Deterring Unequally: Regional Power Nuclear Postures and International Conflict

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It is almost a matter of faith amongst theorists of nuclear deterrence that the acquisition of nuclear weapons is the fundamental game-changer in a state’s quest for security. But what kind of nuclear forces are enough to deter? The existing theoretical literature on this question evinces a pervasive ‘existential bias,’ which argues that a state ought to be able to deter conflict with the very existence of even small nuclear forces. Indeed, Kenneth Waltz has famously argued for the “credibility of small deterrent forces” which ought to be sufficient to prevent conventional wars, implying that only a handful of nuclear weapons are required to credibly establish Thomas Schelling’s well-known “threat that leaves something to chance” in deterring even conventional conflicts.1 The extant quantitative work on nuclear deterrence very explicitly expresses this existential bias by treating all nuclear states as equivalent once they acquire even a single nuclear weapon. This assumes that a state with one nuclear weapon literally reaps the same deterrence effect as states that have a mature second-strike capability or even a first-use capability. Not only is this theoretically suspect, but is this empirically true?

Existing empirical work is simply unsure. This is largely due to the focus on the superpower experiences of the United States and the Soviet Union, whose development of tens of thousands of nuclear weapons belied the arguments of the existential school. The superpowers developed massive nuclear arsenals to deter each other without first settling on an answer to how much it takes to deter conventional conflict.2 Was it the tens of thousands of nuclear weapons oriented for first-use as their experience might suggest, or would just a few weapons capable of nuclear retaliation have sufficed, as some Cold War deterrence theorists ultimately argued? Sixty-five years after the development of nuclear weapons, we still do not have an answer to this question, particularly since the superpower development of overkill arsenals outpaced thinking on this critical issue. Indeed, the superpower nuclear balance is probably not the best guide for analyzing the precise relationship

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between nuclear weapons and deterrence, for several reasons. First, the US and USSR were so much more aggregately powerful than the other states in the system that their ability to deter non-superpower states was largely overdetermined. Second, due to resource constraints and simple learning, the large nuclear arsenals developed by the superpowers have not been, nor are likely to be, replicated by any other state. In fact, the superpower deterrence equation is almost entirely irrelevant to all the other present and emerging nuclear powers which have orders of magnitude smaller nuclear arsenals. Thus, isolating the level of nuclear forces required to deter conflict from the superpower experience is riddled with methodological and empirical difficulty.

Instead, it is the experiences of the regional nuclear powers—the non-superpower states with independent nuclear forces—that are perhaps most relevant to answering the crucial question of precisely what kind of nuclear forces are required for conflict deterrence. The regional nuclear powers developed nuclear forces along the same order of magnitude as each other (less than several hundred) and all operated and maneuvered below the power plane of the US and USSR, thus facing different constraints and opportunities. However, they have had widely different success in deterring conflict. Pakistan has been able to successfully deter Indian conventional power on numerous occasions, but India has not been able to do likewise against Pakistan, as the 1999 Kargil War demonstrated. Israel has had serious deterrence failures against its adversaries in 1973 and 1990 even though it had nuclear weapons. Why have these states had differential success in deterring conventional conflict even though they all had roughly the same number of nuclear weapons? Answering this question is of immediate theoretical and policy importance, particularly as the emerging proliferation landscape unfolds, which by definition will include only regional powers in the future.

I argue that the present cloudiness in our understanding of nuclear deterrence is largely due to the twin problems of the Cold War hangover and the explicit ‘existential bias’ in especially the
theoretical and quantitative studies of deterrence. Indeed, the dichotomous focus on whether a state simply has nuclear weapons or not is a serious conceptual misspecification. This article thus attempts to advance our theoretical and empirical understanding of nuclear deterrence by (1) focusing on the critical experiences of the regional nuclear powers, which comprise the lion’s share of existing—and all of the emerging—nuclear powers, and which provides the most fertile testing ground for theories of nuclear deterrence; and (2) shifting the unit of analysis away from the mere existence of a nuclear weapon to nuclear posture: the forces and employment doctrine states adopt to operationalize their nuclear weapons capabilities. I develop an original classification scheme which disaggregates regional states’ nuclear strategies into three distinct nuclear postures: catalytic, assured retaliation, and asymmetric escalation. Using a statistical research design with this new independent variable, I test how variation in regional nuclear posture affects a state’s ability to deter conflict at various levels of intensity.

Nuclear weapons may deter, but I find that they deter unequally and as a function of a state’s nuclear posture. States with different nuclear postures reap different deterrence power from their nuclear arsenals. In particular, one posture, the asymmetric escalation posture, uniquely deters both dispute initiation and escalation against nuclear as well as non-nuclear opponents. The catalytic posture has had some serious deterrence failures, including several full-blown wars. The assured retaliation posture has also had little effect on a state’s ability to deter even high intensity conventional conflict. Contrary to the pervasive conventional wisdom, there is little evidence that the mere existence of nuclear weapons, or even secure second-strike forces, systematically or significantly deters conventional conflict. If a state wants to deter conventional conflict, it has to orient its nuclear posture to explicitly do so.

This is the first attempt, both theoretically and empirically, to disaggregate nuclear weapons states by their nuclear postures. The implications of these findings for our understanding of what it
takes to deter, and for policy debates about proliferation and counterproliferation, are profound. To reap a significant deterrent effect against conventional attacks from their adversaries, states have to do more than to simply acquire nuclear weapons, sometimes even more than developing secure second-strike forces. For scholars and policymakers alike, this suggests that the key independent variable of interest for stability amongst nuclear powers should be shifted from considering their acquisition of simply nuclear weapons to focusing on their nuclear postures. The implications for conflict in South Asia, the Korean peninsula, and the Middle East are significant. It also suggests additional points of leverage for counterproliferation policies: nuclear posture can be shaped even after a regional power acquires nuclear weapons.

This article proceeds in six sections. First, I briefly review the current thinking on nuclear deterrence, illustrating that existing empirical scholarship treats nuclear weapons states as virtually equivalent—evincing a strong existential bias—based on the assumption that the critical threshold in a state’s hunt for security is the acquisition of a basic nuclear weapons capability. I then lay out my typology of regional power nuclear postures and present the rationale for shifting our analysis away from pooling nuclear weapons states toward disaggregating them by nuclear posture, particularly amongst regional powers, hypothesizing that there should be differences in deterrent power as a function of different nuclear postures. The final sections empirically test whether these various nuclear postures generate differential deterrent effects. The asymmetric escalation nuclear posture uniquely and significantly reduces conflict initiation against a state across all levels of intensity against both nuclear and non-nuclear adversaries, and is therefore on average deterrence optimal.

**Moving Beyond the Existential Bias**

It is taken as simply dogma in the canon of security studies that the critical threshold in a regional state’s search for security is the acquisition of a nuclear weapons capability. Theories of nuclear
deterrent tend to focus on a particular threshold—either a single weapon or, sometimes, secure second-strike forces—as the point beyond which opponents will be deterred from initiating even conventional conflict against a nuclear state for fear of escalation to the nuclear level. Although the Cold War superpower experience involved the development of massive nuclear architectures, many influential deterrence theorists concluded that a basic nuclear weapons capability that generated even a risk of ‘plausible retaliation’ ought to provide a sufficient deterrent to conventional conflict. Indeed, since the end of the Cold War, scholars and practitioners have largely believed that the acquisition of a single or few nuclear weapons by a new (regional) nuclear state, or “existential deterrence,” will radically alter a state’s deterrence equation.

The logic behind this proposition is that the destructive power of the use of a single nuclear weapon is so great that even a small risk that a conventional conflict might escalate to its use ought to be inhibited. Indeed, Schelling’s logic in The Strategy of Conflict suggests that the “threat that leaves something to chance” of using even a single nuclear weapon could inhibit limited wars through the progressive “generation of risk”: limited wars risk escalation to general wars which risk nuclear exchange, and even a plausible threat of the latter should prevent armed conflict. Kenneth Waltz famously wrote, “Nuclear weapons lessen the intensity as well as the frequency of war among their possessors. For fear of escalation, nuclear states do not want to fight long or hard over important interests—indeed, they do not want to fight at all. Minor nuclear states have even better reasons than major ones to accommodate one another peacefully and to avoid any fighting.”

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3 See, for example, Waltz and Sagan 2002, Chapter 1.
4 See, for example, Schelling 1966; Gaddis 1987; Jervis 1988; Mearsheimer 1984/1985; Lieber and Press 2009. To be sure, there were practitioners and theorists such as Paul Nitze that argued that more maximal postures were required, but most scholarly theory ended up focusing on minimal nuclear forces or basic second-strike forces. Nuclear weapons may deter nuclear use, but both since nuclear and non-nuclear states have experienced no nuclear use since 1945, this is a difficult proposition to test. I focus here on the role of nuclear weapons in deterring conventional conflict.
5 This term, first coined by McGeorge Bundy, posits that the “mere existence of nuclear forces,” even ambiguous or non-weaponized, should induce caution in adversaries and deter aggression. See Trachtenberg 1985, 139.
Indeed, in theory, this constraint should be even more binding amongst regional nuclear powers where conventional breakdowns can happen quickly, thereby increasing the risk of a rapid escalatory spiral. A state facing a regional nuclear power should be extremely cautious in initiating disputes since the risk of rapid escalation to the nuclear level may be even higher than between the superpowers. Some scholars including Robert Jervis and Charles Glaser place the critical threshold at ‘mutual vulnerability,’ or secure second-strike forces. But theorists such as Waltz argue (and Jervis suggests) that this threshold is achieved rather easily, particularly at the regional level—again closer to the ‘existential’ level—because adversaries can never be certain of a fully disarming strike that would fully eliminate a state’s capability to retaliate with nuclear weapons, no matter how small its arsenal. Bernard Brodie argued, through example and with some caveats, that a “small menaced nation” need only have a single nuclear weapon which “it could certainly deliver on Moscow if attacked,” and that this ought to be “sufficient to give the Soviet government pause” and reap a deterrent effect. Waltz similarly contends that a state reaps deterrent benefit against conventional conflicts once it “has a small number of deliverable warheads of uncertain location…” and that only this state of ‘plausible retaliation’ need obtain for deterrence. On this point, even John Mearsheimer largely agrees with Waltz, concluding that “there is no question, however, that the presence of nuclear weapons makes states more cautious about using military force of any kind against each other.” According to the established logic then, the mere acquisition of nuclear weapons ought to be the crucial leap in a state’s security position.

