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FROM OPERATION WARP SPEED TO TRIPS

Vaccines as Assets

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Introduction

This chapter examines the political economy of biopharmaceutical innovation, focusing primarily on vaccines in the Covid-19 pandemic. This analysis aims to make visible the deep entanglements that entrench an extractive and dysfunctional innovation ecosystem, calcifying inequities in global access to essential medicines. The chapter argues that the current inequities in vaccine access are not new or anomalous and that they are the result of a complex yet strategic enmeshment among the logics of war and biomedicine, asset accumulation, and intellectual property. Uneven access to Covid-19 therapeutics can be traced to these three elements, which have built inequity into the political economy of biomedicine long before the current pandemic. The first section in the chapter teases out the first entanglement by unpacking Operation Warp Speed (OWS) as the culmination of a historical war-biomedical nexus driven by the United States, which has important implications for the global political economy of biomedical innovation and North-South asymmetries. The second section places OWS in the broader context of an extractive innovation ecosystem guided by a logic of differential accumulation characterised by the assetisation of publicly funded research. The final section explores how asset accumulation logics and unequal access to therapeutics are embedded in the international architecture of the Intellectual Property Rights (IPRs) regime. Before moving forward, I want to present two cases that illustrate these three logics' historical entanglements and how they intersect with the Covid-19 pandemic.

Operation Warp Speed had its genesis on April 13, 2020, when it was pitched to the White House by the then Health and Human Services (HHS) secretary Alex Azar (Diamond 2021). Originally called Manhattan Project 2, OWS was conceived as a colossal public-private partnership that would invest billions of dollars in

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accelerating the development and manufacturing of vaccines, therapeutics, and diagnostics for Covid-19 (Diamond 2021). By April 2020, the name "Manhattan Project 2" had been retired, but the foundational entanglements with the U.S. Department of Defense (DOD) remained calcified (Diamond 2021). General Gustave Perna, in charge of the U.S. Army Materiel Command, was appointed as the Chief Operating Officer, and the DOD was assigned to support OWS in substantive ways (HHS 2020). As the pandemic entered its second year in 2021, OWS had provided over US$18 bn in funding for the Research, Development, Testing, and Evaluation (RDT&E) of vaccines and therapeutics that were intended specifically for the U.S. population (Lancet Commission Task Force Members 2021).

Ten years earlier in July 2010, Tekmira Pharmaceuticals was granted a US$140 mn contract by the DOD to develop a therapeutic candidate for the Ebola virus (Arbutus Biopharma 2010). Despite this research being publicly funded, Tekmira filed several successful patents for its lipid nanoparticle vaccine technology and found its stock rising dramatically in 2014 as the West African Ebola epidemic unfolded (Reuters 2015; World Intellectual Property Organization 2020). A year later, Tekmira acquired OnCore BioPharma to absorb its asset portfolio of patented research for Hepatitis B, rebranded as Arbutus Biopharma, and terminated all development for an Ebola vaccine to focus on Hepatitis B instead (Arbutus Biopharma 2020; Koons et al. 2014; Schnirring 2015). By then, the DOD had invested a total of US$157 mn which allowed Arbutus to patent publicly funded research as an income-generating asset, increase its market capitalisation during the Ebola epidemic, and leverage the subsequent financial performance to acquire the science needed to rebrand itself.

In the Covid-19 pandemic, one of the most significant achievements of OWS has been the mRNA vaccine developed by Moderna, which received a total investment of US$5.97 bn from the U.S. government (U.S. Congressional Research Service 2021). The publicly funded research on Ebola vaccines a decade earlier became a crucial piece of the Covid-19 vaccine puzzle. Moderna's mRNA vaccine relies on lipid nanoparticle technology which had been developed, in part, during the search for an Ebola vaccine (Gaviria and Kilic 2021). Some of the patents for this technology are still held by Arbutus Biopharma, and, as of writing, Moderna is pre-emptively challenging them while Arbutus investors speculate on the potential future earnings of royalties if said patents were to be upheld (Cooper 2021; Gaviria and Kilic 2021). By October 2021, Moderna had a market capitalisation of US$129.76 bn, signalling an increase of 1,872 per cent from December 2019. Meanwhile, three of its executives reached the Forbes 400 list with fortunes worth over US$5 bn each (Lonas 2021; see also Popcevski this volume). Such vast increases in accumulation relied not only on OWS investment but also on the mRNA vaccine platform technologies which the U.S. government partly funded long before the pandemic (Kuter et al. 2021). While Moderna and Arbutus clash in courtrooms over their right to profit from the ownership of publicly funded research as an income-generating asset, millions of people are dying across the world due to inequitable access to Covid-19 vaccines. This inequity has been internationally

codified in a dysfunctional and extractive innovation ecosystem which prioritises the capital accumulation strategies of biopharmaceutical companies headquartered in the Global North over the lives of human beings in the Global South.

