The Theory of Dyadic Strategic Determinism

Matching, Mismatching or Disrupting in the US-USSR/Russia and US-China Dyads: 1945-Present

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“A theory of international politics normally cannot be expected to predict individual actions, because the interaction problem is too complex and because there are too many free variables. It can be expected, however, to predict characteristic or modal behaviour within a particular kind of international system.”

-Morton Kaplan, *International Politics and Foreign Policy*

“Strategic nuclear weapons deter strategic nuclear weapons (though they may also do more than that). Where each state must tend to its own security as best it can, the means adopted by one state must be geared to the efforts of others.”

- Kenneth N. Waltz, *Theory of International Politics*

“Now, here, you see, it takes all the running you can do, to keep in the same place.”

-Lewis Carroll, *Through the Looking-Glass*

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INTRODUCTION

This paper demonstrates that the military strategies of states in dyadic interactions are predictable as a function of relative power.[1] Each state pursues a strategy of internal balancing against a primary adversary.[2] The independent variable in dyadic interactions is the extant hard power of each state.[3] The dependent variable is the reactive response of each, with three possible outcomes: *matching* (countering the adversary by balancing its military might in kind), *mismatching* (pursuing military-parity via one-sided specialization) and *disruption* (seeking a military balance that repudiates static hard power balancing, in favour of terrorism and unconventional or asymmetrical warfare).[4]

Equal-power states tend to match one another. Low-power states against middle-power states, or middle-power states against higher-power states, will mismatch, pursuing strategies which exploit weaknesses in the adversary's extant military structure. A low-power state (against a high-power state) will disrupt. The security dilemma that emerges from an anarchic world, and the fact that dynamic balancing alone cannot mitigate this (members of coalitions distrust one

[1] In this paper the tenets of structural realism will be considered axiomatic, in the sense that an "if → then" formula will be used. If the security dilemma is true, then states will balance internally against identified adversaries, for example. The DSD model is unique, however, because it transcends certain neorealist behavioural predictions for unipolar, bipolar and multipolar systems. The tenets of neorealism as assumed in this paper are derived primarily from Waltz. See Kenneth N. Waltz, *Theory of International Relations* (Long Grove Illinois: Waveland Press, 1979) and Waltz, *Man, the State, and War: A Theoretical Analysis* (New York: Columbia University Press, 1954).

[2] Internal and static balancing are synonymous terms, and are defined as the act of equalizing the odds or the threat of coercion or the power equilibrium against more powerful states via state-specific or internal means, including developing hard power mechanisms—namely armed forces. Static balancing, along with dynamic balancing—of balancing by forming alliances with other states—forms the natural response to the Waltzian third image. See Waltz, *Man, the State, and War*, 159-160.

[3] This statement is controversial. Identifying military power as the primary, determining variable lies on the radical side of the neorealist spectrum. While realism in general downplays internal state factors in major power balancing, most thinkers include some form of motivational element or threat. Lewis Richardson's mostly ignored mathematical analysis is closest to the determinism of DSD. For discussion see Sean Bolks and Richard J. Stoll, "The arms acquisition process: the effect of internal and external constraints on arms race dynamics," *Journal of Conflict Resolution* 44:5 (2000), 581-583.

[4] Here the focus is limited primarily to the major powers, with their tendency to exhibit reiterative strategies ("dyadic chains") of matching and mismatching.

another as they do their adversaries), forces states to pursue deterministic strategies of internal balancing.[5]

In dyadic strategic determinism (DSD) all states balance against their adversaries. Weaker states "cheat" in order to balance despite their weakness. Just as weaker states may balance a stronger adversary via coalitions, they also deterministically balance internally as a function of their adversary's military power.[6] By designing weapons programs which exploit a stronger-adversary's weaknesses, weaker powers can balance despite being less powerful in absolute terms. The greatest disparity in power between adversaries forces the weakest powers to adopt strategies of disruption: non-traditional, innovative and cheap methods of balancing.[7] This analysis is divided into five chapters. In Chapter 1, the DSD model is explained. Chapters 2, 3 and 4 employ the US-USSR/Russia dyad as a case study, considering the First, Second, Third Offsets, as well as future strategic considerations for Russia respectively. Chapter 5 applies the model to China and predicts Chinese strategy as the state rises to become a global military power.[8]

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[5] John Herz described the security dilemma a "a structural notion in which the self-help attempts of states to look after their security needs tend, regardless of intention, to lead to rising insecurity for others as each interprets its own measures as defensive and measures of others as potentially threatening". Frederick Dunn noted that "so long as the notion of self-help persists, the aim of maintaining the power position of the nation is paramount to all other considerations." See John H. Herz, "Idealist internationalism and the security dilemma," *World Politics* 2-2 (1950), 157-180. Dunn is quoted in Waltz, *Man, the State, and War*, 160. See also William T. R. Fox, "Frederick Sherwood Dunn and the American study of international relations," *World Politics* 15-1 (1962), 1-19. See also Thomas J. Biersteker, "Critical reflections on post-positivism in international relations," *International Studies Quarterly* 33 (1989), 14.

[6] The notion of states choosing to balance or "bandwagon" is not directly relevant to DSD as these are external phenomena. DSD predicts that states will aim to balance internally regardless of whether they externally balance against- or bandwagon-with their primary adversaries.

[7] Melvin Small and J. David Singer, *Resort to arms: International and civil wars, 1816-1980* (Beverly Hills, CA: Sage, 1982), 120.

[8] For a general review of the dyadic approach to interstate conflict, see Sarah E. Croco and Tze Kwang Teo, "Assessing the Dyadic Approach to Interstate Conflict Processes: A.k.a. 'Dangerous' Dyad-Years," *Conflict Management and Peace Science* 22 Spring 2005, 5-18.

CHAPTER 1

THE DYADIC STRATEGIC DETERMINIST MODEL

The theory of dyadic strategic determinism asserts that states internally balance against individual primary adversary states (dyads) in just three ways: by matching, mismatching or disrupting. It contends that these three decisions are a function of relative power. The model assumes a neorealist, defensive realist global system, with the major powers as individual state units competing in an anarchic world trapped in a security dilemma in which states must balance against extant power as opposed to future threats.[9] It also accepts that states are inherently rational in their strategic behaviour, and that it is rational, under the security dilemma, for states to prepare for attack by other states. Against an adversary of equal power a state will match: a reactive response to the adversary's perceivable military status. Low-power states against middle-power states, or middle-power states against high-power states will mismatch, producing specialty weapons programs to exploit weaknesses in the adversary's military structure. A lowest-power state against a high-power state will have no choice but to disrupt.

INTERACTION	MINOR	MEDIUM	MAJOR
MINOR →	MATCH	MISMATCH	DISRUPT
MEDIUM →	MATCH	MATCH	MISMATCH
MAJOR →	MATCH	MATCH	MATCH

Table 1. A state pursues one of three strategies against an equal or more powerful state rival.[10]

[9] The core theoretical literature upon which this study is derived is neorealist international relations theory and game theory, and is inspired by the Richardson equations which predict rates of armament change as a function of current armaments, adversary armaments and a "grievance factor." See Michael Nicholson, "Lewis Fry Richardson and the study of the causes of war," *British Journal of Political Science* 29-3 (1999): 547-548. See also Hedley Bull, *The Anarchical Society* (New York: Columbia University Press, 1977): 547.

[10] Table 1 is a template of a simple predictive mechanism that will be used throughout the paper. It should be read from left to right, but not vice-versa. The predictive outcomes within the non-highlighted matrix of the table are the strategies of the states on the left vertical list as a response to the horizontally-listed states.

Relative power refers to actual military power as opposed to the potential power of a state, or the overt military capabilities of that state, in contrast with that of another.[11] As noted below, it is not possible to link directly economic power or metrics such as GDP to the actual military power that states deterministically respond to. At most, general correlations are observable.[12] Dyadic interactions exist within specific dimensions, including both a temporal and a spatial element.[13] The spatial element is a territorial zone of proximity defined as that in which the adversary state can actually unleash military force against the other.[14] This, plus the temporal dimension, can be labelled as a dimensional point of interaction (DPOI), and indicates that state power is relative in part according to where and when the dyadic interaction occurs. This determines the match/mismatch/disrupt choices that a state makes.[15] The term theatre can be used synonymously for the term spatial DPOI. Presumably, the theoretically-most powerful state possible would undertake a matching strategy in all interactive scenarios and in all possible DPOIs.

The concept of the DPOI influencing relative power relationships suggests that the same state can be a matcher in one theoretical DPOI, a mismatcher in a second, and a disrupter in a third. This explains why the U.S. could be the preeminent global superpower in general terms,

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[11] Georg Sørensen, "IR theory after the Cold War," *Review of International Studies* 24 (1998): 23.

[12] The ultimate reason is that economic power does not translate directly into military power, although there are clear correlations. See Paul Kennedy, *The Rise and Fall of the Great Powers: Economic Change and Military Conflict from 1500 to 2000* (New York: Random House, 1987), 145-146.

[13] A state will not interact with a state from history, clearly, but it may try to prepare for a future state or a rising power. This opens the possibility that dyadic strategic determinism is not limited to the determinist effects of an adversary's actual, realised power noted above, but is complicated by allowing for determinants from future perceived threats not yet actualized. For the purposes of this analysis, it is assumed that a state will prepare to fight present (i.e. immediate) threats first.

[14] North Korea identifies the US as its primary adversary and maintains a disrupter strategy due to the vast disparity of power within that dyadic interaction. By increasing the effective range of its few ICBMs, North Korea remains a disrupter but is increasing the DPOI of its potential strategic conflict with the US.

[15] For most of the cold war the dimensional point of interaction between the US/USSR was the Central European theatre, where, regardless of absolute military power, the US was the relatively weaker player, and the Soviet Union the stronger. Hence it was the US that did the mismatching, and the USSR the matching.

and perhaps in the majority of DPOI, but the weaker power within the European theatre DPOI from 1945 until 1989-1991.[16]

Dyadic strategic determinism applies to primary adversaries. Both players within the dyadic game must identify one another as each other's main or most important adversary.[17] It is convenient to render this model as a sentential or dyadic formula, with S signifying the stronger primary adversary state, and W the weaker. Directional arrows indicate awareness or identification of primary adversaries. In Template 1, both states identify one another as each other's primary adversary, as implied by the double-directional arrow at stage 1].[18]

Template 1: stronger power-weaker power dyad

1] $S^0 \leftrightarrow W^0$ (identify)
2] $S^0 \leftarrow W^1$ (mismatch)
3] $\rightarrow S^1$ (match) $\rightarrow W^2$ (mismatch)

Analysis starts in stage 1 at time/military status 0 when the relatively weaker power identifies the other, stronger power as its primary adversary or military threat.[19] Because the weaker power is responding to a present threat of the stronger power, or by virtue of the fact that the weaker power is reacting to the stronger power's position of strength, the weaker power moves first in the interaction by identifying and 2] exploiting a relative weakness in the stronger

[16] The US/USSR dyad was strong power-strong power at the highest global level (the broadest DPOI) but the US was a weaker power against the USSR in the European theatre. These two instances of different scales or different DPOI should imply different dyads, as opposed to the same dyad changing according to spatial perspective.
[17] Christopher H. Achen, and Duncan Snidal, "Rational Deterrence Theory and Comparative Case Studies," *World Politics* 41-2 (1989), 42.
[18] Hedley Bull, *The Anarchical Society* (New York: Columbia University Press, 1977), 132.
[19] For the model to apply it is not essential that both parties of the dyad identify one another as adversaries. This is required, however, for dyadic chains to develop, as will be discussed below. The security dilemma requires a general state of suspicion. Dyadic strategic determinism is a specific possibly-quantifiable manifestation of the security dilemma. But a dyadic "game" can only be played if there are two players cognizant of the game at some level.

power's military status.[20] The directional arrow in 2] indicates that the military status of the strong power is causing the mismatching response in the weaker power.[21] This form of internal balancing by the weaker power exploits some specific military mismatch between the stronger and weaker power, giving the weaker power an advantage that is not reflected in crude contrasts of economic clout or gross military spending.[22]

In stage 3] of the interaction, the strong power identifies the military mismatch and matches it. This means that the strong power identifies the strategy of mismatching exploited by the weaker power rival and counters it with a similar-in-kind but amplified military program.[23] Also in stage 3], the formerly advantageously-mismatched weaker power again recognizes the stronger power's latest matching and again identifies and exploits an underdeveloped/under-emphasized aspect of military strategy in the stronger power in a manner that allows it to balance the stronger power. Stages 2] and 3] represent repeating cycles of mismatching by the weaker power and matching by the strong power. After the primary adversaries have been mutually identified (the dyadic strategic interaction begins—or after step 1] has been obtained), there will be a possible infinite cycling of steps 2] and 3] unless some variable breaks the periodicity of the interaction, as described below.[24]

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[20] Or by increasing its own strength in a manner that gives it a military-strategic advantage over the stronger power in a single or small-subset of military potential.

[21] Christopher H. Achen, "Toward a New Political Methodology: Microfoundations and ART," *Annual Review of Political Science* 5 (2002), 13.

[22] By funnelling military spending into developing a class of weapon relatively underfunded or unexploited by the stronger power, for example.

[23] Why this is the case, as opposed to the stronger power reacting to mismatches with similarly innovative mismatches, will be discussed under the topic of the life-dinner principle below. It will be demonstrated that the mismatcher—the weaker power—tends to be the innovator.

[24] That is, what will be labelled as a "dyadic chain", will be broken only by a "periodicity-disrupting event".

Template 2: stronger power-weaker power dyad at initial stage "n"

1] $S^{n} \leftrightarrow W^{n}$
2] $S^{n+0} \leftarrow W^{n+1}$
3] $\rightarrow S^{n+1} \rightarrow W^{n+2} \rightarrow \infty$

The further abstracted dyadic formula above provides the variable ^{n} indicating any point in time in which the stronger power identifies the weaker power as its primary adversary, given that the weaker power has already identified the stronger power as its primary adversary.[25] If the stronger power does not identify the weaker as its primary adversary so that the bi-directional arrow in stage 1] does not obtain, then the interaction cannot continue past state 2] on the dyadic formula (e.g. a single mismatching event by the weaker power and a balancing of the dyad).[26] The event at stage 3] triggers a potential infinite chain of reciprocal dyadic interactions, the aforementioned dyadic chain, which may only be broken by a periodicity-disrupting event.[27] This is an event that alters the power-balance in such a way as to change the nature of the dyadic relationship. Dyadic chains do not form unless both powers within the dyad consciously recognize one another as primary adversaries in some sense.[28]

The case study evaluated in this paper is the dyadic interaction between the United States and the Soviet Union/Russia from 1945 into the present. The trends of mismatching and matching, often lasting decades with subtle beginnings and endings, and often only explicitly

[25] John W. Jandora, "War and culture: A neglected relation," *Armed Forces & Society* 25-4 (1999), 13.
[26] Richard W. Mansbach, and John A. Vasquez, *In search of theory: A new paradigm for global politics* (New York: Columbia University Press, 1981), 221.
Yuen Foong Khong, *Analogies at war: Korea, Munich, Dien Bien Phu, and Vietnam in 1965* (Princeton, NJ: Princeton University Press, 1992), 300.
[27] A dyadic chain of matching-mismatching-matching-mismatching…and onward unless disrupted by a PDE. The infinity symbol (lemniscate) indicates this periodicity of deterministic behaviour. As demonstrated below, in reality a PDE will often occur within 4 or 5 iterations of a dyadic chain matching/mismatching, or matching/disrupting.
[28] Hans Rattinger, "Econometrics and arms races: A critical review with some extension," *European Journal of Political Research* 4 (1976), 421-39.

articulated in top-secret military documents, can be mapped onto a dyadic formula.[29] As discussed in detail below, the periodicity-disrupting event that ended, or at least severely disturbed, the dyadic chain was the collapse of one of the players: the USSR, and the fall of Soviet communism. The DPOI was primarily the Western and Eastern European continent where the potential for actual military conflict was most likely, in particular along the Iron Curtain, where the US was the relatively weaker power and therefore the mismatcher.[30]

Stronger power-weaker power dyad example: USSR-US (1945-1991)

1] $USSR^0 \leftrightarrow US^0$ (Iron Curtain appears with defeat of Nazi Germany, 1945)
2] $USSR^0 \rightarrow US^1$ (US mismatches USSR conventional forces—the First Offset)
3] $USSR^1$ (Soviet nukes—MAD) $\rightarrow US^2$ (RMA to counter MAD—the Second Offset)

4] $USSR^2$ (match) $\rightarrow US^3$ (mismatch) $\rightarrow \infty$ (in reality this dyadic chain was disrupted by fall of USSR)[31]

[29] These long trends and subtle beginnings and endings make testing the theory particularly fraught.
[30] Barry Buzan, Charles Jones, and Richard Little, *The Logic of Anarchy: Neorealism to Structural Realism* (New York: Columbia University Press, 1993), 132.
[31] This is the prediction based on DSD had the USSR not collapsed. The Soviet Union attempts to match the US mismatch RMA, with its own matching version.

THREE STRATEGIES

MATCHING

Template 3: Equal power dyad [matcher-matcher]

1] $E1^{n} \leftrightarrow E2^{n}$
2] $E1^{n+0} \leftarrow 2E^{n+1}$
3] $\rightarrow E1^{n+1} \rightarrow E2^{n+2} \rightarrow \infty$

Strategic matching is a form of dyadic interaction in which the equal or stronger power counters in kind. That is, it develops military force approximately equal to that of its adversary in the dyad.[32] A strong state that identifies a primary adversary and perceives the extent of its military development counters by creating its own neutralizing response.[33] This matching tends to be unimaginative. In general it simply seeks to counter, as opposed to trumping, the adversary's military threat.[34] The DPOI in which the dyad exists must be identified, as a change in DPOI, and a possible concomitant change in power relationship, can transform an effective matcher into a mismatcher, and vice-versa.[35] Strategic matchers are the dominant or equal power

[32] It is important to note that matching (and mismatching and disrupting, for that matter) does not suggest automatic conflict—it simply predicts a strategic preparatory response. It is not necessarily mobilization, so much as a redirecting or increasing of military spending, or a general changing of strategy. This applies in general terms of power projection. Cultural and geographical factors may play a strong role in exactly how a state matches. During the Cold War, for example, the USSR had no large aircraft carriers, largely because unlike the US, the USSR was not a sea-faring power: its geography overwhelmingly incentivized land power projection. See Charles H. Anderton, "Arms race modeling: Problems and prospects," *Journal of Conflict Resolution* 33-2 (1989), 22.
[33] A neutralizing response means that the state will attempt to balance, thereby neutralizing the outstanding power differential. It does this by internal balancing, by making itself more militarily powerful, and by externally balancing, by combining its force potential with allies in order to possess a combined force of arms that balances the adversary. Due to the security dilemma, internal balancing occurs regardless of external balancing.
[34] As explained below, the matcher tends to be the less innovative of the parties within a dyad. Mismatchers are more heavily pressured to innovate. As a matcher, balancing the mismatcher usually involves little more than replicating an innovation or quantitative balancing. See Anonymous, *US ground forces and the conventional balance in Europe* (Washington DC: *Congress of the United Congressional Budget Office,* 1988), 19.
[35] US/USSR dyads are the best example: During the Cold War the US was the matcher at a global DPOI, but a mismatcher at the European theatre DPOI.

within the dyad in the specific DPOI. Within the game-theoretical dyadic formula their move is second, after first identifying the weaker mismatching power as the primary threat within the DPOI.[36]

As far as examples of matchers go, one must search for equal power dyads and dyads containing at least one very strong power. For much of the history of the modern state (that is, since the mid-1500s), France and Great Britain formed an equal-power matching dyad.[37] The build up to WWI was unique at the time for its relatively rapid pacing of the dissolution and reformation of new dyads. During this time the traditional UK-France matching dyad diminished in importance with these countries aligning, and a unified Germany emerged as a widely recognized primary adversary for both France and Great Britain.[38]

Another example of historical matching includes the UK/Germany dyad in the years immediately prior to WWI and WWII. The DPOI for this dyad existed primarily within the European theatre, and in particular along the coastal seas around Northern Europe (an ocean-based DPOI).[39] The British were the nominal stronger power within this dyad with each identifying the other as a primary adversary. Prior to WWI, Germany accelerated production of warships for a fleet in being worthy of a recently unified great power.[40] This led to the then-dominant British matching Germany's growing military power by increasing its own production

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[36] Again here it is assumed that states balance against power, not threats. See Robert Gilpin, *War and Change in World Politics* (Cambridge: Cambridge University Press, 1981), 110.
[37] C. J. Bartlett, *Great Britain and Sea Power 1815-1853* (Oxford: Clarendon, 1963), 250. See also Stoll Bolks and Theodore Ropp, *The development of a modern navy: French naval policy, 1871-1904*, Edited by Stephen S. Roberts. (Annapolis, MD: Naval Institute Press, 1987), 211.
[38] One reason this occurred was because Germany finally appeared as a modern, discernable nation-state in 1871.
[39] It follows that a seafaring power will commonly exhibit dimensional points of interaction in oceans.
[40] That is, not intended as a serious threat, but rather as a way to incentivize talks or concessions. The fleet in being is an example of a broadly strategic weapon designed more for its diplomatic impact than its military potential. The archetypal example is strategic nuclear weapons.

of surface warships, which triggered a naval ships arms race between the two powers.[41] During the Cold War Britain identified the USSR as its primary adversary, and, as the weaker power, mismatched it with submarine-based Trident missiles. No dyadic chain developed between the USSR and the UK during this period, however, because, as the potential matcher within the dyad, the USSR did not identify the UK as a primary adversary. Undoubtedly the US held this role and was the prime focus and adversary of the USSR throughout the latter's existence.[42]

As noted above, strategic matching is the causal engine for a specific iteration of a familiar phenomenon: the quantitative arms race, contrasted with the qualitative arms race, described below. The nature and definition of arms racing remains an area of significant debate within international relations. However, a general consensus exists on what it is and what it looks like.[43] (Quantitative) arms racing consists of "two or more parties perceiving themselves to be in an adversarial relationship, who are increasing or improving their armaments at a rapid rate and structuring their respective military postures with a general attention to the past, current, and anticipated military and political behaviour of the other parties."[44]

Another interpretation suggests quantitative arms racing as involving "the participation of two or more nation-states in apparently competitive or interactive increases in quantity or quality of war material and/or persons under arms."[45] This definition is refined further as lasting a

[41] The Germans, unable to match pace as the weaker power, reverted—coherent with the theory of DSD—to mismatching by developing a cheaper and deadlier submarine fleet.
[42] Charles H. Anderton, "A selected bibliography of arms race models and related subjects," *Conflict management and Peace Science* 8-2 (1985), 12.
[43] Note the extensive literature on arms racing and its instigating factors, with much overlap with the DSD model especially with regard to primary adversary identification and the typically dyadic nature of arms-races. See Sean Bolks,and Richard J. Stoll. "The arms acquisition process: the effect of internal and external constraints on arms race dynamics." *Journal of Conflict Resolution* 44:5 (2000). See also Theresa Clair Smith, "Arms race instability and war," *Journal of Conflict Resolution* 24-2 (1980), 5.
[44] Colin S. Gray, *Another bloody century: Future warfare*, (London: Weidenfeld and Nicolson, 2005), 40. See also Bernard Brodie, ed., *The absolute weapon* (New York: Harcourt Brace, 1946), 137.
[45] Smith, "Arms race instability and war," 4.

minimum of four years, beginning in a year in which military spending rises and hostility toward some adversary nation-state is declared.[46] Quantitative arms races end either when military spending decreases by at least one of the adversaries for two consecutive periods, or when war breaks out.[47] Wallace provides more specific additional criteria. Quantitative arms racing is a phenomenon of approximately equal powers, and there must by a sharp acceleration in military spending at rates of 10-25% or more.[48]

Therefore strategic matching and quantitative arms racing, by these traditional definitions, require two elements in concurrent form: an acknowledgment or recognition of a primary adversarial relationship, and a concrete increase in military spending. Based on historical examples and the general academic consensus, an additional definitional element should be added within the dyadic strategic determinist model. Increased military spending is committed to similar or directly-interlinked materials, systems or equipment. This produces a quantitative arms race between matching powers, or an arms race in terms of numbers: matching military unit for military unit. Quantitative arms races do not entail massive changes in military technology or attempts to bypass the race for military superiority with innovative strategies.[49] As with the naval arms race between Britain and Germany prior to WWI, and similarly with the global nuclear arms race between the US and USSR during the later Cold War, the increasing armaments in arms races are of the same approximate class and type.[50]

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[46] Alexander George and Richard Smoke, *Deterrence in American foreign policy* (New York: Columbia University Press, 1974), 123.
[47] Jim George, "Discourses on global politics: A critical (re)introduction to international relations" in *Critical Perspectives on World Politics*, R.B.J. Walker, ed. (Boulder, CO: Lynne Rienner, 1994), 220.
[48] Smith, "Arms race instability and war," 5.
[49] This is why arms racing and US Offsets are defined and considered differently. Offsets are forms of mismatching. See Edward Gulick, *Europe's Classical Balance of Power* (New York: Norton, 1955), 313.
[50] Samuel Huntington, "Arms races: Prerequisites and results" in *The use of force*, Robert Art and Kenneth Waltz eds., (Lanham, MD: University Press of America, 1983), 445-447.

Furthermore, the majority of historically recorded arms races have been bilateral, as opposed to multilateral.[51] By consolidating these definitions and adjustments, a firm definition of the quantitative arms race as the observable evidence of strategic matching is derived. Mutual strategic matching produces quantitative arms races: the phenomenon whereby two states of approximately equal power increase the quantity of coinciding armaments in response to what each perceives as the threat of the other state.

MISMATCHING

For reasons of economics, bureaucracy and human unimaginativeness, a state identifying a rival of approximately equal power may attempt to balance it both through coalitions if possible and in matching, static, hard power terms in numbers of tanks, planes, missiles, and in corresponding displays of power.[52] However, a state identifying a rival of greater power will by necessity be limited in how much direct, quantitative, massive-resource-expending balancing it can do.[53] It must therefore search for other methods of accomplishing this deterministic desire to balance.

Limited or restricted attempts at matching produce mismatching. A state will balance in a specific area, in submarine technology for example, but will be unable to truly compete in other spheres, such as overall naval power, in net quantity or power projection ability. The consequent qualitative arms racing will not be universal. It will not be spread across all departments of the

[51] Robert Jervis, "Cooperation under the Security Dilemma," *World Politics* 30-2 (1978), 115.
[52] As noted above, the fact that states balance dynamically—forming coalitions—does not detract from the thesis that they deterministically and simultaneously seek to balance statically. All states are potential adversaries under the security dilemma. See M. Bourne, *Understanding Security* (London, Palgrave Macmillan, 2014), 100.
[53] James Lebovic, "Consider the source: Organizational bias in estimates of foreign military spending," *International Studies Quarterly* 42 (1998), 162-163.

armed forces or within all spheres of military hardware, but will be limited to select areas that economic, cultural and geopolitical realities allow.[54] Military spending tends to get siphoned into this sphere both because it is already championed culturally, and because further investments yield higher returns in terms of superiority and destructive power.[55] The underlying, possibly-unconscious reasoning for mismatching is that possessing a single or a few very good weapons systems that can effectively balance brute military power is better than possessing something of everything, but nothing of which is any specific good.

A clear example of a mismatcher in modern history includes the US against the USSR within the specific DPOI of the European theatre, as considered in detail below. For other examples of mismatchers, currently Pakistan is a weaker relative power and a mismatcher against a stronger India, both on a global and a Kashmiri DPOI. China mismatches against the United States, although, arguably, no dyadic chain has been established as US leadership still identifies Russia as the primary adversary.[56]

A useful analogy for both matching and mismatching is found in the hard sciences. In evolutionary biology, the Red Queen hypothesis states that two competing, coevolving populations will produce selective pressures on each other to adapt in particular symmetrical ways. That is, the evolutionary advancements that allow the one species to gain an advantage

[54] Historically and culturally speaking, the mismatching state will tend over time to make virtue of these economic necessities: its submarines will become the pride and focus of its armed forces, to the detriment of other possible armaments, for example. See Robert Jervis, *Perception and Misperception in International Politics* (Princeton, N.J.: Princeton University Press, 1978), 212.
[55] Robert Jervis, *System Effects: Complexity in Political and Social Life* (Princeton: Princeton University Press, 1997), 19.
[56] This will almost inevitably change within the next decade or so. See Flynt Leverett and Wu Bingbing, "The new silk road and China's evolving grand strategy" *The China Journal* 77 (2016), 9.

over the other will provide a direct selective pressure on the opposing species to adapt against the advantage.[57]

A convenient example is that of proximal fox and rabbit populations. Assuming the fox and rabbit species are directly antagonistic, for example the foxes hunt rabbits within a particular territory, then a biotic environmental pressure will be exerted upon the fox population to better hunt rabbits, say by running faster and becoming more likely to catch rabbits. Those foxes that are disadvantaged in this genetic ability will more likely die of starvation or otherwise less likely to mate successfully.[58] Any developing genetic advantages for the fox population will create corresponding evolutionary pressures upon the rabbit population to adapt in order to overcome the advantage of the foxes, by themselves evolving the ability to run faster and overcome the chasing speed of the foxes, for example. There arises a positive feedback system if adaptation by the predator species is reciprocally countered by adaptation in the prey species and vice versa. The net effect is a dynamic equilibrium or antagonistic co-evolutionary arms race.[59]

However, because each population adapts to counter the adaptations of its coevolving adversary species, there appears to be no ultimate change in the relative balance of power between the one population and the other.[60] It seems like both populations are constantly adapting to one another but both stay the same in their relative survival ratios. And so, as with

[57] The Court Jester hypothesis, as a directly competing claim against the Red Queen hypothesis in evolutionary biology, argues that the key adaptive pressure comes not from biotic species-competitive arms-racing forces but abiotic ones, such as climate. This hypothesis overlaps within international relations which concepts of geographical determinism and, to an extent, the concept of dimensional point of interaction. Current evidence suggests that both the Red Queen hypothesis and the Court Jester hypothesis can coexist on different levels—the micro and macro respectively. See Edward J. Lawler, Rebecca S. Ford, and Mary A. Biegen,"Coercive Capability in Conflict: A Test of Bilateral Deterrence versus Conflict Spiral Theory" *Social Psychology Quarterly* 51 (June, 1988), 106-107.
[58] Gary King, *Unifying political methodology: The likelihood theory of statistical inference* (Cambridge, UK: Cambridge University Press, 1989), 125.
[59] Arnold Zellner, "An efficient method of estimating seemingly unrelated regression equations and test of aggregation bias," *Journal of the American Statistical Association* 57-9 (1962), 23.
[60] Arnold Wolfers, *Discord and collaboration* (Baltimore: Johns Hopkins University Press, 1962), 317.

the Red Queen and Alice in *Through the Looking Glass*, each is running as fast as they can, but not actually going anywhere. The analogy, between coevolving fox and rabbit populations within a particular territory, and stronger powers and weaker powers within a specific DPOI, is evident.[61] Dyadic chains are simply international relations manifestations of the Red Queen phenomenon.

