency Syndrome” (RDS) to describe genetic and epigenetic induced hypodopaminergia in the “Brain Reward Cascade” that contribute to addiction and compulsive behaviors [3,6,41].

Furthermore, ordinary “liking” of something, or pure pleasure, is represented by small regions mainly in the limbic system (old reptilian part of the brain). These may be part of larger neural circuits. In Latin, hedus is the term for “sweet”; and in Greek, hodone is the term for “pleasure.” Thus, the word Hedonic is now referring to various subcomponents of pleasure: some associated with purely sensory and others with more complex emotions involving morals, aesthetics, and social interactions. The capacity to have pleasure is part of being healthy and may even extend life, especially if linked to optimism as a dopaminergic response [42].

Psychiatric illness often includes symptoms of an abnormal inability to experience pleasure, referred to as anhedonia. A negative feeling state is called dysphoria, which can consist of many emotions such as pain, depression, anxiety, fear, and disgust. Previously many scientists used animal research to uncover the complex mechanisms of pleasure, liking, motivation and even emotions like panic and fear, as discussed above [43]. However, as a significant amount of related research about the specific brain regions of pleasure/reward circuitry has been derived from invasive studies of animals, these cannot be directly compared with subjective states experienced by humans.

In an attempt to resolve the controversy regarding the causal contributions of mesolimbic dopamine systems to reward, we have previously evaluated the three-main competing explanatory categories: “liking,” “learning,” and “wanting” [3]. That is, dopamine may mediate (a) liking: the hedonic impact of reward, (b) learning: learned predictions about rewarding effects, or (c) wanting: the pursuit of rewards by attributing incentive salience to reward-related stimuli [44]. We have evaluated these hypotheses, especially as they relate to the RDS, and we find that the incentive salience or “wanting” hypothesis of dopaminergic functioning is supported by a majority of the scientific evidence. Various neuroimaging studies have shown that anticipated behaviors such as sex and gaming, delicious foods and drugs of abuse all affect brain regions associated with reward networks, and may not be unidirectional. Drugs of abuse enhance dopamine signaling which sensitizes mesolimbic brain mechanisms that apparently evolved explicitly to attribute incentive salience to various rewards [45].

Addictive substances are voluntarily self-administered, and they enhance (directly or indirectly) dopaminergic synaptic function in the NAc. This activation of the brain reward networks (producing the ecstatic “high” that users seek). Although these circuits were initially thought to encode a set point of hedonic tone, it is now being considered to be far more complicated in function, also encoding attention, reward expectancy, disconfirmation of reward expectancy, and incentive motivation [46]. The argument about addiction as a disease may be confused with a predisposition to substance and nonsubstance rewards relative to the extreme effect of drugs of abuse on brain neurochemistry. The former sets up an individual to be at high risk through both genetic polymorphisms in reward genes as well as harmful epigenetic insult. Some Psychologists, even with all the data, still infer that addiction is not a disease [47]. Elevated stress levels, together with polymorphisms (genetic variations) of various dopaminergic genes and the genes related to other neurotransmitters (and their genetic variants), and may have an additive effect on vulnerability to various addictions [48]. In this regard, Vanyukov, et al. [48] suggested based on review that whereas the gateway hypothesis does not specify mechanistic connections between “stages,” and does not extend to the risks for addictions the concept of common liability to addictions may be more parsimonious. The latter theory is grounded in genetic theory and supported by data identifying common sources of variation in the risk for specific addictions (e.g., RDS). This commonality has identifiable neurobiological substrate and plausible evolutionary explanations.

Over many years the controversy of dopamine involvement in especially “pleasure” has led to confusion concerning separating motivation from actual pleasure (wanting versus liking) [49]. We take the position that animal studies cannot provide real clinical information as described by self-reports in humans. As mentioned earlier and in the abstract, on November 23rd, 2017, evidence for our concerns was discovered [50]

In essence, although nonhuman primate brains are similar to our own, the disparity between other primates and those of human cognitive abilities tells us that surface similarity is not the whole story. Sousa et al. [50] small case found various differentially expressed genes, to associate with pleasure related systems. Furthermore, the dopaminergic interneurons located in the human neocortex were absent from the neocortex of nonhuman African apes. Such differences in neuronal transcriptional programs may underlie a variety of neurodevelopmental disorders.

