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Mariana Budjeryn

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ABSTRACT

While prosecuting its invasion of Ukraine, Russia has relied heavily on nuclear threats, turning the war in Ukraine into a dangerous nuclear crisis with profound implications for the global nuclear order and its two constitutive systems of nuclear deterrence and nuclear restraint. These two interconnected systems, each aiming to manage nuclear possession and reduce the risk of nuclear use, are at once complimentary and contradictory. While tensions between these systems are not new, the war in Ukraine exacerbates them in unprecedented ways. The system of nuclear deterrence seems to be proving its worth by inducing restraint on Russia and NATO, while the system of restraint is undermined by demonstrating what happens to a country not protected by nuclear deterrence. The latter lesson is particularly vivid given Ukraine's decision to forgo a nuclear option in 1994 in exchange for security assurances from nuclear powers. Russia's use of nuclear threats as an enabler for escalation and the specter of Russian tactical nuclear use against Ukraine goes well beyond its declared nuclear doctrine. The outcome of the war in Ukraine thus has critical importance for deciding the value of nuclear weapons in global security architecture and for resolving the conundrum between the systems of deterrence and restraint.

KEYWORDS

Nuclear deterrence; nuclear nonproliferation; arms control; disarmament; nuclear weapons; nuclear energy; global nuclear order; NATO; Russia; Ukraine; United States

The Russian invasions of Ukraine, first in February 2014 and then in February 2022, have so far been fought with conventional weapons only. But the Russo-Ukrainian war has salient, multifaceted nuclear undertones. It raises important questions about the dynamics of nuclear deterrence, the future of nuclear nonproliferation, arms control and disarmament, and the international governance of nuclear energy. In short, the ongoing war in Ukraine has profound implications for the global nuclear order.

The global nuclear order itself, as it evolved since the shattering introduction of nuclear weapons into the international system in 1945, has been riddled with inherent tensions and contradictions. But the war in Ukraine is making the global nuclear conundrum worse by critically exacerbating existing dysfunctions. Whether – and how – tensions get alleviated, contradictions mitigated, and dysfunctions repaired is yet to be seen. Here, I examine the inherent vulnerabilities of the global nuclear order, diagnose how the war in Ukraine might have exacerbated them, and open the way to the search for a cure.

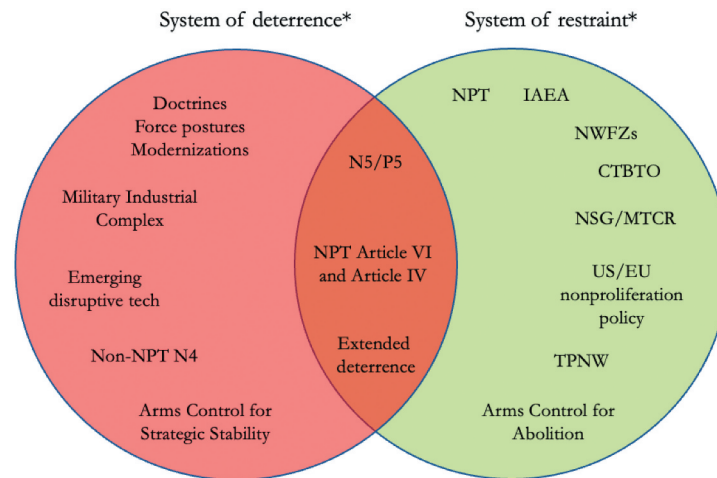
Global nuclear order as deterrence and restraint

Global nuclear order is defined here as a system of national and international practices, policies,

institutions, rules, and common understandings that govern the acquisition, possession, and use of nuclear weapons – the world's deadliest. The concept of order does not imply that the world of nuclear weapons is orderly. Rather, the phrase “global order” refers to the notion that nuclear weapons do not exist in a vacuum; that they are part and parcel of the systemic, institutional, and normative arrangements on national and international levels; that these arrangements are interconnected; and that pulling on one corner of these arrangements sends ripples across the entire fabric.

