



Understanding Foreign Deployed Nuclear Weapons

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Summary

This dissertation delves into the complex dynamics of U.S. nuclear weapon deployments. Scholarly work on nuclear weapons has predominantly focused on strategic forces. However, many escalation scenarios foresee the use of tactical nuclear weapons as a precursor, which could eventually lead to an all-out nuclear war. These are exactly the weapons that the United States has deployed across the world, and we know little about their strategic causes and consequences. My study addresses this gap in the literature.

The first part of this dissertation investigates the causes of U.S. nuclear weapon deployments. It emphasizes the importance of assurance, which has commonly been neglected or subsumed under non-proliferation. Through a comprehensive conceptualization, I distinguish assurance from other strategies of interstate interaction, explaining how the U.S. uses nuclear weapon deployments to assure allies and maintain its sphere of influence. Utilizing an original dataset, I find evidence that largely confirms my assurance hypotheses. With regard to alternative explanations, the power projection hypotheses are supported, but the extended deterrence hypotheses are not. These results contribute to the underdeveloped literature on assurance and provide valuable insights into the strategic considerations underlying U.S. nuclear weapon deployments.

The second part, which is co-authored with Julian Wucherpfennig, examines the consequences of U.S. military deployments, both conventional and nuclear. The theory of free-riding in military alliances postulates that member states piggyback on security commitments by guardian states. We argue that free-riding critically implies that foreign military deployments positively affect subjective feelings of security – in other words: that they assure. In contrast, if citizens hold skeptical views of the guardian or do not subscribe to the (extended) deterrence logic, they might experience an increase in threat perception. We investigate how foreign military deployments impact attitudes toward defense policies in host states through an observational data analysis and a survey experiment. While nuclear and conventional troop deployments decrease citizens' subjective need for defense, they do not necessarily increase their sense of protection, challenging the logic of free-riding.

Taken together, my findings suggest a mismatch between objectives and outcomes. While I find evidence that nuclear weapons are deployed to assure allies, this aim does not appear to be effective at the micro-level.

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1 Introduction

1.1 Motivation

In late 1960, U.S. Congressman Chet Holifield found himself at the center of a rather bizarre scene on an airfield in Germany. Together with fellow members of the Joint Committee on Atomic Energy, and accompanied by staffers from Atomic Energy Commission laboratories, he was on a mission to inspect how oversight and custody of U.S. foreign deployed nuclear weapons looked in practice. What they discovered unnerved them, and it shocked U.S. President Kennedy when he heard about it: Out in the open on an airfield, “either completely exposed to the elements” or with only a “minimum cover”, airplanes were equipped with nuclear weapons, ready to set off in under 15 minutes (Quick Reaction Alert).¹ While this description may be sufficient to cause significant fear for the average reader, in the Cold War era, it was yet another routine measure on the brink of nuclear Armageddon. With the doomsday clock set at seven minutes to midnight, and nuclear-armed aircraft ready to fulfill the prophecy in just about that time, the Cold War was characterized by hair-raising policies.²

This is not what unnerved Holifield and his group. What caught their eyes was the security arrangements around the U.S. deployed weapons. A single American officer, often young and on his first deployment, was guarding two nuclear armed airplanes at once, in eight hour shifts. Even the most dedicated soldier, the group noted, would become “bored, dissatisfied, and inattentive to his duties.”³ What made matters worse: In the event of an attempted unauthorized use, the U.S. officer was expected to inform their superiors via a telephone controlled by personnel from the host nation while potentially defending the aircraft against host nation guards deployed on the airfield. This lenient custody system was not unique to Germany. In the United Kingdom, a U.S. Congressman discovered that British officers possessed both American and British authentication keys to launch the nuclear-capable Thor missile. In Turkey and Italy, host state personnel could have easily overpowered the U.S. custodian and launched nuclear-armed Jupiter missiles capable of reaching the Soviet Union.⁴ No matter where American officials looked, the supposed U.S. custody of nuclear weapons was nothing more than a mere facade. Authentication keys were copied and guardian positions were left understaffed, while nuclear weapons were kept in a state of readiness for immediate use.

The United States has deployed “tactical” nuclear weapons, designed for battlefield use, to

¹Burr, 2020b, document 5, p. 40.

²“The Dawn of a New Decade” 1960.

³Burr, 2020b, document 5, p. 40.

⁴Trachtenberg, 1999, p. 195.

other countries since 1954. These weapons are not the “strategic” types that are commonly associated with fears of nuclear armagedon, mounted on colossal intercontinental ballistic missiles and attached to long-range bombers.⁵ Yet, as noted in the Holifield report, the bombs equipped to the Quick Reaction Alert aircraft were still capable of causing at least 50 times the destruction of the Hiroshima bombing, with virtually no way for the U.S. to prevent it.⁶ A handful of German airmen, supervised by a single junior American officer, presided over the fate of humanity, as any unauthorized use, the Holifield report concluded, might well result in an “*all-out nuclear war.*”⁷

Fast forward 63 years, and once again, the deployment of nuclear weapons is causing unease among political decision-makers and defense specialists alike. On March 25 2023, Russian President Putin announced that his country would deploy nuclear weapons to Belarus.⁸ Similar to the United States, Russia will deploy tactical nuclear weapons, which represent almost half of its nuclear arsenal, abroad.⁹ By relying on nuclear threats, Russia has brought the looming risk of human extinction through nuclear war back on the public agenda.¹⁰ While nuclear scholars had always been aware of the continued danger, many outside of the field were perhaps more surprised to rediscover an issue that had ceased to capture widespread attention since the end of the Cold War.

Russia has issued numerous nuclear warnings since it attacked the whole of Ukraine in 2022. From insinuating that Ukraine could drag NATO into a nuclear war,¹¹ to describing the Western actions as an existential risk to Russia,¹² to threatening disastrous global consequences if a no-fly zone was established in Ukraine,¹³ to putting annexed Ukrainian territory under the nuclear umbrella.¹⁴ However, these threats were not followed by any observable action on the ground. Deploying nuclear weapons to an ally is a dangerous next step on the escalation ladder. Indeed, the risk of a nuclear escalation is so grave that the Doomsday Clock, set to seven minutes before midnight in the year the Holifield report was written, has been moved to 90 seconds to midnight in 2023.

Given the significant risks involved it is unclear why nuclear weapons have frequently been deployed abroad. Why would states choose to entrust their allies with nuclear weapons that

⁵There is no single comprehensive definition of tactical and strategic nuclear forces. During the Cold War, these terms were distinguished based on the intended mission of the weapons. Tactical nuclear weapons were designed for use on the battlefield, with smaller warheads and greater precision, while strategic systems targeted population centers, critical infrastructure and important manufacturing capabilities. However, as long-range delivery vehicles have become more precise, the distinction between tactical and strategic systems has become less clear. Today, tactical systems often refer to those not captured under the New Start Treaty; see: Woolf, 2022.

⁶The nuclear bombing of Hiroshima resulted in the deaths of 140,000 people.

⁷Burr, 2020b, document 5, p. 10.

⁸Seddon and Schwartz, 2023.

⁹Kristensen and Korda, 2022a.

¹⁰Bollfrass and Herzog, 2022, pp. 19–22.

¹¹Website of the President of Russia, 2022.

¹²See: The Spectator, 2022. This is a clear reference to Russia’s nuclear doctrine, which foresees the use of nuclear weapons against threats to the very existence of the Russian state.

¹³Al Jazeera, 2022.

¹⁴Reuters, 2022b.

cause significant concerns among decision-makers regarding information leakage due to lax security provisions in host states,¹⁵ are more usable, and also entail a greater risk of unauthorized access? This is even more puzzling given that the military-technical value of these deployments had already diminished significantly by the late 1950s, as the development of intercontinental ballistic missiles (ICBMs) and ballistic missile submarines (secure second-strike capability) reduced their operational significance. Yet, nuclear weapons have continuously been deployed to other states since the first deployments occurred in 1954. My dissertation studies exactly these questions. Specifically, it examines the strategic logic of U.S. deployed nuclear weapons by asking: *Why has the United States deployed nuclear weapons abroad, and how have they impacted host states?* It is worth noting that the United States has deployed nuclear weapons to more countries than any other state. Since the beginning of the Cold War, U.S. deployments have spanned the globe, with 14 host nations across North America, Europe, North Africa, and Asia.

In my dissertation, I analyze the strategic *causes* of U.S. nuclear weapon deployments, which constitute the primary focus of my study. While existing literature has predominantly concentrated on extended deterrence and power projection, my research advances these earlier theories by highlighting the role of assurance. Specifically, my contribution encompasses three main aspects. First, I provide a comprehensive conceptualization of assurance within the context of other strategies of interstate interaction. Second, I develop a theory that explains the connection between assurance and foreign nuclear weapon deployments. I argue that the United States uses such deployments to assure allies that may otherwise act independently of the U.S. alliance system. Third, I test my hypotheses using a novel dataset that significantly improves previous data collection efforts by providing technical details on each individual nuclear armed delivery vehicle deployed by the United States.

The second part of my dissertation, co-authored with Julian Wucherpfennig, examines the *consequences* of U.S. nuclear weapon deployments. Focusing on the micro-level, we investigate the impact of both nuclear and conventional troop deployments on attitudes towards defense policies among (potential) host states. Our theoretical framework goes beyond common assumptions of free-riding and also considers the possibility that such deployments may instill fear in host state populations. Utilizing observational survey data and an original survey experiment, we find evidence that military deployments decrease citizens' subjective need for defense. This drawback extends beyond the potential risks commonly associated with nuclear deployments, such as fears of unauthorized use and escalation, and is a significant issue to consider. However, the survey experiment also reveals that citizens hardly feel protected by these deployments, calling into question

¹⁵See for example: Burr, 2020b, document 26, p. 4, and document 5, pp. 38-39.

the logic of free-riding.

Studying nuclear deployments is important. The anecdote of the Holifield report serves as a powerful reminder of the potential for these weapons to bring about the destruction of human civilization. How might this play out in detail? For instance, the deliberate use of tactical nuclear weapons could lead to a tit-for-tat exchange that ultimately results in total destruction.¹⁶ It is worth noting that these weapons, unlike their strategic counterparts, have commonly been deployed close to the battlefield and are designed for both deterrence *and* actual war fighting. In fact, the majority of publicly discussed scenarios regarding potential nuclear escalation in Ukraine do not rely on the notion of a “bolt out of the blue” strategic strike. Instead, they typically revolve around the use of tactical nuclear weapons.¹⁷ Moreover, even without going through the tit-for-tat phase of nuclear conflict, the use of any nuclear weapon could be misinterpreted as a first strike in a larger nuclear attack, potentially leading to an unrestricted retaliation. Lastly, just the limited use of one tactical nuclear weapon would dramatically heighten threat perceptions and increase the likelihood of miscalculations. There are numerous well-documented accounts of nuclear close calls resulting from human error or misleading sensory data, often relying on the cool-headed decisions of those in positions of authority to prevent catastrophe.¹⁸ Military and political decision-makers may be less inclined to grant the benefit of the doubt once a nuclear weapon has been used. Given these civilization-destroying characteristics, it is imperative to better understand nuclear weapon deployments.

Recent developments have also brought foreign nuclear deployments back into the political spotlight. Russia’s announcement to station nuclear weapons in Belarus, its first foreign nuclear deployment since the end of the Cold War, has been a cause for concern.¹⁹ The full-scale Russian invasion of Ukraine in 2022 shattered the illusion of the end of history in Western Europe. In Central Europe, NATO ally Poland is openly advocating in favor of hosting nuclear weapons to counter Russia’s aggression.²⁰ Meanwhile, China’s assertiveness and North Korea’s increasingly sophisticated nuclear arsenal are causing anxiety among U.S. allies in Asia, leading to renewed interest in a national nuclear capability in South Korea, and discussions about U.S. nuclear deployments to the peninsula.²¹ Additionally, the possibility of a nuclear-armed Iran adds to the already complex geopolitical landscape. Together, these developments are putting pressure on the United States to increase its conventional and nuclear presence in allied regions in the foreseeable

¹⁶Powell, 1989.

¹⁷See for example: Gannon, 2022; Shapiro, 2022.

¹⁸Lewis, Pelopidas, and Williams, 2014; Schlosser, 2014; Podvig, 2014.

¹⁹Karmanau, 2023.

²⁰Rosa Hernández, 2022.

²¹Pillai Rajagopalan, 2023; Sukin, 2023; Field, Shelley, and Griffiths, 2017.

future.²² The lack of research on nuclear deployments leaves the scientific community ill-equipped to engage in serious deliberations about where future deployments might occur and how they could impact deterrence, assurance and overall strategic stability.

The importance of studying foreign deployed nuclear weapons extends beyond their associated risks and political relevance. The social scientific study of nuclear weapons is limited by small sample problems.²³ Although it is undoubtedly a positive outcome that there are only a few nuclear weapon states and that the world has seen only two instances of nuclear weapon use, this fact does pose a challenge to causal inference designs.²⁴ However, as Gartzke and Kroenig observe, “the stakes involved – no less than the fate of humanity – advocate that researchers find ways to compensate, satisfice, and overcome.”²⁵ Foreign deployed nuclear weapons provide a unique opportunity to expand the empirical basis of nuclear weapon research. While there have only ever been ten nuclear weapon states,²⁶ the United States alone has deployed nuclear weapons to 14 different countries. Moreover, U.S. deployments ended in nine out of these 14 cases, but only one nuclear weapon state gave up its own weapons. While I do not delve into this temporal dimension in detail, studying the cases of former nuclear host states enables before-and-after comparisons, which can provide valuable insights into the effects of nuclear weapons at large in future research.

Indeed, foreign nuclear deployments offer a diverse and extensive array of cases to explore deterrence, escalation control, and nuclear strategy more broadly. For instance, investigating the emboldening effect of nuclear weapons on the example of nuclear host states would be intriguing. Although previous research has examined the impact of nuclear umbrellas on a client state’s tendency to initiate conflicts, the effect of nuclear deployments remains unexplored.²⁷ While we have

²²The ongoing Russian attack on Ukraine has prompted the United States to deploy additional military to its European allies. The announcement was made at the NATO Madrid summit in late June of 2022. The deployments included a permanent military headquarters in Poland, the deployment of F-35 fighter jets to Britain, and troop deployments to Romania; see: Powell, 2022. Earlier that year, the Biden administration had already approved the additional deployment of 20,000 troops, for a new total of over 100,000 in Europe; see: McLeary, 2022. While there is no indication yet of plans to renew nuclear weapon deployments, the structural conditions for such a development exist. First, current host nations have recently bought new dual-capable aircraft, with Germany announcing the purchase of the F-35 as a replacement for the aging Tornado. Not least because of its stealth features, this is a significant improvement in capabilities; see: Reuters, 2022a. Moreover, the United States is continuing its planned replacement of the B-61 with the guided B-61-12. Second, the NATO-Russia Founding Act is de facto dead; see: Mackinnon, 2022. The agreement prohibits nuclear deployments in any Eastern European NATO member states, but it is uncertain if NATO still feels bound by it after numerous Russian breaches. Indeed, already in 2018, in the midst of the demise of the INF Treaty, Polish Foreign Minister Jacek Czaputowicz stated that his country would be prepared to host U.S. missiles that fall under the treaty range; see: Sieradzka, 2018. Poland has since substantiated its interest of becoming a nuclear host state; see: Rosa Hernández, 2022. Third, Russia’s deployment of nuclear-capable missiles to Belarus, which might be followed by the deployment of nuclear warheads soon, could provoke a reaction from NATO; see: Karmanau, 2023. These trends are not limited to European allies as debates about redeploying nuclear weapons to South Korea gaining momentum; see: Lee, 2022.

²³Gartzke and Kroenig, 2016, p. 398; Gartzke and Kroenig, 2017, p. 1854.

²⁴Gartzke and Kroenig, 2017, p. 1854.

²⁵Gartzke and Kroenig, 2017, p. 1867.

²⁶Belarus, Kazakhstan, and Ukraine had nuclear weapons on their territory after the dissolution of the Soviet Union. However, they did not consciously acquire these weapons; they arguably never had full control over them, and the nuclear weapons were fully removed from these states’ territories, in accordance with them, within about two years after the end of the Soviet Union. For all these reasons, I do not consider them former nuclear weapon states, and they are poor cases for most nuclear weapon-related research.

²⁷Narang and Mehta, 2019.

limited opportunities to assess how nuclear weapon states act without their nuclear forces, as only one country has disarmed, we can examine the pre- and post-nuclear weapon phases of nine former U.S. nuclear weapon host states. The number of cases increases to 19 with the inclusion of former U.K. and Soviet deployments. Furthermore, nuclear weapon states often do not share borders or are not adversaries, as in the case of the United Kingdom and France. However, nuclear dynamics may differ based on the weapons' location. For instance, concerns about nuclear use were likely distinct between the Soviet Union and the United States, with their capitals separated by 8,285 km, versus the Federal Republic of Germany and the German Democratic Republic, divided by a heavily fortified direct land border with nuclear mines. Therefore, examining nuclear deployments provides insights into novel aspects of nuclear strategy. Yet, at the start of this research agenda should be the most fundamental question: Why have states deployed nuclear weapons abroad?

Despite the apparent relevance of foreign-deployed nuclear weapons, research on their strategic causes and consequences has been limited, with few exceptions.²⁸ Although nuclear weapons in general have been the subject of numerous articles, books, and dissertations, as pointed out by Sechser, “we know comparatively little about [...] *foreign-deployed* nuclear weapons”²⁹. This lack of scholarly attention could be attributed to the fact that the deployments have been shrouded in secrecy. Even today, the United States and the five remaining nuclear host states³⁰ neither confirm the existence of the deployments nor their quantity, although the deployments are an “open secret,” and there are very good estimates about the number of deployed warheads³¹. It took about ten years after the end of the Cold War for a successful Freedom of Information Act request to reveal the full picture of U.S. nuclear deployments around the world for the first time, but the information was limited to the years before 1977 and heavily redacted, with one host state still unidentified by researchers beyond reasonable doubt.³² There is even less publicly available information for Soviet and British deployments. Therefore, it has proven to be challenging to focus specifically on nuclear deployments within the broader context of nuclear weapons analysis. Nevertheless, there are now 24 known cases of nuclear deployments, and the amount of primary information that has been brought to light continues to grow steadily.³³ This offers an important opportunity for new research.

Further, the strategic forces of the Soviet Union and the United States, have become *the* symbol of catastrophic risk, and central concepts of nuclear security such as mutually assured

²⁸These include: Fuhrmann, 2018; Sechser, 2017; Fuhrmann and Sechser, 2014b; Fuhrmann and Sechser, 2014a.

²⁹Sechser, 2017, p. 444.

³⁰Belgium, Germany, Italy, the Netherlands, and Turkey

³¹See for example: Kristensen and Korda, 2022b, pp. 176–177.

³²Norris, Arkin, and Burr, 1999.

³³See: Fuhrmann and Sechser, 2014a, p. 466. In addition, the National Security Archive has published numerous archival documents in the past two decades, including multiple large publications in the past years.

destruction critically dependent on secure second-strike strategic nuclear forces.³⁴ Moreover, the study of nuclear weapons has largely been conducted in the United States, focusing squarely on the United States. These factors may have led scholars to focus on the “big guns” stationed in the United States, rather than carefully assessing their smaller, more usable counterparts that are commonly deployed abroad. While tactical nuclear weapons could devastate the battlefield on which they are used – in the context of the Cold War, this would primarily have been Europe – these weapons also provided the United States with an opportunity to transfer the risks of nuclear war to other regions.³⁵ However, as detailed above, foreign-deployed nuclear weapons can easily lead to catastrophic outcomes for the United States and its allies alike.

1.2 Research Agenda

The research in this dissertation broadly covers two dimensions: First, the causes of U.S. foreign deployed nuclear weapons. Second, the consequences of these deployments and their impact on the opinion of host state citizens on defense. What unites these two dimensions is the exploration of a neglected aspect of interstate interaction: assurance. Previous scholarly work on foreign nuclear weapon deployments has overlooked assurance or subsumed it under non-proliferation.³⁶ At the same time, the role of assurance has been consistently emphasized in political commentary and policy-focused publications.³⁷ This disconnect between common belief on the one hand, and rigid conceptualization and empirical testing on the other, has created a notable gap. Studying assurance is crucial to answering fundamental academic and political questions, and can provide insights into the driving forces behind nuclear deployments. Indeed, previous research in international relations has recognized the need for a more thorough examination of the strategy.³⁸ For instance, with renewed momentum for nuclear deployments in Europe and Asia, it deems crucial to disentangle the driving forces behind these deployments. If assurance is indeed a cause, it invites further probing into the scope conditions that determine its success.

By studying assurance, we can also refine important concepts in international relations, such as the elemental dilemma faced by states in alliances, fearing both entrapment and abandonment.³⁹ The latter is problematic because of the anarchic structure of the international system: There is no guarantee that an ally will provide assistance in times of need. To avoid this scenario, states

³⁴The concept of a secure second strike refers to the capability of launching a nuclear counter-attack that can cause significant harm to the aggressor, even after enduring a nuclear attack.

³⁵Heuser, 1999, p. 132.

³⁶See for example: Sechser, 2017; Reiter, 2014; Fuhrmann and Sechser, 2014a; Fuhrmann, 2018; Lanoszka, 2018.

³⁷Sauer and Zwaan, 2012, p. 88; Andreasen et al., 2018, p. 17; Moniz and Nunn, 2018; Varriale, 2015; Yost, 2009, pp. 764–770.

³⁸Goldgeier and Wojtowicz, 2022, pp. 739–740; Knopf, 2012.

³⁹Snyder, 1984, pp. 466–468.

seek assurance through guarantees that solidify the alliance. This is the central premise of positive assurances, which relies on signals that convince other states of protection. These signals can be words or deeds. Importantly, they are aimed at overcoming abandonment fears. Additionally, assurance is integral to coercive strategies such as deterrence and compellence. Schelling argues that every threat should include a promise of non-harm to give the threatened party an incentive to comply with the demand or warning.⁴⁰ This is known as negative assurance. A thorough understanding of assurance is thus vital in addressing fundamental political and academic questions. While my research primarily focuses on positive assurances, it recognizes the importance of studying assurance as a whole.

This dissertation also extensively discusses extended deterrence and power projection (i.e., direct deterrence and compellence). Together with assurance, they form the strategic framework in which nuclear deployments are embedded. While prior research suggests that a formal alliance with a nuclear state enhances deterrence for the protégé state, the deployment of nuclear weapons does not seem to have an additional effect.⁴¹ Moreover, scholarly work has found that states with nuclear allies are more likely to initiate a militarized dispute, but there exist no studies on the specific effect of nuclear deployments.⁴² Overall, previous research suggests that nuclear deployments may be less consequential for deterrence and compellence than commonly believed.⁴³ However, this dissertation focuses on examining the causes of foreign nuclear weapon deployments, such as extended deterrence, assurance, or power projection, and how citizens in host states perceive them. Thus for the purposes of my work, it is largely irrelevant, if these deployments indeed deter or compel adversaries. Instead, the United States' *belief* that foreign nuclear deployments fulfill their intended purposes, as well as the perceptions of host state citizens towards these deployments, are both critical factors for this dissertation. If citizens suspect the United States of having self-serving intentions, such as power projection, they may become more skeptical towards military deployments on their territory. To explore this further, I investigate the micro-mechanisms of citizen perception by assessing their attitudes towards foreign military deployments, including both conventional and nuclear forces, and how these attitudes affect their views on national defense.

Beyond the immediate field of study, my research has broader implications for international relations. For instance, through the examination of the impact of nuclear deployments on the subjective need for national defense among host state citizens, I contribute to the growing literature on the relationship between nuclear weapons and public opinion. Moreover, my work relates to

⁴⁰Schelling, 2009, p. 74.

⁴¹Fuhrmann, 2018; Sechser, 2017; Fuhrmann and Sechser, 2014b.

⁴²Narang and Mehta, 2019.

⁴³Fuhrmann, 2018, pp. 67–68.

arms control and non-proliferation issues, as the survey experiment in *Chapter 4*, among other things, asks citizens about their preferences for a national nuclear capability. Additionally, my study enhances our general comprehension of the spread of nuclear weapons, given the frequent association of nuclear deployments with nuclear proliferation.⁴⁴ Finally, my dissertation raises intriguing questions regarding interstate interactions at large, such as when and how states seek to assure one another, the relationship between protégés and guardians, and whether small states hold leverage over their larger partners. These are just a few of the broader questions that my research explores.

1.3 Structure

The dissertation is loosely structured along two dimensions. First, consequences and causes. Second, extended deterrence, power projection, and assurance. This is shown in [Table 1](#).

	Extended Deterrence	Power Projection	Assurance
Causes			
Consequences			

Table 1: Themes

In *Chapter 2*, I provide an overview of U.S. nuclear weapon deployments. The United States first deployed nuclear-armed delivery vehicles in the United Kingdom and Morocco in 1954. In total, the United States has stationed nuclear weapons in 14 different countries, of which 12 were allied nations at the time of the deployments. Drawing on both secondary sources and recently published archival material, I describe how the deployments came about. In some cases, allies actively demanded a deployment on their territory, such as in the case of the Netherlands, while in other cases, such as in the case of Morocco, the United States deployed the weapons unilaterally, without even informing the host state. The circumstances surrounding the deployments varied significantly across different countries, including the specific arrangements in which the weapons were deployed. In some countries, such as the Netherlands, only host state forces have been assigned to use nuclear weapons, while in others, some warheads were earmarked for use by U.S. forces and some for use by host state forces.⁴⁵ However, in Denmark, Morocco, the Philippines, and Taiwan, there was no involvement of host state forces at all. In addition, some U.S. allies sought assurance of their special relationship with the United States through bilateral consultation agreements. For instance, a series of letter exchanges starting with the Murphy-Dean Agreement of 1958 confirmed the U.S. willingness to consult with the United Kingdom over the years.⁴⁶

⁴⁴See for example: Alberque, 2017, p. 11.

⁴⁵For instance, this has been the case in Germany for most of the deployment time, Turkey until 2006, or Italy.

⁴⁶See for example: Burr, 2005, document 14 and document 29; Burr, 2020b, document 10 and document 14.

Chapter 3 zooms in on the role of assurance in the deployment of U.S. nuclear weapons and lays out the main argument of my dissertation. I explain that assurance is a key factor in these deployments. Unlike previous research, which has focused on extended deterrence and power projection or grouped assurance under non-proliferation, I conceptualize assurance as a separate strategy of interstate interaction: It is non-coercive, it can be used to keep or change a status-quo, and it involves both positive (promises to protect) and negative (promises of no harm) dimensions, with my dissertation focusing on the former. While assurance can contribute to non-proliferation, it is a distinct strategy in its own right and can be achieved through a range of means, including military deployments, to achieve various goals from maintaining global alliances to non-proliferation. In addition, in contrast to coercive strategies like extended deterrence and power projection, which target adversaries, positive assurance is aimed at allies.

My central argument is that the United States selectively deploys its nuclear weapons to assure allies who otherwise have the capacity to act independently. Military deployments can serve as a tool of assurance because they lend credibility to the underlying security guarantees. Fearon has categorized such signals as sunk costs and hand-tying.⁴⁷ Quek further refined these concepts by adding installment costs, commitments to incur costs over a future period of time, and reducible costs, which can be offset in the future contingent on the signaler's action.⁴⁸ Nuclear deployments can act as effective tripwires, raising the risk of nuclear war (hand-tying), but also reducing the cost of war fighting once it breaks out (reducible costs). Additionally, these deployments come with painful diplomatic and military costs (sunk costs), some of which must be paid over time (installment costs). For instance, the Soviet Union was highly concerned about nuclear weapon deployments to Germany, because they thought this would be a first step toward a German nuclear weapon.⁴⁹ This complicated negotiations over the Non-Proliferation Treaty.⁵⁰ A considerable diplomatic cost. In sum, nuclear deployments are credible signals which can be utilized for assurance purposes.

Next, I delve into the factors that shape the United States' willingness to provide assurance to its allies. While several factors can impact the U.S.' ability to provide assurance to other countries, I argue that the primary determinant is an ally's potential ability to act independently from the U.S. alliance system. This, in turn, is determined by three factors: First, maintaining strong relationships with other major powers; second, military prowess; and third, nuclear latency. Together, my argument suggests that the United States uses nuclear weapon deployments to pro-

⁴⁷Fearon, 1997.

⁴⁸Quek, 2021.

⁴⁹Trachtenberg, 1999, pp. 280–281; Alberque, 2017, p. 27.

⁵⁰Alberque, 2017, p. 12.

vide assurance to allies that have the potential to pursue a more independent foreign policy that could undermine U.S. influence. To account for alternative explanations, I also examine if the deployments are more likely in highly threatened states (extended deterrence) or in strategically important geographic locations (power projection), factors that the literature has so far focused on.

To empirically test my hypotheses, I rely on an original dataset that captures yearly information on U.S. nuclear deployments as well as each nuclear-armed delivery vehicle present in a host state. The dataset includes details such as the vehicle model, purpose of use, range, and extent of control the host state has over nuclear weapon use. Since the exact number of deployed nuclear warheads is unavailable, examining the number of distinct nuclear delivery vehicles provides a good approximation. Indeed, I suspect that the effect of nuclear deployments, from assurance to power projection, increases with their quantity. In addition, U.S. allies frequently demanded customized solutions to address their specific concerns, which often required a diverse range of nuclear-armed delivery vehicles. For instance, the NATO Dual-Track Decision demonstrates how European allies requested intermediate-range nuclear forces on their territory to address perceived capability gaps. A count of nuclear-armed delivery vehicles also sheds light on this dimension, as it is more likely that allies who receive a more extensive range of vehicles are better accommodated.

As mentioned above, data availability has been a limiting factor in the study of foreign deployed nuclear weapons. However, in the past two decades, the release of archival documents has greatly improved access to information. Indeed, they can shed new light onto many of the questions which had previously been impossible to answer. Despite this, the conversion of these documents into usable data has not kept pace. The dataset created for this study is a significant improvement over previous efforts and opens the door for research in various directions, from examining the effects of defensive and offensive nuclear deployments, the range of delivery vehicles, and the diversification of nuclear arsenals on deterrence, to whether or not certain systems embolden irresponsible behavior more than others, to the study of the effectiveness of assurance under different conditions.

While these potential avenues of research are intriguing, the analyses conducted in this dissertation already yield compelling results. Through an examination of the causes of nuclear deployments, my research largely supports the assurance hypotheses, which significantly enhances our understanding of such deployments and improves upon earlier theories. While I find no evidence of a positive correlation between maintaining good relationships with other major powers and nuclear deployments, my results show that military size and nuclear latency are positively correlated with nuclear deployments. Thus, my study indicates that assurance plays a crucial role, as states with the material capabilities to act independently from the United States are more likely to receive (a

greater variety of) U.S. nuclear forces. Additionally, I find support for the role of power projection, but only limited evidence for the common belief that extended deterrence objectives lead to U.S. nuclear weapon deployments. My findings significantly contribute to the currently underdeveloped literature on assurance, and they provide valuable insights and important nuances into the strategic calculus involved in U.S. nuclear weapon deployments.

Focusing on the consequences of U.S. nuclear weapon deployments, *Chapter 4* examines the effects of conventional and nuclear deployments on host state citizens' attitudes toward national defense.⁵¹ The theory of free-riding in military alliances postulates that member states piggyback on security commitments by guardian states. Because foreign military deployments (in the form of troops or nuclear weapons) render such promises particularly credible, the United States regularly threatens withdrawal from allied states in order to prevent alleged free-riding. While existing research on this topic has primarily focused on macroeconomic indicators like defense spending, this chapter explores the micro-foundations and mechanisms of this logic, examining how foreign military deployments affect citizens' attitudes towards defense policies in (potential) host states.⁵² Since most close U.S. allies are democracies, electoral preferences play a crucial role in shaping policy decisions.⁵³ Thus, studying what citizens think about foreign and security policy is not only interesting in its own right, but can also help to explain political outcomes.

We develop three causal pathways that link foreign military deployments to citizens' subjective need for national defense. First, free-riding occurs when citizens trust the guardian and subscribe to the logic of deterrence, resulting in lower threat perceptions caused by military deployments and a reduced subjective need for national defense. Second, disengagement occurs when citizens do not trust the guardian and are not afraid of the adversary. In this case, military deployments heighten threat perceptions and are seen as contributing to an unnecessary escalation spiral fueled by the guardian. This also leads to a lower subjective need for national defense as citizens try to disengage from what they see as the guardian's reckless agenda. Finally, self-insurance occurs when citizens do not trust the guardian but are also wary of the adversary. In this scenario, military deployments increase threat perceptions, but citizens simultaneously want to increase national defense efforts to take back control, resulting in a heightened subjective need for national defense.

In the empirical analysis, we utilize cross-national survey data from the European and World Value Survey and find that foreign military deployments decrease citizens' subjective need for national defense – in line with the free-riding and disengagement hypotheses. To disentangle the

⁵¹Co-authored with Julian Wucherpfennig.

⁵²Olson and Zeckhauser, 1966; Sandler and Hartley, 1999; Oneal and Elrod, 1989.

⁵³Aldrich et al., 2006; Page and Shapiro, 1983; Lin-Greenberg, 2021; Tomz and Weeks, 2013, p. 850; Rathbun et al., 2016.

underlying causal mechanisms we devise a survey experiment in which we randomize hypothetical withdrawals (Germany) and deployments (Czech Republic) of nuclear weapons. To measure threat perceptions, we present respondents with a series of items pertaining to the likelihood of their country, or its allies, being involved in a future war. Thereafter, we ask them about their willingness to contribute to, and their demand for, national defense. Again we find evidence that military deployments decrease citizens' subjective need for defense. Our results suggest that besides the risks of unauthorized use and escalation, the decreased defense contribution in host states are another significant drawback of U.S. nuclear weapon deployments. However, the survey experiment also reveals that citizens hardly feel protected by nuclear or conventional deployments, calling into question the logic of free-riding.

In the conclusion, I contextualize my findings and offer policy recommendations: First, assurance is a complex undertaking that operates on different levels and can lead to antipathy among citizens who perceive nefarious goals behind military deployments. This in turn can lead to adverse policy effects. Second, assurance and extended deterrence are distinct concepts, and different countries have different assurance needs. Finally, protégé states have leverage over their guardian, and historically, countries like Germany have used this leverage to keep the United States in Europe and on their territory.

2 Historical Background: Where They Were

In this chapter, I provide a brief overview of the history of U.S. nuclear weapon deployments, drawing on both secondary sources and recently published archival documents. Although this section is primarily descriptive, it serves as a crucial introduction to the dissertation's topic, setting the stage for the subsequent chapters. In *Chapter 3*, I develop a comprehensive argument regarding the role of assurance in nuclear weapon deployments. As the historical overview indicates that these deployments occurred beyond reasons of pure military rationale, the argumentation outlined in *Chapter 3* naturally flows from the groundwork laid out in this chapter. First, I present a general outline of the deployment timeline. Next, I delve into the consultation and control agreements primarily related to NATO allies. Subsequently, I explain the implementation of nuclear deployments in Asia, followed by an exploration of the broader military-strategic context.

2.1 Timeline

Since 1954, the United States has deployed nuclear weapons to 14 different countries, with some deployments occurring with U.S. forces stationed abroad, and others assigned to allied forces: Following the 1957 NATO summit in Paris and the adoption of military planning document MC 70 in 1958, allies began to own and operate some of the foreign deployed nuclear-armed delivery vehicles.⁵⁴ However, this was only the case in NATO. As part of the NATO military chain of command, host states would use their own delivery vehicles to carry out a nuclear strike if push came to shove.⁵⁵ The system remains in place today.⁵⁶

The first deployments took place in the United Kingdom and Morocco, with the latter occurring during its time as a French protectorate. Despite not being formally allied with the United States, the decision was made to deploy nuclear bombs without informing the host country, leading to political tensions after Morocco gained independence in 1956.⁵⁷ After a lengthy period of negotiations, the United States eventually withdrew its deployments from the Kingdom around 1963.⁵⁸ There is little publicly available information about the Moroccan case. However, it is possible that the deployments must primarily be understood in the context of Franco-U.S. relations, as the country was still a French protectorate when they first occurred. Taking place at the same time, U.S. nuclear deployments in the United Kingdom followed a remarkably different trajectory, as the

⁵⁴Lutsch, 2020, pp. 47–48.

⁵⁵Lutsch, 2020, p. 47.

⁵⁶There are currently five nuclear host states: Belgium, Germany, Italy, the Netherlands, and Turkey.

⁵⁷Spain, under the rule of dictator Franco, was the only other country to receive U.S. nuclear deployments without a formal alliance. Madrid saw close military cooperation with the United States as a chance to break free from international isolation; see: Portela, 2014. The deployments ended during the democratic transition in the 1970s.

⁵⁸Conway, 2019.

United Kingdom was granted special consultation rights from the United States, and remained a nuclear host until 2008.⁵⁹ This speaks to the broad range of circumstances under which the United States has deployed its nuclear weapons abroad.

The majority of initial U.S. nuclear weapon deployments occurred between 1955 and 1960, during which time the United States spread its nuclear presence to numerous countries including West Germany (1955), Italy (1956), the Philippines (1957), Denmark, South Korea, Spain, Taiwan (1958), Turkey (1959), the Netherlands, and Greece (1960).⁶⁰ After 1960, only Belgium (1963) and Canada (1964) were added to the list of host states. Despite occurring around the same time, these deployments differed in significant ways. For instance, Denmark was only provided with limited information about the deployments and was also uninterested in the details.⁶¹ In Asia, deployments to the Philippines and Taiwan were kept secret from both adversaries and the local population.⁶² As I elaborate on in *Chapter 3*, one primary explanation for nuclear weapon deployments in the scientific literature has been extended deterrence. However, it can be called into question whether deployments that are kept secret from adversaries can effectively deter them. Indeed, some deployments were clearly driven by demands from the host state, in which case assurance would be a more plausible explanation.

2.2 Control And Assurance

One example is Italy, which sought prestige associated with nuclear weapons and saw the deployments as an opportunity to rehabilitate the country and place it firmly on the political map again. Additionally, Italian decision-makers wanted to avoid being entirely dependent on the United States and other NATO powers in case of nuclear war and sought influence over wartime decisions.⁶³ During negotiations over nuclear-armed intermediate-range ballistic missiles in the late 1950s, Italy feared receiving fewer custody rights than other allies and demanded a clause specifying the special relationship between both countries to ensure their status vis-à-vis the United States.⁶⁴ Similarly, newly published archival documents reveal that the Netherlands had first approached officials in Washington about nuclear deployments to their country.⁶⁵ In May 1959, the United States and the

⁵⁹See: Norris and Kristensen, 2013. On the consultation agreements, see for example: Burr, 2005, document 9; Burr, 2005, document 14 and document 29; Burr, 2020b, document 10 and document 14.

