

# An International Game of Risk: Troop Placement and Major Power Competition

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What strategies are behind major powers' decisions to deploy forces abroad? We argue that major powers use noninvasion troop deployments to create, consolidate, and expand their spheres of influence around the world, while at the same time trying to prevent their major power rivals from doing the same. This results in an action-reaction process, in which each additional major power troop placement happens as a strategic response to recent and anticipated placements by others. This theoretical framework leads us to expect temporal and regional clustering in troop deployments by allied and rival major powers. We test our expectations using data on troop deployments and a local structure graph model, a network estimator that allows for modeling each troop placement as a function of other deployments, weighted by ideological similarity. Our results provide evidence for our hypotheses.

**W**hat strategies are behind major powers' decisions to project influence abroad? How do they decide when to expand their spheres of influence and when to consolidate them? We contend that major powers strategically anticipate and react to the actions of other major powers as they seek to build, consolidate, and expand their global presence. In other words, major powers compete with one another in order to advance their global political interests.

Noninvasion troop deployments are a key tool for power projection. Major powers' troops abroad delineate their spheres of influence around the world. In this article, we focus on the strategic logic behind major powers' decisions on where to deploy troops. We argue that these decisions are driven by their grand strategy of projecting influence abroad as well as their more narrow goals to protect and influence ideologically similar states—protégés. Our key insight is that, in making deployment decisions, major powers consider not just their

own immediate foreign policy goals but also those of other major powers.

Our study is among the first to systematically explore the determinants of major power troop deployments. Doing so fills a gap in the international relations literature that, despite the growing number of studies analyzing the effects of troop deployments abroad (e.g., Allen and Flynn 2013; Gartzke and Kagotani 2017; Martinez Machain and Morgan 2013), still lacks theoretical explanations for the locations of noninvasion military deployments. By examining these explanations, we can also draw inferences about the interactions among competing major powers. Doing so helps us assess whether major powers seek to set up spheres of influence while also reacting to the actions and expectations of their adversaries. While much of the international relations literature assumes that major powers behave strategically with respect to one another (e.g., Bueno de Mesquita and Lalman 1992; Lake and Powell

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1999), work in foreign policy analysis tends to emphasize domestic preferences and processes (e.g., Hudson 2005; James and Oneal 1991).

We use a novel statistical estimator—a local structure graph model (LSGM; Chyzh and Kaiser 2019)—to model major powers' interdependent decisions to deploy troops abroad.<sup>1</sup> The estimator treats troop placements as network edges that form in response/anticipation of other troop placements: for example, the US decision to place troops in an ideologically similar state affects, and is affected by, troop placements of US major power rivals, such as Russia. Mirroring our theoretical predictions, the statistical model allows for treating deployment decisions as attempts to consolidate and expand one's sphere of influence, while simultaneously responding to a rival's attempts to do the same. Using data from 1981 to 2007, we find that major powers develop ideologically coherent spheres of influence while also reacting to the efforts of other major powers to expand their own.

### MAJOR POWER COMPETITION AND TROOP DEPLOYMENTS

Noninvasion troop deployments, defined as deployments established with the consent of the host state (e.g., foreign military bases or troops that perform training exercises), are a long-standing tool of power projection. The act of placing troops abroad signals a major power's ability to project power beyond its geographical borders; that is, it is a tool for demarcation of a sphere of influence. Deploying additional troops to the same region may signal a major power's intent to consolidate its sphere of influence, while sending troops to new regions may indicate an intention to expand.

The high cost of troop deployments, compared to other power-projection tools (e.g., alliances, arms transfers, and leader visits), usually limits their use to ideologically aligned states (McManus and Nieman 2019). Moreover, troop deployments are relatively high-profile signals of support, with new bases and troop increases warranting regional media coverage (McManus and Yarhi-Milo 2017). Even small or covert deployments rarely go unnoticed by the intelligence services of other major powers (Carson and Yarhi-Milo 2017).

The Cold War provides an illustrative example. Major power politics during much of this period were viewed through the prism of US and Soviet efforts to expand their influence throughout the world. Early on, both the United States and USSR had clearly demarcated spheres of influ-

ence, defined primarily through geographical proximity (the Western Hemisphere and Eastern Europe, respectively). As the Cold War progressed, both powers competed for influence in the Third World, as well as made forays into each other's spheres of influence. As the world moved away from colonialism, both superpowers looked to expand their influence to newly independent states. Much of this competition, particularly in the 1970s and 1980s, took the form of establishing a military presence abroad (Harkavy 1982).

The competition between the United States and USSR was consistent with the policy outlined by Kennan (1946, 861), who argued that the “main element of any United States policy toward the Soviet Union must be that of a long-term, patient but firm and vigilant containment of Russian expansive tendencies.” The proposed policy was the “adroit and vigilant application of counter-force at a series of constantly shifting geographical and political points, corresponding to the shifts and maneuvers of Soviet policy” (862). The two necessary requirements for pursuit of this policy were the US readiness to maintain and expand its influence—a willingness to deploy troops in response to the actions taken by an adversary and to use those deployments as an ideological “counterforce” to the Soviet Union. This implied that US policy included both the development of ideological and geographic spheres of influence and building a counter to the actions of rival major powers. The approach advanced by Kennan, however, appears consistent with not only the policy pursued by the United States but also that of other major powers.

Recent interactions between the United States and Russia have continued to follow this dynamic. Suspicious of North Atlantic Treaty Organization (NATO) expansion, Russia responded by placing troops in Tajikistan and Uzbekistan (Gibler 1999; Gibler and Sewell 2006). Following Russia's annexation of Crimea, involvement in eastern Ukraine, and military exercises off the coasts of the Baltic states, the United States deployed several special operations forces to NATO members Latvia, Lithuania, and Estonia in early 2017. The United States and other NATO allies also expect to send 8,000–12,000 troops to the Baltic States and Poland in the near future (Sotter 2019).

US-Russian competition is not the only instance of major powers reacting to a rival's troop deployments. During the imperial era, Great Britain competed with the United States for influence in Latin America and Southeast Asia; Britain, the Netherlands, and France competed with one another in Asia; and Belgium, France, Germany, and Great Britain all sought to expand their reach during the “Scramble for Africa.” Nor has competition been limited to just the superpowers during the contemporary era. Despite being unable to compete globally with either the United States or USSR/Russia, France has maintained a desire to lead pacts with minor powers

1. There is growing research that demonstrates the necessity to statistically model interdependence (Gallop 2016; Minhas, Hoff, and Ward 2016).

outside of the superpowers' spheres (Schraeder 1995, 541) by resisting encroachments into Francophone Africa, which French leaders referred to as *chasse gardée*, or “exclusive hunting ground.” Acrimonious exchanges between US and French officials highlight that Francophone Africa has emerged as a publicly contested arena of Great Power competition (Schraeder 2000, 396).