Operation Warp Speed and War-Biomedical Logics

Structured as a public–private partnership, OWS was characterised by a vast network of departments, agencies and programmes anchored to a matrix of state investment that has been expanding for decades (HHS 2020). While not alone in its efforts, the DOD became a foundational pillar of OWS, leading support in diagnostics, therapeutics, vaccines, production, and distribution (HHS 2020). The key companies that received OWS support for vaccine RDT&E funding and/or advanced purchasing agreements were AstraZeneca, Johnson & Johnson, Merck, Pfizer-BioNTech, Moderna, Novavax, and Sanofi-GSK (U.S. Congressional Research Service, 2021). The groundwork for this relationship was laid long before the Covid-19 pandemic through public funding for research on other viruses like SARS, MERS, Ebola, Hepatitis B, Dengue, and HPV (Kuter et al. 2021). The deeply enmeshed attachments between war and the biopharmaceutical sector in the 21st century are highlighted by the fact that the DOD was among the largest investors in these vaccine technologies. In recognition of this role, the Joint Program Executive Office for Chemical, Biological, Radiological and Nuclear Defense (JPEO-CBRND) became an integral actor within OWS (Slaoui and Hepburn 2020). The JPEO-CBRND is tasked with facilitating the development and acquisition of countermeasures against chemical, biological, radiological, and nuclear threats to "fight and win unencumbered" (DOD 2020). Such institutional entanglements between the DOD and therapeutic innovation also serve to excuse, and often justify, the continued expansion of the U.S. war-making apparatus. This is achieved through discursive and affective tools that present the DOD as an integral actor in global health investment and disease management (Terry 2017).

War-biomedical logics have evolved considerably in the last three decades, particularly after the doctrine of mutual deterrence shifted to a focus on counter-proliferation (Terry 2017). These "pedagogies of preparedness" rationalised new trajectories of techno-scientific research and justified a fixation on biosecurity that obscured the distinction between peacetime and wartime (Terry 2017: 161). A key result of these measures was a significant entrenchment of networks between the defence community and the life sciences, evidenced by federal agencies tripling funding for biochemical countermeasures between 9/11 and 2008 (Reppy 2008; Terry 2017). Congressional support for this expansion was driven by an attachment to the defensive protection offered through biosecurity, the promissory hope of biomedical salvation, and the perceived economic growth opportunities through techno-scientific innovation (Mazzucato 2018a; Terry 2017). This continued during the Obama presidency, for instance through the National Bioeconomy Blueprint, which emphasised the role of DOD vaccine research in strategies for future economic growth (Obama White House 2012).

Increased government spending on the private defence sector has altered the landscape of techno-scientific research. Defence strategies can neglect important biomedical research pathways, as funding decisions are guided by assessments of threats and risks to U.S. national security (Ficke et al. 2012; Reppy 2008). For example, stem cell RDT&E for musculoskeletal polytrauma resulting from improvised explosive devices has been prioritised, alongside vaccine technologies for certain viruses due to the expectation of ongoing military presence in "high-risk" tropical regions (Christopherson & Nesti 2011). These decisions can create funding and expertise vacuums, leading to the marginalisation of alternative enclaves of investigation that potentially delay or outright eclipse other therapeutic innovation pathways for civilian patient populations, including those in the Global South. Reppy summarises these concerns by positing that "if we accept the argument that new knowledge is influenced by the conditions under which it is produced, we would expect the MIC [Military Industrial Complex] to have shaped the scientific knowledge produced" (Reppy 2008: 803). War-biomedical logics are also reflected in the reshaping of traditional public health structures, which have been weakened in favour of those led by defence strategies. For instance, the Public Health Emergency Preparedness cooperative (PHEP) within the Centers for Disease Control (CDC) had its annual budget reduced by 50 per cent from 2006 to 2013 (Terry 2017). In this way, war-biomedical entanglements are deepened by expanding defence-funded biomedical research and a corresponding displacement of traditional public health bureaucracies. As Terry argues, such attachments between biomedical innovation and war discursively justify the continued expansion of the U.S. defence budgets and bureaucratic reach (Terry 2017).