One way to conceive of the global nuclear order is that it consists of two interlocked sub-orders, or systems: a system of nuclear deterrence and a system of nuclear restraint (Walker 2000; see Figure 1). In this conception, both systems recognize the unique destructive power of nuclear weapons which distinguish them from other armaments, place them into a category of their own, and emerge with the ultimate objective of avoiding a nuclear war. Yet the systems of deterrence and restraint encompass divergent understandings of the relationship between nuclear weapons and international peace and security.

The system of nuclear deterrence is based on the premise that for as long as nuclear weapons exist and more than one country possesses such weapons in the world, the way to avoid a nuclear war is to deter an



*William Walker (2000), "Nuclear Order and Disorder," *International Affairs* 76(4): 703-724

Figure 1. Global nuclear order as systems of deterrence and restraint (Figure courtesy of William Walker).

adversary from launching any nuclear strike first by credibly threatening nuclear retaliation. Winston Churchill called nuclear deterrence a “melancholy paradox,” and for good reason. In the system of deterrence, nuclear weapons are both the cause of existential threat and the remedy for it. Nuclear deterrence is both the problem and the solution to nuclear risk. In principle, the same could be said of all armaments. But in practice, nuclear weapons are so uniquely destructive, and their use would be so catastrophic, that nuclear deterrence has long struggled to reconcile the contradiction between the moral inadmissibility of nuclear use and the credibility of nuclear threat.

The system of nuclear deterrence is of course much more than a scholarly debate between deterrence theorists. It has grown to rest on very real – and costly – national nuclear weapons research, production, and modernization programs and complexes, doctrines and operational plans, sets of deterrence relationships (typically dyads) to which nuclear capabilities and doctrines are tailored, as well as alliance relationships to which nuclear deterrence is extended as part of security provision. Much of the thinking and practice of deterrence evolved in the context of the Cold War and the stand-off between two nuclear superpowers – the United States and the Soviet Union – and their respective alliances, NATO and the Warsaw Pact. Today, however, the system of deterrence is more complex as it includes an increased number of nuclear powers and deterrence dyads – US–Russia, US–China, India–Pakistan, India–China, US–North Korea. In addition, new security domains and disruptive technologies have emerged that bring new uncertainties that affect the stability and credibility of nuclear deterrence.

For its part, the system of nuclear restraint rests on the premise that nuclear weapons, their possession and proliferation, are detrimental to global security. Institutionally, however, the system of nuclear restraint is centered on the international nonproliferation regime that prioritizes countering the spread of nuclear weapons, while reconciling itself to the existence – albeit temporary – of nuclear powers. This was the grand bargain embodied in the Treaty on the Nonproliferation of Nuclear Weapons (NPT) which, to date, comprises some 191 state-parties. The NPT grants recognition to five nuclear possessors that developed nuclear weapons before 1967 – the United States, the USSR/Russia, the United Kingdom, France, and China – while aiming to deny nuclear weapons to all other countries in the system. To mitigate the inherently discriminatory nature of the NPT (1968) treaty where equally sovereign countries are treated differently, two further bargains have been incorporated: a promise of “nuclear haves” to share with “nuclear have-nots” nuclear technologies for peaceful purposes (Article IV of the NPT) and a pledge to pursue a total and complete disarmament through negotiations (Article VI). A set of international institutions, including the International Atomic Energy Agency (IAEA), trade regimes, including the Nuclear Suppliers Group (NSG), and national policies have worked to bolster and uphold the system of nuclear restraint.

Because the two systems of nuclear deterrence and nuclear restraint have evolved alongside each other, they are interconnected and, in some respects, are mutually reinforcing. For instance, the NPT reconciled itself to the five nuclear possessors that existed at the time of its signature – which also happens to be the five permanent

members of the UN Security Council – and the deterrence relationships that exist among them, vesting these countries in the nonproliferation regime, garnering their support for the implementation of the treaty, and thus imbuing it with salience and longevity. The provision of the extended deterrence by the United States to its allies in NATO and the Asia-Pacific might have influenced the decision by the most technologically capable and politically motivated countries, including Japan, South Korea, Taiwan, and arguably former West Germany, not to acquire nuclear weapons of their own.