Figure 1 provides a visualization of major power troop deployments to minor powers during two time periods: 1985 (fig. 1A) and 2005 (fig. 1B). It is evident from figure 1A that the United Kingdom and France tended to deploy troops to their former colonies in Africa and the Middle East, the United States placed troops in Europe, and the USSR placed theirs in the Middle East and Southeast Asia. In addition, each major power—especially the United States and the USSR—had troop deployments in close proximity to one another.

Figure 1B demonstrates that, in 2005, these four major powers continued to deploy troops abroad to a number of countries. Russia maintained a strong presence in the Middle East and Central Asia. The United States countered with a larger Middle East presence and increased placements in Southeast Asia. France, meanwhile, continued placing troops in Africa, as well as expanded its reach into Central Asia. Britain, in turn, expanded its military presence in sub-Saharan Africa, the Middle East, and Southeast Asia. Notably, British deployments in the Middle East and Southeast Asia reflect its grand strategy of cooperating with its long-term major power ally, the United States, as the United States fought the “war on terror” in the post-9/11 era—a pattern consistent with the theoretical argument we present below. The post-9/11 shift in US and British deployments also illustrates that major power

deployment strategies persist past the end of the Cold War, as major powers react and adapt to new geopolitical challenges.

As illustrated by the figure, troop placements by one major power affect those of other major powers. While the United States and USSR, in particular, place troops near one another, they also appear to have relatively clearly demarcated spheres of influence. The tendency to place troops in the vicinity of a rival's troops and the demarcation between spheres suggest that both powers accounted for one another's troop placements when deciding where to deploy their own troops.

### STRATEGIC TROOP DEPLOYMENTS

Major power competition for areas of influence around the world is a strategic game of high risks and high rewards. Succeeding necessitates developing a grand strategy of which geographical regions to target, what areas to expand into or concede, and how to prevent one's major power rivals from gaining influence in the same regions. Each part of this strategy carries its own benefits and risks. Expanding one's protégé network provides access to economic resources (e.g., through increases in trade and investment), additional sway on important global policy issues (e.g., coalition building), and strategic advantages (e.g., access to key geopolitical points; Allen 2018; Henke 2017; Lake 2009).

All of these benefits, however, are equally attractive to other major powers, which means that rival major powers will frequently find themselves competing for the same regions of influence. Expanding into any given region also carries significant risks, such as a possible long-term entanglement in a peripheral conflict (e.g., the USSR in Afghanistan). Expanding into regions that are already dominated by a rival carries even

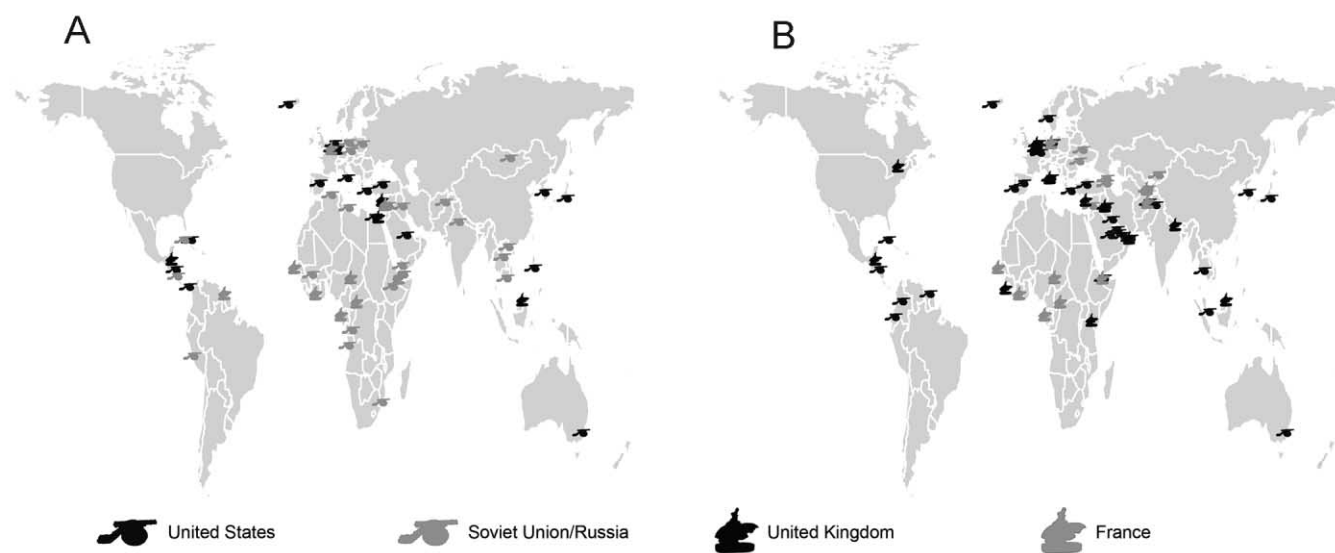


Figure 1. Major power troop deployments to minor powers: A, 1985; B, 2005. Troop data are from Braithwaite (2015). Color version available as an online enhancement.

greater risks. If successful, these risks may be justified by the sizable gains in influence vis-à-vis a rival. Any attempts to expand into a rival's sphere of influence, however, are likely to trigger a response, possibly provoking a security spiral or even unwanted conflict with the major power rival. If expansionary efforts are unsuccessful, they result in spending resources without any subsequent gain in influence, as well as likely reputational costs. Of course, making no effort to expand or maintain one's presence in a region, thus conceding it to a rival, carries its own risks of spurring fears of abandonment among protégés and a loss of influence in both absolute terms and relative to the rival.

In addition to formulating a cost-benefit-effective grand strategy, major powers also have to develop a plan of which countries to work with within a region of interest. That is, deploying troops to an overseas location is a two-way relationship with a host state. In order to obtain the consent of a state to host their troops, major powers have to offer the host a package of benefits that may include security guarantees, economic enticements, or other types of side payments (Henke 2019). Potential hosts that are similar to the major power in terms of ideological preferences are likely to be more enthusiastic about hosting troop deployments and may require fewer incentives to do so. This is especially true for protégés that face security concerns, as major power troop deployments provide a tangible security mechanism for protecting the host state from external threats (e.g., US troops in South Korea).<sup>2</sup> This is analogous to the well-established finding that defense pacts are most likely to form among ideologically similar states (Lai and Reiter 2000).

From the protégé's perspective, troop placements create an *ex ante* expectation that the major power will defend it against possible aggressors. First, the deployment itself is costly to the major power and is therefore a credible signal of the major power's willingness to spend resources on the host state. It also facilitates a potential intervention to defend the protégé. Gartzke and Kagotani (2017) make the argument that even in the presence of a formal military alliance, a troop presence serves as a strong signal of the major power's commitment to the host state. Unlike an alliance commitment, which is not frequently updated, the commitment associated with deployments is continuously renewed, as long as the major power maintains a military presence in the host state (see also Morrow 1994). Moreover, deployments may affect the strength or effectiveness of military cooperation and the probability of military success (Fearon 1997; Morrow 1994).