Template 1 abstracted: stronger power-weaker power dyad at initial stage "n"

1] $S^{n} \leftrightarrow W^{n}$
2] $S^{n+0} \leftarrow W^{n+1}$
3] $\rightarrow S^{n+1} \rightarrow W^{n+2} \rightarrow \infty$

If dyadic chains are those reiterative cycles of reciprocal dyadic interactions indicated in sentential form in stage 3] of the dyadic formula, then, minus any periodicity-disrupting events, DSD predicts the international relations equivalent of the Red Queen phenomenon.[62]

As noted, what is referred to as arms racing is largely synonymous with the concept of the dyadic chain. Arms races are competing programs of military preparation—of buildups of military hardware to match or mismatch a primary adversary. Arms races that are quantitative matters of stock-piling numbers of similar weapons occur between matching powers (equal power dyads).[63] Qualitative arms racers are mismatchers. These states pursue strategies of one-

[61] Azar Gat suggests that Red Queen phenomena will arise by virtue of the security dilemma alone. States will develop hostile co-evolutionary strategies. See Azar Gat, "Ideology, national policy, technology and strategic doctrine between the world wars," *Journal of Strategic Studies* 24-3 (2001), 30.
[62] The more links in the dyadic chain, the faster advancements in military technology will develop, and the more mature the dyadic chain, the more advanced the technology in play will become. There is a pressure to increase quantity and quality of military armaments due to dyadic chains over time, in a general sense. See David V. Coletta, "Learning from military transformations: Navigating the Third Offset Strategy," *Parameters* 47-4 (2018), 13.
[63] The US-Soviet competition to out-stockpile the most ICBMs and nuclear warheads is the quintessence of the quantitative arms race between matching powers on a global scale (that is, with the broadest possible dimensional point of interaction). See Michael D. Ward, "Differential paths to parity: A study of the contemporary arms race," *American Political Science Review* 78 (1984), 301-303.

upmanship with weapons that are more advanced or unique than those possessed by the adversary.[64]

The notion that stronger, matching powers tend to race quantitatively, while weaker, mismatching powers tend to race qualitatively is explained by another concept borrowed from evolutionary biology: the life-dinner principle. Just as the selective pressure on the rabbit to adapt is stronger than that on the fox, because failure means death by predation for the rabbit but just the loss of a meal for the fox, selective pressure to adapt acts more strongly on a weaker state than a stronger, because failure could spell annihilation for the weaker state, but merely loss of dominance or supremacy for the stronger.[65]

As discussed in detail in chapters 2, 3 and 4, the concept of mismatching is manifested in the so-called Offsets of the US armed forces. Offsetting is considered a possible solution to the problem of waning US power in any particular DPOI.[66] US government doctrinal statements do generally comport with the dyadic strategic determinist model. The commonly-repeated statement that the answer to the threat of rising powers will involve the US armed forces utilizing more innovative solutions is essentially admitting that the adversary which becomes the stronger power in any specific DPOI, and which starts matching, must be met with a mismatching US response.[67]

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[64] Brian M. Pollins and Randall L. Schweller, "Linking the Levels: The Long Wave and Shifts in U.S. Foreign Policy, 1790-1993," *American Journal of Political Science* 43 (April 1999), 453-454.

[65] Erich Weede, "Arms races and escalation: Some persisting doubts," *Journal of Conflict Resolution* 24 (1980), 285-87.

[66] The Third Offset was primarily a response to Russian revanchism, with US strategists looking into the "deep future" past 2030 when Russia may balance the United States. It could also be applied to the rising Chinese threat. See P.H.B. Godwin, "Change and Continuity in Chinese Military Doctrine, 1949–1999," In Mark A. Ryan, David M. Finkelstein and Michael A. McDevitt eds., *Chinese Warfighting: The PLA Experience since 1949* (New York: M.E. Sharpe, 2003), 221.

[67] The argument, however, that it is Offset doctrine which leads to mismatching should be reversed. It is the determinist mismatching which produces the secondary Offset doctrine. See Michael Wallace, "Arms races and escalation: Some new evidence," *Journal of Conflict Resolution* 3-16 (1980), 15-17. See also Michael Wallace, "Some persisting findings: A reply to Professor Weede," *Journal of Conflict Resolution* 1-24 (1980), 289-92.

As examined below, the First and Second Offset strategies were pursued by the United States in response to the Soviet threat. The First Offset, under the Eisenhower administration, countered the superiority of Soviet conventional weapons. This involved focusing on a nuclear deterrent. The Second Offset, again a direct response to the USSR in the European DPOI, consisted of the innovative modernization of US forces; specifically precision-guiding systems and computerization, and planning victory in a major war in Europe via the doctrine of AirLand Battle.[68] The Third Offset, officially announced in a 2014, emphasizes miniaturization and automation, and other cost-saving measures.[69]

DISRUPTION

Wallace's point that quantitative arms-racing states tend to be equally powerful is important. There must be some degree of relative, comparative power for states to be able to match or mismatch.[70] If adversaries are roughly equal in power, they will match one another. If the dyad is lopsidedly powerful: if one state is significantly more powerful, then mismatching occurs. Desperation and innovation are positively correlated, as noted. A question arises: what happens when a state that is triggered to balance against an adversary is so weak that it cannot even afford to mismatch? One solution is that the weaker state can choose not to compete

[68] Peter J. Woolley, "Geography and the limits of US military intervention," *Conflict Quarterly* (Fall, 1991), 3-4.
[69] Sydney J. Freedberg, Jr., "Hagel lists key technologies for US military; Launches 'Offset Strategy'" *Breaking Defense*, November 16, 2014. https://breakingdefense.com/2014/11/hagel-launches-offset-strategy-lists-key-technologies/ (accessed March 14, 2019).
[70] Michael Wallace, "Racing redux: The arms race-escalation debate revisited," in *Prisoners of war? Nation-states in the modern era* Charles S. Gochman and Alan Ned Sabrosky, eds. (Lexington, MA: Lexington Books, 1990), 117.

militarily at all, although all of theory and historical evidence rejects this option.[71] Rational states will prepare for aggression by other states.

However, in a third strategy, forced upon the weakest due to the security dilemma, the state strives to balance internally, but in what may be described as desperate and extreme ways. Much as weaker states that mismatch will resort to innovative methods of internal balancing, the weakest states will exhibit the most innovative, strange and unorthodox strategies; those that are cheap by virtue of their extreme or unorthodox nature.[72] Examples of disruption strategies include terrorism, brinkmanship and unpredictably-erratic state behaviour, and the development, threat or use of highly unconventional or condemned weapons and tactics. Disruption is not exhibited by the major powers, for the singular reason that major powers are able, almost by definition, to match or mismatch their primary adversaries, and because in general it is in the interest of the strongest states to maintain a semblance of international order.[73]

Due to their unorthodox, unpredictable and chaotic nature, strategies of disruption more often lead to actual conflict than strategies of matching and mismatching.[74] Examples of disruption include North Korean threats and nuclear testing vis-à-vis the US, Al Qaeda and ISIS attacks and terrorism launched against the US, Hamas propaganda and attacks against Israel, Vietnamese guerrilla tactics against France in the 1950s, and then, upon identifying it as its primary adversary, the US.[75]

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[71] The weaker state will also search for allies to balance the stronger adversary state. This is the external balancing described above, and will occur as an independent endeavor for all states, excepting perhaps the very strongest.
[72] Benjamin Valentino, Paul Huth, and Dylan Balch-Lindsay, "Draining the sea: mass killing and guerrilla warfare," *International Organization* 58-2 (2004), 221.
[73] Strategies of disruption are exhibited by failed and failing states, very small and/or weak states, and non-state, or aspirational-state actors. See Stone, John. "Cyber war will take place!" *Journal of Strategic Studies* 36-1 (2013), 16.
[74] Theresa Clair Smith, "The insurance factor? An assessment of war costs," *Journal of Peace Research* 22-2 (1985), 28.
[75] For context, North Korea threatens the US with annihilation, yet spends some $10 billion US on its military, compared to $650 billion spent by the United States. North Korean military spending accounts for approximately 30% of GDP. Disruption is North Korea's only real strategic options vis-à-vis the United States. See Jeremy

Disrupting states will aim to balance internally by raising the stakes of war for the stronger power, as much the same as the other two strategies ultimately do. However due to their lack of military and power-projection capability, disrupting states emphasize civilian casualties, environmental destruction, and threats of irrational or suicidal behaviour.[76] An oft-seen strategy of the disrupting power is to take a third country hostage, threatening not the considerably powerful primary adversary but a weaker proxy state closer to the disruptor. North Korea threatens South Korea in this sense, as has, historically, China vis-à-vis the US, using Taiwan as its hostage.[77]

Examples of strong major powers matching against weak, disrupting powers are rare, given that few great powers deem these extremely weak states to be worth identifying as primary adversaries. The strategy of disruption is primarily a sub-state phenomenon.[78] The US did not identify post-war Iraq in 2003 or Afghanistan in 2001 as primary adversaries, due to the fact that these states did not pose any existential threat to the extent that a nuclear-armed Russia continues to exhibit. This is an important cause of the inertia that prevents states from rapidly adjusting to innovative threats. It may also partly explain why the US response to insurgency crises has been historically weak and delayed, requiring strong and persistent political and State Department cajoling.[79]

Laurence and Danbee Moon, "North Korea spends about a third of income on military: group," *Reuters* https://ca.reuters.com/article/topNews/idCATRE70H1BW20110118 (accessed April 11, 2019).

[76] David P. Fidler, "Outside the wire: American exceptionalism and counterinsurgency," *William Mitchell Law Review* 37-5 (2011), 26.

[77] L. Feng and T. Duan, 'Zhongguo Hauyang Diyuan Anquan Tezheng Yu Xin Shiji Haishang Anquan Zhanlue' ["Characteristics of China's sea geostrategic security and sea security strategy in the new century"], *Zhongguo Junshi Kexue* (2007), 27–29.

[78] Thomas R. Cusack, "The evolution of power, threat, and security: Past and potential developments," *International Interactions* 12 (1985), 162-164.

[79] See Vietnam, Iraq after the 2003 Iraq War, and Afghanistan post-2001 US invasion. See William C. Brainard, "Uncertainty and the Effectiveness of Policy." *The American Economic Review* 57 (June 1967), 422-24.

CRITIQUES OF THE MODEL

OVERSIMPLIFICATION

All models are by definition simplifications of the systems they seek to explain. But a major issue with models in general and dyadic strategic determinism in particular is that it may over-simplify. This simplification becomes problematic if it detracts from the predictive power of the model. As the systems being modelled increase in complexity, the model's predictions become correspondingly more generalized, as models in general must trade complexity and realism for predictability. The more realistic the model, the narrower is its predictive power.[80]

The DSD model simplifies geopolitical relationships. It is inherently simplistic, given that there is an entire ecology of states of varying power-levels, all interacting in countless shifting ways.[81] The knowledge each adversary possesses of the other differs over time and directly influences state behaviour.[82] Information about the other side's capabilities is assumed to be perfect within the DSD model, which is a gross simplification of the real world.[83] Dyadic

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[80] Such factors as geography or more specifically geopolitics, serve to influence primary adversary determination, effect dimensional point of interaction, and otherwise influence the occurrence of periodicity-disrupting events which break dyadic chains. German strategic preparation for much of its history has been strongly influenced by its need to prepare for two-front wars (against France and Russia), which complicated primary adversary determination. See Robert Citino, *The German Way of War: From the Thirty Years' War to the Third Reich* (Lawrence, Kansas: University of Kansas Press, 2005), 188-189, and Robert M. Citino, "The German way of war revisited," *Historically Speaking* 11-5 (2010), 1-2. See also Uwe Hartmann, "The evolution of the hybrid threat, and resilience as a countermeasure," *NATO Research Paper* No. 139 (2017), 3.

[81] Canada's strategic preparation has been affected by the fact that it is essentially a strategic parasite of the US. The US will always defend against a theoretical invasion by another country targeting Canada, and so Canada does not spend on its military like similarly powerful countries. It does still, however, internally balance against the US in a nominal sense, producing action plans and like for theoretical US invasions.

[82] C. L. Glaser, "The Security Dilemma Revisited," *World Politics* 50-1 (1997), 20.

[83] A theoretical major power might, for example, expand ICBM production because it thinks it suffers a missile gap—when it actually does not. See Paul R. Hensel and Sara McLaughlin, "Power transitions and dispute escalation in evolving interstate rivalries," August 1996, https://www.researchgate.net/publication/228495291_Power_transitions_and_dispute_escalation_in_evolving_interstate_rivalries (accessed May 2, 2019).

strategic determinism also simplifies the concept of time. The model is turn-based. The interacting states take turns matching, mismatching, matching and so on. However, in reality states are constantly adapting and manoeuvering vis-à-vis one another.

A state's power transformation, linked to changing economic power, may not translate into a strategy change for decades, and the state's adversaries may over-, or underestimate its power. In a hypothetical world which perfectly replicates the DSD model of state-strategizing, powers would develop military programs in environments with zero uncertainty (i.e. full knowledge of all aspects of rival states and their capabilities). In such a model states would devote an undefined but equal (relative to rival states) percentage of GDP to military spending. Also, in this world predictions of state strategy would themselves be perfect. That is, it would be possible to predict with certainty whether a state pursues matching, mismatching or disruption strategies.

Such a hypothetical world assumed in international relations models does not exist. There are thousands of variables which effect the model's predictive power.[84] Therefore even if correct the model can at most suggest trends and general patterns, in the style of meteorology or the other sciences of highly complex open systems. But this general predictive power is sufficient. A model of any level of predictive utility is better than nothing, especially in such a high-stakes endeavor as grand strategy.[85] In such generally useful models, known variables can be examined, and to an extent accounted for and controlled against. These include the amount and quality of knowledge about a rival state possessed by a particular power. This will affect the extent to which a state can determine whether it is most suitable to match, mismatch or disrupt a rival

[84] Andrew D. Martin and Kevin M. Quinn, "Dynamic Ideal Point Estimation via Markov Chain Monte Carlo for the U.S. Supreme Court, 1953-1999." *Political Analysis* 10 (Spring, 2002), 134-35.
[85] Michael D. McGinnis, "Richardson, rationality, and restrictive models of arms races," *Journal of Conflict Resolution* 35 (1991), 19.

state. Domestic factors such as politics, culture and the prestige or priority of the military as an institution will also influence state strategies.[86]

Other real-world factors complicate the realization of a power-predictive model of military strategy. Knowledge is one of these. One assumption of the abstract functional hypothesis is perfect knowledge of all adversaries: each rival knowing both its own and its rivals' economic power, military abilities and so on. Knowledge of a rival's capabilities will influence both the type and extent of reactive internal balancing. A state may expand ICBM production, for example, because it thinks it suffers a missile gap.[87] Such beliefs are of varying degrees of accuracy, based in part on the work of the intelligence agencies of the state, as well as the counter-intelligence and bluffing efforts of the adversary.

Historical and cultural factors strongly influence the link between economic power and military power. History shapes culture, and vice versa. Some states tend to be belligerent, others comparatively passive.[88] The standard assumption is that states which have historically been enemies will tend to identify one another as adversaries and will build military strategies with one another in mind. It is a common and false assumption that states which have traditionally been aligned will be slower to identify as potential adversaries and may not sufficiently match/mismatch/disrupt one another.[89] Other factors further complicate the relationship between

[86] Daryl G. Press, "The myth of air power in the Persian Gulf War and the future of warfare," *International Security* 26-2 (2001), 18.
[87] Susan G. Sample, "Military buildups as a Correlate of War," Paper prepared for the Norman Thomas Lecture Series (Conference on the Scientific Study of War), Vanderbilt University, Nashville, TN, March, 5.
[88] Highly developed states such as Canada and much of modern Europe spend less on their militaries (as a percentage of GDP) than NATO leadership would prefer, and what many other more militaristic countries achieve.
[89] Susan G. Sample, "Arms races and dispute escalation: Resolving the debate," *Journal of Peace Research* 34 (1997), 11-13. See also Paul Huth and Bruce Russett, "General deterrence between enduring rivals: Testing three competing models," *American Political Science Review* 87 (March 1993), 70-71.

power and military strategy, including geopolitics. States in historically warring and unstable environments will tend to spend more on their militaries, for example.[90]

Perhaps a more serious issue with the DSD model is its apparent determinism. While it is argued here that states tend to deterministically pursue strategies of military balancing, this does not necessarily imply that agency itself is illusory.[91] The number of variables that inform strategic choice are so numerous that it certainly appears that choice plays a role in strategic planning. Despite the multitude of variables, it is ultimately the security dilemma which provides the impetus for decision-making. This universal phenomenon is the determinism behind decision making. Other factors listed above may add or subtract from the general pressure of the security dilemma, but the security dilemma remains nonetheless. With this in mind, many of the complicating variables described here can be placed safely within the black box of state-specific forces (the Waltzian second image). In the final analysis, it is less important that all forces are accounted for and that the model adheres rigidly to real world specifics, so much as the model is useful. This is determined by its predictive power.[92]

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[90] North Korea is essentially on a constant war-footing for reasons of ideology. The same can be said for Iran, although Iran's geographic location—surrounded by failing or enemy states— incentivizes military spending. See Jeremy Laurence and Danbee Moon, "North Korea spends about a third of its income on the military," *Reuters* https://ca.reuters.com/article/topNews/idCATRE70H1BW20110118 (accessed April 11, 2019).
See also Jack S. Levy, "When do deterrent threats work?" *British Journal of Political Science* 18 (October, 1988), 490-492.

[91] A fitting analogy is found within the psychological behaviourism of BF Skinner in the 1960s. His response to the question of mind and consciousness was dismissal. These entities may exist, but they are not necessary to the functioning of the behaviourist model. Like Pierre Laplace, who in regard to questions of the existence of God replied: "I have no need of that hypothesis."

[92] Patrick Morton, *System and Process in International Politics* (New York: Wiley, 1984), 224. See also Benjamin Most and Harvey Starr, *Inquiry, Logic, and International Politics* (Columbia: University of South Carolina Press, 1989), 320.

ADVERSARY-IDENTIFICATION

The adversary-identification problem raises the issue of a state having multiple potential rivals. In a multipolar system a major power will likely deem numerous states legitimate threats. But it cannot match, mismatch, or disrupt every possible rival state.[93] There is a limit to military spending. In a general sense, all states heed Vegetius' maxim: *Si vis pacem, para bellum*. However in an anarchic world of hostile powers, the question becomes not so much whether, as opposed to how, to prepare.[94] It has been assumed that the states themselves decide how to prepare, that they have free will in such matters. However if the security dilemma forces states to look with suspicion at their neighbours, then preparation is deterministic or at least very strongly influenced by states' ability to prepare.[95]

As noted above, dyadic strategic determinism applies to primary adversaries. Both players within the dyadic game must identify one another as each other's main or most important adversary. This has to do with the urgency and existential importance of these interactions in particular, which dictates a maximal or first-priority resource allocation. The US does not identify North Korea as its primary adversary because there are other powers that are more of a threat to the safety of the US. For this reason there is currently no dyadic chain in effect between

[93] As noted below, it can, however, fight states it has not prepared to fight over the long term, or states that it does not identify as its primary adversary. The US fought Iraq in the Persian Gulf War with military equipment, strategies and tactics developed to defeat the Soviet Union. There is nothing to prevent a state fighting fast and minor wars against secondary adversaries with the strategies and armaments deterministically developed to counter the primary adversary.

[94] See Patrick M. Morgan, *Deterrence Now* (Cambridge: Cambridge University Press, 2003), 180-182.

[95] In international relations theory generally, it is the liberal school that is associated with free will, and the realist camp more inclined to espouse a determinist system. Classical and structural realists differ in this regard, with the classical realist emphasis on leader decisions in contrast to the structural-determinist inclinations of neorealism. See Bruce Russett, "International interactions and processes: The internal verses the external debate," in *Political science: The state of the discipline*, Ada Finifter ed. (Washington, DC: American Political Science Association, 1983), 552-554. For a general overview and commentary on this simplification, see Waltz, *Man, the State, and War*, 65.

the US and North Korea.[96] Although the dyadic strategic determinist model predicts that states will gear their military preparation to balancing their primary adversaries, this does not imply that such states will not fight against other, non-primary adversaries. In general, however, given the economy of all military spending, states will prepare for and fight minor, non-primary adversary states within the confines of the military infrastructure and limitations imposed by their extant dominant primary-adversary balancing strategies.[97]

As noted, the reiterative cycles of internal balancing predicted by dyadic strategic determinism only arise between primary adversaries. That is, adversaries which display the most dangerous and most urgent threat to one another. Adversary identification is influenced by factors of geography, history, cultural or religious interactions, economic factors such as trade, and even massive relative power differentials.[98] Certain triggers may force powers to identify states as primary adversaries, in a "final straw" event. A state entering another state's territory, or the threat of such, for instance, could be such a trigger.[99] Triggers may involve a growing rival state using non-conventional weapons or committing an atrocity (often the same thing).[100]

Major power preparation must include elements of resource allocation and construction: choosing a suitable allocation of wealth for specific military hardware that will be needed for the planned response to attack or the state's own preventive or pre-emptive strike. The collective, unconscious computations involved in identifying primary adversaries can be complex. Subject

[96] Currently first place is held by Russia, with China ascending in importance.
[97] Michael Wallace, "Armaments and escalation: Two competing hypotheses," *International Studies Quarterly* 26 (1982), 37-39.
[98] As the sole world superpowers from 1945-1991, the US and USSR were destined to be adversaries regardless of any other precipitating event.
[99] An automatic trigger for Britain, which precipitated its declaring war on Germany in 1914, was German troop movement into Belgium, which Britain deemed close enough to its own territory to warrant fighting the intruder pre-emptively. It is true that Britain identified Germany as an adversary long in advance for other factors described above, such a trigger placed Germany squarely in British sights as its primary, existential adversary.
[100] John H. Nuckolls, "Post-Cold War nuclear dangers: proliferation and terrorism," *Science* 267-5201 (2017), 27.

to the contingencies of history, an obvious first concrete step is for states to prepare for conflict in their immediate geographical territory before planning for distant wars or projecting power further afield.[101] Particularly bellicose states will be identified as primary adversaries sooner if geographically proximate threats are comparatively sedate.[102] Regardless, primary adversary identification and balancing does not preclude preparing for and fighting wars against non-primary foes. By preparing to fight the most powerful adversary, it is easier to deal with any weaker secondary threats that arise.

REDUCTIO AD BELLUM

For the major powers, the decision to go to war remains just that: a decision. The dyadic strategic determinist model does not predict eventual war between states in dyads, as opposed to the preparation for war.[103] Dyadic strategic determinism only predicts, for example, that a stronger power and a weaker power which identify one another as primary adversaries will tend to revert to dyadic chains: reiterations of balancing, unbalancing and balancing. Although many studies of arms racing argue that long-term inter-state balancing will increase the probability of war breaking out between the adversaries, this does not correspond with historical experience. Many, if not the majority, of quantitative and qualitative arms races have ended without war.[104]

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[101] Steve Pikering, *Understanding Geography and War: Misperceptions, Foundations, and Prospects* (New York: Palgrave Macmillan, 2017), 122. See also Eric Kaufmann, Review of Robert D. Kaplan, "The revenge of geography: what the map tells us about coming conflicts and the battle against fate," *Population and Development Review* 39-2 (2013), 26.
[102] H. Morgenthau, *Politics among Nations: The Struggle for Power and Peace*, *6th ed*. (New York: McGraw Hill, 1985), 1-2.
[103] Kendall Moll and Gregory Luebbert, "Arms races and military expenditure models," *Journal of Conflict Resolution* 24 (1980) 153-155. See also Paul F. Diehl, "Arms races and escalation: A closer look" *Journal of Peace Research* 20 (1983), 205-207.
[104] R. Jervis, "Dilemmas about Security Dilemmas," *Security Studies*, 20-3 (2011), 416-418.

The dyadic strategic determinist model allows for the peaceful termination of dyadic chains, or re-phrased, the peaceful termination of arms races. Real-world factors which interrupt dyadic chains and possible military escalation are referred to above as periodicity-disrupting events.[105]

Dyadic chains are broken by factors which inhibit one or both dyadic participants from continuing to escalate and develop militarily in reference to each other.[106] Examples of PDEs include one of the states undergoing bankruptcy or collapse as the Soviet Union did in the modern era, one of the states failing to develop the technological knowledge or resources required to develop mismatching weaponry, one or both of the states engaging in military conflicts and wars with other powers (or each other), or one of the states being inhibited by political factors such as popularly-forced demilitarization. For a dyadic chain to continue indefinitely, the DSD model assumes no such periodicity-breaking events.[107]

With the fall of the USSR the stronger power-weaker power dyadic interaction described above between the US/USSR was destroyed. The emergent US-Russia dyad is an entirely new strategic interaction altogether, given the different size and capabilities of modern Russia.[108] While the fall of the Soviet Union was a periodicity-disrupting event within a single dyadic interaction, this event was so powerful, and the game was changed so much, that not only did the dyadic chain break, but the positions and choices of the players was necessarily recalculated based on the new relative power relationship.[109] The notion of the periodicity-disrupting event

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[105] Paul F. Diehl, "Arms races and escalation," *Journal of Peace Research* 20-3 (1983), 211-212.
[106] Bruce Bueno de Mesquita, and David Lalman, "Empirical Support for Systemic and Dyadic Explanations of International Conflict," *World Politics* 41 (October), 1-20.
[107] A good starting hypothesis is that dyadic chains tend to end after 4 or 5 "turns" of reiterative balancing. See Bruce Bueno de Mesquita, "The End of the Cold War: Predicting an Emergent Property." *Journal of Conflict Resolution* 42 (April 1998), 143-145.
[108] Because Russia is in a global sense much weaker than the US, and because dyadic strategic determinism predicts interactions based on relative power, a new dyadic interaction must be calculated. See Ian Brzezinski and Nicholas Varangi, "The NATO-Russia exercise gap…then, now, & 2017," *Atlantic Council* (October 25, 2016), 7.
[109] Scott D. Bennett, "Measuring rivalry termination, 1816-1992," *Journal of Conflict Resolution* 41-2 (1997), 15.

saves dyadic strategic determinism from predicting inevitable, eventual war, and may explain the flaw in arms racing models which over-predict military conflict. The DSD model may even suggest war as relatively low-probability outcome of arms races/dyadic chains, given the great number of other, often mundane factors that disrupt infinite escalating forms of internal power-balancing.[110]

THE CONSTRAINED STATE: WHY MATCH?

The constrained state problem raises the seeming incongruity that it is the stronger state in the dyad that matches, against the weaker state that mismatches.[111] Why should the more powerful state match? Surely the more powerful state has more freedom to operate and could escape the determinants of the dyadic chain by mismatching a mismatch as opposed to reiteratively matching it. The trend, however, is for the stronger state to always match. There are two reasons for this. First, given the link between economic power and military power, the stronger state can more often afford to match in budgetary terms. It is not forced to innovate because of affordability, as the weaker power is more likely to. The second reason is the inverse of the life-dinner principle described above. Because the stronger power is less at risk of annihilation than the weaker power, there is less need and less selective pressure on the stronger power to be innovative in its balancing. The stronger state needs only to balance, and then possibly slightly more, in order to satisfy the demands of the security dilemma.[112]

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[110] Paul F. Diehl and Mark J. C. Crescenzi."Reconfiguring the arms race-war debate," *Journal of Peace Research* 35 (1998), 28.
[111] Damon Coletta, "Principal-Agent Theory in Complex Operations," *Small Wars & Insurgencies* 24-2 (2013), 320–321.
[112] Jan Angstrom, "The changing norms of civil and military and civil-military relations theory," *Small Wars and Insurgencies* 24-2 (2013), 12-13.

The determinism of dyadic strategic determinism derives from a cost-benefit analysis. States are distrustful of one another due to the nature of the system in which they exist, which is anarchic and with delays in information-gathering and rife with misunderstood intentions and motives. The relative downsides of preparing for war with an adversary that does not occur is relatively minor; an economic opportunity cost of funds being spent on unnecessary military hardware. This is especially true when contrasted with the ultimate downside of not preparing for an attack or invasion that actually occurs—possible annihilation.[113] Preparation may be flavoured by specific state-characteristics of history, geography and outlook, but the fact of strategic preparation against an adversary itself (that is, whether it will be a matching, mismatching or disruption strategy) is guaranteed and predictable as a function of relative military power.[114]

THE POWER-FUNCTION PROBLEM

To describe states as stronger or weaker is meaningless without context. Stronger and weaker should be understood to mean stronger and weaker within a particular interactive dyad. The predictive utility of the model is lost if two states cannot be contrasted with one another before their dyadic relationship is established. As an example, when considering the India-Pakistan dyad, it is essential to know that India is the stronger power in its dyad with Pakistan, if any consequent general predictions are to be made using the DSD model. A traditional method of

[113] The security dilemma in combination with a rational cost-benefit analysis provides the deterministic impetus of dyadic strategic determinism. But again, as Kenneth Waltz emphasized, these are just general trends. There are not laws in social science. See Waltz, 121.