As such, little has been theorized about the deterrence effects of choices states make about their nuclear arsenals after they initially develop them. Part of this lacuna has rested on another

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8 See Jervis 1989, p. 35; Glaser 1990; also Waltz 1981.
9 Waltz in Waltz and Sagan pp. 141-142.
10 Brodie 1959, p. 275. This may not have a war-winning effect, but a deterrent effect.
11 Waltz in Waltz and Sagan, pp. 142.
12 Mearsheimer 2001, p. 129. Mearsheimer does argue that security competition and conventional power are still relevant in a MAD world, but that nuclear weapons should make conflict against a state less likely.
mostly unarticulated and untested assumption advanced by theorists of nuclear deterrence: nuclear postures are simply optimized for a state’s security environment—as is often argued about the US and Soviet balance\textsuperscript{13}—and are therefore epiphenomenal, exerting no independent effect on a state’s ability to deter conflict. The implication is that there should be no difference in deterrence power across nuclear states, since once a state initially acquire nuclear weapons it simply optimizes its resulting arsenal size and orientation to its security environment. This further reinforces the existential bias, justifying the treatment of nuclear weapons states as equivalent once they acquire an initial nuclear weapons capability.

As a result, the existing empirical literature, both qualitative and quantitative, has tended to largely treat nuclear states as equivalent regardless of the size, structure, and orientation of their nuclear arsenals. The prevailing deterrence logic suggests that once a state acquires a nuclear capability, it is characteristically different than non-nuclear states and there ought to be little marginal utility to additional nuclear weapons or changes in force structure. Yet we still do not have clear understanding of whether the acquisition of nuclear weapons deters conflict and, if so, at what point and which types of conflict. For example, some of the more recent qualitative work on the effects of nuclear weapons in regional contexts has focused on South Asia because of the number of India-Pakistan crises both before and after they lived under the shadow of nuclear weapons.\textsuperscript{14} The bulk of this literature assumes that India and Pakistan are nuclear equivalents, even though they operationalize their nuclear forces in very different ways, with very real consequences on their ability to deter different levels of conflict.\textsuperscript{15} The move to disaggregate nuclear powers has not moved much beyond South Asia in the qualitative literature. In addition, one of the research challenges plaguing qualitative approaches to this question is the strategic selection effects of disputes initiated against

\textsuperscript{13} See Glaser 1990; Lieber and Press 2009.
\textsuperscript{14} See, for example, Ganguly 2008; Kapur 2008; Kapur 2007; Sridharan 2007; Leng 2000.
\textsuperscript{15} See Narang 2010a.
nuclear states because it is difficult to measure the ‘crises that don’t bark’ and when deterrence is successful.

In order to address these selection effects, the quantitative dispute literature has analyzed large-\(n\) datasets to estimate the deterrence effect of nuclear weapons by trying to measure levels of conflict before and after nuclearization. But this literature is guilty of very explicitly expressing the existential bias, simply including a dummy variable for whether a state has nuclear weapons or not in a particular year, which in practice treats the USSR during the Cold War as the nuclear equivalent of Israel post-1967.\(^{16}\) This literally assumes that one nuclear weapon has the same deterrent power as ten thousand, irrespective of how they are deployed. Work by Huth, Huth and Russett, Fearon, Bennett and Stam, Horowitz, Beardsely and Asal, and Signorino and Tarar on deterrence successes and failures follows this approach.\(^{17}\) Scholars have yet to disaggregate nuclear weapons states according to their nuclear type, the hypothesis being that nuclear postures matter, systematically producing differential deterrence and stability effects.\(^{18}\) The existing aggregation of nuclear weapons states into a single category may miss some of the variation that different postures produce in crises or dispute situations.

As a result, the quantitative dispute literature has generated mixed results in assessing the role of nuclear weapons on deterrence successes. As a representative example, Bennett and Stam note that their tests on the effect of nuclear weapons on the probability of various levels of conflict are indeterminate: “While variables are statistically significant, estimated effects differ in direction

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\(^{17}\) Ibid. Horowitz 2009 accounts for the age of a nuclear power, which is an important contribution, but still treats nuclear weapons powers as equivalent based on the mere possession of a nuclear weapons capability.

\(^{18}\) My approach is different from more recent attempts to include ‘arsenal size’ as a variable. The latter approach assumes that there is a linear effect of arsenal size on conflict deterrence, whereas I assume that there are threshold effects based on how arsenals are arrayed and deployed. In addition, there are large uncertainties around the size of a state’s nuclear arsenal, but there is less uncertainty about posture, both for analysts and more critically for adversaries.
across subsets and outcomes. Unable to estimate key effect on war probability.”19 This may be, in part, because of the large effect the superpowers have on all quantitative results testing the role of nuclear weapons on conflict. Because both the US and USSR both possessed nuclear weapons for the longest period and were involved in the most politically relevant dyads for conflict, they are overrepresented in dyad-year datasets designed to test the effects of nuclear weapons. Although there is a slight deterrent effect of nuclear weapons even including superpower fixed-effects, it is not a clear or robust result.

These results and the current approach to studying nuclear deterrence imply two correctives to advance our understanding of the effect of nuclear weapons on international conflict. First, it suggests that regional nuclear powers ought to be analyzed as a separate class of states. I define the regional nuclear powers as the non-superpower states with independent nuclear forces: China, France, India, Israel, Pakistan, and South Africa.20 These states developed nuclear arsenals roughly around the same size as each other (less than several hundred) and operated below the superpower plane in international affairs, and thus faced similar structural constraints and opportunities.21 Clearly, there is substantial variation in the aggregate power metrics across the regional nuclear powers, such as between China and South Africa. But, on key relevant dimensions including their geostrategic situation, the sizes of their nuclear arsenals, and their regional conflict landscapes, I posit that the regional nuclear powers can be reasonably treated with a single analytical lens. Regional nuclear powers for a variety of reasons—financial, technical, and through simple learning—have chosen

19 Bennett and Stam 2004, 112.
20 North Korea is excluded for temporal reasons (since it only credibly acquired nuclear capabilities in 2006); the United Kingdom is excluded because of its tight integration with US nuclear forces which, in practice, make its nuclear weapons effectively an adjunct force of the US; the Ukraine, Kazakhstan, and Belarus are excluded because, although they inherited nuclear weapons as newly-independent state, they never exerted independent control over them before transferring them back to Russia.
21 This term is also intended to appeal to previous work that argued for the unique structural situation of so-called middle or semi-major powers. See Katzenstein 1985.
fundamentally different approaches to operationalizing their nuclear arsenals than the superpowers.\textsuperscript{22} And they have had widely different deterrence success, making them a fertile and relevant testing ground for the effects of nuclear weapons on conflict. As such, this article focuses on the regional nuclear states because the similar power metrics and arsenal sizes, but varying deterrence success, amongst them allows me to crucially isolate the effects of nuclear weapons on conflict.

The second corrective is that the critical unit of analysis should not be simply a nuclear weapons capability, but nuclear posture. Nuclear posture is the incorporation of some number and type of nuclear warheads and delivery vehicles into a state’s overall military structure, the rules and procedures governing how those weapons are deployed, when and under what conditions they might be used, against what targets, and who has the authority to make those decisions.\textsuperscript{23} As Tara Kartha colorfully put it, without a nuclear posture “a much vaunted [nuclear] test remains simply a loud bang in the ground.”\textsuperscript{24} In this article, I thus use the term “nuclear posture” to refer to the capabilities (actual nuclear forces), employment doctrine (under what conditions they might be used), and command and control procedures (how they are managed and potentially released) a state establishes to operationalize its nuclear weapons capability. This focus on postures as a variable as opposed to declaratory nuclear doctrines is preferable because it maintains the focus on observable capabilities, organizational procedures and interests, and patterns of behavior that are measurable both to adversaries and analysts.

It is nuclear posture, rather than declaratory nuclear doctrine or the uncertainty of specific numbers, which ought to generate deterrent power against an opponent. Numbers of nuclear

\textsuperscript{22} See Narang 2010b.

\textsuperscript{23} As a definitional aside, the focus is intended to be on a state’s observable nuclear posture as defined above, as opposed to a state’s declared nuclear doctrine. A state’s nuclear posture is essentially its peacetime nuclear orientation and procedures for deployment and signaling during crises. Because of the challenges of studying doctrines in general, and nuclear doctrines in particular—which are highly classified, often unarticulated, untested, and of questionable credibility—I have chosen to focus on a critical component of doctrine, a state’s nuclear posture, in order to gain some leverage on the questions of interest.

weapons are fraught with uncertainty and the marginal utility of additional nuclear weapons without a change in posture or strategy—the probability and credibility of use in a given contingency—ought not to affect an adversary’s calculations about initiating conflict. Furthermore, states care more about what an adversary can do with its nuclear weapons than what it says about them. As such, I hypothesize that it is differences in nuclear posture that generates variation in a state’s ability to deter different types and intensities of conflict.  

In the Cold War, the United States and the Soviet Union evolved nuclear postures to eventually establish some degree of dynamic stability between them, and various postures had differential deterrent effects. Similarly, regional nuclear powers have adopted varied, but identifiable, nuclear postures across a spectrum of capabilities, management procedures, and transparency, with each having different deterrent effects.

I therefore move beyond the pervasive existential bias in the existing literature by unpacking the regional nuclear powers. I identify three types of regional power nuclear postures: a catalytic nuclear posture, an assured retaliation nuclear posture, and an asymmetric escalation posture. I then test the differential effects of regional power nuclear postures to see if a particular type of nuclear posture can achieve significant deterrent effects and, if so, against what kinds of opponents. In doing so, I hope to help resolve the cloudy results generated by the quantitative deterrence literature by specifying which type of nuclear states, if any, are better able to deter conflict at various levels of intensity. The research design in this paper largely circumvents the strategic selection effects that plague purely case-study work on deterrence by systematically testing the effect of posture on conflict across states both before and after adoption, thereby measuring the effective reduction in conflict a state experiences after it adopts a particular nuclear posture. I find that while the catalytic and assured retaliation postures generate little deterrent power—belying the expectations of the

25 See, for example, Feaver 1992/1993.
26 This literature is vast; see, for example, Freedman 2003; also see Lieber and Press 2009.
existential school—the asymmetric escalation posture uniquely deters conflict at most measurable intensities against both nuclear and non-nuclear adversaries.