2. Deployed troops may also assist host states facing domestic threats (Chyzh and Labzina 2018).

Second, even small deployments can deter aggression against the host, as the troops serve as a trip wire (Fearon 1997; Gartzke and Kagotani 2017; Schelling 1960). If the major powers' troops are killed in an attack on their protégé, this potentially commits the major power to engaging in a larger intervention.<sup>3</sup> Once committed, there is little question that major powers can bring the full brunt of their capabilities to a conflict (Chiba, Martinez Machain, and Reed 2014; Gartzke and Kagotani 2017). For example, the recent US deployments to the Baltic states sent in response to Russia's active foreign policy in the region involve only a few dozen troops but send a strong signal of US commitment to the region (Schmitt 2017).

From the perspective of the major power, troop deployments are also among the most direct forms of influence over the host. They provide the major power with an implicit coercion mechanism (either through the actual use of military force or through the threat of removing the benefit that the deployed troops provide; Lake 2009; Nieman 2016). While some degree of ideological or preference similarity between the major power and the host is a precondition for troop placement—that is, convincing ideologically dissimilar states to accept noninvasion troops will require provision of additional benefits (Henke 2019)—once deployed, major powers are likely to be able to consolidate their influence and bring host states closer into their political orbit (McDonald 2015).<sup>4</sup>

Beyond the direct effects of deterring aggression and enhancing their control over protégés, major powers acquire additional benefits by placing troops in multiple states within the same region. Once a major power has deployed troops to one state, it is logistically easier to deploy troops to the same or neighboring states. Moreover, spreading deployments to multiple states within a region does not only increase the credibility of the major power's commitment to each individual state but also allows the major power greater control over the region as a whole (Allen, Flynn, and Van Dusky-Allen 2017). That is, by placing troops in several countries, a major power enhances its ability to promptly respond to threats—internal or external—anywhere within the region.

Finally, major powers with shared ideology may operate cooperatively to attain these benefits. Braumoeller (2012) shows that balance of power rarely, on its own, explains patterns of major power behavior; rather, balance of ideology

3. The likelihood of intervention does not have to be certain for the signal of commitment to be credible. Schelling (1960, 187) argues that threats that "leave something to chance" are still an effective deterrent.

4. One way that noninvasion troops do this is by directly providing aid and services (Allen et al. 2020; Flynn, Martinez Machain, and Stoyan 2019).



matters as well. Ideologically similar powers may coordinate to create a broad political bloc that serves as a bulwark against the efforts of ideologically distant rival major powers. In this way, major powers share burdens and, if necessary, strategically retrench, knowing that their rivals will not be able to rapidly expand (Haynes 2015). For example, the United States and United Kingdom, in the post-9/11 era, have coordinated military efforts, and as figure 1B shows, the United Kingdom has followed American deployments to the Middle East.

Given these observations, we posit that the tendency to develop ideologically coherent spheres of influence within regions is a general strategy of major power competition (Allen et al. 2017; Lake 2009). This suggests that we may observe clusters (or cascades) of temporally proximate major power deployments to protégés within the same region: Each new (or additional) troop placement increases the probability of another troop placement by the same major power or its ally.

**H1.** Major powers are more likely to deploy troops to an ideologically similar protégé if they (or their major power allies) deploy troops to other protégés within a region.

In addition to maintaining and expanding their own spheres of influence, major powers need to react to and contain their rivals' attempts at expansion, especially when such expansion poses a threat to their protégés. This logic is consistent with the Cold War strategy of containment, advocated by Kennan (1946). Essentially, a major power's influence within a region is a zero-sum game, where a gain in influence by a rival results in one's own relative loss of influence.

Maintaining one's influence in a region, therefore, requires reacting to any increases in deployment by a rival (Powell 1991; Waltz 1959). Sending reinforcements or new deployments in response to those by a rival major power serves to reassure protégés in the region of an intent to defend them. A failure to send reinforcements, in contrast, may signal (or be interpreted as) a lack of willingness or ability to protect the protégés in the region. Thus, a lack of response to a rival's deployment risks decreasing or losing one's influence in the region.

An example of this is the establishment of a US air base in Israel in 2017, just eight months after Russia expanded and modernized its naval and air bases in Israel's neighbor Syria through an agreement with Syrian President Bashar al-Assad. The United States and Russia had several diplomatic clashes over Russia's support for the Syrian government, and, as a response to these clashes, Russian President Vladimir Putin reinforced the Russian military presence in the Mediterranean. The Russian naval base in Tartus, Syria, is the only naval

base that Russia has outside of the former Soviet states, and per the expanded basing agreement, Russia is able to keep 11 warships and to indefinitely use the Hmeimim air base (Ivanova 2017; Karmanu 2019). The US air base in Israel is no less significant, as it is the first permanent US military installation with its long-time protégé and is perceived as a signal of US commitment (Gross 2017).

In this example, Russia has made consistent and directed efforts at expanding its foothold in the region, and the United States is countering this expansion by taking unambiguous steps to increase its own presence. US actions send a two-part message to Russia (the rival) and to its own protégés in the region. To Russia, the United States is signaling that it is not willing to relinquish influence in the region and will act to counter any further attempts at expansion. To its regional protégés, the US actions are reassurances of their continued support and willingness to defend them.

The processes described above suggest that we may observe clusters (cascades) of temporally proximate deployments to ideologically dissimilar minor powers within the same region: an action by one major power triggers a reaction by a rival (ideologically dissimilar) major power to place troops with its ideologically similar protégés in the region. As a result, we should observe the deployment of troops by one major power to one of its protégés in a region followed by a deployment by a rival major power to one of its own protégés in the same region.

**H2.** Major powers are more likely to deploy troops to ideologically similar protégés in response to a rival major power deploying troops to its own protégés within a region.

## RESEARCH DESIGN

We focus our analysis on major power troop deployments from 1981 to 2007.<sup>5</sup> We define a state as a major power if it is one of the five permanent members of the UN Security Council—United States, United Kingdom, France, USSR/Russia, and China.<sup>6</sup> This coding is consistent with previous

5. Our theory and test pertains mainly to major powers, as they constitute the bulk of noninvasion deployments, in terms of both pure volume and geographical scope. The logic of noninvasion troop deployments, however, should follow similar dynamics among minor powers—at least those with sufficient will and resources—as their foreign policy actions are limited more by resources than ambition (Chiba et al. 2014). We focus on a sample of major powers in order to gain the greatest degree of theoretical leverage on our primary independent variables, as well as to limit the already significant computational requirements for estimation.

6. These five states are also the five recognized nuclear powers, according to the Treaty on the Non-proliferation of Nuclear Weapons (NPT), an

literature that has defined major powers in terms of their economic power, large military capabilities, and active involvement in the international system (Fordham 2011). Our time frame allows us to explore general action-reaction processes among major powers, as it includes both the last decade of the Cold War and its aftermath.