[114] Military leaders and strategists are trained in knowing when, where and how best to strike when pre-determined triggers are activated by a pre-determined primary adversary. It is the pre-determined aspects that provide the rungs upon which the malleable contemporary activities of states and armed forces play out. The dyadic strategic determinist model aims to explain why the pre-determined aspects are what they are. See Robert Axelrod, *The Evolution of Cooperation* (New York: Basic Books, 1984), 111-113.

predicting military power, other than simply counting tanks and ICBMs, is to link economic power and military power. But as noted above, economic power and military power do not map neatly onto one another.[115] Democratic states, assuming that the general population in some way influences foreign policy, are constrained by the relative domestic priority placed on military spending.[116] So state GDP does not necessarily match military spending due to political, cultural, and economic reasons. States, like Canada, can be economically strong but militarily weak.[117]

Even if economic and military power were tightly linked, there would necessarily be a degree of arbitrariness in differentiating low, medium, and high wealth, and the corresponding high, medium and low military power. The simplest method would be to take a list of all 195 countries of the world and organize it according to ascending wealth or economic power (GDP). The bottom 65 countries (poorest to richest or countries 1-65) are automatically by this definition low wealth (as in lower third of all countries ranked according to GDP). The next 65 countries (66-130) are medium wealth (as in middle third of all countries ranked by ascending GDP). The highest 65 countries are defined as high wealth (countries 131-195).[118]

The flaws of such a methodology are clear, primarily because GDP is a poor indicator of military spending and therefore a poor indicator of military power. Grouping all countries in the top third of GDP as high wealth includes the United States, Canada, Russia and Ireland, for example.[119] In no DPOI is Ireland a military power in the sense that Russia or the US is. Bottom

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[115] C. L. R. Attfield, D. Demery, and N. W. Duck, *Rational Expectations in Economics* (Cambridge, MA: Blackwell, 1991), 166-168.
[116] Sean M. Bolks, *Security policy choice: Foreign policy behavior as a function of threat, governmental structure, and state capability* (Rice University, Ph.D. thesis, 1999), 118.
[117] Post-WWII Japan and Germany are perhaps the most famous examples, although Canada fits within this category.
[118] Guido W. Imbens and Paul R. Rosenbaum, "Robust, accurate confidence intervals with a weak instrument: quarter of birth and education," *Journal of the Royal Statistical Society* 168-1 (2005), 26.
[119] According to 2016 World Bank data. United States takes first place. Canada is 10th, Russia is 12th, Ireland is 40th and Iraq sits at 53rd.

third countries under this system include such states as Tuvalu (194th), The Federated States of Micronesia (189th) and Tonga (187th). A war between the US and Micronesia would be short, and it seems fair to conclude that Micronesia would adopt a strategy of disruption to survive. Such a statement seems so obvious as to be a truism. The issue is primarily that there is a disparity of inter-state military power that is not reflected in GDP rankings of countries.[120]

A better method of defining low, medium and high wealth states for the purpose of predicting military strategies is to ignore general economic power and look at absolute spending on military armaments. By comparing actual dollars spent on military matters, it is possible to remove the complicating factors of culture and politics from the model, which complicates % GDP comparisons.[121] So for its definition of power, of strong, middling and weak, the DSD model opts for a simple definition of funds (controlling for currencies and exchange rates) spent on military forces. The state that has the biggest, best military is the stronger power in the dyad. The force-differential that separates weak military power from middling, and middling from strong, remains unclear.[122]

In conclusion, this analysis establishes that the military strategies of states in dyadic interactions are predictable as a function of relative power, and that there are ultimately only three fundamental strategies.[123] States deterministically pursue strategies of internal or static

[120] Adam R. C. Humphreys, "Another Waltz? Methodological Rhetoric and Practice in Theory of International Politics," *International Relations* 26-4 (2012) 389–390.
[121] Paul F. Diehl, "What are they fighting for? The importance of issues in international conflict research," *Journal of Peace Research* 29 (1992) 335-337.
[122] Henry S. Farber and Jeanne Gowa, "Polities and Peace," *International Security* 20-2 (1995), 16.
[123] As a model, operational definitions will be exhaustive, but certain tenets of structural realism will be considered axiomatic, with empirical proof derived secondarily from the predictive accuracy of the model as a whole. See P.K. Huth, "Deterrence and International Conflict: Empirical Findings and Theoretical Debates," *Annual Review of Political Science* 2 (1999), 27–28.

balancing against primary adversaries.[124] The three possible strategies are matching, mismatching, and disruption. The focus here will be limited to the major powers.[125] In the following chapters the historical US/USSR dyad will be examined as a case study, considering the First, Second, and Third US offsets as forms of mismatching, as well as future strategic considerations for Russia. Chapter 5 will establish predictions for Chinese grand strategy according to the dyadic strategic determinist model.

[124] Internal and static balancing are synonymous terms, as noted. See James D. Fearon, "Signaling versus the balance of power and interests: An empirical test of a crisis bargaining model," *Journal of Conflict Resolution* 38 (1994), 237-238.

[125] The concepts of dyadic chains, the related red queen phenomenon and the life-dinner principle is discussed in detail above.

CHAPTER 2

FIRST OFFSET (1953-1977): THE US MISMATCHES CONVENTIONAL SOVIET POWER

Template 1: stronger power-weaker power dyad

1] $S^0 \leftrightarrow W^0$ (identify)
2] $S^0 \rightarrow W^1$ (mismatch)
3] $\rightarrow S^1$ (match) $\rightarrow W^2$ (mismatch) ∞ [dyadic chain: match-mismatch]

Stronger power-weaker power dyad: USSR-US (1945-1991)

1] $USSR^0 \leftrightarrow US^0$ (Iron Curtain appears, 1945; US New Look Policy, 1953)
2] $USSR^0 \rightarrow US^1$ (US mismatches USSR conventional forces—the First Offset)

The dyadic formula above establishes the USSR as the stronger power, and the US as the weaker power, in the specific DPOI of the European continent from 1945. The United States has undergone two transformations in its military strategy and structure in relation to the USSR and, after 1992, Russia, with a third transformative change currently underway.[126] US strategists and military historians have referred to these large, systematic changes in strategy, and their concomitant changes in military spending and emphasis, as Offsets.[127] As will be shown below, the First and Second Offsets were specific examples of the US mismatching the USSR within the European DPOI, particularly along the North German plain, the Fulda Gap in the centre-east and the Hof Corridor in the south.[128]

[126] The Third Offset is considered in chapter 4 below. For a comprehensive overview, see Damon V. Coletta, "Learning from military transformations: Navigating the Third Offset strategy," *Parameters* 47-4 (2018): 47-50.
[127] While the standard assumption is that the planning and policy comes before the military transformation, and that these are free decisions, the dyadic strategic determinist model suggests that the balancing is a powerful force that more often dictates the policy than vice-versa.
[128] Donald A. Carter, *Forging the Shield: The US Army in Europe*, 1951-1962 (Washington DC: Center of Military History United States Army, 2015), 38.

As established above, mismatching is a strategy utilized by lower-power states against higher-power states. The relative power imbalance applies to the specific DPOI in which the dyad exists.[129] A state may be more powerful than another in general or on a global scale, but weaker in a particular DPOI.[130] The weaker states in these dyads within these particular DPOIs will mismatch, producing specialty programs to exploit weaknesses in the adversary's military structure. That is, the relatively weaker state will cheat in order to balance internally despite its weakness.[131] By pursuing a weapons-specialization program designed to exploit a stronger-adversary's weaknesses within a particular DPOI, weaker powers can internally balance despite being less powerful.

A dyadic interaction between two states of equivalent power leads to matching; a condition that history and general power calculations suggests should have been the case for the US/USSR dyad. However, because of its relative military weakness in the European theatre, within this particular DPOI the US pursued, or was forced to pursue, a strategy of mismatching against the Soviet threat. The US developed strategic nuclear weaponry in order to mismatch the USSR's conventional military superiority in Europe. It will be demonstrated that the US sought to balance the USSR within the European theatre, but due to a massive disparity in conventional armaments and troop numbers between the two countries, and the fact that the US lacked the

[129] It is important to note that strategies determined by relative power are a function of that power within the dimensional point of interaction (or theatre) in which the dyad exists. Global power applies to the equation if it influences the specific DPOI in question. For further discussion of military power restricted by geography in the specific case of the US, see Peter J. Woolley, "Geography and the limits of US military intervention," *Conflict Quarterly* (Fall, 1991), 35-37.

[130] Typically in the areas closest to the globally weaker power. In a hypothetical case of the USSR successfully establishing bases in Cuba, the DSD model would suggest that as the more powerful state within the Cuban-Caribbean DPOI it would be the US matching and the USSR mismatching.

[131] Terms that suggest agency such as "choose" and "sought" are used throughout this paper as conventions. The model is decidedly deterministic. As noted, just as weaker states will dynamically or externally balance a stronger adversary via coalition, they will also balance statically or internally via strategies of disparate power-to-wealth function. This deterministic internal balancing occurs independently of any external balancing or band-wagoning. The security dilemma applies to all states against all states, regardless if states are aligned. History is replete with states betraying one another and violating alliances for individual gain.

ability or political will to locate matching quantities of troops and armaments on European soil, a strategy of matching was not possible for the US during the period of the First Offset, from 1953 until 1977, and therefore it pursued a strategy of mismatching against the USSR.[132]

Until the fall of the Soviet Union in December 1991, the USSR was acknowledged by all analysts, as well as the powers themselves, to be the stronger state within the Western European DPOI, the most likely area for the Cold War to turn hot.[133] This was the case for historical, philosophical, and geographic/logistical reasons. At the end of WWII the Soviet Union was identified as the most important and immediate threat to US security, particularly as German power waned and it became evident that the USSR was not simply going to leave the territories it had taken from the Germans.[134] Leading up to the end of WWII, it was clear that the US and the USSR were the two most powerful adversaries on the globe in terms of military might. Official Soviet government policy called for continuous revolution and the overthrow of capitalist governments everywhere.[135]

With the fall of Germany and the entrenchment of the USSR in post-war Europe, the US recognized the Soviet Union as its primary adversary.[136] The Soviet Union in turn identified the US as its primary adversary, particularly with the advent of NATO in 1949, which was formed

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[132] 1977 was the year in which the USSR first possessed more nuclear warheads than the US. This lead continued until 2002.

[133] Studies suggest that American strategists may have overestimated the magnitude of the Soviet conventional advantage throughout the Cold War, as they certainly did with regard to the purported "missile gap" of the 1960s. As described above, strategic decisions are determined by knowledge of the adversary. Often this knowledge is flawed. See Michael F. Altfeld, "Arms races? And escalation? A comment on Wallace." *International Quarterly* 27 (1983), 17-18.

[134] This identification fulfills step one in the dyadic template, and implies the US as the mismatching player. The first statesman to actually stress the post-war threat of the USSR was Churchill. However his influence over the US during WWII waned in proportion to the relevance of British power. See Richard J. Stoll, "Steaming in the dark? Rules, rivals, and the British navy, 1860-1913," *Journal of Conflict Resolution* 36 (1992), 273-274.

[135] R. C. Allen, *Farm to factory: a reinterpretation of the Soviet industrial revolution* (Princeton University Press, 2003), 46-47.

[136] Churchill's famous Iron Curtain speech was a public acknowledgement that the Soviet Union was the new primary adversary for much of the West.

with the express intent of containing the further expansion of the USSR and the communist revolution into Western Europe, and providing a clear disincentive against attack via the coalition and its celebrated Article 5.[137]

	GERMANY	USSR	US
POPULATION IN 1945 (MIL)	80	190	130
STANDING ARMIES 1945 (MIL)	6.1	12.4	11.9
MOBILIZED 1939-45 (MIL)	17.9	34	16.4

Table 2. Population and military force (1939-1945). Reproduced from WWII: a Statistical Survey.[138]

The Soviet conventional military presence facing Western Europe after WWII and into the 1950s was superior to that of the US and NATO, in raw numbers if not in quality.[139] At the end of WWII, as the Western allies drove toward Berlin from the West, and the Soviets from the East, Stalin planned not only for the final battle against the Nazis, but for a far longer game of establishing a military presence necessary to hold the territories after the war and to mitigating the US and allied desire that the USSR return its occupied lands of Eastern Europe to their pre-war independence.[140] As Table 2 depicts, standing troop numbers were approximately equal for the US and USSR at the end of the war. However, the US quickly demobilized and removed the vast majority of its troops from Europe, while the USSR maintained and increased its conventional armaments and troop levels.

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[137] Michael R. Alvarez, and Garrett Glasgow, "Two-stage estimation of non-recursive choice models," *Political Analysis* 8 (Spring, 1999), 7-9.

[138] John Ellis, *World War II: A statistical survey: The essential facts and figures for all the combatants* (New York: Facts on File, 1993), 26-27.

[139] The military stereotype is that Russia fought wars with overwhelming numbers of poorly equipped and poorly trained troops and that this was the case especially in WWII. The truth of these notions have now been challenged. See David J. Singer, "Threat perception and the armament-tension dilemma," *Journal of Conflict Resolution* 2 (1958), 103-105.

[140] The US policy of unconditional surrender prevented a more forward-thinking strategy of limiting Soviet conquest of Nazi-held Eastern Europe before the end of the war, as Churchill had argued. One method of achieving this may have been to have a US assault toward Berlin from the South. See Robert J. Art, *America's Grand Strategy and World Politics* (New York: Routledge, 2009), 224-226.

While the American public, European allies, and military personnel demanded a rapid demobilization and return from Europe, Soviet demobilization was non-existent. The number of Soviet active troops actually increased as the USSR remained on a war footing and initiated a recruiting program for soldiers of what in 1955 became the Warsaw Pact states. Recruitment and mobilization for the Soviet Union was not complicated by such issues as democracy and popular opinion, and the Warsaw Pact countries remained occupied states in all but name. According to a NATO Information Service of 1962, the USSR kept its war industries working at full capacity.[141]

US and Soviet troop numbers, then, were roughly equivalent at the end of the war in 1945. They became dramatically disproportionate as the US demobilization under operation Magic Carpet progressed while the USSR maintained its war-readiness. US troop levels in Germany were reduced from 2.61 million immediately after the war, to just 247,000 in 1955 (Table 3).[142] The post-war European DPOI saw a massive increase in Soviet military power vis-à-vis the US, with NATO allies unable to replace waning American power in any meaningful way.[143]

	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955
US TROOPS (MIL)	2.61	0.278	0.103	0.091	0.082	0.079	0.121	0.256	0.243	0.251	0.247

Table 3. US troops stationed in Germany (FRG) (1945-1955).[144]

[141] J. H. Noren, "The controversy over Western measures of Soviet defense expenditures," *Post-Soviet Affairs* 3 (1995), 274-276.
[142] Operation Magic Carpet further disadvantaged the West against preparing for the new adversary in Stalin's USSR: the populations of the victor democracies demanded demobilization. See Andrew Kydd, *Trust and Mistrust in International Relations* (Princeton University Press, 2005), 91-93. See also Henry Kissinger, *Diplomacy* (New York: Simon and Schuster, 1994), 321.
[143] Lawrence S. Kaplan, *The United States and NATO: The formative years* (Lexington, Kentucky: University Press of Kentucky, 1984), 221-222.
[144] Hubert Zimmermann, "The improbable permanence of commitment: America's troop presence in Europe during the Cold War," *Journal of Cold War Studies* 11-1 (2009), 4.

As a continuation of its military philosophy and industrial capacity during WWII, the Soviet Union emphasized the massive production of what may be called conventional military might: tanks, planes, artillery and troops. The Soviet occupation of the formerly Nazi-held East at the end of WWII was bloody and emphasized numerical superiority. Retreating German divisions grew more violent to civilians and the army's own perceived internal malcontents with an increasing desperation.[145] Soviet troops were notoriously fickle in their regard for the lives and well-being of the civilians they liberated and the military prisoners they captured.[146] Brute force and the establishment of an oppressive police state became necessary to maintain order. This heavy-handed, highly visible Soviet military presence became an accreted policy of massive military build-up after the war, as it became evident that Stalin had no intention of truly liberating or de-militarizing the territories conquered by the Red Army.[147] Because the USSR never left the territories it captured by this numerical superiority and brute force, all subsequent Soviet military planning for Eastern Europe was derived from and strongly flavoured by this strategic occupational mentality behind the Iron Curtain.[148]

Finding reliable information on Soviet conventional military power in the early Cold War is notoriously difficult.[149] However it has been estimated that in 1953, Eisenhower's inaugural year as president, the USSR possessed approximately 175 divisions, with another 125 in reserve.[150] The US, in contrast, had access to 29 Army and Marine Corps divisions, with 7 in

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[145] Allan Clark, *Barbarossa, The Russian-German conflict, 1941-1945* (New York: Morrow, 1965), 440.
[146] Ibid.
[147] J. Joffe, *The limited partnership: Europe, the United States, and the burdens of alliance* (Cambridge, Massachusetts: Ballinger, 1987), 29-30.
[148] In the sense that conventional military force was essential for maintaining order in the occupied states anyway. It followed to expand these forces and point them at Western Europe.
[149] Anonymous, "US Ground Forces and the Conventional Balance in Europe" *Congress of the United Congressional Budget Office* June (1988), 5.
[150] The "175 active Soviet divisions" was an oft referenced number to indicate the power of the USSR's conventional military power in Europe in the 1950s. See William T. Lee, *Understanding the Soviet military threat: How C.I.A. estimates went astray* (New York: National Strategy Information Center, 1977), 231-233.

reserve.[151] Although Soviet divisions tended to be smaller than US/NATO divisions, a single division consists of 10,000 to 20,000 troops (often 10,000+ troops, 500-600 tanks, 100 artillery, mechanized infantry or some combination thereof). Assuming an average of 15,000 units per division, the Soviet threat represented some 1.8 million units: four times the size of the US forces in the European theatre DPOI (540,000 units). Other sources suggest the Soviet forces in total amounted to around 5.5 million men in the mid-1950s, with ground forces of 2.5-2.8 million troops.[152]

As an originally and continually-occupying force, and as a land power more generally, the Soviet Union developed and maintained divisions designed to fight conventional wars on land, focusing on increasing numbers of troops, artillery, mechanized infantry, armoured vehicles and missile systems. This remained the basic design of Soviet military policy in Europe from the end of WWII until the collapse of communism. From 1945 until 1985, NATO intelligence recorded a constant and steady increase in such conventional armaments. In the period between 1960 and 1980, for example, the number of divisions of Soviet armoured infantry fighting vehicles was increased from 30 to 100, the number of anti-tank guided missile systems on armoured vehicles was increased from 0 to 27, the number of rocket launchers was increased from 220 to 800, and the number of divisions incorporating portable surface to air missile systems was increased from 0 to 200.[153] In 1968 the USSR possessed over 1,600 Frog, Scud and Scaleboard tactical surface to surface missiles and rockets.[154] US/NATO conventional forces, in contrast, were maintained at low levels.

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[151] John Mueller, "The essential irrelevance of nuclear weapons," In *The cold war and after: Prospects for peace*, Sean M. Lynn-Jones and Steven E. Miller, eds. (Cambridge, MA: MIT Press, 1993), 115-117.
[152] Richard A. Bitzinger, "Assessing the Conventional Balance in Europe: 1945-1975," A *RAND NOTE* (May 1989), 5-7.
[153] Ibid.
[154] Ibid.

FORCE COMPARISON	WARSAW PACT	NATO
TOTAL (INCLUDES NAVY)	4,000,000	2,600,000
DIVISION EQUIVALENTS	115	88
MAIN BATTLE TANKS	46,230	13,470
ANTI-TANK LAUNCHERS	35,400	12,340
ARTILLERY/MORTARS	38,800	11,000
ARMOURED VEHICLES	94,800	33,000
ATTACK HELICOPTERS	1,175	580
SUPPORT HELICOPTERS	1,375	1,960

Table 4. Force comparison: rapidly deployable forces within DPOI until 1984.[155]

As noted these numbers of Soviet armaments increased until at least the mid-1980s (table 4 above), and it can be generalized that within the European DPOI the Soviet conventional threat for any individual category of armament, with very few exceptions, outnumbered the US at a 1.2 to 1 ratio, with several cases of the Soviet numbers exceeding the US two to one (table 5).[156] The force-disparity was particularly pronounced in terms of battle tanks (2.1:1 ratio in favour of the USSR) and artillery units and mortars (2.3:1 ratio).

	WARSAW PACT	RATIO (WP:N)	NATO
ACTIVE PERSONNEL	6,000,000	1.3 : 1	4,500,000
DIVISION EQUIVALENTS	230	1.9 : 1	121
GROUND FORCES			
MAIN BATTLE TANKS	52,000	2.1 : 1	24,250
ANTITANK LAUNCHERS	28,000	1.2 : 1	22,580
ARTILLERY/MORTARS	42,000	2.3 : 1	18,350
TACTICAL AIRCRAFT	6,550	1.3 : 1	5,125

Table 5. Comparison of Warsaw Pact and NATO forces, including non-rapidly deployable forces in 1986.[157]

[155] Anonymous, "NATO-Warsaw Pact Force Comparison," reproduced from *US Forces and the Conventional Balance in Europe*, *Congress of the United States*, June, 1988 https://www.cbo.gov/sites/default/files/100th-congress-1987-1988/reports/doc01b-entire.pdf (accessed March 7, 2019).
[156] Ibid. See also Mark Harrison, *How much did the Soviets really spend on defence? New evidence from the close of the Brezhnev era* (Warwick: Warwick Economic Research Papers, 2003), 115-119.
[157] Ibid.

In terms of predicting hypothetical scenarios in which the Cold War could turn hot, both the US and USSR took West Germany as the natural focal point for an invasion against NATO members from the East. The North German plain, the Fulda Gap in the centre-east and the Hof Corridor in the south were the primary threat areas. Because of its level terrain, the Fulda Gap, a region stretching north-east of Frankfurt, has historically been considered a key strategic territory.[158] This was identified by both the US and the USSR as the likely first pathway for an invasion by the Warsaw Pact, with the massive Soviet numerical advantage in conventional weaponry, and in particular main battle tanks, suggesting initial overwhelming success in any blitzkrieg or attritional-style invasion.[159]

These military facts made the significant US and NATO disparity in conventional military power west of the Fulda Gap particularly concerning. The West in general and the US in particular could not hope to contain the quantity and raw power of the Soviet conventional threat. Nor, unlike the US, was the USSR hesitant to plan for and accept massive military and civilian casualties, particularly in the Soviet satellites of Eastern Europe, such as Poland.[160] Revealed Soviet plans for an invasion across the Fulda Gap incorporated tactical nuclear strikes that were assumed not to trigger a NATO nuclear counterattack.[161] If the US identified the USSR as its primary adversary in 1945 due to its being the most existentially-threatening major power left

[158] Manus I. Midlarsky, "Polarity, the learning of cooperation, and the stability of international systems." In *From rivalry to cooperation: Russian and American perspectives on the post-cold war era*, Manus I. Midlarsky, John A. Vasquez, and Peter V. Gladkov, eds. (New York: HarperCollins, 1994), 38-39.
[159] Robert Martinage, *Toward a new Offset strategy: exploiting US long-term advantages to restore US global power projection capability* (Washington, DC: Center for Strategic and Budgetary Assessments, 2014), 15-17.
[160] Anonymous, "Soviet Military Power: 1985" *CIA Document* (Released October 19, 2009): 7.
[161] Guillaume Lasconjarias, and Jeffrey A. Larsen, eds., *NATO's Response to Hybrid Threats* (Washington, DC: NATO Defense College, 2015), 17-19.

after WWII, it was clear that such an existential threat could only massively increase if the Soviet Union conquered Western Europe.[162]

As early as 1945, then, it had become clear to US and (in 1949) NATO leaders that it was at a major disadvantage in its military preparedness and ability to project power across Central and Eastern Europe. The US military presence was not only much smaller in quantity in comparison with the Soviet military presence, with estimates as high as an approximate 1:4 ratio, it was also much more constrained in its ability to project power across continental Europe.[163] Regardless of global power, in the European DPOI, the US was clearly the weaker partner within the US/USSR dyad.

The US, then, was limited in its ability to match the USSR in this DPOI by geographical, logistical and political reasons. The US contribution to NATO, the vast majority of its fighting force, would have had to produce or train the matching military units, ship them 6000 km across the Atlantic (and 800 km to a hypothetical West German front), and find bases for them in Germany, France, Britain, Belgium and the Netherlands, despite the political challenges at home and from the base-countries.[164] All these decisions required the approval of the host countries, causing much debate and deliberation among the populations of the democratic states of West and Central Europe.[165] Warsaw Pact states, being coalition partners of the USSR in name only, were either unable or unwilling to reject plans to levy or station troops within their territories.[166]

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[162] Jacek Kugler, "Terror without deterrence: Reassessing the role of nuclear weapons," *Journal of Conflict Resolution* 28 (1984), 470-472.
[163] David Jones,, Stuart Bremer, and J. David Singer, "Militarized interstate disputes, 1816-1992: Rationale, coding rules, and empirical patterns," *Conflict Management and Peace Science* 15 (1996), 6-7.
[164] Paul Huth and Bruce Russett. "What makes deterrence work? Cases from 1900 to 1980," *Journal of Conflict Resolution* 36 (1984), 496-498.
[165] And the problem increased in proportion to a growing anti-Americanism. See Joseph S. Nye, *Soft power: The means to success in world politics* (New York: Public Affairs, 2004), 127-128. See also John H. Herz, "Idealist internationalism and the security dilemma," *World Politics* 2-2 (1950), 19-20.
[166] M. Harrison, "Resource mobilization for World War II: the USA, UK, USSR, and Germany, 1938-1945," *The Economic History Review*, 41-2 (1988), 171-173.

Therefore, although generally the more powerful military state on a global level, the US was the clear weaker state within the European theatre. While the quality of US and NATO troops and equipment was generally superior to that of the USSR and Warsaw Pact states throughout the Cold War, such disparate raw numbers of units made rearmament in kind too costly and impractical for the US. A wall-of-flesh strategy (matching troop for troop) for balancing the Soviets in Western Europe was briefly considered in the early stages of the Cold War but deemed too expensive, too slow to instigate, and too politically fraught, among leaders in both the US and Europe.[167]

The two factors described above, the pre-existing and growing strength of the Soviet conventional military position and the relative weakness and difficulty of the US in matching Soviet power, led the in-coming President Eisenhower in 1953 to choose to bypass the traditional and expected policy (of a competing superpower) of matching strength for strength in kind within the European DPOI. Instead the US pursued a much cheaper, more politically acceptable program of general strategic nuclear deterrence.[168] Eisenhower initiated the New Look in US military strategy against the Soviet Union: which would later become known as the First Offset.[169]

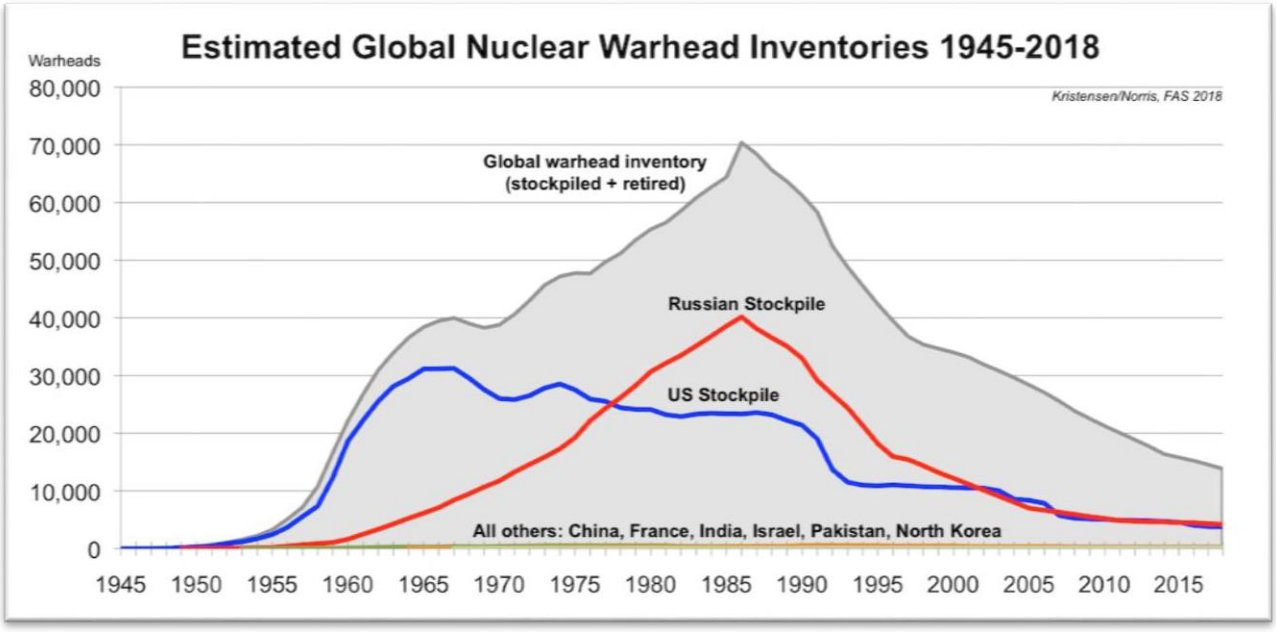
This innovative US response to overwhelming Soviet conventional power in a strategically important, if poorly accessible, DPOI was to maintain conventional forces at a generally steady, albeit-inferior level. This was just enough to act as a tripwire that would dis-

[167] For further discussion on the relative quality of US and Soviet forces during the Cold War, see Rebecca Grant, "The Second Offset: when the Soviets achieved nuclear parity, the US regained its military advantage—through technology," *Air Force Magazine* July (2016).
[168] Although policy-makers dispute any notion of determinism in their lengthy debates and formulations, for the sake of simplicity and predictability, actual events of the present and past should be deemed the best determinants for predicting events of the future.[168] While policies of matching were indeed considered (e.g. an arms race of countering the Soviet military presence in kind), ultimately the "decision" was made to mismatch.
[169] Michael Gordon Jackson, "Beyond brinkmanship: Eisenhower, Nuclear War Fighting, and Korea, 1953-1968," *Presidential Studies Quarterly* 35-1 (2005), 20-22.

incentivize Soviet adventurism, and allowed the US to focus on a two-pronged mismatching strategy.[170] The first prong consisted of stockpiling nuclear warheads, launch vehicles, and strategic bombers that were both forward deployed as well as stationed in the US. The second prong was the establishment of a diplomatic stance that explicitly threatened the use of nuclear weapons against any Soviet conventional attack.[171] It was key for not only the mismatching response to be legitimate (the US also had to actually possess the mismatching power in the form of stockpiled nuclear warheads and their vehicles), but it also had to be a clearly defined and conveyed message.[172] A mismatching strategy must be made clear to the adversary, in the sense that the weaker power must in some sense advertise the fact that it is relatively weaker but that it has developed a balancing response.