⁶⁰Norris, Arkin, and Burr, 1999.

⁶¹Kristensen, n.d.

⁶²The United States' nuclear deployments varied not only in the political framework they were embedded in but also in the types and quantities of nuclear ammunition deployed. For example, Denmark received nuclear bombs in 1958, followed by the nuclear-armed air defense system Nike Hercules in 1959, which were both under the control of U.S. military forces. In Italy, deployments began with the introduction of nuclear munition for the MGM-5 Corporal and the Honest John, both surface-to-surface missiles. By 1960, nuclear bombs, Atomic Demolition Munitions ("nuclear mines"), and nuclear-armed Jupiter missiles and Nike Hercules had followed. Unlike in Denmark, some of these systems were assigned to Italian forces as well.

⁶³Foradori, 2014; Nuti, 2016; Nuti, 2007; Nuti, 2011.

⁶⁴Nuti, 2007, 182–183.

⁶⁵Wiebes and Burr, 2021.

Netherlands signed an agreement that contained a secret technical and security annex, stipulating that nuclear weapons would be deployed to the Netherlands and should be immediately available in case of war. A year later, the first nuclear bombs arrived on Dutch territory.

Another instructive case to outline the role assurance played in nuclear weapon deployments is Germany. It is also an exemplary case to understand why at the beginning of the Cold War, a myriad of proposals for nuclear weapon control were discussed among U.S. allies. While Germany had pledged to pursue *Westbindung*, i.e., the integration into the political, economic, and military structures of the political West, it also explored the possibility of being a neutral power between the two blocs and sought strong ties with France. However, U.S. decision-makers were concerned that a Franco-German alliance could threaten Germany's commitment to NATO.⁶⁶ Additionally, the United States feared that Berlin might strike a deal with Moscow in exchange for neutrality.⁶⁷ Germany sought nuclear deployment, but it also wanted as much control over the weapons as possible.⁶⁸ For example, in 1964 the German government approached the United States about the possibility of deploying nuclear mines along the Warsaw Pact border. Importantly, control was to be pre-delegated to the German army.⁶⁹ Decision-makers in Berlin believed that the United States would not use nuclear weapons quickly enough and that deterrence would be strengthened if Germany had a 'finger on the trigger'.⁷⁰ This thinking was reflected by other allies as well, resulting in inter-allied negotiations about control of foreign deployed nuclear weapons that covered the first-third of the Cold War. The task for U.S. decision-makers was to assure allies of their security, without unintentionally causing nuclear proliferation.

President Eisenhower believed that allies needed actual control over nuclear weapons to take on more responsibility of their own, and he favored a solution that involved a NATO nuclear force.⁷¹ Officially, all weapons were secured by dual-key procedures. However, the measures put in place to secure the weapons were initially quite lenient, with many loopholes.⁷² Despite legal constraints, the United States effectively undermined its own laws by arranging for allied access to nuclear warheads.⁷³ For example, it was widely known that Italian personnel could have launched the Jupiter missiles equipped with nuclear warheads⁷⁴, despite the official dual-key procedure required

⁶⁶Trachtenberg, 1999.

⁶⁷Gavin, 2020, pp. 50–51.

⁶⁸Lutsch, 2020, pp. 65–68.

⁶⁹Alongside Germany, Turkey and Greece also asked the United States in the late 1960s to deploy such mines along their Warsaw Pact borders. However, when it became clear that the United States would not pre-delegate authority to detonate these weapons, Turkey and Greece lost interest; see: Bird, 2008, p. 66.

⁷⁰Lutsch, 2020, pp. 65–68.

⁷¹Trachtenberg, 1999, p. 154; Trachtenberg, 1999, pp. 204–209.

⁷²Müller, 2003; Burr, 2020a; Trachtenberg, 1999, pp. 194–195.

⁷³Müller, 2003, p. 78; Trachtenberg, 1999, pp. 194–195.

⁷⁴Eventually, the Jupiter missiles were withdrawn due to a secret deal that ended the Cuban Missile Crisis; see: Trachtenberg, 1999, pp. 353–354.

to use them.⁷⁵ Indeed, visits by U.S. officials from Congress and the State Department in the early 1960s confirmed that U.S. control over the weapons was very loose, which they found concerning.⁷⁶

The question of allied control changed considerably with the incoming Kennedy administration. In June 1962, President Kennedy signed a National Security Action Memorandum which introduced Permissive Action Links (PALs) that locked nuclear warheads until release orders were given by a U.S. president.⁷⁷ The introduction of PALs marked a shift towards greater centralization and control by the United States over its nuclear weapons, including those earmarked for allied use. The Kennedy administration sought to reduce the risk of accidental or unauthorized nuclear use, and to establish clear lines of control and responsibility over nuclear weapons. This also applied to weapons operated by U.S. personnel abroad.⁷⁸ Although they were intended to be used for all nuclear weapons, some systems remained without PALs. For example, the M388 Davy Crockett, a nuclear bazooka, was too small to be equipped with them, perhaps contributing to its withdrawal from Germany and South Korea by 1968. Moreover, according to Clearwater, the nuclear AIR-2A Genie, an air-to-air rocket, did not receive PAL-modifications.⁷⁹ Thus, Canadian forces were able to use them without prior U.S. consent until their withdrawals in 1984.⁸⁰

Allies attempted to evade universally applicable rules by seeking special privileges. Nuclear deployments were commonly accompanied by secret agreements with the host state, which detailed technical guidelines.⁸¹ However, some states also demanded special consultation rights. Thus, selected nuclear deployments were accompanied by bilateral agreements that outlined consultation rights beyond general guidelines. The National Security Archive has published various original archival documents that shed light on these arrangements, some of which have only recently been declassified.⁸² For instance, the United Kingdom aimed to secure extensive consultation agreements that would reflect the special American-British relationship. A series of letter exchanges starting with the Murphy-Dean Agreement of 1958⁸³ confirmed the U.S. willingness to consult with the United Kingdom over the years.⁸⁴ However, such agreements could result in opaque structures of deployments, rights, and secrecy. For example, the United States deployed nuclear weapons to

⁷⁵Trachtenberg, 1999, p. 195.

⁷⁶For example, State Department lawyer John Pender remarked in a report that “allied forces could easily help themselves to the mated weapons whenever they felt it necessary to use them, without United States consent; there is no over-all considered or effective United States plan in being at the moment to prevent this eventuality”; see: Burr, 2020b, document 29; Burr, 2019, document 9.

⁷⁷Burr, 2020b; Mackby and Slocombe, 2004, p. 186; Trachtenberg, 1999, p. 309.

⁷⁸Burr, 2020b.

⁷⁹In total, two air-launched anti-aircraft weapons, one air defense ground-launched missile, and depth bombs were deployed to Canada. During the majority of deployment years, Canadian forces were responsible for operating the delivery vehicles, while U.S. forces, as in all other instances, *officially* retained full custody of the warheads; see: Burr, 2005; Clearwater, 1998.

⁸⁰Clearwater, 1998, pp. 182–184.

⁸¹See for example: Wiebes and Burr, 2021, document 2.

⁸²Wiebes and Burr, 2021; Burr, 2020b; Burr, 2020a.

⁸³Burr, 2005, document 9.

⁸⁴See for example: Burr, 2005, document 14 and document 29; Burr, 2020b, document 10 and document 14.

the United Kingdom, which were intended to be used by the Dutch Navy under NATO command. Nevertheless, only the United Kingdom would be directly consulted regarding the release of these weapons, as requested in secret negotiations by Prime Minister Wilson.⁸⁵

Allies sought greater involvement in nuclear decision-making, but there were also concerns about the potential impact of consultations on deterrence. For instance, Germany feared that involving too many states in the decision to use or prevent the use of nuclear weapons in Europe could undermine deterrence.⁸⁶ Similarly, an agreement between Canada and the United States reflected this thinking. Starting in 1964, the U.S. maintained a nuclear presence in Canada until 1984.⁸⁷ While Canada had the right to be consulted before any use of nuclear weapons from or on its territory, Canadian Prime Minister Pearson signed a memo that effectively granted the United States unilateral authority to use its nuclear weapons stationed in Canada in case of an incoming attack.⁸⁸ This was because consultations before defending against an imminent attack could weaken deterrence and defense, especially since the nuclear air defense systems stationed in Canada were purely defensive.⁸⁹

2.3 Nuclear Deployments In Asia

In Asia, U.S. nuclear deployments were strictly earmarked for U.S. forces only, except in South Korea where they were integrated to a much greater extent. The South Korean army operated several dual-capable systems, such as gun artillery, the Honest John⁹⁰, and Nike Hercules⁹¹. Additionally, war plans allowed for the provision of nuclear-capable delivery systems by South Korea to U.S. personnel who had custody of nuclear warheads, and South Korean artillery units had trained with U.S. dummy nuclear warheads since at least 1974. Lastly, formal integration of South Korean and U.S. forces occurred in 1978 after the establishment of the U.S.-South Korean Military Committee. The Combined Forces Command allowed South Korea to participate in nuclear-related intelligence and campaign planning, and its military leadership was regularly consulted and briefed by U.S. counterparts on war plans including nuclear issues.⁹² Despite these privileges, South Korea did not receive the same status as some U.S. NATO allies, which was a source of frustration for the South Koreans.

In addition to control issues, decision-makers in South Korea grappled with fears of aban-

⁸⁵Burr, 2005.

⁸⁶Heuser, 1999, pp. 138–139.

⁸⁷Burr, 2005; Norris, Arkin, and Burr, 1999.

⁸⁸Clearwater, 1998.

⁸⁹Norris, Arkin, and Burr, 1999.

⁹⁰A rocket artillery.

⁹¹A surface-to-air missile.

⁹²Hayes, 1991, pp. 109–111; Hayes, 1993.

donment by the United States. Nuclear deployments to the peninsula began in 1958 with the introduction of nuclear artillery, missiles, and mines. By 1967, there were approximately 950 nuclear warheads in South Korea.⁹³ However, after significant U.S. conventional troop withdrawals, decision-makers in Seoul feared that this would lead to the withdrawal of tactical nuclear weapons as well.⁹⁴ In response, South Korea began developing its own nuclear weapons and delivery vehicle technology. Ultimately, these plans did not come to fruition due to a change in leadership, U.S. pressure, and the fact that U.S. nuclear weapons remained in South Korea until the end of the Cold War.⁹⁵ Overall, the case of South Korea demonstrates again how issues of political leverage and inter-allied relations had to be balanced with pure military rationales.

Unlike in South Korea, the United States kept its deployments to Taiwan and the Philippines confidential, with only the highest-ranking officials being informed.⁹⁶ Yet, in authoritarian states such as Taiwan at the time, power is often highly centralised. The same applies to the Philippines during the presidency of Marcos. Thus, it is perhaps unsurprising that the United States saw no necessity to inform a broad circle of political decision-makers. Indeed, Washington was concerned that information about the presence of nuclear weapons could have adverse effects on domestic politics in the host states, particularly due to public opposition in the Philippines.⁹⁷ The United States primarily deployed naval systems to the Philippines, including nuclear ammunition for depth bombs, the RIM-2 Terrier and RIM-8 Talos surface-to-air missiles, and the RUR-5 Asroc anti-submarine missile. Additionally, non-naval nuclear bombs and nuclear munitions for the AIM-26 Falcon air-to-air missile were also deployed. Despite being an island as well, the United States only deployed two non-naval nuclear systems to Taiwan: Nuclear bombs and the MGM-1 Matador surface-to-surface cruise missile. The deployments in both countries lasted until the mid-1970s, when the United States withdrew all nuclear systems.⁹⁸

2.4 Nuclear Strategy

The concise historical overview of U.S. nuclear weapon deployments in this chapter is completed by briefly examining the underlying nuclear strategy. All developments outlined above took place against the backdrop of dynamically evolving political and military strategies. Nuclear weapons were included in U.S. military planning since 1947. By 1948, the National Security Council approved NSC-30, and in 1949 NATO adopted DC 6/1.⁹⁹ The plans resulted in an arsenal of 250

⁹³Kristensen and Norris, 2017, p. 350.

⁹⁴Kim, 2001, pp. 54–56.

⁹⁵Kim, 2001.

⁹⁶Burr, 2006, document 7 and document 17A-C; Schirmer, 1983.

⁹⁷Schirmer, 1983.

⁹⁸Norris, Arkin, and Burr, 1999.

⁹⁹Sagan, 1989, pp. 15–16; Heuser, 1995, pp. 41–42.

nuclear bombs.¹⁰⁰ However, just ten years later, the United States “fielded approximately 18,000 atomic and thermonuclear weapons.”¹⁰¹ This was the result of a more complex and flexible nuclear strategy, which included the deployment of many thousand nuclear warheads abroad.

In the 1950s, budget constraints led to a heavy reliance on nuclear weapons to reduce costs associated with conventional troops.¹⁰² In addition, military officials also saw nuclear weapons as the only meaningful weapon, and throughout the Eisenhower administration, Washington relied on massive retaliation¹⁰³, as announced in a speech by State Secretary John Foster Dulles in 1954, and enshrined in NATO policy with MC 48.¹⁰⁴ The reliance on nuclear weapons in turn made the deployment of at least some nuclear weapons to oversea bases necessary.¹⁰⁵

In 1957, NATO policy evolved further with the adoption of MC 14/2 and MC 70.¹⁰⁶ At the same time, President Eisenhower and his administration did not believe that focusing on conventional defense was sensible or financially viable. Military decision-makers shared this assessment and they continued to only plan for all-out general war with nuclear weapons.¹⁰⁷ This was also evident in the first U.S. Single Integrated Operational Plan (SIOP-62), which had as its only option the simultaneous release of all U.S. nuclear weapons on all assigned targets¹⁰⁸. However, the incoming Kennedy administration wanted to broaden its military options by applying the strategy changes of MC 14/2 to the U.S. force structure.¹⁰⁹ Eventually, the U.S. administration’s preferences led to the adoption of NATO’s MC 14/3, commonly known as flexible response, in 1967.¹¹⁰ The new plan aimed to stop a war and restore deterrence rather than winning a war.¹¹¹ This required improving conventional forces and developing a more nuanced arsenal of nuclear weapons that could be used at different steps of the escalation ladder in various locations. Although the pace of war planning did not change as quickly as the administration had hoped, the new doctrine resulted in a more diversified arsenal.¹¹² Notably, U.S. nuclear weapon deployments peaked around 1970¹¹³.

While it is impossible to determine the exact number of nuclear warheads assigned to each delivery vehicle or fully track the number of nuclear-armed delivery vehicles present in host states, macro-trends can be identified. The peak of deployments by the number of warheads was likely

¹⁰⁰Unlike today, complete U.S. nuclear superiority made time a negligible factor. Indeed, it would have taken six days to prepare the nuclear force for use; see: Sagan, 1989, pp. 18–19.

¹⁰¹Sagan, 1989, p. 19.

¹⁰²Heuser, 1999, pp. 34–38; Freedman, 1989, pp. 103–104.

¹⁰³That is the strategic bombing of the adversaries homeland with all capabilities in any conflict, even small ones.

¹⁰⁴Freedman, 1989, pp. 103–120; Heuser, 1995, pp. 43–44.

¹⁰⁵Freedman, 1989, pp. 83–85.

¹⁰⁶Which Beatrice Heuser calls “Differentiated Responses”; see: Heuser, 1995, p. 45.

¹⁰⁷Heuser, 1999, pp. 38–41.

¹⁰⁸Freedman, 1989, p. 24; Heuser, 1995, pp. 44–45.

¹⁰⁹Heuser, 1995, p. 45.

¹¹⁰Heuser, 1995, p. 46.

¹¹¹Heuser, 1999, pp. 43–47.

¹¹²Gavin, 2012, pp. 34–40.

¹¹³Norris, Arkin, and Burr, 1999.

around 1970, with an estimated 8,000 to 9,000 nuclear warheads deployed to other countries, excluding U.S. overseas territories.¹¹⁴ Subsequently, the U.S. nuclear presence around the world gradually diminished. By 1965, the United States had withdrawn its nuclear weapons from Morocco, followed by Denmark in 1965. Deployments ended in Taiwan in 1974, followed by Spain and the Philippines in 1976, Canada in 1984, and South Korea in 1991. After the Cold War, deployments remained in Belgium, Germany, Greece, Italy, the Netherlands, Turkey and the United Kingdom. However, the single most extensive reduction occurred in 1991, following the Presidential Nuclear Initiatives, which diminished the tactical nuclear warhead stockpile overseas from around 5,000 in 1991 to under 1,000 by 1995.¹¹⁵ Since then, the United States has only deployed nuclear bombs abroad.

The scope of this chapter is limited and cannot provide a comprehensive historical account of the evolution of U.S. and NATO military strategy. However, this brief analysis of the early days of the Cold War reveals the direct connection between strategy, force posture, and nuclear weapon deployments – as it would for an analysis of the periods following it. Yet, even seemingly military-driven decisions often included elements of assurance. As Francis Gavin notes, operational plans based on flexible response were not fully implemented throughout the Kennedy and Johnson administrations. Military leaders did not believe in the wisdom of anything, but a massive response.¹¹⁶ At the same time, allies demanded a controlled, that is flexible, response.¹¹⁷ Thus, the strategy caused nuclear deployments to assure allies, but it was not implemented in operational planning. The following chapter will provide a detailed exploration of how nuclear weapon deployments relate to assurance, including an empirical investigation of the causes of nuclear weapon deployments.

¹¹⁴Kristensen, 2005; Norris, Arkin, and Burr, 1999.

¹¹⁵Corin, 2004; Koch, 2012, p. 1; Kimball and Reif, 2017.

¹¹⁶Gavin, 2012, pp. 30–56.

¹¹⁷Gavin, 2012, p. 54.

3 A Theory Of U.S. Nuclear Weapon Deployments

3.1 Introduction

Which countries receive U.S. nuclear weapon deployments? Asked differently: Why does the United States deploy nuclear weapons abroad? Since 1954, U.S. nuclear ammunitions for delivery vehicles, ranging from artillery to aircraft missiles to nuclear mines, have been stationed in 14 different countries, 12 of which have been allies. The scientific literature has predominantly attributed these deployments to extended deterrence and power projection.¹¹⁸ However, with the development of intercontinental ballistic missiles (ICBMs) and ballistic missile submarines (secure second-strike capability) in the late 1950s, the military-technical value of these deployments has diminished. Simultaneously, these deployments carry significant risks, such as the potential theft of sensitive information or the increased likelihood of escalations that could ultimately result in an all-out nuclear war.¹¹⁹ Investigating the role of assurance can help to solve the puzzle of why the United States has continued to deploy its nuclear weapons abroad. Indeed, there are numerous examples of allies insisting on a physical U.S. presence in their country, including nuclear weapon deployments, rather than relying solely on extraterritorial security guarantees.¹²⁰ Consequently, next to the well-examined strategies of extended deterrence and power projection, assurance might be a primary cause for U.S. nuclear weapon deployments.

The main argument of this chapter posits that the United States uses nuclear weapon deployments to provide assurance to its allies, particularly those who have the potential to act with greater independence from the U.S. alliance system. Based on the existing literature, I highlight three factors that characterize this potential: maintaining good relations with other major powers, military power, and nuclear latency.¹²¹ According to my theory, allies who possess credible outside options related to these three categories are relatively more likely to receive assurance in the form of nuclear weapon deployments, as the United States fears losing them from its sphere of influence. Thus, the main theoretical contribution of this work lies in outlining a supply-side theory of nuclear weapon deployments. My findings suggest that while maintaining good relations with other major powers tends to reduce the likelihood of nuclear deployments,¹²² military power and nuclear latency consistently increase the probability of both nuclear deployments in general and the

¹¹⁸Horowitz, 2014; Geller, 2017; Fuhrmann and Sechser, 2014a; Fuhrmann, 2018.

¹¹⁹See for example: Burr, 2020b, document 26, p. 4, and document 5, pp. 38-39; Burr, 2020b, document 5, p. 10.

¹²⁰For example, European allies sought intermediate-range force deployments to Europe in the 1980s, while U.S. officials attempted to convey to their partners that there was no need for such deployments because of the overall balance of forces; see: Cary, 2019, p. 161. In another example, U.S. Secretary of Defense Robert McNamara unsuccessfully tried to convince his Turkish counterpart that Polaris missiles deployed on submarines in the Mediterranean were adequate compensation for the withdrawal of Jupiter missiles from Turkey, especially since the former were a more modern weapon system; see: Burr, 2019, document 13.

¹²¹Blankenship, 2020.

¹²²Perhaps because of fears of espionage.

number of nuclear delivery vehicles deployed in a given country. These results largely confirm my assurance hypotheses. Furthermore, alternative explanations are considered that complement the proposed theory. While extended deterrence appears to have a more limited role than previously assumed, power projection is positively correlated with both nuclear deployments and the number of different delivery vehicles deployed.

Although some systematic research has been conducted on this topic, there is still a significant gap in the literature, providing an excellent opportunity for further investigation. The existing literature has mainly focused on non-proliferation, extended deterrence, and power projection as possible causes of nuclear weapon deployments. This chapter adds to the literature through an in-depth examination of assurance, which has frequently been subsumed under non-proliferation.¹²³ However, assurance is a distinct strategy that extends beyond the goal of non-proliferation and is essential to understanding alliance politics and international relations more broadly.¹²⁴ One important contribution of this chapter is the conceptualization of assurance and its application to nuclear weapon deployments. In addition, this chapter presents an original dataset on U.S. nuclear weapon deployments that codes all nuclear systems present in each host state of U.S. nuclear weapons since 1954. Nuclear systems here refers to the presence of a nuclear-capable delivery vehicle and nuclear ammunition for said vehicle.¹²⁵ For example, in 1965, the United States deployed nuclear ammunition for bombs, the Honest John, the M110 8-inch Howitzer, and the Nike Hercules to Greece. In my dataset, this sums up to three unique nuclear systems hosted by Greece. Importantly, U.S. allies demanded tailored solutions to their perceived problems that required a wide range of nuclear-armed delivery vehicles. A mere nuclear deployment without attention to these details was often insufficient to provide effective assurance to them. Consequently, a binary measure of nuclear weapon deployments is inadequate to capture important nuances.

The dataset not only provides information on the number of nuclear delivery vehicles deployed but also includes technical details such as the maximum range and operation area (air-to-ground, air-to-air, etc.) for each vehicle. Moreover, the dataset encompasses information on a state's ability to veto the use of nuclear weapons deployed on its soil, which can take the form of bilateral agreements that demand consultation with the host state in case of use. Additionally, the ability to veto the use of nuclear weapons on a state's territory might be purely physical in the sense that all or some of the nuclear weapons on its territory are to be delivered by the military of that state.¹²⁶ While the analysis in this chapter does not fully utilize the potential of these variables,

¹²³See for example: Lanoszka, 2018; Fuhrmann and Sechser, 2014a, p. 461.

¹²⁴See: Goldgeier and Wojtowicz, 2022, pp. 739–740. For instance, assurance is part of a central dilemma in alliance theory, as states need to trust the security guarantees of their partners to avoid abandonment concerns; see: Snyder, 1984, pp. 466–468.

¹²⁵For simplicity, I frequently refer only to “nuclear delivery vehicles” in this chapter.

¹²⁶A current example is Germany, where U.S. deployed nuclear weapons would be delivered by German aircraft,

they constitute a critical foundation for future research on foreign-deployed nuclear weapons, as explained in the summary of this chapter, and in the conclusion of the dissertation.

The chapter commences with an overview of assurance, defining the concept and contrasting it against extended deterrence and power projection (direct deterrence and compellence). The conceptualization can be easily applied beyond the specific context of nuclear weapon deployments. Subsequently, this chapter argues that nuclear weapon deployments are effective tools of assurance, as they are associated with hand-tying, sunk, installment, and reducible costs.¹²⁷ Next, it examines the factors that influence the United States' willingness to assure allies. While various factors can impede or promote U.S. efforts to assure other nations, I argue that an ally's ability to act independently of the U.S. alliance system is the fundamental determinant of nuclear deployments for assurance purposes. The ally's potential for independence is influenced by three factors: Positive relations with other major powers, military strength, and nuclear latency. Overall, I argue that the United States deploys nuclear weapons to assure allies who can pursue a more autonomous foreign policy to the detriment of American interests. The chapter also explores alternative explanations for U.S. nuclear weapon deployments, extended deterrence, and power projection, before testing the resulting hypotheses on an original dataset.

The results show that the United States is more likely to deploy nuclear weapons, and a broader range of nuclear delivery vehicles, to states with relatively higher military power or nuclear latency. However, positive relationships with other major powers appear to decrease the likelihood of nuclear deployments. This may be due to the United States' fear of sensitive information leaking to major adversaries. Regarding alternative explanations, the results support power projection hypotheses, but not extended deterrence ones. The conclusion summarizes the findings and recommends directions for future research.

3.2 Defining Assurance

Since 1954 the United States has deployed nuclear weapons to 14 different countries. Thus far, existing scholarship has found three causes for these deployments: extended deterrence, power projection, and non-proliferation.¹²⁸ This categorization, however, does not account for the importance of assurance. In fact, existing research on nuclear weapon deployments often subsumes assurance under non-proliferation.¹²⁹ Conceptually, this should be reversed: Non-proliferation is only one of the many goals of assurance, as showcased in [Figure 1](#). While often neglected in the

manned by German pilots.

¹²⁷Quek, 2021.

¹²⁸Fuhrmann and Sechser, 2014a, p. 456.

¹²⁹See for example: Sechser, 2017; Lanoszka, 2018; Fuhrmann and Sechser, 2014a.

literature, assurance is a strategy in its own right that relies on different means to achieve a variety of goals. One important means is the deployment of nuclear weapons to achieve the goal of maintaining a global network of allies. This forms the core argument of this chapter.

3.2.1 Differentiating Assurance From Coercive Strategies

Assurance has remained understudied both as a concept and as a cause of foreign nuclear weapon deployments.¹³⁰ For instance, Fuhrmann and Sechser only discuss the term in relation to the possible non-proliferation motives of deploying nuclear weapons.¹³¹ Another example is Lanoszka's work on assurance, which adds considerable nuance to our understanding of military deployments as tools of strategic influence but also focuses squarely on the goal of non-proliferation. In addition, a recent scholarly exchange has again highlighted the necessity for a highly thorough conceptualization of assurance.¹³² As I show in this chapter, assurance is a strategy in its own right that is distinct from extended deterrence and power projection and encompasses a broad range of goals beyond non-proliferation. Based on work by Jeffrey Knopf, I propose the following definition:

Assurance is the use of signals to convince another state or set of states that the senders either will not cause or will not allow the recipients' security to be harmed, with the goal of influencing the recipient's behavior.

This definition offers several insightful aspects. Most notably, what distinguishes assurance from more frequently discussed interstate strategies is its non-coercive nature. Unlike deterrence and compellence, as I will explore below, assurance does not rely on the use of threats. The definition also highlights two dimensions within assurance: *negative assurance*, which involves committing not to harm another entity, and *positive assurance*, which entails pledging to actively protect another entity. For instance, the deployment of military forces, such as nuclear weapons stationed in another country, would be considered positive assurance. In addition, the definition does not specify the direction of the intended effect. That is, assurance can be used to prevent a state from taking a particular action or to encourage it to take a specific action. Conversely, coercive strategies are typically categorized based on their intent to maintain or alter the status quo.

It is important to recognize that assurance, like coercive strategies, is not an act of benevolence but rather a strategic choice aimed at achieving specific goals. This chapter categorizes goals into three distinct layers that form a process. First-order goals pertain to the most immediate effect

¹³⁰Blankenship and Lin-Greenberg, 2022b, p. 4.

¹³¹Fuhrmann and Sechser, 2014a, p. 461.

¹³²See the 2022 debate in Security Studies: Blankenship and Lin-Greenberg, 2022b; Mastro, 2022; Goldgeier and Wojtowicz, 2022; Blankenship and Lin-Greenberg, 2022a.

of the signal. In the case of assurance, the first-order goal is to make a state feel protected or not threatened (see Table 2). Second-order goals refer to the expected behavior resulting from the (successful) signal. For instance, a state that feels secure due to assurance signals is more likely to remain committed to a given alliance. Third-order goals represent the overall rationale for why influencing the behavior of another state is important, such as maintaining a global network of allies (see Figure 1 for more examples). Thus, these layers of goals are instrumental. First-order goals are necessary to achieve second-order goals. More specifically, if a state does not feel protected by assurance signals (first-order goal), it is unlikely that its behavior can be influenced as intended (second-order goal). In turn, second-order goals are important because they follow a larger rationale (third-order goal). For simplicity's sake, this chapter often refers to third-order goals as simply "goals."

That assurance is a strategy in its own right becomes evident when it is compared with more common strategies of interstate persuasion, namely deterrence, and compellence, which are coercive. According to Austin Long, deterrence is "the manipulation of an adversary's estimation of the cost/benefit calculation of taking a given action. By reducing prospective benefits or increasing prospective costs (or both), one can convince the adversary to avoid taking the action."¹³³ This can be simplified into the following definition:

Deterrence is the use of a threat to convince another entity to avoid pursuing an action to the detriment of the deterring state.

I will frequently refer to *direct deterrence* in this dissertation, to distinguish it more clearly from extended deterrence. The latter is defined as:

Extended deterrence is the use of a threat to convince another entity to avoid pursuing an action to the detriment of a third state.

Compellence and deterrence are closely interconnected, with the former only differing from the latter in its aim to induce another entity to *take* an action.¹³⁴ Schelling defined compellence as "a threat intended to make an adversary do something"¹³⁵. Correspondingly, my definition is:

Compellence is the use of a threat to convince another entity to pursue an action.

It is important to note that compellence, direct and extended deterrence are typically employed against adversaries, although there can be exceptions. Threats are generally not associated with

¹³³Long, 2008, p. 7.

¹³⁴Sperandei, 2006, p. 253.

¹³⁵Schelling, 2009, p. 69.

interactions between friendly states. In contrast, negative assurances are often directed at allies, adversaries, and neutral states. It is equally important to signal to an adversary that one does not intend to harm them, for example, to prevent an arms race, as it is to neutral or allied states. Positive assurances, on the other hand, are primarily issued to allied states. Indeed, adversaries by definition do not provide protection to one another, and hence positive assurances are not applicable in their case.

Table 2: Conceptualization

Concept		Target	Coercive	Direction of Effect	1 st Order Goal
Assurance	Negative	Ally, neutral or adversary	X	Keep or change status-quo	Make another state feel not threatened
	Positive	Ally	X	Keep or change status-quo	Make another state feel protected
Ext. Deterrence		Adversary	✓	Keep status-quo	Protect another state
Power Projection	Dir. Deterrence	Adversary	✓	Keep status-quo	Protect oneself
	Compellence	Adversary	✓	Change status-quo	Protect oneself, or revisionist

Table 2 summarizes the concepts that this chapter has thus far discussed. On the left side of the table are three causes for nuclear deployments. They are then further separated into secondary concepts that align with the definitions above. It should be noted that previous literature has grouped direct deterrence and compellence as power projection, as both are essentially self-serving.¹³⁶ This dissertation will follow this categorization. As can be seen, there are important differences between assurance, deterrence, extended deterrence, and compellence. First, assurance does not distinguish between stopping or encouraging another entity from pursuing an action. Second, coercive strategies rely on a threat to harm the recipient, while assurance aims to convince a recipient that they will not experience harm. Third, positive assurances are most often aimed at allies, while negative assurances frequently target allies, neutral states, and foes alike. Coercive strategies, on the other hand, are most often aimed at adversaries.

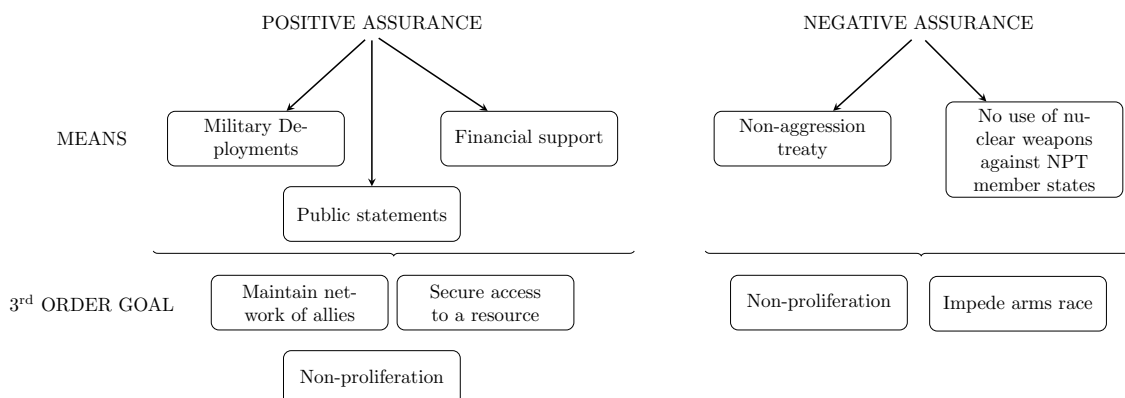


Figure 1: Examples of means and goals in negative and positive assurances

¹³⁶Fuhrmann and Sechser, 2014a.

In the existing literature, there is a tendency to conflate assurance with non-proliferation.¹³⁷ Although it is true that states have attempted to dissuade other states from nuclear proliferation through positive or negative assurances, non-proliferation is a goal, not a strategy. In fact, assurance can be utilized to reach many different goals, sometimes simultaneously. For instance, as elaborated below, assurance is employed to maintain a global network of allies. Figure 1 illustrates how positive and negative assurances, means, and third-order goals are interrelated through various examples. It is important to note that this list is not exhaustive, and numerous additional means and goals can be accomplished through assurance.

Taken together, these insights demonstrate that assurance is a distinct strategy with a diverse set of goals beyond non-proliferation and is separate from (extended) deterrence and compellence. An example illustrated in Table 3 further emphasizes this point. Let us suppose that the United States aims to secure access to semiconductors and that there is one crucial supply state. Securing access to semiconductors is a third-order goal. Because of many possible obstacles regarding this third-order goal, the United States must influence the behavior of other states (second-order goal) through assurance. The table illustrates these second-order goals and how they can be achieved in various, non-exclusive ways.

For the sake of comparison, let us assume that nuclear weapons are the only available tool. The United States could use negative assurances, meaning that it pledges to refrain from using nuclear weapons against the supply state. As a result, the U.S. would decrease the supply state’s incentive to seek protection from another major power, which could otherwise lead to future trade restrictions for the United States. Thus, by discouraging alignment (influencing the behavior of another state), the Washington achieves the second-order goal of preventing supply restrictions, which contributes to the third-order goal of securing access to semiconductors.

Table 3: Application of different strategies to secure access to a good, e.g. semiconductors

Concept		Method	Target	Pathway	2 nd Order Goal
Assurance	Negative	Promise to not use nuclear weapons	Supply state	Disincentivize alignment with other major power	Prevent supply restrictions
	Positive	Nuclear weapon deployment	Supply state	Make supplier feel protected	Preferential trade agreement
Extended Deterrence		Nuclear weapon deployment	Adversary	Threaten potential attackers	Prevent attack on supplier
Power Projection	Deterrence	Nuclear weapon deployment	Adversary	Threaten potential attackers	Prevent attack on U.S. trade infrastructure
	Compellence	Nuclear weapon deployment	Adversary	Threaten obstructing state	Open up U.S. trade infrastructure

Another possible strategy is using positive assurances, i.e., promising to protect the supply state, which can be substantiated with nuclear deployments in the country. Indeed, these deployments

¹³⁷See for example: Fuhrmann and Sechser, 2014a, pp. 461–463; Knopf, 2012, p. 387.

can also be used in the case of extended deterrence, and it may be difficult to tell the two apart. However, the key distinction lies in the intended target. Although the same deployment could serve to assure the supply state and deter potential aggressors, the United States may determine that it can achieve deterrence by deploying nuclear weapons in the broader region rather than specifically in the supply country. Conversely, the supply state may disagree, as evidenced by the history of U.S.-South Korean relations. Here, nuclear deployments throughout the region had failed to assure decision-makers in Seoul, who demanded significant deployments within their own country.¹³⁸ In which ways the United States employs a signal depends on whether the aim is solely to deter potential attackers, or also to assure the supply state. The United States may even believe that the supply state is not under threat at all, and that it does not need to be protected either through regional deployments, or military stationed in the supply state itself. However, if the supply state does not share this assessment, and the United States wants to assure it, military deployments might still be used, despite the fact that there is no apparent military rationale from the U.S. point of view. For instance, the deployment of intermediate-range nuclear missiles to Europe in the 1980s did not seem to offer meaningful military advantages from the perspective of the United States, but it was still carried out because of allied preferences.¹³⁹

If assurance is the main cause of the deployment, it should lead to some form of concession by the supply state, such as preferential access to resources, lower prices, or even preventing other states to access the resource. Extended deterrence, on the other hand, is aimed at the adversary. It focuses primarily on preventing the supply state from being attacked, coerced, or intimidated (second-order goal) to maintain supply security (third-order goal). In reality, the two strategies often overlap, enabling the United States to reap the benefits of both extended deterrence and assurance simultaneously.

Following assurance and extended deterrence, [Table 3](#) depicts power projection which can involve both deterrence and compellence strategies. In the case of extended deterrence, nuclear deployments are employed to safeguard another country, which in this instance is the supply state. On the other hand, when nuclear deployments are utilized for direct deterrence (power projection), the deploying state itself becomes the protected entity. Thus, the United States may utilize these deployments to protect its own merchant ships. Again, there is some degree of overlap here, as shielding its ships in the region may also result in the unintended externality of protecting the supply state. Importantly, however, this does not have to be the case, and one can easily imagine scenarios where a U.S. deployment would protect its own assets without protecting all states in the

¹³⁸Kim, 2001, p. 56.

¹³⁹Cary, 2019, p. 161; Colbourn, 2022, p. 91.

region. Finally, the United States leverages nuclear deployments to compel an adversary to change the existing status-quo. For example, if an adversary were to block a trade route, the United States might want to force them to open it up for U.S. operations.