The unit of analysis is the major-minor power dyad-year, or, in the parlance of network analysis, an *edge* between each major power and each minor power in each year.<sup>7</sup> The sample contains a total of 22,480 observations, which include 950 unique dyads between the five major powers and 190 minor powers (the number of minor powers varies by year).

### Dependent variable

The dependent variable, New Troops, measures whether a major power deployed new troops (as either reinforcements to a previous deployment or a deployment to a country that did not host any troops in the previous year) to a minor power in a given year (i.e., an edge is realized).<sup>8</sup> We focus on new troop deployments, as the primary goal of our analysis is to model an action-reaction process in troop deployments, that is, to test whether an increase in deployments by one major power triggers an increase in deployments by other major powers. New Troops equals 1 if the total number of troops deployed by major power  $M$  to a protégé  $p$  in year  $t$  is greater than in the previous year,  $t - 1$ .<sup>9</sup> There are 405 cases in which the variable New Troops equals 1 in our sample, which make up about 1.8% of total major-minor power dyad-years. Troop data were originally gathered by Braithwaite (2015) from the International Institute for Strategic Studies' publication, the *Military Balance*.<sup>10</sup>

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important determinant of major power status (Jo and Gartzke 2007). Membership in the Permanent Five and as a NPT nuclear power implies recognition by other major powers, another important qualification for major power status (Fordham 2011). Finally, these five states also tend to be the most active in terms of troop placements; see app. table 2 (tables 2 and 3 available online). Using the Correlates of War major power definition, rather than the Permanent Five, would only add post-1991 Germany and Japan to our sample. Neither Germany nor Japan made many deployments during the period under review, however, as each only began accepting expanded military roles in the early 2010s.

7. Dyads between major powers are excluded from the analysis.

8. Deployments to countries that did not host any troops in the previous year make up about 23% of all New Troops, whereas reinforcements to existing troop placements make up the other 77%.

9. We treat all new placements the same, regardless of size or whether they involve a permanent military installation. Within the sample, 49% of New Troops are at least 50% larger than the previous year's figure, while 59% are at least 25% larger. The empirical results do not change substantively using these alternative measures as the dependent variable.

10. Braithwaite (2015) excludes strictly offshore personnel and UN mission deployments.

Figure 2 reports the annual distribution of New Troops by the four major powers that deployed troops during the period under study—China did not deploy noninvasion troops between 1981 and 2007. The figure illustrates several temporal patterns, such as a gradual increase in US deployments, especially in the post-9/11 time period; a gradual decrease in USSR/Russia's deployments;<sup>11</sup> and relatively stable trends in French and British deployments. Figure 3 displays the geographical distribution of New Troops for each of the four major powers that were active between 1981 and 2007. The United States and Russia seem to have more of a global outlook, France tends to send troops to Africa, and the United Kingdom is also concerned with the Middle East and South Asia.

### Methodology

In order to model the theoretically relevant action-reaction processes of major power troop placements, we use network analysis, specifically an LSGM (Casleton, Nordman, and Kaiser 2017; Chyzh and Kaiser 2019). LSGM is a type of spatial autoregressive model that allows for modeling the formation of network edges (here troop placements) in response to the (weighted) effect of other concurrent troop deployments (either realized or unrealized, i.e., troops are deployed or not).<sup>12</sup> The LSGM allows us to adopt a *nodes-as-actions* approach, rather than a *node-as-actor* approach (Chyzh and Kaiser 2019, 399–400). The former allows us to treat the action as the focus and examine whether a troop deployment elicits a localized response within a specific area of the graph (e.g., how likely is a French deployment to Chad given a Soviet troop deployment to Libya?), whereas the latter limits the inferential scope to global actor- or dyadic-level characteristics, for example, whether joint democracy is a predictor of deployments.

Figure 4 provides a visualization of all realized New Troops that were placed in 1985, 1995, and 2005. This is a node-as-actor visualization; that is, states are treated as nodes, and the actions of placing new troops are treated as edges. Major powers deploying troops are denoted by squares, while minor powers that received troops are denoted as circles.

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11. The spike in 1993 corresponds to Russia sending new troops to several former Soviet republics.

12. LSGM is similar to spatial autoregressive models (SAR) and conditional autoregressive models (CAR), yet it employs a logistic distribution for an easy application to binary outcome variables. LSGM is also similar to exponential random graphs (ERGMs) as both model network outcomes as a function of endogenous network dynamics (Wasserman and Faust 1994). While ERGMs have been primarily applied to model global network outcomes (e.g., occurrence of triangles), LSGM allows for directly modeling edge realizations (here, troop placements) as a function of realizations of other edges, i.e., local network outcomes. Given our interest in a binary outcome variable and treating edge formation as a function of other edges, LSGM is the most natural choice of a statistical estimator.