Yet the contradictions and tensions inherent to the global nuclear order abound. Hopes that the end of the Cold War would precipitate general nuclear disarmament as the relevance of nuclear weapons faded have, to the despair of nuclear non-possessors, not come to fruition. Even though the lion's share of the two superpowers' nuclear arsenals has been eliminated under bilateral strategic arms control treaties, the United States and Russia still possess enough mega-tonnage to annihilate virtually all civilization on Earth (Kristensen and Korda 2022). In addition, since the end of the Cold War new nuclear possessors emerged – India, Pakistan, and North Korea – while others, particularly the United States, Russia, and China, have launched ambitious and expensive strategic modernization or buildup programs that make sense from a deterrence perspective but fail to reconcile with nuclear restraint and the rhetorical tribute to the pursuit of nuclear disarmament.

Working across the contradictions

While NPT Article VI's commitment to pursue arms control is one of the linchpins that reconciles systems of deterrence and restraint, each system awards a different role to arms control. Within the system of deterrence, arms control is primarily understood as an arrangement among adversaries to bolster strategic stability and does not necessarily entail arms reduction – although it often did. Within the system of restraint, however, arms control is considered a necessary process of incremental reductions on the way to the abolition of nuclear weapons. Whatever the definition used, much of treaty-based arms control architecture has crumbled over the past two decades with the demise of the Anti-Ballistic Missile, Conventional Armed Forces in Europe, Intermediate-Range Nuclear Forces, and Open Skies treaties. Meanwhile, new arms control, at least in its traditional form of a legally-binding and verifiable treaty, became much harder to pursue and achieve due to new geopolitical and technological challenges – including the poor diplomatic relations between Russia and the United

States, the need to incorporate more actors, most notably China, and the emergence of new domains and technologies, including cyber, space, advanced conventional, hypersonic missiles, additive manufacturing, and artificial intelligence, among others – that might have destabilizing effects on nuclear deterrence and therefore require appropriate governance.

All the while, nuclear-possessing countries and non-nuclear countries – particularly those not benefiting from the extended nuclear deterrence – have been at perennial loggerheads over the perceived poor progress toward total and complete disarmament of the former. The indefinite extension of the NPT in 1995 robbed the non-nuclear countries of an important tool to pressure nuclear-possessing countries to do better on their Article VI commitment to disarmament through arms control by holding their acquiescence to consecutive NPT extensions as a lever.

Over the past decade, this led to a chasm between the nuclear haves and have-nots which resulted in the signature in 2017 and entry into force in 2021 of the Treaty on the Prohibition of Nuclear Weapons (TPNW) which aims to delegitimize nuclear weapons as inhumane. The TPNW, also known as the Ban Treaty, stems from a justified frustration and aims for the goal of abolishing all nuclear weapons by stigmatizing them as inhumane (TPNW 2017). But it also risks undermining the nonproliferation regime in which nuclear-possessing countries have been stakeholders. To add to the challenges, the continued existence and gradual normalization of nuclear possessors outside the NPT regime – Israel, India, Pakistan, and in the future likely North Korea – further undermines the standing of the NPT as a framework for legitimized nuclear possession, couched in mutual obligations and bargains (such as they are) between nuclear haves and have-nots.

Adjacent to the systems of deterrence and restraint is the international governance of the peaceful uses of nuclear energy that builds on Article IV of the NPT and is safeguarded by the IAEA. Many countries are seeking to introduce nuclear energy into their electricity production mix to mitigate climate change, which is an existential threat to humanity just like nuclear weapons. The expected development of nuclear energy will spread nuclear knowledge, technologies, and materials to more countries and, with it, can increase proliferation risks and demands on the IAEA's capacity to safeguard nuclear technologies and detect the diversion of civilian nuclear technology to military uses.

The global nuclear order and the war in Ukraine

This brief outline takes stock of the challenges to the global nuclear order – some old and some more recent.