I want to extend this further and argue that war-biomedical entanglements help preserve the ontological security of the DOD and of the U.S. more broadly. In International Relations, ontological security refers to how states seek the "security of a consistent self" by constructing and reproducing autobiographical identity narratives (Subotić 2015: 613). These narratives serve to justify the existence and continuity not only of the state itself but also of its membership in the international community (Subotić 2015). My claim is that the deepening of war-biomedical entanglements is used by the DOD to preserve its ontological security and justify the continuing ballooning of its budgets, bureaucratic reach, corporate partnerships, and international presence. Narratives of biomedical salvation, biosecurity, and biosurveillance are employed to enmesh the very health of populations with the strength and reach of the DOD. The pivot to bioterrorism countermeasures since 9/11 has meant that the state can never have too much health or too much security (Terry 2017). This translates to the United States' self-appointed mandate as an enforcer of global biosecurity, an ongoing project that demands permanent international threat surveillance, disease management, and active intervention.

For the United States more broadly, the framing of its military as an indispensable leader in global health helps it remain secure in its identity as a global military power. Any threat to the integrity and magnitude of the U.S. defence structure (such as budget reductions) is framed as a threat to global health security

and therapeutic innovation. Given that biosecurity becomes a project with no temporal or territorial limits, such framing justifies the existence and expansion of the U.S. defence apparatus and by extension, requires its continued diffusion across political and bureaucratic borders into an indefinite future where emerging biological threats reside in-waiting (Terry 2017). The entanglement between war-biomedical logics and the ontological security of the United States has significant implications for the political economy of biopharmaceutical research because the sector has co-evolved with counterterrorism and biosecurity approaches to U.S. defence in the 21st century. This entanglement will likely deepen in the coming years as the Biden Administration seeks to repair and reconstruct the identity of the United States as a global "leader" in health and disease management, particularly after the perceived disruption and dislocation of this identity during the Trump Presidency.

The Australia-United States Ministerial Consultations (AUSMIN) held in September 2021 present an excellent example of the future entrenchment of war-biomedical logics due to the Covid-19 pandemic. The AUSMIN joint statement commits both countries to robust biosecurity, biosafety, and biosurveillance in the Indo-Pacific region to "prevent, detect, and respond to emerging COVID-19 variants, and the emergence or resurgence of other infectious diseases" (AUSMIN 2021). The aim is to support the U.S. Global Health Security Strategy and reinforce existing cooperation with the DOD (AUSMIN 2021). Global biosurveillance networks and the simultaneous strengthening of research and manufacturing of therapeutic products are supposed to bolster the architecture of health security in the region (AUSMIN 2021). This joint statement is significant for three reasons. Firstly, a clear war-biomedical nexus is made evident by the plethora of security references and DOD involvement that justify an ongoing defensive presence in the region. Secondly, the United States and the DOD preserve their ontological security by reinforcing identities of leadership in global health (in)security in the eyes of the international community. Thirdly, the anticipatory and limitless approach to biomedical threat surveillance justifies continuous DOD funding for biopharmaceutical RDT&E. The problem is not the public financing of biomedical research in itself but rather the extractive and dysfunctional innovation ecosystem in which it takes place. This anticipatory mind-set is further entangled in the very logic of capital accumulation in the biopharmaceutical sector, as the speculative value of expected future earnings is attached to the prospect of unending and permanent biomedical insecurity. The justifying narrative, similar to the one used to preserve the ontological security of the United States, is that any threat to capital accumulation in the sector will result in a corresponding decrease in global health and a decrease in therapeutic innovation.

Asset Accumulation Logics

While war-biomedical entanglements are not the only issue, they exacerbate the dysfunctional and extractive nature of our broader innovation ecosystem in two major ways. Firstly, they entangle therapeutic innovation with defence imperatives,

shaping the context and trajectory of the innovation that emerges. Each government agency or department that finances biomedical research infuses its own bureaucratic and institutional settings in the innovation process itself. As a result, RDT&E beholden to defence strategies is often bound by restrictive secrecy, classified status, redactions, and opaque progress disclosure which benefit corporate interests and disincentivise the sharing of scientific innovation (Reppy 2008). Secondly, the biopharmaceutical sector relies on the coercive power of the state to encode and protect its capacity for capital accumulation. This takes place through legal modules, which graft assets with requisite attributes to facilitate and maximise accumulation (Pistor 2019). War-biomedical entanglements enable the sector to recruit perhaps the most coercive branch of the state—its defence and national security bureaucracies. In doing so, the capacity for accumulation protected in domestic law and international treaties becomes further entrenched by the deeper and more impenetrable protection of national security and defence bureaucracies.