**A Typology of Nuclear Postures**
Empirically, I identify three analytically distinct nuclear postures that have been adopted at the regional level. There can be variations on a theme, but the broad character of nuclear postures at the regional level falls into three categories:

**Catalytic.** A catalytic nuclear posture relies on an ambiguous nuclear capability aimed at “catalyzing” third-party—often U.S.—military or diplomatic assistance to defend the state by threatening to unsheathe nuclear weapons and escalate a conflict should assistance not be forthcoming.  

27 Critically, it depends on there being at least one third party whose interests in the region’s stability are sufficiently high that it could potentially be compelled to intercede to effect de-escalation; this posture is therefore generally an option available only to regional powers, since it requires the availability of a more powerful patron (e.g., a superpower). This posture tends to emphasize centralized control and thus does not integrate nuclear weapons into a state’s military doctrine—indeed, it relies on high levels of ambiguity surrounding capabilities and conditions of use—but uses them in a political gamble to accelerate third-party assistance by threatening their use as a last resort should the state’s vital interests be threatened. It can be executed with only limited nuclear weapons that may or may not be fully assembled or even fully functional, because even a small risk of use may be sufficient to trigger third-party intercession. The key feature of this posture is that the deterrent signal is not sent directly to the envisioned opponent (as required in “existential deterrence”  

28), but rather to a *third party* in an attempt to induce or blackmail its intervention. The

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27 This term was used to describe South Africa’s nuclear posture. See Terence McNamee, “The Afrikaner Bomb: Nuclear Proliferation and Rollback in South Africa,” in Cohen and McNamee 2005, 14.  
28 Existential deterrence is not a posture, but rather a property that may or may not be attained once a state acquires nuclear weapons. For regional states with small nuclear forces, if they have the availability of a third-party patron, a
attempt to draw in a third party is thus the defining feature of a catalytic posture, regardless of whether that attempt succeeds. Because third-party intervention is indirect and probabilistic, the catalytic posture may not have a strong deterrent effect on adversaries because they may calculate that they can achieve limited conventional war aims before nuclear weapons are operationalized and before third-party intervention occurs, or without triggering intervention altogether.

As an illustration, Israel adopted this posture and executed it during the 1973 Yom Kippur War. Three days into the war, as Syrian and Egyptian forces threatened Israel’s survival, Israel conducted operational checks on delivery vehicles in a manner easily detectible only to U.S. intelligence to signal that it was contemplating unsheathing its opaque nuclear weapons capability. The goal was to galvanize the U.S. government into rearming Israel with conventional weapons to enable it to defend itself and into pressuring the Soviet Union to rein in its Syrian and Egyptian clients. The key differentiating feature of this posture is that Israel directed its nuclear signal at the United States, not at Egypt or Syria; indeed, Israel’s nuclear capabilities failed to deter their initial assaults and subsequent escalation. South Africa also adopted a catalytic posture during the 1980s, as did Pakistan in the late 1980s.

**Assured Retaliation.** Unlike the catalytic posture which relies on indirect deterrence through probabilistic third-party intervention, the assured retaliation posture seeks to directly deter nuclear attack and coercion. To do so, it moves up the spectrum of capabilities and deployment procedures, and is distinguished by the development of survivable second-strike forces that target an opponent’s key strategic centers. There must be full transparency about capabilities, so that the intended opponent has no doubt about the state’s ability to retaliate with nuclear forces following a

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30 Liberman 2001; on Pakistan see Narang 2010a.
first strike, but deployment patterns can be ambiguous to enhance survivability. Indeed, survivability can be achieved by a variety of stewardship procedures (e.g., component separation and dispersion) or technical means (e.g., sea-based systems) that render it virtually impossible for opponents to be confident of achieving a disarming first strike, thereby plausibly assuring a retaliatory capability. Stewardship procedures that enhance survivability also enable a state with an assured retaliation posture to maximize assertive and centralized political control over nuclear assets, because retaliation needs simply to be assured, not necessarily immediate.

Because of the character of its capabilities and the potential delay in deploying and retaliating with nuclear forces, however, the assured retaliation posture may be incapable of deterring conventional attacks, which often requires the credible ability to immediately release pre-delegated nuclear weapons in a tactical theater. Particularly against a nuclear adversary, the assured retaliation posture may not deter limited—perhaps even intense—conventional conflicts because of the perceived high-level stability induced by (stable) mutual nuclearization (the so-called stability/instability paradox). An assured retaliation posture may therefore be appropriate for states with sufficient territorial or conventional force advantages against their primary adversaries, which thus need only deter threats and attacks at strictly the nuclear level. China and India have adopted assured retaliation postures (what they sometimes refer to as “credible minimum deterrence”), each relying on a small but secure and survivable nuclear force arrayed for an assured retaliatory strike against their primary opponents’ strategic and/or soft counterforce targets. There is nothing preventing a state with an assured retaliation posture from using nuclear weapons first—though India and China espouse no first use policies—but the key indicator is that these are

31 Targeting would have to be primarily countervalue, because the deployment procedures and associated delivery capabilities preclude rapid tactical or hard counterforce use. The aim is not assured destruction or massive retaliation, but assured retaliation. Pre-delegation may occur to survive a decapitation attempt, but not for warfighting purposes.


33 On India see, for example, Tellis 2001; Perkovich 1999; Singh 1998. On China, see for example, Fravel and Medeiros 2010; Medeiros 2004; Lewis and Xue 1988; Lewis and Xue 2006.
primarily oriented for a deterrence by punishment mission against high-value targets, not for a
deterrence by denial mission against conventional forces.

**Asymmetric Escalation.** Whereas the assured retaliation posture is oriented for a nuclear
second strike, the asymmetric escalation posture is geared for the rapid (and asymmetric) first use of
nuclear weapons against conventional attacks to deter their outbreak, operationalizing nuclear
weapons as usable war fighting instruments. A state with this posture must therefore have sufficient
tactical and potentially survivable second-strike strategic weapons to absorb potential retaliation.
Although peacetime deployments can be centralized, to credibly deter conventional attacks an
asymmetric escalator must have the ability to disperse and deploy assets extremely quickly and
enable their release on the battlefield through pre-delegative procedures to military end-users in the
event of a crisis to enable a deterrence by denial mission; it is thus the most aggressive option
available to nuclear states. To credibly threaten first use, this posture must be largely transparent
about capabilities, deployment patterns, and conditions of use.

The asymmetric escalation posture may have the most significant deterrent effect at all levels
of conflict-intensity due to the costly signal of credibly threatening early first use of nuclear weapons
against even conventional attacks. The trade-off, however, is that the credibility requirements of this
posture can generate significant command and control pressures that increase the risk of inadvertent
use of nuclear weapons. Thus, states that select asymmetric escalation postures are often those that
face extremely binding security constraints and therefore have little choice. For example, during the
Cold War, NATO and French forces faced a conventionally superior nuclear-armed proximate
threat in the Soviet Union and adopted deterrent postures that threatened the first use of nuclear
weapons against Soviet forces and strategic targets should they breach Western Europe.\(^{34}\) The
character of the asymmetric escalation posture can vary (e.g., massive retaliation vs. flexible

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\(^{34}\) See, for example, Yost 1984/1985.
response), but the key feature is the enabling of a credible asymmetric first use of nuclear weapons against conventional aggression to deter its outbreak. This posture does not require numerical superiority of nuclear weapons—the two are often conflated—but is instead dependent on how a state arrays its nuclear forces and threatens to credibly use them. Table 1 summarizes the three nuclear postures and their characteristics.

[TABLE 1 HERE]

Although, for example, an asymmetric escalation posture may have unintended catalytic effects, I classify a state’s posture by its outermost edge if one arrays these postures as concentric circles with catalytic in the center, then assured retaliation, then finally asymmetric escalation, which is a conceptually intuitive way to organize these postures by how resource and organizationally intensive they are. The classification scheme of these postures is not meant to obscure the fact that there are differences within them, to be sure. Nevertheless, across certain key dimensions, these doctrines are analytically distinct, internally coherent, and are a useful typology to analyze the variation in regional power nuclear doctrines. While some states, such as India, have adopted the same posture throughout their nuclear histories, others such as Pakistan and Israel have shifted postures.\(^{35}\) The fact that these postures are sticky and take time to both develop and shift is a double-edged sword: on the one hand, the stickiness reduces a lot of the measurement uncertainty; on the other hand, it means that temporal variation is rarer. Nevertheless, empirically, the coding of regional power nuclear postures according to this typology is depicted in Table 2.\(^{36}\)

\(^{35}\) A theory for why regional nuclear powers choose or shift nuclear postures is beyond the scope of this article, but is covered in substantial detail in Narang 2010b.

\(^{36}\) For a fuller characterization of each country's nuclear posture see Ibid.
Theory and Hypotheses: Deterrence Effects of Nuclear Postures
In this article, nuclear postures are taken as an independent variable to determine whether various regional power nuclear postures have differential effects on states’ ability to deter the outbreak of conflict of various intensities. Compared to both when the state did not have nuclear weapons and compared to other nuclear and non-nuclear states, what effects should these different postures have on a state’s ability to deter the eruption of conflict (general deterrence) against both nuclear and non-nuclear opponents?37

In theory, these different postures should result in different likelihoods of conflict initiation and escalation because they generate different spaces for conflict. Drawing on the literature on costly-signaling and the credibility of threats,38 these various nuclear postures create different thresholds at which the threat to use nuclear weapons becomes credible. Each of these different thresholds establishes the point at which a given intensity of conflict should be deterred. This variation thus creates a different space for conflict against each type of regional nuclear power. In the case of catalytic postures, the threat of nuclear use is very low at most realistic conventional thresholds, and the likelihood of third-party intervention is probabilistic, creating a large space for conventional conflict and escalation before the threat to use nuclear weapons becomes relevant. In the asymmetric escalation case, that space is compressed so tightly, since even limited conventional breaches can credibly trigger nuclear threats owing to the costly way in which states array their nuclear assets in such a posture. These differences in the ‘enforced’ conflict-space should have a measurable effect on these postures’ ability to deter the frequency and intensity of conflict. I derive

37 See Fearon 2002. This is distinct from immediate deterrence, which is deterrence once a crisis breaks out and there has already been a general deterrence failure.
38 Ibid; Schelling 1960; Schelling 1966.
the following hypotheses for the effects of nuclear posture on conflict outcomes against both nuclear and non-nuclear adversaries, since the effects might be separable in theory.