Just how damaging the Russian aggression against Ukraine will be for the international nonproliferation regime is still being debated. Some have argued that the regime withstood many crises in the past and likely will withstand this one too (Einhorn 2015, 2022; Budjeryn and Umland 2021; Bollfrass and Herzog 2022; O'Hanlon and Riedel 2022). After all, well before the Russian invasion of Ukraine, the international nonproliferation regime was aptly described as “a system in distress” (Miller 2012). Yet the current historical moment might be a different kind of a shock to the system. Even though the war in Ukraine might not result in an immediate wave of nuclear proliferation or spell the end of the NPT, it is a stress test for the systems of deterrence and restraint, as well as for the international governance of nuclear energy. These shocks are happening simultaneously and in unprecedented ways, making the amplitude of the combined risks to the global nuclear order arguably greater than it has ever been.

A boost for the system of nuclear deterrence

While prosecuting its military assault on Ukraine, Russia has relied heavily on nuclear threats and signaling, the main purpose of which has been to deter any direct Western military involvement on Ukraine's soil. In a speech inaugurating the invasion of Ukraine on February 24, 2022, Russia's President Vladimir Putin threatened consequences never seen in history to anyone who might think of interfering with his plans (Putin 2022a). Four days later, Putin gave orders to put Russia's strategic deterrence forces on higher readiness alert (Office of the President of Russia 2022). By the end of April, analysts counted over 20 nuclear signals from Russia, including the use of dual-capable systems such as Iskander-M short-range ballistic missiles and Kinzhal hypersonic cruise missiles against targets in Ukraine (Arndt and Horovitz 2022). Most recently, in response to the swift and successful Ukrainian counteroffensive in early September that routed the Russian military in the Kharkiv region of eastern Ukraine, Putin issued his most explicit nuclear threats yet, stating that Russia's territorial integrity, independence, and freedom will be ensured by “all means” at Russia's disposal (Putin 2022b).

The abundant nuclear threats issued by Putin and other Russian officials seem to suggest that nuclear deterrence between NATO and Russia works, causing restraint on both sides. While Western nations have imposed punishing sanctions on Russia and are supplying armaments and other aid to Ukraine, these same countries – including the United States and other

NATO members – have repeatedly stated, before and after the war started, that they will not send troops to fight alongside Ukrainians (NATO 2022; TASS 2022; The White House 2022a). Every new type of military hardware shipped to Ukraine is first carefully considered for the potential escalatory risks it might entail.

Russia, for its part, has not dared to attack a NATO country or shipments of Western military aid even if the Russian leadership believes that their country is already fighting a proxy war with NATO on Ukraine's territory and that Western sanctions are an act of economic warfare (Marson 2022; Reuters 2022a).

The main reason for such caution is the all-too-justified fear of nuclear escalation. Indeed, during the four decades of the Cold War, the two superpowers took care to avoid any direct military confrontation precisely for this reason. Very likely, the Western response to Russia's invasion of Ukraine would have been much the same even without Putin's explicit nuclear saber-rattling.

Nuclear weapons might have thus far prevented the war from spreading beyond Ukraine's borders, either eastward or westward. But Russia has used the threat of nuclear escalation to launch and prosecute its war of aggression against a country not protected by nuclear deterrence. What seems fair to assume is that if Russia were not a nuclear power and therefore could not use nuclear threats to deter any direct Western involvement, its calculations about invading Ukraine would have been very different. Indeed, the use of nuclear threats as a shield or even as an enabler for a war of aggression goes well beyond the declared Russian doctrine, which states that Russia would use nuclear weapons only to deter a nuclear attack on its soil and against its nuclear forces, or in a conventional conflict when the very existence of the Russian state is in peril (Ministry of Foreign Affairs of the Russian Federation 2020).

If restraint between Russia and the United States/NATO can be seen as a positive outcome of nuclear deterrence, Russia's invasion of Ukraine is the demonstration of the negative consequences for a country not protected by a nuclear deterrent, either its own or extended by an ally. Indeed, following the collapse of the Soviet Union, Ukraine found itself in a security and deterrence vacuum, wedged between an expanded NATO and a revisionist Russia. That Europe's next war erupted in Ukraine should be no surprise to those who believe that power abhors a vacuum.