The broader therapeutic innovation ecosystem is characterised by extractive and dysfunctional dynamics that de-prioritise equitable health care access, instead favouring capital accumulation (Mazzucato 2018a; Roy 2020; UCL IIPP 2018). Echoing recent literature on techno-scientific capitalism, I argue the biopharmaceutical sector is mediated by the asset form (Birch 2017; Birch and Muniesa 2020; Kang 2020; Pistor 2019; Roy 2020). Studies on the political economy of the biosciences have traditionally examined commodification, fixating on the production and market exchange of therapeutic commodities like vaccines (Helmreich 2008; Birch and Tyfield 2013; Birch and Muniesa 2020; Mittra and Zoukas 2020; Roy 2020). Commodities are intended to be bought and sold, with value realised at the point of sale. Assets are instead designed to generate income via rent for a given period, through mechanisms of ownership, monopolised exclusion, and even Veblenian sabotage—understood as the strategic and deliberate restriction of productivity and creative innovation (Nitzan and Bichler 2009; Veblen 1904). As explained by Pistor, commodification is necessary but insufficient for maximising capital accumulation (Pistor 2019). Assets are the ideal vehicle, but to fulfil their promise, they must be legally encoded with four attributes: priority over other financial instruments; durability over time; universality whereby attributes are protected and enforced across national and international jurisdictions; and convertibility so asset holders can lock-in past gains by transferring asset ownership in market exchanges (Pistor 2019). All four attributes require the state's coercive power, and they rely on the law as a "powerful social ordering technology" (Pistor 2019: 17). In the biopharmaceutical sector, techno-scientific knowledge itself has become assetised through a range of legal instruments that fall under the banner of IPRs, which are in turn protected by the state domestically and by treaties internationally.

I extend this claim further, arguing that assetisation is guided by a logic of differential accumulation in line with a power theory of capital (Nitzan and Bichler 2009). Through this lens, capital is not a material expression of industrial productivity but an institution of power. This architecture of power is organised through relations of

ownership, and its centre of gravity is the capitalisation of expected future earnings. Dominant firms seek to accumulate capital *differentially*, beating the average rate of return relative to other firms. Firms can shape and (re)configure techno-scientific research and development in the pursuit of differential accumulation by owning claims on scientific knowledge as an income-generating asset. In doing so, they not only claim ownership over techno-scientific knowledge as assetised property, but they also make claims on how societies engage with health and illness. These claims take the form of corporate ownership of the pace, trajectory, and accessibility of therapeutic innovations like vaccines. If we understand capital to mean differential social power expressed in monetary units, we can examine an asset as a mechanism that, once capitalised, enables the owner to exercise power over the trajectory of industries and even the pace of innovation. The legally-encoded attributes of an asset become particularly salient here. By extension of their ownership, dominant asset holders also benefit from priority, durability, universality, and convertibility of their differential power.

Like war-biomedical entanglements, asset accumulation logics also carry a discursive element to reinforce an extractive innovation ecosystem. The biopharmaceutical sector creates and disperses its own autobiographical narratives, including those that frame innovation as contingent on venture capital, increasing financial returns, and high therapeutic prices (Mazzucato 2018a; Pistor 2019; Roy 2020; UCL IIPP 2018). While these arguments influence public opinion, they are most valuable in their ability to recruit the backing of the state, which protects and enforces the legal coding of firms' assets. These narratives have been on full display throughout the pandemic. For instance, the powerful lobby trade group Pharmaceutical Research and Manufacturers of America (PhRMA) has aggressively opposed patent waivers for Covid-19 therapeutics through lobbying and public campaigning, claiming a waiver would undermine future biomedical discovery (PhRMA, 2021). These narratives naturalise an extractive innovation ecosystem, obfuscating and displacing the state's role to delegitimise claims that publicly funded innovation should remain part of a global public commons. These justifications can often permeate government agencies, departments, and legislative committees when they rely on inflated RDT&E costs provided by the industry to determine "acceptable"—yet ever-rising—therapeutic prices (Deangelis 2016; DiMasi & Grabowski 2007; Gotzsche 2012; Roy 2020). During the pandemic, these narratives have also been echoed by global leaders. The U.K. Prime Minister Boris Johnson claimed, in a rather spectacular fashion, that the "reason we have the vaccine success is because of capitalism, because of greed" (BBC News 2021).