**Catalytic postures** are primarily designed to draw international intervention when a state’s physical existence is (usually conventionally) threatened. Because this posture relies on a ‘bomb in the basement’—and not necessarily secure second-strike forces—whose use would only be contemplated or credible under near-fatal circumstances, its use is mostly non-credible in likely conventional, especially limited conventional, contingencies short of total-war. Since its primary utility is to compel third-party intervention beyond some red-line, it should therefore have little effect in deterring low-levels of conventional conflict that do not cross that red-line.

**Assured Retaliation postures** are perhaps best informed by the hypothesized stability-instability paradox against nuclear adversaries. Again, there is a wide-space for conventional conflict because nuclear threats are not credible in limited conventional wars since the weapons are often in a recessed state to maximize centralized management. Because this posture aims to deter conflict at the nuclear level and is oriented toward second-strike capabilities, the frequency of conventional conflict vis-à-vis certain nuclear actors may increase and may be unaffected vis-à-vis non-nuclear actors. That is, as some theorists such as Robert Jervis and Glenn Snyder argue, though the intensity of conflict may be capped because of this nuclear posture, the frequency at some lower conflict intensities may either go up or be unaffected depending on the opponent. Jervis argues that, “to the
extent that the military balance is stable at the level of all-out nuclear war, it will become less stable at lower levels of violence.” 39 Against nuclear opponents then, an assured retaliation posture may actually result in an increase in the frequency of lower levels of conventional conflict by capping escalation at higher intensity disputes. Against non-nuclear powers, however, though the risk of uncontrollable escalation may deter non-nuclear states from initiating intense armed conflict, assured retaliation postures ought to be mostly irrelevant in limited conventional contingencies. I would therefore not expect this posture to have a significant effect in deterring limited conventional conflict against non-nuclear opponents:

\[ H_{\text{Assured Ret}}: \text{The frequency of conventional conflict in nuclear dyads may increase at lower levels of violence, but should be unaffected or decline at higher levels; the frequency of conventional conflict in non-nuclear dyads should decline, particularly at higher levels of violence.} \]

**Asymmetric escalation postures** should have the most significant effect on a state’s international relations post-nuclearization and cross-nationally. With this nuclear posture, a state threatens to use nuclear weapons against even conventional breaches and takes extremely costly measures to make that threat credible and salient. Contrary to the predictions of the stability-instability paradox, I hypothesize that there should be a substantial decrease in the frequency of armed conventional conflict directed at the state across all intensity levels. This marked reduction in conflict against both nuclear and non-nuclear opponents should derive from the asymmetric escalation posture’s ability to manipulate the risk of escalation early in a conflict by credibly threatening the use of nuclear weapons against even limited conventional attacks. By credibly threatening such graduated but rapid escalation, states with asymmetric escalation postures should experience a decrease in both the

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frequency and intensity of conflict against both nuclear and non-nuclear opponents. States that adopt this posture are likely to be those facing substantial conventional conflict, so this is a hard test of this hypothesis and any reduction in conflict levels would be a significant finding.

\( H_{\text{AsymmetricEscalation}} \): Frequency of armed conventional conflict across all intensity levels in both nuclear and non-nuclear dyads should decrease.

A summary table of the direction of these ‘first-difference’ hypotheses against both nuclear and non-nuclear opponents broken down by general deterrence (ability to deter frequency and intensity of conflict) relative to pre-nuclearization is depicted below in Table 3, where a positive effect means increased ability to deter (i.e. decreased conflict)

[TABLE 3 HERE]

These hypotheses unpack the predicted differential effects of posture and compete with the overall null hypothesis that there should be no variation in the deterrent effect of regional power nuclear postures. This observable hypothesis could obtain either because nuclear weapons serve as a basic ‘existential deterrent’ against both nuclear and non-nuclear opponents regardless of how the particular assets are incorporated or arrayed, or because postures are already strictly optimized for a state’s security environment as per the realist hypothesis and should therefore deter equally well. My hypotheses predict that there should be a differential impact of regional nuclear posture, with the asymmetric escalation posture being the most security-efficient in deterring conflict and escalation against both nuclear and non-nuclear adversaries owing to the costly signal of credibly threatening the first use of nuclear weapons in conventional conflicts.
One potential confounder is that the strategic interaction with a regional nuclear power may not be driven by what I characterize the posture to be, but by what the opponent believes the posture to be. For the most part, I assume that a regional nuclear power’s adversaries will have the same view of its posture as my classification because of the broad classification scheme of postures that I am employing and the focus on observable capabilities.

Research Design: General Deterrence Tests Data and Methods
This article focuses on whether a regional state’s adoption of a particular nuclear posture dampens, on average, the frequency of conflict across various levels of intensity. Because of the nature of this question, the most appropriate methodological avenue of investigation is a large-

\( n \)

analysis that looks at all states in the system across a large swath of time to isolate the average effects of adopting a specific nuclear posture on the frequency and intensity of conflict. I therefore present statistical tests which seek to explore the effect that regional power nuclear postures have on conflict dynamics with other states cross-nationally and cross-temporally from 1816-2001 (the full universe of available observations) as well as 1945-2001 (observations restricted to the nuclear era). The advantage of this method is that it is able to effectively measure the ‘crises that don’t bark’ by estimating the reduction in conflict initiation and escalation against a state after it has adopted a particular nuclear posture. By examining the full universe of dyadic-interaction observations, no selection bias is introduced into the study and one can attempt to measure a relatively unbiased effect of adopting a particular nuclear posture on deterrence success.

In order to test the effects of these various nuclear postures on general deterrence, I begin by following Bennett and Stam and employ a directed-dyad dataset consisting of over 1 million dyads, coded as Initiator (\( State A \)) vs. Target (\( State B \)), in the international system between 1816 and
That is, the structure of the dataset is organized such that, in every year, there is an observation for whether each state initiated a militarized dispute against every other state in the system and, if so, how far the conflict escalated. I also use a restricted dataset consisting of only politically relevant dyads, which are dyads that include interactions with major powers and geographically contiguous states (and those separated by some set distance by water). The subset of the dataset that includes politically relevant directed-dyads contains 116,057 observations. Some of the control variables included in the Bennett and Stam dataset have only been calculated through 1992. I therefore conduct one primary analysis using the dataset from 1816-1992 including the full complement of available controls. However, for my purposes, sufficient control variables have arguably been calculated through 2001, so I also used the EUGene software package to construct a directed-dyad set to include the dyads between 1816 and 2001 containing key conflict variables in order to test the effect of nuclear posture over this extended time period.

I primarily choose to follow Bennett and Stam because they have an algorithm to generate a dependent variable that is appropriate for my question. Specifically, the Militarized Interstate Dispute (MID) dataset has variables for dispute initiation as well as level of dispute escalation but there is no variable which combines both initiation and escalation. Therefore, following Bennett and Stam, I calculate a dependent variable which identifies both which side initiated a dispute and how high that dispute ultimately escalated after iterative moves. This ordinal dependent variable ranges from 0 to 4, and a summary table of the variable is shown below.

[TABLE 4 HERE]
Because this dependent variable captures both the decision to initiate a dispute and to escalate a dispute simultaneously, it is particularly appropriate as a measure for the deterrent effects of regional power nuclear postures. The tradeoff with this operationalization is that it prevents modeling dispute escalation as a multistage process because it only captures the final stage of escalation, and not each iteration.\(^4^2\) That is, it only captures that Pakistan initiated a conflict against India in 1999 that ultimately escalated to the mutual use of force; it does not capture the intermediate spiral of escalation and which side chose to escalate at each point.\(^4^3\) But the advantage to using this dependent variable is that it captures the strategic decision of State A to initiate a dispute against State B and the level of escalation that that dispute ultimately reaches after iterative escalation. It is therefore a direct test of the question of interest: once a state adopts a particular nuclear posture does the frequency and intensity of disputes initiated against it decline and, if so, by how much?

My independent variable of interest is nuclear posture. Because I am interested in the deterrent effect of various regional nuclear postures, I disaggregate the nuclear status of regional State Bs\(^4^4\), the target state in the directed dyad, into the different nuclear postures. In practice, this means creating a set of dummy variables for nuclear weapons states that includes catalytic, assured retaliation, asymmetric escalation, and other posture. These variables are coded according to the guidelines set forth in Table 2, with the US (and the UK\(^4^5\)) and USSR taking the value of other posture for the duration of their nuclear weapons capacity to isolate the effects that the various postures had on

\(^4^2\) Bennet and Stam 2004, p. 65.

\(^4^3\) There is only one level of the dependent variable (DV=2) for which this is problematic and may lead to some statistical anomalies where the DV=2 level seems odd, since it could be that State A initiated the dispute but a nuclear State B used force (hence DV=2) and forced A to back-down without reciprocating. In the rest of the levels of the DV, however, the strategic moves are clear (initiation (DV=1), both use force (DV=3), full war (DV=4)).

\(^4^4\) I also ran analyses that disaggregated State A in the analysis, to see if these postures had any effect on a state’s willingness to initiate disputes. That is, did the adoption of a particular nuclear posture embolden states to pick more, and/or more intense, disputes. The results were mixed, though the asymmetric escalation posture did increase a state’s aggressiveness slightly but varied by specification. The emboldening effect of this posture could also be totally endogenous and was entirely driven by Pakistan.

\(^4^5\) See footnote 20.
regional powers’ deterrent capacity. This research design is preferable to simply dropping observations that include the superpowers (plus UK) because one implication worth exploring is whether a particular regional nuclear posture was able to deter conflict even in dyads that potentially included a superpower. It also allows me to isolate deterrence effects for the superpowers specifically.