The risk of Russia using non-strategic or tactical nuclear weapons against Ukraine to reverse its losses and terminate the war on Russian terms is also a distinct – and an increasingly alarming – possibility (Cole 2022; Freedman 2022; Giovannini 2022). While

US President Joe Biden stated that any use of nuclear weapons would be unacceptable and its consequences severe for Russia, he has not publicly communicated anything that could remotely qualify as a deterrent threat – nuclear or otherwise – that might dissuade Russia from using tactical nuclear weapons against Ukraine, although more specific consequences might have been parlayed privately (Sonne and Hudson 2022). There are other reasons why Russia might not use nuclear weapons in Ukraine: the unwillingness to admit that it is facing the kind of adversary that warrants crossing the nuclear threshold, the poor efficacy of nuclear weapons for Russian military objectives, the absence of suitable targets, or the unpreparedness of Russian troops for combat in a theater affected by a nuclear strike.

Yet the sad but honest reality might just be that nothing may credibly deter Russia from using tactical nuclear weapons in Ukraine – just like there was nothing to credibly deter Russia's invasion in the first place, even as its massive military buildup along Ukraine's borders was visible to all. Russian tactical nuclear weapons may not be used and Ukraine may eventually prevail, recover its territory, and rebuild its cities. But not one of the tens of thousands killed in this war will be brought back to life, none of the prisoners untortured, and none of the women un-raped. To the question of what could have prevented such an absurd fury of violence and slaughter, nuclear deterrence would seem to be the most compelling answer.

With nuclear deterrence proving its worth, the demand for it will likely grow. Sweden and Finland have already changed their decades-long policy of neutrality and are in the process of joining NATO. The Alliance's eastern flank, which feels most vulnerable to Russian threats, will likely demand a more robust US extended deterrence commitment, including forward deployment of US nuclear weapons. China's growing nuclear might and North Korea's legal codification of the irreversibility of its nuclear armament and its right to a preemptive strike will put similar demands on the US nuclear umbrella in the Asia-Pacific (Smith 2022). Reinforced, US extended nuclear deterrence could help dissuade such allies as Japan, South Korea, and Taiwan from acquiring nuclear weapons of their own. But it will not help reduce the role of nuclear weapons in international security. With countries relying more – rather than less – on nuclear deterrence, the already difficult goal of the Ban Treaty to delegitimize “any and all nuclear threats” will prove even harder to achieve (TPNW 2022). In turn, the chasm between the system of deterrence and the system of restraint will likely grow.

A blow to the system of nuclear restraint

The crucible of Ukraine is particularly damaging to the system of nuclear restraint in view of that country's 1994 decision to surrender a vast nuclear arsenal that it had inherited from the collapsed Soviet Union. What Ukraine had relinquished was not a “ready-to-use” nuclear deterrent, but rather a nuclear option. Ukraine surrendered that option and transferred its nuclear warheads to Russia against the background of a growing threat of Russian border revisionism, which could have fashioned a sufficient motivation for Ukraine to turn that option into a deterrent. Indeed, the perception of a growing Russian threat served for Ukraine as a reason to both second-guess the prudence of quick disarmament and demand security guarantees from nuclear powers as part of the denuclearization deal. One reason Ukraine ultimately chose, wisely, to disarm was its desire not to defy the international nonproliferation consensus but join the international community on good terms (Budjeryn 2021).

Another reason was that Ukraine thought it got a good deal in return for denuclearizing. Part of the deal were the security assurances to respect Ukraine's sovereignty and the inviolability of its borders and abstain from the threat or use of force against Ukraine, pledged in the so-called Budapest Memorandum by three nuclear powers, depositaries of the NPT: the United States, the United Kingdom, and Russia (UNTC 1994). This document, which accompanied Ukraine's accession to the NPT, became a key part of the system of nuclear restraint. Its violation by Russia in 2014 and then again in 2022 with renewed contempt and brutality, is a damaging blow to the entire nonproliferation regime and the value of security assurances as a tool of nonproliferation policy. That the other signatories of the Budapest Memorandum – the United States and the United Kingdom – chose to sideline the document, even as they extended diplomatic and military assistance to Ukraine, further damaged the credibility of the nonproliferation regime (Budjeryn 2022).