In pursuit of this first prong of the mismatching offset, between 1955 and 1965, the US increased its nuclear stockpile from fewer than 5,000 warheads to more than 30,000 (Graph 1). During this same period, the number of troops stationed in Europe stagnated from 247,000 in 1955, to 262,000 in 1965 (Table 5 below). This bolsters the notion that the US was developing a mismatching strategy, employing its strategic nuclear threat against Soviet conventional power, while maintaining a relatively small, tripwire-style conventional presence within the DPOI.

[170] This tripwire strategy increases the cost of calling a bluff on the part of the enemy (the USSR) and legitimizes the threat of retaliation (by the US). Any Soviet attack that harmed US soldiers could—in the eyes of US political leaders—provide additional political cover for responding with a nuclear attack. See Brian McAllister Linn, "The American way of war," *OAH Magazine of History* 22-4 (2008), 28.
[171] S.M. Lynn-Jones, "Offense-Defense Theory and Its Critics," *Security Studies* 4-4 (Summer 1995), 660–662.
[172] As is frequently the case in grand strategy, signalling to the adversary was an essential element of the strategy.



Graph 1. Nuclear weapons comparison (all weapons).[173]

	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
US TROOPS (MIL)	0.247	0.250	0.235	0.227	0.229	0.226	0.232	0.277	0.251	0.263	0.262

Table 6. US troops stationed in Germany (FRG) (1955-1965).[174]

Against steadily increasing Soviet conventional armaments, then, the US kept its own conventional forces within the European DPOI consistently low, but at the same time dramatically increased the number of nuclear warheads, launchers, missiles and long-range bombers—all of which were maintained in strategic response to Soviet conventional forces in Europe. As discussed in Chapter 3, the USSR did eventually respond in kind, in a matching

[173] Anonymous. "NATO-Warsaw Pact force comparison." *NATO declassified* https://www.nato.int/cps/fr/natohq/declassified_138256.htm (accessed April 5, 2019).
[174] Zimmerman, 4.

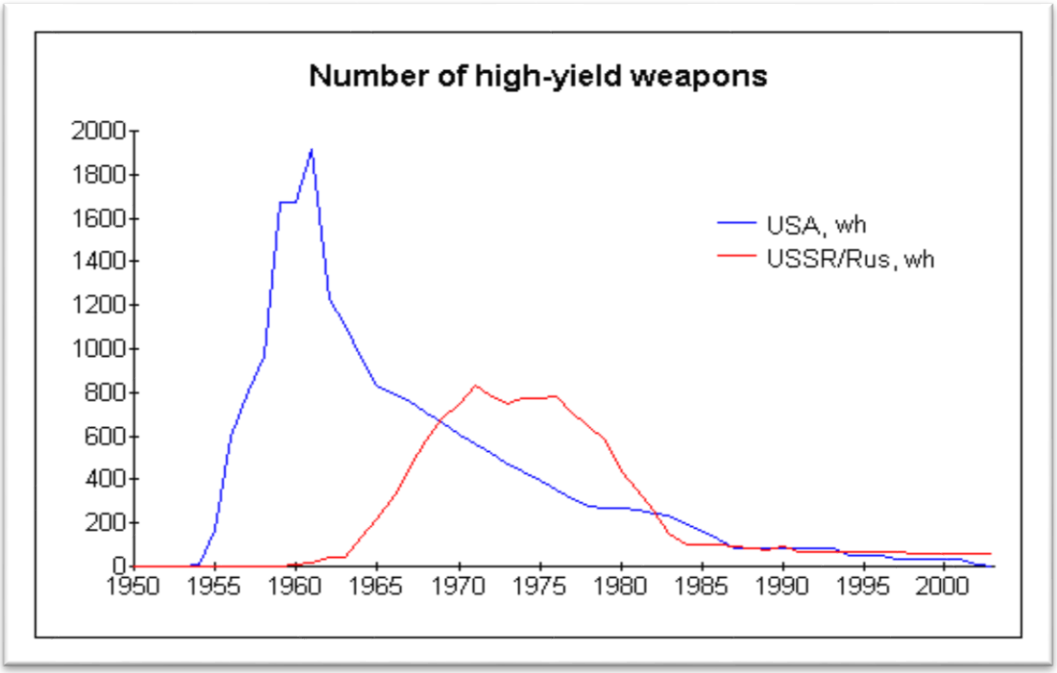
fashion befitting the stronger, matching power within the DPOI, and nuclear parity was reached in the late 1970s.[175]

It is difficult, as always in the social sciences, to separate causation from correlation. However, a great deal of data and circumstantial evidence supports the notion that the First Offset was a strategy of mismatching as defined above. A decisive piece of evidence indicating that the strategy of developing a lopsided nuclear threat was a form a mismatching, is found in the fact that the US did not alter its military policies as the Soviet conventional military presence increased, as a strategy of quantitative arms racing inherent to matching would suggest. By 1975, the balance of conventional military force was still dramatically skewed in favour of the Soviets, with 58 divisions against 27 of NATO forces, 19,000 battle tanks against 6,100 of NATO and 2,460 tactical aircraft against 1,700 of NATO.[176] The US response during the First Offset was to continue to rely on its nuclear response, with a focus on the comparatively cheap policy of maintaining a quantity advantage initially, and subsequently a quality advantage of strategic nuclear weapons against the USSR, and to maintain a concomitant policy of belligerency concerning the purported triggers for launching an attack.[177]

Therefore as the mismatcher, the US developed an innovatively-balancing military response to overwhelming Soviet conventional power both by the quantity of its warheads, and by virtue of their technological superiority. The US sought massive dominance in this strategic threat both in numbers of warheads, and in the destructive power of each, by developing large

[175] 1978 is the estimated exact year. See Robert J. Art, "Geopolitics Updated: The Strategy of Selective Engagement," *International Security* 23-3 (1998), 7-9.
[176] Anonymous, "The Soviet Union: military spending," *Nintil* https://nintil.com/2016/05/31/the-soviet-union-military-spending/ (accessed April 23, 2019).
[177] Bear F. Braumoeller, "Systemic politics and the origins of great power conflict," *American Political Science Review* 102-1 (2008), 24-25.

numbers of high-yield (multi-megaton explosive force) nuclear weapons (Graph 2).[178] Even as the USSR began to match the US nuclear deterrent in numbers of warheads, it lagged behind it in the destructive capability of its weapons until the late 1960s. As expected under the life-dinner principle discussed above, the US was the more innovative state within the dyad, and the more likely to pursue new technologies in the service of mismatching, even if the USSR possessed the same military technology.[179] The pressure was greater on the US to mismatch, than it was on the Soviet Union, as the incumbent dominant power, to match.



Graph 2: Nuclear weapons comparison between the US/USSR (high-yield).[180]

[178] Anonymous, *US ground forces and the conventional balance in Europe* (Washington DC: Congress of the United Congressional Budget Office, 1988), 119-121.
[179] See Dima P. Adamsky, "Through the Soviet looking glass: The Soviet military-technical revolution and the American revolution in military affairs," *The Journal of Strategic Studies* 31-2 (2008), 258.
Anonymous, "Soviet Military Power: 1990," *CIA Document* released October 19, 2009. https://www.scribd.com/document/46476221/Soviet-Military-Power-1990 (accessed April 5, 2019).
[180] High-yield weapons defined as multi-megaton warheads: 20-50 MT. See Robert Johnston, "Multimegaton weapons: The largest nuclear weapons," *Johnston's Archive* http://www.johnstonsarchive.net/nuclear/multimeg.html (accessed April 15, 2019).

As the second prong of the US mismatching strategy, identified specifically as Eisenhower's New Look, a concerted policy of brinkmanship and nuclear sabre-rattling was pursued. As there was no clear escalation ladder in the event of conflict with the USSR, given the limited military options allowed by a nuclear mismatch strategy, the US had to make its theoretical intentions clear. That is, given that the US opted for a strategy of threatening immediate nuclear strikes in the event of war, it had to make sure the Soviets understood that it was not bluffing, and that minor conflicts would not escalate into nuclear war.[181]

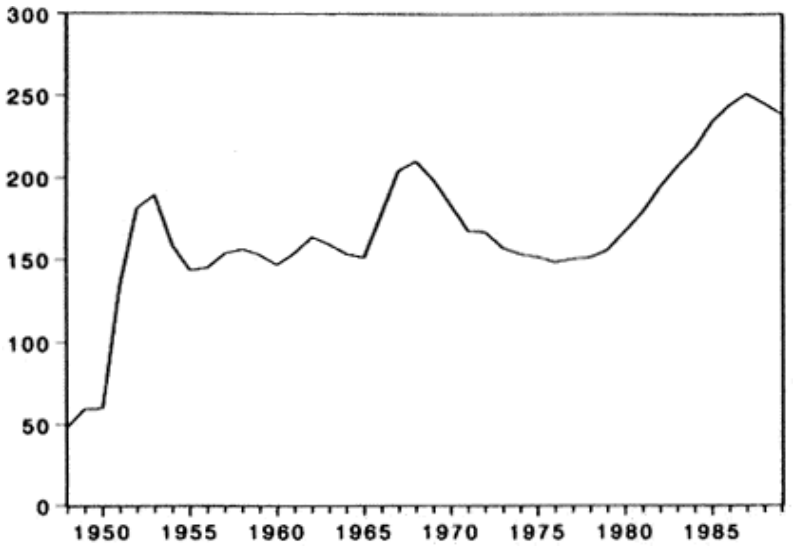
It is both ironic and fitting that US policy as the weaker power (at least in conventional military and localized terms) side-stepping a stronger force by mismatching, was termed massive retaliation by Eisenhower's Secretary of State, John Foster Dulles.[182] This form of mismatching required the concomitant appearance of hair-trigger view of potential conflict within the DPOI. The US mismatch was marked by its brinkmanship. Dulles stated that the US would respond to provocations as it saw fit, and Eisenhower not only threatened nuclear strikes but strongly considered using them in the Korean War against the Chinese.[183]

Characteristic of a mismatching strategy, the US focus on nuclear deterrence was considerably cheaper than building and maintaining large numbers of conventional units within the European theatre.[184] With the exception of a period of relatively high military spending leading up to the Korean War (1950-1953), Eisenhower oversaw a reduction in the defense

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[181] Robert Axelrod, *The Evolution of Cooperation* (New York: Basic Books, 1984), 142-145.
[182] Richard A. Bitzinger, "Assessing the Conventional Balance in Europe: 1945-1975," A *RAND Note* May (1989), 21-22.
[183] As expected along the spectrum of disruption to mismatching to matching, disruption tends toward the most hostile forms of diplomacy, followed by mismatching, and finally matching. See Michael Gordon Jackson, "Beyond brinkmanship: Eisenhower, Nuclear War Fighting, and Korea, 1953-1968," *Presidential Studies Quarterly* 35-1 (2005), 52-53.
[184] David Braybrooke and Charles E. Lindblom, "Types of decision-making" In *International politics and foreign policy*, James Rosenau ed., 2d ed. (New York: Free Press. 1969), 207-9. See also Gary Goertz, and Paul Diehl, "Measuring military allocations: A comparison of different approaches," *Journal of Conflict Resolution* 30 (1986), 553-555.

budget of a massive 40% between the fiscal years 1952 and 1956 as the First Offset was introduced.[185] US military expenditures remained stable during the height of the massive nuclear buildup between 1955 and 1965 (graph 3).[186] Interestingly, the second lull in US military spending between the early 1970s and 1985 correlates with the Second US Offset, described in Chapter 3. A prima facie hypothesis suggests that periods of mismatching will correlate with periods of military innovation, however this is defined, and periods of reduced spending, assuming all other variables are controlled. The inverse may also be true. States that match may be identified by their reduced military innovation and increased military spending; two factors that seem, at first glance, to be contradictory, in the sense that developing and producing military technology is assumed to cause increases in military spending.[187]



Graph 3. US military spending ($ billions).[188]

[185] Zachary Keck, "A tale of two Offset strategies: The Pentagon's new Offset strategy is modeled on two very different historical examples," *The Diplomat* (November 18, 2014), 29-31.
[186] The initial low point in the 1940s, and the drastic increase in military spending in the early 1950s can be attributed to the general rearmament after Operation Magic Carpet—the demobilization immediately post-WWII.
[187] Zachary Keck, "A tale of two Offset strategies," 11-12.
[188] Robert Higgs, "The Cold War economy: Opportunity costs, ideology, and the politics of crisis," *Explorations in Economic History* 31-3 (1994), 289.

The US strategic nuclear response within the Western European DPOI was therefore both significantly cheaper and a highly innovative method of balancing: two telltale elements of mismatching. Instead of directly countering Soviet conventional military superiority within the DPOI in kind, the US response was to bypass it and make it obsolete—to mismatch it.[189] The First US Offset, or the policy of bypassing the Soviet conventional military threat by presenting a strategic nuclear deterrent, is therefore an example of mismatching according to the dyadic strategic determinist model.

In conclusion, the United States has undergone two overt changes in its military strategy vis-à-vis the USSR/Russia, with a third supposedly in the process of occurring.[190] Strategists and historians have referred to these changes of strategy, and their concomitant changes in military spending, as Offsets. Toward the end of WWII the USSR was identified as the most important and immediate threat to US security. At the end of WWII it became clear that the US and the USSR were the two most powerful adversaries on the globe. A dyadic interaction between two great powers of equivalent power typically leads to matching arms racing behaviour.[191]

However, because of its relative military weakness in the European theatre in particular, America developed nuclear weaponry in order to mismatch the USSR's conventional military superiority. In other words, the US sought to balance the USSR within the European theatre, but due to a massive disparity in conventional armaments and troop numbers between the two

[189] For further examples across history, see John Lambelet, "A numerical model of the Anglo-German dreadnought race," *Peace Science Society (International) Papers* 24 (1975) 29-31.
[190] Christopher Hemmer, "The lessons of September 11, Iraq and the American Pendulum," *Political Science Quarterly* 122-2 (2007), 24-25.
[191] George Baer, *One Hundred Years of Sea Power: The U.S. Navy, 1890-1990* (Stanford, CA: Stanford University Press, 1994), 270-271.

countries, and the fact that the US lacked the ability or desire to locate such quantities of troops and armaments on European soil, matching was not a realistic option for the US at the time.[192]

A dyadic interaction between two states of equivalent power leads to matching, a condition that history and general power calculations suggests should have been the case for the US/USSR dyad. However, because of its relative military weakness in the European theatre, within this particular DPOI the US pursued or was forced to pursue a strategy of mismatching against the Soviet threat.

This chapter established that the US developed strategic nuclear weaponry in order to mismatch the USSR's conventional military superiority. It was demonstrated that the US sought to balance the USSR within the European theatre, but due to a massive disparity in conventional armaments and troop numbers between the two countries, and the fact that the US lacked the ability or political will to locate matching quantities of troops and armaments on European soil (that is, because it was the weaker state with the dyad within that DPOI), A strategy of matching was not possible for the US during the period of the First Offset, from 1953 until 1977, and therefore it pursued a strategy of mismatching against the USSR.[193]

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[192] Donald A. Carter, *Forging the Shield: The US Army in Europe, 1951-1962* (Washington DC, Center of Military History United States Army), 2015. See also A. E. Busch, "Ronald Reagan and the defeat of the Soviet empire." *Presidential Studies Quarterly 27*-3, (1997), 1-3.

[193] 1997-78 was the year in which the USSR first possessed more nuclear warheads than the US. This lead continued until 2002. See O.R. Coté, Jr, *The Third Battle: Innovation in the U.S. Navy's Silent Cold War Struggle with Soviet Submarines* (Newport RI: Naval War College 2003), 112, and Thomas R., Cusack and Michael D. Ward, "Military spending in the United States, Soviet Union, and People's Republic of China," *Journal of Conflict Resolution* 25 (1981), 429-31.

CHAPTER 3

SECOND OFFSET (1977-2008): SOVIET NUCLEAR PARITY AND THE US RESPONSE

Template 1: stronger power-weaker power dyad

1] $S^0 \leftrightarrow W^0$ (identify)
2] $S^0 \leftarrow W^1$ (mismatch)
3] $\rightarrow S^1$ (match) $\rightarrow W^2$ (mismatch)

Stronger power-weaker power dyad: USSR-US (1945-1991)

1] $USSR^0 \leftrightarrow US^0$ (Iron Curtain appears, 1945; US New Look Policy, 1953)
2] $USSR^0 \rightarrow US^1$ (US mismatches USSR conventional forces—First Offset)
3] $USSR^2$ (Soviet nukes—MAD) $\rightarrow US^3$ (RMA against MAD – Second Offset)

Being the weaker member of the USSR/US dyad within the European DPOI since 1945, the US was forced to mismatch in order to balance internally against it.[194] In turn, as the strongest power on the European continent, the USSR reactively matched against the US. The dyadic strategic determinist model predicts that mismatches will be countered with reciprocal matches in such stronger power-weaker power dyads in which both states identify one another as their primary adversaries. Against the US First Offset strategy, the USSR matched in kind, by producing its own competing program of nuclear deterrence, similar in both quantity of warheads, and, ultimately, destructive power in megatons.[195] This is indicated above in propositional form via the dyadic formula. As described, against the USSR matching against the

[194] In addition to its attempts to balance externally, in the form of coalitions such as NATO.
[195] A. P. Dobson, "The Reagan administration, economic warfare, and starting to close down the cold war," *Diplomatic History* 29-3 (2005), 554-556. See also L. Dudkin and A. Vasilevsky, "The Soviet Military Burden: A Critical Analysis of Current Research," *Hitotsubashi journal of economics* (1987), 41-42.

First Offset, the US reacted with yet another round of mismatching.[196] This took the form of a revolution in military and organizational technology, and is referred to in general as the Second Offset or the Revolution in Military Affairs (RMA).[197]

This chapter examines how the USSR matched US strategic nuclear mismatching, and how the US in turn sought to mismatch this nuclear matching. The development of RMA was a clear iteration of a mismatching strategy, as opposed to a disrupting or matching strategy, because US conventional weapons numbers again remained relatively stable, because the technology developed was significantly cheaper to apply in comparison to a quantitative matching arms racing strategy, and because it exploited weaknesses in Soviet conventional armaments. Finally, the Soviet strategic response that was disrupted by the fall of communism in December 1991, and which destroyed the dyadic interaction, replacing it with an entirely new US-Russia dyad, is considered.[198]

As should be predicted by the dyadic strategic determinist model, while maintaining and expanding its conventional military forces, the Soviet Union also sought its own strategic nuclear arsenal as a matching response to the US First Offset, reaching approximate nuclear parity in 1977-1978.[199] That is, in the stronger power-weaker power dyad of the USSR/US during the Cold War within the European DPOI and in which both states identified each other as primary adversaries, a dyadic chain of mismatching and matching developed. The US mismatched the USSR. The USSR in turn matched the technological developments of that mismatching

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[196] Daniel Fiott, "America first, third offset second?" *The RUSI Journal* 163-4 (2018), 5-6.
[197] C. L. Glaser, *Rational Theory of International Politics: The Logic of Competition and Cooperation* (Princeton: Princeton University Press, 2010), 121-123. See also Charles S. Gochman, and Zeev Maoz, "Militarized interstate disputes, 1816-1976: Procedures, patterns, and insights," *Journal of Conflict Resolution* 28 (1984), 585-587.
[198] IISS, *The Military Balance 2015* (London: Routledge 2015). Information Office of the State Council, 'Russia's Military Strategy', May 2015, http://eng.mod.gov.cn/Database/WhitePapers/>. See also Paul Kennedy, *The Rise and Fall of the Great Powers: Economic Change and Military Conflict from 1500 to 2000* (New York: Random House, 1987), 11-13, and Henry Kissinger, *Diplomacy* (New York: Simon and Schuster, 1994), 140-142.
[199] J. J. Mearsheimer, *The Tragedy of Great Power Politics* (New York: Norton, 2001), 6-8.

strategy.[200] Direct evidence for this claim is found in the fact that the Soviet Union developed its own strategic nuclear deterrent, while maintaining its original conventional superiority. It matched the US because in the European DPOI it could afford to do so.[201]

YEAR	US WARHEADS	SOVIET WARHEADS
1950	299	5
1955	2,422	200
1960	18,638	1,627
1965	31,139	6,144
1970	26,008	11,736
1975	27,519	19,235
1976	25,914	22,165
1977	25,542	24,281
1978	**24,418**	**26,169**
1979	24,138	28,258
1980	24,104	30,665
1985	23,368	38,582
1990	21,392	32,980

Table 7. Number of nuclear warheads in US/Soviet inventories.[202]

The First Offset policy was not kept secret from the USSR for long. It countered in typical great-power matching form by simultaneously increasing its conventional military advantage while developing its own strategic nuclear threat.[203] While there was only a short delay between the US and the USSR in actual nuclear weapons technology (the Soviets exploded their first nuclear weapon in 1949), the USSR did not initially emphasize stockpiling nuclear weapons to the extent that the US did, nor did it place such emphasis on nuclear first strike

[200] John Mueller, "The essential irrelevance of nuclear weapons," In *The Cold War and after: Prospects for peace*, edited by Sean M. Lynn-Jones and Steven E. Miller, rev. ed. (Cambridge, MA: MIT Press, 1993), 45-47.
[201] That matching powers should bankrupt themselves, while mismatching powers should not, is an interesting question that requires further study.
[202] Max Rosler and Mohamed Nagdy, *Our World in Data*, 26.
[203] Nor did the US intend to keep it a secret. On the contrary, a nuclear deterrent is only a deterrent to the extent that the adversary is made aware of it.

capabilities.[204] The reason for this was that it did not need to. It deemed its conventional military advantage a sufficient form of balancing against the US.

For the USSR the focus during the early stages of US First Offset was toward increasing its conventional forces, under the belief that it was in this manner increasing an already superior, matching position. A classified CIA report from 1981 (declassified in 2009), states that between 1977 and 1983, Soviet Forces acquired 1,500 ICBMs, 1,300 SLBMs, 250 bombers, 5000 fighters, 15,000 new tanks and substantial numbers of "new additional major surface combatants, nuclear-powered ballistic missile submarines, and attack submarines."[205] During this same period the US added a mere 135 ICBMs, 390 SLBMs, no bombers, 3,000 fighters, 5000 tanks, and 106 major warships.[206] As Table 6 above reveals, the Soviet response to the First Offset was delayed. While it continued to increase its conventional armaments in the early First Offset period (1953-1977), its nuclear arsenal remained relatively puny: just 6,144 warheads in 1960 compared to the 18,638 possessed by the US in that year, for example.[207]

However, as Soviet awareness of the US policy of nuclear mismatching increased, and as the USSR developed its matching strategy of stock-piling nuclear warheads to match the US strategic offset, mutually-assured destruction became a reality, nullifying the threat of nuclear strike by either power.[208] As the matching power, the USSR did not stop at nuclear parity, but, as Graph 4 below shows, continued to stockpile warheads until it possessed a clear advantage in both conventional weaponry and in its strategic nuclear threat, with a peak of 45,000 warheads in

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[204] Ido Oren, "Capability and hostile behavior in arms race models," *International Interactions* 21 (1996), 309-311. See also R. Perry, *Comparisons of Soviet and US Technology*. Rand (1973), 11.
[205] C. L. Glaser, *Analyzing Strategic Nuclear Policy* (Princeton: Princeton University Press, 1990), 124-125.
[206] Anonymous, "NATO-Warsaw Pact force comparison," *NATO declassified* https://www.nato.int/cps/fr/natohq/declassified_138256.htm (accessed April 5, 2019).
[207] Ibid.
[208] Charles W. Ostom, "A reactive linkage model of the U.S. defense expenditure policymaking process," *American Political Science Review* 72 (1973), 941-943.

1985 against 25,000 for the US.[209] This achievement of strategic nuclear parity was an issue primarily for the US. Although both countries could counter one another in nuclear might, the USSR continued to benefit from its massive conventional military advantage.[210]



Graph 4. USSR closes the nuclear missile gap in 1977-1978.[211]

In dyadic strategic terms, the development of a Soviet strategic nuclear deterrent meant that the original US mismatch, its strategic nuclear arsenal, was neutralized, and Soviet conventional military superiority in the European DPOI again took precedence and threatened US security. The US was once again pressured to internally balance, or mismatch, these conventional forces. It did so by developing the Revolution in Military Affairs.[212]

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[209] Lester W. Grau, and Charles K. Bartles, *The Russian Way of War: Force Structure, Tactics, and Modernization of the Russian Ground Forces* (Fort Leavenworth, Kan.: Foreign Military Studies Office, 2016), 113. See also Anonymous, "NATO-Warsaw Pact force comparison," *NATO declassified* https://www.nato.int/cps/fr/natohq/declassified_138256.htm (accessed April 5, 2019).

[210] See also Dmitry Gorenberg, "Contractees in BTGs," *Russian Defense Policy Blog*, September 17, 2016. https://russiandefpolicy.blog/2016/09/17/contractees-in-btgs/ (accessed March 5, 2019).

[211] Anonymous, *US ground forces and the conventional balance in Europe* (Washington DC: Congress of the United Congressional Budget Office, 1988), 3-5.

[212] Erik Gartzke, "The myth of cyberwar: bringing war in cyberspace back down to earth," *International Security* 38-2 (2013), 30-31.

The term Revolution in Military Affairs (RMA) is used in two different senses. In the first sense, it is the catch-all general term for massive technological changes in armed forces in relatively brief periods of time. If the standard evolution of militaries is manifested as gradual incremental change, RMAs are periods of brief, revolutionary change that dramatically alter the ways wars are fought, at least for a single military organization.[213] This sense of the term RMA was defined in the Annual Report to Congress as an occurrence "when a nation's military seizes an opportunity to transform its strategy, military doctrine, training, education, organization, equipment, operations, and tactics to achieve decisive military results in fundamentally new ways".[214] Although the debate around the difference between the invention of a unique weapon or strategy and an actual revolution in military affairs remains contentious, purported examples of RMAs across history include the advent of the cannon, the musket and the rifle, and the introduction of the Blitzkrieg method by the Germans in WWII.[215] Current RMAs include the ongoing development of robotics in modern warfare, incorporating miniaturization and automation.[216]

In the second sense, the term RMA refers to a very specific change in the US armed forces in particular between 1977 and 2008.[217] This is the phenomenon synonymous with what is

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[213] Eliot A. Cohen, "Change and transformation in military affairs," *Journal of Strategic Studies* 27-3 (2004), 13. See also Rebecca Grant, "The Second Offset: when the Soviets achieved nuclear parity, the US regained its military advantage—through technology," *Air Force Magazine* July (2016), 19-20, and Daniel L. Byman, and David C. Waxman, "Kosovo and the great air power debate," *International Security* 24-4 (2000), 22-23, and Ben Cassidy, "Machiavelli and the ideology of the offensive: gunpowder weapons in the Art of War," *The Journal of Military History* 67-2 (2003), 24.

[214] Matthew Mowthorpe, 138.

[215] Götz Neuneck, "The revolution in military affairs: its driving forces, elements, and complexity." *Complexity* (July 2008), 16-17.

[216] Eliot A. Cohen, "The meaning and future of air power," *Orbis* Spring (1995), 24-25. See also S. Daggett, & A. Belasco, (2002, March), *Defense Budget for FY2003: Data Summary*. *CRS Report for Congress*, March 2004.

[217] The year 2008 is cited as the end of the second offset era because this year is linked with US diplomatic acceptance of the fact of Russian revanchism triggered by the Russo-Georgian war of that year. See P. Apps, "U.S. special forces quietly increase Eastern European presence after Russian aggression," *The Huffington Post* http://www.huffingtonpost.com/2014/06/10/ukraine-us-special-forces_n_5482279.html (accessed May 10, 2019).

also called the Second US Offset, introduced by the Defense Advanced Research Projects Agency (DARPA) during the Carter Presidency under Secretary of Defense Harold Brown and Deputy Secretary of Defense William Perry and continued through the Reagan Administration, and represents the US mismatching the USSR's conventional weaponry in the European theatre developed in response to the Soviet Union's achieving nuclear parity.[218] This narrower, specific second interpretation of RMA is the form under consideration here.

The RMA, or Second US Offset, was developed ultimately to make better conventional (i.e. non-nuclear-strategic) arms. For reasons of necessity, it was explicitly a strategy of quality over quantity. The underlying issues facing the US in the European DPOI did not change with the development of the First Offset; they were merely bypassed by this strategic nuclear deterrent. The US continued to be at a major disadvantage in terms of numbers of Soviet conventional armaments and ease of movement. The USSR was able to develop and move armaments to possible war zones in the European theatre with ease because its territory abutted that of the potential enemy. The US was on foreign territory and was handicapped by both economic-logistic and political restrictions.