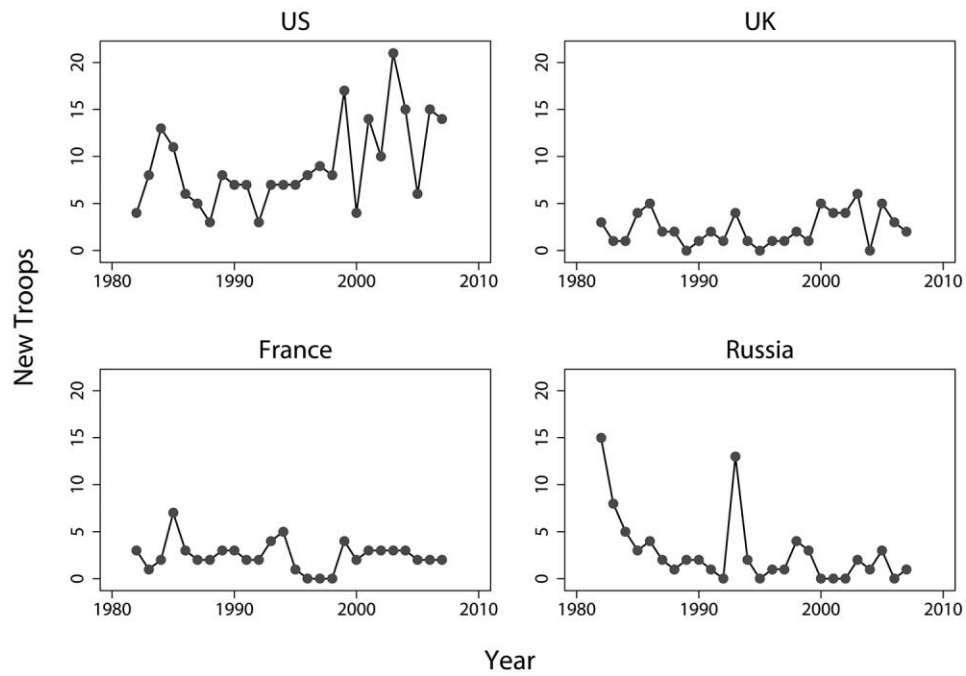


Figure 2. New troops by major power

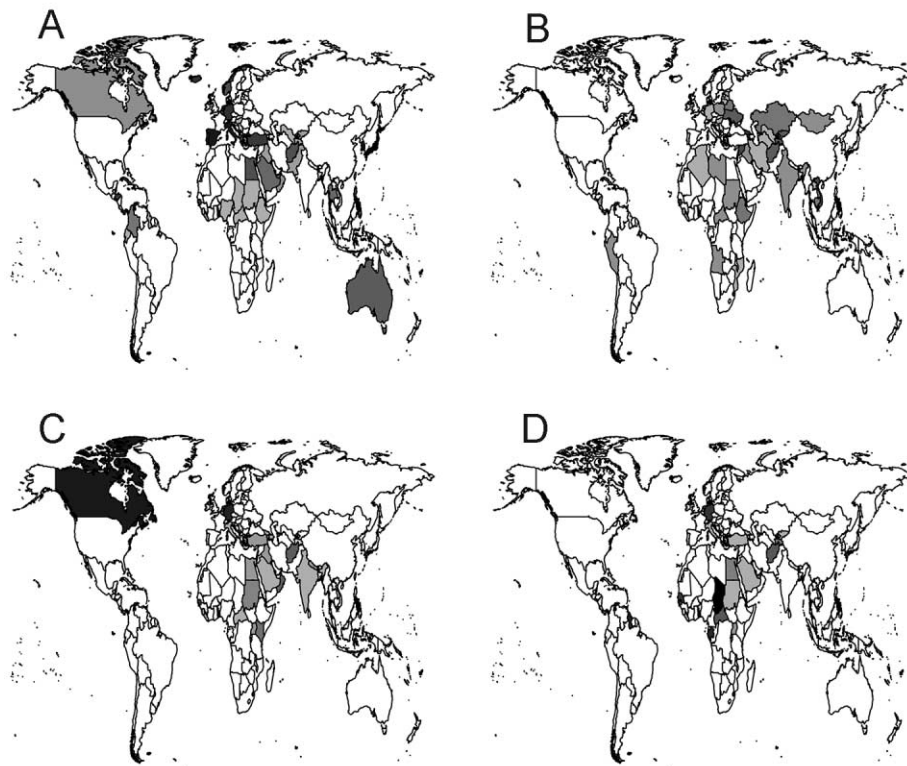


Figure 3. Aggregate new troop placements, 1981–2007. A, United States; B, Soviet Union/Russia; C, United Kingdom; D, France. Darker colors represent higher frequency of new troops between 1981 and 2007. China made no troop deployments during this period. Color version available as an online enhancement.

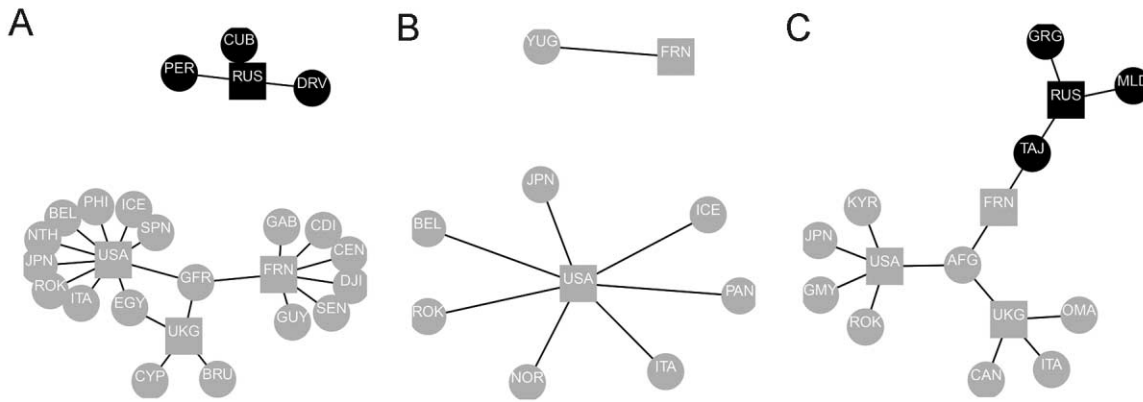


Figure 4. Conceptualizing troop placements as formation of network edges: A, 1985; B, 1995; C, 2005. Color version available as an online enhancement.

Figure 5 provides a visual reconceptualization of figure 4 as a nodes-as-actions network. What was previously an edge in figure 4 is now treated as a node in figure 5. That is, in figure 5 the nodes are the major power actions of placing new troops in a minor power, and the source of connectivity among them is measured as the ideological distance between each pair of major-minor power dyads (i.e., ideological distance between troop placements). Each individual troop placement (node) is displayed as a point in a two-dimensional illiberal-liberal ideological space with coordinates defined as major power’s and minor power’s ideal point scores. The ideal point scores align all international states on a  $[-3, 3]$  ideological scale, such that higher scores are associated with a liberal ideology, while lower scores are associated with a non-liberal ideology. Ideal point scores are obtained from Bailey, Strezhnev, and Voeten (2017), as discussed in the “Independent variable” section. The Y-axis in figure 5 shows the ideal point scores for minor powers, while the X-axis shows the ideal

point scores for major powers. The major powers shown in the figure are the USSR (most illiberal), France and the United Kingdom (more liberal), and the United States (most liberal).

The conceptualization of a network of relationships (ideological distances) among major-minor power dyads (as in fig. 5) provides several new insights over a more traditional approach of treating international states as nodes and relationships among them as edges (e.g., fig. 4). For example, figure 5A shows that, in 1985, minor powers that receive troops tend to have ideal point scores similar to those of the major power deploying the troops, implying that major powers engage in ideological consolidation. This is evident by the lack of edges in the top left and bottom right quadrants of the figure. Figure 5B highlights the post-Cold War change in the deployment dynamic, with no balancing deployments in 1995. Figure 5C shows a decrease in ideational polarization, with Russia’s ideal scores shifting from about  $-2$  in the Cold War era (fig. 5A) to about  $0$  in 2005.