To provide a descriptive sense of the kind of conflict each nuclear posture has experienced, I present a frequency count for each level of the dependent variable by each posture-type below in Table 5. This table presents these counts for each type of nuclear posture once it was adopted by a target state in the directed-dyad data structure. Because the superpowers (plus the UK) have been nuclear states the longest, there are more dyadic observations for that category than the other three regional power types.

[TABLE 5 HERE]

Examining the frequency counts yields two striking observations. First, disputes between two states are (thankfully) relatively rare. But second, the regional power nuclear postures have not fared equally well in preventing the outbreak of higher levels of conflict. In particular, the asymmetric escalation posture experiences both many fewer disputes and many fewer that escalate to higher levels of intensity than the other two postures. Furthermore, the catalytic posture has experienced a disproportionate number of conflicts that have escalated to full-blown wars, suggesting some serious deterrence failures. However, without examining the full universe of observations to determine the reduction in conflict (or lack thereof) after adopting a particular posture and compared to non-nuclear states, we cannot infer anything definitive from these descriptive statistics.
I thus proceed with my statistical estimation, which focuses on the full universe of dyadic observations. Because of the structure of the dependent variable, the most appropriate statistical estimation, following Bennett and Stam, is a multinomial logit model which estimates the probability that the actual outcome (DV) will occur for each discrete value of the dependent variable given the set of independent variables. For example, it estimates the probabilities that the US in 2001 might initiate, say against Iran, no dispute (DV=0), a dispute that does not involve the use of force (DV=1), a dispute that escalates to one side using force (DV=2), and so on through war (DV=4). The probabilities of conflict for that US-Iran dyad in any given year must sum to 1.0 across the five levels of the dependent variable. This model is chosen over an ordered logit or probit model because it relaxes the assumption that the independent variables have a monotonic effect on the discrete levels of MID initiation and escalation. In other words, since the ordering structure is unknown in a given dispute—i.e. there can be a higher probability of a dyad experiencing a dispute short of war than it actually experiencing a full-blown war—a multinomial logit model is more appropriate than the alternatives.

This modeling choice, however, requires a slightly more sophisticated assessment of the statistical and substantive impacts of the independent variables of interest. Multinomial logit estimations produce multiple coefficients per independent variable. That is, it estimates the effect that an asymmetric escalation posture, for example, has on each level of the dependent variable. This means that the significance of a given variable cannot be assessed by examining the table of coefficients and associated $t$-tests, since a variable could have a statistically significant effect at some values of the DV and not others yet exert an overall statistically significant effect. Instead, one drops the entire variable, say asymmetric escalation, to see whether a model with that variable is more

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46 Bennett and Stam 2004, p. 64.
47 E.g. $Pr(DV=0)=0.75$, $Pr(DV=1)=0.03$, $Pr(DV=2)=0.01$, $Pr(DV=3)=0.15$, $Pr(DV=4)=0.06$. $\sum Pr(DV=i)=1.0$
48 There is little downside to using a multinomial logit model since it mathematically collapses to an ordered logit if there is indeed a monotonic structure for the dependent variable.
powerful than a model without the variable at standard levels of statistical significance. Thus, block likelihood ratio tests are employed to determine whether each posture has a statistically significant and systematic effect on the frequency and intensity of conflict outbreak.

To assess the substantive results, I present the relative risk ratio for each posture at each level of conflict intensity. This ratio is calculated by taking the model’s predicted probabilities and simulating what would happen, on average, if all target states in the dataset went from not having nuclear weapons to adopting a particular nuclear posture against either a non-nuclear opponent or a nuclear opponent, controlling for everything else. This measure is a clean way of interpreting how many times more or less likely conflict is at each level of intensity after adopting a given nuclear posture—especially since the probability of conflict between any two states in any two years is so low, this measure provides a relatively straightforward way to interpret how nuclear posture affects those already small probabilities. This is the method of choice for assessing substantive impact, following the procedure in Bennett and Stam. Relative risk ratios are interpreted as follows: a value of 1.00 means that adopting a particular posture has no effect on a state’s ability to deter conflict at that level—the probability of conflict at that level after adopting a given posture is exactly the same as the probability of conflict at that level before adopting that posture, so the ratio is 1.00. A risk-ratio of 3.00, however, indicates that the probability of conflict at that level after adopting a particular posture is three times higher than the probability before adopting the posture. And finally, a value less than 1.00 (e.g. 0.25) suggests that adopting a particular posture reduces the probability of conflict at that level by some factor (e.g. 4x). Thus, deterrence success is indicated by relative risk ratios less than 1.00.

I present results from (1) using the full set of independent variable controls for conflict found in a dataset spanning 1816-1992 as well as (2) using an expanded dataset through 2001 which

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49 This risk ratio is calculated using the actual population frequencies of conflict, not the odds ratio (which is predicted in cases where the empirical frequency of events is unknown).
has a truncated, but arguably sufficient, set of control variables. The controls included in the Bennett and Stam dataset include, at the monadic level: measures for GDP, whether the initiator has nuclear weapons, regime type, democratization, variance of democratization, and polity change all from Polity IV for each state in the dyad for every year. These variables are included to capture the effect regime type or regime transition has on the outbreak and escalation of conflict.

The dyadic level controls include dyadic defense pact (one dummy variable for defense pact between dyad members, one dummy variable if one or both states were members of NATO), arms race (a dummy variable which measures if the three year moving average of constant-dollar military expenditure growth is greater than 8 percent, following Diehl (1983) in the particular dyad), balance of conventional capabilities (the ratio of State A’s CINC score from COW to the total CINC capability within the dyad), and a distance-discounted measure of power following Bueno de Mesquita. Several measures of dyadic power transition are included as well: a five year moving average of the differential growth rates from COW as a proxy for power transition within the dyad, dyadic satisfaction with the status quo based on the $\text{Tau}_6$ as well as $S$-scores which measure alliance portfolio and foreign policy similarity within a dyad (interacted with the power transition variable and multiplied by -1 to achieve a measure of dissatisfaction with the status quo), and dyadic trade as a proportion of GDP for both initiator and target. All of these controls are designed to capture the effect that various dyad-level phenomena—such as an arms race between two countries (increasing chance of conflict) or a defense pact between them (decreasing chance of conflict)—has on the risk of conflict outbreak and escalation.

The system-level controls included in the full model include measures for hegemonic stability ($\text{british hegemony}=1$ from 1816-1918 and $\text{bipolarity}=1$ for 1945-1992) and concentration of capability following Singer, Bremer, and Stuckey (1972). These controls ensure that the effect of

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50 See Bennett and Stam 2004, Chapter 4.
nuclear posture is adjusted for periods where the international system was either more or less conflict-prone. To account for the time-series structure of the dataset, following Beck and Katz, cubic spline corrections based on peace years are employed to correct for temporal autocorrelation. Robust standard errors are calculated based on clustering error terms by each unique dyad.

Inclusion of these all these various controls—almost all of which have been shown to have a statistically significant effect on the outbreak of conflict and on conflict escalation—is designed to isolate the independent effects of nuclear posture on dispute outbreak and escalation. In other specifications, I use fewer controls to avoid overfitting or erroneous estimates, but the substantive results remain unchanged. In these tests, if a target state adopts a specific posture and can both prevent the incidence of disputes against it as well as cap the level of escalation, this would be a significant finding in the quantitative dispute literature. Especially since a state’s decision to acquire nuclear weapons in the first place may theoretically be correlated with the level of violence that state is experiencing in its security environment, if the adoption of only a particular posture reduces the incidence of that violence as well as its intensity, such a finding would suggest an independent deterrent effect of specific types of nuclear postures.

Because the Bennett and Stam dataset only goes through 1992, truncating roughly 20 percent of the regional nuclear states’ dyads over time, I employed the EUGene software package to construct a dataset of politically relevant directed-dyads from 1816-2001 containing the controls that cover the extended time swath which are some, but certainly not all, of the control variables from the original Bennett and Stam dataset. If the results from this dataset comport with the one through 1992, it would be a significant robustness check on both specifications. Political relevance is again defined as any dyad containing a major power as well as dyads containing contiguous states or

51 I made a couple of coding corrections in the Bennett and Stam 2004 dataset: the 1967 and 1973 Arab-Israeli wars are not coded as full wars in the dataset, even though they are coded as such in the Correlates of War Dataset. I therefore corrected for this discrepancy by coding these conflicts as initiated by Egypt and Syria that escalated to war (DV=4).
separated by less than 400 miles of water. The coding rules for the catalytic, assured retaliation, and asymmetric escalation postures are the same as above, though extended through 2001 (which includes the change in Pakistani and Israeli posture as coded in Table 2). Again, the US, USSR and UK are dummied out as nuclear states adopting other posture so that they are included in the dataset but the effects of their postures are kept separate from what I classify as regional nuclear powers. The controls included in this dataset are the conventional balance of power, whether the initiator state is a nuclear weapons state, a cold war dummy, revisionist intentions, and the Polity IV regime type measures. Temporal autocorrelation is again corrected by inclusion of peace-years cubic splines. Multinomial logit estimation, block significance tests, and relative risk ratios are all calculated as above.

Results: General Deterrence Tests
The most robust finding is that the asymmetric escalation posture uniquely and significantly deters conflict at every level of intensity.\(^{52}\) Not only is there little evidence for an existential effect of nuclear weapons, but surprisingly, the assured retaliation posture has also had little systematic deterrent power against conventional conflict. The catalytic posture is significant but for the wrong reasons: it has had some spectacular deterrence failures at the level of full war. For the postures tested in the 1816-1992 dataset, catalytic, assured retaliation, and asymmetric escalation, the block significance tests for the catalytic and asymmetric escalation postures is \(p < .001\), which suggests their inclusion in the model improves its predictive power by a statistically significant level against all types of opponents after controlling for a whole host of monadic, dyadic, and system-level variables. The assured retaliation posture is not significant in most specifications (which would be consistent with my hypotheses) or barely statistically significant at the \(p < 0.10\) level; even when it is significant,

\(^{52}\) The results for just the superpowers, other posture, were quite mixed and not robustly significant. Partly this is because many of the disputes involving the superpowers were with each other, which undermined the systematic deterrent power of their nuclear arsenals. But I could find nothing systematic for the superpower posture variable.
this posture has little substantive deterrent effect against either nuclear or non-nuclear opponents. Critically, the statistical significance of the asymmetric escalation posture is the most robust to model specification, whereas assured retaliation is the least robust. The effect of the catalytic posture is relatively robust as well particularly for its surprising breakdown in the highest intensity conflicts (DV=4), though not nearly as strongly as the asymmetric escalation posture. For the substantive effects of these various postures on conflict and escalation, I present the relative risk ratios for each of the different types of postures against both nuclear and non-nuclear initiators. These represent the relative risk of conflict breaking out against a target state, on average, after the target state has adopted posture X. The results in Table 6 are presented for the politically relevant directed-dyad dataset.