In summary, the examples presented in this section illustrate the distinctions between positive (promising protection) and negative assurances (promising to refrain from harm), demonstrate how both concepts differ again from coercive strategies regarding the non-use of threats, and highlight the intended target of the signal. Within coercive measures, extended deterrence, deterrence, and compellence can be distinguished from one another through the entity that benefits (extended deterrence \leftrightarrow deterrence & compellence) and whether the strategy is designed to keep or change the status-quo (extended deterrence & deterrence \leftrightarrow compellence).

3.2.2 The Causes Of U.S. Nuclear Weapon Deployments

This chapter does not aim to simply contribute to the conceptualization of assurance, but to apply the concept to the case of foreign deployed nuclear weapons. In this section, I outline important attributes that make nuclear weapon deployments highly useful tools of assurance. In the international system, anarchy prevails, and there is no higher authority to safeguard states from each other. As a result, states must rely on negative assurances, i.e., are promises of doing no harm, from other states with whom they have no close affiliation.¹⁴⁰ In addition, if alliance commitments are not met, there is no recourse available to states. Therefore, they must also depend on positive assurances, i.e., promises of protection, from states to whom they are allied to.¹⁴¹ This chapter focuses on positive assurance, is heretofore referred to as assurance. As Snyder outlines in his seminal work, states have to fear abandonment and entrapment in alliances. This means that they can be drawn into a conflict they do not want to participate in because of their alliance obligations and that they can be abandoned by allies once a conflict breaks out and they are in need of help.¹⁴² However, assurance can help to alleviate at least one part of this dilemma by reducing abandonment fears. To understand how such promises can be made credible, we need to turn to the study of signals in international relations.

According to Fearon, there are two types of signals: those that result in hand-tying, incurring inevitable costs once a conflict breaks out, and those that result in sunk costs, incurring costs

¹⁴⁰There are of course debates about the extent to which this is true. For example, Lake points out that hierarchies do not stop at the state level. He argues that dominant states provide a political order that the ruled accept. In exchange, the subordinate state cedes parts of its sovereignty to the dominant state; see: Lake, 2009. Moreover, parts of this problem can be alleviated through the construction of shared identities. E.g. Germany does not fear being attacked by France in the foreseeable future; see: Wendt, 1992.

¹⁴¹History teaches us that assurances are often not upheld. A recent example is Russia's promise not to attack Ukraine, recorded in the Budapest Memorandum.

¹⁴²Snyder, 1984.

upfront.¹⁴³ Quek further refines these concepts by adding installment costs and reducible costs.¹⁴⁴ The former are promises to incur costs over a future period of time. For example, a state might deploy its military to another state which creates sunk costs. However, maintaining the military in the other state creates installment costs that will have to be paid continuously for the duration of the deployment. Reducible costs represent yet another form of signaling. They “are costs that have been paid but can be offset in the future contingent on the signaler’s action.”¹⁴⁵ While the state pays costs upfront, it receives a discount in the future depending on its own actions. For example, troop deployments are costly. However, in the event of a crisis where the deploying state must defend its ally, it saves costs as the military is already stationed in proximity to the battlefield. A part of the total costs of fighting (e.g. sending troops and preparing bases) are already paid. Yet, if the deploying state does not follow through with its promise to defend the ally, then costs paid in the past for stationing the troops were in vain.¹⁴⁶

Quek uses military deployments to explain his concept, and while this chapter also focus on them, I reiterate that deployments are not the only mean to assure allies. Indeed, numerous actions can, in theory, be interpreted as assurance: For instance, an earlier cancellation of Nord Stream 2 might have assured Poland and the Baltic states of the sincerity of Germany’s statements of solidarity toward its eastern neighbors. In practice, assurance is most commonly associated with relatively more tangible behavior, such as diplomatic state visits, public statements, and military deployments.¹⁴⁷

Military deployments is an umbrella term and covers a wide range of deployment types. However, for the purpose of this chapter, it is especially important to understand how *nuclear deployments* cause hand-tying and reducible costs. Blankenship and Lin-Greenberg’s have created a dichotomy for military deployments.¹⁴⁸ According to this scheme, nuclear deployments should be categorized as high resolve and high capability deployments: They are visible, expensive to de- and redeploy, put friendly forces at risk and they can be used to effectively punish an adversary, or deny military success.¹⁴⁹ All of these characteristics are advantageous in the pursuit of sending credible signals.

Hand-tying and reducible costs. First, nuclear deployments cause hand-tying. For example, they are used as tripwires. As Schelling notes, tripwires contribute to deterrence because they

¹⁴³Fearon, 1997.

¹⁴⁴Quek, 2021.

¹⁴⁵Quek, 2021, p. 540.

¹⁴⁶Quek, 2021, pp. 540–541.

¹⁴⁷Blankenship, 2020, p. 1022.

¹⁴⁸The conceptualization has caused considerable debate; see: Goldgeier and Wojtowicz, 2022; Mastro, 2022; Blankenship and Lin-Greenberg, 2022b.

¹⁴⁹Blankenship and Lin-Greenberg, 2022b, pp. 8–11.

blow up if the other side moves.¹⁵⁰ Accordingly, the United States would then be dragged into a war if the troops they deployed in another state are being attacked. While the U.S. can still decide to let the incident slip by without retaliation, they are automatically involved in the conflict by the nature of the attack, producing a hand-tying effect. Importantly, nuclear deployments not only draw the guardian into the conflict, but also heighten the risk that it escalates to the nuclear level, making them especially useful for the purpose of hand-tying. The risk of nuclear escalation is heightened through different causal channels. First, an adversary who attacks a nuclear host state might target the nuclear weapons. For the United States, it may appear as if the adversary is attempting to deplete the U.S. nuclear weapons arsenal. Thus, the U.S. could be incentivized to use its nuclear weapons before they are lost. Additionally, targeting the nuclear weapons of a host state might involve the adversary's nuclear weapons, especially if the host state's weapons are based in hardened silos. Once nuclear weapons have been used, there is a risk that war cannot be brought back to the conventional level. At the same time, any nuclear war can easily spiral out of control and spill over to the U.S. homeland. Increasing the risk for the guardian again increases the credibility of the security guarantee. Moreover, there is the possibility of use by commanders on the battlefield, either against stated guidelines, or because of pre-delegation.¹⁵¹ However, in the case of the United States this scenario was only plausible at the beginning of the Cold War. Second, credibility is enhanced because the costs are paid upfront, but can be offset in the future if the deployments are put to use: reducible costs.¹⁵²

Sunk and installment costs. A third pathway linking assurance and nuclear deployments is their ability to create sunk costs.¹⁵³ Indeed, they entail significant financial costs upon the initial implementation,¹⁵⁴ and may also incur diplomatic costs that cannot be recovered. Lastly, the deploying state has to continuously pay for some of these costs, such as maintenance of gear and salaries. This constitutes installment costs¹⁵⁵. While these costs are not unique to nuclear deployments, there are compelling reasons to believe that they are more pronounced in this case. For instance, the Soviet Union was particularly apprehensive about nuclear weapon deployments in Germany because they feared that it would pave the way for Germany to acquire its own nuclear weapons.¹⁵⁶ As a result, it became substantially more difficult to achieve an agreement with the

¹⁵⁰See: Schelling, 2009. However, recent studies have raised doubts about the practical efficacy of tripwires; see: Allison, Herzog, and Ko, 2022; Blankenship and Lin-Greenberg, 2022b; Musgrave and Ward, 2018; Poast and Reiter, 2021.

¹⁵¹Burr, 2020b, document 26, p. 4, and document 5, pp. 38-39.

¹⁵²Quek, 2021.

¹⁵³Fearon, 1997, pp. 72-78.

¹⁵⁴Fuhrmann and Sechser, 2014b, p. 924.

¹⁵⁵Quek, 2021.

¹⁵⁶Trachtenberg, 1999, pp. 280-281; Alberque, 2017, p. 27.

Soviet Union on the Non-Proliferation Treaty.¹⁵⁷ According to Trachtenberg, the United States initiating nuclear sharing arrangements in NATO was also one of the main causes of the Berlin Crisis.¹⁵⁸ Of course, conventional troop deployments can also cause adverse reactions. Nevertheless, they rarely bring the other side to question its most fundamental interest: survival. Consequently, the United States advances the credibility of its security guarantees by paying and sustaining painful diplomatic costs.

3.2.3 Historical Evidence

There is ample historical evidence that different U.S. allies in Europe and Asia were assured by nuclear weapon deployments and that the United States used these deployments specifically to assure allies. As Bird notes, “NATO leaders had come to see [foreign deployed nuclear weapons] as a symbol of the American commitment to defend Europe.”¹⁵⁹ Thus, reducing the number of nuclear deployments faced considerable backlash, even if they were regarded as obsolete by the United States. This pertained to atomic demolition munitions, for which NATO never found a convincing military rationale, and Honest Johns deployed in Greece and Turkey until the late 1980s, despite being practically unusable according to U.S. Department of Defense planners.¹⁶⁰ Indeed, in case of the Honest Johns, U.S. planners thought that a withdrawal would diminish the political commitment that they symbolized.¹⁶¹ In addition, the deployments had to be tied to the allies directly to assure them. In a conversation with Turkish Defense Minister İlhami Sancar, U.S. Secretary of Defense McNamara tried to convince his counterpart that Polaris missiles deployed on submarines in the Mediterranean were adequate compensation for the withdrawal of Jupiter missiles from Turkey, which were less effective from a military perspective. However, Sancar strongly noted that any withdrawal of weapons from Turkey would negatively impact Turkey’s confidence in its guardian.¹⁶² Arguably, the United States itself encouraged this perception by placing a spotlight on the number of nuclear warheads deployed in Europe.¹⁶³

Another instructive example is the tale of nuclear weapons in South Korea, which was marked by Korean demands for lasting and diverse deployments on the peninsula. In the early 1970s, the United States reduced its troop presence in South Korea from 61,000 to 40,000.¹⁶⁴ There was significant concern that a reduction of troops would quickly lead to a withdrawal of the tactical nuclear weapons deployed in South Korea, which would have made the country much more insecure

¹⁵⁷Alberque, 2017, p. 12.

¹⁵⁸Trachtenberg, 1999, p. 247.

¹⁵⁹Bird, 2008, p. 67.

¹⁶⁰Arkin and Fieldhouse, 1985, p. 109; Bird, 2008.

¹⁶¹Arkin and Fieldhouse, 1985, p. 109.

¹⁶²Burr, 2019, document 13.

¹⁶³Bird, 2008, p. 67.

¹⁶⁴Kim, 2001, pp. 54–56.

in the eyes of its officials.¹⁶⁵ This fear was not unwarranted. From 1974 to 1982, the number of U.S. deployed nuclear weapons decreased from 640 to 150.¹⁶⁶ In reaction to these developments, South Korea started to work on its own nuclear weapon and delivery vehicle technology. However, the pursuit of a Korean nuclear capability also shows that there can be limits to the degree that U.S. allies can pursue an independent foreign policy. While assurance had failed, American pressure and denial of technological cooperation successfully undermined Korean proliferation attempts.¹⁶⁷

Another informative historical example is the discussion on deploying intermediate-range forces to Europe in the late 1970s and 1980s. After the Soviet Union had deployed modern SS-20 intermediate-range missiles, German Chancellor Schmidt both publicly and in private discussions denounced what he saw as dangerous gaps in capabilities.¹⁶⁸ If the Soviet Union was able to threaten Western Europe with its intermediate nuclear forces, the United States could only retaliate to such threats from outside of Europe. This would effectively decouple the Washington from its European allies given strategic nuclear parity.¹⁶⁹ Indeed, allies had been wary of the nuclear balance in Europe for many years. Following the withdrawal of the Jupiter missiles from Europe in 1963, no intermediate range missiles were stationed on the continent. As a result, many NATO allies feared that the Soviet Union had a qualitative advantage that could undermine extended deterrence.¹⁷⁰ This apprehension was exacerbated by the Soviet modernization of its intermediate range missile force. As a reaction to Chancellor Schmidt's speech, NATO pursued a "Dual Track" policy that foresaw deployments of modern intermediate nuclear range missiles (track two) if arms control talks failed (track one).¹⁷¹ This decision came about despite many U.S. decision-makers failing to see the significance of the Soviet SS-20 deployments.¹⁷² For example, in the run up to the decision, Secretary of State Kissinger actively prohibited a State Department analysis of the sub-strategic nuclear balance and directed the State Department to instead issue statements of assurance to the Europeans which failed to convince them.¹⁷³ Moreover, inside the Carter administration there was widespread skepticism if the deployments were needed, including by the President himself. To them, it was a purely political exercise to assure the allies.¹⁷⁴ The political nature of the deployments is further exemplified by how sea-based intermediate-range deployments were quickly discarded due to their U.S.-centric nature. Thus, while they would have been able to

¹⁶⁵Kim, 2001, p. 56.

¹⁶⁶Kristensen and Norris, 2017, p. 351.

¹⁶⁷Kim, 2001.

¹⁶⁸Schmidt, 1978; Boutwell, Doty, and Treverton, 1985, pp. 68–70.

¹⁶⁹See: Cary, 2019, pp. 148–149. The fear of decoupling was amplified after U.S. President Carter stopped the development of the neutron bomb, although Chancellor Schmidt had committed to its deployment to Europe. The decision shocked European allies; see: Cary, 2019, p. 161.

¹⁷⁰Colbourn, 2022, pp. 35–36.

¹⁷¹Cary, 2019, p. 149.

¹⁷²Boutwell, Doty, and Treverton, 1985, pp. 71–72.

¹⁷³Cary, 2019, p. 161.

¹⁷⁴Colbourn, 2022, p. 91; Boutwell, Doty, and Treverton, 1985, pp. 71–72.

counter the Soviet deployments militarily, they did not assure the allies.¹⁷⁵

Of course, history seldom unfolds in a straightforward narrative. The truth is that the entire Euromissile saga is tremendously complex, and marked by an abundance of important nuances. For example, many European allies were largely convinced of the wisdom of detente, more than the United States.¹⁷⁶ A successful easing of tensions through diplomatic means was potentially preferred to nuclear deployments. Yet, with no easing of the political situation in sight, many European states wanted to be assured by nuclear weapon deployments. Another important factor, and one which highlights NATO's often paradoxical political discussions, pertains to Germany's refusal to host these weapons on its own: Despite its central role in bringing about the Dual-Track decision, Germany did not want to be the only country to host the new nuclear weapons. This was primarily because Chancellor Schmidt was afraid to explain such a decision to the German population. Second, he wanted to avoid the impression of an overly powerful Germany.¹⁷⁷ In the next section, I outline how the United States chose the countries to which it deployed nuclear weapons for assurance. Nevertheless, the Euromissile episode does not only exemplify the allied desire to host nuclear weapons but also their agency in refusing any deployments outright. Nuclear weapon deployments were not unequivocally regarded as desirable by governments in Europe. For example, Norway and Denmark have outright refused the deployment of any nuclear weapon on their territories, including the Euromissiles. My main contribution lies in introducing a supply-side theory of nuclear weapon deployments, as outlined in the following section. However, this should not distract from how some U.S. allies did not want to host nuclear weapons in the first place.

3.2.4 Whom To Assure: Host State Characteristics

Thus far, this chapter has conceptualized assurance and explained why nuclear deployments are strong signals that can lend credibility to assurances. However, two important questions remain to be answered when determining what causes U.S. nuclear weapon deployments: Which countries does the United States want to assure, and what goal does it want to achieve with this strategy? Traditionally, many scholars have focused on U.S. assurances to prevent nuclear proliferation.¹⁷⁸ The United States sends costly signals to assure other states and prevent them from acquiring nuclear weapons, which has historically produced mixed results.¹⁷⁹ However, there is good reason to believe that the United States does not only use assurance to disincentivize nuclear proliferation. Indeed, it has also continuously assured the United Kingdom and France, despite them both being

¹⁷⁵Colbourn, 2022, p. 94.

¹⁷⁶Barton, 2021, p. 92.

¹⁷⁷Colbourn, 2022, pp. 97–100.

¹⁷⁸Knopf, 2012, pp. 387–394; Reiter, 2014; Fuhrmann and Sechser, 2014a; Lanoszka, 2018.

¹⁷⁹Sechser, 2017; Reiter, 2014.

nuclear weapons states. This chapter focuses on how the United States employs assurance to maintain a global network of allies. Specifically, Washington uses nuclear weapon deployments to strengthen alliance cohesion and trust. As Fuhrmann and Sechser argue, “allies who do not trust one another’s assurances may abrogate their own alliance commitments, defect to other alliances, or take actions that undermine collective alliance goals.”¹⁸⁰ In the following section, I examine factors that lead the United States to assure certain allies with nuclear deployments, and not others.

According to Blankenship, the United States is committed to ensuring that states that may consider breaking away from its sphere of influence are dissuaded from doing so.¹⁸¹ Since the end of the Cold War, the United States has maintained a global network of allies to prevent any adversary from controlling important geopolitical regions.¹⁸² Thus, the U.S. has a strong incentive to prevent friendly states from making decisions that would diminish influence over them. For example, these states may seek independence, join a new alliance, or align themselves with other major powers.¹⁸³ Historically, U.S. allies had little reason to join other military alliances during the Cold War, as the only alternative superpower was the Soviet Union, and aligning with them would have greatly impacted their political freedom. As such, the costs of such an alignment made it implausible. Since the end of the Cold War, Russia and China have emerged as the most powerful competitors to the U.S., but neither has shown significant interest in assuming an extensive guardian role akin to that of Washington.

While it is unrealistic to assume that U.S. allies would completely change camps, improving relations with other major powers to the discontent of the United States, and perhaps even opting for neutrality, has always been a credible option. For instance, Turkey used threats of neutrality to achieve formal inclusion into NATO.¹⁸⁴ Another example is Germany, which had pledged to pursue *Westbindung*, i.e., integration into the political, economic, and military structures of the political West, but also flirted with the idea of being a neutral power between the two blocs.¹⁸⁵ To keep Germany in line, the United States had to assure Germans of their security through military deployments. The idea was that Germany would not leave NATO, if it had confidence in the partnership with the United States.¹⁸⁶

¹⁸⁰Fuhrmann and Sechser, 2014b, p. 921.

¹⁸¹Blankenship, 2020.

¹⁸²Brands and Feaver, 2017, pp. 17–18.

¹⁸³Kim and Simón, 2021, p. 3.

¹⁸⁴Goldgeier and Wojtowicz, 2022, p. 738.

¹⁸⁵For example, often to the discomfort of decision-makers in Washington, German governments have sought strong ties to France, which has traditionally pursued a rather independent foreign policy, with some distance to NATO. This was seen as a reason for concern among U.S. decision-makers when the French-German friendship was threatening to damage Germany’s commitment to NATO; see: Shifrinson and Schuessler, 2019; Trachtenberg, 1999, pp. 371–377. As Francis Gavin notes, the United States was also scared that Germany would strike a deal with the Soviet Union at the price of neutrality; see: Gavin, 2012, pp. 50–51.

¹⁸⁶Gavin, 2012, p. 51.

It became evident that Germany was not satisfied with haphazard nuclear deployments and instead required tailored systems to address specific concerns. The NATO Dual Track Decision is perhaps the most renowned example of this. Chancellor Schmidt of Germany implored NATO, particularly the United States, to recognize the capability gap in Europe.¹⁸⁷ While the Soviet Union had intermediate-range nuclear forces positioned to strike European capitals, European nations had to rely on U.S.-based forces. Schmidt perceived this as a detachment of Europe from the United States. Thus, the numerous short-range nuclear weapons deployed in Germany failed to assure him. To counter this situation, U.S. intermediate-range forces were required to be deployed overseas. In addition, it is not just specific systems but also their total number that holds importance. Evidently, few nuclear weapon states rely on a minimal deterrence doctrine, and research has shown that numbers can matter in the nuclear world.¹⁸⁸ Thus, in my hypotheses, I will refer to both nuclear deployments and the number of individual systems received, as both can enhance the signal's credibility.

Thus, the first assurance hypothesis states:

HA1: U.S. allies that maintain good relationships with other major powers are more likely to receive U.S. nuclear weapon deployments, and are more likely to receive a greater variety of nuclear-armed delivery vehicles.

A second credible option for states to reduce their dependence on the United States for security is to develop their own military capabilities. As a state's military power increases, its reliance on external security guarantees may decrease. For instance, France chose to pursue a more independent path due to a lack of trust in U.S. security guarantees.¹⁸⁹ It withdrew from NATO's integrated military command, distancing itself from the U.S. alliance system, and has continued to prioritize its sovereignty even after rejoining. In fact, in August 2019 French President Macron gave an annual speech in front of the diplomatic corps and argued for a more autonomous Europe between the U.S., China and Russia, which would make its own decisions on the relationship with Russia, calling for a big reassessment.¹⁹⁰ Macron's stance echoes that of previous French presidents, who have emphasized the need for a stronger military to achieve a more autonomous Europe –

¹⁸⁷Risse-Kappen, 1991, p. 177.

¹⁸⁸See for example: Snyder and Diesing, 1977, 459–462; Kroenig, 2018. In addition, Jervis has argued that nuclear superiority, that is possessing more nuclear weapons than the other side, is irrelevant in a world of secure second-strike capabilities. Yet, he also contends that the number of weapons might hold more relevance in a war of attrition, which was implausible between the superpowers throughout the Cold War. However, it was exactly the kind of war foreseen on the European battlefield; see: Jervis, 1979.

¹⁸⁹Buteux, 2010, p. 12; Trachtenberg, 1999, pp. 208–223.

¹⁹⁰Macron, 2019.

exemplifying how military power and foreign policy freedom are connected.¹⁹¹

The France example not only illustrates the overall role of military power but also the importance of nuclear proliferation specifically, as the French developed their own nuclear deterrent at the beginning of the Cold War. Indeed, nuclear proliferation is an especially effective form of military armament, and allies can use proliferation threats as leverage. During the early Cold War, Germany showed interest in nuclear proliferation.¹⁹² Historians still debate whether Germany really intended to pursue nuclear weapons.¹⁹³ Importantly, for the purpose of this chapter, the United States viewed the possibility of German nuclear proliferation as credible, and took measures to discourage Germany from pursuing it.¹⁹⁴

Countries with nuclear capabilities have a credible outside option, which should make it more likely for them to receive nuclear weapon deployments. Research has shown that the United States offers cooperative overtures to states with an *overt* capability to produce nuclear weapons.¹⁹⁵ Moreover, nuclear latency has commonly been included in previous research on this topic.¹⁹⁶ However, one can also argue that this measure exhibits tautological problems: States possessing nuclear latency may already have a heightened interest in obtaining nuclear deployments. Nevertheless, while the United States appears to demonstrate relatively greater amicability towards states with overt nuclear latency capabilities,¹⁹⁷ by-and-large nuclear latency tends to invite coercion without providing effective deterrence.¹⁹⁸ As a result, merely maintaining nuclear latency is an inferior strategy for states seeking to develop a national nuclear capability. This leads to two additional hypotheses:

HA2: U.S. allies with more military power relative to other U.S. allies are more likely to receive U.S. nuclear weapon deployments, and are more likely to receive a greater variety of nuclear-armed delivery vehicles.

HA3: U.S. allies with a latent capability to develop nuclear weapons are more likely to receive U.S. nuclear weapon deployments, and are more likely to receive a greater variety of nuclear-armed delivery vehicles.

International relations theory provides additional host state factors that can impact the deployment of nuclear weapons, which must be accounted for in the empirical analysis. First, construc-

¹⁹¹Willsher, 2022.

¹⁹²Egeland and Pelopidas, 2020, pp. 239–240; Heuser, 1999, pp. 148–150; Trachtenberg, 1999, pp. 232–237.

¹⁹³Lutsch, 2018, pp. 15–19.

¹⁹⁴See for example: Gavin, 2010, pp. 400–415; Lutsch, 2018.

¹⁹⁵Mattiacci, Mehta, and Whitlark, 2022.

¹⁹⁶Fuhrmann and Sechser, 2014a; Blankenship, 2020, pp. 1020–1021.

¹⁹⁷Mattiacci, Mehta, and Whitlark, 2022.

¹⁹⁸Mehta and Whitlark, 2017.

tivism highlights the role of identities. In this regard, it is possible that shared political ideology, such as liberal democratic credentials, can potentially moderate the United States' willingness to deploy nuclear weapons abroad. The second factor is related to liberalism, which suggests that political and economic exchange can foster socialization effects that may facilitate future exchange. This means that economic relationships might spill over into other areas such as military cooperation. Thus, economic ties between the United States and a foreign state may also moderate the likelihood of military cooperation, including the deployment of nuclear weapons.

The role of foreign nuclear weapon deployments as assurance tools for the United States relies not only on the characteristics and developments of its allied states, but also on domestic factors in America. One such factor is budget constraints, which may limit the extent to which the U.S. is willing to provide material assurance to its allies. These constraints can impact both overall capability levels and relative changes in wealth. Indeed, studies have indicated that voters tend to be more responsive to changes in economic outcomes than to the overall level of economic well-being¹⁹⁹. Therefore, in the context of nuclear weapon deployments, the degree to which the U.S. is able to maintain and enhance its GDP growth and total level of industrial-military capabilities may influence the extent to which it deploys these weapons as assurance tools.

In summary, states can increase their independence from the United States by maintaining favorable relationships with other major powers and building their own military capabilities. These states possess credible outside options and thus have a lower tolerance for abandonment fears.²⁰⁰ This in turn incentivizes U.S. assurance, reflecting the main argument of this chapter that the U.S. deploys nuclear weapons to states that may potentially slip from its sphere of influence.²⁰¹ Simultaneously, *HA2* and *HA3* contradict the explanation of nuclear weapon deployments as extended deterrence. States with nuclear latency and a large military budget can defend themselves and are least in need of military support. However, if they are more likely to host nuclear weapons, these countries' deployments likely beyond pure military rationale. Consequently, these two hypotheses provide an especially good test to contrast different theories explaining nuclear weapon deployments.

Skeptical Allies. This chapter has so far assumed that allies are commonly assured by nuclear weapon deployments. However, there is also evidence to the contrary, which could result in the confirmation of the null hypothesis in the empirical analysis. For instance, European populations are highly skeptical regarding the benefits of nuclear deterrence and largely opposed to nuclear deploy-

¹⁹⁹Becher and Donnelly, 2013.

²⁰⁰Snyder, 1984, pp. 466–468.

²⁰¹A similar argument has been made by Blankenship, although in a different area of application; see: Blankenship, 2020.

ments.²⁰² Anecdotal evidence suggests that this is not a new phenomenon. In the 1980s, protests against NATO's Double-Track Decision and the deployment of ground-launched ballistic and cruise missiles in Europe drew hundreds of thousands to the streets.²⁰³ In addition, Lauren Sukin argues that credible nuclear security guarantees can backfire. According to her theory, demonstrations of nuclear resolve by a guardian state can cause fears of entrapment by the protégé.²⁰⁴ She tests her hypothesis by utilizing a survey experiment among the South Korean public and has found that they fear being driven into a nuclear conflict with North Korea by the United States.²⁰⁵

Such skepticism is not always limited to the public. High-level government officials in South Korea have expressed their concerns regarding the U.S. drawing them into a nuclear war with North Korea.²⁰⁶ We can find similar concerns in the history of the Cold War. Europeans simultaneously feared being left alone by an overly cautious United States and being entrapped in a nuclear war by a reckless guardian.²⁰⁷ While Europeans feared conventional war²⁰⁸ and often wanted the United States to deploy more nuclear weapons and to use them earlier,²⁰⁹ they were also concerned that crossing the nuclear threshold could lead to Europe being wiped out.²¹⁰ Evidently, the position of many U.S. allies toward nuclear weapons use and deployment can best be described as ambivalent. For example, German Chancellor Adenauer was simultaneously worried that the United States would use nuclear weapons too late in a conflict and that it would place too much emphasis on nuclear war fighting with the risk of destroying Europe.²¹¹ More recently, Smetana and Onderco find that “a significant majority of [German members of parliament] disagreed with the use of nuclear weapons under any condition.”²¹²

To sum up, nuclear weapon deployments can instill fear in host states, both among the general public and, to a lesser extent, government officials. Under these circumstances, nuclear weapons might not actually assure allies. Consequently, the empirical analysis may result in a confirmation of the null hypothesis, i.e., assurance is not a cause of U.S. nuclear weapon deployments. However,

²⁰²Bunde et al., 2020; Egeland and Pelopidas, 2020; ICAN, 2018; ICAN, 2021; ICAN, 2020; ICAN, 2019.

²⁰³Risse-Kappen, 1991, p. 164.

²⁰⁴The issue very much touches on Snyder's security dilemma in alliances, where allies have to fear abandonment (discussed above) and entrapment; see: Snyder, 1984. Thus far, the latter has mostly referred to a protégé drawing the guardian into a conflict it does not want to participate in; see: Sukin, 2020, p. 1015. However, Sukin approaches the problem from the opposite direction, claiming that the guardian can also entrap the protégé.

²⁰⁵Sukin, 2020.

²⁰⁶Field, Shelley, and Griffiths, 2017; Sang-Hun, 2017.

²⁰⁷In the 1980s, U.S. President Reagan's remarks to limit nuclear war to Europe gravely concerned allies; see: Heuser, 1999, p. 23. This was a recurring theme that was especially prevalent whenever allies perceived the United States to escalate a conflict, as was the case in the Korean War, the Vietnam War, the Latin America interventions of the 1970s and 1980s, or the bombing of Libya in 1986; see: Heuser, 1999, pp. 22–23.

²⁰⁸Heuser, 1999, p. 15.

²⁰⁹Lutsch, 2020, pp. 66–68.

²¹⁰Interestingly, this fear increased the more allies got to know about nuclear weapons. For example, Germany's position on nuclear use became more conservative, the more it got taught about nuclear strategy and the effects of nuclear weapon use by the United States in the 1960s; see: Sayle, 2020; Lutsch, 2020, p. 382.

²¹¹Trachtenberg, 1999, p. 232.

²¹²Onderco and Smetana, 2021, pp. 639–640.

it is plausible that there is a strong expert-citizen divide, where foreign policy elites welcome the deployments despite considerable shares of the common population rejecting them. Naturally, U.S. decision-makers are more receptive to the opinions of foreign policy elites, and use nuclear deployments to assure them.

3.2.5 Extended Deterrence And Power Projection

Although I primarily focus on the role of assurance, the scientific literature identifies two additional factors that contribute to the deployment of nuclear weapons: extended deterrence and power projection.²¹³ It is important to note that I do not propose a singular relationship between nuclear deployments and assurance. Instead, a comprehensive understanding of nuclear weapon deployments also requires an examination of extended deterrence and power projection. These rationales compete at times, as deployments for extended deterrence purposes are directed towards states that lack adequate protection, while those for assurance are aimed at states that possess sufficient military means to act independently. Nevertheless, between states, these causes can also be complementary, with deployments to certain countries resulting from assurance needs, while deployments to others may be primarily driven by power projection or extended deterrence concerns. The primary objective of this chapter, however, is to analyze the various causes of U.S. nuclear weapon deployments, with a particular emphasis on assurance. It does not offer a definitive conclusion on the relative importance of each factor.

Extended deterrence. Regarding assurance, it is important to know whether the host state feels protected or not. In the case of extended deterrence, however, the guardian state might deploy nuclear weapons abroad if it believes that the deployments are crucial for the protection of the protégé, even if the latter does not share this opinion. Nevertheless, in reality, these two dimensions routinely overlap: States that feel threatened often are being threatened. For example, the Baltic states and Poland claim to be vulnerable to Russian military attacks, and they objectively face a higher risk than Portugal or Spain.²¹⁴ The history of NATO shows that military planning and threat assessments have influenced strategic planning. Strategic planning, in turn, was directly connected to nuclear weapon deployments. In the late 1940s nuclear weapons were regarded as purely strategic weapons. This was based on the military planning documents NSC-30 (United States) and DC 6/1 (NATO).²¹⁵ In this case, there was no incentive for widespread deployments

²¹³Fuhrmann and Sechser, 2014a, pp. 459–461.

²¹⁴Nevertheless, even for countries with similar histories and a shared threat environment, perceptions of risk can differ, as the cases of the Czech Republic or Hungary show, which have been less concerned about Russia than their Polish and Baltic neighbors; see: Kulesa, 2010. Consequently, what is “objectively” needed to defend an ally (extended deterrence), can potentially differ quite substantially from what is needed to assure them.

²¹⁵Heuser, 1995, pp. 41–42; Sagan, 1989, pp. 15–16.

of tactical nuclear weapons. However, with the evolution of NATO's doctrine from MC 14/2 and MC 70 to MC 14/3, a more flexible posture, and the deployment of nuclear weapons around the world, became necessary.²¹⁶

Threat assessments that underly military planning are influenced by the behavior of major adversaries. Even today, the capabilities of U.S. adversaries still routinely trigger discussions of nuclear weapon deployments.²¹⁷ However, threat perceptions do not necessarily coincide with extended deterrence. In some cases, such as the deployment of intermediate-range missiles to Europe in reaction to Soviet deployments, assurance seemed to have played a larger role than extended deterrence. If military planning is the outcome of allied threat perceptions, assurance, rather than extended deterrence, is the cause of deployments. While it can be challenging to disentangle assurance from extended deterrence, it is possible to theorize under which conditions we would see one but not the other. If extended deterrence is the main reason for nuclear deployments, we would expect these deployments to occur in countries possess limited means to defend themselves, which directly contrasts the assurance hypotheses *HA2* and *HA3*. Indeed, this is a very useful test to distinguish between assurance and extended deterrence. In addition, nuclear deployments should occur in countries that have been targeted in militarized disputes by other states. By definition, these states are highly threatened. This results in the following extended deterrence hypotheses:

HET1: U.S. allies against which a militarized dispute has been initiated are more likely to receive U.S. nuclear weapon deployments, and are more likely to receive a greater variety of nuclear-armed delivery vehicles.

HET2: U.S. allies with less military power relative to other U.S. allies are more likely to receive U.S. nuclear weapon deployments, and are more likely to receive a greater variety of nuclear-armed delivery vehicles

HET3: U.S. allies that do not have a latent capability to develop nuclear weapons are more likely to receive U.S. nuclear weapon deployments, and are more likely to receive a greater variety of nuclear-armed delivery vehicles

²¹⁶See: Wiebes and Burr, 2021; Heuser, 1999, pp. 43–47; Gavin, 2012, p. 34; Heuser, 1995, p. 45. At the same time, Gavin notes that military plans in accordance with flexible response were not implemented throughout the Kennedy and Johnson administrations; see: Gavin, 2012, pp. 30–56. Yet, the United States would not have been able to assure allies, if it had revealed that it did not believe in a controlled, i.e., flexible, response; see: Gavin, 2012, p. 54.

²¹⁷For example, the ever more sophisticated North Korean arsenal has spurred debates about renewed deployments to South Korea; see: Kristensen and Norris, 2017, p. 349; Pillai Rajagopalan, 2023; Sukin, 2023; Field, Shelley, and Griffiths, 2017. Likewise, the demise of the INF Treaty due to secret Russian nuclear capabilities sparked discussions about new intermediate-range missile deployments to Europe; see: Reif, 2019; Sieradzka, 2018.

Power Projection. The second alternative explanation for nuclear deployments is power projection. This refers to the U.S. deploying its military abroad to protect itself (direct deterrence) or more effectively compel an adversary. Deployments are then determined by geo-strategic concerns.²¹⁸ Examples include countries located near strategically relevant chokepoints and those in regions void of other U.S. allies.²¹⁹ Relying on theater nuclear weapons can also keep the war away from the U.S. homeland by creating additional steps on the escalation ladder. Beatrice Heuser argues that influential decision-makers in the U.S. administration, such as Secretary of Defense McNamara, viewed the flexible response doctrine as a way to regionally confine a war between the superpowers to Europe.²²⁰ Indeed, many allies feared exactly such a scenario, in which the United States would willingly accept the devastation of the European battlefield to protect itself.²²¹ In addition, Fuhrmann and Sechser argue that the United States had to rely on nuclear deployments before the introduction of ICBMs.²²²

The logic of power projection suggests that the location of U.S. allies causes nuclear weapon deployments. For instance, the U.S. would not need to use Guatemala to project its power over Mexico. However, deployments in Asia might be necessary to effectively compel China. In addition, the United States can deploy nuclear weapons to distant allies to keep a potential war confined to the region. The goal of power projection is the direct protection of the deploying state or the enhancement of its capability to compel adversaries. In both cases, the behavior and capabilities of adversaries are important. For example, Soviet nuclear armament led to Mutually Assured Destruction (MAD) in the early 1960s. This caused some U.S. decision-makers to try to limit nuclear war to Europe by deploying nuclear weapons abroad.²²³ The relationship between adversary behavior and power projection is also evident in the case of South Korea. In the 1970s the “8th Tactical Fighter Wing at Kunsan formed part of a three-base strike force against China together with the 18th Tactical Fighter Wing at Kadena Air Base in Okinawa and the 3rd Tactical Fighter Wing at Clark Air Base in the Philippines.”²²⁴ A nuclear-armed China put the United States on the defense.²²⁵ However, it can be assumed that at least for South Korea, the Chinese threat was of lesser importance than for its guardian. Taken together, this results in three power projection hypotheses:

²¹⁸Fuhrmann and Sechser, 2014a, pp. 463–465.

²¹⁹Blankenship, 2021, pp. 703–704.

²²⁰Heuser, 1995, p. 58.

²²¹Howard, 1982, p. 318.

²²²Fuhrmann and Sechser, 2014a, pp. 463–464.

²²³Heuser, 1995, pp. 56–58.

²²⁴Kristensen and Norris, 2017, p. 351.

²²⁵Trachtenberg, 1999, pp. 385–389.

HPP1: U.S. allies positioned near maritime chokepoints surrounding their patron’s adversaries are more likely to receive U.S. nuclear weapon deployments, and are more likely to receive a greater variety of nuclear-armed delivery vehicles

HPP2: U.S. allies located far from the United States are more likely to receive U.S. nuclear weapon deployments, and are more likely to receive a greater variety of nuclear-armed delivery vehicles.

HPP3: Before the United States acquired ICBMs, U.S. allies were more likely to receive U.S. nuclear weapon deployments, and were more likely to receive a greater variety of nuclear-armed delivery vehicles.