In simpler terms, the system controls the production of dopamine, a chemical messenger that plays a significant role in pleasure and rewards. The senior author, Dr. Nenad Sestan from Yale, stated: “Humans have evolved a dopamine system that is different than the one in chimpanzees.” This may explain why the behavior of humans is so unique from that of non-human primates, even though our brains are so surprisingly similar, Sestan said: “It might also shed light on why people are vulnerable to mental disorders such as autism (possibly even addiction).” Remarkably, this research finding emerged from an extensive, multicenter collaboration to compare the brains across several species. These researchers examined 247 specimens of neural tissue from six humans, five chimpanzees, and five macaque monkeys. Moreover, these investigators analyzed which genes were turned on or off in 16 regions of the brain. While the differences among species were subtle, **there was** a **remarkable contrast in** the **neocortices**, specifically in an area of the brain that is much more developed in humans than in chimpanzees. In fact, these researchers found that a gene called tyrosine hydroxylase (TH) for the enzyme, responsible for the production of dopamine, was expressed in the neocortex of humans, but not chimpanzees. As discussed earlier, dopamine is best known for its essential role within the brain’s reward system; the very system that responds to everything from sex, to gambling, to food, and to addictive drugs. However, dopamine also assists in regulating emotional responses, memory, and movement. Notably, abnormal dopamine levels have been linked to disorders including Parkinson’s, schizophrenia and spectrum disorders such as autism and addiction or RDS.

Nora Volkow, the director of NIDA, pointed out that one alluring possibility is that the neurotransmitter dopamine plays a substantial role in humans’ ability to pursue various rewards that are perhaps months or even years away in the future. This same idea has been suggested by Dr. Robert Sapolsky, a professor of biology and neurology at Stanford University. Dr. Sapolsky cited evidence that dopamine levels rise dramatically in humans when we anticipate potential rewards that are uncertain and even far off in our futures, such as retirement or even the possible alterlife. This may explain what often motivates people to work for things that have no apparent short-term benefit [51]. In similar work, Volkow and Bale [52] proposed a model in which dopamine can favor NOW processes through phasic signaling in reward circuits or LATER processes through tonic signaling in control circuits. Specifically, they suggest that through its modulation of the orbitofrontal cortex, which processes salience attribution, dopamine also enables shilting from NOW to LATER, while its modulation of the insula, which processes interoceptive information, influences the probability of selecting NOW versus LATER actions based on an individual’s physiological state. This hypothesis further supports the concept that disruptions along these circuits contribute to diverse pathologies, including obesity and addiction or RDS.

#### 2] Evolution – only a naturalistic understanding of the world explains it.

**Lutz and Lenman 18.** Lutz, Matthew and Lenman, James, "Moral Naturalism", The Stanford Encyclopedia of Philosophy (Fall 2018 Edition), Edward N. Zalta (ed.), URL = <https://plato.stanford.edu/archives/fall2018/entries/naturalism-moral/>. //Massa

The second argument against moral non-naturalism concerns moral epistemology. **According to**evolutionary debunking arguments**, our moral beliefs are products of evolution**, and this evolutionary etiology of our moral beliefs serves to undermine them. Exactly why evolution debunks our moral beliefs is a matter of substantial controversy, and the debunking argument has been interpreted in a number of different ways (Vavova 2015). Sharon Street, whose statement of the evolutionary debunking argument has been highly influential, holds that debunking arguments make a problem for all versions of moral realism—her paper is entitled “A Darwinian Dilemma for Realist Theories of Value.” But according to another popular line of argument, these debunking arguments are only problems for moral non-naturalism. **The fundamental worry is that our moral beliefs are the product of evolutionary facts rather than moral facts**. If this is so, **this would serve to debunk our moral beliefs, either because it is a necessary condition on justified belief that you take your beliefs to be explained by the facts in question** (Joyce 2006, Ch. 6; Bedke 2009; Lutz forthcoming) **or else because the non-naturalist is left with no way to explain the reliability of our moral beliefs** (Enoch 2009, Schechter 2017).