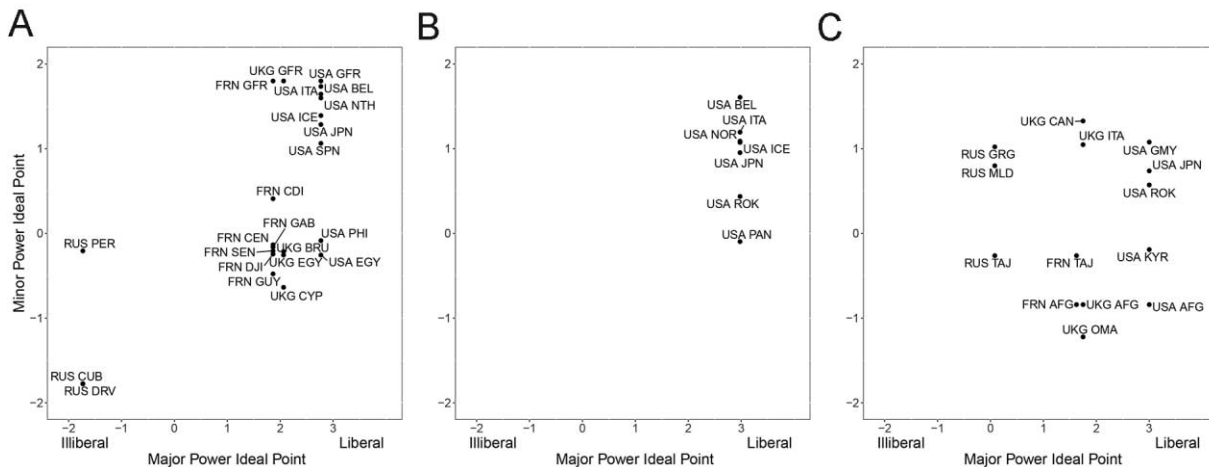


Figure 5. Ideological distance among troop deployments: A, 1985; B, 1995; C, 2005



Most importantly, focusing on the relational dependencies among troop deployments themselves allows us to model each troop deployment as a function of all other contemporaneous or temporally proximate deployments, either realized (troops were deployed) or unrealized (no troops were deployed), weighted by (ideological) proximity to the given observation. More precisely, the statistical estimator models the realization in each observation as a function of that in all other observations within a *neighborhood*. A neighborhood identifies the degree of (ideological) dependence between each pair of potential troop deployments. Within each neighborhood, a set of conditional distributions for each observation is defined, given the weighted outcomes in all other observations as well as exogenous covariates (Casleton et al. 2017; Chyzh and Kaiser 2019). Neighborhoods can be defined by binary characteristics (presence within a geographical region) or continuous characteristics (intensity/distance within a lattice; Chyzh and Kaiser 2019).

More formally, suppose  $i$  is a potential edge in a network of  $n$  potential edges, where  $i \in \{1, 2, \dots, n\}$  with a location denoted as  $s_i = (u_i, v_i)$  in Cartesian space. Within a neighborhood,  $i$ 's neighbors are denoted as  $-i$ , where  $\mathbf{y}_{-i} = \mathbf{y}(s_{-i}) = \{\mathbf{y}(s_j) : s_j \neq s_i\}$ . Neighborhoods are specified as an  $n \times n$  matrix  $\mathbf{w}$ , where cell  $ij$  is the degree of connectivity between edges  $i$  and  $j$ , with 0 on the major diagonal.<sup>13</sup> In our case, for example, neighborhoods take the form of a continuous ideological space (i.e., major-minor power policy similarity) for all minor powers within a geographical region.

The binary random variable,  $y(s_i) = y_i$ , records the realization of the dependent variable (edge) as

$$y(s_i) = \begin{cases} 1 & \text{if edge } s_i \text{ is present} \\ 0 & \text{if edge } s_i \text{ is absent.} \end{cases} \quad (1)$$

Since the realization of an edge is binary (i.e., new troops are either deployed or not), we assume a binary conditional distribution expressed in exponential family form as

$$P(Y_i = y_i | \mathbf{y}(N_i)) = \exp[A_i(\mathbf{y}(N_i))y_i - B(\mathbf{y}(N_i))], \quad (2)$$

where  $A_i$  is a natural parameter function and  $B_i = \log[1 + \exp(A_i(\mathbf{y}(N_i)))]$ . Conditional dependencies among edges are modeled through the natural parameter function as

$$A_i(\mathbf{y}(N_i)) = \log\left(\frac{\kappa_i}{1 - \kappa_i}\right) + \eta \sum_{j \in N_i} w_{ij}(y_j - \kappa_j), \quad (3)$$

where  $\log(\kappa_i/(1 - \kappa_i)) = \mathbf{x}_i^T \boldsymbol{\beta}$ ,  $\mathbf{x}_i$  is a vector of exogenous covariates,  $\boldsymbol{\beta}$  is a vector of parameter estimates,  $\mathbf{w}$  is a matrix of connectivities among edges,  $\eta$  is a dependence parameter,  $y_j$  is the outcome in location  $s_j$ , and  $\kappa_j$  is the probability that

$j$  is realized. Vector  $\boldsymbol{\beta}$  represents the instantaneous effects of the exogenous covariates, while  $\eta$  captures dependence among observations.

The dependence term,  $\eta \sum_{j \in N_i} w_{ij}(y_j - \kappa_j)$ , can make either a positive or a negative contribution to the natural parameter function. The dependence term makes a positive contribution if the realization of the neighbors' values exceeds its expectation,  $y_j > \kappa_j$ , and decreases its value if the observed value is less than the expected value,  $y_j < \kappa_j$ . If  $\eta > 0$ , the presence of edges with strong connectivities,  $y_j = 1$ , has a positive effect and the absence of edges,  $y_j = 0$ , has a negative effect on the probability that  $y_j = 1$ . In contrast, if  $\eta < 0$ , the presence of edges with strong connectivities,  $y_j = 1$ , has a negative effect and the absence of edges in a neighborhood,  $y_j = 0$ , has a positive effect on the probability that  $y_j = 1$ .

An important feature of this parametrization—and one of the key improvements over other spatial models—is the global parameter centering of the dependence term,  $y_j - \kappa_j$ . This specification effectively prevents overestimating the effect of neighbors, which are themselves a function of both exogenous (global) and neighborhood (local) effects. The subtraction of the global portion of the effect ensures that the local effects are only counted when they carry their own value-added effect. This deals with the well-known issue of conflation between common exposure and diffusion; that is, do two units share an outcome because both are exposed to the same exogenous factor or because of their mutual influence on each other? In the above model specification, the common exposure is modeled via the global term,  $\log(\kappa_i/(1 - \kappa_i))$ , which is also used for centering the dependence term to avoid misattributing a local effect to what, in fact, is simply the effect of common exposure (Kaiser and Caragea 2009). A failure to center by the global parameter, in other words, is equivalent to treating the dependent variable as endogenous for unit  $i$  yet exogenous for all neighboring units. This characteristic, absent in most analogous spatial econometrics models (e.g., spatial probit), makes LSGM more appropriate for our application. An added benefit of the global centering parameter is that it improves the interpretability of the dependence parameter:  $\eta$  is directly proportional to the log odds ratio of the presence of an edge, relative to an independence model (Chyzh and Kaiser 2019, 402).

Now we build on equation (3) to account for possible temporal dependencies in our data. We model temporal dependence and, more specifically, asymmetric dependence among edge realizations in the current and previous time periods (e.g., a realization in  $i$  is affected by positive outcomes in its neighbors in the previous temporal period but not affected by negative outcomes). Substantively, such dependencies imply that recent troop deployments by a major power to a minor power affect the

13. Edges have no connectivity with themselves.

probability that a rival major power deploys troops to a nearby minor power, while the lack of deployments has no effect. An asymmetric approach is relevant to modeling troop deployments, as both major and minor powers likely put more weight on the deployment of rival troops, given that new deployments are relatively rare. In other words, the probability of a major power deploying troops to a minor power is affected by the degree of ideological closeness of rival major/minor powers who have recently deployed/received troops.