All hypotheses are shown in [Table 4](#) below:

Table 4: Hypotheses

	H1	H2	H3
Assurance	U.S. allies that maintain good relationships with other major powers...	U.S. allies with more military power relative to other U.S. allies...	U.S. allies with a latent capability to develop nuclear weapons...
Extended Deterrence	U.S. allies against which a militarized dispute has been initiated...	U.S. allies with less military power relative to other U.S. allies...	U.S. allies that do not have a latent capability to develop nuclear weapons...
Power Projection	U.S. allies positioned near maritime chokepoints surrounding their patron’s adversaries...	U.S. allies located far from the United States...	Before the United States acquired ICBMs, U.S. allies...
	...are more likely to receive U.S. nuclear weapon deployments, and are more likely to receive a greater variety of nuclear-armed delivery vehicles.		

3.3 Empirical Analysis

3.3.1 Dataset

To examine the question regarding why the United States deploys its nuclear weapons abroad and test my hypotheses, I utilize an original dataset on the deployment of nuclear weapons by the United States. The dataset comprises 14 nuclear host states across the globe, as depicted in [Figure 2](#). As the map shows, the United States deployed nuclear weapons in its immediate region (Canada), to European nations, North Africa (Morocco), and Asia, thus maintaining a nuclear

presence in almost all regions of the world. The deployment of nuclear weapons by the United States in a diverse range of countries from allies to non-allies, democracies to authoritarian states, and poor to rich countries, implies that a combination of various causes, rather than a single one, help explain these deployments. As mentioned in the previous section, the three theories (assurance, extended deterrence, and power projection) can potentially complement one another.

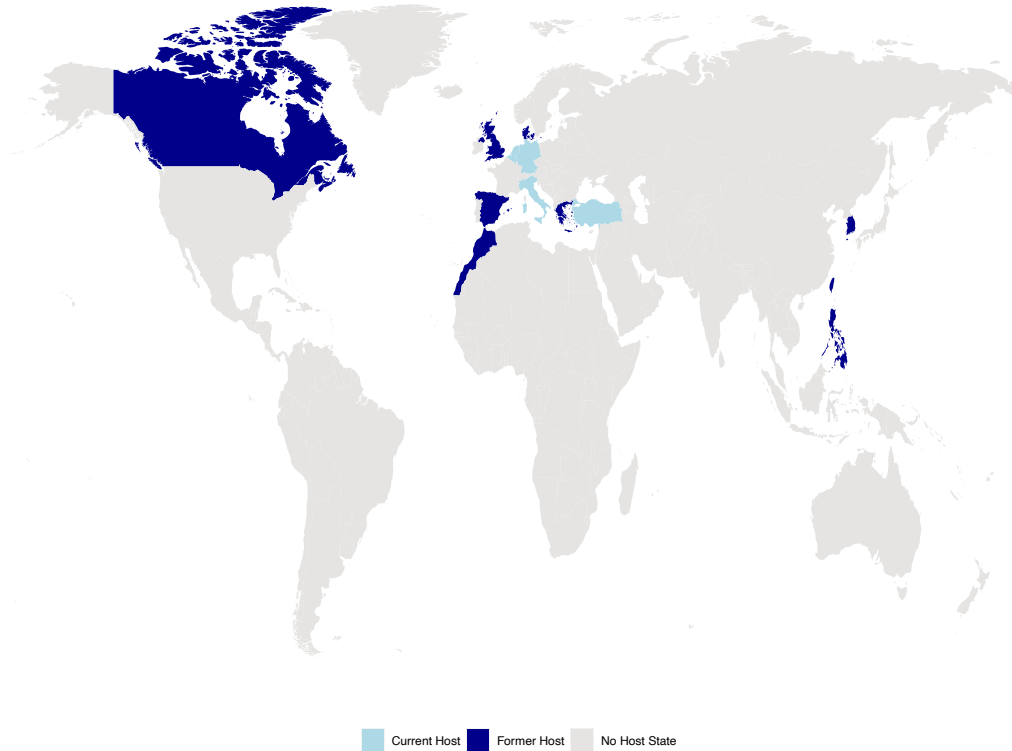


Figure 2: U.S. nuclear weapon host states, 1954-2020

The U.S. has deployed nuclear weapons to: Belgium, Canada, Denmark, Germany, Greece, Italy, Morocco, the Netherlands, the Philippines, South Korea, Spain, Taiwan, Turkey, United Kingdom.

Today Belgium, Germany, Italy, the Netherlands, and Turkey remain.

My analysis encompasses yearly data on U.S. allies, loosely based on the ATOP data²²⁶ and including allies in the Americas, Pakistan, Taiwan, and Israel. All U.S. nuclear weapon deployments are associated with formal alliances, except in two cases: Morocco and Spain. Washington deployed nuclear weapons to Morocco when it was still a French protectorate, and the deployment ended a few years after Morocco gained independence. Therefore, one can speculate that the U.S. would not have deployed its nuclear weapons if Morocco had already been independent at the time.

²²⁶Leeds et al., 2002.

Regarding Spain, the U.S. negotiated the unlimited use of some military bases in exchange for economic and military assistance to the Franco regime.²²⁷ Because of the limited availability of some independent and control variables after 2010, I restrict my analysis to the period between 1948 and 2010.²²⁸

My original dataset includes information on each nuclear-armed delivery vehicle present in a host state along with their ranges.²²⁹ For example, in 1965, the United States deployed nuclear ammunition for bombs, the Honest John, the M110 8-inch Howitzer, and the Nike Hercules to Greece. The dataset also categorizes the type of nuclear-armed delivery vehicle as “surface to surface”, “surface to air”, “air to air”, “air to ground”, “anti-submarine”, or “atomic demolition munition”. In the case of Greece, the dataset includes dummy codes for “air to ground” (nuclear bomb), “surface to surface” (Honest John and M110 8-inch Howitzer), and “surface to air” (Nike Hercules). [Table 5](#) offers a complete overview of all host states of U.S. nuclear weapons and shows that there is considerable variation in the number of different types of systems a country receives. This suggests that the United States customized its deployments, and that binary measures of deployment overlook important nuances. If the mere presence of nuclear weapons were sufficient to achieve U.S. goals, we would not observe such a diverse array of systems being deployed for varying durations. However, if the United States believed that a mix of systems was necessary to deter adversaries or assure allies, then the results align with what we see in the table.

Next to technical details, the dataset also provides information on the degree of control a host state had over the use of nuclear weapons deployed on its territory. This may be through bilateral arrangements that ensure consultation with the host state before any use of nuclear weapons or through the physical control of nuclear weapons by the host state’s military.²³⁰ While I do not utilize the full scope of these variables in this chapter’s analysis, they are an important foundation for future research on foreign deployed nuclear weapons, as I explain further in the dissertation’s conclusion.

Importantly, by coding each individual nuclear-armed delivery vehicle present in a host state, I yield a count of these systems per country-year. As I have outlined in the example of NATO’s Dual Track Decision above, U.S. allies were not merely content with nuclear deployments. Indeed, they demanded tailored solutions to the problems they saw. Thus, while the United States regarded the overall nuclear balance as sufficiently deterring toward Soviet aspirations in the 1980s, allies

²²⁷To ensure the reliability of my results to sampling, I conducted robustness tests in Appendix A using a stringent sample of U.S. allies. This sample excludes countries in Central and South America, Taiwan after 1980, Pakistan after 1972, and Israel. Furthermore, I utilize an additional sample that encompasses all states that are not rivals of the United States.

²²⁸The modern U.S. alliance system began to take shape in 1949. Nuclear deployments began in 1954.

²²⁹The ranges of aircraft assigned for nuclear bomb delivery are missing in this version of the dataset.

²³⁰A detailed explanation of the coding is provided in Appendix C.

Table 5: Deployment by country

Belgium (1963-today)	Air-to-ground, Surface-to-surface
Britain (1954–2008)	Air-to-ground, Anti-submarine, Surface-to-surface
Canada (1964–1984)	Air-to-air, Anti-submarine, Surface-to-air
Denmark (1958–1965)	Air-to-ground, Surface-to-air
Germany (1955-today)	Air-to-air, Air-to-ground, Atomic demolition munition, Surface-to-air, Surface-to-surface
Greece (1960-2001)	Air-to-ground, Surface-to-air, Surface-to-surface
Italy (1956–today)	Air-to-ground, Anti-submarine, Atomic demolition munition, Surface-to-air, Surface-to-surface
Morocco (1954–1963)	Air-to-ground, Anti-submarine
The Netherlands (1960–today)	Air-to-ground, Surface-to-surface
Philippines (1957–1977)	Air-to-air, Air-to-ground, Anti-submarine, Surface-to-air
South Korea (1958-1991)	Air-to-ground, Atomic demolition munition, Surface-to-air, Surface-to-surface
Spain (1958-1976)	Air-to-air, Air-to-ground, Anti-submarine, Surface-to-air
Taiwan (1958-1974)	Air-to-ground, Surface-to-surface
Turkey (1959-today)	Air-to-ground, Surface-to-surface

demanding intermediate-range nuclear deployment on European soil to counter what in their opinion was a dangerous gap in capabilities.²³¹ Another example is the Turkish reaction to the withdrawal of Jupiter missiles. Despite nuclear bombs and nuclear-armed Honest Johns remaining on Turkish territory, archival documents show that Turkish defense minister İlhami Sancar was adamant that the withdrawal of Jupiter missiles from his country would considerably undermine Turkish trust in U.S. security guarantees.²³² Allies often were not satisfied with receiving one nuclear system and instead demanded a broad range of capabilities. Consequently, a binary measure of nuclear weapon deployments fails to encapsulate such important nuances.

It is also important to note that there are alternative coding schemes that could have been used. One such scheme involves including information on U.S. port visits with nuclear weapons. These visits appear to have happened rather frequently and some states even banned them.²³³ However, as these visits do not constitute permanent deployments, and information on them is limited, they were excluded from the dataset. Another alternative coding scheme involves information on instances where the United States stored nuclear weapons on the territory of a host state to be used by another state’s military.²³⁴ Although we can attribute these deployments to the countries for which they were intended, the primary impact of the deployments likely occurred in the host state. For example, if nuclear weapons were deployed in Germany but earmarked for British forces, they would have had a minimal deterrent effect on the British homeland.

Table 6 provides a comprehensive view of my original dataset, which includes 539 country-year observations of U.S. deployed nuclear weapons. Notably, the frequency of types of deployed nuclear systems varies significantly. For example, nuclear ammunition for air-to-air weapons was deployed for only 43 country-years, while air-to-surface systems were deployed for 497 country-years. Table 7

²³¹Colbourn, 2022, pp. 35–36; Colbourn, 2022, p. 91; Cary, 2019, p. 161.

²³²Burr, 2019, document 13.

²³³For example, Japan explicitly forbid port visits of ships carrying nuclear weapons; see: Pugh, 1989. However, there is evidence that the United States disregarded the Japanese demand; see: Kristensen, 1999.

²³⁴One example is depth bombs stored in the United Kingdom which would have been picked up and used by the Dutch Navy in case of war; see: Burr, 2005. However, in this case, the United States committed itself to consult with the British ally before using the weapons; see: Burr, 2005.

displays the sample used in my analysis, which excludes Spain and Morocco as nuclear host states. This leads to a reduction in the total number of nuclear deployment years. Among the 3213 country-years of U.S. allies used in the sample, nuclear deployments were experienced in 470 of them.

Variable	N
Deployment Years	539
Countries	14
Air-to-surface	497
Surface-to-surface	229
Surface-to-air	132
Anti-Submarine	103
ADM	87
Air-to-air	43

Table 6: Complete dataset

Variable	N
Country-years	3213
Nuclear deployments	470
Air-to-surface	439
Surface-to-surface	229
Surface-to-air	131
ADM	87
Anti-Submarine	80
Air-to-air	40

Table 7: U.S. allies sample

To offer a close analysis of the different systems the United States has deployed in other countries, [Figure 3](#) shows that the most frequently deployed nuclear system was nuclear bombs, followed by the Honest John, M110 8-inch Howitzer, and Nike Hercules.²³⁵ While the latter three systems lost their nuclear role after the end of the Cold War, they continued to serve as conventional forces for U.S. allies. This applies to the M110 8-inch Howitzer, for example, which was until recently still being operated by Turkey. Interestingly, some delivery vehicles that were at the center of intense political tension were widely deployed, such as the Jupiter missiles and Pershing 2. In total, my dataset identifies 29 different nuclear-armed delivery vehicles. While the United States evidently deployed nuclear bombs to almost every host state (see [Appendix B](#)), most other systems were selectively deployed to some host states and not others.

²³⁵The Honest John is a surface-to-surface rocket artillery with a range of 5-38 km; the M110 8-inch Howitzer is a surface-to-surface gun artillery with a range of 16-23 km; and the Nike Hercules is a surface-to-air missile with a range of 140 km. Information about all delivery vehicles can be found at the beginning of the codebook in [Appendix C](#).

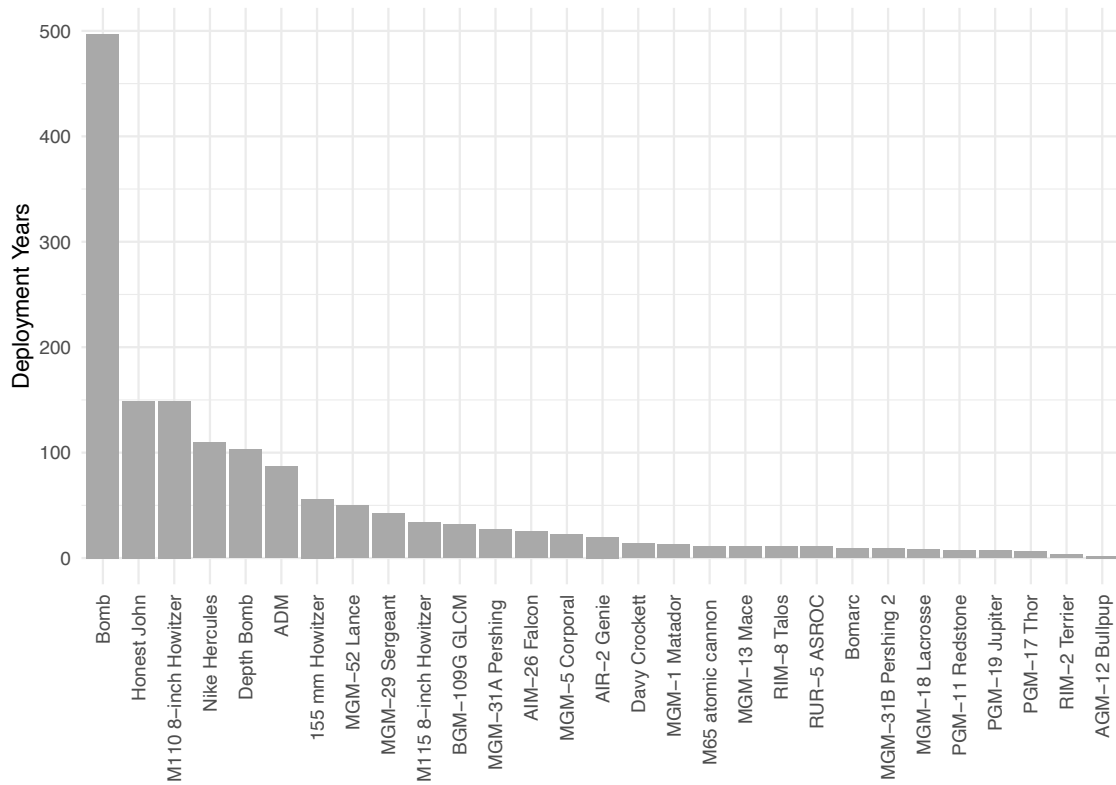


Figure 3: Total deployment years by delivery vehicle

Finally, as demonstrated in [Figure 4](#), the number of deployed systems during the Cold War followed the number of host states. As more countries began to host nuclear weapons, the United States deployed a wider variety of systems. This is further evidence that the United States has tailored its deployments to the needs of its allies. However, since the end of the Cold War, only nuclear bombs remain in allied countries. Most systems were deployed to a select number of allies (see Appendix B). If the United States adapted its deployments to the needs of allies, we can also imagine that it accommodated some allies more than others. Unearthing such trends is important when trying to examine the role of assurance in nuclear weapon deployments.

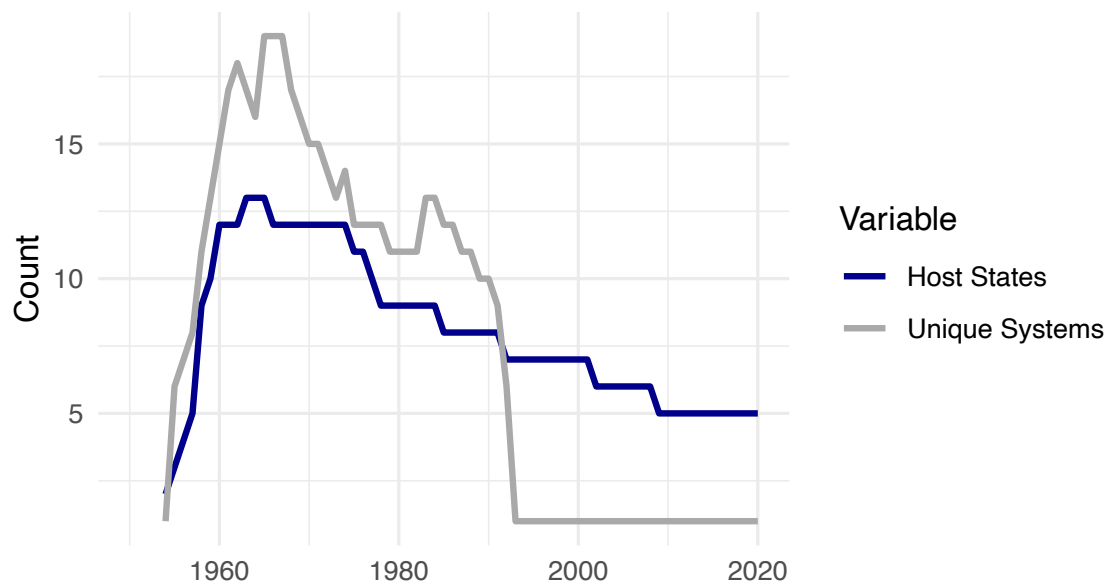


Figure 4: Total number of unique deployed delivery vehicles, and host states per year

Dependent Variables

To test my hypotheses, I employ two dependent variables: The first is a binary variable that indicates the presence or absence of nuclear deployments. The second is a count variable that measures the number of unique nuclear-armed systems present in a country during a given year. As mentioned earlier, we are interested in having access to a full range of nuclear capabilities that were tailored to their specific needs. One can argue that instead of counting unique nuclear-armed delivery vehicles, a better measure would be to examine the type of nuclear weapons a country received, such as air-to-air or air-to-surface. The description of the dataset demonstrated that there is significant variation regarding this metric. However, relying on a count of unique nuclear-armed delivery vehicles has a crucial advantage: it is a better proxy for the number of warheads a country received. Unfortunately, the publicly available records do not allow for the construction of a variable that captures the number of nuclear warheads deployed to each country each year. Yet, this is an important dimension of the deployments, as allies might have felt more assured by *more* nuclear weapons. In addition, the argument can be made that deterrence and compellence hinge on the number of warheads or systems deployed. Indeed, this logic evidently shaped the size of U.S. and Soviet strategic nuclear arsenals. In summary, using a count of unique nuclear-armed delivery vehicles captures some of the variations in different types of nuclear systems, and it is the best available proxy for the number of nuclear warheads deployed to a country.

Independent Variables

Assurance. To test the assurance hypotheses, I introduce three independent variables. First, I include a variable that measures a state's relationship with other major powers. To capture this, I utilize data from Blankenship that considers the following two factors: "(1) whether the ally had an alliance with Russia or China and (2) whether the ally received a visit from a Russian or Chinese leader in the past three years."²³⁶ My expectation is that states that do not have to fear other major powers possess the option of acting more independently from the United States, distancing themselves from its alliance system. Thus, the United States wants to assure these allies of the viability of the alliance. Second, I use the number of military personnel in a country as a measure of military power.²³⁷ There are two advantages to using personnel instead of military expenditure: Military expenditure is commonly standardized using U.S. dollar exchange rates despite the purchasing power of one dollar varying widely among different countries. This is a regular criticism against comparing military budgets.²³⁸ Moreover, as noted in the Correlates of War codebook, it is impossible to completely exclude non-military expenses from reported military budgets. Thus, relying on military personnel can provide better comparability. Nevertheless, military expenditure is included in the robustness tests in Appendix A for further analysis.²³⁹ Third, I add a binary nuclear latency variable that indicates if a state has at least a pilot-scale enrichment or reprocessing plant in operation in a given year.²⁴⁰ My theory suggests that military power, as measured by factors such as the number of military personnel and nuclear latency, can be an indicator of a state's ability to act independently on the world stage, potentially to the displeasure of the United States, which should lead to more nuclear deployments.

The tested hypotheses are as follows:

HA1: U.S. allies that maintain good relationships with other major powers are more likely to receive U.S. nuclear weapon deployments, and are more likely to receive a greater variety of nuclear-armed delivery vehicles.

HA2: U.S. allies with more military power relative to other U.S. allies are more likely to receive U.S. nuclear weapon deployments, and are more likely to receive a greater variety of nuclear-armed delivery vehicles.

²³⁶Blankenship, 2020, p. 1024.

²³⁷Sourced from the Correlates of War National Material Capabilities dataset (v6.0); see: Singer, Bremer, and Stuckey, 1972.

²³⁸See for example Kofman and Connolly, 2019.

²³⁹Military expenditure is also taken from the Correlates of War National Material Capabilities dataset (v6.0).

²⁴⁰Fuhrmann and Tkach, 2015.

HA3: U.S. allies with a latent capability to develop nuclear weapons are more likely to receive U.S. nuclear weapon deployments, and are more likely to receive a greater variety of nuclear-armed delivery vehicles.

Extended Deterrence. To examine the relationship between militarized disputes and nuclear weapon deployments for the extended deterrence hypotheses, I use data from the Militarized Interstate Disputes dataset (v4.02).²⁴¹ Specifically, I include all incidents in which a state was the main target of a militarized dispute ($\text{roleb} == 3$) and the incident is not coded as a reciprocated dispute because roles are assigned randomly by the dataset authors in such cases. My theory suggests that highly threatened states, those which are the target of a militarized dispute, should receive more nuclear weapon deployments if the main cause for these deployments is extended deterrence. Additionally, I again utilize the military personnel and nuclear latency variables to test if the deployments occurred in states that are not able to protect themselves. If deployments are more frequent in such poorly armed states, extended deterrence is a likely cause of deployment. However, if the opposite is true, i.e., states that are highly armed also receive more U.S. nuclear weapon deployments, assurance is a more probable cause.

The tested hypotheses are as follows:

HET1: U.S. allies against which a militarized dispute has been initiated are more likely to receive U.S. nuclear weapon deployments, and are more likely to receive a greater variety of nuclear-armed delivery vehicles.

HET2: U.S. allies with less military power relative to other U.S. allies are more likely to receive U.S. nuclear weapon deployments, and are more likely to receive a greater variety of nuclear-armed delivery vehicles

HET3: U.S. allies that do not have a latent capability to develop nuclear weapons are more likely to receive U.S. nuclear weapon deployments, and are more likely to receive a greater variety of nuclear-armed delivery vehicles

²⁴¹Palmer et al., 2021.

Power Projection. To test the final set of hypotheses on power projection, I employ three independent variables. First, I include data from Blankenship on whether a country is located close to a key maritime chokepoint near a major U.S. adversary.²⁴² As these chokepoints are critical for commercial and military ships to reach open waters, the United States has a strategic interest in maintaining a presence in these areas. Consequently, to defend these strategic chokepoints, or to use them to compel adversaries, the United States would want to deploy nuclear weapons to these locations when acting out of a power projection logic. Second, I use a variable that measures the distance of a country from the United States.²⁴³ Indeed, a relatively greater distance from the U.S. makes the deployments more useful to project power. Third, I include information on the introduction of ICBMs into the U.S. arsenal. Once this capability was established, the United States may have been less dependent on the deployment of nuclear weapons to project its power.²⁴⁴

The tested hypotheses are as follows:

HPP1: U.S. allies positioned near maritime chokepoints surrounding their patron's adversaries are more likely to receive U.S. nuclear weapon deployments, and are more likely to receive a greater variety of nuclear-armed delivery vehicles

HPP2: U.S. allies located far from the United States are more likely to receive U.S. nuclear weapon deployments, and are more likely to receive a greater variety of nuclear-armed delivery vehicles.

HPP3: Before the United States acquired ICBMs, U.S. allies were more likely to receive U.S. nuclear weapon deployments, and were more likely to receive a greater variety of nuclear-armed delivery vehicles.

Control Variables

To address temporal dependence, I follow Carter and Signorino's recommendation and control for it in all models.²⁴⁵ More specifically, I construct a variable that counts the consecutive years without deployments and include its squared and cubic terms. Additionally, I incorporate a lagged transformed dependent variable to the regressors, as both deployment and non-deployment can impede strong temporal dependency. I also ran all analyses with a consecutive count of deployment years instead of the lagged dependent variable. The results remained substantially unchanged,

²⁴²Blankenship, 2021, p. 708.

²⁴³Sourced from Gleditsch and Ward, 2001.

²⁴⁴Fuhrmann and Sechser, 2014a, pp. 463–464.

²⁴⁵Carter and Signorino, 2010.

although the model fit (AIC) was better for the lagged dependent variable models. Controlling for temporal dependency in count models to estimate autoregressive processes is non-trivial – which poses difficulties for all models that rely on my second dependent variable, the count of unique nuclear-armed systems.²⁴⁶ To account for this, I apply a log-transformed lagged dependent variable that takes $\ln 1$ if $y_{t-1} = 0$ and $\ln y_{t-1}$ if $y_{t-1} > 0$. I then include a further indicator variable that takes on the value of 1 if $y_{t-1} > 0$ and 0 if $y_{t-1} = 0$. This approach is based on Cameron and Trivedi.²⁴⁷ For the binary dependent variable, *nuclear host*, I employ a logit regression. To model the count dependent variable, *number of deployed systems*, I use a quasi-Poisson regression model that accounts for the under-dispersed nature of my data. In both models, I cluster standard errors by country.

I run two models for each dependent variable, all of which include the time variables discussed above. The first model controls for GDP and population, as both variables may be potential causes of military personnel and nuclear deployments. For instance, Blankenship uses GDP as a proxy for a country’s ability to act independently from the United States, assuming GDP to cause U.S. assurances.²⁴⁸ At the same time, GDP likely influences force size. The same reasoning can be applied to the size of a country’s population. To account for these potentially confounding effects, I include them as control variables.

In the second model, I control for additional factors that may affect the likelihood of nuclear deployments. First, I include a measure of trade with the United States, as close trade relationships may lead to socialization effects that result in nuclear deployments, distinct from the strategic reasoning proposed in this chapter. Second, I add a measure of shared and non-shared rivals with the United States, as countries with more rivals may be more likely to demand military deployments. By distinguishing between shared and non-shared rivals I can also potentially observe self-serving tendencies. For instance, does the United States deploy its weapons to countries to deter or compel its own rivals? Indeed, as I explain below, non-shared rivals may also be an alternative measure of power projection. Third, I control for U.S. CINC as a measure of the U.S. capacity to deploy military abroad.²⁴⁹ I also include U.S. GDP growth as a measure of relative capacity.²⁵⁰ Fourth, the analyses include a measure for liberal democracy.²⁵¹ Lastly, I apply lag modifications to relevant variables in the analyses.²⁵²

²⁴⁶Brandt et al., 2000.

²⁴⁷Cameron and Trivedi, 2013, pp. 281–284.

²⁴⁸Blankenship, 2020, pp. 1023–1024.

²⁴⁹Data is taken from Blankenship, 2020.

²⁵⁰Own calculation.

²⁵¹Taken from the Quality of Government dataset; see: Teorell et al., 2021. The data is based on the VDem dataset.

²⁵²The analyses are overall robust to these lag transformations.

3.3.2 Results

The results of the assurance model, the main model of this analysis, are depicted in [Table 8](#). Generally speaking, they provide empirical support for my theoretical argument. However, it is worth noting that not all of the hypotheses are corroborated, as the direction of effect for the relationship with other major powers is contrary to my expectations. The analysis reveals that the size of a nation's military is positively correlated with the deployment of U.S. nuclear weapons, both in terms of being a host state and the number of unique nuclear systems deployed. These results are statistically significant for both dependent variables and remain so after the inclusion of additional covariates. While nuclear latency also seems to have a positive effect on both dependent variables, the relationship is not statistically significant at conventional levels in one of the four models. Surprisingly, a close relationship with another major power reduces the likelihood of receiving a large number of unique nuclear systems, contrary to my expectations. However, I do not find an effect on nuclear host status. One possible explanation for this outcome is that the United States does not want to deploy nuclear weapons to countries that are closely aligned with other major powers due to the sensitive nature of technical agreements and military planning associated with such deployments.²⁵³ In contrast to my results, previous research has found a positive correlation between public statements of support – a tool of assurance – and maintaining close relationships with other major powers.²⁵⁴ However, such statements are largely risk-free, which would explain why they are used to assure allies with close relationships to other major powers, while nuclear deployments, as I find in this analysis, are more cautiously used in such cases.

[Table 9](#) presents the findings from the extended deterrence models. There is limited evidence to suggest that extended deterrence has been a primary cause of U.S. nuclear weapon deployments. Indeed, being a target of a MID is only found to be statistically significant in one model, and it is negatively related to the number of unique deployed nuclear systems. At the same time, the effect of the size of a country's military and the capability to produce nuclear weapons are again found to have a positive effect on the likelihood of becoming a nuclear host state or receiving a high number of nuclear systems. Consequently, states with limited self-defense capabilities are *less* likely to receive nuclear deployments. This contradicts the extended deterrence hypothesis, which suggests that countries that are highly threatened or lack the means to defend themselves would be more likely to receive nuclear weapon deployments.

²⁵³For example, in a letter to President Kennedy, the Joint Committee on Atomic Energy expressed their concerns that nuclear deployments could compromise sensitive information; see: Burr, [2020b](#), document 26, p. 4, and document 5, pp. 38-39. A more recent example is the United States halting the training and delivery of F-35 DCAs to Turkey following the latter's purchase of Russian air defense technology and associated espionage risks; see: Groll and Seligman, [2019](#).

²⁵⁴Blankenship, [2020](#).

Table 8: Assurance models

	<i>Dependent variable:</i>			
	Nuclear Host		# Deployed Systems	
	(1)	(2)	(3)	(4)
<i>Main independent variables</i>				
Relationship w/ major powers	-0.830 (0.516)	-0.774 (0.562)	-0.069*** (0.021)	-0.038** (0.027)
Military Personnel (ln)	0.823*** (0.275)	1.307*** (0.402)	0.038* (0.022)	0.051** (0.029)
Nuclear latency	1.418** (0.566)	1.135* (0.689)	0.001 (0.048)	0.012** (0.036)
<i>Control variables</i>				
Post Cold War	-1.017 (0.838)	-0.420 (0.863)	-0.172*** (0.035)	-0.162** (0.040)
GDP (ln)	0.422* (0.243)	1.161* (0.632)	0.005 (0.022)	0.041** (0.046)
Population (ln)	-0.357 (0.401)	-0.994 (0.733)	0.067 (0.046)	0.035* (0.059)
Trade w/ US (ln)		-0.365 (0.270)		-0.054** (0.019)
# Shared Rivals w/ US		0.410 (0.790)		0.037** (0.041)
# Non-Shared Rivals		-0.421 (0.359)		-0.052** (0.028)
US CINC		0.500*** (0.185)		0.009*** (0.005)
Liberal Democracy		1.212 (1.440)		0.088* (0.095)
US GDP Growth		0.113 (0.120)		-0.003*** (0.003)
Time trends:	✓	✓	✓	✓
S.e. clustered by country:	✓	✓	✓	✓
Observations	2,973	2,675	2,973	2,675

Note:

*p<0.1; **p<0.05; ***p<0.01

Table 9: Extended deterrence models

	<i>Dependent variable:</i>			
	Nuclear Host		# Deployed Systems	
	(1)	(2)	(3)	(4)
<i>Main independent variables</i>				
Victim MID	0.010 (0.186)	0.021 (0.253)	-0.010 (0.009)	-0.0004*** (0.009)
Military Personnel (ln)	0.811*** (0.248)	1.295*** (0.384)	0.037* (0.021)	0.049** (0.029)
Nuclear latency	1.294** (0.626)	1.084 (0.769)	-0.016 (0.054)	0.009** (0.037)
<i>Control variables</i>				
Post Cold War	-1.336* (0.775)	-0.576 (0.839)	-0.207*** (0.043)	-0.179** (0.047)
GDP (ln)	0.349 (0.243)	1.090* (0.629)	-0.002 (0.020)	0.044** (0.045)
Population (ln)	-0.409 (0.418)	-1.005 (0.815)	0.058 (0.044)	0.027* (0.056)
Trade w/ US (ln)		-0.412 (0.284)		-0.055** (0.019)
# Shared Rivals w/ US		0.347 (0.695)		0.042** (0.039)
# Non-Shared Rivals		-0.498 (0.345)		-0.052** (0.029)
US CINC		0.504*** (0.194)		0.010*** (0.005)
Liberal Democracy		1.143 (1.602)		0.076* (0.086)
US GDP Growth		0.109 (0.119)		-0.002*** (0.003)
Time trends:	✓	✓	✓	✓
S.e. clustered by country:	✓	✓	✓	✓
Observations	3,068	2,675	3,068	2,675

Note:

*p<0.1; **p<0.05; ***p<0.01

Finally, [Table 10](#) shows the results of the power projection analysis. I find substantial evidence that U.S. nuclear deployments have, to some extent, self-serving motives. Since the introduction of ICBMs, the likelihood of nuclear deployments has decreased. Moreover, greater distance from the United States is positively correlated with an increase in nuclear deployments. These results are statistically significant in three out of four models at conventional levels. However, evidence is fragile for the association between strategically important geographic locations, specifically maritime chokepoints, and U.S. nuclear deployments. Nonetheless, the findings suggest that the deployments align with power projection strategies to some degree.

Several notable results emerge when examining the control covariates. First, whenever GDP is statistically significant, there is a positive correlation between being a nuclear host and the number of deployed systems. Indeed, Blankenship uses GDP as a proxy for a country's capacity to act independently from the United States.²⁵⁵ While I chose to rely on military power and nuclear latency as the main independent variables, these findings provide further support for the assurance hypotheses. In addition, sharing a larger number of rivals with the United States is positively associated with a larger number of deployed systems. While the number of rivals not used as a main independent variable in the power projection models, this finding further indicates that deployments are connected to self-serving deliberations. Finally, countries with higher liberal democracy scores receive a more diverse portfolio of nuclear systems. This suggests that while nuclear deployments do not necessarily hinge on the democratic credentials of a host state, only ideologically aligned allies are trusted with many different systems. This further supports the idea that the United States may have been concerned about information leakage, offering fewer nuclear weapon systems to allies with whom it did not share fundamental commonalities, such as being a liberal democracy.

²⁵⁵Blankenship, 2020.

Table 10: Power projection models

	<i>Dependent variable:</i>			
	Nuclear Host		# Deployed Systems	
	(1)	(2)	(3)	(4)
<i>Main independent variables</i>				
Distance to US	0.286*** (0.092)	0.192 (0.230)	0.021** (0.010)	0.020** (0.020)
ICBM US	-1.662* (0.892)	-1.606 (1.622)	-0.165*** (0.030)	-0.056** (0.040)
Located at Mar. Chokepoint	0.806 (0.501)	0.154 (0.930)	0.037 (0.030)	0.043** (0.049)
<i>Control variables</i>				
Post Cold War	-1.568** (0.686)	-1.111 (0.743)	-0.188*** (0.043)	-0.178* (0.056)
GDP (ln)	0.691** (0.296)	1.416** (0.688)	-0.003 (0.020)	0.041** (0.039)
Population (ln)	0.029 (0.307)	-0.291 (0.533)	0.073* (0.042)	0.048** (0.043)
Trade w/ US (ln)		-0.335 (0.627)		-0.045** (0.040)
# Shared Rivals w/ US		1.759 (1.097)		0.044* (0.050)
# Non-Shared Rivals		-0.147 (0.290)		-0.063** (0.041)
US CINC		0.415** (0.192)		0.006*** (0.006)
Liberal Democracy		0.987 (1.532)		0.036* (0.079)
US GDP Growth		0.176 (0.144)		-0.0002*** (0.003)
Time trends:	✓	✓	✓	✓
S.e. clustered by country:	✓	✓	✓	✓
Observations	3,079	2,686	3,079	2,686

Note:

* p<0.1; ** p<0.05; *** p<0.01

Robustness tests

The assurance models have been subjected to a variety of robustness tests, all of which are outlined in Appendix A. The results hold up well under scrutiny, remaining largely unchanged. For example, the findings remain consistent when a much stricter definition of U.S. allies is applied (cutting observations by half), or when all countries except U.S. rivals are included²⁵⁶ (increasing observations by a factor of about 2.5). However, when the military personnel variable is substituted for military expenditure, the results are inconclusive, with military expenditure turning negative in one model. This indicates that the analysis is sensitive to how military power is measured. In addition, all models were combined to run regressions with the assurance, extended deterrence, and power projection variables together. This altered the results in one significant way, with nuclear latency turning negative in one of the models. Nonetheless, the size of a country's military remains positive and statistically significant across all models. Again, I find no evidence supporting the extended deterrence hypotheses, the results for the power projection hypotheses are less coherent for strategic location and distance to the United States. Lastly, U.S. ICBM capability is negative and retains statistical significance in three out of four models.

²⁵⁶Loosely based on Thompson and Dreyer, 2011; but adding Warsaw Pact countries, North Korea and North Vietnam.

3.4 Summary

This chapter has provided a comprehensive analysis of the causes of U.S. nuclear weapon deployments and developed a general theory to explain their occurrence. The central focus of the chapter was on the crucial role of assurance as a primary cause of nuclear weapon deployments. In contrast to previous research, I clearly delineated assurance from extended deterrence and power projection. Specifically, assurance relies on promises of protection, rather than threats, and is aimed at allies (positive/negative assurance) and adversaries (negative assurance) alike. In addition, while non-proliferation and assurance are often used interchangeably, they represent distinct concepts, with assurance being a strategy and non-proliferation being a goal that can be achieved through extended deterrence, power projection and assurance. I applied this novel conceptualization to the case of U.S. foreign deployed nuclear weapons. The argument is clear and straightforward: Allies with greater leverage to act independently from the U.S. – determined by their relationship with other major powers and military capabilities – are more likely to receive nuclear weapon deployments, as the United States seeks to keep them in its sphere of influence.