**But if moral naturalism is true, the realist needn’t grant the skeptic’s premise** that our moral beliefs are the product of evolutionary facts rather than moral facts. **If moral facts are natural, then we needn’t see moral facts as being contrary to natural, evolutionary facts.** The **moral facts might be among these evolutionary facts that explain our moral beliefs.** If, for instance, **to be good** just **is** to be **conducive to social cooperation, then an evolutionary** account that says that we judge things to be good only when they are conducive to social cooperation **would not debunk any of our beliefs about goodness. This** account **would**, instead, **provide a deep vindication of those beliefs** (Copp 2008).

#### 3] Actor specificity – every policy benefits some and harms others, which also means side constraints freeze action and governments must make tradeoffs.

#### 4] Death is the worst evil

Paterson 03 – Department of Philosophy, Providence College, Rhode Island. (Craig, “A Life Not Worth Living?”, Studies in Christian Ethics, <http://sce.sagepub.com>)

Contrary to those accounts, I would argue that it is death per se that is really the objective evil for us, not because it deprives us of a prospective future of overall good judged better than the alter- native of non-being. It cannot be about harm to a former person who has ceased to exist, for no person actually suffers from the sub-sequent non-participation. Rather, death in itself is an evil to us because it ontologically destroys the current existent subject — it is the ultimate in metaphysical lightening strikes.80 The evil of death is truly an ontological evil borne by the person who already exists, independently of calculations about better or worse possible lives. Such an evil need not be consciously experienced in order to be an evil for the kind of being a human person is. Death is an evil because of the change in kind it brings about, a change that is destructive of the type of entity that we essentially are. Anything, whether caused naturally or caused by human intervention (intentional or unintentional) that drastically interferes in the process of maintaining the person in existence is an objective evil for the person. What is crucially at stake here, and is dialectically supportive of the self-evidency of the basic good of human life, is that death is a radical interference with the current life process of the kind of being that we are. In consequence, death itself can be credibly thought of as a ‘primitive evil’ for all persons, regardless of the extent to which they are currently or prospectively capable of participating in a full array of the goods of life.81 In conclusion, concerning willed human actions, it is justifiable to state that any intentional rejection of human life itself cannot therefore be warranted since it is an expression of an ultimate disvalue for the subject, namely, the destruction of the present person; a radical ontological good that we cannot begin to weigh objectively against the travails of life in a rational manner. To deal with the sources of disvalue (pain, suffering, etc.) we should not seek to irrationally destroy the person, the very source and condition of all human possibility.82

#### 6] Existential threats outweigh – all life has infinite value and extinction eliminates the possibility for future generations – err negative, because of innate cognitive biases

GPP 17 (Global Priorities Project, Future of Humanity Institute at the University of Oxford, Ministry for Foreign Affairs of Finland, “Existential Risk: Diplomacy and Governance,” Global Priorities Project, 2017, <https://www.fhi.ox.ac.uk/wp-content/uploads/Existential-Risks-2017-01-23.pdf>,