While OWS invested mostly in late-stage clinical development and early manufacturing, a significant amount of the basic and exploratory research on which vaccine and therapeutic technologies relied had been funded by the U.S. government decades earlier. The stated intention of OWS was to bridge the "dead space" in pharmaceutical drug development, what is usually referred to as the "valley of death", where companies fail to translate scientific discoveries into commercially-viable products for mass consumption (Mazzucato 2018a; Diamond 2021). To do

so, OWS supported promising vaccine candidates by facilitating parallel RDT&E and manufacturing capability, given that the "dead space" in pharmaceutical production often occurs in between those two stages (Mazzucato 2018a; Roy 2020; Slaoui and Hepburn 2020). This narrative presented OWS as a late-phase investor and facilitator who entered the picture only once robust clinical data from the private sector was available to correct a market failure in an emergency. This not only perpetuated the market failure theory of state investment, but it also served to hide the crucial role of the state throughout the entire innovation process, rendering it invisible until it re-entered the frame as a facilitator of last resort in the final act. By this stage, however, the research that had been publicly-funded decades earlier had been repurposed, reconfigured, and diversified through a complex matrix of corporate and legal mechanisms that serve to camouflage the role of the state and maximise accumulation for asset holders. This matrix corresponds with the increased financialisation of the biopharmaceutical sector, calcifying a dysfunctional and extractive innovation ecosystem through corporate amalgamation and share repurchasing.

Mergers and acquisitions (M&As) can be understood as mechanisms of corporate control aimed at taming, limiting, and controlling overall market efficiency (Nitzan 2001). Since amalgamation facilitates dominant firms' organised power, mergers have become a most potent form of differential accumulation by breadth—increasing earnings whilst reducing competition as a form of sabotage (Nitzan and Bichler 2009). Dominant firms then capitalise on this sabotage by strategically managing the resulting stagnation (Nitzan 2001). Historically, the biopharmaceutical sector has struggled with differential accumulation, primarily because blockbuster drugs with sales exceeding US$1 bn are relatively rare (Amir-Aslani and Chanel 2016). The sector has relied heavily on M&As to bypass the short-term demands of financial markets, which tend to become too overwhelming for small firms (Roy 2020). While aggressive M&As have proven lucrative as financial strategies, there is little evidence that they deliver higher product outputs. In fact, research productivity is negatively correlated with M&As as companies grow in size (Amir-Aslani & Chanel 2016). Large pharmaceutical companies can bridge gaps in research output by acquiring biotechnology start-ups and, more importantly, their IPRs and product pipelines like Tekmira did in 2015. For instance, in 2020, OWS funded research for a Sanofi/GSK mRNA Covid-19 vaccine candidate with US$30 mn and paid an additional US$2.07 bn in advance purchasing agreements (U.S. Congressional Research Service 2021). By August 2021, Sanofi had acquired Tidal Therapeutics in a US$470 mn deal, and all outstanding shares of Translate Bio which were valued at US$3.2 bn (Sanofi 2021b; Sanofi 2021a). Despite having acquired the mRNA technology of two leading companies, in September 2021 Sanofi announced it would discontinue its vaccine candidate due to the market saturation generated by competitors Pfizer and Moderna (White and Burger, 2021). This example demonstrates four key dynamics—an extractive public-private relationship where publicly funded firms prioritise financial returns; the assetisation of techno-scientific knowledge through IPRs; convertibility enabling the transfer of

asset ownership across firms; and the reliance on M&As as a strategy to maximise differential accumulation.