To test the theory developed in this chapter, an original dataset was created that represents another significant contribution to the field of study. This dataset coded every unique type of nuclear ammunition present in a host state in a given year. Importantly, the presence of nuclear-*capable* systems alone is not sufficient. For example, Italy operated the M110 8-inch Howitzer, a nuclear-capable system, until the late 1990s. However, nuclear ammunition for the artillery was only present until 1992. I found consistent evidence that military power, measured by a country's military size and nuclear weapons production capabilities, is positively correlated with nuclear host status and with receiving a greater variety of nuclear systems. This finding supported my theory that the United States assures allies who possess the means to act more independently based on their military capabilities. However, in contrast to my theoretical argument, the data also suggested that good relations with other major powers can reduce the likelihood of nuclear deployments. I argued that this may be due to concerns among decision-makers in Washington that states with overly close relationships to major U.S. adversaries can potentially leak sensitive information related to nuclear deployments.

In addition to assurance, I tested whether extended deterrence and power projection are significant causes for nuclear deployments, as they have been the focus of previous literature. My data analysis did not yield evidence that highly vulnerable states, such as those that are targets of militarized interstate disputes or have little military capability to defend themselves, are more likely to receive nuclear deployments. This is in clear contradiction with the extended deterrence hy-

potheses. In contrast, power projection indicators showed a positive correlation with both nuclear host status and the number of deployed nuclear systems. The introduction of ICBM capabilities had a negative effect on deployments. In other words, possessing the ability to reach global targets from the United States has diminished the utility of nuclear deployments – in line with one of my power projection hypotheses. Moreover, countries located further from the United States are more likely to receive nuclear weapon deployments, which is again consistent with power projection considerations. However, I did not find evidence that countries located at strategically important chokepoints are more likely to be nuclear hosts or to receive a broader range of nuclear systems.

In summary, my research findings offer a more comprehensive understanding of the causes of nuclear weapon deployments in three distinct ways. First, I provided a clear conceptualization of assurance. Second, I developed a theoretical framework to explain the relationship between assurance and nuclear weapon deployments. Third, I tested this framework using an original dataset of U.S. foreign deployed nuclear weapons. While assurance is not the sole determinant of these deployments, it complements previous explanations in significant ways. Crucially, assurance shifts the focus from purely military justifications – be it the defense of allies or self-serving deployments that should protect the United States – to interstate political considerations, particularly between allies. This raises new and intriguing questions: How are institutions, nuclear deployments and alliances connected? Which factors contribute to the sense of security of U.S. allies? How does this contrast with what deters adversaries?

This chapter not only presented new insights into the causes of nuclear weapon deployments but also laid the foundation for a broader research agenda on this topic. The novel dataset introduced here can facilitate further investigations into the technical aspects of deployed systems, such as the range and type of these systems, and their relationship to political and military phenomena. Another promising avenue for future research is to expand the dataset to include Soviet and British deployments. In the case of the Soviet Union, this would require substantial additional efforts, as the literature on these deployments is considerably more limited, and archival documents are either difficult to come by (Russia), or only accessible with a broad range of language skills (from Polish to Mongolian). Lastly, my conceptualization of assurance can also be applied to examine the *effects* of nuclear deployments. Indeed, we might wonder whether U.S. assurance efforts are successful. For example, do nuclear deployments cause favorable voting in international organizations? Alternatively, do they strengthen bonds between the United States and its allies in other ways? In the next chapter, I take a slightly different approach, together with my co-author, by studying how military deployments, both nuclear and conventional, affect citizens' attitudes toward national defense and whether they actually provide a sense of assurance to the public.

3.5 Appendix A: Robustness Tests

Table 11: Assurance models: strict coding of U.S. allies

	<i>Dependent variable:</i>			
	Nuclear Host		# Deployed Systems	
	(1)	(2)	(3)	(4)
<i>Main independent variables</i>				
Relationship w/ major powers	-0.775 (0.485)	-0.829 (0.558)	-0.061*** (0.021)	-0.030** (0.026)
Military Personnel (ln)	0.747** (0.297)	0.884* (0.458)	0.014 (0.020)	0.027** (0.019)
Nuclear latency	1.326** (0.552)	1.208* (0.670)	0.013 (0.045)	0.045** (0.044)
<i>Control variables</i>				
Post Cold War	-1.058 (0.846)	-0.429 (0.819)	-0.172*** (0.034)	-0.157** (0.036)
GDP (ln)	0.331 (0.233)	1.395* (0.725)	-0.010 (0.022)	0.028** (0.039)
Population (ln)	-0.298 (0.403)	-0.993 (0.724)	0.081* (0.045)	0.029** (0.034)
Trade w/ US (ln)		-0.257 (0.300)		-0.026** (0.022)
# Shared Rivals w/ US		0.620 (0.581)		0.033** (0.034)
# Non-Shared Rivals		0.027 (0.495)		-0.009** (0.034)
US CINC		0.494*** (0.167)		0.014*** (0.005)
Liberal Democracy		-0.237 (1.806)		0.010* (0.059)
US GDP Growth		0.117 (0.121)		-0.003*** (0.003)
Time trends:	✓	✓	✓	✓
S.e. clustered by country:	✓	✓	✓	✓
Observations	1,297	1,264	1,297	1,264
<i>Note:</i>			*p<0.1; **p<0.05; ***p<0.01	

Table 12: Assurance models: all states except U.S. rivals

	<i>Dependent variable:</i>			
	Nuclear Host		# Deployed Systems	
	(1)	(2)	(3)	(4)
<i>Main independent variables</i>				
Relationship w/ major powers	-0.963** (0.476)	-0.934** (0.467)	-0.071*** (0.021)	-0.044** (0.027)
Military Personnel (ln)	0.874*** (0.239)	1.671*** (0.384)	0.043* (0.023)	0.075** (0.032)
Nuclear latency	1.505** (0.620)	1.125* (0.680)	-0.007 (0.043)	0.002** (0.033)
Post Cold War	-0.700 (0.835)	0.086 (0.907)	-0.151*** (0.035)	-0.135** (0.040)
GDP (ln)	0.460* (0.239)	0.822 (0.549)	0.010 (0.021)	0.013** (0.045)
Population (ln)	-0.485 (0.332)	-1.095* (0.593)	0.050 (0.044)	0.016* (0.064)
Trade w/ US (ln)		-0.124 (0.181)		-0.026** (0.017)
# Shared Rivals w/ US		-0.140 (1.100)		0.011** (0.043)
# Non-Shared Rivals		-0.575* (0.314)		-0.043** (0.024)
US CINC		0.538*** (0.136)		0.012*** (0.004)
Liberal Democracy		1.524 (0.984)		0.140* (0.096)
US GDP Growth		0.068 (0.114)		-0.005*** (0.004)
Time trends:	✓	✓	✓	✓
S.e. clustered by country:	✓	✓	✓	✓
Observations	7,328	6,760	7,328	6,760
<i>Note:</i>			*p<0.1; **p<0.05; ***p<0.01	

Table 13: Assurance models: military expenditure

<i>Dependent variable:</i>				
	Nuclear Host		# Deployed Systems	
	(1)	(2)	(3)	(4)
<i>Main independent variables</i>				
Relationship w/ major powers	-0.927* (0.554)	-0.884 (0.569)	-0.061*** (0.022)	-0.036** (0.026)
Military Expenditure (ln)	0.101 (0.171)	0.820* (0.480)	-0.022* (0.011)	0.028** (0.030)
Nuclear latency	1.263** (0.543)	1.046 (0.638)	0.0004 (0.040)	0.024** (0.033)
Post Cold War	-1.090 (0.878)	-1.124 (0.848)	-0.165*** (0.032)	-0.177** (0.039)
GDP (ln)	0.326 (0.342)	0.688 (0.627)	0.027 (0.031)	0.020* (0.053)
Population (ln)	0.300 (0.336)	0.104 (0.515)	0.087* (0.051)	0.078* (0.054)
Trade w/ US (ln)		-0.699** (0.320)		-0.072** (0.024)
# Shared Rivals w/ US		1.357** (0.660)		0.050* (0.052)
# Non-Shared Rivals		-0.179 (0.365)		-0.052** (0.033)
US CINC		0.538*** (0.164)		0.009*** (0.005)
Liberal Democracy		0.948 (1.364)		0.043* (0.091)
US GDP Growth		0.110 (0.121)		-0.003*** (0.003)
Time trends:	✓	✓	✓	✓
S.e. clustered by country:	✓	✓	✓	✓
Observations	2,877	2,631	2,877	2,631

Note:

* p<0.1; ** p<0.05; *** p<0.01

Table 14: Combined models

<i>Dependent variable:</i>				
	Nuclear Host		# Deployed Systems	
	(1)	(2)	(3)	(4)
<i>Main independent variables</i>				
Relationship w/ major powers	-0.976* (0.558)	-0.755 (0.588)	-0.071*** (0.021)	-0.050** (0.025)
Military Personnel (ln)	0.685** (0.291)	1.308*** (0.379)	0.040* (0.021)	0.071** (0.028)**
Nuclear latency	1.330** (0.599)	1.088 (0.668)	0.017 (0.046)	-0.001** (0.037)
Victim MID	-0.045 (0.201)	0.003 (0.264)	-0.014 (0.010)	-0.004*** (0.009)
Distance to US	0.198** (0.095)	0.209 (0.230)	0.018 (0.013)	0.037** (0.029)
ICBM US	-1.912* (1.009)	-1.400 (1.613)	-0.183*** (0.037)	-0.085** (0.048)
Located at Mar. Chokepoint	0.445 (0.466)	0.102 (0.758)	0.039 (0.028)	0.061* (0.055)
<i>Control variables</i>				
Post Cold War	-1.151 (0.886)	-0.630 (0.940)	-0.152*** (0.034)	-0.135** (0.050)
GDP (ln)	0.781*** (0.296)	0.998 (0.705)	0.011 (0.026)	0.005* (0.061)
Population (ln)	-0.421 (0.423)	-1.031 (0.883)	0.051 (0.036)	0.005* (0.055)
Trade w/ US (ln)		-0.017 (0.620)		-0.0004** (0.048)
# Shared Rivals w/ US		0.177 (1.027)		-0.019* (0.060)
# Non-Shared Rivals		-0.480 (0.347)		-0.069** (0.047)
US CINC		0.465** (0.220)		0.011*** (0.007)
Liberal Democracy		0.983 (1.861)		0.097 (0.106)
US GDP Growth		0.173 (0.145)		-0.0002*** (0.003)
Time trends:	✓	✓	✓	✓
S.e. clustered by country:	✓	✓	✓	✓
Observations	2,973	2,675	2,973	2,675

Note:

* p<0.1; ** p<0.05; *** p<0.01

3.6 Appendix B: Nuclear Systems By Country

System	Belgium	Canada	Denmark	Germany	Greece	Italy	Morocco	Netherlands	Philippines	South Korea	Spain	Taiwan	Turkey	United Kingdom
1 155 mm Howitzer	0	0	0	1	0	0	0	0	0	1	0	0	0	0
2 ADM	0	0	0	1	0	1	0	0	0	1	0	0	0	0
3 AGM-12 Bullpup	0	0	0	1	0	0	0	0	0	0	0	0	0	0
4 AIM-26 Falcon	0	1	0	1	0	0	0	0	1	0	1	0	0	0
5 AIR-2 Genie	0	1	0	0	0	0	0	0	0	0	0	0	0	0
6 BGM-109G GLCM	1	0	0	1	0	1	0	0	0	0	0	0	0	1
7 Bomarc	0	1	0	0	0	0	0	0	0	0	0	0	0	0
8 Bomb	1	0	1	1	1	1	1	1	1	1	1	1	1	1
9 Davy Crockett	0	0	0	1	0	0	0	0	0	1	0	0	0	0
10 Depth Bomb	0	1	0	0	0	1	1	0	1	0	1	0	0	1
11 Honest John	0	0	0	1	1	1	0	1	0	1	0	0	1	0
12 M110 8-inch Howitzer	0	0	0	1	1	1	0	1	0	0	0	0	1	0
13 M115 8-inch Howitzer	0	0	0	0	0	0	0	0	0	1	0	0	0	0
14 M65 atomic cannon	0	0	0	1	0	0	0	0	0	1	0	0	0	0
15 MGM-1 Matador	0	0	0	1	0	0	0	0	0	0	0	1	0	0
16 MGM-13 Mace	0	0	0	1	0	0	0	0	0	0	0	0	0	0
17 MGM-18 Lacrosse	0	0	0	1	0	0	0	0	0	1	0	0	0	0
18 MGM-29 Sergeant	0	0	0	1	0	1	0	0	0	1	0	0	0	0
19 MGM-31A Pershing	0	0	0	1	0	0	0	0	0	0	0	0	0	0
20 MGM-31B Pershing 2	0	0	0	1	0	0	0	0	0	0	0	0	0	0
21 MGM-5 Corporal	0	0	0	1	0	1	0	0	0	0	0	0	0	0
22 MGM-52 Lance	0	0	0	1	0	1	0	1	0	0	0	0	0	0
23 Nike Hercules	0	0	1	1	1	1	0	0	0	1	0	0	0	0
24 PGM-11 Redstone	0	0	0	1	0	0	0	0	0	0	0	0	0	0
25 PGM-17 Thor	0	0	0	0	0	0	0	0	0	0	0	0	0	1
26 PGM-19 Jupiter	0	0	0	0	0	1	0	0	0	0	0	0	1	0
27 RIM-2 Terrier	0	0	0	0	0	0	0	0	1	0	0	0	0	0
28 RIM-8 Talos	0	0	0	0	0	0	0	0	1	0	1	0	0	0
29 RUR-5 ASROC	0	0	0	0	0	0	0	0	1	0	1	0	0	0

Table 15: Unique deployed systems by host state.

3.7 Appendix C: Codebook

Description: This codebook depicts every U.S. nuclear weapon deployment by host country. It starts with an overview of all variables included in the dataset. Moreover, it offers an overview of all delivery vehicles, their ranges, and their classification into six types. Thereafter, there is additional information on all cases, including information if there are uncertainties regarding dates or the type of specific nuclear ammunition deployments, and sources for each country case.

Variables:

- cname: Name of the host state
- ccode: Country code (ISO 3166-1 numeric)
- year: Year(s) of nuclear deployment
- veto: Indicating the type of veto power a host state had over the nuclear-armed delivery vehicles present in its territory (see below).
- use: Indicating if a host state was able to use the nuclear-armed delivery vehicles present in its territory without U.S. consent (see below)
- sts: Presence of a surface-to-surface nuclear-armed delivery vehicle in a given year
- sta: Presence of a surface-to-air nuclear-armed delivery vehicle in a given year
- ata: Presence of an air-to-air nuclear-armed delivery vehicle in a given year
- atg: Presence of an air-to-ground nuclear-armed delivery vehicle in a given year
- as: Presence of an anti-submarine nuclear-armed delivery vehicle in a given year
- adm: Presence of an Atomic Demolition Munition (nuclear mine) in a given year
- deployment: Information about deployment initiator
- termination: Information about termination (withdrawal) initiator
- Weapon*: Name of each nuclear-armed delivery vehicle in the host state each year
- Range*: Range of each nuclear-armed delivery vehicle in the host state each year
- numbersystems: Total number of unique nuclear-armed delivery vehicles present in the host state each year
- maxrange: Maximum range covered by each deployed nuclear-armed delivery vehicle

Coding: veto

- 0: No deployment
- 1: Secret deployment (secret to host state)
- 2: Host state not included in nuclear mission
- 3: Partial physical veto
- 4: Consultation agreement
- 5: Partial physical veto and consultation agreement
- 6: Full physical veto
- 7: Full physical veto and consultation agreement

This variable focuses on the ability of a state to prevent the use of nuclear weapons deployed on its territory. This may be in the form of bilateral arrangements that guarantee the host state that it will be consulted in the case of use. Additionally, the ability to veto the use of nuclear weapons on a state's territory might be purely physical in the sense that all or some of the nuclear weapons on its territory are to be delivered by the military of that state.

Coding: use

- 0: No nuclear host
- 1: Full U.S. custody
- 2: Limited U.S. custody

The second dependent variable focuses on the ability of a state to use some of the nuclear weapons deployed on its territory, without the approval of the guardian state. This was possible, for example, in the early years of U.S. deployments, before the installation of Permissive Action Links (PALs). However, even afterward, specific weapon systems could be launched without U.S. approval.

Coding: deployment & termination

- 1: Deployment/termination initiated by United States
- 2: Deployment/termination initiated by host state

Weapon systems:²⁵⁷

²⁵⁷Some systems had different modifications, often, but not only, relating to modernization. For example, ADMs existed in the following versions: W-7/ADM-B (1954–1967), T-4 (1957–1963), W-30/TADM (1961–1966), W-31/ADM (1960–1965), W-45/MADM (1962–1984), and W-54/SADM (1964–1989). However, for many systems, it is not yet possible to trace exactly which versions were deployed per country-year. Thus, these differences are largely ignored in this version of the dataset, adding minor imprecision to the range variable.

The United States deployed nuclear ammunition to other states for many different delivery vehicles since 1954. Beneath is information about the ranges covered by each delivery vehicle.

Ranges delivery vehicles:

- **ADM:** 1 km
- **Bomb/Depth bomb:** NA²⁵⁸
- **Davy Crockett (M-28/M-29):** 2.01 km/4.0 km
- **AIR-2 Genie:** 9.7 km
- **AIM-26 Falcon:** 9.7 km
- **RUR-5 ASROC:** 9.7 km
- **M115 8-inch Howitzer:** 16 km
- **M110 8-inch Howitzer:** 16-23 km
- **MGM-18 Lacrosse:** 19 km
- **AGM-12 Bullpup:** 19 km
- **155mm artillery (M109 Howitzer/ M114 155 mm Howitzer/ M198 Howitzer):** 21 km/14.6 km/22.4km
- **M65 atomic cannon (280mm):** 30 km
- **AGM-62 Walleye:** 45 km
- **RIM-2 Terrier:** 32 km
- **Honest John:** 5-38 km
- **MGM-5 Corporal:** 48-130 km
- **MGM-52 Lance:** 130 km
- **MGM-29 Sergeant:** 139 km
- **Nike Hercules:** 140 km
- **RIM-8 Talos:** 92 km
- **PGM-11 Redstone:** 92.5-323.5 km
- **BOMARC:** 600 km
- **MGM-31A Pershing (Pershing 1a):** 740 km

²⁵⁸Depending on assigned aircraft. Information not included in this version of the dataset.

- **MGM-1 Matador:** 400 km (TM-61A); 1000 km (TM-61C)
- **MGM-31B Pershing 2:** 1770 km
- **MGM-13 Mace:** 2300 km
- **PGM-19 Jupiter:** 2400 km
- **PGM-17 Thor:** 2400 km
- **BGM-109G GLCM:** 2500 km

Weapon System Type:

Types:

- 1: Surface-to-surface
- 2: Surface-to-air
- 3: Air-to-ground
- 4: Air-to-air
- 5: Anti-submarine
- 6: Mine

- **ADM:** Mine
- **Bomb/Depth bomb:** Air-to-ground bomb
- **Davy Crockett (M-28/M-29):** Surface-to-surface gun artillery
- **AIR-2 Genie:** Air-to-air rocket
- **AIM-26 Falcon:** Air-to-air missile
- **RUR-5 ASROC:** Anti-submarine rocket (naval)
- **M115 8-inch Howitzer:** Surface-to-surface gun artillery
- **MGM-18 Lacrosse:** Surface-to-surface ballistic missile
- **AGM-12 Bullpup:** Air-to-ground missile
- **155mm artillery (M109 Howitzer/ M114 155 mm Howitzer/ M198 Howitzer):**
Surface-to-surface gun artillery
- **M110 8-inch Howitzer:** Surface-to-surface gun artillery
- **M65 atomic cannon (280mm):** Surface-to-surface gun artillery
- **AGM-62 Walleye:** Air-to-ground bomb

- **RIM-2 Terrier:** Surface-to-air missile (naval)
- **Honest John:** Surface-to-surface rocket artillery
- **MGM-5 Corporal:** Surface-to-surface ballistic missile
- **MGM-52 Lance:** Surface-to-surface ballistic missile
- **MGM-29 Sergeant:** Surface-to-surface ballistic missile
- **Nike Hercules:** Surface-to-air missile
- **RIM-8 Talos (RIM-8J/RIM-8A):** Surface-to-air missile (naval)
- **PGM-11 Redstone:** Surface-to-surface ballistic missile
- **BOMARC:** Surface-to-air missile
- **MGM-31A Pershing (Pershing 1a):** Surface-to-surface ballistic missile
- **MGM-1 Matador:** Surface-to-surface cruise missile
- **MGM-31B Pershing 2:** Surface-to-surface ballistic missile
- **MGM-13 Mace:** Surface-to-surface cruise missile
- **PGM-19 Jupiter:** Surface-to-surface ballistic missile
- **PGM-17 Thor:** Surface-to-surface ballistic missile
- **BGM-109G GLCM:** Surface-to-surface cruise missile

Country cases:²⁵⁹

Belgium 1963 - 2020²⁶⁰

Nuclear bombs were deployed in Belgium under the code name “pine cone” in 1963. Since then, they have been assigned to Belgium forces at Kleine Brogel. From 1984 to 1988, Belgium also hosted BGM-109G GLCM as part of NATO’s dual track decision.

Veto:

1963 - 1984: 6

1985 - 1989: 3

1990 - 2020: 6

Use:

1963 -2020: 1

Deployment: NA

Termination: 0

Weapon systems:

1963 - 2020: Bomb

1984 - 1988: BGM-109G GLCM

Canada 1964 - 1984²⁶¹

The U.S. deployed different air defense systems to Canada which were both assigned to U.S. and Canadian forces. According to Clearwater (1988), it was not possible to fit PALs to the Genie air defense rocket, which was deployed from 1964 to 1984.

The U.S. granted Canada far reaching rights regarding the use of nuclear weapons. While there remained some discord in terms of the usage of nuclear weapons by the joint North American Aerospace Defense Command over U.S. territory, the two countries found consensus regarding the use from Canadian territory and in the Canadian airspace. A first vague agreement was signed in 1964, outlining that “the release of nuclear warheads to meet operational requirements will be the subject, where practical, of prior intergovernmental consultation”. A year later this agreement was replaced by a more detailed document which inscribed Canada’s right to be consulted. The

²⁵⁹Next to the sources listed, all cases also rely on the appendix of Norris, Arkin, and Burr, 1999.

²⁶⁰Kimball, 2019; Kristensen, 2005; Harahan, 1993.

²⁶¹Canadian Mennonite University, 2004; Burr, 2020b; Burr, 2005; Clearwater, 1998.

latter agreement also included clear guidelines for emergency situations in which the Commander-in-Chief of the North American Aerospace Defense Command would be allowed to use nuclear weapons without prior political consultations. This applied to all NORAD forces, not only those of Canada. Lastly, nuclear weapons were only deployed with U.S. forces between 1965-1966 and 1968-1970. In all other years, Canadian forces only were assigned to operate the delivery vehicles.

Veto:

1964: 3

1965-1966: 5

1967: 7

1968-1970: 5

1971-1984: 7

Use:

1964-1984: 2

Deployment: 1

Termination: 2

Weapon systems:

1964 - 1972: BOMARC

1965 - 1984: AIR-2 Genie

1965 - 1966: AIM-26 Falcon

1968 - 1970: Depth bomb

Denmark 1958-1965²⁶²

The deployments in Denmark occurred between 1958 and 1965 when the U.S. first briefly stationed four airborne nuclear weapons to the island in 1958, and afterwards deployed 48 Nike Hercules nuclear air defense systems to Thule Air Base in Greenland. The Danish government knew about the deployments, but only to a limited extent. Denmark had allowed the United States to deploy nuclear weapons at the base without being informed of the details of the deployments - and without asking to be consulted on these details. Consequently, the Danish government also was not able to influence decisions of use.

Veto:

1958-1965: 2

²⁶²Kristensen, n.d.; Vestergaard, 2014.

Use:

1958-1965: 1

Deployment: 1

Termination: 1

Weapon systems:

1958: Bomb

1959-1965: Nike Hercules

Germany 1955 - 2020²⁶³

Germany was host to the most diverse arsenal of unique nuclear delivery vehicles: From nuclear bombs, to missiles, artillery to a nuclear recoilless gun, the Davy Crockett, and many more. The first nuclear weapon deployments took place in March to May 1955. However, in the beginning, these weapons were exclusively stationed with U.S. military personnel. By 1958, the Bundestag had voted to approve the acquisition of nuclear delivery vehicles for the Bundeswehr, and German soldiers had been trained to use them. While PALs were introduced in Germany just as in all other host states after 1961, these did not fit the Davy Crockett nuclear recoilless gun. Because the Permissive Action Link locks were too heavy for the relatively small weapon, Germany effectively could have still used nuclear weapons unilaterally until their withdrawal in 1967.

However, concerning Germany's veto decision, two important events should be noted. First, Germany signed a secret agreement with the U.S. in 1968 in which the U.S. agreed to consult with Germany in certain scenarios of nuclear weapon use on or from German territory. The agreement was not as far reaching as the one between the U.S. and the UK, but it did provide Germany with some rights to be consulted.

Since 2005 all U.S. nuclear weapons in Germany are earmarked for German delivery vehicles (Tornado) only.

Veto:

1955-1957: 2

1958-1968: 3

1969-2005: 5

2006-2020: 7

²⁶³Federation of American Scientists, [n.d.](#); IISS, [1984](#); Fisher, [1990](#); Militärhistorisches Museum der Bundeswehr, [n.d.](#); Blume, [2009](#); Thorson, [1991](#); De Boer, [1985](#); Bird, [2008](#); Norris, Arkin, and Fieldhouse, [1990](#); Mackby and Slocombe, [2004](#); Norris and Arkin, [1992](#); Kristensen, [2007](#); Trachtenberg, [1999](#); Burr, [2005](#); Lutsch, [2020](#); Burr, [2020a](#).

Use:

1955-1957: 1

1958-1967: 2

1968-2020: 1

Deployment: 1

Termination: 0

Weapon systems:

1955 - 2020: Bomb

1955 - 1962: MGM-1 Matador

1955 - 1960: M65 atomic cannon (280 mm)

1955 - 1980: Honest John

1955 - 1967: MGM-5 Corporal

1956 - 1992: M115 8-inch Howitzer

1957 - 1986: ADM

1958 - 1964: PGM-11 Redstone

1959 - 1989: Nike Hercules

1959 - 1969: MGM-13 Mace

1960 - 1963: MGM-18 Lacrosse

1961 - 1970: AIM-26 Falcon

1961 - 1967: Davy Crockett

1962 - 1963: AGM-12 Bullpup

1963 - 1975: MGM-29 Sergeant

1964 - 1990: MGM-31A Pershing

1965 - 1992: 155mm artillery

1972 - NA: AGM-62 Walleye²⁶⁴

1974 - 1992: MGM-52 Lance

1983 - 1991: The MGM-31B Pershing 2

1983 - 1991: BGM-109G GLCM

Greece 1960 - 2001²⁶⁵

There exists only limited information about the U.S. nuclear weapon deployments in Greece.

However, it is known that the U.S. deployed nuclear warheads for Nike Hercules and Honest

²⁶⁴Not included in the dataset, because there is no publicly available information about the date of withdrawal.

²⁶⁵Kristensen, 2005.

John missiles, 8-inch Howitzer artillery, and nuclear bombs to the country. Moreover, it appears that the U.S. only had a supporting role in these nuclear deployments, meaning they took care of training and custody, but all delivery vehicles were operated by the Greek army.

Veto:

1960-2001: 6

Use:

1960 - 1962: 2

1963 - 2001: 1

Deployment: NA

Termination: 2

Weapon systems:

1960 - 2001: Bomb

1961 - 1988: Honest John

1963 - 1988: Nike Hercules

1962 - 1985: M115 8-inch Howitzer

Italy 1956 - 2020²⁶⁶

Italy became a nuclear host in 1956 and has hosted 11 unique nuclear systems since then. The first nuclear delivery vehicles assigned to Italian forces were two Honest John battalions for the third missile brigade of the Italian army in 1959. The Honest John were followed by Jupiter intermediate range ballistic missiles in 1960, assigned to Italian soldiers. Moreover, the Jupiter missiles, as the Thor missiles in the UK, were especially weakly guarded and could have been used by the Italian forces. Consequently, Kennedy wanted these weapons, which were able to reach Soviet territory, gone. In a secret deal tied to the withdrawal of Soviet nuclear forces from Cuba, the U.S. eventually agreed to withdraw Jupiter missiles from Turkey and Italy in 1963. There remains some uncertainty about the withdrawal of nuclear ammunition for the Nike Hercules. They were still present in 1985 and gone by 1990. In addition, it is known that the Montbell decision foresaw the removal of all Nike Hercules warheads from Europe by 1990, leading to their removal in Germany in 1988. I coded the same year for the withdrawal in Italy.

From 1983 to 1991, Italy also hosted BGM-109G GLCM as part of NATO's dual track decision.

Today nuclear bombs remain at one U.S. operated and one Italian run airbase in the country.

²⁶⁶Burr, 2006; IISS, 1984; Norris, Arkin, and Fieldhouse, 1990; Meleca, 2015; Kristensen, 2014; Nuti, 2007; Nuti, 2011; Foradori, 2014; Burr, 2020b; Bird, 2008.

Italy pressed the U.S. to apply the dual-key arrangements to all nuclear weapon systems in Italy, also meaning those solely operated by U.S. military. In 1962 both governments agreed that a use decision of any nuclear weapons deployed in Italy would require the approval of the United States and Italy. Moreover, the United States committed to informing Italy about the number and locations of nuclear weapons in the country, which had not previously been the case.

Veto:

1956 - 1958: 2

1959: 3

1960 - 2020: 5

Use:

1956 - 1958: 1

1959 - 1962: 2

1963 - 2020: 1

Deployment: 1

Termination: 0

Weapon systems:

Bomb: 1957 - 2020

MGM-5 Corporal: 1956 - 1964

Honest John: 1956 - 1976

ADM: 1956 - 1986

PGM-19 Jupiter: 1960 - 1963

Nike Hercules: 1960 - 1988²⁶⁷

M115 8-inch Howitzer: 1964 - 1992

MGM-29 Sergeant: 1964 - 1976

MGM-52 Lance: 1976 - 1992

Depth bomb: 1972 - 1992

BGM-109G GLCM: 1983 - 1991

Morocco 1954 - 1963²⁶⁸

Morocco was among the first two states to receive nuclear weapons. Beginning in 1954, the U.S. deployed nuclear bombs to air bases in the country. However, at the time, Morocco was still a

²⁶⁷Some uncertainty remains about the exact withdrawal date; see text.

²⁶⁸Burr, 2006; Conway, 2019.

French protectorate. Indeed, Moroccan officials were not informed of the deployment of nuclear weapons until the country became independent in 1956. However, some sources also indicate that the French were not asked about their consent. After its independence, Morocco refused to accept the old agreement between France and the United States, which eventually contributed to the withdrawal of U.S. nuclear weapons in 1963 after a lengthy period of negotiations.

Veto:

1954 - 1955: 1

1956 - 1963: 2

Use:

1954 - 1963: 1

Deployment: 1

Termination: 2

Weapon systems:

1954 - 1963: Bomb

1957 - 1961: Depth Bomb

The Netherlands (1960 - 2020)²⁶⁹

The first nuclear weapons came as nuclear bombs in 1960, assigned to Dutch aircraft. This was followed by Honest John surface-to-surface rockets and 8-inch Howitzer artillery in 1961 and 1962 respectively. By 1979 Honest Johns had been replaced with MGM-52 Lance artillery. All these systems were also assigned to Dutch forces. According to the public available information, the Dutch never signed special consultation agreements with the United States. Indeed, they were not informed about a secret consultation agreement between the British and the Americans which applied to depth charges which were earmarked for Dutch use but stored in the United Kingdom. The Netherlands was also a planned hosting ground for the BGM-109G GLCM as part of NATO's dual track decision, but because of the INF Treaty, the missiles never arrived.

Veto:

1960 - 2020: 6

Use:

1960 - 1962: 2

²⁶⁹Wiebes and Burr, 2021; Burr, 2005.

1963 - 2020: 1

Deployment: 1

Termination: 0

Weapon systems:

1960 - 2020: Bomb

1961 - 1978: Honest John

1962 - 1992: 8-inch Howitzer (M-110)²⁷⁰

1979 - 1992: Lance

Philippines 1957 - 1977²⁷¹

There are few sources about the U.S. nuclear weapon deployments in the Philippines. However, what is known is that these deployments were secretive, and that likely only President Marcos knew about them. There is no indication that previous governments had been informed. For some analyses, it might make sense to code the deployments as entirely secret. This could be the case for questions regarding deterrence, given the fact that potential adversaries likely also did not know about the deployments.

Veto:

1957 - 1965: 1

1965 - 1977: 2

Use:

1957 - 1977: 1

Deployment: 1

Termination: NA

Weapon systems:

1957 - 1977: Bomb

1957 - 1974: Depth bomb

1961: Mk 105 Hotpoint (Depth bomb)

1962 - 1971: AIM-26 Falcon

1965 - 1967: RIM-2 Terrier

²⁷⁰Some uncertainty remains about the exact withdrawal date. Most likely withdrawn as part of the Presidential Nuclear Initiatives.

²⁷¹Burr, 2006; Schirmer, 1983.

1965 - 1974: RUR-5 ASROC

1965 - 1974: RIM-8 Talos

South Korea 1958 - 1991²⁷²

Nuclear weapon deployments in South Korea began in 1958 with the introduction of Honest John surface-to-surface missile, Atomic-Demolition Munition, 280-millimeter guns and the 8-inch (203-millimeter) howitzer. The numerical peak of the deployment was reached in 1967 when 950 nuclear warheads were stationed in South Korea. For some systems, there remains uncertainty about the exact withdrawal dates. This is the case for the Honest John, Nike Hercules and Sergeant missile. However, Norris and Kristensen note that Washington initiated the withdrawal of these systems in 1977. Thus, I dated the withdrawal to 1978, although e.g. 1977 or 1979 would also be possible. The degree to which South Koreans were involved in nuclear weapon use remains somewhat unclear. It is known that potentially dual-capable delivery systems were transferred to the South Korean army, such as nuclear capable artillery, the Honest John and Nike Hercules. Moreover, at least for artillery systems, South Korea was sought to provide nuclear capable delivery systems to U.S. personnel who had custody over nuclear warheads. Furthermore, South Korean artillery units had trained with U.S. dummy nuclear warheads from at least 1974 onward. In addition, a formal integration of South Korean and U.S. forces took place in 1978 after the establishment of the U.S.-South Korean Military Committee. The Combined Forces Command also allowed South Korea to participate in nuclear related intelligence and campaign planning, and that its military leadership was regularly consulted and briefed by U.S. counterparts on war plans including nuclear issues. To the frustration of the South Koreans, these privileges did not amount to the same status as granted to some U.S. NATO allies. Taken together, there is some evidence that the South Korean military was involved to a much larger degree in the use and control of nuclear delivery vehicles than other U.S. allies in Asia. However, there is no hard evidence that South Korea was assigned to use nuclear weapons if push came to shove.

Veto:

1958 - 1991: 2

Use:

1958 - 1991: 1

Deployment: NA

Termination: 1

²⁷²Cochran et al., 1984; Kristensen and Norris, 2017; Hayes, 1993; Hayes, 1991; Bird, 2008.

Weapon systems:

1958 - 1979: Honest John

1958 - 1962: M65 atomic cannon (280mm)

1958 - 1991: M115 8-inch Howitzer

1958 - 1986: ADM

1958 - 1991: Bomb

1960 - 1963: MGM-18 Lacrosse

1961 - 1978: Nike Hercules²⁷³

1962 - 1968: Davy Crockett

1963 - 1978: MGM-29 Sergeant²⁷⁴

1964 - 1991: 155mm artillery

Spain 1958-1976²⁷⁵

The U.S. only deployed nuclear weapons in Spain during the reign of Francisco Franco. During that time, the U.S. was granted unrestricted access to military bases on Spanish territory, and it was allowed to deploy nuclear weapons there. This was done in an exchange against military and economic help. However, the most important aspect of this arrangement for Spain was the end of international isolation marked by the cooperation with the US, even though there was no security guarantee tied to the deployments. There is no indication that Spain had any say in the use of the nuclear weapons deployed on its territory. On the contrary, the Franco government tried to make the U.S. remove nuclear weapons from close to Madrid, but the U.S. refused to do so. The deployment was ended just after the death of Franco, when the country turned democratic and saw itself decide between NATO and military neutralism. To boost the domestic acceptance of an eventual accession to NATO, the Spanish government renegotiated the deployment agreement with the U.S. to have the U.S. nuclear weapons removed from its territory in 1976.

Veto:

1958 - 1976: 2

Use:

1958 - 1976: 1

Deployment: 1

Termination: 2

²⁷³Some uncertainty remains about the exact withdrawal date.

²⁷⁴Some uncertainty remains about the exact withdrawal date.

²⁷⁵Portela, 2014.

Weapon systems:

1958 - 1965: Bomb

1959 - 1976: Depth Bomb

1962 - 1964: AIM-26 Falcon

1965: RUR-5 ASROC

1966: RIM-8 Talos

Taiwan 1958 - 1974²⁷⁶

The U.S. first deployed the Matador cruise missile and then nuclear bombs in Taiwan. An early version of the MGM-1 Matador (TM-61A) had a range of 400 km. However, according to my research the TM-61C was deployed in Taiwan with a range of 1000 km. The weapons were assigned to U.S. military at Tainan Air Base. In fact, according to William Burr, only President Kai-Shek and his son, Chiang Ching-kuo, knew about the nuclear deployments on the side of the Taiwanese. Consequently, just as in the case of the Philippines, it might be appropriate to code the deployment as a secret deployment for some analyses. This could be the case for questions regarding deterrence, given the fact that potential adversaries likely also did not know about the deployments.

Veto:

1958 - 1974: 2

Use:

1958 - 1974: 1

Deployment: 1

Termination: 1

Weapon systems:

1960 - 1974: Bomb

1958 - 1962: MGM-1 Matador

Turkey 1959 - 2020²⁷⁷

Nuclear weapon deployments first occurred in Turkey in 1959. These were Honest John missiles and nuclear bombs. Shortly after, the United States introduced Jupiter missiles to Turkey for a short period between 1961 and 1963. In addition, Turkey hosted the 8-inch nuclear Howitzer from 1962 onward. Although, Nike Hercules systems were deployed in Turkey, there is no indication

²⁷⁶Burr, 2006.