The strategic selective pressure, therefore, was to transform relatively few US armaments into better ones, in order to match with quality the greater quantity of Soviet units.[219] That is, the pressure was to mismatch. Rebecca Grant notes that "though the US couldn't afford to match the

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[218] The second offset saw real-world applications introduced during the Carter and Reagan administrations, but plans were complete by 1975, with DARPA's ARPA/DNA Long range research and development planning program. See Robert Martinage, "Toward a new Offset strategy: exploiting US long-term advantages to restore US global power projection capability," *Center for Strategic and Budgetary Assessments*, 13. It is ironic that partisan right-wing institutions such as the Heritage Foundation have labelled Carter's military spending as the "Carter Era of Neglect" when in fact the Carter administration was instrumental in realizing the Second Offset with its relatively cheap "quality over quantity" approach. See DoD, 'Joint Operational Access Concept', n.d., http://www.defense.gov/pubs/pdfs/JOAC_Jan%202012_Signed.pdf (accessed January 2019).

[219] Gary Goertz and Paul Diehl, "The 'volcano model' and other patterns in the evolution of enduring 8 rivalries," Paper presented at the annual meeting of the International Studies Association, Chicago, February, 7-8.

Soviets tank for tank, it could field smaller numbers of extremely capable, high-quality equipment, leap-ahead technologies, and associated operational concepts. It was quality vs. quantity."[220] Secretary Brown himself described the same in a 1981 report to Congress: "Technology can be a force multiplier, a resource that can be used to help off-set numerical advantages of an adversary. Superior technology is one very effective way to balance military capabilities other than matching an adversary tank-for-tank or soldier-for-soldier."[221]

This aim of multiplying force by technology was accomplished by three principal elements of technical and organizational advancement: information processing, telecommunications, and space technology, with the intent of making a single US unit capable of matching 5-10 Soviet units, and vastly increasing the accuracy and destructive ability of US conventional weapons.[222] Former Defense Secretary Chuck Hagel noted that in the mid- to late-1970s the US invested in "extended-range precision-guided munitions, stealth aircraft, and new intelligence, surveillance, and reconnaissance platforms".[223] The so-called "Holy Grail" of RMA was "seeing deep and shooting deep", or the ability to strike Soviet tanks, for example, on the move, if necessary in rear echelon areas (deep into enemy territory), in bad weather and at night.[224] Matthew Mowthrope argues that the RMA consists of three elements, which he defines as precision strike, information warfare, and dominant maneuver.[225]

Explicit examples of the technologies and systems of the Second Offset, some of which took twenty years to develop and incorporate into the US military structure, include the Airborne

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[220] Rebecca Grant, "The Second Offset," *Airforce Magazine* July 2016.
[221] Martinage, "Toward a new Offset strategy: exploiting US long-term advantages to restore US global power projection capability," 13.
[222] Miguel Gonzalez, "Spanish Troops Deploy Near Russia with Orders to 'Avoid Provocation,'" *El Pais*, May 24, 2017. https://elpais.com/elpais/2017/05/24/inenglish/1495614373_565828.html. (accessed February 14, 2019).
[223] Zachary Keck, "A tale of two Offset strategies: The Pentagon's new Offset strategy is modelled on two very different historical examples," *The Diplomat* November 18, 2014.
[224] Martinage, 14.
[225] Matthew Mowthorpe, 137.

Warning and Control System (AWACS), with the E-3 Sentry plane introduced in 1977, the stealth fighter and stealth bomber (the stealth attack aircraft F-117 Nighthawk's maiden flight was in 1981 while the B-2 Spirit bomber had its maiden flight in 1989), precision-guided munitions such as the Tomahawk cruise missile (entered service in 1983), and improved reconnaissance and communications systems such as the Global Positioning System (GPS).[226]

Although the Second Offset was pursued specifically in order to counter Soviet conventional numerical superiority, it was never, of course, tested against the USSR itself.[227] It was, however, used in full force against Iraqi forces during the Persian Gulf War to great effect, with the ground fighting lasting a mere three days with essentially zero American battle-casualties. The so-called left hook strategy undertaken by the coalition troops was permitted by RMA-produced advanced battle tanks equipped with GPS.[228]

As with the First Offset, evidence for the dyadic strategic determinist interpretation, specifically that the RMA was a form of mismatching as opposed to disruption or matching, can be derived circumstantially by demonstrating that the RMA was not form of quantitative arms racing (military unit quantities remained stable during the transformation), was relatively cheap, and explicitly exploited weaknesses in the stronger power's own military strategy.

The development of RMA was a form of mismatching because US conventional weapons numbers remained relatively stable or were reduced. Unlike what should occur within a quantitative arms-racing dyad, from 1977 until the fall of the USSR the number of US units

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[226] Daniel Gouré, "The third offset strategy is already being realized in Europe and Asia," *Real Clear Defense* https://www.realcleardefense.com/articles/2017/04/20/the_third_offset_strategy_is_already_being_realized_in_europe_and_asia_111215.html (accessed May 12, 2019).

[227] Given that the Cold War remained cold until the Soviet Union's collapse. See Robert Higgs, "The Cold War economy: Opportunity costs, ideology, and the politics of crisis," *Explorations in Economic History* 31-3 (1994), 28-29.

[228] Hassan M. Kamara, "The influence of US strategic culture on innovation and adaptation in the US army," *Journal of Strategic Security* 4-8 (2015), 21-23.

within the European theatre remained relatively stable. While isolating specific causes of fluctuations in military spending and troop levels can be difficult, the Second Offset within the Cold War European DPOI involved replacing older units with fewer, upgraded forms, or refitting older units with advanced technology such as GPS navigation systems.[229]

Debate continues regarding the actual cost savings of the Second Offset, although the plateaus in military spending (detailed below) suggest that there were no net increases in percent-GDP terms.[230] Mowthorpe, writing in 2005 during the height of the debate on the validity of the Rumsfeld doctrine of using RMA developments to reduce active troops in the field, noted that "the RMA provides the opportunity to create a new force multiplier that will enable the military to do more with less," and that "this would see a reduction in the annual defense budget from $245 billion to $210 billion."[231] Although developmental costs of precision guided weaponry are high, savings can be expected over time due to massive improvements in the effectiveness of each individual missile fired (that is, decreasing circular error probability (CEP), which reduces missile cost because each missile has a greater chance of hitting its target, reducing the need for multiple attempts with multiple missiles).[232]

Regardless of the debate within the US military of the cost-savings of the development of the RMA, it has been significantly cheaper than the Soviet stockpiling strategy. Graph 5

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[229] Active duty troop levels have continuously been reduced over time. The point here is that mechanized units, tanks and ultimately the equipment/machinery aspects of active divisions have remained stable or been reduced in line with the developing RMA. The advent of the 2nd Offset has both been a cause and an effect of the doctrine of reduced boots on the ground, at least up until the insurgency crises post-Operation Iraqi Freedom. See D. Lennox, *Jane's Strategic Weapon Systems* (London: Jane's Information Group 2011). See also George R. Lucas, "Postmodern war," *Journal of Military Ethics* 9-4 (2010), 1-3.

[230] Mowthorpe, 143.

[231] Mowthorpe, 143. See also Edward N. Luttwak, "Dead end: counterinsurgency warfare as military malpractice," *Harper's Magazine* February (2007), 29-30.

[232] For technical considerations see William Nelson, "Use of Circular Error Probability in Target Detection," (The MITRE Corporation; United States Air Force, Bedford, MA, 1988), 35, and James C. Spall and John L. Maryak, "A feasible Bayesian estimator of quantiles for projectile accuracy from non-iid data," *Journal of the American Statistical Association* 87-419 (1992), 676.

indicates that the Soviet matching strategy of the late 1970s until the late 1980s cost a more significant portion of national income, and, more revealingly, led to an increasing or accelerating portion of national income spending, than the mismatching strategy maintained by the US during this same period. Despite its balancing effect, the Second (and First) Offsets were enacted during decreases in spending relative to national income.[233]



Graph 5. Soviet (red) and US (blue) military spending (1950-1995) in absolute value.[234]

Although general military spending increased under the Reagan Administration across all DPOIs in which the US military had significant presence, and while US military spending in the

[233] James Lebovic, "Using military spending data: The complexity of simple inference," *Journal of Peace Research* 36 (1999) 681-683. See also Alex Mintz, and Chi Huang, "Defense expenditures, economic growth, and the "peace dividend," *American Political Science Review* 84 (1990), 1283-1284.
[234] Anonymous, "The Soviet Union: Military spending," *Nintil* https://nintil.com/the-soviet-union-military-spending/ (accessed April 23, 2019). For a broader discussion see A. E. Busch, "Ronald Reagan and the defeat of the Soviet empire," *Presidential Studies Quarterly* 27-3 (1997), 451-453.

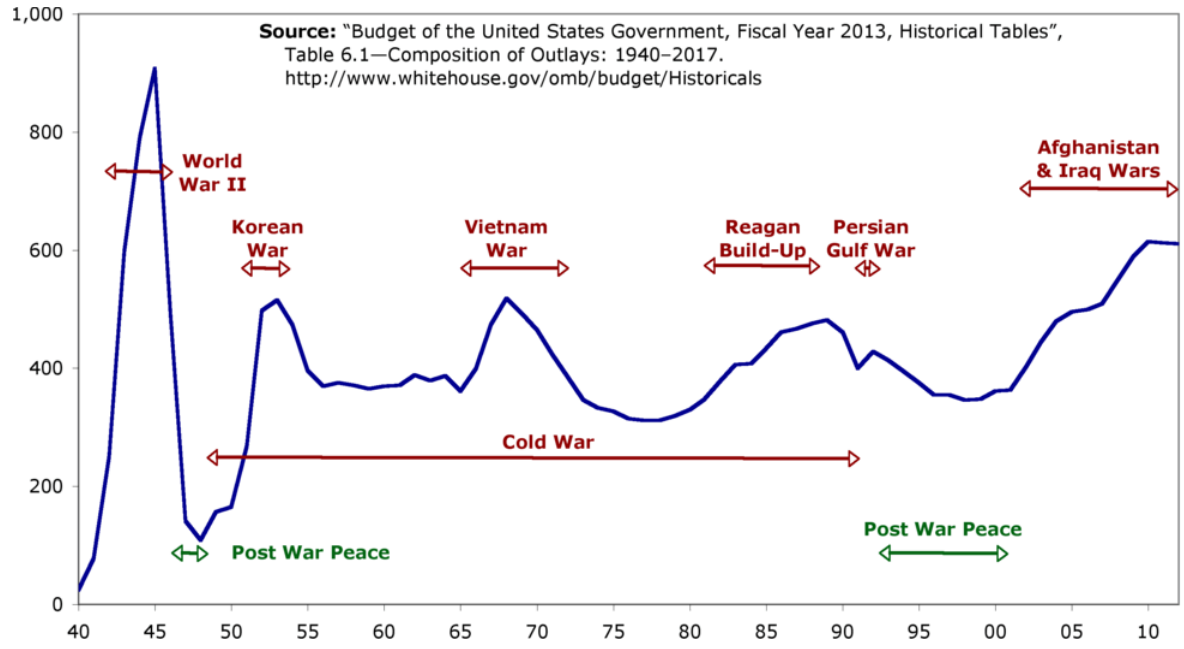
European DPOI must be separated from global US military spending, the clear trend of a spending plateau is evident during the early phase of the Second Offset.[235]

A broader, possibly universal trend can be derived from historical instances of mismatching. Military spending by these countries tends to plateau or diminish. In graphs of US military spending over time, for example controlling for large mobilizations such as during the Korean, Vietnam, Persian Gulf, and Afghanistan and Iraq wars, periods of mismatching map loosely with spending plateaus or decreases.[236] Soviet matching, in contrast, as indicated by Graph 5 above, was associated with sustained spending increases. The contrast was most overt from 1975-1980, when US spending remained relatively low and stagnant in comparison to the high and dramatically increasing spending of the USSR during this period.[237]

Retrofitting older units with upgraded electronic systems or replacing outdated units with modern iterations was cheaper than purchasing larger and larger quantities of brand new forms of the older conventional units (as the general Soviet strategy maintained). This is especially true if the upgrades were made with commercial technology.[238] Martinage notes that "the 1970s Offset Strategy occurred during a period of reduced defense spending…it was the Soviet Union's achievement of strategic nuclear parity coupled with the numerical superiority of Warsaw Pact conventional forces that drove it."[239]

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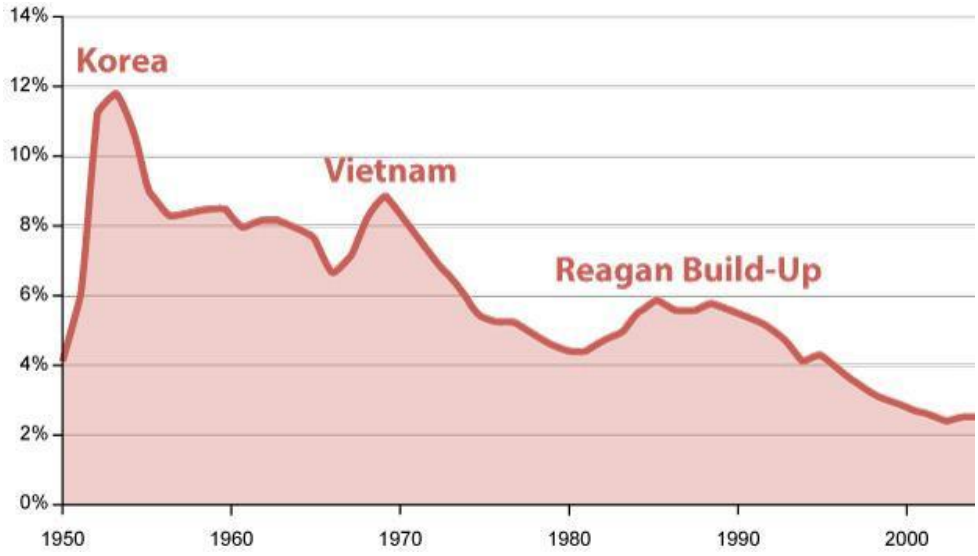
[235] Kari Roberts, "Jets, flags, and a new Cold War?: Demystifying Russia's Arctic Intentions," *International Journal* Autumn (2010), 959-961.
See also A. Nove, *An Economic History of the USSR: 1917-1991*, 1st ed. (London: Allen Lane, 1992), 4-6.
[236] Ralph Sanders, "Technology in military strategy: A realistic assessment," *Technology in Society* 5 (1983), 1-2.
[237] A complicating variable within the dyadic strategic determinist model described above.
[238] Paul Scharre, *Army of none: Autonomous weapons and the future of war* (New York: WW Norton and Company, 2018), 119-121. See also G. Shen, 'Lun Xinxihua Shidai de Hexin Junshi Nengli' [On the core military capabilities in the information age], Zhongguo Junshi Kexue 2011-2 (2011), 44–52.
[239] Theresa Clair Smith, "Arms race instability and war," *The Journal of Conflict Resolution* 24-2 (1980), 15-16.



Graph 6. US military outlays in $ billions by fiscal year.[240]

As Graph 6 above and Graph 7 below reveal, notwithstanding the increase caused by the Reagan buildup, apropos of no new global threats, military spending as a percentage of GDP decreased during the Second Offset, while American military power increased.[241] Given that mismatching is a strategy of the relative weaker power within a given dyad, it follows that the innovation factor should be higher, and spending trends lower, both in relation to historical spending of the state itself and in contrast with the stronger state being balanced against.[242]

[240] Adjusted for inflation in 2005 US $ billions. Note spending plateaus during periods of mismatching: First and Second US offsets are displayed here. See also William R. Thompson, "Polarity, the Long Cycle, and Global Power Warfare," *Journal of Conflict Resolution* 30 (1986), 587-589.
[241] Trading Economics, "Military Expenditure by Country," Trading Economics.com https://tradingeconomics.com/country-list/military-expenditure (accessed April 11, 2019).
[242] Smith, "Arms race instability and war," 18-19. See also D. Steinberg, "Trends in Soviet military expenditure," *Europe-Asia Studies*, 42-4 (1990), 4-5.



Graph 7. US military spending as percentage of GDP.[243]

As noted, mismatching powers have a tendency to be more innovative than matching powers, based on the notion that the mismatcher is in a weaker state than the matcher, and that there is more selective pressure on the mismatcher to innovate out of its strategic weakness and find unique ways to internally balance (analogous to the "life-dinner" principle from evolutionary biology).[244] The development of the RMA was a form of mismatching, as opposed to matching, on the part of the US, because the technology was clearly reactive and exploited relative weaknesses in extant Soviet armaments. RMA-enhanced units which could better track their older Soviet counterparts, and missiles with much higher precision and accuracy, made much of the conventional Soviet force slow and weak in comparison, rendering those units effectively obsolete. According to Martinage, specific examples of this conventional-forces

[243] Susan G. Sample, "Furthering the investigation into the effects of arms buildups," *Journal of Peace Research* 35-1 (1998), 17-18. See also S. Tang, "The Security Dilemma: A Conceptual Analysis," *Security Studies* 18-3 (2009), 587-589.

[244] Likewise, weaker states are more likely to innovate in their external balancing, allying more readily and with more unique or non-traditional partners, than stronger matching powers. See Matt Ridley, *The red queen: Sex and the evolution of human nature* (New York: Harper Perennial, 1993), 67-68.

exploitation include the development of an airborne synthetic aperture radar platform that could identify moving concentrations of armoured vehicles from 300 km away, terminally guided submunitions able to identify and destroy large numbers of armoured ground vehicles over a wide area, and road-mobile, long-range, highly accurate surface-to-surface missile (SSM) system (the Lockheed ATACMS system).[245]

The Second Offset was a successful form of mismatching because it cheaply and innovatively neutralized the Soviet advantage in conventional military power. The predictive response was for the USSR to again match the US; this time by introducing its own RMA technologies. This did occur to a small extent, although a full matching cycle was disrupted by the collapse of the USSR in December 1991.[246] This quintessential periodicity-disrupting event, the bankruptcy and collapse of the Soviet Union, broke the dyadic chain of mismatching and matching that had existed in two full iterations and the first half of a third since the end of WWII.[247]

An important question arises: whether this particular form of US mismatching, one of three historical forms against the same primary adversary and within the same DPOI, was an actual revolution in military affairs. Why should this particular iteration of a dyadic chain be revolutionary? Could the First and Third Offsets (discussed below) also then be considered RMAs? A clear qualifier seems to be the extent of technological change exhibited within the

[245] Martinage, 15.
[246] John Baylis, Steve Smith, and Patricia Owens, *The Globalization of World Politics: An Introduction to International Relations*, 5th ed. (New York: Oxford University Press, 2005), 220-222. See also Gary Goertz and Paul Diehl, "Enduring rivalries: Theoretical constructs and empirical patterns," *International Studies Quarterly* 37 (1993), 147-171.
[247] Charles S. Gochman, and Russell J. Leng, "Realpolitik and the road to war: An analysis of attributes and behavior," *International Studies Quarterly* 27 (1983), 97-99.

mismatch. Technological innovation is not by itself a necessary requirement of a mismatching strategy, although they are closely correlated.[248]

In conclusion, the technologies and systems developed for the Second Offset infiltrated the entire structure and philosophy of American war-fighting. [249] Other states which perceived the US as their greatest rivals adopted disrupting, mismatching or matching strategies against the specific US power of the RMA.[250] As described below, contemporary resurgent Russia strategy in Europe is a belated form of matching against US RMA technologies. Modern terrorism, guerilla and insurgency methods are disruption strategies against RMA technologies and war-fighting methods as well.[251]

Due to the USSR matching the US strategic nuclear threat, the numerical superiority of Soviet conventional forces again became the primary threat to the US and its interests in Europe. With the advent of nuclear parity in the late 1970s, which it was not possible to effectively match, the US was forced once again to mismatch against the original Soviet threat: conventional weaponry numerical superiority.[252] It did this via the RMA: a quality-over-quantity response, by developing and applying technologies that enhanced its own, non-nuclear and conventional weaponry in the European theatre. [253]

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[248] Richard Ned Lebow, "Conclusions," in *Psychology and deterrence*, edited by Robert Jervis, Richard Ned Lebow, and Janice Gross Stein (Baltimore: Johns Hopkins University Press, 1985), 203-205. See also Barton C. Hacker, "The machines of war: Western military technology 1850-2000," *History and Technology* 21-3 (2005), 2-4.
[249] Thomas Mahnken, and Barry D. Watts, "What the Gulf War can (and cannot) tell us about the future of warfare," *International Security* 22-2 (1997), 27-28. See also Williamson Murray, "Thinking about revolutions in military affairs," *JFQ* Summer (1997), 30.
[250] Alex Mintz and Karl DeRouen, *Understanding Foreign Policy Decision Making* (Cambridge: Cambridge University Press, 2010), 290-292.
[251] Lewis F. Richardson, *Arms and insecurity: A mathematical study of the causes and origins of war* (Pittsburgh, PA: Boxwood, 1960), 13-14.
[252] Susan G. Sample, *Arms races and the escalation of disputes to war* Ph.D. diss., Vanderbilt University (1997), 290-292.
[253] David J. Singer, Stuart Bremer, and John Stuckey, "Capability distribution, uncertainty, and major power war, 1820-1965," In *Peace, war, and numbers*, edited by Bruce Russett (Beverly Hills, CA: Sage, 1972), 170-172. See also SIPRI http://www.sipri.org/research/armaments/milex/milex_database (Accessed Feb 12, 2018).

CHAPTER 4

THIRD OFFSET (2008-PRESENT): THE RUSSIA-US DYAD TODAY AND TOMORROW

Template 1: stronger power-weaker power dyad

1] $S^0 \leftrightarrow W^0$ (identify)
2] $S^0 \leftarrow W^1$ (mismatch)
3] $\rightarrow S^1$ (match) $\rightarrow W^2$ (mismatch)

Stronger-weaker power dyad: RUSSIA-US (2008-PRESENT)

1] $USSR^0 \leftrightarrow US^0$ (Iron Curtain appears, 1945; US New Look Policy, 1953)
2] $USSR^0 \rightarrow US^1$ (US mismatches USSR conventional forces—First Offset)
3] $USSR^2$ (Soviet nukes—MAD) $\rightarrow US^3$ (RMA against MAD – Second Offset)
3] $RUSSIA^4$ (RMA technologies) $\rightarrow US^5$ (Third Offset)

The First and Second Offsets have been examined in the context of the dyadic strategic determinist model. The Third (and ongoing) US Offset will be analyzed in the same manner, with general predictions for the future of Russia-US strategic behaviour under various conditions. As the Third Offset is still in a very nascent stage, discussion regarding its impact and identity will be much more speculative than examinations of the First and Second Offsets. Chapters 4 and 5, which address contemporary and future scenarios for Russia and China respectively, allow for the application of the dyadic strategic determinist model and some concrete predictions for the future. The determinist criteria identified above, namely the military power-ratio between two states within an interactive dyad and the DPOI in play, allow for predictions of whether a state will match, mismatch or disrupt.[254]

[254] David J. Singer, "Peace in the global system: Displacement, interregnum, or transformation?" In *The long postwar peace: Contending explanations and projections*, edited by Charles W. Kegley Jr. (New York:

THE US-RUSSIA DYAD TODAY

The Third Offset appears at first glance to be fundamentally different from the First and Second Offsets. This is due to the fact that contemporary Russia appears to be the weaker party of the Russia-US dyad within the European DPOI. At first glance, the Third Offset, which the US is developing today, appears to be the only type of offset strategy that does not involve mismatching, as opposed to a general modernization of the US armed forces, or even a form of matching.[255] However, this supposition is false. Despite appearances to the contrary, within the European DPOI, Russia continues to be the stronger power and is belatedly matching US Second Offset military power. The US continues to mismatch within this DPOI due to its relative weakness. The Third Offset, which is envisioned as a response to the Russian threat in Europe specifically, is yet another example of the US mismatching a stronger regional power.[256] Regardless of its detailed components, the Third Offset, like the First and Second Offsets, is a strategy of mismatching against a primary existential threat, albeit with secondary spillover effects into the entire US military organizational structure and philosophy.[257]

With the collapse of the Soviet Union in December 26 1991, the great power dyad of the US-USSR disintegrated. Due to the fact that Russia inherited a considerable conventional fighting force and the majority of its nuclear arsenal, this dissolved power-relationship was

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HarperCollins, 1991), 56-59. See also J. W. Taliaferro, "Security Seeking under Anarchy: Defensive Realism Revisited," *International Security* 25-3 (2000), 20-21.

[255] The global system of the future seems most likely to be multipolar, with Russia, China, India, the EU, Brazil and the US as possible major poles. The strategic power of the US will necessarily shrink in such a system, and it will be unable to dominate every dimensional point of analysis. See John A. Warden III, "Strategy and airpower," *Air and Space Power Journal* 25-1 (2011), 23.

[256] Aleksandr Golts, "How Many Soldiers Does Russia Have?" *Eurasia Daily Monitor* 142-144, November 8, 2017. As of December 6, 2017: https://jamestown.org/program/many-soldiersrussia/ See also Aviram Jenik, "Cyberwar in Estonia and the Middle East," *Network Security: Cyberwar* April (2009), 2-4.

[257] Samuel P. Huntington, "Arms races: Prerequisites and results," *Public Policy* 8 (1958), 41-43.

immediately replaced with a US-Russia dyad, although with a dramatically weakened Russian state.[258] With no competing superpower to match it on a global scale, and a diminished Russia within the European DPOI, the US was able to significantly reduce its armed forces between 1992 and 2015, as depicted in Table 8.[259] This reciprocal reduction of US power is circumstantial evidence that the US continued to identify Russia as its primary adversary, as it balanced against it as it had the USSR.[260]

US FORCE ELEMENT	1990	1996	2003	2010	2015
ACTIVE PERSONNEL (MIL)	2118	1547	1427	1580	1433
ARMY DIVISIONS	18	12	10	10	10
AIRCRAFT CARRIERS	14	13	12	11	10
SURFACE COMBATANTS	206	116	106	100	105
SSN	136	82	56	57	59
LARGE AMPHIBIOUS VESS	63	39	38	31	31
FIGHTER AIRCRAFT	3444	2485	2413	2158	1570
BOMBERS	301	195	199	154	139

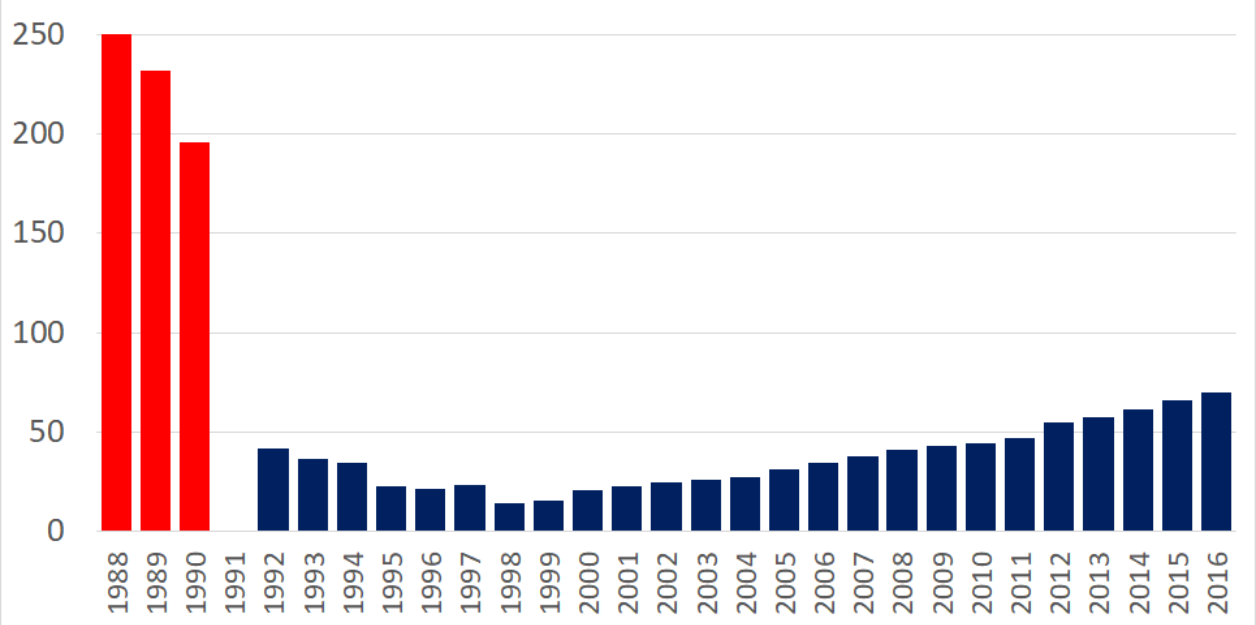
Table 8. Selected US Force Elements (1990-2015). Reproduced from IISS, The Military Balance.[261]

Russia and United States, then, continued to identify one another as primary adversaries. This has not changed since 1945, despite the various diplomatic niceties and rapprochements throughout these years.[262] However, in the immediate period following the fall of the Soviet Union, and throughout this catastrophic periodicity-disrupting event, the allocation of primary

[258] With Boris Yeltsin as president of Russia from 1991 until 1999 US-Russia relations were warm. The US provided Russia with economic assistance and Russia allowing the expansion of NATO into the East. It appeared at this time that in a US-dominated unipolar world, the United States briefly did not have a primary adversary. This is a mistaken view, as noted above.
[259] Richard Bernstein and Ross Munro, "The coming conflict with America," *Foreign Affairs* 76 (1997). 18-20.
[260] E. B. Montgomery, (2006) 'Breaking out of the Security Dilemma: Realism, Reassurance, and the Problem of Uncertainty', *International Security*, 31:2, pp. 151-185.
[261] IISS, *The Military Balance* 2015 (London: Routledge 2015), May 2015.
[262] Victor A. Kremenyuk, "The cold war as cooperation," In *From rivalry to cooperation: American perspectives on the post-cold war era*, edited by Manus I. Midlarsky, John A. Peter V. Gladkov (New York: HarperCollins, 1994), 3-5.

adversaries for both the US and Russia appeared to be in a state of flux. Nonetheless, the fundamental element of primary adversary identification remained. Both states retained their nuclear arsenals and Russia continued to exhibit a massive conventional military threat, and therefore each state represented the other's most immediate existential threat.[263]

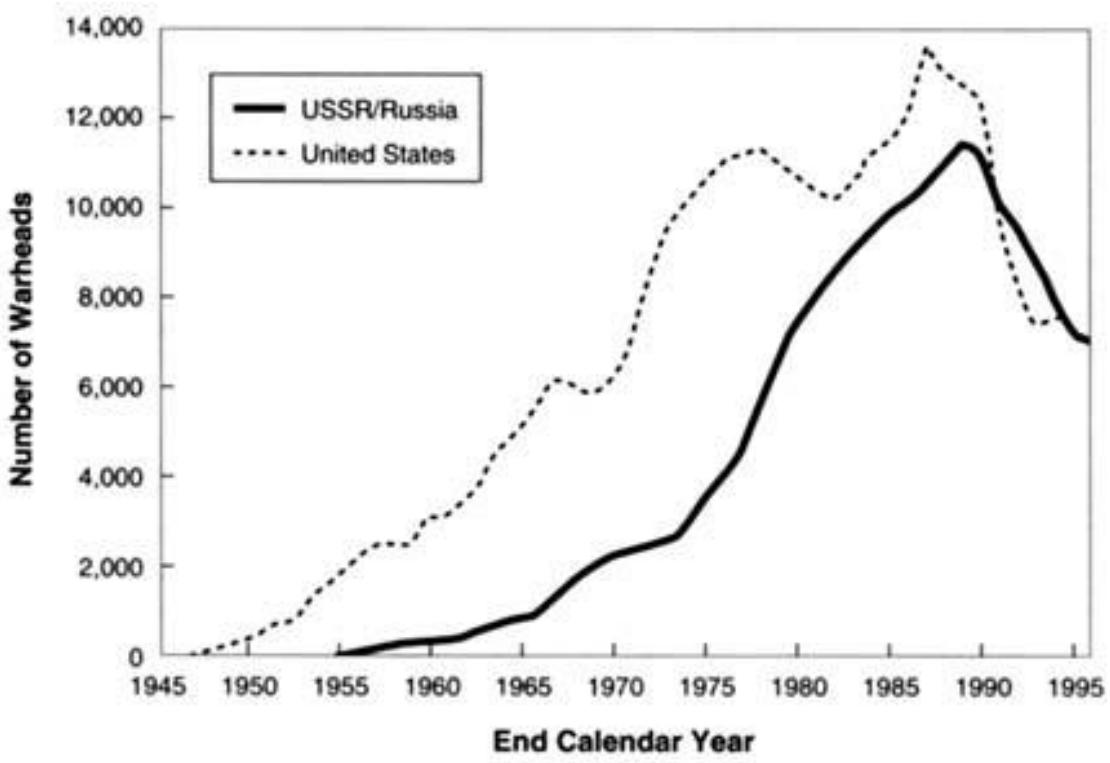
Not only did Russia lose much of its economic power in the aftermath of the collapse of the Soviet Union, but many of its military units and strategic bases suddenly became the property of other countries.[264]



Graph 8. Soviet and Russian military expenditures in $ billions of constant 2015 dollars.[265]

[263] Robert W. Herrick, *Soviet naval strategy: Fifty years of theory and practice* (Annapolis, MD: Naval Institute Press, 1968), 128-130.
[264] Kalevi J. Holsti, *Peace and war: Armed conflicts and international order 1648-1989* (Cambridge, UK: Cambridge University Press, 1991), 240-242.
[265] Michael Kofman, "Russian defense spending is much larger, and more sustainable than it seems," *Defense News* https://www.defensenews.com/opinion/commentary/2019/05/03/russian-defense-spending-is-much-larger-and-more-sustainable-than-it-seems/ (accessed March 20, 2019).