As the sector begins to resemble an oligopoly through high concentration, natural ceilings to amalgamation emerge because biopharmaceutical giants simply run out of suitably large competitors to merge with (Morrison and Lähteenmäki 2016). Faced with the threat of differential de-accumulation, firms undertake share repurchasing programs (commonly known as share buybacks) to compensate for the natural ceiling to accumulation by breadth. Share repurchasing is a differential accumulation strategy whereby companies re-purchase their shares to increase the price of the remaining stock, benefiting shareholders and increasing the market capitalisation of the firm (Mazzucato 2018a; Roy 2020; UCL IIPP 2018). From 2016 to 2020, the top fourteen biopharmaceutical companies spent over US$219 bn in share buybacks and over US$358 bn in dividends, with the combined total surpassing their RDT&E expenditure by US$56 bn (U.S. House of Representatives 2021). Moderna, which received almost US$6 bn in public funding from the U.S. government during the pandemic, was authorised by its board of directors to spend US$1 bn in stock repurchases in 2021 (Speights 2021). The justification behind this strategy of shareholder value maximisation (SVM) is that shareholders are the most efficient allocators of firms' resources because they are the only investors with no guaranteed return, arguably making them rightful claimants of any residual revenue through dividends (Mazzucato 2018a; Pistor 2019; Roy 2020). The primacy of SVM was driven by a shift toward capitalisation becoming the primary model for assessing firm valuation, and the push to replace industrial managers with stock-compensated executives who would allocate resources to maximise dividends rather than expand industrial and innovation capacity (Krier 2009). A fundamental corollary of this trend is that therapeutic innovation and health care access are eclipsed by a logic of accumulation anchored to the monopolisation of techno-scientific research as an income-generating asset. These accumulation logics are used to enact and justify high therapeutic prices, concentrated sector amalgamation, short-term shareholder gains over RDT&E output, the enclosure of publicly-funded research for private gain, and the strengthening of legal modules that protect asset owners.

TRIPS and Intellectual Property Logics

Maximising differential accumulation from asset ownership depends on protecting assets' legal attributes across jurisdictions, rendering their codification as universal as possible for the longest duration possible. In the biopharmaceutical sector, IPRs are used as income-generating assets through exclusive ownership, temporarily enclosing techno-scientific knowledge. Ownership bestows IPR holders with governance functions over prices, supply, and distribution not only over the patented invention but also over its downstream applications (Kang 2021; McMahon 2021; Thambisetty et al. 2021). These governance functions demand further interrogation with defence funded innovations, given that security stipulations cloak RDT&E in

additional layers of secrecy and bureaucratic opacity that benefit corporate interests. Since the decline of the individual inventor in the 20th century, most patents in the United States have been filed by corporate entities (Coriat & Weinstein 2012; Pistor 2019). This translates to corporate governance over techno-scientific knowledge, a governance model guided by a logic of differential accumulation which demands the expansion of assets' durability and universality to continuously exceed average rates of return. As Haunss explains, if controlling knowledge is a technology of power and "because power is a relational concept, knowledge can only so long serve as its base as a differential distribution is maintained" (Haunss 2013: 77). Through this lens, IPR regimes create monopolies over innovations only to release them to the public once they have "lost their differentiating potential" (Haunss 2013: 77). Dominant firms—in concert with lawyers, lobbyists, sympathetic legislators, and industry representatives—exercise the power of corporate governance to expand the differentiating potential of their assets in time (through durability) and place (through universality).

Conventional methods for prolonging the durability of IPRs involve securing patent protections that go beyond the standard twenty years, securing new patents with only minor or trivial variations, and strategically benefiting from trade secrets which can remain protected and undisclosed (Bell 2015; Kang 2021; Thambisetty et al. 2021). The universality of standard IPR protections across jurisdictions is pursued through a complex architecture of international treaties and agreements, forum shifting across international organisations, direct licensing agreements with firms, and bi-and-plurilateral agreements between countries that add protections beyond minimum standards (Haunss 2013; Kang 2021; Pistor 2019). Expanding the boundaries of durability and universality becomes an incomplete yet interminable project because the imperative for differential accumulation is interminable. The logic does not abide a limit to maximising shareholder value, exceeding average rates of return, or increasing market capitalisation relative to other firms. This ongoing project is enacted through legitimation narratives built on neoclassical and utilitarian economic foundations that present a causal relationship between IPRs, innovation, trade, and economic growth (Mazzucato 2018b; Pistor 2019).

Narratives legitimising maximalist positions on IPRs present them as the most effective mechanism for fomenting innovation. They posit that monopolies provide just rewards for productive undertaking, that temporary monopolies are necessary incentives because traditional market mechanisms will neglect public goods, and that monopolies encourage inventors to disseminate and disclose their work (Haunss 2013; Gabriel 2014; Mazzucato 2018b; Pistor 2019). Complementary justifications suggest that international IPR harmonisation fosters trade and economic growth in the Global South by protecting manufacturers in foreign markets and encouraging technology transfers (Haunss 2013). While a comprehensive critique of these arguments is beyond the scope of this chapter, I want to draw attention to three key issues. The first is that these narratives latch on to the ghost of the individual inventor, while most IPRs are held by corporations which "are creatures of law that have neither intellectual power nor creativity of their own" (Pistor 2019: 115).