²⁷⁷Kristensen, 2019; Burr, 2019; Kristensen and Norris, 2012; Arkin and Fieldhouse, 1985.

that nuclear warheads accompanied the deployment. Today only the nuclear bombs at Incirlik air base remain. Just as in Italy, U.S. control over Jupiter missiles was especially weak. Today, only a few nuclear warheads remain at Incirlik air base. However, neither Turkish nor U.S. nuclear capable aircraft remain at the base due to a change in the basing agreement in the 1990s. To deliver these weapons, the U.S. would need to fly aircraft into Incirlik to retrieve the weapons and employ them during a crisis. Until 1996, nuclear bombs were also stored at two Turkish operated bases with dual-capable Turkish aircraft available for the delivery of these weapons. Moreover, until 2005 some nuclear bombs at Incirlik were earmarked for Turkish use.

Veto:

1959 - 2005: 3

2006 - 2020: 2

Use:

1959 - 1962: 2

1963 - 2020: 1

Deployment: NA

Termination: 0

Weapon systems:

1959 - 2020: Bomb

1959 - 1992: Honest John²⁷⁸

1961 - 1963: PGM-19 Jupiter

1965 - 1992: M115 8-inch Howitzer²⁷⁹

United Kingdom 1954 - 2008²⁸⁰

The United States started deploying nuclear weapons to the United Kingdom in 1954. The first weapons were for the use of U.S. forces only – and parts of the nuclear arsenal in the United Kingdom remained earmarked for U.S. forces at RAF Lakenheath throughout all deployment years. Starting in 1958, U.S. nuclear ammunition was also assigned to British units. Many of the U.S. nuclear warheads to be used by British forces were with the RAF and the British Army of the Rhine units in Germany. Before the introduction of PALs, U.S. control was especially weak in the case of aircraft on quick reaction alert from 1960 onward, and for the Thor missiles, where U.S. officials

²⁷⁸Some uncertainty remains about the exact withdrawal date.

²⁷⁹Some uncertainty remains about the exact withdrawal date.

²⁸⁰Kristensen, 2005; Boutwell, Doty, and Treverton, 1985; De Boer, 1985; Burr, 2020b; Burr, 2005; Norris and Kristensen, 2013.

in 1959 was amazed to find a British officer in possession of both keys for the missile. From 1983 to 1991, the UK also hosted BGM-109G GLCM as part of NATO's dual track decision. In 1952 a communiqué, prepared for talks between U.S. President Truman and UK Prime Minister Churchill, confirmed that the U.S. would consult with the UK in the case of using the bases where nuclear weapons would be stationed in the future. However, only in 1958 did the two nations sign a formal agreement, the Murphy-Dean Agreement. The agreement spelled out the exact procedure under which consultations between the two governments would occur if the circumstances permitted it. These applied both to strategic, meaning longer-term, and tactical, meaning imminent, warnings of an incoming attack. A following specification of the agreement clarified that UK forces assigned to SACEUR would have the same provision applied to them, as well as all UK forces operating with U.S. warheads. However, UK nuclear forces equipped with national nuclear warheads would fall outside of the scope of the agreement. Subsequent UK Prime Ministers periodically pressed the United States to reaffirm the statement, which decision-makers in Washington would always do.

Veto:

1954 - 1957: 2

1958 - 1992: 5

1992 - 2008: 4

Use:

1954 - 1957: 1

1958 - 1962: 2

1963 - 2008: 1

Deployment: NA

Termination: NA

Weapon systems:

1954 - 2008: Bomb

1958 - 1963: PGM-17 Thor

1955 - 1992: Depth Bomb

1983 - 1991: BGM-109G GLCM

4 The Consequences Of U.S. Nuclear Weapon Deployments²⁸¹

4.1 Introduction

Having examined the causes of U.S. foreign deployed nuclear weapons, my dissertation now turns to their consequences. Together with my co-author, we specifically ask: How do foreign military deployments impact defense policies of host states? While deployments of both U.S. troops and nuclear weapons on the soil of NATO allies have been a reality for decades, renewed debate about defense contributions has recently placed this question in the spotlight again. The announcement by former U.S. President Trump in 2020 to withdraw significant numbers of military personnel from Germany was widely regarded as a reaction to his beliefs about alleged free-riding within the alliance. Although this decision was revoked by the Biden administration, insinuations persist that allies take for granted that their security is guaranteed by the United States. Threatening to withdraw military deployments, or even demanding financial compensation for troop deployments, has been a prominent tool to put pressure on allies since the beginning of the Cold War.²⁸² This debate has gained renewed importance after the Russian attack on Ukraine which triggered an increase in U.S. military deployments to Europe.²⁸³ Critics, such as Barry Posen, were quick to warn that an increased presence of U.S. military forces in Europe would undermine recent pledges by European nations to step up their own defense, and instead foster a familiar pattern of free-riding by allowing Europeans to hide behind U.S. protection.²⁸⁴

Do foreign military deployments induce a sense of security that leads host countries to discount their own defense? Despite the prominence of the claim, extant research has surprisingly not addressed whether foreign military deployments actually give rise to a sense of protection among regular citizens. The bulk of existing scholarship that could speak to this question has focused on macro-economic indicators, especially defense spending.²⁸⁵ These studies hardly address the underlying micro-foundations and causal mechanisms – despite the fact that virtually all NATO member states are democracies. Importantly, in these countries, political decisions are influenced by public sentiment.²⁸⁶ Thus, in this chapter, we ask whether and how foreign military deployments impact citizens' threat perceptions and their subjective need for national defense. We examine the relationship between military deployments – both conventional and nuclear – and citizens' subjective need for national defense by employing an observational data analysis and a survey

²⁸¹This chapter is based on a paper which I co-authored with Julian Wucherpfennig.

²⁸²Gavin, 2012, pp. 41–43; Gavin, 2004, 63–67; Blankenship, 2021, pp. 719–720; Shiffrinson and Schuessler, 2019.

²⁸³Powell, 2022; McLeary, 2022.

²⁸⁴Posen, 2022.

²⁸⁵Olson and Zeckhauser, 1966; Sandler and Hartley, 1999; Oneal and Elrod, 1989.

²⁸⁶Reiter and Stam, 2002.

experiment (conducted in Germany and the Czech Republic). In line with earlier studies, we find that these deployments reduce citizens' willingness to contribute to national defense efforts. Second, we attempt to shed light on the underlying causal mechanisms. Our results indicate a complex relationship between military deployments, threat perception, and citizens' subjective need for national defense. Above all, we find no evidence that these deployments reduce host state citizens' threat perceptions.

Given its persistence and the high stakes involved, it is unsurprising that the political debate on alliances and defense contributions has been thoroughly examined by scholars for many years. Earlier studies have found mixed results: Assessing allied defense contributions vis-à-vis the United States critically depends on the timeframe, universe of cases and unit of measurement.²⁸⁷ While the vast majority of studies has looked at macro indicators – i.e., defense spending or the provision of personnel to military missions – authors have recently started to include non-tangible variables such as citizen's sentiment towards fighting for their own country, focusing on the micro-foundations of defense policies.²⁸⁸ Yet, the question remains: Are conventional and nuclear deployments actually a net cost for Washington? Do they incentivize free-riding by allies? In this chapter, we broaden the scope of existing research in two important respects. First, we expand the novel literature on non-tangible factors, taking into account the effects of U.S. conventional *and* nuclear deployments on citizens' subjective need for national defense. Second, we add nuance to this relationship by examining alternative pathways beyond free-riding. For example, if citizens in host countries perceive the U.S. agenda as less altruistic and more self-serving, foreign military deployments may actually be perceived as additional risks that put host countries in danger, rather than protecting them. If the adversary is simultaneously not seen as threatening, host citizens may wish to de-escalate by lowering national defense efforts (disengagement). Conversely, distrusting the guardian *and* the adversary can lead to higher defense spending in an attempt to regain sovereignty (self-insurance).²⁸⁹

There is good reason to suspect that citizens do not necessarily feel protected by U.S. military deployments. For example, several opinion polls suggest that host state citizens view nuclear weapon deployments²⁹⁰ with considerable skepticism.²⁹¹ Even if citizens are directly in contact with U.S. personnel, their opinions on military deployments vary.²⁹² Our survey experiment confirms

²⁸⁷See for example: Sandler and Shimizu, 2014, p. 46; Lepgold, 1998; Sandler and Shimizu, 2014; Kim and Sandler, 2020; Dorussen, Kirchner, and Sperling, 2009; Sperling and Webber, 2009; Becker and Malesky, 2017; Cooper and Stiles, 2021; Zyla, 2016; Bogers and Beeres, 2013.

²⁸⁸Jakobsen, 2018; Jakobsen and Jakobsen, 2019.

²⁸⁹A similar logic is outlined by Sukin, 2020.

²⁹⁰Today, there remain five states which host U.S. nuclear weapons, all NATO members. These are: Belgium, Germany, Italy, the Netherlands, and Turkey.

²⁹¹Bunde et al., 2020, p. 127; Körber Stiftung, 2019, p. 36; Egeland and Pelopidas, 2020; ICAN, 2021; ICAN, 2019; ICAN, 2018.

²⁹²Allen et al., 2023.

earlier findings: About 70 percent of respondents in both Germany and the Czech Republic suspect the United States to pursue partially selfish goals by deploying its military abroad, and over 30 percent believed the deployments to be entirely self-serving. In addition, about half of the respondents did not trust the United States in more general terms.²⁹³ A critical public has also driven political action in the past: German governments sought to push for an end of U.S. nuclear deployments in several instances since the end of the Cold War.²⁹⁴ Other host states had also joined these efforts.²⁹⁵ Given the longstanding negative views on nuclear deployments in Germany and other host states, and their practical implications, it is all the more relevant to ask *how* such deployments impact defense efforts.

We attempt to shed new light on this debate by examining host state citizens' subjective need for national defense. The chapter is structured as follows. We first review relevant literature to lay out theoretical mechanisms that could plausibly connect foreign military deployments and subjective needs for national defense. We then set out to test them empirically. Here, our approach is two-fold. First, we present a large-N analysis drawing on cross-national survey data from NATO member states. Unlike earlier studies, we account for the nested structure of the data and include nuclear deployments in the analysis. Our results suggest that U.S. military deployments, not only conventional but also nuclear, negatively impact individual-level supply and demand for defense. We then complement this analysis with a survey experiment that sheds light on the underlying causal mechanisms. We find additional evidence that military deployments are negatively related to defense contributions. In addition, the survey experiment reveals that citizens' threat perception can actually *increase* with the presence of U.S. military in their country. However, a final causal mediation analysis does not result in conclusive evidence that heightened threat perceptions cause lower subjective needs for national defense.

4.2 Three Models Of Foreign Military Deployments

Extant literature identifies three different models to explain foreign military deployments to allied states: (1) protecting allies through *extended deterrence*, (2) *power projection* through direct deterrence of the guardian itself, using advantages in geography by deploying military abroad to extend the sphere of influence, and (3) *non-proliferation* through assurances whereby the guardian reduces incentives for the protégé to acquire its own nuclear weapons.²⁹⁶ As I explained in *Chapter*

²⁹³Contrary to these finding, a poll in 2022 found a slight majority of Germans favoring the continuation of U.S. nuclear deployments; see: Bongen, Rausch, and Schreijäg, 2022. However, the poll remains a single outlier.

²⁹⁴Borger, 2009.

²⁹⁵However, after the German announcement to purchase nuclear capable F-35s, all countries currently hosting nuclear weapons have decided to modernize their delivery vehicles and continue the deployments; see: Reuters, 2022a.

²⁹⁶Fuhrmann and Sechser, 2014a, p. 456.

3 existing scholarship has commonly conflated non-proliferation and assurance. Indeed, in my conceptualization, I have outlined how non-proliferation can be one of many goals of assurance. Because military deployments are not solely driven by non-proliferation concerns²⁹⁷, I will deviate from the literature and refer to the last strategy as assurance, instead of non-proliferation.

Extended deterrence. Military deployments are commonly viewed as tools of extended deterrence, which is principally regarded to suffer from a credibility problem that arises because fighting a costly war on behalf of the protégé may not be in the guardian’s immediate interest. In *Chapter 3* I have outlined in detail how foreign military deployments cause hand-tying, reducible, sunk, and installment costs, which lend credibility to the underlying security guarantees.²⁹⁸ Importantly, extended deterrence may induce free-riding. The discussion about the extent to which allies take advantage of each other dates back to the Cold War. In their seminal work, Olson and Zeckhauser argue that NATO’s common defense is a pure public good which in turn incentivizes free-riding, especially from smaller states whose under-spending will not substantially affect common defense.²⁹⁹ The notion of a perfect public good was quickly challenged on three principal grounds: First, states could reap private benefits from their own defense investments which are not shared with allies³⁰⁰; second, deterrence might be a public good, but defense, if deterrence fails, is not³⁰¹; third, security assurances can be withheld from non-paying members³⁰².

Some studies have claimed that throughout the Cold War, free-riding stopped after the introduction of flexible response, which placed a premium on conventional defense by U.S. allies and de-emphasized the role of nuclear deterrence provided by the United States.³⁰³ However, it has also been claimed that these results vanish once outliers are excluded from the analysis.³⁰⁴ Focusing on the post-Cold War period, many authors have claimed that free-riding has become a problem once again.³⁰⁵ Besides temporal factors, geography can also condition defense contributions. Indeed, it has been found that as the distance between Moscow and an ally’s capital increases, defense spending decreases, highlighting the role of threat perceptions.³⁰⁶

Military expenditure is not the only measure of free-riding in the literature. Indeed, a “growing number of scholars have challenged this approach, including a few who were once its proponents.”³⁰⁷

²⁹⁷See the empirical analysis in *Chapter 3*.

²⁹⁸Fearon, 1997; Quek, 2021.

²⁹⁹Olson and Zeckhauser, 1966.

³⁰⁰Jacques van Ypersele de Strihou, 1967.

³⁰¹Sandler and Hartley, 1999; Sandler and Forbes, 1980; Ringsmose, 2016.

³⁰²Ivanov, 2011.

³⁰³Sandler and Forbes, 1980; Sandler and Shimizu, 2014, p. 46.

³⁰⁴Oneal, 1990; Oneal and Elrod, 1989.

³⁰⁵Lepgold, 1998; Kim and Sandler, 2020; Sandler and Shimizu, 2014; Jakobsen, 2018.

³⁰⁶Lanoszka, 2015; Béraud-Sudreau and Giegerich, 2018; Plümper and Neumayer, 2014.

³⁰⁷Cooper and Stiles, 2021, p. 2.

Following their lead, in our own analyses we also examine non-material indicators. Brands and Feaver criticise allegations of financial free-riding by allies on the grounds that the United States, in contrast to its allies, pursued global hegemonic goals.³⁰⁸ Similar arguments have been made with regard to the structure of asymmetric alliances, where the protégé gives up autonomy for protection, which would by design lead to a disproportionate sharing of military expenditures.³⁰⁹ Consequently, a narrow focus on defense budgets might unnecessarily limit scholarly insights.³¹⁰ Moving beyond monetary measures of free-riding, a number of studies find that in relative terms some smaller and middle powers in NATO contribute actually more troops and assets to NATO missions than the United States and other larger powers.³¹¹ Thus, whether studies have found evidence for free-riding or not also depends on the measurement used, i.e., monetary or non-monetary.

We are specifically interested in the effect of *military deployments*, which have been found to contribute to a decrease in national defense efforts.³¹² On the macro level, an increase in U.S. troops appears to lower host state troop levels.³¹³ Moreover, the presence of U.S. deployments can also decrease military spending, depending on the regional security context.³¹⁴ However, in another study, the authors find no evidence for free-riding caused by U.S. troops within NATO.³¹⁵ Shifting the focus to non-material indicators of free-riding, Jakobsen shows that survey data on the willingness of European NATO allies to fight for their own country has been remarkably low since the end of the Cold War, especially in countries that host U.S. military bases.³¹⁶ In addition, host state populations are significantly less willing to fight for their own country once a threshold of U.S. troop deployments is reached.³¹⁷ We expand existing research by including not only conventional but also nuclear U.S. deployments that might affect the subjective need for defense. In addition, we attempt to shed light on the micro-foundations underlying this relationship, by taking into account citizens' threat perceptions.

Power Projection. Foreign military deployments can serve not only to protect allies but also to safeguard the deploying state (direct deterrence) and exert pressure on adversaries (compellence). We refer to these aims as power projection, which is entirely self-serving. For example, before

³⁰⁸Brands and Feaver, 2017.

³⁰⁹Lake, 2009, p. 11; Morrow, 2000, p. 928.

³¹⁰Brands and Feaver, 2017.

³¹¹Dorussen, Kirchner, and Sperling, 2009; Sperling and Webber, 2009; Becker and Malesky, 2017; Cooper and Stiles, 2021; Zyla, 2016; Bogers and Beeres, 2013.

³¹²Posen, 2018.

³¹³Machain and Morgan, 2012.

³¹⁴Allen, Flynn, and VanDusky-Allen, 2017.

³¹⁵Allen, VanDusky-Allen, and Flynn, 2016.

³¹⁶Jakobsen, 2018.

³¹⁷Jakobsen and Jakobsen, 2019.

the broad integration of intercontinental ballistic missiles (ICBMs), nuclear weapon states utilized foreign deployments to close the distance to the adversary.³¹⁸ Today, nuclear deployments can be used to increase flexibility and to create options on different levels of the escalation ladder. To the best of our knowledge, there are no studies that specifically look at the effect of foreign military deployments for purposes of direct deterrence (rather than extended deterrence) or compellence, leaving closer examinations of these questions to future research.

What matters for our purposes is that citizens could suspect the guardian to engage in self-serving behavior – i.e., using military deployments to protect itself rather than the host. Howard argues that citizens in NATO states during the Cold War were wary that Washington might impose a war on them “in which the Europeans have no interest and from which they will be the first to suffer.”³¹⁹ More recently, Sukin finds evidence for such sentiments in a survey experiment in South Korea. Her findings suggest that credible nuclear security guarantees by a guardian can scare the protégé’s population.³²⁰ This is because demonstrations of strength can not only deter but also fuel escalation. States with revisionist goals can be deterred by signals of strength. However, used against states motivated by insecurity, it can cause conflict.³²¹ Indeed, critics of military deployments claim that “they are provocative to adversaries.”³²² According to this view, foreign military deployments may not increase, but rather decrease perceptions of security. Consequently, citizens may fear an escalation, potentially fueled by military deployments. This implies that military *withdrawals* might actually decrease the threat perceptions of certain segments of the host state population, while military *deployments* might increase their threat perception.

Assurance. Lastly, we turn to assurance which might have two important drawbacks. First, it may lead to moral hazard. Allies could become emboldened by security guarantees, resulting in overly risky behavior. This effect has been observed in several instances, such as states under a nuclear umbrella or those hosting U.S. troops, who have been found to be more likely to engage in disputes with other nations.³²³ Nonetheless, some scholars argue that such concerns are overblown because most defensive alliances only offer protection in cases of self-defense, thereby reducing the likelihood of risky behavior.³²⁴ Second, assurance, just as extended deterrence, could potentially incentivize free-riding.

In sum, the literature has so far produced mixed results when it comes to free-riding in alliances,

³¹⁸Fuhrmann and Sechser, 2014b, p. 464.

³¹⁹Howard, 1982, p. 316.

³²⁰Sukin, 2020.

³²¹Knopf, 2012, p. 384.

³²²Avey, 2017, pp. 89–90.

³²³Machain and Morgan, 2012; Narang and Mehta, 2019.

³²⁴Fuhrmann, 2018; Sechser, 2017.

and most of these studies have focused on macro effects such as the relative military expenditure of countries. In contrast, much less research has been conducted on non-monetary micro-mechanisms such as citizens' attitudes on national defense. Moreover, existing research does not distinguish between nuclear and conventional deployments. Lastly, little attention has been put on the causal mechanism. We contribute to the existing literature by expanding the novel research agenda on the micro-foundations of citizens' subjective need for defense, by adding nuclear deployments as a main explanatory variable, and by taking into account threat perception and host state citizens' views about the guardian.

4.2.1 Empirical Implications And Hypotheses

Based on the existing literature, we derive theoretical expectations for our empirical analysis. The causal pathways described in the following paragraphs are visualized in Figure 5. We argue that disentangling the relationship between foreign military deployments and citizens' subjective need for national defense necessitates taking a closer look at threat perceptions.

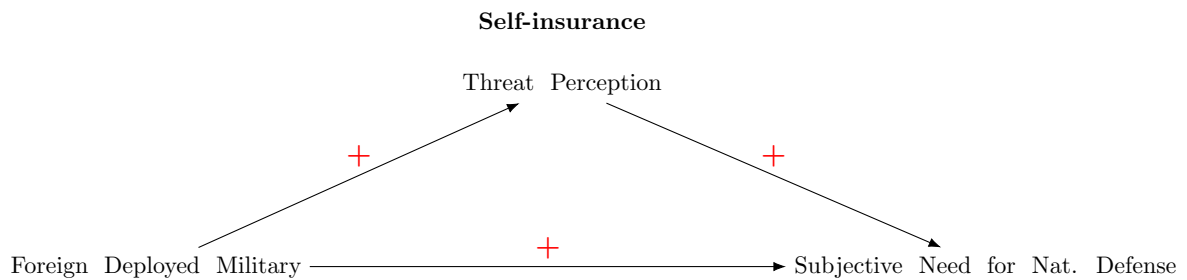
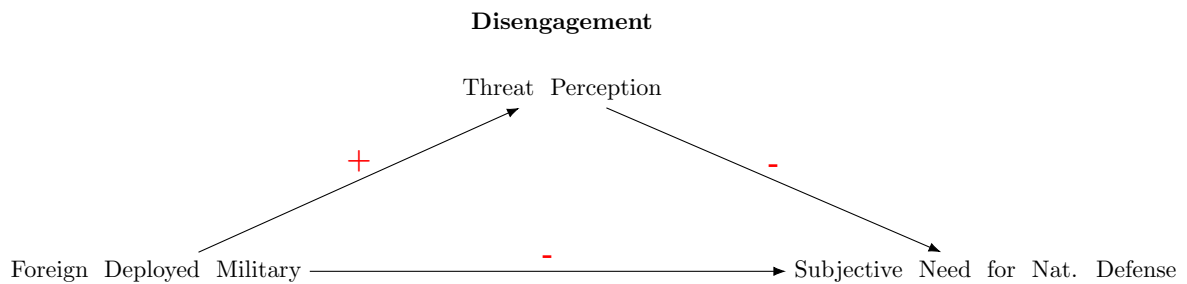
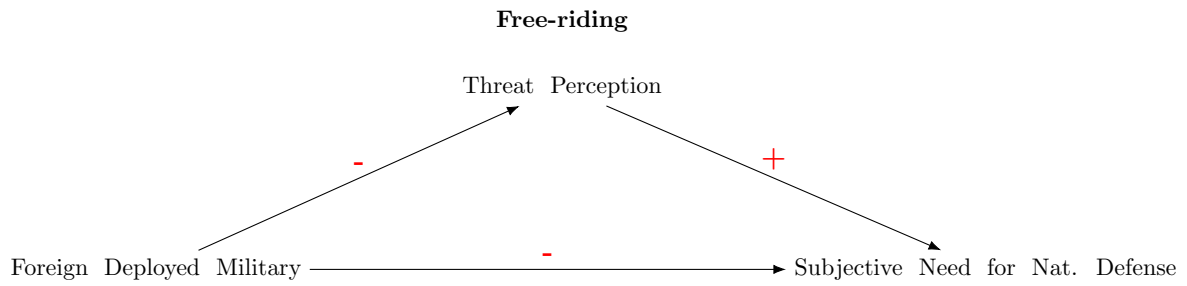


Figure 5: Causal pathways

Free-riding. The deployment of conventional troops and nuclear weapons can mitigate abandonment concerns, which in turn can cause free-riding. It becomes redundant to spend money and thought on one's own military capabilities because deterrence is increasingly detached from the efforts of the host state. In addition, military deployments increase warfighting capabilities should deterrence fail. Particularly nuclear weapons are unmatched by anything the non-nuclear ally can add. The marginal contribution of allies to their own defense is diminishing in the face of military deployments. The fact that deterrence and defense are credibly covered by the guardian leads to a decreased subjective need for national defense and decreased threat perceptions in the host state.

H1a: Conventional troop deployments decrease the subjective need for national defense among host

populations by decreasing threat perceptions.

H1b: Nuclear weapon deployments decrease the subjective need for national defense among host populations by decreasing threat perceptions.

Disengagement. There is another channel that might connect military deployments and threat perceptions. We suspect a substantial share of citizens in NATO states to be highly skeptical of the benefits of military deployments. First, if citizens reject the logic of deterrence, then military deployments will be viewed as contributing to the spiral of violence. As Rathbun et al. point out, *doves* often believe that displays of power, “risk inciting fear on the other side and escalating hostilities in such a way that leaves both sides worse off.”³²⁵ Indeed, even weeks before the Russian attack on Kyiv, Germany refused to deliver weapons to Ukraine in order not to contribute to an unwanted escalation.³²⁶ Moreover, there is evidence that especially left-leaning European citizens reject nuclear weapons, opposing their deployment.³²⁷ Second, and related, citizens might mistrust their guardian’s intentions to align with their own interests. Again, military deployments might be seen to provoke unnecessary conflict. Third, citizens might indeed believe that the deployments strengthen deterrence, but they might be more afraid of the consequences of possible deterrence failure. This fear is likely magnified by the fact that the deployed military is at best partially controlled by the protégé. Thus, the intensity, duration, and outcome of a war, should deterrence fail, are no longer in the hands of the host state. Indeed, many opinion polls and public opinion surveys have found that U.S. allies are skeptic about military deployments, especially nuclear forces.³²⁸ However, such sentiments might be less present since the Russian attack on the entire territory of Ukraine in 2022. In two recent opinion polls, a small majority of Germans supported the continuation of status-quo nuclear policies.³²⁹ Moreover, according to our own survey experiment, at least 22 percent of Germans support the development of a German nuclear bomb.

For citizens who do not believe in deterrence, distrust the United States, or fear deterrence failure, a withdrawal of military deployments should decrease threat perceptions. However, Russia’s 2022 invasion of Ukraine is a tough test for this theory. Members of the public who were previously skeptical about the value of military deployments may now feel more secure due to their presence. What would be the effect of decreasing threat perceptions on the subjective need for national defense? There are different possibilities: An increase in the subjective need for national

³²⁵Rathbun et al., 2016, p. 126.

³²⁶Bunde, 2022, p. 522.

³²⁷Onderco and Smetana, 2021.

³²⁸Bunde et al., 2020, p. 127; Körber Stiftung, 2019, p. 36; Egeland and Pelopidas, 2020; ICAN, 2021; ICAN, 2019; ICAN, 2018; Onderco, Etienne, and Smetana, 2022.

³²⁹Graf, 2022; Bongen, Rausch, and Schreijäg, 2022.

defense, a decrease in the subjective need for national defense, or no effect. All three are plausible. One possibility is that host state citizens believe national armament contributes to provocation. This results in the following hypotheses:

H2a: Conventional troop deployments decrease the subjective need for national defense among host populations by increasing threat perceptions.

H2b: Nuclear weapon deployments decrease the subjective need for national defense among host populations by increasing threat perceptions.

Self-insurance. Sukin argues that credible security guarantees may induce fears by rendering large-scale war a reality.³³⁰ Consequently, people will place *more* emphasis on their own military “to remove responsibility over security crises from the nuclear ally and to regain domestic control over nuclear decision-making.”³³¹ Translated into our terminology, this implies an increase in the subjective need for national defense. We can therefore derive a third set of *self-insurance* hypotheses:

H3a: Conventional troop deployments increase the subjective need for national defense among host populations by increasing threat perceptions.

H3b: Nuclear weapon deployments increase the subjective need for national defense among host populations by increasing threat perceptions.

There are reasonable arguments to expect at least partial non-findings as well. Citizens who do not feel protected by military deployments might primarily be motivated by pacifist ideology. In this case, the subjective need for national defense may be unaffected by heightened threat perceptions because pacifists typically support national disarmament regardless of the level of perceived threat.

4.3 Empirical Analysis

In this section we provide an empirical analysis of the consequences of U.S. foreign military deployments to allied states, focusing squarely on micro-level attitudes on national defense. Before we

³³⁰Sukin, 2020.

³³¹Sukin, 2020, p. 1038.

do so, we address an obvious argument: From a realist perspective, what citizens think about national defense and foreign policy has little impact on the political decision-making process. Rather, structural factors determine a state’s behavior, leaving little room for domestic politics. Yet, there is ample evidence to assume that public opinion influences foreign and security policies, at least in democracies. Research has found that citizens hold informed views about foreign policy, that these views are congruent with political decisions, and that the causal pathway leads from public opinion to political outcome (and not the other way around).³³² Moreover, recent studies have found that voters care deeply about foreign policy issues and that political leaders and non-elected officials alike avoid taking foreign policy decisions that are not supported by the public.³³³ In addition, even if citizens know little about the issue at hand, they nevertheless form coherent foreign policy views based on their basic values.³³⁴ In sum, studying what citizens think about foreign and security policy is not only interesting in its own right, but can also help to explain political outcomes.

Our empirical strategy is twofold. We first present an analysis of large-scale cross-national public opinion data from multiple waves of the World and European Values Surveys. The purpose of this analysis is to examine whether military deployments in the form of troops and nuclear weapons affect citizens’ subjective needs for national defense in ways that generalize across a large number of countries and time points. While informative, this analysis has some limitations, including potentially confounding variables. Critically, since these data do not allow us to operationalize threat perceptions, this analysis cannot speak to the underlying mechanisms. Thus, we complement the observational data analysis with a survey experiment.

4.3.1 Observational Data Analysis

To examine the link between foreign military deployments and attitudes toward national defense we draw on the European and World Values Surveys (referred to here as: WVS). The WVS captures people’s values and attitudes through a standardized survey that has been administered in many countries around the globe during seven waves, spanning the period 1980 to 2020. Given current relevance and data availability, we focus on military deployments by the United States on the soil of NATO allies.³³⁵ We exclude France and the United Kingdom from the sample since these countries operate nuclear arsenals of their own, and so the theoretical logic outlined above hardly

³³²Aldrich et al., 2006; Page and Shapiro, 1983.

³³³Lin-Greenberg, 2021; Tomz and Weeks, 2013, p. 850.

³³⁴See: Rathbun et al., 2016. This is not to say that we will not be able to find anecdotal evidence of occurrences where public opinion has failed to influence foreign policy. For example, Jacobs and Shapiro show that U.S. President Johnson was unresponsive to public opinion about the Vietnam War; see: Jacobs and Shapiro, 1999.

³³⁵The countries included are: Belgium, Bulgaria, Canada, Denmark, Estonia, (West) Germany, Greece, Hungary, Iceland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Slovenia, Spain, Turkey.

applies to them.

Dependent variables. We employ two dependent variables, both of which capture attitudes toward national defense. Our first dependent variable is an item asking respondents the following question: “Of course, we all hope that there will not be another war, but if it were to come to that, would you be willing to fight for your country?”, with 1 denoting ‘yes’ and 0 denoting ‘no’. Previous research has argued that this item can be interpreted as an indicator of defense contributions at the individual level, i.e., the supply side.³³⁶ Our second dependent variable captures individuals’ demand for national defense and comes from a slightly more involved item which asks people to pick from different options for what they believe should be the top priorities for their country during the next ten years. The options are the following:

1. A high level of economic growth
2. Making sure this country has strong defense forces
3. Seeing that people have more say about how things are done at their jobs and in their communities
4. Trying to make our cities and countryside more beautiful

Given these choice alternatives, respondents are asked to denote their first and second priorities. We use this information to construct a dummy variable denoting if the respondent identified a need for strong defense forces as either first or second priority, thus articulating a demand for national defense over other policy objectives.

Main explanatory variables. We complement the individual-level data from the WVS with additional data at the country level. In particular, we compiled data on foreign military deployments. The variable *nuclear host* denotes whether the country hosts U.S. nuclear weapons. We measure conventional military deployments through the number of *U.S. troops* deployed in the country, relying on data by Braithwaite and Kucik which we expand with information provided by IISS.³³⁷ Since foreign troops are also deployed by other states, we control for the number of *non-U.S. troops* in the country.

Control variables. We also include a number of potential confounders in our models. At the individual level, these are age, sex, and an item on (lack of) confidence in the military (dummy), all derived from the WVS. At the country level, these are GDP per capita, population, as well as the

³³⁶Anderson, Getmansky, and Hirsch-Hoefler, 2020; Jakobsen, 2018.

³³⁷Braithwaite and Kucik, 2018.

Polyarchy democracy scale.³³⁸ In addition, we include a dummy denoting whether the country is currently involved in an ongoing armed conflict. This combines both intra- and interstate conflicts, as well as involvement as an external actor (“side B”).³³⁹ Finally, we add an additional intercept for survey waves that took place during the Cold War, i.e., before 1992.

Given the hierarchical structure of the data (individual-level data combined with country-level covariates), we rely on multilevel models. More specifically, given the binary nature of our dependent variable, we use a logit estimator with random intercepts by country. Importantly, these random effects account for all time-invariant confounders, such as geographic location. As is recommended for these types of models, we center all independent variables to a mean of zero.

Results. Our results are given in Table 16. Models 1 and 2 are models with “willingness to fight” as the dependent variable, while in Models 3 and 4 the dependent variable is whether “strong defense forces [are] important.” Models 1 and 3 use a specification that includes the logged number of U.S. and non-U.S. troops deployed in the country.³⁴⁰ Since many country-years do not see any foreign troop deployments, Models 2 and 4, therefore, offer an alternative way of dealing with these “excess-zeros” by including an additional intercept for country-years in which a positive number of troops were deployed.

The results are strikingly consistent and in line with the free-riding (H1) and disengagement hypotheses (H2). Across all models, we find that respondents residing in countries that are hosting U.S. nuclear weapons are systematically less willing to fight for their country, and they are less likely to deem strong defense forces important. These effects are analogous for conventional military deployments by the U.S., as higher numbers of U.S. military personnel are also associated with a lower willingness to fight for the respondent’s country and a lower demand for strong defense forces. Interestingly, these effects are reversed for non-U.S. troops, which are associated with a higher willingness to fight and higher significance placed on national defense. One explanation is of course that especially non-U.S. troops are not randomly allocated, but tend to cluster along the Russian border as part of NATO’s Enhanced Forward Presence, that is in countries for which the external threat is arguably most pronounced.

We also briefly comment on the estimates from the control variables. We find that older citizens and women are less willing to fight for their country, but deem national defense as relatively more important. Citizens who lack confidence in the military are both less willing to fight for their

³³⁸All taken from the Quality of Government dataset; see: Teorell et al., 2021. The variables we use are based on data from the World Bank Group, Penn World Table, and the VDem dataset

³³⁹All based on the UCDP Armed Conflict Database; see: Davies, Pettersson, and Öberg, 2022.

³⁴⁰For this we added 1 to each count so as to be able to apply the log transformation in cases with zero troops as well.

country and less likely to see strong defense forces as a priority. At the country level, larger military expenses are associated with increased willingness to fight, although this finding is only statistically significant for the demand for national defense. The effect of GDP varies between specifications, while larger populations appear to generally show less subjective need for national defense. The more democratic the respondent's country, the more willing they are to fight for their country, and the less important strong defense forces are deemed. Current involvement in a war is associated with a higher willingness to fight, as well as a higher significance attributed to the country's military. Finally, willingness to fight was lower during the Cold War, while the effect is mixed for the demand for defense. Overall, these results are strikingly in line with existing literature, which in turn adds credibility to our findings regarding foreign military deployments.

Table 16: Hierarchical logit regressions with random intercepts

	<i>Dependent variable:</i>			
	Willingness to fight		Strong defense forces important	
	(1)	(2)	(3)	(4)
Nuclear host	-0.294*** (0.036)	-0.311*** (0.036)	-0.610* (0.323)	-0.722** (0.359)
ln U.S. troops	-0.293*** (0.079)	-0.262*** (0.083)	-0.837*** (0.137)	-1.197*** (0.154)
ln non-U.S. troops	0.060* (0.035)	0.077** (0.036)	0.209*** (0.058)	0.323*** (0.062)
U.S. troops > 0		-0.151*** (0.029)		0.179*** (0.038)
non-U.S. troops > 0		-0.046** (0.023)		0.090*** (0.028)
Age	-0.094*** (0.009)	-0.095*** (0.009)	0.116*** (0.011)	0.117*** (0.011)
Sex	-0.279*** (0.009)	-0.279*** (0.009)	0.0005 (0.010)	-0.00001 (0.010)
Confidence in the military	-0.129*** (0.010)	-0.133*** (0.010)	-0.152*** (0.011)	-0.149*** (0.011)
ln Military expenses	0.052 (0.050)	0.046 (0.049)	0.427*** (0.038)	0.300*** (0.044)
ln GDP p.c.	-0.019 (0.164)	0.638*** (0.196)	2.917*** (0.155)	1.890*** (0.237)
ln Population	-4.701*** (0.575)	-6.352*** (0.588)	-2.437*** (0.300)	-0.898* (0.480)
Polyarchy	0.233*** (0.045)	0.221*** (0.045)	-0.060** (0.026)	-0.081*** (0.031)
Country at war	0.393*** (0.047)	0.360*** (0.049)	2.051* (1.240)	1.102 (1.262)
Cold war	-0.133*** (0.049)	-0.140*** (0.054)	-0.0002 (0.047)	0.139** (0.059)
Constant	-1.518 (1.161)	-2.008 (1.228)	-1.556*** (0.284)	-1.437*** (0.303)
Number of countries	19	19	18	18
sd(Country)	5.488	6.694	1.03	1.104
Observations	63,083	63,083	59,724	59,724
Log Likelihood	-36,511.990	-36,495.990	-28,885.790	-28,868.680

Note:

*p<0.1; **p<0.05; ***p<0.01

4.3.2 Survey Experiment

While the cross-national data analysis yields important, generalizable implications concerning our theoretical deliberations, it is not without limitations. First, given the observational nature of the data, we should be cautious when it comes to attributing causality to the findings. Specifically, neither nuclear nor conventional military deployments are randomly assigned to some host allies, but not others. Second, the WVS analysis merely shows that foreign military deployments negatively impact the way in which citizens assess the importance of defense, including their own willingness to contribute, but leaves open why this would be the case. Critically, we do not know if these deployments also influence threat perceptions, and whether or not threat perception is ultimately linked to the subjective need for national defense.