There is no doubt that Russia was very badly weakened, both economically and militarily, during the fall of the Soviet Union and throughout the aftermath. As Graph 8 above reveals, Soviet military spending dropped from just under $200 billion in 1990, to under 50 billion in 1992 under the new Russian regime.[266] Despite the massive reduction in Russian military spending, much effort was devoted to maintaining a semblance of military order.



Graph 9. Number of nuclear warheads by year: US-USSR/Russia.[267]

Therefore, perhaps ironically given the threat the Soviet nuclear arsenal continued to present to the US, American assistance was instrumental in protecting the orderly inheritance of

[266] Ibid.
[267] John P. Holdren, et al., *The Future of U.S. nuclear weapons policy* https://www.nap.edu/read/5796/chapter/8 (accessed May 2, 2019).

Soviet warheads to Russian authority.[268] As Graph 9 above indicates, Russia maintained nuclear parity against the US throughout the fall of the Soviet Union and remained the primary existential threat to the US despite the hitherto-unprecedented thaw in relations during the early period of the post-Soviet collapse.[269]

Despite established and popular opinion, there is clear evidence that Russia remains the stronger power within the European DPOI, and that the US continues to mismatch it.[270] A dyadic chain continues to exist between the two countries, one of stronger power – weaker power, matching-mismatching. This is evidenced by Russia's military spending and in its strategic nuclear threat, its continuing conventional advantage, and in the development of its own matching RMA response to US Second Offset forces. It is also evidenced in the Third Offset, which is the US response to Russia's matching strategy of developing RMA technology. In the same sense that the US was forced to innovate against the USSR's matching strategic nuclear threat, it is now being forced to innovate against the USSR's matching RMA threat.

Other than in Europe, Russia mismatches or disrupts the US in almost all other DPOIs in which it competes with the US.[271] But it does this largely by choice. Its geostrategic priority is the former Soviet states and immediate neighbours. Russia's military budget in 2015 was ostensibly $52 billion, in contrast to a NATO budget of $895 billion.[272] In 2018 Russia's military

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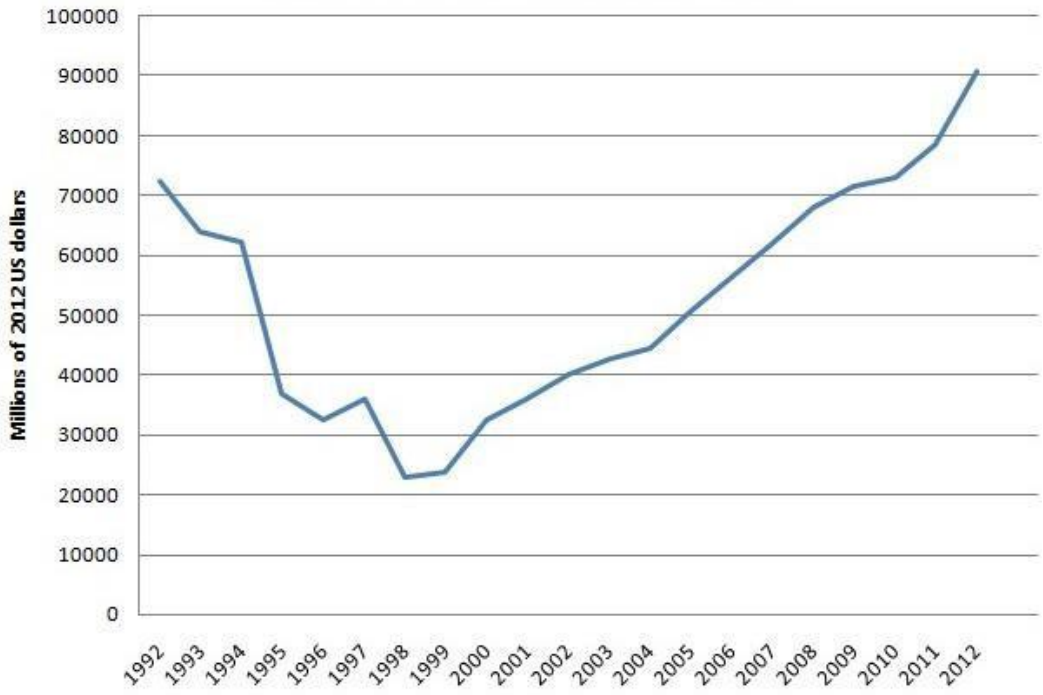
[268] The irony is reduced when the reason for the assistance is made clear: the US perceived a more serious danger in numerous nuclear-armed and erratic disrupting states than in a single orderly, matching nuclear super power. It was a strategy of "better the enemy you know." A strong, matching power is in a sense preferable over a weak, disrupting power. The latter is less likely to maintain the established conventions of great power statecraft. See Brian T. Mooney, "Old wine in new skins: Aquinas, just war and terrorism," *Pacifica* 20 (2007), 21-22.
[269] J. J. Mearsheimer, "The False Promise of International Institutions," *International Security* 19-1 (1994), 21.
[270] Barry Posen, "Command of the Commons: The Military Foundations of U.S. Hegemony," *International Security*, 28-1 (2003), 16-17.
[271] Scott Sagan, "Structural realism after the Cold War," *International Security* 25 (2000), 39–41.
[272] Michael Kofman, "Russian defense spending is much larger, and more sustainable than it seems," *Defense News* https://www.defensenews.com/opinion/commentary/2019/05/03/russian-defense-spending-is-much-larger-and-more-sustainable-than-it-seems/ (accessed March 20, 2019).

spending increased to $61.4 billion according to the Stockholm International Peace and Research Institute—about the size of the military budget of Britain or France.[273] However, Michael Kofman argues that these figures (such as those depicted in Graph 8 above) are inaccurate. Due to the fact that Moscow purchases from Russian defense manufacturers in rubles, Russia's military budget is in reality closer to $150-180 billion per year, with a higher percentage devoted to research and development than many Western defense budgets.[274] Moreover it spends less on maintaining its armed forces, about one third of which is made up of conscripts, because it bases fewer troops abroad than the US.[275] Therefore in global terms Russia spends around $180 billion per year on its military, in contrast to a US total of approximately $650 billion.[276] However because Russia is no longer a global power, the majority of its military strength is focused on these aforementioned areas of continental Europe and the former Soviet satellites. In this DPOI, Russia is the most powerful state, maintaining a matching strategy against the US and NATO.

	1991	1995	2000	2005	2010	2016
NATO	992,750	757,989	723,940	660,304	495,568	397,947
RUSSIA	1,412,000	474,000	328,500	404,500	404,500	350,000

Table 9. NATO ground personnel compared with total Russian ground personnel (1991-2016).[277]

[273] Gorenberg, "Contractees in BTGs," *Russian Defense Policy Blog*, 2017 https://russiandefpolicy.blog/2016/09/17/contractees-in-btgs/ (accessed April 2, 2019).
[274] Kofman, "Russian defense spending is much larger, and more sustainable than it seems," (accessed March 20, 2019).
[275] John P. Holdren, et al., *The Future of U.S. nuclear weapons policy* https://www.nap.edu/read/5796/chapter/8 (accessed May 2, 2019).
[276] Kofman, "Russian defense spending is much larger, and more sustainable than it seems."
[277] IISS, *The Military Balance 2015* (London: Routledge 2015).

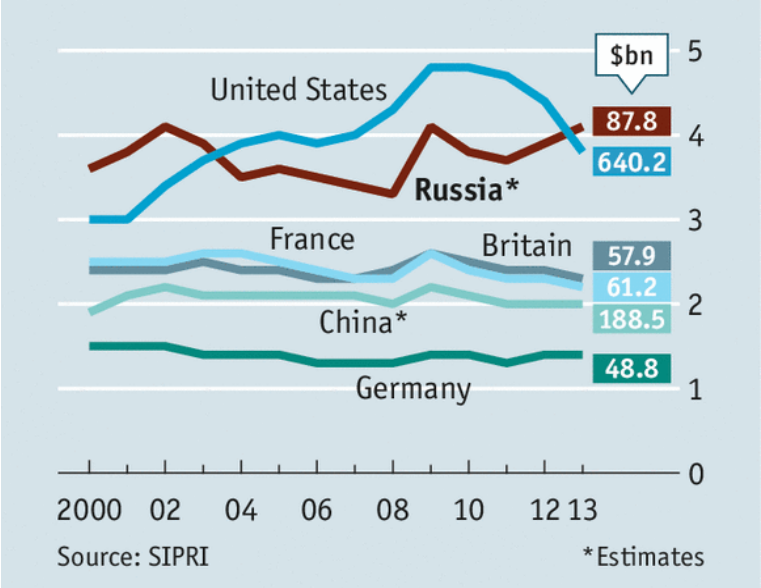


Graph 10. Russian military spending (1992-2012).[278]

Although it lost much of its conventional power with the fall of the USSR, this reduction was from a position of massive superiority. As Table 9 above reveals, since 1991 NATO and Russian troop levels have fluctuated. Russian ground personnel have been reduced dramatically but in concert with NATO decreases.[279] Since its invasion of Georgia in 2008, Russia has reversed the overall decline in the quality of its military forces. This development is a form of matching, as Russia is now in a process of increasing the quality of its armed forces in the European DPOI specifically. While maintaining strategic nuclear parity against the US, Russia is belatedly matching the Second Offset by developing and building its own modernized RMA-centred armed forces.[280] Therefore, just like the US as it developed its RMA technology,

[278] Anonymous, *SIPRI Military Expenditures Database*.
[279] Ibid.
[280] As will be demonstrated in Chapter 5, the United States is in the process of switching its identification of its primary adversary from Russia to China. For reasons of its strategic nuclear threat, its massive size and its

Russia's conventional military levels remain generally constant, while it is massively improving the overall quality and power projection abilities of its forces.[281]



Graph 11. Military spending as percentage of GDP, country comparison.[282]

Today Russia is focused on developing RMA technologies, incorporating them into its conventional forces and new platforms. Therefore while its total (global) military forces are inferior to those of the US, with its number of aircraft under half that of the US (1.251 to 2,929) for example, within the European DPOI Russia is clearly still the dominant power.[283] As of 2017, its active units along the borders of Estonia, Latvia and Lithuania consist of 757 main battle

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revanchism, Russia punches above its economic and military weight. This may not be sustainable, as will be discussed below.

[281] Anonymous, "Global military spending remains high at $1.7 trillion," *SIPRI* https://www.sipri.org/media/press-release/2018/global-military-spending-remains-high-17-trillion (accessed Feb 12, 2018).

[282] Anonymous, "Military spending around the world is booming," *The Economist* https://www.economist.com/international/2019/04/28/military-spending-around-the-world-is-booming (Accessed Feb 19, 2018).

[283] Scott Boston, et al., "Assessing the conventional force imbalance in Europe: Implications for countering Russian local superiority," *RAND Research Report* Santa Monica, CA, (2018), 22-23. See also Margarete Klein, "Russia's military policy in post-Soviet space: aims, instruments and perspectives," *SWP Research Paper* January 2019, 2.

tanks in contrast to 129 NATO tanks, of which 42 are non-US.[284] It is modernizing this conventional numerical superiority with qualitative RMA improvements.

Domestically-developed RMA military units currently deployed by Russia include modernized air defenses and long-range strike weapons, such as the SS-26 STONE tactical ballistic missile. The Russian conventional tank advantage now includes upgraded T-72B3s, which are third-generation improvements over the original Soviet T-72 introduced in 1971. These include vastly improved sights for all-weather and night fighting, digital radio, GPS and improved armour and munitions. Older generation T-72s can be refurbished into T-72B3s, much like the US tanks refurbished with RMA technology from 1977 until the early-1990s.[285] The T-72B3 cannot currently compete against the best US tank, which is the M1 Abrams, itself an RMA improvement over the M60, and which was introduced in 1980.[286] However the trend is clear. Russia is developing its own domestic versions of US RMA technologies and unit-improvements, while maintaining similar unit levels to US forces on the European continent.

These trends are particularly evident in the Baltic region. A war between Russia and the US/NATO would likely begin with an invasion of the Baltic States. Latvia, Lithuania and Estonia maintain small armed forces and the NATO force structure in place is insufficient for preventing a rapid Russian invasion and annexation by mechanized units, consisting largely of tripwire units that would be unable to sustain major fighting for the length of time required to mobilize reinforcements. This region is most vulnerable to Russian dominance in the air, as reported by a 2018 RAND report.[287]

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[284] Ibid.
[285] Ibid.
[286] Ibid.
[287] Ibid., 9

	US ONLY	RUSSIA
AIRCRAFT		
4TH GENERATION	2928	1251
5TH GENERATION	179	0
AIR MISSILE DEFENSE		LAUNCHERS
LONG RANGE SAM	0	272
MEDIUM RANGE SAM	0	72
SHORT RANGE AIR DEFENSE	0	288

Table 10. Air power over Baltics States: US and Russia (2018).[288]

Table 10 indicates that modernized Russian air defenses are being used to counter modernized US aircraft. Although the US technology is more advanced, the Russian response is to match RMA units against RMA units. As the matcher, albeit one playing developmental catch-up, Russia is also developing its own fifth generation aircraft, including the Mikoyan LMFS, a proposed stealth multirole combat aircraft designed to compete against the US fifth-generation F-35A stealth multirole fighter.[289]

Military details aside, these trends in Russian military development are manifestations of a matching strategy because they are not fundamentally innovative. They are simply home-grown or copycat iterations of US-developed RMA technology, established upon a military structure that continues to incorporate older conventional forces and a balancing strategic nuclear threat. Nor is the current Russian military restructuring cheap. Russia is both modernizing and increasing the quantity of its force units. As Graph 10 and 11 above reveal, Russia's military spending has significantly increased, and continues to increase, since 2000. It exhibits the telltale signs of a strategic matcher. Within the European DPOI it is balancing the US by spending

[288] Ibid., 9
[289] Anthony Cordesman, "Russian Exercises and NATO Force Planning: The Need for a Real Strategy to Deal with Russia," *Center for Strategic and International Studies* September 15, 2017, 4-6.

money to replicate its adversary's force structure.[290] This is evident in microcosmic form in the Baltic States example above. Although Russia is matching the US via RMA means in this region, it continues to aim to match in purely quantitative, older-generational military units, as shown in Table 11.

WEAPONS SYSTEMS	NATO	RUSSIA	RATIO
MAIN BATTLE TANKS	129	757	1:5.9
INFANTRY FIGHTING VEHICLES	280	1276	1:4.6
SELF-PROPELLED HOWITZERS	32	342	1:10.7
ROCKET ARTILLERY	0	270	0:270

Table 11. Ground forces in vicinity of Baltic States: US and Russia (2017).[291]

Within the European DPOI, the US is the weaker party within the contemporary US-Russia dyad. While the newly formed Russian state was reeling in the aftermath of the collapse of the USSR, the US was able to continue to mismatch it via its Second Offset RMA advantages. However as Russia has recovered and, since 2008, accelerated the development of its matching RMA response, the US must mismatch within the European DPOI once again.[292]

All of the factors described in the chapters above which have placed the US at a strategic disadvantage within the European DPOI continue to exist today. The US is limited in its ability to strategically match Russia in Europe for geographical, logistical and political reasons. Just as in 1949, the US contribution to NATO, the vast majority of its fighting force, must travel 6000 km across the Atlantic (and 800 km to a hypothetical Western German front against a

[290] Scott Boston, et al., "Assessing the conventional force imbalance in Europe: Implications for countering Russian local superiority," *RAND Research Report*, 16-17.
[291] Ibid., 9.
[292] Margarete Klein, "Russia's military policy in post-Soviet space: aims, instruments and perspectives," *SWP Research Paper* January 2019, 2.

hypothetical attack by Russia). US military bases in Germany, France, Britain, Belgium, the Netherlands and countries in Eastern Europe such as Poland are limited in size and strategic freedom. Basing in the states of Eastern Europe and the former Soviet satellites could be considered triggers for war by Russia, and would today escalate tensions rather than offer balancing solutions.[293] Such bases are maintained despite the political challenges at home and from the host countries where decades of peace in Europe makes voters more anti-American and apathetic toward threats of Russian aggression.[294] All basing decisions require the ongoing approval of the host countries, causing much debate, deliberation and resistance among the populations of the democratic states Europe.[295]

THE THIRD OFFSET

The Third Offset is an ongoing development of technologies and systems which will allow the United States to mismatch Russia's own RMA-based modernization of its armed forces. Essentially, the US is searching for a way to defeat its own prior military advances, which are now being co-opted by Russia as it seeks to match the US within the European theatre.[296] The Third Offset was born of the Defense Innovation Initiative, which was established in 2014 in light of Russian military modernization. The Long-range Research and Development Program

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[293] Bear Braumoeller, "Understanding System Dynamics: Simple Models of Complexity." In *Systems Theories of World Politics*, ed. Mathias Albert, Lars-Erik Cederman, and Alexander Wendt (Bielefeld, Germany: Institut fur Weltge sellschaft, 2008), 15-16.
[294] Dale Copeland, *The Origins of Major War* (Ithaca New York: Cornell University Press, 2000), 4-5.
[295] Ibid., 116-117. See also Anthony Cordesman, "Russian Exercises and NATO Force Planning: The Need for a Real Strategy to Deal with Russia," *Center for Strategic and International Studies* September 15, 2017, 4-6.
[296] Van Jackson, "The Pentagon's third offset strategy: What US allies and partners need to know," *The Diplomat* https://thediplomat.com/2015/04/the-pentagons-third-offset-strategy-what-us-allies-and-partners-need-to-know/ (accessed February 10, 2019), 24. See also Robert Gilpin, "The theory of hegemonic war," *The Journal of Interdisciplinary History* 18-4 (1988), 22-23.

Plan is designed to identify and advance technologies that can be militarized and used to counter older RMA developments. Daniel Gouré states that these include "robotics, autonomous systems, miniaturization, big data and advanced manufacturing, including 3-D printing."[297]

A 2016 news release from the US Department of Defense describes the aspirational Third Offset as incorporating "autonomous learning systems for handling big data and determining patterns, human-machine collaboration for more timely relevant decision making, and assisted human operations through technology assistance like exoskeletons or wearable electronics."[298] Other elements include "advanced human-machine combat teaming such as with manned and unmanned systems working together, and network-enabled autonomous weapons and high-speed weapons like directed energy, electromagnetic rail guns and hypersonics."[299]

Frequently depicted as just a wish list of new technologies, the Third Offset ultimately focuses on developing military systems that will allow the US to once again mismatch Russia within the European DPOI. Not coincidentally, as China develops its own RMA forces, the US will be able to deter Chinese aggression with renewed military power initially provoked by the Russian RMA threat. [300] As the US once again attempts to mismatch a modernizing and revanchist Russian power in Europe, its relatively weaker position, caused by the cultural, political, geographical and logistical weaknesses described above, forces it to seek out an innovative, relatively inexpensive military solution.

The Third Offset fulfills the established requirements of a mismatching strategy. It is both highly innovative and cheap. It aims to exploit brand new, previously un-militarized technologies

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[297] Jackson, "The Pentagon's third offset strategy: What US allies and partners need to know," 25-27.
[298] Ibid.
[299] Ibid.
[300] Daniel M. Hartnett and Frederic Vellucci, "Toward a Maritime Security Strategy: An Analysis of Chinese Views since the Early 1990s," in Philip C. Saunders, Christopher D. Yung, Michael Swaine, and Andrew N. Yang (eds), *The Chinese Navy: ExpandingCapabilities, Evolving Roles* (Washington: National Defense University Press, 2011), 53-56.

and concepts, such as energy weaponry and automation. Ideas such as the incorporation of cybernetic components onto soldiers, unlike RMA technologies, link electronics and computer components directly into their human controllers as opposed to the machines they are operating.[301] The relative cost savings of future Third Offset technologies are evident in the notion of miniaturization. Not only will miniaturized units be more difficult to hit, they will cost less in materials. Manufacturing costs will be further reduced by utilizing 3D printing, and automation will reduce the massive costs of training, housing, feeding and protecting human soldiers and support staff who must be based on the European continent.[302]

The Third Offset is also a form of cheating in the sense that it bypasses the strengths of RMA technologies, as opposed to competing directly against them. By utilizing 3D printing, laser weapons, autonomous units and miniaturization, Third Offset techniques may utilize swarm warfare and decoys, which will reduce the RMA advantage of decreased circle error probability (CPE) described below.[303] Military systems that incorporate multiple small autonomous redundant units will reduce the per-unit cost of increased enemy missile strike success.[304]

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[301] John A. Lynn, "The evolution of army style in the modern West, 800-2000," *The International History Review* 18-3 (1996), 9-10.
[302] Götz Neuneck, "The revolution in military affairs: its driving forces, elements, and complexity," *Complexity* (July 2008). See also David G. Perkins and James M Holmes, "Multidomain Battle: Converging Concepts Toward a Joint Solution," *Joint Force Quarterly* 88 (2018), 26-27.
[303] William Nelson, "Use of Circular Error Probability in Target Detection," (The MITRE Corporation; United States Air Force, Bedford, MA, 1988), 25-26. See also James C. Spall, and John L. Maryak, "A feasible Bayesian estimator of quantiles for projectile accuracy from non-iid data," *Journal of the American Statistical Association* 87-419 (1992), 10-11.
[304] Emanuel Adler, and Vincent Pouliot, "International Practices," *International Theory* 3-1 (2011), 25-27.

THE US-RUSSIA DYAD TOMORROW

As noted above, to be a worthy theory of international politics, dyadic strategic determinism must accurately predict future trends to some extent. In this sense, it is not important that the theory be "true", so much as useful.[305] In very broad terms one prediction of the dyadic strategic determinist model is that, starting from a very weak level, as states develop they will adopt a succession of strategies against their consistently strong adversaries, from disruption, to mismatching, to matching. The same trend will occur in reverse. Against a consistently strong primary adversary, a weakening rival will revert from strategies of matching, to strategies of mismatching, to finally strategies of disruption.

According to the dyadic strategic determinist model, Russian grand strategy of the future can be predicted if both the country's primary adversary and its power relative to that adversary is known. If Russia continues to identify the US as its primary adversary and if it does not significantly weaken economically, and therefore ultimately militarily, or otherwise decrease its military spending, then it will continue to match the US within the European DPOI. This will be true as long as the security dilemma holds.[306] If the Russian economy weakens and military spending plummets, it will, at some point, adopt a strategy of mismatching and then even disruption against the United States within the DPOI. However with the ascension of China,

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[305] Charles W. Ostrom Jr., "Evaluating alternative foreign policy decision-making models," *Journal of Conflict Resolution* 21 (1978) 235-236.

[306] D. Reiter, "Exploring the Bargaining Model of War," *Perspectives on Politics* 1-1 (2003), 27–30. See also Paul Roe, "The Intrastate Security Dilemma: Ethnic Conflict as a 'Tragedy'?" *Journal of Peace Research* 36-2 (1999), 183–185.

Russia may switch its primary adversary identification from the US to China, and adopt a mismatching strategy against the Chinese threat.[307]

However, if Russia continues to identify the US as its primary adversary and if it does not weaken economically (and therefore again ultimately militarily), then dyadic strategic determinism suggests that it will continue to seek to match the US in Europe. This will be manifested as, first, a full modernization of Russian force units in Europe into their RMA iterations, and, second, if the US develops the Third Offset systems described above, a reciprocal development of matching Third Offset technologies, incorporating automation, miniaturization, cybernetics, and the like.[308]

If the Russian economy weakens by some significant degree in the future it will ultimately adopt a strategy of mismatching or even disruption against the United States. In this scenario, the time frame of which is largely impossible to predict, a mismatching Russia within the European DPOI would for the first time since 1945 become the innovator, developing cheaper cheating technologies and strategies for internally balancing the US on its borders. Its focus will by necessity become one of innovating around US power, as opposed to matching its quality quantitatively. A possible mismatching strategy deployed by Russia in other (non-European DPOIs) is seen in its modern cruise missile program. The 3M22 Zircon is an anti-ship hypersonic cruise missile which was most recently tested in December 2015.[309] It is a form of innovative mismatching largely because it is so fast that it can beat standard naval anti-missile

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[307] Assuming China is more powerful in the DPOI. See R.S. Ross, "China's Naval Nationalism: Sources, Prospects and the US Response," *International Security* 34-2 (2009), 46–81. See also D. Shambaugh, *Modernizing China's Military: Progress, Problems and Prospects* (Berkeley: University of California Press, 2004), 110-112.
[308] S.J. Tangredi, *Anti-access Warfare: Countering A2/AD Strategies* (Annapolis MD: Naval Institute Press, 2013), 56-58.
[309] Anonymous, "3M22 Zircon" *Missile Defense Advocacy Alliance* https://missiledefenseadvocacy.org/missile-threat-and-proliferation/missile-proliferation/russia/3m22-zircon/ (accessed March 2, 2018). See also J. Van Tol, M. Gunzinger, A. Krepinevich and J. Thomas, "AirSea Battle: A Point-of-Departure Operational Concept," 2010, <http://csbaonline.org/publications/2010/05/airsea-battle-concept>. (accessed March 2, 2018).

defenses and is known as a possible carrier killer.[310] At Mach 8 to 9 it can reach speeds up to 6,850 mph (11,000 km/h). For comparison the Royal Navy's Sea Ceptor surface-to-air missile can only intercept targets travelling up to Mach 3. Given that a cruise missile costs around $1 million US, while an aircraft carrier by itself costs around $12 billion, the Zircon missile is a quintessential example of a mismatching technology.[311]

A disrupting Russia, a scenario much less likely than a mismatching Russia, can be expected to develop policies similar to modern North Korea, adopting desperate, non-traditional and extreme methods of balancing. As noted above, much as the weaker state that mismatches will resort to innovative methods of internal balancing, like the US against Russia in Europe today, the weakest states exhibit the most innovative, unique and unorthodox strategies, those that are cheap by virtue of their extreme or unconventional nature.[312] Examples of strategies that a disrupting future Russia might adopt include instances of state-sponsored terrorism, unprovoked brinkmanship and unpredictably-erratic state behaviour, and the development, threat or use of highly unconventional or condemned weapons and tactics including cyber warfare. These forms of hybrid warfare, synonymous with strategic disruption, would constitute a major geopolitical crisis given Russia's continued possession of thousands of nuclear warheads and its ability to escalate hybrid warfare to nuclear total warfare. Russia might hold other states hostage, in the same fashion as a disrupting China has traditionally done with Taiwan.[313]

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[310] Amanda Macias, "Russia again successfully tests ship-based hypersonic missile—which will likely be ready for combat by 2022," *CNBC* https://www.cnbc.com/2018/12/20/russia-tests-hypersonic-missile-that-could-be-ready-for-war-by-2022.html (accessed March 2, 2018).
[311] John A. Vasquez, "Why do neighbors fight? Proximity, interaction, or territoriality?" *Journal of Peace Research* 32 (1995), 277-280.
[312] Keith Pavlischek, "The ethics of counterinsurgency," *Current* June (2009), 2-3.
[313] Anonymous, "US Navy chief: Aircraft carrier may traverse Taiwan Strait," *The Asahi Shimbun* http://www.asahi.com/ajw/articles/AJ201901180029.html (accessed April 11, 2019). See also Scott Sagan, "Realist Perspectives on Ethical Norms and Weapons of Mass Destruction," In Sohail Hashmi and Steven Lee, eds., *Ethics and weapons of Mass Destruction: Religious and Secular Perspectives* (New York, NY: Cambridge University Press, 2004), 73–75.