Meanwhile, if the prospects for advancing US-Russian arms control, which is essential to reconcile the system of deterrence and the system of restraint, seemed rather poor prior to the war, it is even less promising now. The last strategic arms control treaty between the two superpowers, New START, is due to expire in 2026. The Biden administration has signaled that it would be open to begin negotiations on a follow-on treaty (The White House 2022b). The Russian side,

however, has not responded in kind – in fact, quite the opposite. In August, Russia declared that it would not resume on-site inspections under the New START treaty that were halted during the pandemic (Reuters 2022b). It is difficult to see how Russia would agree to sit at the arms control negotiating table without first getting some relief of Western sanctions, an unlikely prospect given the war in Ukraine shows no signs of abating soon. It is also difficult to see how the United States would agree to another legally binding arms control treaty that does not include Russia's vast arsenal of non-strategic nuclear weapons, also an unlikely prospect. Thus, the fulfillment of NPT Article VI – a contentious issue between nuclear haves and have-nots before the war in Ukraine – is likely to be exacerbated, not alleviated.

Meanwhile, the Russian occupation, military use, and shelling of Ukraine's Zaporizhzhia Nuclear Power Plant (ZNPP) raises a risk of a major nuclear accident and poses a truly unprecedented challenge for the international governance of peaceful uses of nuclear energy. The IAEA and its director general, Rafael Grossi, responded with an equally unprecedented mission to ZNPP in September and have urged forcefully for the establishment of a nuclear safety and security protection zone around the plant (IAEA 2022). This would require convincing Russia to withdraw its military forces from ZNPP, which it is unlikely to do. Moreover, any international enforcement of such a zone would require a decision of the UN Security Council – which Russia can veto. The 10th NPT Review Conference in August ended without adopting a consensus document over the objections of one country, and one country only – the Russian Federation – and its refusal to compromise on the formulation of paragraphs relating to the occupation of ZNPP (UN 2022). Longer term, the international community must face the harsh reality that its institutions of nuclear governance are not adequately equipped to respond to the weaponization of a civilian nuclear facility – Europe's largest – or to prevent it from happening elsewhere in a world that is eyeing nuclear energy as one of the ways to mitigate climate change.

A global nuclear order at the crossroads

Danish nuclear physicist Niels Bohr purportedly liked to quip that prediction is very difficult, especially if it's about the future. Despite the odds, humanity has managed to live with nuclear weapons for over seven decades without blowing itself up. One reason for this good fortune is just that: dumb luck (Pelopidas and Wellerstein 2020). Another reason is the continued efforts to manage the global nuclear conundrum, in

good faith and to the best of our abilities. The evolved and evolving global nuclear order and its two constitutive systems of nuclear deterrence and nuclear restraint have at times worked to reinforce each other, helping to reduce the chances of nuclear use and nuclear war. But these systems have deep, inherent contradictions that the ongoing war in Ukraine is gravely exacerbating.

Resolving these contradictions in a logical, equitable, and just manner would require coordinated systemic transformations difficult to imagine and more difficult still to implement – but not impossible. Much will depend on the ultimate outcome of the war in Ukraine and the lessons drawn from it for the value of nuclear weapons in international security. If Ukraine prevails over the nuclear bully with determination, skill, and modern conventional weapons, then nuclear weapons will prove their uselessness and likely lose their luster. Instead, if Ukraine falls or is destroyed by a Russian nuclear attack while its international partners demur – deterred by Russian nuclear might and hidden behind NATO's nuclear deterrent – then future efforts to deny nuclear weapons to other countries by proselytizing the virtues of nonproliferation will surely seem like a sham. The nuclear shadow cast by the war in Ukraine might stretch long into the future.

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Notes on contributor

Mariana Budjeryn is a senior research associate with the Project on Managing the Atom (MTA) at the Harvard Kennedy School's Belfer Center. Formerly, she held appointments as a Stanton Nuclear Security Fellow at MTA, a fellow at the Harvard Davis Center for Russian and Eurasian Studies, and as a visiting professor at Tufts University and the Peace Research Institute Frankfurt. Mariana's research focuses on the international non-proliferation regime, arms control, nuclear crises, and post-Soviet nuclear history.

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