We, therefore, conducted a survey experiment in Germany (May/June 2022) and the Czech Republic (September 2022) to further unpack the relationship between military deployments and citizens' subjective need for national defense. Even though the survey experiment *per se* cannot solve the problem of non-random assignment of foreign military deployments, a closer understanding of how these deployments affect subjective needs for national defense lends more credibility to the non-experimental evidence presented above. It is often necessary to select cases that demonstrate a range of variability across specific characteristics deemed relevant to the study. In this particular instance, Germany and the Czech Republic were chosen due to their differences with respect to a set of important characteristics. First, the Czech Republic has neither hosted any permanent U.S. military deployments nor are there plans for deployments in the near future. In comparison, Germany has continuously hosted a sizeable U.S. conventional and nuclear military presence in its country since the beginning of the Cold War. Consequently, we can test the effect of military deployments from two angles: Initial deployment (Czech Republic) and withdrawal of an existing presence (Germany). Second, Germany has one of the highest military budgets, and one of the largest economies in the world. If push comes to shove, it plausibly possesses the material means to defend itself against a range of threats. This is not the case for the Czech Republic, a relatively small country with a limited military budget compared to other NATO states. Third, countries that used to belong to the Warsaw Pact or the Soviet Union are often regarded as having a considerably higher threat perception vis-a-vis Russia than their Western counterparts in NATO and the European Union. Even though the former GDR was part of the Warsaw Pact, its territory eventually became part of Western Germany – a long-time NATO ally. Indeed, Germany has often been regarded as being wilfully blind to Russian threats. Consequently, we expect threat perceptions to vary markedly between Germany and the Czech Republic.

Treatment. A key challenge is how to exogenously randomize the treatment. The difficulty arises because the treatment, foreign military deployments, is fixed depending on the respondent's country of residence. We, therefore, split the samples into four groups, a control group in addition to three experimental treatment groups. More specifically, we remind all participants about the factual status quo in their home country pertaining to NATO membership, the level of U.S. troop deployments (GER: 36,000, CZ: 0), and U.S. nuclear weapon deployments (GER: 20, CZ: 0). For Germany we then introduce experimental scenarios in which the U.S. withdraws (1) 18,000 conventional forces, (2) all nuclear weapons, or (3) both from German soil. In the Czech Republic, we ask respondents in the experimental conditions to imagine that the United States intends to deploy to Czechia (1) 4,500 conventional forces, (2) 20 nuclear bombs, which in case of conflict and subject to joint decision-making, could be launched by Czech aircraft or (3) both. The baseline and treatment prompts can be found in Appendix A.

Intermediate variables. The intermediate variables we are interested in pertain to the respondent's assessment of threat. We ask respondents to evaluate the likelihood of different future scenarios involving conflict in Europe and in their home country if the above-mentioned deployments/withdrawals materialize. Specifically, we asked whether in the medium term:

- there will be an armed conflict between the U.S. and Russia in which [Country] will be dragged into.
- the U.S. will use nuclear weapons in Europe.
- Russia will use nuclear weapons in Europe.
- [Country] will be attacked militarily.
- EU or NATO allies of [Country] will be attacked militarily.
- states which are not [Country] allies will be able to expand their power on the world stage.
- the relationship between Russia and [Country] will recover, and
- if push comes to shove, the U.S. would defend [Country] with its military.

If people subscribe to the logic of extended deterrence through foreign deployed military and its intended effect of preventing attacks by adversarial states, then they should experience an increase in threat perception caused by future withdrawals [and the other way around in the Czech survey]. As a result, individual supply and demand for defense become more critical, leading to a higher willingness to fight for their country and to attribute higher significance to the strength of national

armed forces – precisely because they are not assured anymore. By contrast, if foreign deployed military is viewed only in terms of provocation and escalation, then the perceived levels of threat should decrease relative to the baseline condition [and the other way around in the Czech survey].

Ex-ante views. Before the introduction of the treatment conditions, we ask respondents about their ex-ante views regarding:

- Their general opinion about military means (scale ranging from “provokes conflict” to “secures peace and order”) and to what extent their country can rely on allies to guarantee its own security (scale ranging from “not at all” to “exclusively”).
- The level of trust toward the United States, Russia, NATO, the UN, and the EU.

In addition, after the introduction of the baseline scenario, respondents are asked to select two reasons that they believe to best explain U.S. military deployments abroad out of the list below:

1. To protect those countries in which they are stationed
2. To protect other allies
3. To protect the United States
4. To pursue U.S. global political or economic goals
5. To prevent allies from developing their own nuclear weapons
6. Don't know

We treat answers 3 to 5 as “self-serving” options, i.e., if respondents choose these answers, they believe the deployments to be driven by U.S. self-interest, rather than those of its allies.

Outcomes. Finally, to measure the subjective need for national defense, we employed the following questions, including a replication of the *willingness to fight* item from our data analysis.³⁴¹

- [Country] should acquire its own nuclear weapons (4-point scale)
- As you know, NATO countries in 2014 pledged to invest 2 percent of their GDP on defense. In 2021 [Country] invested [GER: 1.53, CZ: 1.4] percent. How much do you think [Country] should invest in the future? (continuous scale from 1 to 3+)

³⁴¹As noted in Appendix A, two of the outcome variables in the Czech survey were changed compared to the German survey. Consequently, we did not include them in our analysis.

- Of course, we all hope that there will not be another war involving [Country], but if it were to come to that, would you be willing to fight for your country? (Yes/No)

We also use Principle Component Analysis (PCA) to summarize our correlated outcome variables onto a linear coordinate system, thereby reducing the dimensionality of the original data (see Appendix B for PCA visualization). Overall, the survey experiment allows us to gauge into the black box of causal mechanisms by examining whether foreign deployed military impact attitudes towards national defense as an externality of host-state assurance or anxiety.

Results. The results of our survey experiment largely confirm the view that accusations of free-riding overly simplify the complex nature of the micro-mechanisms of foreign and defense policies. However, the findings are not entirely conclusive and challenge us to think beyond our theoretical framework. Indeed, while they speak to some questions, they open new ones about the relationship between military deployments, threat perceptions, and citizens' subjective need for national defense. Across all analyses, we use OLS regressions with robust standard errors. We control for age, region, gender, education, political interest, political orientation, knowledge about nuclear weapons and foreign policy, and the day participants took the survey (see Appendix B for full regression tables). Our findings offer some interesting insights into the micro-mechanisms of foreign and defense policy: (1) The presence of U.S. military deployments does not seem to lower threat perceptions (rather the opposite), (2) the subjective need for national defense increases in the absence of U.S. military deployments, (3) results in Germany and the Czech Republic differ.

When asked about their ex-ante views, only few respondents thought that the United States deployed its military abroad for purely altruistic reasons. As Figure 6 shows, a majority of respondents in both the Czech Republic and Germany suspected the deployments to be at least partially self-serving (left bars). Moreover, more respondents chose two answers indicating selfish reasons for the deployments than respondents who chose two answers indicating that they believed the deployments had no self-serving character (central bars). Perhaps most strikingly, less than half the respondents in the Czech Republic, and only about 30 percent of German participants, believed that the United States actually deployed its military to protect the state they are deployed to (right bars).

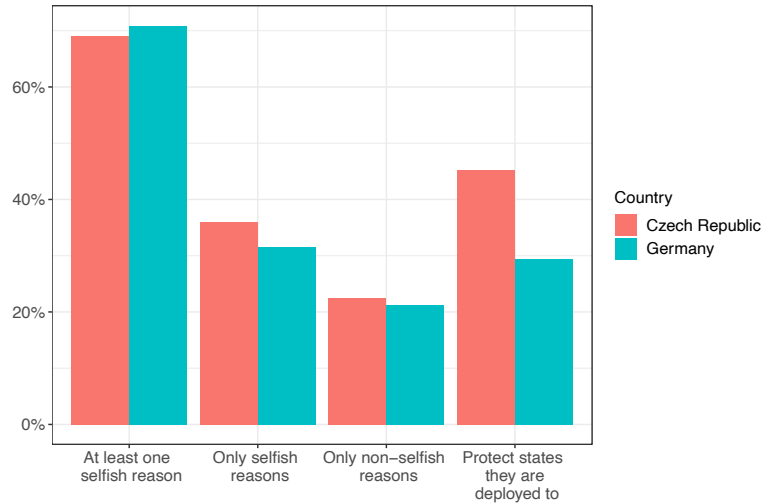


Figure 6: Question about ex-ante views: Respondents are asked to name the two reasons (out of five) they believe to best explain U.S. military deployments.

Similarly, Figure 7 shows that about half the respondents in both Germany and the Czech Republic generally do not trust the United States,³⁴² despite the fact that these countries strongly rely on U.S. security provisions. Taken together, these descriptive statistics suggest a considerable level of skepticism toward the United States, which in turn might influence the degree to which citizens feel protected by U.S. military deployments. However, trust toward NATO is considerably higher among respondents, with almost 80 percent of Germans indicating to trust NATO somewhat or fully. What about Russia, arguably the main adversary for both countries? In our theory, we laid out how simultaneous mistrust of the guardian and trust toward potential adversaries could lead to disengagement. However, our survey does not show any evidence that respondents in either Germany or the Czech Republic trust Russia. Only about 10 percent of surveyed individuals chose “trust fully” or “trust somewhat”.

³⁴²We transformed the four-point scale into a dummy variable indicating either *trust*, or *no trust*.

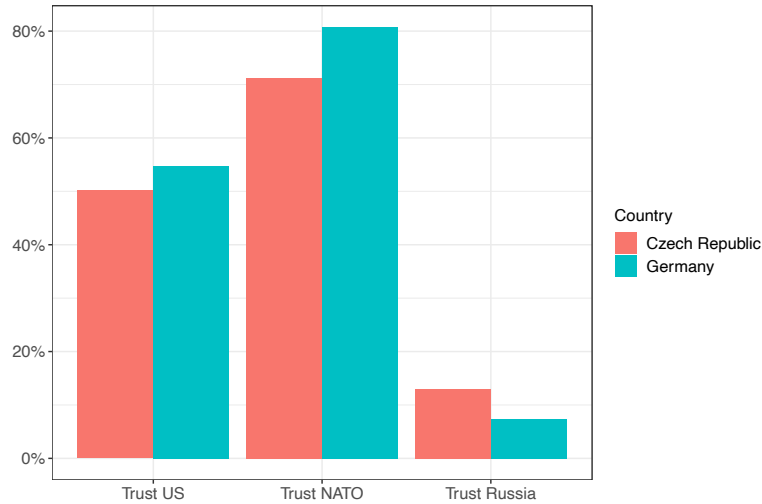


Figure 7: Question about ex-ante views: Respondents are asked to rate their trust toward different countries and organizations on a four-point Likert scale ranging from “I do not trust at all” to “I trust fully”. We transformed the scale into a dummy variable.

The effects of the treatment levels on the subjective need for national defense are visualized in Figure 8.³⁴³ Because we work with opposing treatments in Germany and the Czech Republic – the withdrawal of military, and the deployment of military, respectively – we reverse all Czech Republic coefficients. Consequently, our coefficient plots visualize the effects of withdrawals.³⁴⁴

There are several interesting results: First, the findings in the German survey broadly confirm the results of the observational data analysis. While the effect of the different treatment levels is not entirely consistent, all statistically significant results substantiate the claim that citizens support tougher defense measures under reduced or fully withdrawn U.S. military deployments. For example, in panel *A* we observe that a withdrawal of troops increases citizens’ willingness to fight in Germany. In panel *B*, preferences for nuclear proliferation increase if U.S. nuclear weapons were withdrawn. In panel *C*, German survey respondents support an increase in defense spending after the withdrawal of troops. For the outcome PCA scale in panel *D*, both conventional troop and nuclear weapon withdrawals increase the outcome.

Second, the same does not hold true for the Czech Republic. The treatments generally have smaller effects on respondents’ answers compared to the German survey experiment. We only observe a statistically significant effect in panel *B*, where the absence of any U.S. deployments diminishes the likelihood of national nuclear proliferation. While the results in the German study further substantiate our cross-national WVS data analysis findings, they naturally raise the question why we observe almost no effect in the case of the Czech Republic. Future studies should

³⁴³For all figures, confidence intervals represent 90 and 95 percent levels respectively.

³⁴⁴Original results are in the regression tables in Appendix B.

zoom in on these inner-European differences which are beyond the scope of this paper.

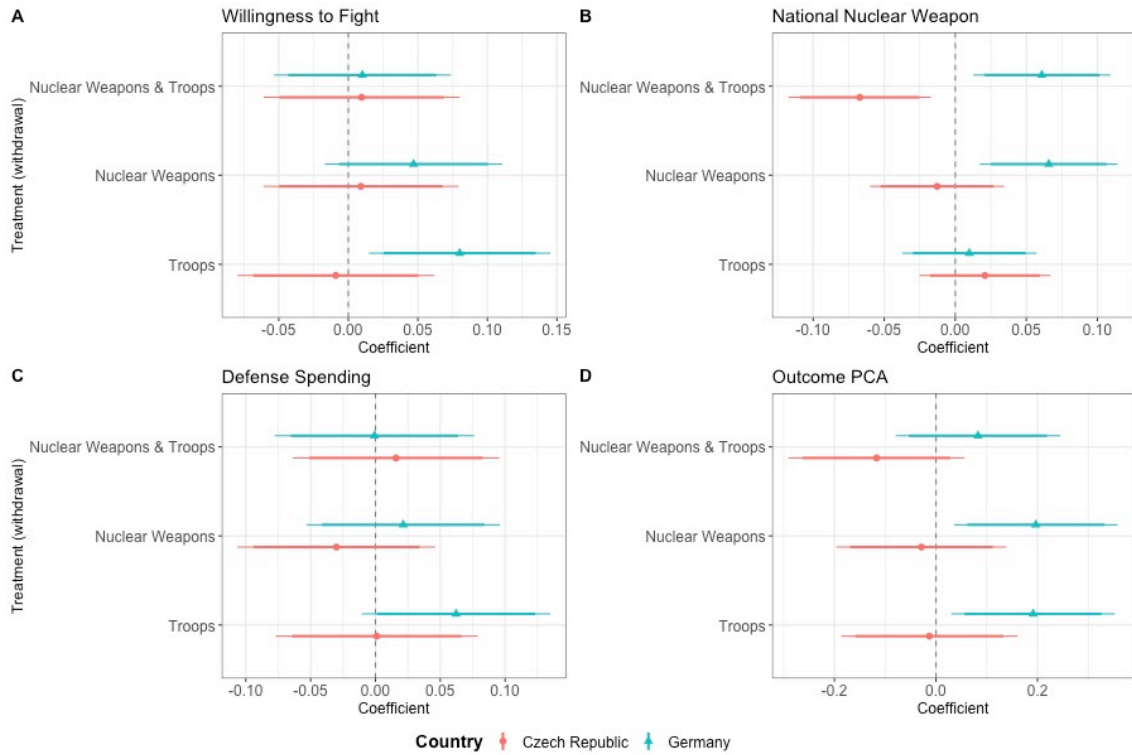


Figure 8: Coefficient plots - Effect of withdrawal of military on outcome variables.

Following the descriptive results for the respondents’ ex-ante views, we further investigate the relationship between U.S. military deployments and threat perception in Figure 9. The plots show the effect of the treatment on our threat variables. Importantly, we again reversed the coding for the Czech survey. We here focus on threat variables that ask about the likelihood of war involving the country in question or its allies, and a PCA combining these elements.³⁴⁵ Arguably, these are the most direct measures of threat. All other results can be found in Appendix B.

Strikingly, we find little evidence that U.S. deployments induce assurance, i.e., perceptions of security among citizens, as is assumed by the “free-riding” hypothesis (see Figure 5). If anything, citizens’ threat perceptions seem to decrease after the withdrawal of U.S. military deployments – in line with the descriptive statistics in 6. These results largely support the expectations of the “disengagement” or “self-insurance” hypotheses. As can be seen in panels B and C, both German and Czech respondents regard nuclear use as less likely in the absence of U.S. military deployments, although significance levels vary. In addition, Germans regard it as *less* likely that their country will be attacked (panel D) or that allies will be attacked (panel E) when the United States withdraws

³⁴⁵For PCA loadings see Appendix B.

its troops. Similarly, the combined PCA yields negative estimates, i.e., a lower threat perception for Germans respondents treated under the conventional troop withdrawal scenario. Indeed, all statistically significant results suggest that threat perceptions are lower in the absence of U.S. military deployments. At the same time, we often only receive statistically significant outcomes for one treatment level: Our results are not entirely conclusive. Importantly, however, there is no systematic evidence that a withdrawal of U.S. military deployments heightens respondents' threat perceptions. If anything, the evidence points to the contrary. This underlines the notion that the relationship between U.S. military deployments and threat perceptions is arguably more complex than commonly assumed. We view this insight as a promising starting point for future research.

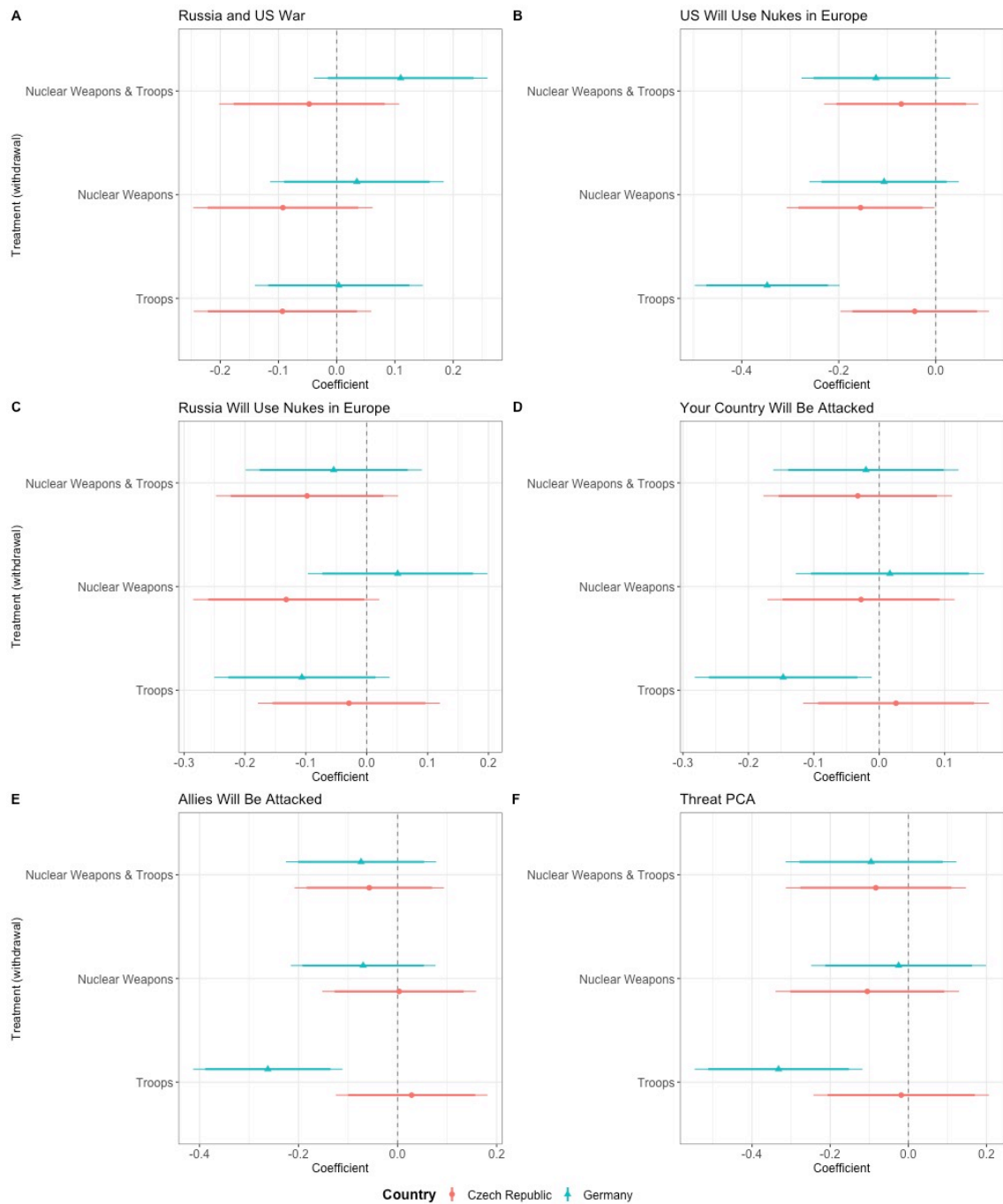


Figure 9: Coefficient plots - Effect of withdrawal of military on intermediate variables.

Lastly, in Figure 6 we show the results of the intermediate variables – threat perceptions – on outcomes, i.e., attitudes towards defense. We again focus on threat variables that ask about the likelihood of war involving the country in question or its allies, and a PCA scale combining these items.³⁴⁶ The panels in Figure 6 are sorted by dependent variable, i.e., each panel contains

³⁴⁶All other results can be found in Appendix B.

the results of multiple independent regressions, keeping the dependent variable constant. Overall, heightened threat perceptions result in heightened subjective needs for national defense. This is in line with the self-insurance hypothesis. An exception is the use of nuclear weapons by the United States in Europe in panels *A*, *B*, and *D*. Perhaps the most consistent finding of the survey experiment is that heightened threat perceptions lead to heightened desires for a national nuclear capability, as can be seen in panel *C*. This result will be of interest in future studies on nuclear (non-)proliferation.

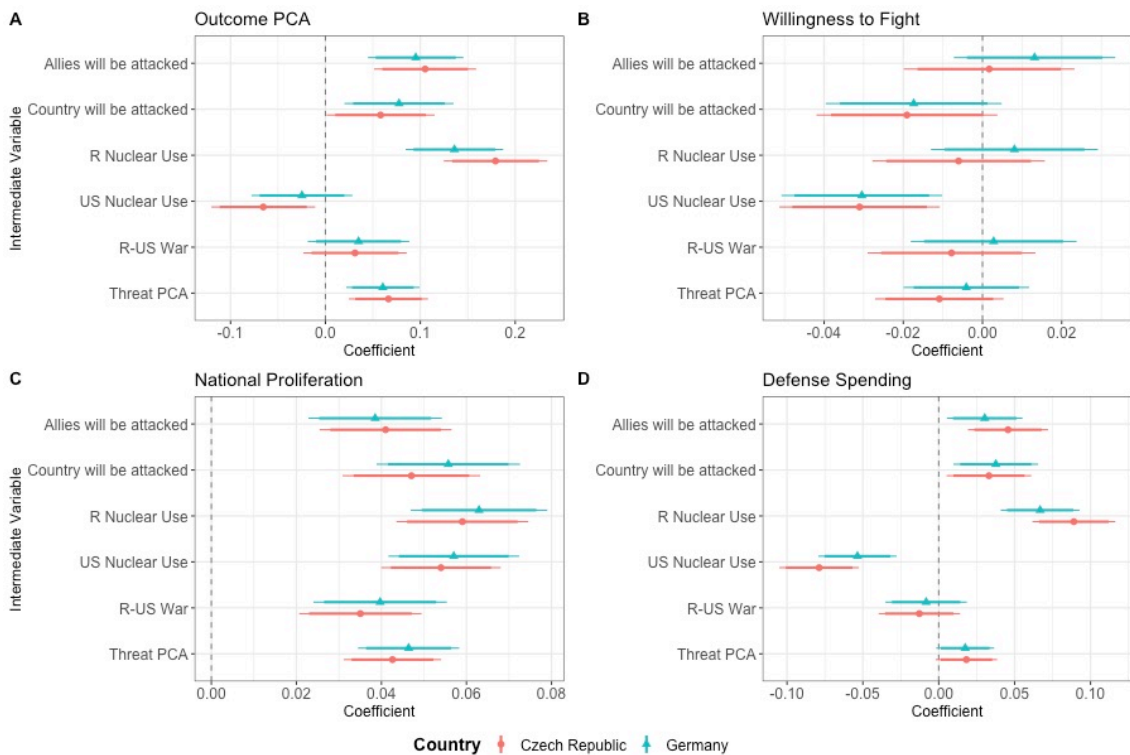


Figure 10: Coefficient plots - Effect of intermediate variables on outcome.

We also conducted a mediation analysis which did not yield any clear results, and which can be found in Appendix B. Specifically, we generally found that threat perceptions hardly mediate the effect of military deployments on attitudes toward national defense. There are many possible reasons why this is the case: First, the delivery and impact of our treatment could not be strong enough to detect a mediated effect. Second, threat perception might not mediate the relationship between U.S. military deployments and host state citizens' foreign policy preferences. Indeed, we could imagine that while threat perceptions seem to increase with U.S. military deployments, citizens do not foremost base their opinion about defense policies on threat perceptions. Third, mediation analysis has important shortcomings, especially sequential ignorability. Importantly,

there might exist unobserved cofounders for the mediator \leftrightarrow outcome relationship since we cannot randomize threat perceptions on top of U.S. deployments.

In summary, the survey experiments highlight the complex nature of the effect of U.S. deployments on citizens' foreign policy attitudes. On the one hand, we find additional evidence which confirms the findings of our observational data analysis: U.S. military deployments decrease the subjective need for national defense. On the other hand, we also find considerable skepticism toward U.S. military deployments in both Germany and the Czech Republic. Accordingly, citizens' threat perception rather seems to decrease in the absence of U.S. military in their country. We do not find any evidence which suggests that citizens feel protected by such deployments. In addition, we show that heightened threat perceptions tend to increase the subjective need for defense. However, this depends on the type of threat as well. For example, respondents were less likely to indicate a willingness to fight for their country in the face of U.S. nuclear use, perhaps because a conventional defense is viewed as meaningless in the face of a nuclear attack.

Overall, we are not able to fully disentangle the causal relationship underlying our questions. Yet, there is substantial evidence that common free-riding explanations can at best partially explain our results. Thus, we contend that a considerable share of European citizens behaves according to the disengagement hypothesis: U.S. military deployments cause heightened threat perceptions, leading to the de-prioritization of national defense. Lastly, we find more conclusive results in Germany than in the Czech Republic in almost all analyses. Future research should try to dig deeper into differences in the subjective need for national defense among different European states. Particularly, it would be interesting to examine the underlying factors for the divide from different angles: Historical, geographical, and cultural.

4.4 Summary

In line with previous studies, our analysis showed that U.S. military deployments lower the subjective need for national defense of host state citizens. This applied to both conventional forces and nuclear weapon deployments, which had not been tested before. Widely held beliefs would ascribe such findings to *free-riding*: Citizens feel protected by military deployments, resulting in a lowered willingness to contribute to their own security. Crucially, this implies that military deployments lower citizens' threat perceptions. However, we argued that this is not a given. If citizens carry skeptical views of the guardian, or if they do not subscribe to the logic of (extended) deterrence, they might experience an increase in threat perception stemming from military deployments. This reasoning underlay our disengagement and self-insurance hypotheses. Thus, to further unpack these mechanisms, we conducted a survey experiment in the Czech Republic and Germany, hoping

to get deeper insights into the relationship between U.S. military deployments, threat perceptions, and the subjective need for national defense. Our findings partly confirmed these expectations: We found little evidence that citizens feel protected by U.S. military deployments. If anything, our results indicated that after the withdrawal of U.S. conventional and nuclear forces, citizens were less worried about potential future armed conflict.

In addition, the results of the survey experiment, especially in Germany, were broadly in line with our cross-national data analysis: U.S. military deployments decreased the subjective need for national defense. We explained this with our disengagement theory, i.e., many citizens regard U.S. military deployments as counterproductive to sustaining peace. As a result, they do not wish to contribute to what they see as escalatory behavior, and favor “dovish” national defense policies instead. However, we also found evidence that heightened threat perceptions increase the subjective need for national defense, confirming the expectations of the self-insurance theory. Consequently, while intriguing, our findings remained somewhat inconclusive.

Our cross-national WVS data analysis lent itself to generalizable conclusions, whereas the survey experiment unveiled important between-country nuances. By and large, treatment effects were less pronounced in the Czech Republic than in Germany, especially with regard to the variables measuring respondents’ subjective need for national defense. Moreover, if anything, military deployments seemed to increase the subjective need for national defense for Czech respondents – the opposite was true for German respondents. This constitutes a first interesting avenue for future research. While on average, U.S. military deployments seemed to lower the subjective need for national defense, this might not be the case in all countries. Perhaps a natural next step would be to divide NATO member states into those that joined after the end of the Cold War, and those that joined before.

Together, these findings suggested a complex relationship between military deployments, threat perception, and citizens’ subjective need for national defense. Earlier studies have not taken such nuances into account. However, we were also not able to fully disentangle these issues. Our findings challenge us to think beyond our theoretical framework. Indeed, while they speak to some questions, they also open new ones. Beyond between-country differences, future research could look at the relationship between threat perception and citizens’ subjective need for national defense. We were able to detect consistent effects of the treatments on both subjective needs for national defense and threat perceptions. Moreover, we found consistent effects of threat perceptions on the subjective need for national defense. Yet, a mediation analysis combining all these elements did not yield any clear results. While this could be due to limitations in the causal mediation analysis framework, it could also be the case that threat perception and subjective need for national defense

are more separated than we expected in our theoretical deliberations, i.e., threat perception is not a main driver of changes in the subjective need for national defense.

U.S. military deployments have been put in the spotlight once again by former President Trump. Given that Russia's attack on Ukraine has subsequently caused an increase in these deployments, they will likely remain the topic of controversy for the foreseeable future. Yet, there is a considerable lack of understanding with regard to the micro-mechanisms underlying the relationship between military deployments and national defense policies. This study indicates that decision-makers should more carefully think about the effects of these deployments. Importantly, the perspectives of ordinary citizens and foreign policy elites may differ significantly. This in turn can cause resentment among the population, and through democratic channels, underinvestment in national defense. Thus, we hope to be the starting point for a new research agenda on the relationship between security guarantees, threat perceptions, and citizens' subjective need for national defense.

4.5 Appendix A: Survey Questionnaire

Baseline and treatment

Germany

- *Condition 0*: “Please think about the international political situation, and potential dangers for Germany stemming from other states. Since 1955, Germany is a member of NATO, a US-led military alliance. As of today, there are about 36,000 U.S. soldiers deployed in Germany. In addition, there are about 20 American nuclear bombs on German soil, which in case of conflict and subject to joint decision-making, could be launched by German aircraft.”

In addition to this baseline, a subset of the respondents is presented with either of these scenarios:

- *Treatment 1*: “Now there continue to be political actors in the United States, who advocate to reduce the military presence in Germany. Let us assume that the U.S. withdraws 18,000 U.S. soldiers from Germany.”
- *Treatment 2*: “Now there continue to be political actors in the United States, who advocate to reduce the military presence in Germany. Let us assume that the U.S. withdraws all nuclear bombs from Germany.”
- *Treatment 3*: “Now there continue to be political actors in the United States, who advocate to reduce the military presence in Germany. Let us assume that the U.S. withdraws 18,000 U.S. soldiers and all nuclear bombs from Germany.”

Czech Republic

- *Condition 0*: “Please think about the international political situation, and potential dangers for the Czech Republic stemming from other states. The Czech Republic has been a member of NATO, a US-led military pact, since 1999. America deploys its military in various NATO countries, but so far there are no American soldiers or nuclear weapons deployed in the Czech Republic.”

In addition to this baseline, a subset of the respondents is presented with either of these scenarios:

- *Treatment 1*: “Now there continue to be political actors in the United States, who advocate to increase the military presence in Europe. So let’s assume that the United States would deploy 4,500 soldiers to the Czech Republic.”
- *Treatment 2*: “Now there continue to be political actors in the United States, who advocate to increase the military presence in Europe. So let’s assume that the United States would

deploy 20 U.S. nuclear bombs to the Czech Republic, which in case of conflict and subject to joint decision-making, could be launched by Czech aircraft.”

- *Treatment 3*: “Now there continue to be political actors in the United States, who advocate to increase the military presence in Europe. So let’s assume that the United States would deploy 4,500 soldiers to the Czech Republic, and 20 U.S. nuclear bombs, which in case of conflict and subject to joint decision-making, could be launched by Czech aircraft.”

Changed questionnaire for the Czech Republic

For our survey experiment in the Czech Republic we slightly adapted our set-up because of some lessons learned throughout the first survey. While we do not want to change too much for comparability reasons, we decided to adapt two items in our outcome question. We have largely left these questions out of the analysis for the German survey, which is why it will have little influence on comparability. Instead of:

- [Country’s] security is guaranteed by the national army (4 point scale)
- [Country’s] security is guaranteed by its allies (4 point scale)

We now ask:

- A strong national army is important. (4 point scale)
- The Czech Republic should rely on the U.S. for its defense. (4 point scale)

We received mixed results with the original questions and we suspect this to be the case, because they do not ask for an action, but for an evaluation of the status-quo. For example, in the case of Germany, people might wish to be protected by the national army. However, given numerous news reports that hardly indicate operational readiness, respondents might not think that this is possible at the moment. Thus, they answer that their national security is not guaranteed by the national army. In a similar manner, we now ask participants to tell us if they think it is important to secure U.S. protection, not how they evaluate the status-quo of this protection.