TABLE 6 HERE

The most striking result in Table 6 is the significant reduction in conflict frequency and escalation experienced by states that adopt the asymmetric escalation posture. Since the assured retaliation posture is not significant, this finding suggests that states that adopt an asymmetric escalation posture uniquely enjoy a reduction in conflict at every level of intensity as compared to not having nuclear weapons and compared to other postures. States that adopt a catalytic posture, however, face a significant increase in high intensity conflict initiated against them—it seems due to preventive war incentives to strangle the nuclear baby in its bathwater, as evidenced by Israel being targeted by its Arab neighbors repeatedly between 1967 and 1973 when had first adopted a catalytic posture.

53 These are pooled block likelihood ratio tests which test whether the inclusion of the variable has a statistically significant effect against all opponents. A restrictive test limited to only nuclear opponents also reveals that the catalytic and asymmetric escalation postures are significant at the p<0.001 level, while the significance of assured retaliation postures against nuclear opponents is again dependent on model specification; but irrespective of this, even when assured retaliation is significant at standard statistical levels, it has little substantive effect against nuclear opponents.
posture. The most important finding is the degree to which the deterrence dividend is unequally distributed across regional nuclear powers. Not all nuclear postures deter equally well.

The results are similar in the extended dataset from 1816-2001. The block significance tests for the model on this dataset again reveal that the catalytic and asymmetric escalation postures are significant at the $p<0.001$ level, while the assured retaliation posture is not robustly significant. The relative risk ratios for the various postures on the extended dataset are shown below in Table 7.

On average, states adopting a catalytic posture can have a seriously higher risk (15 times in the above specification!) of being attacked by a non-nuclear state in a conflict that escalates to war as compared to before it adopted a catalytic posture. On the other hand, after adopting an asymmetric escalation posture, states see a marked reduction in risk of armed conflict at all the most important levels of intensity—3 to 4 times less probability of conflict where one or more party uses force. The results for the asymmetric escalation posture are quite robust to specification.

Finally, to test if there are any systematic era effects, Table 8 displays results for tests performed on a dataset restricted to the nuclear era (1945-2001), using the same controls as for the results generated in Table 7 above. Again catalytic and asymmetric escalation are significant and robust at the $p<0.001$ level while assured retaliation is not robustly significant, implying again that adopting an assured retaliation posture potentially has no average effect on a state’s ability to deter conflict at various levels against either nuclear or non-nuclear opponents when the dataset is restricted to the nuclear era as well.

In some specifications, assured retaliation was significant at the $p<0.10$ level, but it was highly sensitive to specification. However, even when it is significant, the assured retaliation posture has either a marginal or a null deterrent value.
Substantively however, the post-WWII results are virtually identical to the results from the full dataset time swath, lending weight to the full model’s specification. Because there is no theoretical reason to prefer a model restricted to the nuclear era—the pre-nuclear era dyads provide a mass of controls which captures levels of disputes between dyads without nuclear weapons, for which there is little theoretical reason to exclude—I present a graphical interpretation of the results generated in Table 7 (without 95% confidence intervals for clarity’s sake in this depiction; first differences with confidence intervals are presented later) below in Figure 1.

[FIGURE 1 HERE]

To get a sense of the deterrent power of the asymmetric escalation posture in reducing the frequency of conflict at various levels of intensity, against both nuclear and non-nuclear opponents, Figure 2 depicts the results for the asymmetric escalation nuclear posture in an inverted scale (1/relative risk ratio).

[FIGURE 2 HERE]

Substantively, the most important result from this analysis is that the asymmetric escalation posture is seemingly deterrence optimal. Against non-nuclear initiators, the asymmetric escalation posture is unique in deterring conflict at every intensity level, whereas the catalytic and assured retaliation postures have had some significant deterrence failures at critical levels, including war itself. Against nuclear opponents, all three postures still seem to experience roughly the same level of probing as before by other nuclear powers at very low level disputes (at DV=1), but the asymmetric escalation
posture is unique in halting these probes from escalating beyond a war of words, as it were. The catalytic and assured retaliation postures have not fared nearly as well. These findings comport well with the hypotheses for each posture against both non-nuclear and nuclear opponents.

Just how optimal is the asymmetric escalation nuclear posture? That is, if a state has no nuclear weapons, how much ‘deterrence benefit’ would it reap if it adopted an asymmetric escalation posture? Similarly, if a state has a catalytic or an assured retaliation posture, how much deterrence benefit would it reap if it shifted to an asymmetric escalation posture? The answer is, quite a bit. In order to illustrate this, I calculated first-differences, which is the change in probability for each level of the dependent variable if the average state shifted from not having nuclear weapons to adopting an asymmetric escalation posture (all control variables set at the mean, or median for variables with discrete levels). These first differences were calculated using Clarify and illustrate the absolute change in probability for each level of the dependent variable. The baseline empirical probability of each level of the dependent variable in politically relevant dyads is shown below in Table 9, to give the reader a sense of the magnitude of the shifts that result in switching to an asymmetric escalation posture.

[TABLE 9 HERE]

Figures 3 through 5 depict the first difference, with 95 percent confidence intervals, in shifting to an asymmetric escalation posture from not having nuclear weapons, from a catalytic posture, and from an assured retaliation posture against both nuclear and non-nuclear opponents. If the confidence interval does not cross zero, than the first-difference is significant at the $p=0.05$ level.

[FIGURE 3 HERE]

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55 All first differences were calculated using Clarify in Stata based on the specification represented in Table 7.
For each level of the dependent variable, a state is better off having an asymmetric escalation posture, against both nuclear and non-nuclear opponents, than not having nuclear weapons. Though the absolute change in probability at the war intensity is low, since the baseline rate is 0.00065, the first difference suggests a 3-4 times reduction in the probability of war if a state shifts to an asymmetric escalation posture. Figures 4 and 5 illustrate the effects of shifting from a catalytic and assured retaliation posture to an asymmetric escalation posture, on average, demonstrating that the asymmetric escalation posture is indeed deterrence optimal compared to the other two postures as well.

A state that shifts from a catalytic to an asymmetric escalation posture reaps substantial and significant deterrent benefits for higher intensity disputes. At the level of force being used by one or both sides, and for wars, the asymmetric escalation posture clearly dominates the deterrent power of the catalytic posture, particularly since catalytic states are vulnerable to preventive strike attempts. A state with a catalytic posture would thus reap a measurable deterrence benefit, particularly at higher intensity conflict levels, if it shifted to an asymmetric escalation posture.

Although the effect is less pronounced at lower levels of conflict, an assured retaliator would experience a substantial (in relative risk terms) and statistically significant deterrence benefit at higher intensity conflict if it shifted to an asymmetric escalation posture. The confidence intervals at the higher intensities of conflict do not cross zero and thus represents a measurable and statistically significant reduction in conflict against both nuclear and non-nuclear opponents if a state were to
shift from an assured retaliation to an asymmetric escalation nuclear posture. These results illustrate substantively that, on average, the asymmetric escalation posture is, from strictly a deterrence perspective, the optimal nuclear posture available to states. States without nuclear weapons, with a catalytic posture, and with an assured retaliation posture would all experience measurable reductions in higher intensity conflicts if they adopted asymmetric escalation postures. This suggests that the deterrence benefits of nuclear weapons are not evenly distributed. Indeed, orienting nuclear forces toward an asymmetric escalation posture seems to be, on average, the only way to enjoy a significant reduction in high intensity conventional conflicts.

I performed many robustness checks, none of which largely affected the substantive impact of the various regional power nuclear postures. Although the specific numbers change based on specification, the most fundamental findings that the catalytic posture experiences significant breakdowns, that the assured retaliation posture provides little systematic deterrent power, and that the asymmetric escalation posture is deterrent optimal, seem largely robust. To ensure that no one state’s posture was driving the results (especially France’s effect on the asymmetric escalation posture and, to a lesser extent, Israel’s effect on the catalytic posture), I tried country-specific fixed effects in both datasets and found little statistical or substantive difference in the results, though the point estimate for the catalytic posture’s failure at the ‘war’ level is dampened when including an Israel dummy. Even after adding France fixed-effects (after the model already controls for the Cold War and NATO-membership) the asymmetric escalation posture still has a significant and marked substantive effect in reducing conflict across all levels of intensity. In addition, I checked whether the results were sensitive to disagreements about when a particular regional power adopted a particular posture (i.e. 1974 versus 1989 in the case of India or 1967 versus 1970 for Israel)\footnote{See Montgomery and Sagan 2009, p. 308.}; for the most part, substantively they are not, though point estimates may change.
I also tried specifications that included the UK as an *asymmetric escalation* regional posture rather than dummying it out as *other posture*, but it did not affect the substantive results significantly. I also ran tests that included the US, USSR, and UK in the early phases of their nuclear programs (coded as *asymmetric escalation*) when they might have been in the same class as some of the regional powers. Even after trying various cutoff years (e.g. $t_{nukes} + 5$, $t_{nukes} + 10$, $t_{nukes} + 20$, to the entire period), there was little change in the substantive results for the various postures. But, the substantive effect of *asymmetric escalation* is stronger when the superpowers are dummyed out as *other posture*, which is not surprising since the superpowers experienced significant disputes with each other and by proxy.