The IPR regime in its current form is not designed to benefit inventors but rather the investors who, supposedly through their risk-taking and efficient allocation of resources, have been granted the right to capitalise on the ownership and governance of techno-scientific knowledge. The second issue is that this argument fails to cohere with the public financing of RDT&E, particularly given the risks taken by states throughout the entire innovation chain and their ability to create markets and not merely correct market failures (Mazzucato 2018a; Roy 2020). If the IPR regime were truly designed to benefit risk-taking investors, then most Covid-19 vaccines and therapeutics would be publicly owned and governed. The current IPR regime's logic is instead to facilitate differential accumulation by asset owners and their *private* creditors and investors, cementing an extractive and dysfunctional system that privatises publicly funded techno-scientific innovation. The third issue is how these narratives justify dysfunctional and often catastrophic power asymmetries between IPR-exporting and IPR-importing countries. The current North-South divide in access to Covid-19 vaccines is not an anomaly but a foundational pillar of the international IPR regime. It was proactively and strategically built into the very architecture of the Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement (Haunss 2013; Kang 2021; Pechlaner 2010; Yinliang 2014).

The TRIPS Agreement of 1995 set minimum international standards in IPR protection that all 164 World Trade Organization (WTO) member countries must now abide by. Within TRIPS, there has been a constant tension between the maximalist position advocated by the corporate sector and IPR-exporting countries on one side and a network of state and non-state actors in the Global South advocating for equitable access to medicines on the other (Haunss 2013; Guan 2016). Before Covid-19, this conflict reached its apex during the HIV/AIDS crisis in the 1990s, leading to the Doha Declaration adopted by the WTO in 2001 (Correa 2004; Haunss 2013). Due to opposition from the corporate sector and IPR-exporting countries, Doha failed to amend TRIPS substantially and instead clarified flexibilities on compulsory licensing. These have been critiqued for being too cumbersome and asymmetrical, making them inadequate and insufficient to secure access to therapeutics in the Global South (Correa 2004; Guan 2016; Kang 2021; Thambisetty et al. 2021). In addition, IPR-exporting countries have sought to bypass flexibilities by embedding TRIPS-Plus clauses into bilateral and plurilateral trade agreements, threatening sanctions, litigation, and export market barriers unless fortified IPR protections are agreed to (Haunss 2013; Ido 2021; Kang 2021; Pistor 2019). The IPR maximalist coalition has traditionally argued that access to therapeutics in the Global South should be pursued through private market mechanisms like voluntary licensing and corporate philanthropy, international aid, and donations from the Global North (Haunss 2013; Thambisetty et al. 2021). These developments have coalesced with Covid-19, as the current North-South polarisation in vaccine access can be traced to the inadequacies of existing TRIPS flexibilities, the insufficiency of philanthropy and pooled donation systems like COVAX, and the adverse distributive effects of voluntary licensing agreements that facilitate vaccine hoarding by the Global North

in secretive bilateral negotiations (Ariyarathna and Kariyawasam 2020; Brown 2021; Hanrieder 2020; Iacobucci 2021; Kang 2021; Spina Alì 2016; Thambisetty et al. 2021). Against this backdrop, India and South Africa proposed a comprehensive TRIPS waiver in October 2020 to temporarily waive patents, copyrights, and trade secrets relating to Covid-19 vaccines, therapeutics, and diagnostics (Thambisetty et al. 2021). While the Biden Administration endorsed a TRIPS waiver in May 2021, no such waiver has materialised as of writing due to strong opposition from the biopharmaceutical sector, industry lobby groups, and other IPR-exporting countries (Brown 2021; Kang 2021).

A TRIPS waiver would be an effective tool for improving global vaccine access precisely because it would disrupt the attributes of IPRs as income-generating assets, namely their durability, universality, and convertibility. In the case of convertibility, assets could face devaluation because they will have been released to the public much earlier than markets anticipated and before they reached the loss of their differentiation potential under conventional IPR standards. While necessary, a waiver of patents and trade secrets as undisclosed technical know-how is not a panacea. Countries in the Global South will need to rapidly expand their manufacturing capabilities, in-country vaccine technologies, and supply chain infrastructures (Brown 2021; Kang 2021; Labonté et al. 2021; Thambisetty et al. 2021). Legal certainty regarding patents' temporal delimitations through waivers and licensing flexibilities alleviate concerns over expensive litigation, economic sanctions, and trade disputes, leading to faster generic market entry and scaled-up manufacturing capabilities (Correa 2004; Iacobucci 2021; Ido 2021; Spina Alì 2016;). In contrast, stasis and uncertainty surrounding TRIPS flexibilities create difficult market conditions for generic entry and for the scaling up of manufacturing, leading to funding stagnation and chronically low infrastructure capabilities in many countries (Iacobucci 2021; Ido 2021).