Due to the sharp gradient in its power-projection capabilities, it is likely that Russia will continue to match the US along its European border, but will attempt to mismatch it in other DPOIs. The Russian economy is expanding slowly, although there is no foreseeable economic crisis or political threat that could seriously impede a creeping increase in military spending.[314] The Russian military will transform more dramatically than its military budget suggests due to its focus on incorporating RMA technologies and discontinuance of obsolete conventional armaments. However, regardless of its general military spending increases and belated military transformation, as China asserts itself as a rival superpower to the United States, Russia's place of power will diminish.[315] There is a more than even chance in the next five to ten years that either Russia or America (and possibly both) will reassign their primary strategic focus to a rising China, regardless of overt diplomatic relations. At this point the US-Russia dyadic chain will be permanently disrupted, and the reiterative cycle of matching and mismatching between Russia and the US will end. This prediction is reflected in stage 6] of the USSR/Russia-US historical dyadic formula below, and assumes that the US will be the first to focus on China as its primary adversary.[316]

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[314] Francis A. Beer, and Robert Hariman, "Realism and rhetoric in international relations" in *The Rhetorical Turn in International Relations* (Michigan State University Press, 1996), 200-202. See also Jack Snyder, *Myths of empire: Domestic politics and international ambition* (Ithaca, NY: Cornell University Press, 1991), 19-20.

[315] This can be phrased technically according to DSD: Russia will continue to weaken, reducing its power within traditional dimensional points of interaction, and reverting to mismatching and/or disruption strategies. Fewer countries will identify Russia as their primary adversary, and so there will be fewer dyadic chains involving Russia. See Jayshree Bajoria, "China's Military Power," *Foreign Affairs.com* https://www.cfr.org/backgrounder/chinas-military-power (accessed April 11, 2019).

[316] Michael S. Chase, Andrew S. Erickson, and Christopher Yeaw, "Chinese theatre and strategic missile force modernization and its implications for the United States," *Journal of Strategic Studies* 32-1 (2009), 29-30.

Complete historical stronger power-weaker power dyad: USSR/Russia-US (1945-near future)

1]	$USSR^0 \leftrightarrow US^0$ (rise of Iron Curtain, New Look policy)	IDENTIFY
2]	$USSR^0$ (conventional superiority) $\rightarrow US^1$ (First offset)	US MISMATCHES USSR
3]	$USSR^2$ (nuclear parity) $\rightarrow US^3$ (Second Offset)	US MISMATCHES USSR

PERIODICITY DISRUPTING EVENT: COLLAPSE OF USSR

1]	$Russia^0 \leftrightarrow US^0$ (continued adversary identification)	IDENTIFY
2]	$RUSSIA^1$ (Soviet power inertia) $\rightarrow US^2$ (RMA inertia)	US MISMATCHES RUSSIA
3]	$RUSSIA^3$ (RMA technologies) $\rightarrow US^4$ (Third Offset)	US MISMATCHES RUSSIA
4]	PDE: US/RUSSIA SEES CHINA AS PRIMARY ADVERSARY	

Both the historical dyadic formula above and tables 12 and 13 below can aid in extrapolating current trends and military power into general future behaviour. The US/USSR dyad was a weaker power-stronger power interaction within the European DPOI and therefore a mismatch-match dyad (for the US-USSR respectively).[317] This relationship is expected to continue into the future in the form of the US-Russia dyad. Table 12 is the predictive template proposed in Chapter 1 (page 4). Table 13 is this template with the matrix cells filled according to the predictive strategies of the US-Russia dyad as a function of relative military power, based on the current predictions. Under no realistic circumstances will the US be a disrupting power to any other state in the future. The DSD model predicts that Russia will continue to be the major power within the continental European DPOI, but will mismatch and disrupt if its military power diminishes substantially relative to the US.[318]

[317] T.J. Christensen and J. Snyder, "Chain Gangs and Passed Bucks: Predicting Alliance Patterns in Multipolarity," *International Organization* 4-2 (Spring 1990), (Published by the World Peace Foundation and MIT), 22-23.
[318] Michael P. Clements and David F. Hendry, *Forecasting Economic Time Series* (Cambridge: Cambridge University Press, 1998), 15-17. See also James Der Derian, "The desert of the real and the simulacrum of war," *International Affairs* 84-5 (2008), 26-28.

RELATIVE POWER	MINOR	MEDIUM	MAJOR
MINOR →	MATCH	MISMATCH	DISRUPT
MEDIUM →	MATCH	MATCH	MISMATCH
MAJOR →	MATCH	MATCH	MATCH

Table 12. Predictive template. US-Russia strategies are a function of relative power.

RELATIVE POWER	US MINOR	US MEDIUM	US MAJOR
RUSSIA MINOR →	NA	MISMATCH	DISRUPT
RUSSIA MEDIUM →	NA	MATCH	MISMATCH
RUSSIA MAJOR →	NA	NA	MATCH

Table 13. Using DSD to predict general US-Russia strategic interactions in the future.[319]

Template 1: stronger power-weaker power dyad

1] $S^0 \leftrightarrow W^0$ (identify)
2] $S^0 \leftarrow W^1$ (mismatch)
3] $\rightarrow S^1$ (match) $\rightarrow W^2$ (mismatch)

As noted, identifying the primary adversary of Russia is simple: it is the United States, which, due to its leadership and vast overrepresentation within its military structure, is synonymous with NATO for all intents and purposes.[320] Given its status as protector of Europe, and its full integration into and control of NATO, the US essentially shares a vicarious border with Western Russia. In the far future it seems probable that a super-power China, which shares a true, physical border with Russia, will replace the US as Russia's primary adversary, or even a

[319] James D. Fearon, "Rationalist Explanations for War," *International Organization* 49-3 (1995), 319-414.
[320] So it is incorrect to state that NATO is, or ever has been, the primary adversary of Russia. In terms of pure power, the US is NATO. See Christopher Woolf, "America has been at NATO's helm for 70 years. Can it survive without US leadership," *Public Radio International* https://www.pri.org/stories/2019-04-03/america-has-been-nato-s-helm-70-years-can-it-survive-without-us-leadership (accessed March 20, 2018).

unified and militarized European Union (also a very unlikely future event).[321] In summation, accurately predicting Russia's relative military power is difficult but not impossible, and, as the dependent variable dictating Russia's strategic behaviour of matching, mismatching and disrupting, must be linked to its economy. Generally speaking, if identifying the US as its primary adversary and if determining the DPOI as Europe, Russia will match if powerful enough, mismatch if significantly weakened, or disrupt if faced with some long-term economic or otherwise severely weakening event.[322]

Abstracted stronger power-weaker power dyad

1] $S^{n} \leftrightarrow W^{n}$
2] $S^{n+0} \leftarrow W^{n+1}$
3] $\rightarrow S^{n+1} \rightarrow W^{n+2} \rightarrow \infty$

As noted, in a stronger power – weaker power dyad, the stronger matching power will tend to balance against the weaker power's mismatches by adopting the adversary's technology while maintaining the other elements of their own arsenal. The likely global US response against a Russian hypersonic missile program will be to seek to neutralize it via a quantitative arms race (e.g. a competing hypersonic missile program) but with increased numbers. This is evidenced in non-European DPOIs by the US developing its own hypersonic cruise missile program while still maintaining and increasing its aircraft battle group fleets.[323]

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[321] M. Yahuda, "China's New Assertiveness in the South China Sea," *Journal of Contemporary China* 22-81 (2013), 446–59.
[322] Frank Whelon Wayman, "Power shifts and the onset of war," In *Parity and war: Evaluations and extensions of The War Ledger*, edited by Jacek Kugler and Douglas Lemke (Ann Arbor: University of Michigan Press, 1996), 145-147.
[323] Eric Heginbotham et al., "The US-China Military Scorecard: Forces, geography, and the evolving balance of power, 1996-2017," RAND Corporation https://www.rand.org/pubs/research_reports/RR392.html (accessed April 11, 2019), 3-5.

Assuming that Russia remains a matching power within the European DPOI, and that both the US and Russia continue to identify one another as primary adversaries, the DSD model predicts that the dyadic chain will endure. This means that Russia will match against the US Third Offset, and that the US will be forced to mismatch against Russia's matching Third Offset systems. It is interesting to speculate what a future Fourth US Offset might resemble.

Again assuming current Third Offset technologies are developed, and extrapolating from the historical examples of mismatches provided above, a Fourth Offset will include cheap and innovative mechanisms for neutralizing Third Offset technologies, as opposed to simply increasing technological advancements. Given the ubiquity of the computer chip and computer applications within modern military technology, the weaponization of electronic interference and internet-disruption may take priority.[324] Cheap and innovative might mean the development and upscaling of electromagnetic pulse (EMP) technologies, and, in particular, methods of protecting against EMP strikes while utilizing them as weapons.[325] These would serve to incapacitate both Second and Third Offset-style technologies. Cheap and innovative may also mean the militarization of real-time evolving computer viruses that can be targeted against military equipment at the tactical (battle field), operational and strategic levels.[326]

In conclusion, despite appearances to the contrary, within the European DPOI, Russia continues to be the stronger power and is belatedly matching US Second Offset military

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[324] Michael Miklaucic, "America's allies: The fourth strategic offset," *The Hill* https://thehill.com/opinion/national-security/412656-americas-allies-the-fourth-strategic-offset (accessed June 5, 2018). See also Dale C. Copeland, "Rationalist theories of international politics and the problem of the future." *Security Studies* 20-3 (2011), 3-4.
[325] Scott deMarchi, Christopher Gelpi, and Jeffrey D. Grynaviski, "Untangling Neural Nets," *American Political Science Review* 98 (June 2004), 371-73. See also DoD, "Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2015," <http://www.defense.gov/pubs/2013_China_Report_FINAL.pdf>. (accessed June 12, 2018).
[326] Thomas R. Cusack, and Richard J. Stoll, *Exploring realpolitik: Probing international relations theory with computer simulation* (Boulder, CO: Lynne Reinner, 1990), 29-31. See also Robert H. Durr, "An Essay on Cointegration and Error Correction Models," *Political Analysis* 4 (1992), 185-188.

power.[327] A pressure therefore continues to force the US to mismatch as the weaker power. [328] The Third Offset, just like the First and Second Offsets, is a strategy of mismatching against a primary existential threat, albeit with secondary spillover effects into the entire US military organizational structure and philosophy.[329] If Russia continues to identify the US as its primary adversary and if it does not weaken economically (and therefore ultimately militarily), then it will continue to match the US in Europe. If the Russian economy weakens the country will at some point adopt a strategy of mismatching and possibly disruption against the United States. However with the ascension of China, Russia may switch its primary adversary and match, mismatch or disrupt this new super-power, thereby breaking the Russia-US dyadic chain, which in its various iterations has existed continuously since 1945.[330]

[327] E. Wertheim, *The Naval Institute Guide to Combat Fleets of the World* (Annapolis MD: Naval Institute Press 2013), 174-175. See also Posen, Barry, "Command of the Commons: The Military Foundations of U.S. Hegemony," *International Security* 28-1 (2003), 8-9.
[328] Suzanne Werer and Jacek Kugler, "Power transitions and military buildups: Resolving the relation-ship between arms buildups and war," In *Parity and war: Evaluations and extensions of The War Ledger*, edited by Jacek Kugler and Douglas Lemke, (Ann Arbor: University of Michigan, 1996), 187-189. See also Susan G. Sample, *Military buildups as a Correlate of War*, Paper prepared for the Norman Thomas Lecture Series (Conference on the Scientific Study of War), Vanderbilt University, Nashville, TN, March, 1998.
[329] Kenneth Hagan, *This people's navy: The making of American sea power* (New York: Free Press, 1991), 4-5. See also Russel F. Weighley, *The American way of war: A history of United States military strategy and policy* (Indianapolis: Indiana University Press, 1973), 111-113.
[330] Newsweek Archives, "How the Chinese military became a threat to the US and Russia after years of weakness," Newsweek https://www.newsweek.com/look-chinas-army-643034 (accessed April 10, 2019).

CHAPTER 5

CHINESE FUTURE GRAND STRATEGY

The case study and focus of this paper has been the US-USSR/Russia dyad. However the dyadic strategic determinist model establishes that it is possible to make general predictions about the military strategy of any other state if just three variables are known. First, which possible rival will the state in question identify as its primary adversary, second, how great is its military power relative to the adversary, and third, in what dimensional point(s) of interaction will the two states be interacting.[331] Perhaps the most urgent dyadic interaction that needs studying is that of one superpower, the US, and an emerging other, China. The evolving Sino-US dyad is often compared with the US-USSR dyad of the Cold War. Dyadic strategic determinism can be used to predict broad trends in strategic preparation and perhaps allow a more objective and empirical approach to questions about the future of the relationship and military trends between the United States and China. Sentential and dyadic formulas should be considered first.

RELATIVE POWER	US MINOR	US MEDIUM	US MAJOR
CHINA MINOR →	NA	NA	DISRUPT
CHINA MEDIUM →	NA	NA	MISMATCH
CHINA MAJOR →	NA	MATCH	MATCH

Table 14. Using DSD to predict general Sino-US strategic interactions in the future.

[331] As established in chapter 1 above. General rules of theorizing within the social sciences and politics specifically are derived from Kenneth N. Waltz, *Theory of International Relations* (Long Grove Illinois: Waveland Press, 1979), 4-10. See also Dale Copeland, *The Origins of Major War* (Ithaca New York: Cornell University Press, 2000), 12-13. Foundational notions of neorealism are adumbrated in Waltz: *Man, the State, and War: A Theoretical Analysis* (New York: Columbia University Press, 1954), 159-164. For general discussions of theorizing within the social sciences, see Robert Powell, "Anarchy in International Relations Theory: The Neorealist-Neoliberal Debate," *International Organization.* 48-2 (1994), 342–344; Heikki Patomäki, "The rhetorical strategies and the misleading nature of attacks on 'postmodernism': a reply to Østerud," *Journal of Peace Research* 34-3 (1997), 7-8; Michael P. Murray, "Avoiding Invalid Instruments and Coping with Weak Instruments," *Journal of Economic Perspectives* 20 (Fall 2006), 17-19; and Jeffrey B. Lewis and Keith T. Poole, "Measuring Bias and Uncertainty in Ideal Point Estimates via the Parametric Bootstrap," *Political Analysis* 12 (Spring 2004), 122-123.

Template 1: Stronger power – weaker power dyad [matcher-mismatcher]

1] $S^n \leftrightarrow W^n$
2] $S^{n+0} \leftarrow W^{n+1}$
3] $\rightarrow S^{n+1} \rightarrow W^{n+2} \rightarrow \infty$

Template 3: Equal power dyad [matcher-matcher]

1] $E1^n \leftrightarrow E2^n$
2] $E1^{n+0} \leftarrow 2E^{n+1}$
3] $\rightarrow E1^{n+1} \rightarrow E2^{n+2} \rightarrow \infty$

Economic power is linked to military power.[332] China has in under 70 years developed from an economic backwater into the second largest economy in the world. Its military is bound to catch up.[333] The US and USSR identified each other as primary adversaries during the Cold War, and therefore both actively mismatched and matched one another respectively. For much of modern history China has been a weak state, especially in contrast to the US and USSR. It follows from this that Chinese grand strategy remained generally the same regardless of whether the People's Republic of China (PRC) identified its primary adversary as the US or the USSR (as in either case it was a weak power seeking to balance against a vastly stronger power).[334] The recent history of Chinese strategy, from the advent of the PRC in 1949 until the today, can be construed from its evolution as disrupter to mismatcher to matcher, as a function of its increasing

[332] This has been established and evidenced by countless sources. A seminal monograph linking economic and military power is found in Paul Kennedy, *The Rise and Fall of the Great Powers: Economic Change and Military Conflict from 1500 to 2000* (New York, Random House, 1987), 358-360.
[333] It is the US or China, depending on the specific metrics being measured. See Trading Economics, "Military Expenditure by Country," Trading Economics.com https://tradingeconomics.com/country-list/military-expenditure (accessed April 11, 2019).
[334] Because both the US/USSR were matching each other, they maintained approximately equal net military power, and therefore China was mismatching approximately the same net military power, regardless of whether the US or the USSR was China's primary adversary. See R. Haddick, "China's offensive missile forces: implications for the United States," 1 April 2015, <http://www.uscc.gov/sites/default/files/Haddick%20USCC%20Testimony%201%20April%202015.pdf>. (accessed June 20, 2018). No reciprocal dyadic chains were formed, however, either within the US/China dyad or the USSR/China dyad, due to neither country identifying China as its primary adversary.

military power. China has progressed from a strategy of disruption as a regional pariah, to one of mismatching and military subspecialisation, into a nascent strategy of matching implied by its modernizing armed forces and its expanding Anti-Access/Area Denial (A2/AD) capabilities.[335]

The early history of the PRC is a history of strategic disruption. Identifying a state's primary adversaries is difficult in general, but especially for China, given its tradition of political opacity, both in its historical and modern diplomacy. The PRC has had several candidate primary adversaries, based largely on territorial proximity and ideological disputes with India, Japan, Russia and the US as the most important modern rivals.[336] China considered the US its primary adversary immediately during the formation of the PRC in 1949 and during the Korean War.[337] While closely aligned after the immediate formation of the PRC, China identified the Soviet Union as its primary adversary during the Sino-Soviet political split of 1956-1966, which was caused by differing interpretations of Marxist-Leninist-Stalinist doctrine. The PRC maintained this stance afterward due to territorial disputes around Xinjian, and because of Mao's disdain for Nikita Khrushchev.[338] These diplomatic tensions led to an outright invasion and annexation of land by the USSR in 1969, and allowed enterprising US diplomats a window for rapprochement with China. This culminated in Nixon's visit in 1972 and full normalization of Sino-US

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[335] Anti-Access/Area-Denial, explained below. For recent Chinese developments/challenges, see Ngo Minh Tri, "China's A2/AD challenge in the South China Sea: Securing the air from the ground," *The Diplomat* https://thediplomat.com/2017/05/chinas-a2ad-challenge-in-the-south-china-sea-securing-the-air-from-the-ground/ (accessed April 11, 2018).

[336] David Hunt, "Dirty wars: Counterinsurgency in Vietnam and today," *Politics and Society* 38-1 (2010), 27-28. See also "Information Office of the State Council, 'The One-China Principle and the Taiwan Issue'", 21 February 2000, <http://www.china.org.cn/english/taiwan/7956.htm>. (accessed April 14, 2018); E. Joffe, "People's War under modern conditions: a doctrine for modern war," *China Quarterly* 112 (1987), 15-16; and Thomas Mahnken, "China's Anti-access Strategy in Historical and Theoretical Perspective," *Journal of Strategic Studies* 34-3 (2011), 299–301.

[337] F. Tang, Q. Wang and Y. Wang, "Zhongguo Gongchangdang Lingdao Renmin Haijun Jianshe Fazhan Qiben Jingyan" [Basic experience in building the people's navy led by the Communist Party of China], *Zhongguo Junshi Kexue* 2011-3 (2011), 27–37.

[338] Robert Jervis, "Was the Cold War a Security Dilemma?" *Journal of Cold War Studies* 3-1 (2001), 36-60. See also Kissinger, *Diplomacy*, 4-5.

diplomatic relations in 1979.[339] Under the doctrine of Triangular Diplomacy between 1970 and 1989, China maintained a de-facto alliance with US in order to balance the USSR.[340] After the fall of the Soviet Union and its dissolution as an existential threat to the PRC, the US again became China's primary rival.[341]

Thus prior to 1989, China identified the USSR as its primary adversary. Although the USSR and the PRC shared an ideology and purported global goals, universal aspects of adversary-identification continued to exist. These included the fact that the USSR and PRC share a long border. The Soviet Union represented a massive military force immediately adjacent to Chinese territory and even invaded and annexed land in 1969. Both the USSR and PRC proclaimed leadership of the world communist movement.[342] The Chinese strategy of disruption against the USSR during these periods was at times similar to that used by North Korea against the United States today, with brinkmanship and sabre-rattling, and, after 1964, when the PRC tested its first nuclear bomb, thinly veiled threats of nuclear war.[343]

Although the country was weak in terms of military hardware and technology, a disrupting China threatened to punish its adversary with irrational and extreme uses of what little modern military force it possessed.[344] The Soviet invasion of 1969 was prompted in part by fears that China would itself invade the USSR with waves of essentially unarmed soldiers (human wave attacks) and use guerrilla warfare once in Soviet territory: both forms of asymmetrical

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[339] Ibid.
[340] Ibid.
[341] According to DSD, all other factors being equal, proximity determines primary adversaries. See Eric Kaufmann, Review of Robert D. Kaplan, "The revenge of geography: what the map tells us about coming conflicts and the battle against fate," *Population and Development Review* 39-2 (2013), 12-14.
[342] H. Kundnani, "Asia's security dilemma," *European Council on Foreign Relations*, https://www.ecfr.eu/article/commentary_asias_security_dilemma292 (accessed March 12, 2019).
[343] Mao famously declared Khrushchev and Soviet Marxism of the time "revisionist", a significant insult diplomatically-speaking. See Kissinger, *Diplomacy*, 290-292.
[344] Yves-Heng Lim, "Expanding the dragon's reach: the rise of China's anti-access naval doctrine and forces," *Journal of Strategic Studies* May (2016), 9-10.

warfare familiar to disrupters.[345] Another method within China's strategy of disruption against the US was (and is) to threaten Taiwan as a proxy that America has promised to protect. Although the PRC has a historical claim to Taiwan, China has leveraged its proximity to the de facto American ally to increase its power. [346] By essentially holding Taiwan hostage, China has been able to very cheaply balance against the US. That is, by utilizing a policy that has existed essentially as long as the PRC itself has, by threatening Taiwan, including pointing initially even unsophisticated missiles at the island, China possesses a much more effective balancing power against the US than it otherwise would.[347]

As a massive, ostensibly nuclear-armed country with a developing economy and a revolutionary ideology under Mao, the PRC played the role of the pugnacious rogue state, even threatening nuclear war and total annihilation if provoked.[348] Mao's "people's war" was a distinctly communist Chinese form of disruption, and the belligerency of Chinese diplomacy, like that of North Korea today, was a stand-in for actual military power.[349] When US Defense Secretary Harold Brown visited China in 1980, he was one of very few Americans to inspect the

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[345] Derek Lutterbeck, "Arab uprisings, armed forces, and civil-military relations," *Armed Forces and Society* 39-1 (2013), 21. See also H. Peng, 'Qiantan Xinxihua Jiaotianxia de Yilieshengyou' [On the weak defeating the strong under information conditions], Zhongguo Junshi Kexue 1 (2008), 25-27.

[346] Taiwan exists today only because the US has protected it. In 1950 the US navy prevented a Chinese invasion of Taiwan. See D. Roy, "China is playing offense, not defense, in the South China Sea," *The Diplomat*, 4 June 2015, <http://thediplomat.com/2015/06/china-is-playing-offense-notdefense-in-the-south-china-sea/> (accessed Jan 4, 2019).

[347] For a good summation of the history of the conflict, see Eleanor Albert, "China-Taiwan Relations," *Foreign Affairs.com* https://www.cfr.org/backgrounder/china-taiwan-relations (accessed April 10, 2019). The question of whether the US was/is concerned more with protecting the independence of Taiwan because of its sovereign people or because it is essentially a massive naval and missile base that would extend China's reach by 1300 miles is not relevant here. See M. Pilger, "China's New YJ-18 Antiship Cruise Missile: Capabilities and Implications for U.S. Forces in the Western Pacific," *US–China Economic and Security Review Commission Staff Research Report*, 28 October 2015, <http://origin.www.uscc.gov/sites/default/files/Research/China%E2%80%99s%20New%20YJ-18%20Antiship%20Cruise%20Missile.pdf> (accessed January 13, 2019). See also Huang Tzu-ti, "China has 2,000 ballistic missiles threatening Taiwan and US: US military report," *Taiwan News.com* https://www.taiwannews.com.tw/en/news/3508977 (accessed April 10, 2019).

[348] Ronald Spector, *Eagle against the sun: The American war with Japan* (New York: Macmillan, 1985), 155-157. See also Bruce M. Russett, *The prisoners of insecurity* (San Francisco: Freeman, 1983,) 22-23.

[349] See Kissinger, *Diplomacy*, 293-294.

People's Liberation Army (PLA). He saw "an army uncomfortably poised between the tenets of the 'people's war,' which brought the communists to power, and the demands of great-power preparedness in 1980".[350] As its economic development increased, China was able to develop its own military industry, no longer restricted to obsolete Soviet and captured Taiwanese technology. A policy of mismatching its adversaries appeared, namely against the US after the fall of the USSR, and particularly within the strategically vital near-seas DPOI.[351]

Chinese mismatching against the US, from the fall of the USSR in December 1991 until today, has consisted of developing military programs that threaten Taiwan as a proxy. Recently, however, China has developed military technology that could overwhelm US antiballistic missile defenses, attack fighters and aircraft carriers; the primary means by which the US projects power in the China seas.[352] This strategy is a form of mismatching because it relatively cheaply and innovatively exploits weaknesses in US power-projection, namely by cutting off supply-line restricted naval and air units within the China Seas DPOI.[353]

Military strategies evolve from one to another in the sense that resources must be diverted from old strategies and clusters of expertise to new ones against bureaucratic and doctrinal inertia. Modern forms of mismatching have emerged from the PRC's older strategies of

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[350] Anonymous, "How the Chinese military became a threat to the US and Russia after years of weakness," *Newsweek* https://www.newsweek.com/look-chinas-army-643034 (accessed April 10, 2019).
[351] Reuters, "US Navy chief: Aircraft carrier may traverse Taiwan Strait," *The Asahi Shimbun* http://www.asahi.com/ajw/articles/AJ201901180029.html (accessed April 11, 2019).
[352] Ngo Minh Tri, "China's A2/AD challenge in the South China Sea: Securing the air from the ground." *The Diplomat* https://thediplomat.com/2017/05/chinas-a2ad-challenge-in-the-south-china-sea-securing-the-air-from-the-ground/ (accessed April 11, 2019). See also W.S. Murray, "An Overview of the PLAN Submarine Force", in A.S. Erickson, L.J. Goldstein, W.S. Murray and A.R. Wilson (eds), *China's Future Nuclear Submarine Force* (Annapolis MD: Naval Institute Press 2007), 27-28; and ONI, "The PLA Navy: New Capabilities and Missions for the 21st Century," April 2015, <http://www.oni.navy.mil/Intelligence_Community/china_media/2015_PLA_ NAVY_PUB_Interactive.pdf>. (accessed May 2, 2019).
[353] Michael Peck, "What makes China's 'mini-Aegis-class destroyer' special? No sailors," *The National Interest* https://nationalinterest.org/blog/buzz/what-makes-chinas-mini-aegis-class-destroyer-special-no-sailors-45992 (accessed April 10, 2019).

disruption; holding Taiwan as a geostrategic hostage. The relatively cheap, unsophisticated forces and threats of a disrupting China have been upgraded and increased into a modern fighting force of nuclear-powered ballistic missile submarines (SSBNs), short-range ballistic missiles (SRBMs), cruise missiles and an advanced anti-satellite program.[354] While China still threatens Taiwan with diplomatic bluster that was originally an element of a crude strategy of disruption, this has evolved into a pillar of modern military mismatching against US hegemony within Chinese territorial waters and near seas.[355]

China's development as a mismatcher against the US can be evidenced in military developments within the last 20 years, both quantitative and qualitative. This is true both within the Taiwan Strait and near-seas DPOI in particular, and of the PLA in general.

SYSTEM	WARHEADS	LAUNCHERS	RANGE (KM)
ICBM	75-100	50-75	5,400-13,000+
MRBM	200-300	100-125	1500+
SRBM	1,000-1,200	250-300	300-1,000
GLCM	200-300	40-55	1,500+
LACM	200-300	40-55	1,500+

Table 15. China's Missile Forces (2017). Reproduced from US Office of the Secretary of Defence.[356]

Because China is attempting to mismatch within its own marine territory, its emphasis has been on first preventing the US from unrestricted force movement within the DPOI itself ("Area-

[354] *People's Daily*, "Wo 093G Heqianting Weixie Daxing Zhanjian Ke Jiazhuang dui liu/lu Xunhangdaodan" [Our 093G can threaten large warship and carry LACM/ASCM], 30 March 2015, <http://military.people.com.cn/n/2015/0330/c1011-26770075.html>. (accessed January 14, 2019). See also Qiu Yue, "China's 093G SSN threaten large warships and could carry LACM," *China Daily*, 30 March 2015, <http://www.chinadaily.com.cn/micro-reading/mil/2015-03-30/content_13460358.html>. (accessed January 14, 2019).