4.6 Appendix B: Additional Empirical Results

Full regression tables Germany and Czech Republic

Table 17: Effects of treatment (withdrawals) on outcomes [GER]

	<i>Dependent variable:</i>						
	Will. to fight (1)	Nat. army protects Germany (2)	Allies protect Germany (3)	Proliferation (4)	Defense spending (5)	Outcome PCA (6)	Outcome PCA imputed (7)
Troops	0.079** (0.033)	0.036 (0.030)	0.013 (0.023)	0.010 (0.024)	0.062* (0.037)	0.187** (0.082)	0.156** (0.066)
Nukes	0.044 (0.033)	0.082*** (0.030)	-0.031 (0.024)	0.064*** (0.025)	0.019 (0.038)	0.186** (0.082)	0.139** (0.067)
Troops and Nukes	0.010 (0.032)	0.028 (0.030)	-0.063** (0.024)	0.061** (0.025)	-0.001 (0.039)	0.082 (0.082)	0.084 (0.067)
Age	-0.0002 (0.001)	-0.003*** (0.001)	0.0001 (0.001)	-0.002*** (0.001)	0.002** (0.001)	-0.001 (0.002)	-0.0004 (0.002)
Gender	0.146*** (0.027)	0.019 (0.024)	0.031 (0.019)	0.026 (0.020)	-0.044 (0.029)	0.181*** (0.065)	0.136*** (0.052)
Political Interest	0.048*** (0.005)	0.009* (0.005)	0.021*** (0.005)	0.016*** (0.004)	0.054*** (0.007)	0.134*** (0.015)	0.120*** (0.012)
Left-Right Scale	0.031*** (0.007)	-0.017*** (0.007)	-0.034*** (0.006)	0.049*** (0.006)	0.069*** (0.009)	0.167*** (0.019)	0.160*** (0.016)
Previous Knowledge	0.002 (0.014)	-0.059*** (0.013)	0.026** (0.011)	-0.058*** (0.012)	0.009 (0.016)	-0.073** (0.037)	-0.052* (0.030)
Additional controls:							
...Regions	✓	✓	✓	✓	✓	✓	✓
...Education	✓	✓	✓	✓	✓	✓	✓
...Survey Day	✓	✓	✓	✓	✓	✓	✓
Observations	1,552	2,087	2,062	2,024	2,179	1,454	2,200
R ²	0.142	0.050	0.066	0.076	0.104	0.174	0.141

Note:

*p<0.1; **p<0.05; ***p<0.01

Table 18: Effects of treatment (deployment) on outcomes [CZ]

	<i>Dependent variable:</i>						
	Will. to fight (1)	A strong nat. army is important (2)	Rely on US (3)	Proliferation (4)	Defense spending (5)	Outcome PCA (6)	Outcome PCA imputed (7)
Troops	0.009 (0.036)	0.004 (0.019)	0.042 (0.029)	-0.021 (0.024)	-0.001 (0.040)	0.013 (0.088)	0.022 (0.072)
Nukes	-0.009 (0.036)	-0.003 (0.019)	0.073** (0.028)	0.013 (0.024)	0.030 (0.039)	0.029 (0.085)	0.026 (0.070)
Troops and Nukes	-0.010 (0.036)	-0.017 (0.020)	0.029 (0.029)	0.067*** (0.026)	-0.016 (0.041)	0.117 (0.088)	-0.044 (0.073)
Age	0.002 (0.001)	-0.001 (0.001)	0.001 (0.001)	-0.005*** (0.001)	-0.007*** (0.001)	-0.010*** (0.003)	-0.006** (0.003)
Gender	0.176*** (0.029)	-0.038** (0.015)	0.107*** (0.022)	-0.092*** (0.019)	0.131*** (0.031)	0.279*** (0.068)	0.191*** (0.058)
Political Interest	0.039*** (0.006)	0.013*** (0.004)	0.019*** (0.005)	0.002 (0.004)	0.028*** (0.007)	0.082*** (0.016)	0.084*** (0.013)
Left-Right Scale	0.024*** (0.007)	0.007* (0.004)	0.027*** (0.006)	0.011** (0.005)	0.046*** (0.009)	0.083*** (0.018)	0.079*** (0.016)
Previous Knowledge	-0.016 (0.019)	-0.013 (0.010)	0.004 (0.014)	-0.119*** (0.016)	0.014 (0.020)	-0.151*** (0.049)	-0.028 (0.036)
Additional controls:							
...Regions	✓	✓	✓	✓	✓	✓	✓
...Education	✓	✓	✓	✓	✓	✓	✓
...Survey Day	✓	✓	✓	✓	✓	✓	✓
Observations	1,431	2,108	2,063	2,008	2,147	1,336	2,177
R ²	0.129	0.034	0.064	0.139	0.083	0.130	0.081

Note:

*p<0.1; **p<0.05; ***p<0.01

PCA Loadings

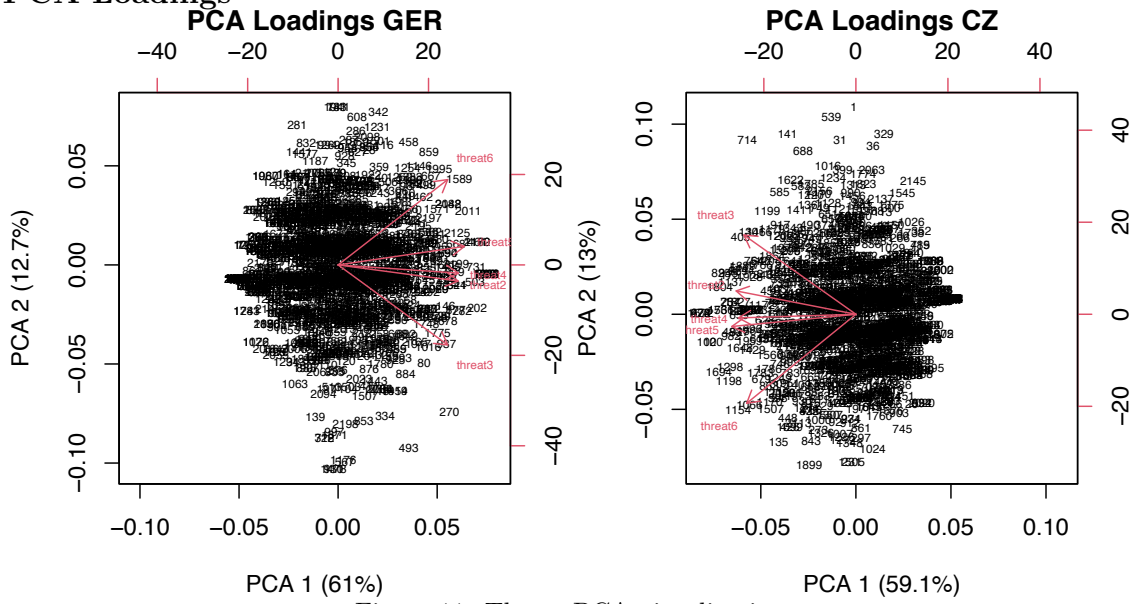


Figure 11: Threat PCA visualization

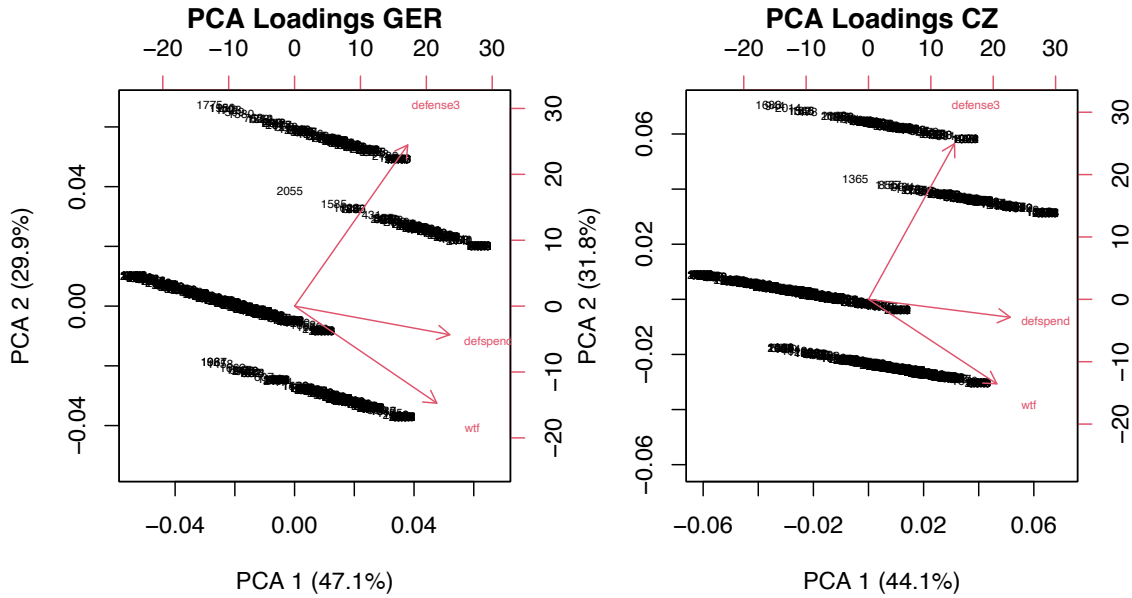


Figure 12: Outcome PCA visualization

Coefficient plots: Effect of threat perception (all items) on outcome

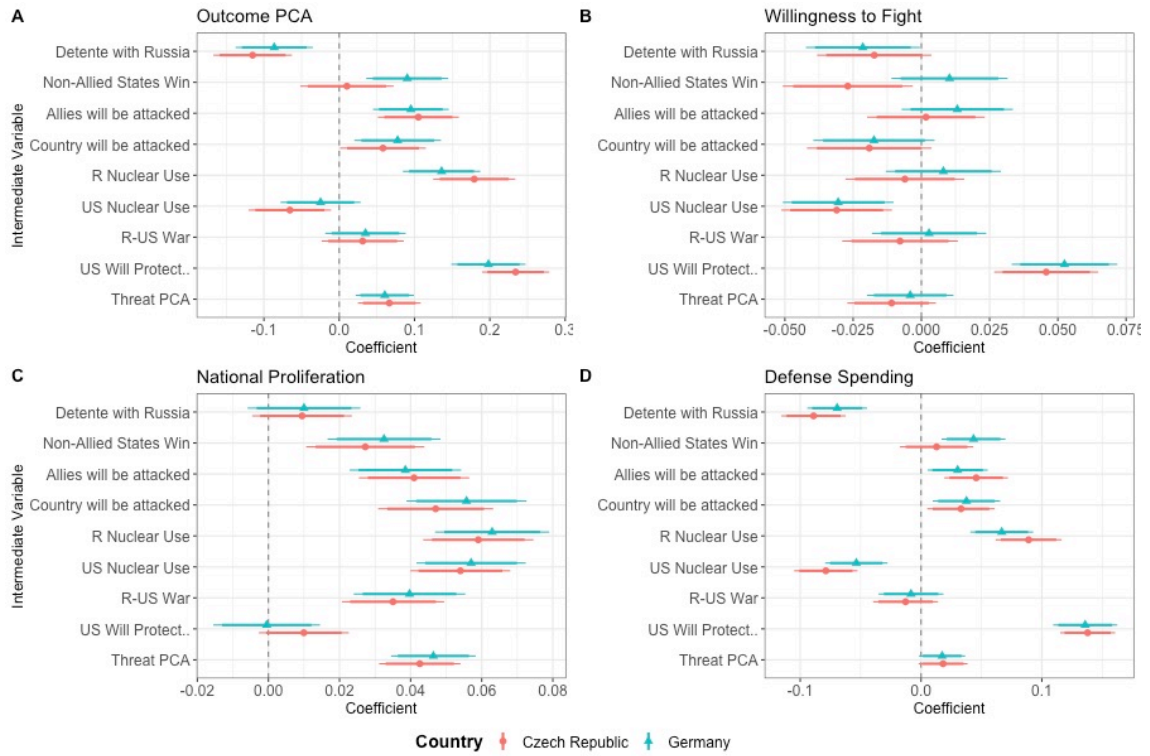


Figure 13: Coefficient plots - Effect of intermediate variables on outcome. Confidence intervals represent 90 and 95 percent level respectively.

Coefficient plots: Effect of treatment on threat perception (all items)

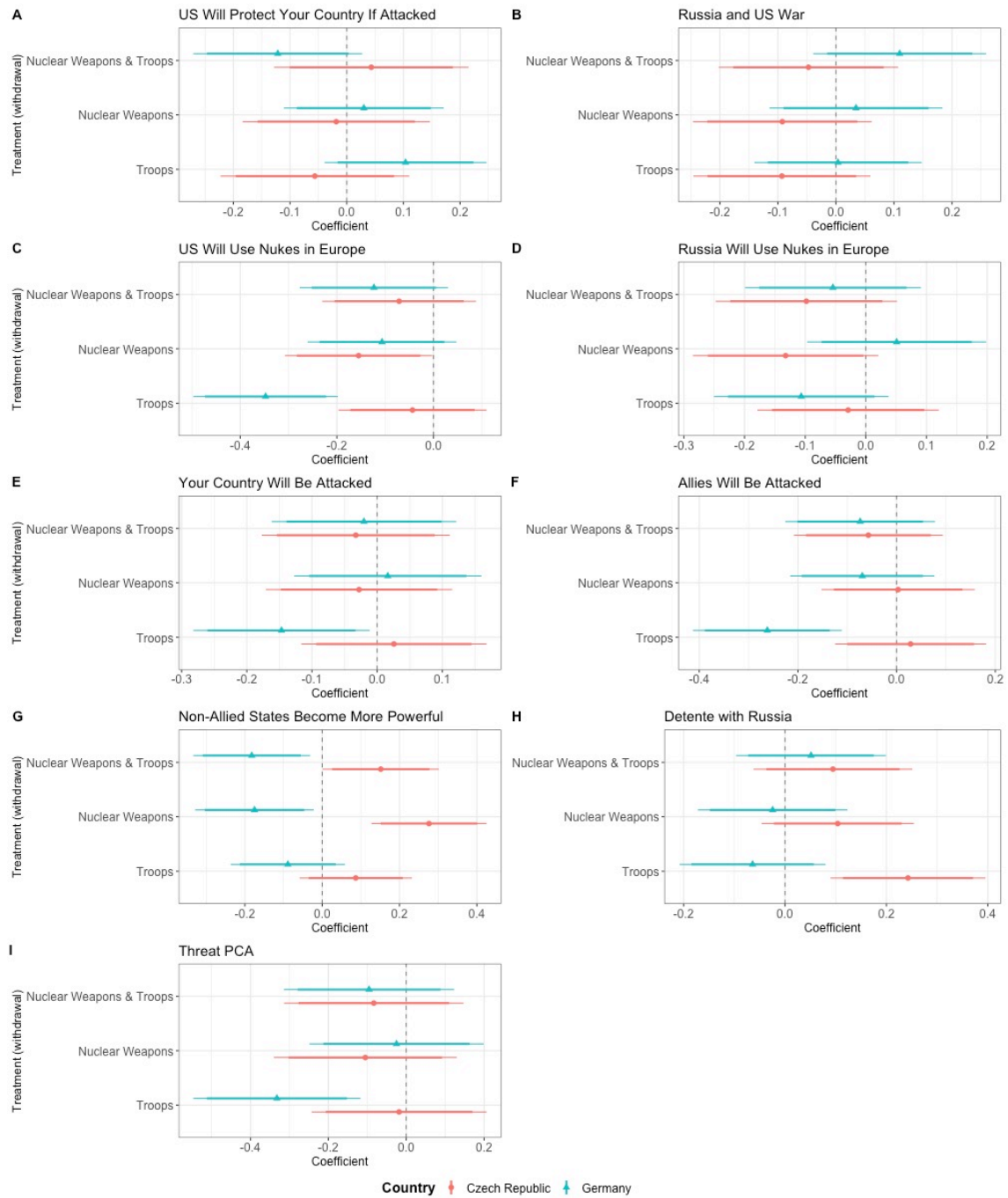


Figure 14: Coefficient plots - Effect of treatments on intermediate variables. Confidence intervals represent 90 and 95 percent level respectively.

Results Mediation Analysis: Threat PCA

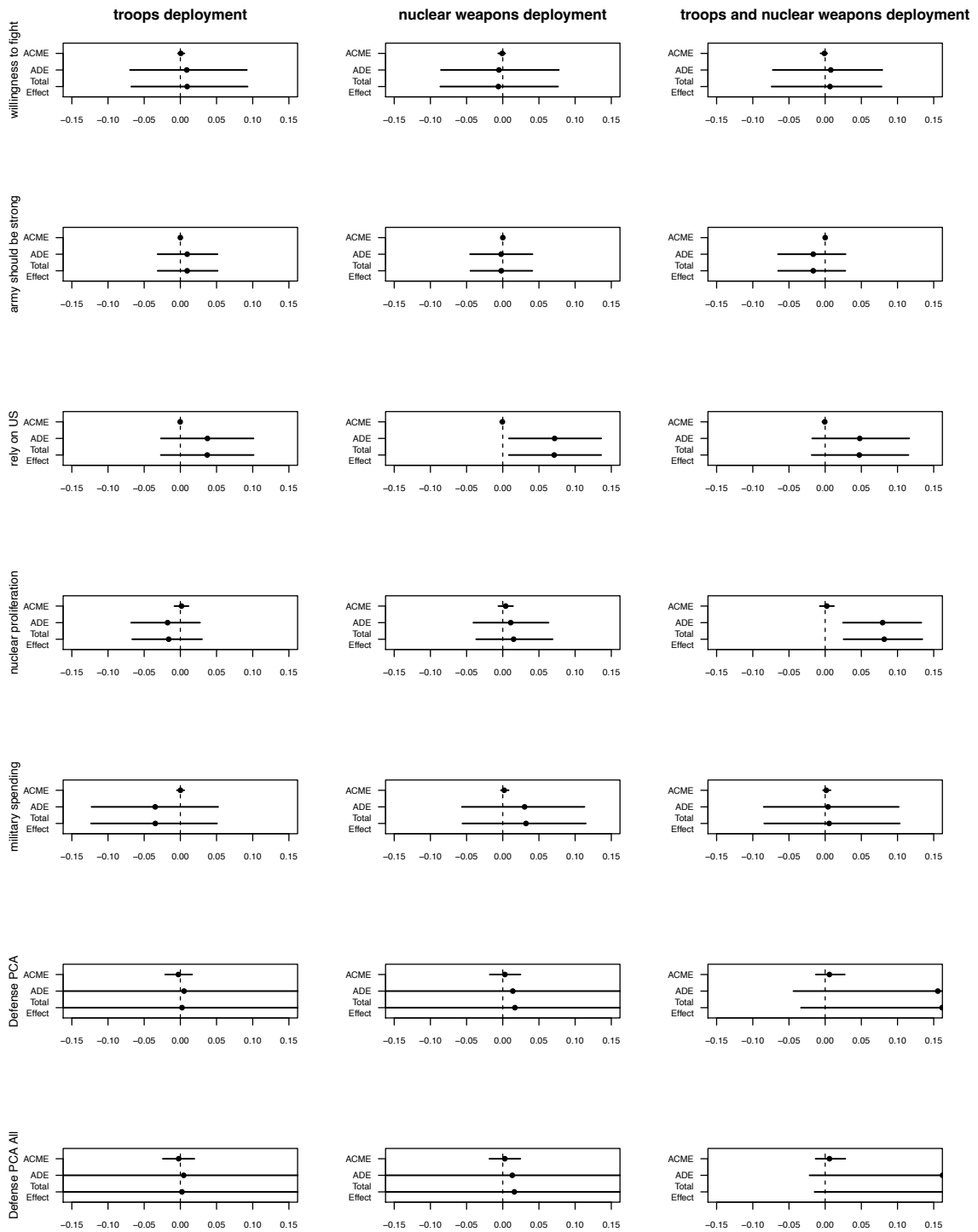


Figure 15: Mediation Analysis, coefficient plots for the Czech Republic. Mediator: Threat PCA

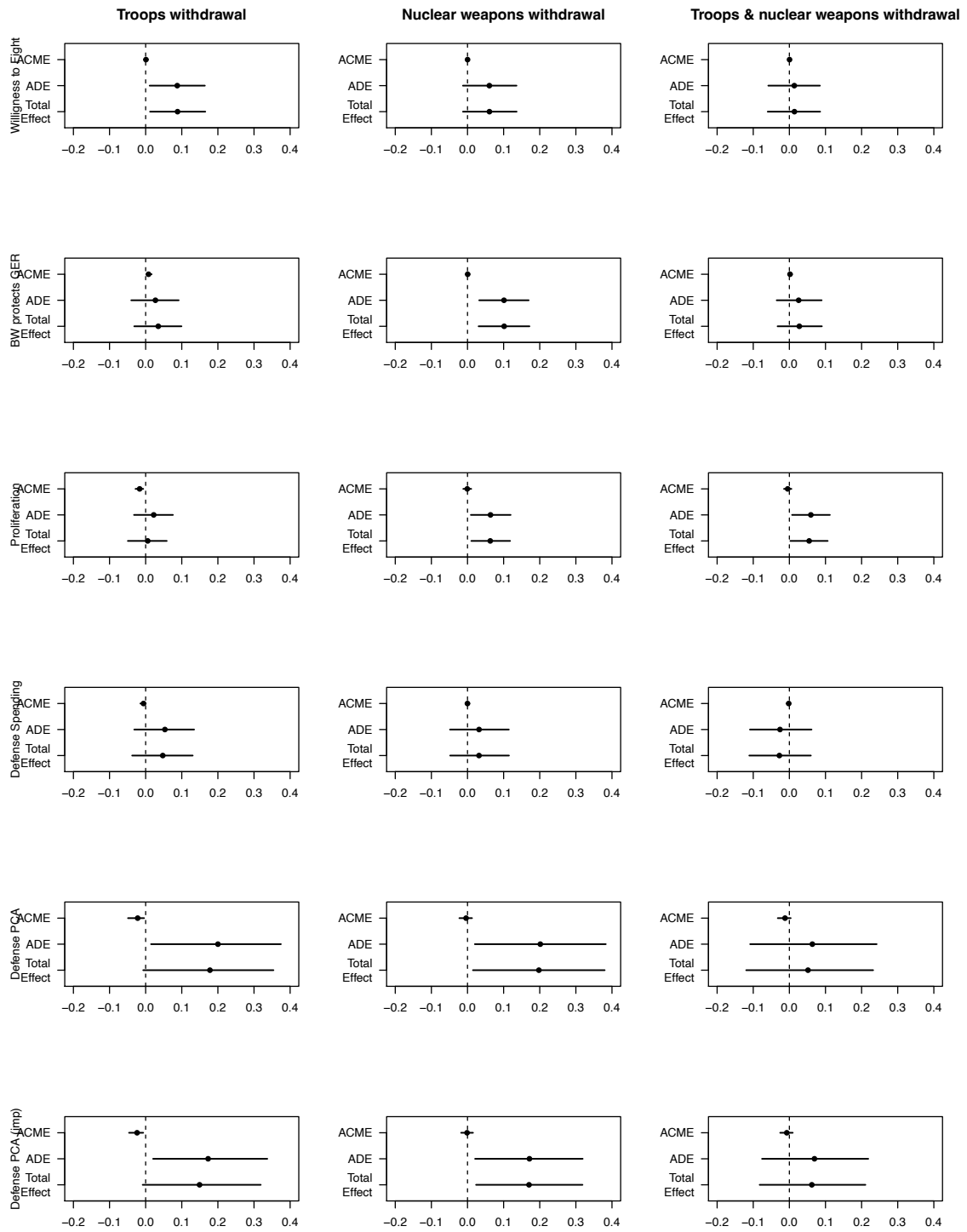


Figure 16: Mediation Analysis, coefficient plots for Germany. Mediator: Threat PCA

5 Conclusion

Nuclear weapons remain an existential threat to human life. While students of international relations might have questioned the viability of nuclear weapons research just a couple of years ago, few would do so today.³⁴⁷ There are perhaps no higher stakes in social science research when it comes to the preservation of human life than in the research on nuclear weapons. Thus, it is surprising that scholars have largely omitted to analyze foreign deployed nuclear weapons. Indeed, there are numerous possible pathways that link the use of tactical nuclear weapons, the types that have been deployed around the world since 1954, to an all-out nuclear war. After all, these systems are designed to be used on the battlefield. This risk has painfully been brought back to public consciousness by Russia's full scale invasion of Ukraine in 2022. Throughout the Cold War, the Soviet Union, the United Kingdom, and the United States deployed their nuclear weapons abroad. Today, five states hosting U.S. nuclear weapons remain, with the possibility of future Russian deployments looming.³⁴⁸ My dissertation has addressed the research gap on foreign deployed nuclear weapons by conducting a thorough examination of the causes and consequences of U.S. nuclear deployments. In the following chapter, I summarize my findings, discuss limitations and possibilities for future research, highlight the policy implications of my research, and provide an outlook on potential future scenarios involving foreign deployed nuclear weapons.

5.1 Summary Of The Research

The dissertation provided important insights into the causes and effects of nuclear weapon deployments, with a particular emphasis on the role of assurance. In this regard, I offered a novel conceptualization of assurance that distinguishes it from extended deterrence and power projection. Indeed, the scientific literature has identified the need to differentiate assurance from other interstate strategies.³⁴⁹ Specifically, extant research has often conflated extended deterrence and assurance. However, I showed that these strategies can be separated based on the target of the signal and the (non)use of threats. Furthermore, assurance has frequently been subsumed under non-proliferation, while in reality, non-proliferation is just one of many potential goals of interstate interactions that can be achieved through either non-coercive (assurance) or coercive (extended deterrence, power projection) strategies. My findings revealed that U.S. nuclear weapon deployments have primarily followed an assurance logic, as outlined in *Chapter 3*. However, there is evidence of a mismatch between intent and outcome. Although the United States aims to assure its allies

³⁴⁷Gartzke and Kroenig, 2017, p. 1854.

³⁴⁸Karmanau, 2023.

³⁴⁹Goldgeier and Wojtowicz, 2022, pp. 739–740.

with these deployments, citizens of host states often hold significant reservations about them, as detailed in *Chapter 4*. Consequently, this skepticism can lead to reduced defense contributions – an outcome that is hardly in line with U.S. preferences.

Chapter 2 offered a brief overview of the history of foreign deployed nuclear weapons, utilizing secondary literature and archival documents as sources. The overview showed that most deployments started in the 1950s, and that some of them were the result of American initiatives. However, in other cases, allies directly approached the United States to request deployments on their territory. Furthermore, some allies were dissatisfied with the usual agreements in which the deployments were embedded and sought more extensive bilateral consultation rights. In addition, I illustrated the preferential treatment that the United States gave to NATO allies, as well as the variations in the number of unique deployed systems and the degree of control granted to allies. Through this historical overview, I showed the political and strategic contexts that have influenced the development of foreign deployed nuclear weapons over time.

In *Chapter 3*, I built on these descriptive insights to develop a theory of U.S. nuclear weapon deployments. Specifically, I outlined how assurance, extended deterrence and power projection, i.e., direct deterrence and compellence, cause nuclear weapon deployments. To begin, I distinguished assurance, a non-coercive strategy, from coercive strategies such as extended deterrence and power projection. Within these categories, I further differentiated between positive assurance, which seeks to convey no intention of harm (“I will not attack you”), and negative assurance, which conveys intentions of protection (“I will protect you, if you are being attacked”). In addition, extended deterrence, direct deterrence and compellence can be differentiated by looking at the beneficiary. Extended deterrence aims to protect another state, while direct deterrence and compellence are primarily self-serving. Another important dimension is the intention behind the signal, which can either be to maintain the status quo (extended and direct deterrence) or to change it (compellence).

In the second part of the conceptualization, I focused on the means and goals associated with assurance. This is critical because previous research has often conflated assurance, a strategy, with the objectives that can be achieved through its use, particularly non-proliferation.³⁵⁰ As demonstrated in the dissertation, assurance can rely on a range of methods, from military deployments to promises of nuclear non-use, to attain numerous goals, such as preventing an arms race, promoting non-proliferation, or sustaining a global network of allies. In sum, this comprehensive conceptualization fills a significant gap in the literature and can be readily applied to various questions in the field of international relations.

One of the immediate applications of this conceptualization is to the understanding of U.S.

³⁵⁰See for example: Lanoszka, 2018; Fuhrmann and Sechser, 2014a, p. 461; Knopf, 2012, p. 387.

foreign nuclear deployments. The chapter revealed that assurance is a key factor in explaining these deployments. The United States is more likely to deploy nuclear weapons, and to deploy a greater number of unique nuclear armed systems, to allies that possess the capability to act independently from their guardian. The use of nuclear weapons for assurance purposes reduces the likelihood of these states to explore alternatives to U.S. protection, thereby sustaining their position within the U.S. alliance system. Previous studies have overlooked the role of assurance in these deployments.³⁵¹ Additionally, while there was evidence for the role of power projection, I found little support for the commonly held belief that extended deterrence causes U.S. nuclear weapon deployments.

The final contribution of this chapter was the creation of an original dataset on U.S. nuclear weapon deployments, which included detailed information on nuclear systems deployed in each host state since 1954. The dataset records the presence of nuclear capable delivery vehicles with corresponding nuclear ammunition. For example, in 1965 the United States deployed nuclear ammunition for bombs, the Honest John, the M110 8-inch Howitzer, and the Nike Hercules to Greece. I also include technical information such as the maximum range and the operation area (air-to-ground, air-to-air etc.) of each nuclear armed system. Additionally, information on the level of control the host state has over the use and non-use of the nuclear weapons is added. In recent years, there has been a growing interest in the specifics of nuclear force postures – in contrast to simply measuring whether a state possess nuclear weapons or not – among researchers.³⁵² However, data on foreign deployed nuclear weapons has been scarce. My dataset fills this gap. It provides opportunities for future research on the determinants and consequences of different types of foreign deployed nuclear weapons.

Chapter 4 turned to the consequences of foreign deployed nuclear weapons.³⁵³ Contrary to conventional wisdom and prior research, the main argument of this chapter suggested that U.S. military deployments, including conventional and nuclear forces, might evoke fears rather than a sense of protection among host state citizens. This is particularly true when citizens are skeptical of the United States or do not subscribe to the logic of extended deterrence. For such citizens, we argued that disengagement, i.e., abandoning national defense altogether, or self-insurance, i.e., investing in national defense to achieve independence from the mistrusted guardian, are more probable than the commonly posited free-riding theory, which critically hinges on the fact that citizens feel protected. Numerous opinion polls have shown that a significant proportion of citizens in host states harbor doubts about U.S. military deployments. Surprisingly, previous research has

³⁵¹Fuhrmann and Sechser, 2014a.

³⁵²See for example: Gartzke and Kroenig, 2014; Narang, 2013; Kroenig, 2013; Gartzke, Kaplow, and Mehta, 2014.

³⁵³Based on a paper that is co-authored with Julian Wucherpennig.

rarely considered the possibility that these deployments may not enhance the host state's sense of security. The theory expounded in this chapter remedied this oversight.

The hypotheses of free-riding, disengagement, and self-insurance were put to the test through a two-part empirical analysis: First, World and European Value Survey data was used to demonstrate that U.S. military deployments reduce the subjective need for national defense among citizens of host states. This applies to the supply side, citizens' willingness to fight for their country, and the demand side, the importance placed on national defense forces. In a second step, the study implemented a survey experiment in Germany and the Czech Republic to uncover the underlying causal mechanisms. Respondents again showed a lower subjective need for national defense in the presence of U.S. military deployments. However, the survey experiment also indicated that the deployments cause increased threat perceptions and that these in turn cause an increase in the subjective need for national defense. Thus, these results question the logic of free-riding, but they are in sum also inconclusive. Above all, they suggest that the relationship between military deployments, threat perception, and citizens' subjective need for national defense is highly complex. An important finding that expands the often monocausal literature on military deployments.

Beyond the specific topics of my dissertation, my work also contributes to broader questions in international relations. Through my investigation of how nuclear deployments affect citizens' opinions on national defense, my work sheds light on the larger field of public opinion on nuclear weapons and arms control. Moreover, my research contributes to the literature on non-proliferation by discussing the spread of nuclear weapons through deployments. Additionally, the findings have important implications for nuclear strategy at large: For instance, if host state citizens are not assured by nuclear deployments, how does this affect nuclear deterrence? In what ways does arsenal diversification impact extended deterrence? What does this mean for ever more capable conventional strike systems? How does the reliance of U.S. alliances on nuclear weapons influence prospects for nuclear abolition? These are just some of the questions that I have touched upon in my research.

5.2 Limitations And Future Research

This dissertation makes a valuable contribution to the advancement of both theoretical and empirical knowledge in the field of nuclear security and beyond. Nevertheless, as with any research endeavor, it is important to acknowledge the limitations. First, and perhaps most obvious, the research does not offer a conclusive evaluation of the relationships between assurance, extended deterrence and power projection. Although *Chapter 3* and *Chapter 4* highlighted how these interstate strategies complement and compete with each other, they did not explore the relative

importance of each strategy under varying conditions. Indeed, in *Chapter 3*, I found empirical evidence for both assurance and power projection as a cause of nuclear weapon deployments. Future research should investigate the weight and conditionality of these factors to provide a more comprehensive understanding of the dynamics of nuclear deployments.

Chapter 4 also touched upon the question of how assurance, power projection and extended deterrence relate to each other by examining the consequences of foreign military deployments. How citizens' perceive the different motives behind U.S. military deployments should critically influence their reactions to them. If citizens believe that the deployments are primarily caused by power projection, they may respond with disengagement or self-insurance. Conversely, if they believe the U.S. is seeking to protect them, they may be inclined towards free-riding. However, the results from the study were inconclusive, with partial evidence for each of the competing hypotheses. Some of this might be explained by inter-country differences between Germany and the Czech Republic, a promising avenue for future investigations. Another possibility is the presence of unobserved confounding factors that influence both threat perception and the subjective need for national defense. Importantly, in our survey experiment we could not simultaneously randomize military deployments, the treatment, and threat perceptions, the hypothesized mediator.

Second, this dissertation did not extensively explore power projection, which involves direct deterrence and compellence, beyond previous research. However, the concept raises interesting questions related to foreign military deployments, particularly regarding whether these deployments actually substantiate attempts of power projection. While my study, as well as existing research, has found considerable evidence that foreign nuclear deployments are caused by power projection, we still lack knowledge about their effects. My dissertation has made a first step into this direction by looking at the consequences of power projection on defense policy preferences of host state citizens who believe that the deployments are caused by self-serving motives. However, it remains unclear how and under what circumstances states would utilize these deployments to bolster direct deterrence and compellence, let alone if it works. Because nuclear deployments accord to the logic of power projection, it is intriguing to shift gears and investigate their impact on potential adversaries: Do these deployments enable states to compel their adversaries more effectively, or to better protect themselves?

Third, my study did not support my initial hypothesis that the United States deploys nuclear weapons more frequently to states with close relationships to other major powers. As I argued in *Chapter 3*, these friendly relationships should in theory allow allies to be able to pursue a more independent foreign policy, in turn incentivising the United States to bind the ally through assurances. However, the opposite seemed to be supported by the data. If anything, close rela-

tionships with major powers appeared to decrease the likelihood of nuclear deployments, which may be due to concerns about the leakage of sensitive information to adversaries. Indeed, archival documents provided preliminary evidence that decision-makers in the United States were worried about the safety of secret technical information.³⁵⁴ Therefore, a more thorough investigation into the interplay between information security and strategic planning as factors influencing nuclear deployments represents a promising direction for future research.

Finally, it is important to note that while the dataset used in this study provides exciting avenues for future research, it also has limitations. Most importantly, there is a lack of data on the range of aircraft assigned to use nuclear weapons in each host state. One issue is that in numerous instances, both the United States and host nations possessed aircraft that had the potential to be equipped with nuclear capabilities. Especially information on the presence of U.S. aircraft stationed in other countries is incomplete and difficult to recollect. This creates a challenge in determining which aircraft were located in a nuclear host state during a specific year and which ones were specifically earmarked for nuclear missions. Future versions of the dataset should still attempt to fill this gap. A more challenging problem relates to the number of warheads deployed in each state. This information will likely be unavailable to the foreseeable future. As a result, a second best alternative is to use the number of unique deployed systems as a proxy, as I did in this dissertation.

Despite its modest shortcomings, my data collection opens up many possible future research avenues. For example, one could look at the effect of different nuclear systems on a variety of outcomes: First, do some nuclear-armed systems embolden host states to engage in reckless actions more than others due to their technical specifications (moral hazard)? For instance, systems that can strike deep into enemy territory may induce riskier behavior. One example are the Jupiter missiles deployed in Turkey and Italy, which were capable of reaching Soviet territory, while many other systems could only strike Warsaw Pact countries. Another potential avenue for future research is to investigate whether offensive nuclear weapons embolden host states to become more aggressive, while defensive-oriented systems (e.g. air-defense) have the opposite effect. Second, how do technical specifications relate to direct and extended deterrence, and do some systems enable states to compel adversaries better than others? Third, I have demonstrated that host state citizens can be doubtful about the advantages of nuclear deployments. However, it is worth exploring whether certain systems trigger more negative reactions than others. For instance, is a higher number of delivery vehicles perceived as particularly hazardous and reckless, especially by citizens who do not endorse the concept of (extended) deterrence? Fourth, U.S. decision-makers

³⁵⁴Burr, 2020b, document 26, p. 4, and document 5, p. 38-39.

might be concerned about the potential disclosure of sensitive information from host states to adversaries, which could influence deployment decisions. While verifying this supposition would necessitate additional archival and other qualitative evidence, my dataset can help to systematically test resulting hypotheses.

I plan to continue working on these issues in the future. One of my main objectives is to investigate whether certain nuclear systems generate more fear among host state citizens than others. To achieve this, I plan to conduct quantitative text analyses on discussions in host states related to specific deployed nuclear delivery vehicles. I want to look into whether some systems are discussed more often than others, and if some are considered to be particularly dangerous or provocative. This could be further enhanced by an observational data analysis that combines existing survey data with my nuclear deployment dataset, while taking into account the findings of the quantitative text analyses. In addition, my objective is to broaden the dataset by integrating comprehensive data on nuclear weapon deployments by the Soviet Union and the United Kingdom. To achieve this goal, I have already commenced the process of gathering relevant information.

5.3 Policy Implications And Future Scenarios

What lessons can political decision-makers draw from the findings of this dissertation? First and foremost, it is essential to recognize that assurance is a multifaceted endeavor that operates on different societal levels. While foreign policy elites may support military deployments, some segments of the population might view them with greater skepticism. This can breed animosity, as citizens perceive their protectors to pursue malicious objectives with the deployments. In the long run, these citizens are likely to rally behind domestic policies that contradict a guardian's preferences, particularly in democracies where popular sentiment plays a crucial role in determining policy outcomes. Shifting the focus from the macro to the micro level provides valuable insights into these trade-offs.

Further, I highlighted the distinction between assurance and extended deterrence, which has real-life implications. Importantly, what provides assurance may not necessarily deter, and vice versa. This is because assurance is intended for the protected state, while extended deterrence is directed towards potential aggressors. Importantly, protégés and adversaries may have different risk tolerances, threat perceptions, and beliefs, leading to varied perceptions of military deployments. For instance, research indicates that tripwires in the Baltic states may have less of an assurance effect than commonly thought.³⁵⁵ At the same time, they might still deter Russia. Employing my conceptual framework to examine military deployments enables us to consider these crucial

³⁵⁵Blankenship and Lin-Greenberg, 2022b.

nuances.

Another important takeaway from my dissertation is that countries have varying assurance needs. For instance, the survey experiments in *Chapter 4* revealed noticeable differences in the responses of German and Czech citizens. An interesting example was a query in which the respondents were asked if they would support their country pursuing nuclear proliferation. In the (for Czechia hypothetical) scenario of a U.S. military presence in their respective country, Czech respondents were more likely to support a national nuclear weapon, while the opposite was true for German respondents. It is worth noting that the general perception of threat tends to fuel aspirations for nuclear proliferation, which is another important conclusion to draw from this study.

Finally, my research highlights the leverage protégés have over powerful guardians, a phenomenon that has been previously studied under various conditions.³⁵⁶ Specifically, I demonstrated that the United States deploys nuclear weapons to states it considers likely to withdraw from its alliance system. As a result, these countries can leverage their position to receive special security guarantees. For example, historically, Germany has arguably used this leverage to keep the United States in Europe and on its territory, despite popular opposition.

What are the practical implications of my findings for the immediate future? Russia's expanded attack on Ukraine, an increasingly hostile China, an ever more sophisticated North Korean nuclear arsenal, and the threat of Iranian nuclear proliferation: The current state of world affairs offers plenty reasons for U.S. allies – from NATO to Australia to South Korea and Saudi Arabia – to ask for tangibly security guarantees. Although there are no definitive plans for new nuclear deployments, this does not imply an absence of discussion. In South Korea, debates about a national nuclear deterrent are picking up pace, along with the idea of renewed U.S. deployments to the peninsula.³⁵⁷ In addition, with the demise of the INF Treaty in 2018, Polish Foreign Minister Czaputowicz stated that his country would be prepared to host U.S. missiles that fall under the treaty range.³⁵⁸ Two years later, the U.S. Ambassador in Warsaw suggested relocating nuclear weapons from Germany to Poland, and in 2022 Polish President Duda reconfirmed his country's interest in hosting U.S. nuclear weapons.³⁵⁹ Continued Russian aggression against Ukraine, and possible nuclear deployments in Belarus, will likely increase the frequency and intensity of these debates.

During the Cold War, it became clear that assurance demand and supply do not always meet.

³⁵⁶James, 2022; Henke, 2019, pp. 155–157; Spindel, 2023; Keohane, 1971; Risse, 1997.

³⁵⁷Pillai Rajagopalan, 2023; Sukin, 2023; Field, Shelley, and Griffiths, 2017.

³⁵⁸Sieradzka, 2018.

³⁵⁹Rosa Hernández, 2022; Pifer, 2020.

This has largely remained true. Today, powerful U.S. allies such as Germany and France in Europe, or Japan in Asia, might fear escalation above all. Conversely, allies that are more directly threatened by Russia, North Korea, or China may be more welcoming to the idea of ramping up nuclear deployments. From the U.S. point of view, nuclear deployments entail considerable risks, and they are not the only means to achieve assurance. Indeed, it is about time to revisit the extended deterrence architecture in Asia. For example, nuclear weapons are not included in the mutual defense treaty between South Korea and the United States. Instead, each year a joint statement outlines the nuclear dimension of the security arrangement.³⁶⁰ While South Korea and the United States have started to explore new avenues for nuclear consultation, a multilateral discussion forum would be better suited for the problems ahead: A Nuclear Planning Group for allies outside of Europe.³⁶¹ However, it remains to be seen if a software solution is possible without at least some allies having access to the hardware (nuclear deployments). Lastly, in Europe, further conventional deployments in Central and Eastern Europe and the inclusion of more allies in nuclear support missions (SNOWCAT) could alleviate some concerns. History has shown that the United States has a variety of tools at its disposal to provide assurance, ranging from pursuing conventional arms control agreements with other major powers to the inclusion of allies in strategic decision-making to military deployments. Given the current political climate, it is crucial for the United States to prioritize assurance and communicate the credibility of its security commitment to its allies in subtle and nuanced ways.

³⁶⁰For the 2022 statement see: U.S. Department of State, [2022](#)

³⁶¹Shin, Hunnicutt, and Choi, [2023](#).

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