The biopharmaceutical sector capitalises on this uncertainty and stasis as a form of industrial sabotage in a Veblenian sense, where accumulation is facilitated by the strategic management of industrial inefficiency (Nitzan and Bichler 2009; Veblen 1904). This prevents countries from rapidly scaling up their manufacturing capabilities and supply chain infrastructures, which could enable them to repurpose said capacity for future production beyond Covid-19 therapeutics. The risk for the biopharmaceutical sector is that an effective TRIPS waiver will create a significant legal precedent that threatens their assets' universality and durability while simultaneously facilitating the expansion of manufacturing capabilities and generic market entry in the Global South. Such developments could threaten accumulation in the sector not only in the context of Covid-19 but also through future manufacturing and distribution of existing and upcoming biomedical innovations. The loss of sales revenue from the commodification of vaccines and therapeutics is certainly a factor in opposition to a TRIPS waiver. However, I argue that the primary consideration is the potential for widespread asset devaluation that would threaten differential accumulation in the sector. The most pressing risk is not necessarily the loss of sales revenue from expanded manufacturing capacity or generic entry

competition in the Global South but rather how these developments would disrupt market expectations of future accumulation from biomedical assets' durability, universality, and convertibility value.

Conclusion

Drawing on emerging biological threats, Terry has argued that in "this anticipatory mind-set, the future invades the present and takes it hostage by predicting risks and speculating on novel drugs" (Terry 2017: 146). While this framing takes war-biomedical logics as a point of departure, I extend it further to highlight the broader entanglement with asset accumulation and intellectual property logics. In a way, the present is taken hostage by the imperatives of differential accumulation that prioritise the expected future earnings from income-generating assets over the lives and health of human beings in the present. This polarised asymmetry between the public's health needs today and the potential for private accumulation in the future is codified in the very legal architecture that governs global health care access. The entanglements and their resultant inequities are justified through legitimation narratives that take the present hostage. These narratives create two tacit threats: that a dismantling of the war-biomedical nexus will result in greater global biological insecurity, and that any disruption to the legal codification of techno-scientific knowledge as an income-generating asset will lead to a standstill of biomedical innovation.

These entanglements place key actors like the U.S. government on an unsteady footing as they walk a seemingly contradictory tightrope when responding to health crises like the Covid-19 pandemic. The state must highlight its identity as a global leader in health security while diffusing this project's imperial nature; and it must visibly protect the legal codification of assetised techno-scientific innovation while simultaneously hiding its role as a major public investor of it. The logic of war-biomedical entanglements means that the United States is incentivised to continue indefinite biosurveillance, biosecurity, and disease management through an ongoing defensive presence in the Global South. Meanwhile, the international IPR regime perpetuates this dynamic by preventing the Global South from expanding its biopharmaceutical infrastructure and manufacturing capabilities to protect the asset valuations of IPR-holding companies in the Global North and, by extension, their differential accumulation. From an IPR maximalist position, the answer is to entrench the asymmetry even further through voluntary licensing, stronger IPR protections, corporate philanthropy, and donations.

While the Covid-19 pandemic has certainly brought many of these issues to public focus, the purpose of this chapter has been to demonstrate that these entanglements are neither new nor anomalous. From Operation Warp Speed to TRIPS, the pandemic has illuminated ahistorical and deep enmeshment of logics that underpin the political economy of global health care. Merely calling for more public funding for biomedical innovation, enhanced pandemic preparedness through biosurveillance, and cosmetic improvements to TRIPS flexibilities will not

suffice. A complete reconfiguration of the current innovation ecosystem and its supporting legal architecture is required to dismantle such extractive and dysfunctional entanglements. These are embedded not only in public-private dynamics currently beholden to asset accumulation logics; they are further entrenched in colonial and imperial power asymmetries between the Global North and the Global South. Close attention must be paid to the specific agencies and departments that provide public funds to interrogate the legitimation narratives they employ and the bureaucratic imperatives they infuse in the innovation process. Likewise, the legal and economic legitimation narratives that justify the assetisation of publicly funded research to maximise differential accumulation must be robustly challenged. Without comprehensive structural reforms in the political economy of biomedicine, and as long as these entanglements continue to calcify, the Global South will continue to disproportionately suffer through health crises like the Covid-19 pandemic.