[355] F. Tang and Y. Wu, 'Zhongguo Haifang Zhamlue Tanyao' [A study of China's coastal defence strategy], Zhongguo Junshi Kexue 5 (2007), 86–97.

[356] US–China Economic and Security Commission, "China's Military and Security Activities Abroad," 4 March 2009, <http://origin.www.uscc.gov/sites/default/files/transcripts/3.4.09HearingTranscript.pdf>. (accessed January 20, 2019).

Denial" or AD), and second, in lock-step with improving Chinese military technology, in preventing the US access into the DPOI in the first place ("Anti-Access" or A2).[357] A2/AD is considered a general military goal, although Area-Denial is significantly easier to achieve than Anti-Access, and requires less advanced technology and smaller unit numbers than Anti-Access.[358] Indirect evidence of a matcher is the achievement of A2/AD within a particular DPOI. Evidence of a mismatcher may be the ability to enforce Area Denial, but the inability to enforce Anti-Access.[359]

In its goal of achieving A2/AD within the China Seas DPOI, the PLA and the People's Liberation Army Navy (PLAN) has developed its own missile technology and is one of only three countries capable of destroying a satellite via direct-ascent anti-satellite weapons (ASAT), which it tested successfully in 2007 and which threatens US military and intelligence satellites used for tracking and targeting enemy units, among other functions. [360] The country has stockpiled approximately 2,000 ballistic missiles, and is developing advanced cruise missile technology.[361] China has both increased its number of missiles in total and in terms of relative military budget allocation, and has increased missile range and targeting accuracy (circular error probability).[362]

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[357] K. Pollpetter, "The Chinese Vision of Space Military Operations," in James C. Mulvenon and David M. Finkelstein (eds), *China's Revolution in Doctrinal Affairs* (Alexandria, VA: CNA, 2005), 193-194. See also Li, N., "The Evolution of China's Naval Strategy and Capabilities: From 'Near Coast' and 'Near Seas' to 'Far Seas'," in Philip C. Saunders, Christopher D. Yung, Michael Swaine, and Andrew N. Yang (eds), *The Chinese Navy: Expanding Capabilities,Evolving Roles* (Washington: National Defense University Press, 2011), 109–111.
[358] Ibid.
[359] Y. Liu, "Zhihaiquan Lilun jin Fazhan Qushi" [Theory of the command of the sea and its trends of development], Zhongguo Junshi Kexue 1 (2005), 42–46.
[360] The technological hurdle overcome involved direct ascent targeting. See CRS Report For Congress, 1.
[361] Huang Tzu-ti, "China has 2,000 ballistic missiles threatening Taiwan and US: US military report," *Taiwan News.com* https://www.taiwannews.com.tw/en/news/3508977 (accessed April 10, 2019).
[362] James Kynge and Stephen Fidler, "China to test missile launched by submarine". *Financial Times* 3 June 1999, 1. See also J. Huang, "Lun Xiandai Zhihaiquan" [On modern mastery of the seas], Zhongguo Junshi Kexue 2 (2003), 24–29.

As indicated on Table 16 below, China has emphasized the development and stockpiling of SRBMs (1,000 km range) and MRBMs (1,000-3,000 km), and has reduced production of longer-range IRBMS (3,000-5000 km), further suggesting a mismatching near-seas DPOI strategy. The fact that Taiwan is 130 km from China at the narrowest point of the Strait of Taiwan indicates that the development of SRMBs at least is not intended to threaten Taiwan from mainland China, so much as play a role in A2/AD against the US and Taiwanese military units and suggests a more aggressive power-projection intent.[363]

MISSILE TYPE	RANGE (KM)	WARHEAD (KG)	CEP (m)	1996 INVENTORY	2003 INV	2010 INV	2017 INV
SRMBs							
DF-11	280-350	500-800	500-600	SMALL NUMBER	175	700-750	1,200
DF-11A	350	500	20-30	SMALL NUMBER	175	700-750	1,200
DF-15	600	500	300	SMALL NUMBER	160	350-400	1,200
DF-15A	600	600	30	SMALL NUMBER	160	350-400	1,200
DF-15B	600-800	600	5	SMALL NUMBER	160	350-400	1,200
MRBMs							
DF-21C	2,500	500	50	0	0	36-72	108-274
DF-16	800-1,000	?	5-10	0	0	0	108-274
IRBMs							
IRBM	5,000	500	30-300	0	0	0	?
CRUISE MISSILE							
DH-10	1,500-2,000	400	5-20	0	0	200-500	450-1,250
ALCM	3,300	400	5-20	0	0	200-500	450-1,250

Table 16. Chinese conventionally armed theatre ballistic and cruise missiles (1996-2010).[364]

[363] Information Office of the State Council, "China's National Defense in 2006," December 2006, <http://www.china.org.cn/english/features/book/194421.htm>. Contrast this with: ONI, "The People's Liberation Army Navy: A Modern Navy with Chinese Characteristics," August 2009, <http://fas.org/irp/agency/oni/pla-navy.pdf>. (accessed January 10, 2019). See also T.J. Christensen, *The China Challenge: Shaping the Choices of a Rising Powe*r (New York: W.W. Norton, 2015), 305-307.

[364] Eric Heginbotham et al., "The US-China Military Scorecard: Forces, geography, and the evolving balance of power, 1996-2017," RAND Corporation https://www.rand.org/pubs/research_reports/RR392.html (accessed April 11, 2019). See also S. Chandrashekar, and S. Perumal, "China's Constellation of Yaogan Satellites & the Anti-ship Ballistic Missile: An Update," January 2015, <http://isssp.in/wp-content /uploads/2015/01/Yaogan-and-ASBM-January-2015-Report.pdf>. (accessed January 4, 2019).

The Dongfeng (DF) missile class is Chinese-developed and built, albeit starting from Soviet models and assistance from the 1950s. The DF-15B SRBM listed in Table 16 is an example of the PLA's advancing domestic military technology and is a key element of China mismatching US power in the China Seas. With a CEP of just 5 meters, it is possible for the DF-15B to successfully target US naval units.[365] The modern DF-16 has a similar CEP of 5-10 meters but a longer range and is specifically designed to counter US Terminal High Altitude Area Defense (THAAD) navy systems.[366]

At the same time as technical advances in Chinese A2/AD, the PLA has reduced its land-based forces by half, to approximately 2 million troops, including a 30% reduction in officer ranks.[367] Funds have been redirected specifically into the navy and air force, and into technologies designed to inhibit US power-projection within the China Seas and Taiwan Strait such as the modern DF-15 and DF-16 SRBMs.[368] Importantly, until recently Chinese military spending has focused on the missiles and AD systems described above. Large-scale conventional naval units have been underfunded in comparison, and it was only in 2012 that China acquired its first aircraft carrier.[369]

To the extent that contemporary China has invested in large-scale military forces, they have tended to be innovative: smaller, cheaper and of similar efficacy to US equivalents. In

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[365] Army Recognition, "DF-15B short range ballistic missile technical data sheet specifications pictures video 12002163," https://www.armyrecognition.com/china_chinese_army_missile_systems_vehicles/df-15b_short-range_ballistic_missile_technical_data_sheet_specifications_pictures_video_12002163.html (accessed April 11, 2019).
[366] Ibid.
[367] Although this is still the largest army in the world. Anonymous, "China reduces army by half; increases size of navy, air force in big way," *The India Times*, https://economictimes.indiatimes.com/news/defence/china-cuts-down-troops-in-army-by-more-than-50/articleshow/67640085.cms (accessed April 10, 2019).
[368] Ibid. See also R. Cliff, "Anti-access Measures in Chinese Defense Strategy, Testimony Presented before the U.S. China Economic and Security Review Commission," 27 January 2011, http://www.rand.org/content/dam/rand/pubs/testimonies/2011/RAND_CT354.pdf (accessed May 3, 2019).
[369] K. Psallidas, C.A. Whitcomb and J.C. Hootman, "Design of Conventional Submarines with Advanced Air Independent Propulsion Systems and Determination of Corresponding Theater-Level Impacts," *Naval Engineers Journal* 122-1 (2010), 111–113.

February 2019, for example, China announced it has developed an unmanned mini-Aegis-class destroyer as a counterpart to the US Navy's Arleigh Burke-class destroyers: the JARI.[370] The JARI's displacement of 20 tons contrasts with the US Aegis warships' 10,000 tons, and if able to actually counter the US destroyers, would be a perfect example of innovative, exploitative and cheap mismatching.

This resource-rebalancing is indicative of China's long-term goal of switching its military focus away from Eurasia (as mismatching the USSR necessitated), and toward modern systems which counter US naval and air power.[371] The timeline of these changes support this view. China began transforming its military away from a large land-based armed forces and toward a smaller, mobile force focused on air and sea in the late 1980s, as the threat of a Soviet invasion diminished, until it was rendered moot in December 1991 with the fall of the USSR.[372] During this time China went from a mismatcher/matcher of a waning Soviet Union, to a disrupter/mismatcher of the US, to a full-fledged mismatcher of the US. The majority of Chinese military capability today is based along the coast within the Taiwan Strait and China Seas DPOI.[373] This is where any conflict with the US will likely occur.[374]

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[370] Michael Peck, "What makes China's 'mini-Aegis-class destroyer' special? No sailors," *The National Interest* https://nationalinterest.org/blog/buzz/what-makes-chinas-mini-aegis-class-destroyer-special-no-sailors-45992 (accessed April 10, 2019).

[371] *The India Times*, "China reduces army by half; increases size of navy, air force in big way." https://economictimes.indiatimes.com/news/defence/china-cuts-down-troops-in-army-by-more-than-50/articleshow/67640085.cms (accessed April 10, 2019).

[372] Ibid. See also M.T. Fravel and C.P. Twomey, "Projecting Strategy: The Myth of Chinese Counter-Intervention," *Washington Quarterly* 37-4 (2015), 171–173, and Fravel, M.T., "The Evolution of China's Military Strategy: Comparing the 1987 and 1999 Editions of Zhanlüexue," in James C. Mulvenon and David M. Finkelstein (eds), *China's Revolution in Doctrinal Affairs* (Alexandria, VA: CNA, 2005), 79–81.

[373] S. Zhang, "Heping Fazhan de Zhongguo Huhuan Haiquan" [Peacefully developing China appeals for sea power], Zhongguo Junshi Kexue 3, (2010), 13-14.

[374] Especially as a mismatcher with an undeveloped blue-water navy and few global military weapons, China will attempt to dominate the Taiwan Strait and near-seas DPOI before aspiring to military objectives further afield. https://www.armyrecognition.com/china_chinese_army_missile_systems_vehicles/df-15b_short-range_ballistic_missile_technical_data_sheet_specifications_pictures_video_12002163.html (accessed April 11, 2019).

	CHINA TOTAL	WITHIN TAIWAN RANGE	TAIWAN TOTAL
FIGHTERS	1,700	130	384
BOMBERS/ATTACK	400	200	0
TRANSPORT	475	150	19
SPECIAL MISSION	115	75	25

Table 17. Taiwan Strait Military Balance, Air Forces. US Office of the Secretary of Defence (2017).[375]

NAVAL FORCES	CHINA TOTAL	EAST + SOUTH THEATRE	TAIWAN TOTAL
AIRCRAFT CARRIERS	1	0	0
DESTROYERS	31	24	4
FRIGATES	56	42	22
CORVETTES	23	14	1
LANDING SHIPS/TRANSPORTS	34	32	12
MEDIUM LANDING SHIPS	21	15	4
DIESEL ATTACK SUBMARINES	54	34	4
NUCLEAR ATTACK SUBMARINES	5	2	0
BALLISTIC MISSILE SUBMARINES	4	4	0
COASTAL PATROL (MISSILE)	88	70	45
COAST GUARD SHIPS	185	N/A	25

Table 18. Taiwan Strait Military Balance, Naval Forces. US Office of the Secretary of Defence (2017).[376]

Ultimately, as the country's economy continues to grow, reaching and then exceeding that of the US in purchasing power parity, China's military spending is be expected to similarly increase.[377] Whereas China currently maintains mismatching strategy against the US, with no dyadic chain due to the fact that Russia currently takes the place of primary adversary of the US,

[375] See Robert S. Ross, "The 1995-1996 Taiwan Strait confrontation: Coercion, credibility, and the use of force," *International Security* 25-2 (2000). See also Anonymous, "Could China seize and occupy Taiwan militarily?" *China Power*: *Unpacking the complexity of China's rise* https://chinapower.csis.org/can-china-invade-taiwan/ (accessed April 11, 2019).
[376] Eleanor Albert, "China-Taiwan Relations," *Foreign Affairs.com* https://www.cfr.org/backgrounder/china-taiwan-relations (accessed April 10, 2019).
[377] Jayshree Bajoria, "China's Military Power," *Foreign Affairs.com* https://www.cfr.org/backgrounder/chinas-military-power (accessed April 11, 2019).

this will almost certainly change as China rises to global military superpower status.[378] As noted, today China still possesses the world's largest armed forces, although its numbers of uniformed soldiers is being reduced dramatically. China maintains the second largest military budget: $168.3 billion (in US dollars) at 1.9% of GDP, compared to the US at $643.3 billion at 3.1% of GDP.[379] China is also the third largest military importer globally.[380] Based on these trends alone China will soon become a matcher against a matching US, first in the China Seas DPOI (particularly around the Taiwan Strait and the Yellow and East China Sea), and ultimately on a global scale across multiple DPOIs.[381]

If it has been established that for now China maintains a mismatching strategy against the US. The country's increasing economic and military power suggests that it will soon adopt a matching strategy. According to the dyadic strategic determinist model, this will occur as soon as it can be afforded. It will not be an immediate shift in policy, but rather a gradual realization that China's newfound military might affords it matching strategy-options. One indication that a state can match is that it can project power in more DPOIs than just the one covering its territory, or

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[378] Weaker states are able to maintain dominance over proportionally smaller regions than stronger states, given that dominance capability is an overt function of power. A global power such as the US can afford to remain physically absent from any particular DPOI because it always has the option (via its dominant A2/AD systems and advanced navy) of quickly moving military force as necessary. This has happened in 1996 under the Clinton Administration when two aircraft carrier battle groups, centered on USS Nimitz and USS Independence, sailed through the Taiwan Strait in response to PRC missile tests. See anonymous, "Could China seize and occupy Taiwan militarily," *China Power: Unpacking the complexity of China's rise* https://chinapower.csis.org/can-china-invade-taiwan/ (accessed April 11, 2019). See also Anonymous, "DF-15B short range ballistic missile technical data sheet specifications pictures video 12002163," *Army Recognition.com.*

[379] Saudi Arabia is third at $82.9 billion and 10.0% of GDP and Russia is fourth, at $63.1 billion and 4.3% of GDP. See *IISS, The Military Balance 2015* (London: Routledge, 2015). See also Information Office of the State Council, "China's Military Strategy," May 2015, http://eng.mod.gov.cn/Database/WhitePapers/>. (accessed January 15, 2019).

[380] Thomas J. Christensen, "The meaning of the nuclear evolution: China's strategic modernization and US-China security relations," *Journal of Strategic Studies* 35-4 (2012), 1-2.

[381] B.D. Cole, *Asian Maritime Strategies: Navigating Troubled Waters* (Annapolis MD: Naval Institute Press, 2013), 112-113. See also I. Easton and M. Stokes, "China's Electronic Intelligence (ELINT) Satellite Developments: Implications for Implications for U.S. Air and Naval Operations," 23 February 2011, <https://project2049.net/documents/china_electronic_intelligence_elint_satellite_developments_easton_stokes.pdf>. (accessed March 5, 2019). See also J.F. Copper, 'Introduction', in J.F. Copper (ed.), *Taiwan in Troubled Times: Essays on the Chen Shui-Bian Presidency* (Singapore: World Scientific 2002), 16–18.

along its immediate borders. Disrupters and to a lesser extent mismatchers are limited in such a capacity. December 2008 was a turning point for Chinese military power when the PLAN sent a flotilla of warships to the Gulf of Aden to aid in fighting Somali piracy.[382] This was the first time that modern China has established a presence in a naval DPOI that is not within the China Seas.

There is further evidence that China is progressively becoming a matcher against the United States.[383] It is modernizing and developing its strategic nuclear threat as well as investing in a blue-water navy to project power across the globe, having launched its first aircraft carrier in 2012 with a second undergoing sea trials and a third under construction.[384] According to Yves-Heng Lim, in the last 20 years, the PLAN has acquired 40 nuclear-powered (SSN) and conventional attack submarines, 20 destroyers, over 30 frigates, its first aircraft carrier, four 18,000-tonne landing docks and more than a hundred smaller vessels.[385] Importantly, the pace of these acquisitions has not been steady. It has accelerated since 2006, in line with a growing consciousness of its economic strength and a concomitant ability to afford such armaments.[386] China's annual military budget is now larger than the military budgets of the rest of Asia combined.[387]

As noted, while it is clear that China recognizes the US as its primary adversary, dyadic strategic determinism predicts that, barring some geopolitical disaster in Europe involving

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[382] A.S. Erikson, "Showtime: China reveals two "carrier-killer" missiles," *National Interest* (3 September 2015), <http://nationalinterest.org/feature/showtime-china-reveals-two-carrier-killer-missiles-13769>.
[383] Z. Fan and B. Ma, Junshi Zhanlüelun [On military strategy] (Beijing: National Defense University Press 2007), 5-7. See also A.S. Erickson and D.D. Yang, "Using the Land to Control the Sea: Chinese Analysts Consider the Antiship Ballistic Missile," *Naval War College Review* 62-4 (2009), 26.
[384] Of the 20 aircraft carriers in the world, the US possesses 11 of these. See A.S. Erickson, "Rising Tide, Dispersing Waves: Opportunities and Challenges for Chinese Seapower Development," *Journal of Strategic Studies* 37-3 (2014), 372–374.
[385] Yves-Heng Lim, "Expanding the dragon's reach," 3-4.
[386] D. Hu, 'Hu Jintao Guanyu Haifang Jianshe Zhongyao Lunshu Yanxi' [An analysis of Hu Jintao's important expositions on maritime defence building], *Zhongguo Junshi Kexue* 3 (2012), 62–64.
[387] J.R. Holmes and T. Yoshihara, *Chinese Naval Strategy in the 21st Century: The Turn to Mahan* (London: Routledge, 2008), 6-7. See also E. Hagt, and M. Durnin, "China's Antiship Ballistic Missile: Developments and Missing Links," *Naval War College Review* 62/-4 (2009), 87–89.

Russia, the US will soon realign its military focus and identify China as its primary adversary, initiating a stronger power (US)-weaker power (China) dyadic chain in the China Seas DPOI.[388] The reason for this is simple: there is no other country that will threaten the US to the extent that China will. Regardless of Chinese intentions, as the PRC continues to develop its military and nuclear forces, and increase its ability to project power, the US will identify it as its primary adversary and attempt to match against it. As China ascends to military super power status, and is recognized as such by the US, a matching-matching dyad will appear, with an associated dyadic chain until some periodicity-disrupting event breaks the cycle.

In conclusion, it is possible to make specific predictions about Chinese military strategy if just three elements are known: first, which state China identifies as its primary adversary, second, how great its military power is relative to that adversary, and third, in what DPOI the two states will be engaging. The DSD model asserts that strategic decisions will be dictated by these three variables. As China's military power has increased, it has progressed from a strategy of disruption, to one of mismatching, into a burgeoning strategy of matching.[389]

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[388] James R. Holmes, "China's Muhammad Ali military strategy," *Real Clear Defense*, 18 February 2015, <http://www.realcleardefense.com/articles/2015/02/18/chinas_muhammad_ali_military_strategy_107631.html>. (accessed May 9, 2019).

[389] James R. Holmes, and T. Yoshihara, "China's New Undersea Nuclear Deterrent," *Joint Force Quarterly* 50 (2008), 16-17. See also D.M. Gormley, A.S. Erickson and J. Yuan, "A Potent Vector: Assessing Chinese Cruise Missile Developments," *Joint Force Quarterly* 74-4 (2014), 19-20; and D.M. Gormley, A.S. Erickson and J. Yuan. *A Low-Visibility Force Multiplier: Assessing China's Cruise Missile Ambitions* (Washington: National Defense University Press, 2014), 21-22. International relations theory, particularly within the structural realist tradition, notes that states may choose between externally balancing against, or band-wagoning with, a hegemonic power. It has been argued that, for historical and cultural reasons, China will unlikely band-wagon with the United States. Regardless of these decisions, as dictated by the security dilemma, it will internally balance against its primary adversary, even if it does not admit to it.

CONCLUSION

This analysis demonstrates that the military strategies of states in dyadic interactions are predictable as a function of relative power, and that there are ultimately only three fundamental strategies. Each state will pursue a strategy of internal balancing against a primary adversary. The independent variable in dyadic interactions is the extant hard power of each state. The dependent variable is the reactive strategic response of each, with three possible outcomes: strategic matching (countering the adversary by balancing its military might in kind), strategic mismatching (pursuing military-parity via one-sided specialization) and strategic disruption (seeking a military balance that repudiates static hard power balancing, in favour of terrorism and unconventional or asymmetrical warfare). Here the focus was limited to the major powers, with their tendency to exhibit reiterative strategies, or dyadic chains, of matching and mismatching.

States will match against adversaries of equal power. Low-power states against middle-power states, or middle-power states against high-power states will mismatch, pursuing strategies which exploit weaknesses in the adversary's extant military structure. A low-power state will disrupt against a high-power state. The security dilemma that emerges from an anarchic world, and the fact that dynamic balancing alone cannot mitigate this dilemma (members of coalitions distrust one another as they do the adversary being balanced against), causes states to adopt deterministic strategies of internal balancing.

Therefore, in the dyadic strategic determinist model a state will aim to balance against primary adversaries. Relatively weaker states will "cheat" in order to balance despite their weakness. Just as weaker states will dynamically balance a stronger adversary via coalition, they will also deterministically balance internally in a fashion that is predictable as a function of

relative military power. By pursuing a weapons-specialization program designed to exploit a stronger-adversary's weaknesses, weaker powers can balance despite being less powerful. The greatest disparity in power between adversaries will force the weakest powers to adopt strategies of disruption: non-traditional, highly innovative and cheap methods of balancing.

Relative power refers to actual military power as opposed to the potential power of a state, or the overt military capabilities of that state, in contrast with that of another. It is not possible to link directly economic power or metrics such as GDP to the actual military power that states deterministically respond to. At most, general correlations are observable. Dyadic interactions exist within specific dimensions, including both a temporal and a spatial element. The spatial element is a territorial zone of proximity defined as that in which the adversary state can actually unleash military force against the other. This, plus the temporal dimension, can be labelled as a dimensional point of interaction (DPOI), and indicates that relative state power is relative in part according to where and when the dyadic interaction occurs. This determines the match/mismatch/disrupt choices that a state makes. The term theatre can be used synonymously for the term spatial DPOI. Presumably, the theoretically-most powerful state possible would undertake a matching strategy in all interactive scenarios and in all possible dimensional points of interaction.

Strategic matching is a form of dyadic interaction in which the equal or stronger power counters in kind. That is, it develops military force approximately equal to that of its adversary in the dyad. A strong state that identifies a primary adversary and perceives the extent of its military development counters by creating its own neutralizing response. This matching tends to be unimaginative. In general it simply seeks to counter, as opposed to trumping, the adversary's military threat.

Limited or restricted attempts at matching produce mismatching. A state will balance in a specific area, in submarine technology for example, but will be unable to truly compete in other spheres, such as overall naval power, in net quantity or power projection ability. The consequent qualitative arms racing will not be universal. It will not be spread across all departments of the armed forces or within all spheres of military hardware, but will be limited to select areas that economic, cultural and geopolitical realities allow. Military spending tends to get siphoned into this sphere both because it is already championed culturally, and because further investments yield higher returns in terms of superiority and destructive power. The underlying, possibly-unconscious reasoning for mismatching is that possessing a single or a few very good weapons systems that can effectively balance brute military power is better than possessing something of everything, but nothing of which is any specific good.

A third strategy, strategic disruption, is forced upon the weakest due to the security dilemma. States still strive to balance internally with this strategy, but in what may be described as desperate and extreme ways. Much as weaker states that mismatch will resort to innovative methods of internal balancing, the weakest states will exhibit the most innovative, strange and unorthodox strategies; those that are cheap by virtue of their extreme or unorthodox nature. Examples of disruption strategies include terrorism, extreme brinkmanship and unpredictably-erratic state behaviour, and the development, threat or use of highly unconventional or condemned weapons and tactics. Disruption is not exhibited by the major powers, for the singular reason that major powers are able, almost by definition, to match or mismatch their primary adversaries, and because in general it is in the interest of the strongest states to maintain a semblance of international order.

The United States has undergone two overt changes in its military strategy vis-à-vis the USSR/Russia, with a third supposedly in the process of occurring. Strategists and historians have referred to these changes of strategy, and their concomitant changes in military spending, as Offsets. Toward the end of WWII the USSR was identified as the most important and immediate threat to US security. At the end of WWII it became clear that the US and the USSR were the two most powerful adversaries on the globe.

As demonstrated in Chapter 2, a dyadic chain between two states of equivalent power leads to matching, or quantitative arms races. However, because of its relative military weakness in the European DPOI, from 1953 until around 1977 the US developed a strategic nuclear threat in order to mismatch the USSR's conventional military superiority. That is, the US sought to balance the USSR in Europe, but due to a disparity in conventional armaments and troop numbers between the two countries, and the fact that the US lacked the ability or desire to locate such quantities of troops and armaments on European soil, matching was not a possible option for the US at the time. The US therefore adopted a cheap and innovative mismatching strategy.

It was established in Chapter 3 that from 1977 until 2008 the USSR (and after December 1991, Russia) matched US strategic nuclear mismatching, and the US in turn sought to mismatch this nuclear matching via the Second Offset or Revolution in Military Affairs. The development of RMA was a clear iteration of a mismatching strategy, as opposed to a disrupting or matching strategy, because US conventional weapons numbers again remained relatively stable, the technology developed was significantly cheaper to apply in comparison to a quantitative matching arms racing strategy, and it exploited weaknesses in Soviet conventional armaments. However, Soviet matching against the Second Offset was disrupted by the fall of communism in

December 1991, which destroyed the dyadic chain, replacing it with an entirely new US-Russia dyad.

Chapter 4 considered modern and future Russian strategy, and the notion of the Third US Offset. The Third Offset is the ongoing development of technologies and systems which will allow the United States to mismatch Russia's own RMA-based modernization of its armed forces. Essentially, the US is searching for a way to defeat its own prior military advances, which are now being co-opted by Russia as it seeks to match the US within the European DPOI. The Third Offset appears at first glance to be fundamentally different from the First and Second Offsets. This is due to the fact that contemporary Russia appears to be the weaker party of the Russia-US dyad within the European DPOI. This Offset seems to be the only type of offset strategy that does not involve mismatching, as opposed to a general modernization of the US armed forces, or even a form of matching.

However, this supposition is false. Despite appearances to the contrary, within the European DPOI Russia continues to be the stronger power and is belatedly matching US Second Offset military power. The US continues to mismatch within this DPOI due to its relative weakness. The Third Offset, which is envisioned as a response to the Russian threat in Europe specifically, is yet another example of the US mismatching a stronger regional power. Regardless of its detailed components, the Third Offset, like the First and Second Offsets, is a strategy of mismatching against a primary existential threat, albeit with secondary spillover effects into the entire US military organizational structure and philosophy.

If Russia continues to identify the US as its primary adversary and if it does not weaken economically (and therefore ultimately militarily), then it will continue to match the US. If the Russian economy weakens and military spending decreases, it will at some point adopt a strategy

of mismatching and then even disruption against the United States within the DPOI. However with the ascension of China, Russia may switch its primary adversary and mismatch or disrupt this new existential threat.

Conversely, if Russia continues to identify the US as its primary adversary and if it does not weaken economically (and therefore again ultimately militarily), then dyadic strategic determinism suggests that it will continue to match the US in Europe. This will be manifested as, first, a full modernization of Russian force units in Europe into their RMA iterations, and, second, if the US develops the Third Offset systems described above, a reciprocal development of matching Third Offset technologies, incorporating automation, miniaturization, cybernetics, and the like.

Chapter 5 examined Chinese grand strategy through the lens of dyadic strategic determinism. The model asserts that it is possible to make specific predictions about Chinese military strategy vis-à-vis other major powers if just three elements are known: first, what state will China identify as its primary adversary, second, how great is its military power relative to the adversary, and third, in what DPOI will the two states be engaging. Strategic decisions will be dictated by these three variables. As China has developed economically and militarily, it has progressed from a strategy of disruption, to one of mismatching, into a burgeoning strategy of matching.

While it is clear that China recognizes the US as its primary adversary, dyadic strategic determinism predicts that, barring some geopolitical disaster in Europe involving Russia, the US will soon realign its military focus and identify China as its primary adversary, initiating a stronger power (US)-weaker power (China) dyadic chain in the China Seas DPOI. The reason for this is simple: there is no other country that will threaten the US to the extent that China will.

Regardless of Chinese intentions, as the PRC continues to develop its military and nuclear forces, and increase its ability to project power, the US will identify it as its primary adversary and attempt to match against it. As China ascends to military super power status, and is recognized as such by the US, a matching-matching dyad will appear, with an associated dyadic chain until some periodicity-disrupting event breaks the cycle.

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