A weighted, asymmetric temporal lag captures the effect of edge realizations in the previous time period on those in the current time period. Mathematically, we model this by adding a new term,  $\alpha \sum_{s_{i-1} \in N_{i-1}^1} w_{ij_{i-1}} (1 - \kappa_{j_{i-1}})$ , to the natural parameter function reported in equation (3). Denote the current temporal period  $t$  and  $N_{i-1}^1$  as  $i$ 's neighbors with an outcome  $y(s) = 1$  in the previous time period  $t - 1$ , or  $N^1 = \{y_{j_{i-1}} : y_{j_{i-1}} = 1\}$ , where  $w_{ij_{i-1}}$  is the  $ij_{i-1}$ th cell of the connectivity matrix  $\mathbf{w}$  in period  $t - 1$ , and  $\alpha$  is the parameter associated with the temporal lag.

When  $\alpha > 0$ , the probability that an edge is realized increases in response to the number of edges with strong connectivity to  $i$  that were realized in the preceding period. Conversely, when  $\alpha < 0$ , the probability that an edge is realized decreases as the number of realizations within the neighborhood in the previous period increases.

Accounting for the asymmetric temporal dependence transforms the natural parameter function from equation (3) in the following way:

$$A_i(\mathbf{y}_i) = \log\left(\frac{\kappa_i}{1 - \kappa_i}\right) + \eta \sum_{j \in N_i} w_{ij} (y_j - \kappa_j) + \alpha \sum_{s_{i-1} \in N_{i-1}^1} w_{ij_{i-1}} (1 - \kappa_{j_{i-1}}). \quad (4)$$

Conceptually, the only difference between equation (3) and our final natural parameter function equation (4) is the addition of the last term,  $\alpha \sum_{s_{i-1} \in N_{i-1}^1} w_{ij_{i-1}} (1 - \kappa_{j_{i-1}})$ . This term allows us to model troop placements in the current time period  $t$  that may have happened in response to any troops placed by allies or rivals in the time period  $t - 1$ .

Parameter estimates are obtained by maximizing the log pseudolikelihood (PL), which is the summation of the logs of the conditional distributions (Besag 1975):

$$\log \text{PL} = \sum_i \{y_i \log(p_i) + (1 - y_i) \log(1 - p_i)\}, \quad (5)$$

where

$$p_i = \frac{\exp(A_i(\mathbf{y}(N_i)))}{1 + \exp(A_i(\mathbf{y}(N_i)))}. \quad (6)$$

Maximizing the PL function recovers consistent point estimates (Casleton et al. 2017; Guyon 1995); we obtain consistent standard errors by performing 500 bootstraps, with a 50 iteration burn-in, keeping every tenth iteration.

### Independent variable

As previewed in the ‘‘Methodology’’ section, our independent variable is Ideological Similarity (by Region), which is a spatially lagged version of the dependent variable, weighted by the degree of ideological connectivity between potential deployment edges within a geographical region. Each (potential) major-minor power new troop deployment is treated as an edge, where the ideological scores of the major and minor power that make up each edge serve as the  $x$  and  $y$  coordinates in a two-dimensional ideological space. We set the  $x$ -coordinate as the major power, with the  $y$ -coordinate representing the minor power. We measure ideological scores as the ideal point scores based on UN General Assembly voting (Bailey et al. 2017; Gartzke 2000). The Euclidean distance between a pair of edges (e.g., distance from edge 1 to edge 2) represents the ideological dissimilarity between them. This distance is the connectivity between the pairs of major-minor power dyads. When the distance is small, edge 1 and edge 2 are ideologically similar. If the distance is large, edge 1 and edge 2 are ideologically far apart. We measure dependence ( $w_{ij}$  in eq. [4]) as the degree of connectivity between these edges (major-minor power pairs) by geographical region.

We calculate our measure of ideological similarity among major-minor power dyads within a shared geographical region. We use the Correlates of War country codes to identify five regions: the Americas (country codes <200), Europe (200–399), sub-Saharan Africa (400–599), the Middle East and North Africa (600–699), and Asia and Oceania (700–999). This measure serves to test our hypotheses. A positive coefficient indicates polarization; that is, major powers are more likely to deploy troops to minor powers in response to realizations of ideologically dissimilar deployments such as those placed by a rival within a region (recall that ideologically dissimilar states have greater values of  $w_{ij}$ ). In contrast, a negative coefficient indicates clustering in ideologically similar deployments within a region—a process consistent with hypothesis 1.

To account for short-term temporal dependence, we include a weighted, asymmetric temporally lagged spatial lag, Spatial Lag ( $t - 1$ ). An asymmetric measure of temporal dependence is necessary as New Troops is a relatively rare event. The inclusion of an asymmetric lag allows us to account for changes in the likelihood of troop placements in the event that a major power deployed troops to a minor

power in the previous year, weighted by ideological distance, whereas nondeployments have no effect. A benefit of the asymmetric lag is that it allows us to directly examine how states respond to deployments in the previous time period. When the coefficient on the Spatial Lag ( $t - 1$ ) is positive, it indicates an ideological balancing process: a deployment in the previous time period increases the probability of ideologically dissimilar deployments in the current time period, which would be consistent with hypothesis 2. Conversely, a negative coefficient on Spatial Lag ( $t - 1$ ) would indicate that a deployment in the previous time period triggers more ideologically similar deployments in the current time period.

### Control variables

We control for a number of other factors that may influence the decision to deploy troops abroad. For the sake of brevity, we only include a brief description of these variables and data sources. A more extensive theoretical justification for each control variable is provided in the appendix (available online). We control for Major Power Economic Growth, operationalized as growth in energy consumption from the previous to the current year (Singer, Bremer, and Stuckey 1972); Minor Power Capabilities (Singer et al. 1972); whether a minor power is engaged in an International War (Bell and Johnson 2015); bilateral Trade between the major and minor power (Barbieri, Keshk, and Pollins 2009); whether the major and minor power share an Alliance (Gibler 2009); and whether the minor power is a Former Colony of the major power (Hensel 2014). Finally, we include a measure of the expected Change in Rival Major Power Capabilities (Bell and Johnson 2015).<sup>14</sup>

### RESULTS

Table 1 displays the results of our statistical analysis. The first model reports our main results for the full sample. To assess the robustness of our findings to temporal changes in major power competition, we estimate three additional models, in which we split up our data by temporal period. First, we split up the data between the Cold War and post-Cold War periods to explore whether the collapse of the Soviet Union resulted in greater levels of major power cooperation.<sup>15</sup> We

also estimate a separate model on the post-9/11 time frame, in order to assess whether this time period is associated with a greater level of major power cooperation, brought together by the goal of counterterrorism, or whether this period is characterized by a return to major power competition, associated with a resurgent Russia.