1.2. THE ETHICS OF EXISTENTIAL RISK In his book Reasons and Persons, Oxford philosopher Derek Parfit advanced an influential argument about the importance of avoiding extinction: I believe that if we destroy mankind, as we now can, this outcome will be much worse than most people think. Compare three outcomes: (1) Peace. (2) A nuclear war that kills 99% of the world’s existing population. (3) A nuclear war that kills 100%. (2) would be worse than (1), and (3) would be worse than (2). Which is the greater of these two differences? Most people believe that the greater difference is between (1) and (2). I believe that the difference between (2) and (3) is very much greater. ... The Earth will remain habitable for at least another billion years. Civilization began only a few thousand years ago. If we do not destroy mankind, these few thousand years may be only a tiny fraction of the whole of civilized human history. The difference between (2) and (3) may thus be the difference between this tiny fraction and all of the rest of this history. If we compare this possible history to a day, what has occurred so far is only a fraction of a second.65 In this argument, it seems that Parfit is assuming that the survivors of a nuclear war that kills 99% of the population would eventually be able to recover civilisation without long-term effect. As we have seen, this may not be a safe assumption – but for the purposes of this thought experiment, the point stands. What makes existential catastrophes especially bad is that they would “destroy the future,” as another Oxford philosopher, Nick Bostrom, puts it.66 This future could potentially be extremely long and full of flourishing, and would therefore have extremely large value. In standard risk analysis, when working out how to respond to risk, we work out the expected value of risk reduction, by weighing the probability that an action will prevent an adverse event against the severity of the event. Because the value of preventing existential catastrophe is so vast, even a tiny probability of prevention has huge expected value.67 Of course, there is persisting reasonable disagreement about ethics and there are a number of ways one might resist this conclusion.68 Therefore, it would be unjustified to be overconfident in Parfit and Bostrom’s argument. In some areas, government policy does give significant weight to future generations. For example, in assessing the risks of nuclear waste storage, governments have considered timeframes of thousands, hundreds of thousands, and even a million years.69 Justifications for this policy usually appeal to principles of intergenerational equity according to which future generations ought to get as much protection as current generations.70 Similarly, widely accepted norms of sustainable development require development that meets the needs of the current generation without compromising the ability of future generations to meet their own needs.71 However, when it comes to existential risk, it would seem that we fail to live up to principles of intergenerational equity. Existential catastrophe would not only give future generations less than the current generations; it would give them nothing. Indeed, reducing existential risk plausibly has a quite low cost for us in comparison with the huge expected value it has for future generations. In spite of this, relatively little is done to reduce existential risk. Unless we give up on norms of intergenerational equity, they give us a strong case for significantly increasing our efforts to reduce existential risks. 1.3. WHY EXISTENTIAL RISKS MAY BE SYSTEMATICALLY UNDERINVESTED IN, AND THE ROLE OF THE INTERNATIONAL COMMUNITY In spite of the importance of existential risk reduction, it probably receives less attention than is warranted. As a result, concerted international cooperation is required if we are to receive adequate protection from existential risks. 1.3.1. Why existential risks are likely to be underinvested in There are several reasons why existential risk reduction is likely to be underinvested in. Firstly, it is a global public good. Economic theory predicts that such goods tend to be underprovided. The benefits of existential risk reduction are widely and indivisibly dispersed around the globe from the countries responsible for taking action. Consequently, a country which reduces existential risk gains only a small portion of the benefits but bears the full brunt of the costs. Countries thus have strong incentives to free ride, receiving the benefits of risk reduction without contributing. As a result, too few do what is in the common interest. Secondly, as already suggested above, existential risk reduction is an intergenerational public good: most of the benefits are enjoyed by future generations who have no say in the political process. For these goods, the problem is temporal free riding: the current generation enjoys the benefits of inaction while future generations bear the costs. Thirdly, many existential risks, such as machine superintelligence, engineered pandemics, and solar geoengineering, pose an unprecedented and uncertain future threat. Consequently, it is hard to develop a satisfactory governance regime for them: there are few existing governance instruments which can be applied to these risks, and it is unclear what shape new instruments should take. In this way, our position with regard to these emerging risks is comparable to the one we faced when nuclear weapons first became available. Cognitive biases also lead people to underestimate existential risks. Since there have not been any catastrophes of this magnitude, these risks are not salient to politicians and the public.72 This is an example of the misapplication of the availability heuristic, a mental shortcut which assumes that something is important only if it can be readily recalled. Another cognitive bias affecting perceptions of existential risk is scope neglect. In a seminal 1992 study, three groups were asked how much they would be willing to pay to save 2,000, 20,000 or 200,000 birds from drowning in uncovered oil ponds. The groups answered $80, $78, and $88, respectively.73 In this case, the size of the benefits had little effect on the scale of the preferred response. People become numbed to the effect of saving lives when the numbers get too large. 74 Scope neglect is a particularly acute problem for existential risk because the numbers at stake are so large. Due to scope neglect, decision-makers are prone to treat existential risks in a similar way to problems which are less severe by many orders of magnitude. A wide range of other cognitive biases are likely to affect the evaluation of existential risks.75