I take these results as strongly suggestive, but by no means the definitive or final-word on the differential effects of regional power nuclear postures on the outbreak and escalation of conflict. In particular, there are several methodological and data issues with these tests which are worth highlighting. First, these results do not provide valid causal inferences, nor are they designed to. There is no denying that states non-randomly acquire both nuclear weapons and specific nuclear postures, so there is an unavoidable level of ‘selection into treatment.’ Nevertheless, it is apparent that the causes of nuclearization do not strongly correlate with a state’s ultimate choice of nuclear posture. For example, states that have developed nuclear weapons for largely security reasons—Israel, China, and Pakistan for example—have adopted three different types of nuclear postures. Therefore this research design takes nuclear posture as a quasi *sui generis* variable in an attempt to isolate the correlation with conflict outcomes. It is not ideal, but given the empirical realities, I believe it is the soundest available approach.

Second, it is widely established that the decision for a state to initiate and escalate a dispute against a nuclear state is strategic, in that the knowledge of that state’s nuclear weapons factors into its initial decision to start the conflict. If it does so, then it is unlikely that nuclear weapons will

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57 See Smith 1996.
deter conflict once the dispute breaks out. One argument is that this selection effect may dampen the ability to study the true deterrent effect of nuclear weapons. First, this problem is particularly acute in intra-crisis statistical tests which select on the outbreak of a crisis, but the structure of the chosen dependent variable here circumvents this problem by testing both whether a state initiated a dispute at all (i.e. including non-dispute observations) as well as how high that dispute eventually escalated.\(^{58}\) This dependent variable is therefore a good measure of whether the adoption of a particular posture dampens dispute initiation as well as dispute escalation. Second, because the dataset includes both cross-dyadic observations of similar characteristics where nuclear weapons are not present as well as cross-temporal observations within specific dyads, there are substantial controls which effectively isolate the effect of a nuclear posture on a given dispute’s dynamics.

Finally, just as the quantitative dispute literature’s tests on the effects of nuclear weapons are overweighted and driven by the US and USSR because of their overrepresentation in dyad-year datasets, the paucity of states for each of the nuclear postures means that the effects of each posture are also driven by a small number of states.\(^{59,60}\) However, while this is certainly an empirical fact, including individual country fixed-effects does not largely affect the significance or substantive effect of the postures because there is enough temporal and cross-dyadic variation to establish the effect of these particular postures. In addition, the dataset that spans through 2001 contains more observations per posture and captures the Israeli and Pakistani switches in nuclear posture, although it lacks some of the latent controls from the Bennett and Stam dataset. Collecting the data to add additional controls beyond 1992 is an area for substantial future work to further refine these initial

\(^{58}\) For intracrisis tests, I developed a research design that exploits repeated crises involving enduring rivals where the nuclear posture variable switches at some point. See Narang 2010a and 2010b.

\(^{59}\) Though these postures are rare, they represent substantial \(n\) in the dataset; rare events techniques are not appropriate in this case because the dependent variable, MIDs, is not rare.

\(^{60}\) It would be interesting to test the dynamics when these various nuclear postures of the target states interact with the various nuclear postures of the initiator state (i.e. asymmetric escalation versus assured retaliation). As one separates the initiator out by posture, however, the strain on the statistical models due to the small \(n\) of each possible combination makes it difficult to draw systematic inferences.
results. Even though I believe that I have performed as many of the technically necessary adjustments and tests that I could, there is no avoiding the fact that this statistical analysis is critically dependent on, literally, only a handful of countries. Nevertheless, I believe I have identified significant and suggestive trends about the differential deterrent effect of various nuclear postures. What these findings suggest is that there is indeed an optimal deterrent configuration, the asymmetric escalation posture, which uniquely deters the outbreak of armed disputes against both nuclear and non-nuclear opponents. But, certainly, additional research is required to further test and refine these findings.

**Discussion**

These tests suggest that there is both theoretical and empirical value in disaggregating nuclear powers by their postures. In particular, on average, these results suggest that at the regional level only one type of regional nuclear power can reap a substantial deterrent effect from nuclear weapons: one that chooses to adopt an asymmetric escalation posture. As these large-\(n\) results suggest, catalytic and assured retaliation postures do not deter higher levels of violence against other nuclear powers, contrary to the expectations of scholars of nuclear deterrence as well as many policymakers.

Indeed, the catalytic posture may be especially suboptimal from a security perspective—states that have empirically adopted these postures have evidently derived little security benefit against nuclear and non-nuclear opponents from the possession of nuclear capabilities. While there seems to be some dampening effect at lower levels of intensity, there is a marked increase in the likelihood of higher intensity conflicts. Part of the increased level of conventional conflict against states with catalytic postures may be due to incentives to preventatively strike their nuclear programs in their inchoate phases. Both Israel and Pakistan faced deterrence failures in the initial phases of their nuclear programs as various opponents attempted to possibly eliminate their nuclear capabilities, Israel in 1967 and 1973 and Pakistan in the period between 1984 and 1987. These
incentives seem to be part of the reason why catalytic states actually face a substantially increased likelihood of being targeted in a conflict that escalates to war, since their nuclear capabilities are smaller for longer than other types of postures. One implication may therefore be that these states’ pursuit of nuclear weapons writes security checks that their catalytic deterrents are unable to cash. Indeed, if the goal of acquiring nuclear capabilities is to deter dispute initiation and escalation, the catalytic posture seems to be uniquely security-inefficient by creating incentives for preventive military action and justifications for regional opponents to pursue their own nuclear capabilities without an attendant reduction in the ability to deter or cap conflict.

The assured retaliation posture, contrary to conventional wisdom, seems to have little effect on deterring conflict initiation and escalation to even full-blown war, and even against non-nuclear opponents. In most cases, the variable is not statistically significant, and when it does achieve standard levels of statistical significance, it has very little substantive effect on deterring conflict since the relative risk ratio is very close to 1.00. Even against nuclear opponents, this particular posture seems to have little deterrent effect against armed conventional conflict. Indeed, the only two instances of near-war or war between nuclear powers involved an assured retaliation state being targeted: China by the USSR in 1969 and India by Pakistan in 1999. This suggests that while the assured retaliation posture has not empirically had regular and serious deterrence failures like the catalytic posture, it seems to have little average effect on opponents’ decisions to initiate or escalate conflict. Crises, and very serious ones at that, do not become infrequent as Jervis and others argued they should once states achieve assured retaliation postures.

The asymmetric escalation posture, on the other hand, significantly deters conflict at both lower and higher levels of violence against both nuclear and non-nuclear states according to these tests. The sheer drop in frequency of armed conflict at all levels of intensity against any type of initiator suggests that from a deterrence perspective, the asymmetric escalation posture is uniquely
optimal. After the adoption of an asymmetric escalation posture, states face on average, roughly three to four times fewer attacks at the war and just-subwar levels of intensity. Indeed, Figures 4 and 5 suggest that, on a strictly deterrence basis, states that already have nuclear weapons are better off switching to an asymmetric escalation posture. No other posture comes close to such a significant reduction in armed conflict outbreak.

Whereas the existing empirical deterrence literature finds that nuclear weapons may slightly lower the risk of conflict initiation and escalation in politically relevant dyads, I show here that that risk-reduction is not evenly distributed across various nuclear states. By disaggregating the nuclear states, I find that while the superpowers may have been able to deter conflict against both nuclear and non-nuclear states—and even there the results are extremely mixed—only certain types of regional nuclear powers have been able to do so. Catalytic and assured retaliation postures do not prevent other nuclear states from picking fights or escalating them short of war. In addition, states that have adopted each of these postures have faced high levels of conflict where a non-nuclear state has been an initiator. There is also little evidence of an ‘existential’ effect of nuclear weapons against non-nuclear states. When a non-nuclear state makes the strategic decision to initiate a dispute against a catalytic or assured retaliation nuclear state, the threat to use nuclear weapons to cap escalation does not appear to have a significant inhibitory effect.

Despite what scholars have sometimes assumed, states do not adopt postures that are uniformly ‘security efficient.’ And despite what some nuclear deterrence theorists have argued, at least as far as the regional nuclear powers are concerned, not only is one (or a few) nuclear weapons insufficient to systematically reap a significant deterrent effect against intense conventional conflict, but even secure second-strike forces—assured retaliation postures—do not systematically deter even serious conventional conflict. For the general deterrence tests, then, we can reject the overall null hypothesis that regional nuclear postures deter conflict equally well. There is variation in how
regional states’ postures have been able to deter both nuclear and non-nuclear opponents. Nuclear weapons deter unequally, and this research suggests that the key driver of that differential deterrence success is nuclear posture.

**Conclusion**

The implications of these findings are important for our understanding of nuclear proliferation and nuclear deterrence. For one, it overturns a central dogma in international relations and in nuclear deterrence theory that the acquisition of even a minimal nuclear capability radically improves a regional state’s ability to deter conventional conflict owing to the risk of escalation. Theoretically, scholars should cease treating nuclear weapons states as equivalent. Nuclear powers adopt often radically different nuclear postures which have widely different effects on international conflict. Empirically, there has simply not been a substantial existential deterrent effect at the regional level for a state that possesses merely a nuclear weapons capability. Second, even the possession of secure second-strike forces may not deter substantial conventional attacks, whether against nuclear or non-nuclear powers. It is not that the frequency or intensity of attacks rises on average, as suggested by the stability-instability paradox, but simply that there is no discernible effect on the level of conventional attacks initiated against a state once it acquires secure second-strike forces. This finding therefore provides a more fine-grained understanding of what it takes, on average, to deter conflict in the international system. For better or worse, these findings suggest that to reap a significant deterrent effect against conventional conflict, regional states must explicitly orient their nuclear forces to do so. There is no magical deterrent benefit against conventional conflict generated by ‘existential,’ ‘catalytic,’ or even ‘assured retaliation’ forces.

For policymakers, these findings suggest that in addition to addressing a state’s march toward nuclear weapons, some attention ought to be paid to how regional states operationalize their nuclear forces and how the United States can shape the adoption of a particular nuclear posture—
particularly the catalytic posture since it is so critically dependent on the availability of the US in many cases (or China for North Korea) to intervene on the regional power’s behalf. More fundamentally, it appears to be nuclear posture, not simply nuclear weapons, which generates differences in the types of conflicts a region and the international community can potentially expect involving a particular regional nuclear power. The implications this has for conflict involving nuclear powers in South Asia, East Asia, and the Middle East is important. It also means that the march toward nuclearization, while important, since it lays the groundwork for an ultimate posture, is not the only pathway that can be targeted by counterproliferation efforts. Even if a regional power already has nuclear weapons, the international community can help shape a particular nuclear posture over another. And there might be good reasons to push states that are tempted to adopt asymmetric escalation postures—which can induce severe command and control pressures and increase the risk of accidental or unauthorized nuclear use—to adopt an assured retaliation nuclear posture and minimize the emphasis of nuclear weapons in their conventional defense. This might entail conventional pacts or guarantees to a regional power so that it does not need to rely on an asymmetric escalation nuclear posture for its day-to-day security. The fundamental point, however, is that nuclear postures matter and that how states operationalize their nuclear weapons has a critical effect on the type of conflict that it is likely to experience. Nuclear weapons may deter, but they deter unequally.
References


### Characteristics of Regional Power Nuclear Postures

<table>
<thead>
<tr>
<th></th>
<th>Catalytic</th>
<th>Assured Retaliation</th>
<th>Asymmetric Escalation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Goal</strong></td>
<td>Third party compellence (probabilistic deterrence)</td>
<td>Deter nuclear use and coercion</td>
<td>Deter conventional conflict and nuclear use</td>
</tr>
<tr>
<td><strong>Capabilities</strong></td>
<td>Ability to assemble a handful of nuclear weapons</td>
<td>Survivable second strike forces</td>
<td>First use capabilities</td>
</tr>
<tr>
<td><strong>Management</strong></td>
<td>Recessed and opaque</td>
<td>Assertive civilian control (e.g., de-mated or de-alerted forces)</td>
<td>Delegative (assets and authority integrated into military forces and doctrine)</td>
</tr>
<tr>
<td><strong>Level of Transparency</strong></td>
<td>Ambiguous capability and deployment</td>
<td>Unambiguous capability; ambiguous deployment</td>
<td>Unambiguous capability and deployment</td>
</tr>
<tr>
<td><strong>Empirical Examples</strong></td>
<td>Israel I</td>
<td>China</td>
<td>France</td>
</tr>
<tr>
<td></td>
<td>South Africa</td>
<td>India</td>
<td>Pakistan II</td>
</tr>
<tr>
<td></td>
<td>Pakistan I</td>
<td>Israel II</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** According to my coding, Israel shifted from a catalytic to an assured retaliation posture after the 1991 Gulf War, and Pakistan shifted from a catalytic to an asymmetric escalation posture in 1998.
<table>
<thead>
<tr>
<th>Regional Power Nuclear Posture</th>
<th>Empirical Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Catalytic</strong></td>
<td>Israel (1967-1991)</td>
</tr>
<tr>
<td></td>
<td>South Africa (1979-1991)</td>
</tr>
<tr>
<td></td>
<td>Pakistan (1986-1998)</td>
</tr>
<tr>
<td><strong>Assured retaliation</strong></td>
<td>India (1974-present)</td>
</tr>
<tr>
<td></td>
<td>China (1964-present)</td>
</tr>
<tr>
<td></td>
<td>Israel (1992-present)</td>
</tr>
<tr>
<td><strong>Asymmetric Escalation</strong></td>
<td>France (1960-present)</td>
</tr>
<tr>
<td></td>
<td>Pakistan (1998-present)</td>
</tr>
<tr>
<td><strong>Other (Superpower) Postures</strong></td>
<td>United States (1945-present)</td>
</tr>
<tr>
<td></td>
<td>USSR/Russia (1949-present)</td>
</tr>
<tr>
<td></td>
<td>United Kingdom (1952-present)</td>
</tr>
</tbody>
</table>

**Table 2.** Empirical classification of regional power nuclear postures
<table>
<thead>
<tr>
<th>Posture</th>
<th>vs. non-Nuclear State</th>
<th>vs. Nuclear State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catalytic</td>
<td>No Effect</td>
<td>No Effect</td>
</tr>
<tr>
<td>Assured retaliation</td>
<td>No Effect</td>
<td>No Effect or Negative</td>
</tr>
<tr>
<td>Asymmetric Escalation</td>
<td>Positive</td>
<td>Positive</td>
</tr>
</tbody>
</table>

Table 3. First-difference hypotheses for deterrence consequences of nuclear posture deterrence relative to non-nuclear states.
<table>
<thead>
<tr>
<th><strong>DV Level</strong></th>
<th><strong>Description</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>State A does not initiate a dispute against State B in year $t$.</td>
</tr>
<tr>
<td>1</td>
<td>State A initiates a dispute against State B in year $t$ but it does not escalate to the use of force.</td>
</tr>
<tr>
<td>2</td>
<td>State A initiates a dispute against State B in year $t$ and dispute escalates to use of force by one state.</td>
</tr>
<tr>
<td>3</td>
<td>State A initiates a dispute against State B in year $t$ and both states use force but it does not escalate to war.</td>
</tr>
<tr>
<td>4</td>
<td>State A initiates a dispute against State B in year $t$ and the dispute escalates to full scale war.</td>
</tr>
</tbody>
</table>

*Table 4.* Description of dependent variable from Bennett and Stam (2004)
Table 5. Frequency count of dependent variable for each nuclear posture-type target state 1945-2001 (calculated from EUGene). *Does not code the Kargil War as a full war.
<table>
<thead>
<tr>
<th>Conflict Level</th>
<th>Catalytic Posture</th>
<th>Assured Retaliation Posture</th>
<th>Asymmetric Escalation Posture</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-Nuclear</td>
<td>Nuclear</td>
<td>Non-Nuclear</td>
</tr>
<tr>
<td></td>
<td>Initiator</td>
<td>Initiator</td>
<td>Initiator</td>
</tr>
<tr>
<td>No Dispute</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Dispute, No Force</td>
<td>1.32</td>
<td>3.95</td>
<td>0.69</td>
</tr>
<tr>
<td>Unilateral Force</td>
<td>0.79</td>
<td>1.03</td>
<td>0.35</td>
</tr>
<tr>
<td>Reciprocated Force</td>
<td>0.88</td>
<td>1.19</td>
<td>0.69</td>
</tr>
<tr>
<td>War</td>
<td>17.92</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Table 6. Relative risk-ratio for outbreak of conflict at each level given a particular nuclear posture within politically relevant dyads between 1816-1992. Catalytic is significant at the \( p<0.001 \) level, with the confidence intervals wider at lower levels of conflict but highly significant at the level of War. Assured Retaliation is not significant, though it depends on specification. Asymmetric Escalation is significant at the \( p<0.001 \) level and the variable is significant for every level of the dependent variable.
<table>
<thead>
<tr>
<th>Conflict Level</th>
<th>Catalytic Posture</th>
<th>Assured Retaliation Posture</th>
<th>Asymmetric Escalation Posture</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-Nuclear</td>
<td>Nuclear</td>
<td>Non-Nuclear</td>
</tr>
<tr>
<td></td>
<td>Initiator</td>
<td>Initiator</td>
<td>Initiator</td>
</tr>
<tr>
<td>No Dispute</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Dispute, No Force</td>
<td>0.56</td>
<td>1.17</td>
<td>0.83</td>
</tr>
<tr>
<td>Unilateral Force</td>
<td>0.35</td>
<td>1.30</td>
<td>0.42</td>
</tr>
<tr>
<td>Reciprocated Force</td>
<td>0.84</td>
<td>1.18</td>
<td>0.92</td>
</tr>
<tr>
<td>War</td>
<td>15.15</td>
<td>0.00</td>
<td>1.53</td>
</tr>
</tbody>
</table>

*This codes the Kargil conflict as shy of full war; if coded as a war, this is greater than zero but the assured retaliation variable is not significant and still has ‘no effect.’

Table 7. Relative risk-ratio for outbreak of conflict at each level given a particular nuclear posture within politically relevant dyads between 1816-2001.
<table>
<thead>
<tr>
<th>Conflict Level</th>
<th>Catalytic Posture</th>
<th>Assured Retaliation Posture</th>
<th>Asymmetric Escalation Posture</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-Nuclear</td>
<td>Nuclear</td>
<td>Non-Nuclear</td>
</tr>
<tr>
<td>No Dispute</td>
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<td>1.00</td>
</tr>
<tr>
<td>Dispute, No Force</td>
<td>0.59</td>
<td>1.02</td>
<td>0.86</td>
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<tr>
<td>Unilateral Force</td>
<td>0.39</td>
<td>1.11</td>
<td>0.52</td>
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<td>Reciprocated Force</td>
<td>0.92</td>
<td>1.08</td>
<td>1.00</td>
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<tr>
<td>War</td>
<td>9.81</td>
<td>0.00</td>
<td>2.02</td>
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</table>

Table 8. Relative risk-ratio for outbreak of conflict at each level given a particular nuclear posture within politically relevant dyads between 1945-2001. *This codes the Kargil conflict as shy of full war; if coded as a war, this is greater than zero but the assured retaliation variable is not significant and still has ‘no effect.’
<table>
<thead>
<tr>
<th><em>DV Level</em></th>
<th><em>Empirical Rate</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.988</td>
</tr>
<tr>
<td>1</td>
<td>0.0033</td>
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<tr>
<td>2</td>
<td>0.0044</td>
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<tr>
<td>3</td>
<td>0.0032</td>
</tr>
<tr>
<td>4</td>
<td>0.00064</td>
</tr>
</tbody>
</table>

*Table 9.* Baseline rates of each level of the dependent variable in the politically relevant dyad sample 1816-2001 (*n*=191866)
Figure 1. Graphs of relative risk of dispute level by regional nuclear type against nuclear and non-nuclear initiators.
Figure 2. Inverted relative risk ratio scale for asymmetric escalation posture against nuclear and non-nuclear opponents.
Figure 3. First difference for each level of the dependent variable in shifting from no nuclear weapons to an asymmetric escalation posture
Figure 4. First difference for each level of the dependent variable in shifting from a catalytic posture to an asymmetric escalation posture.
Figure 5. First difference for each level of the dependent variable in shifting from an assured retaliation posture to an asymmetric escalation posture.