The first two variables in the table relate to the two lagged dependent variables modeling spatial and asymmetric temporal dependence. The Ideological Similarity (by Region) spatial lag models dependence between (potential) troop deployments within a geographical region. In the data, larger values of ideological connectivity indicate greater dissimilarity among the potential deployments. The negative and statistically significant coefficient on the Ideological Similarity (by Region) spatial lag indicates that major power deployments to ideologically similar states exhibit temporal clustering: each additional deployment increases the probability of another deployment by the same major power or its ally. This result is consistent with hypothesis 1, which posited that major powers are more likely to deploy troops to ideologically similar minor powers as a function of their own deployments or those by allied states.

The coefficient on the Spatial Lag ( $t - 1$ ) variable is positive and statistically significant, which indicates a positive relationship between observed new troop deployments by rival (ideologically dissimilar) major powers within the same region in consecutive time periods. This result mirrors the dynamic posited in hypothesis 2, which stated that major powers respond to their rivals' placements of troops within a geographic region.

The coefficients on the spatial lags are consistent with our expectations that major power troop placements are interdependent and responsive to those of other major powers. The results indicate that, in the same time period, major powers are more likely to place troops in regions where ideologically similar troops are being deployed and less likely to place troops in a region if an ideologically distant major power has placed troops there. This suggests that major powers form and maintain spheres of influence through troop presence in multiple protégés within a region. There is also evidence that major powers react to rival troop placements by placing troops within the same region in the subsequent time period. This indicates that major powers seek to contain and counter the

14. We treat the United States as the primary rival of Russia/USSR and China, and Russia/USSR as the primary rival of the United States, United Kingdom, and France.

15. We define the Cold War as ending in 1989 (the fall of the Berlin Wall) and the post-Cold War subsample as starting in 1992, rather than either 1990 or 1991, because the data from the first year in each subsample are used to construct a temporal lag. That is, we allow major powers an extra year to adjust to the changes associated with the end of the Cold War before we start using information on their troop placements to explain the

post-Cold War trends in major power competition. In other words, we believe that troop placements in the transitional years of 1990 and 1991 are uninformative of any possible emerging post-Cold War patterns in major power competition. The results are robust to changing the start date of the period.

Table 1. Models of Troop Placements

	Full Sample 1981–2007	Cold War 1981–89	Post Cold War 1992–2007	Post 9/11 2001–7
Spatial lags:				
Ideological Similarity (by Region)	-.520 (.106)	-.616 (.108)	-.551 (.116)	-.439 (.219)
Spatial Lag ( $t - 1$ )	1.667 (.242)	1.455 (.569)	1.674 (.560)	2.200 (.854)
Major Power Economic Growth	-.012 (.011)	-.013 (.019)	-.098 (.019)	-.132 (.045)
Change in Rival Major Power Capabilities	.049 (.028)	.036 (.040)	.038 (.052)	.129 (.128)
Minor Power Capabilities	.349 (.059)	.622 (.123)	.154 (.093)	.120 (.145)
Minor Power in International War	.850 (.275)	.558 (.367)	-.149 (2.267)	.001 (.001)
Alliance	1.819 (.127)	2.025 (.276)	1.389 (.157)	.867 (.266)
Trade	.084 (.027)	-.036 (.039)	.225 (.040)	.185 (.041)
Former Colony	1.074 (.136)	1.209 (.284)	1.079 (.192)	.725 (.273)
Constant	-5.318 (.153)	-4.644 (.210)	-6.000 (.256)	-5.289 (.273)
Observations	22,480	6,765	14,175	6,430
Minor powers (Pseudo) log likelihood	190 -1,677.59	151 -521.70	188 -1,008.52	187 -479.71

Note. Standard errors (in parentheses) are estimated from 500 bootstraps via a Gibbs sampler with 50 burn-in simulations and thinning every 10 iterations.

expansion of their rivals by reaffirming support for their protégés in the threatened regions.

The results are substantively meaningful. If we set all other variables at their means and medians, there is an approximately 0.09 probability of a new or additional US deployment to Europe, conditional on a new UK deployment to a European ally in the same year. An analogous deployment by Russia, however, is associated with only a 0.01 probability of an additional US deployment in the same year. Contemporaneous deployments by aligned states, in other words, exhibit features of a bandwagoning process. Conversely, the conditional probability illustrated by the temporal lag provides a different story: in the same scenario as above, given a British deployment, the United States has a conditional probability of 0.46 of deploying its own troops to an ally in the next year. The same conditional probability in the event of a Russian deployment, however, is over 0.95. This suggests that, after observing either an ally or a rival deploy troops in the previous year, major powers are more responsive to the latter rather than the former.

All control variables behave as expected and, with the exception of Major Power Economic Growth, are statistically significant in the main model. The positive coefficients on the statistically significant control variables indicate a positive relationship between each of these variables and the probability of troop deployments.

Now that we have interpreted the main results, we briefly discuss the differences among the four models. Our main results are stable across all models; that is, there is strong evidence that the action-reaction processes posited by the theory persist throughout the entire timeline. There are, however, some changes in the significance of the control variables. Starting with a comparison between the Cold War and post-Cold War subsamples, Major Power Economic Growth and Trade are not statistically significant in the Cold War model but have positive and statistically significant effects in the post-Cold War subsample. Minor Power Capabilities, in contrast, is positive and statistically significant in the Cold War subsample but not statistically significant in the post-Cold War subsample. Taken together, these results may indicate that whereas characteristics



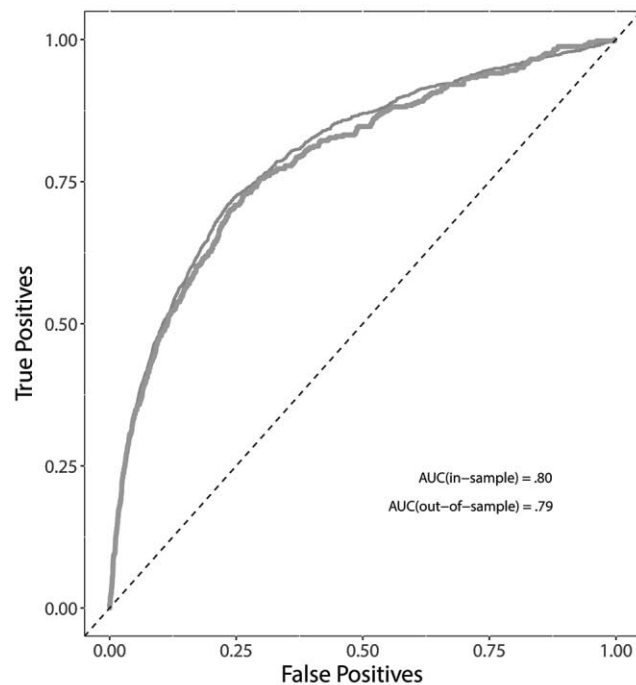


Figure 6. Receiver operating characteristic curves, in- and out-of-sample. The thin line represents in-sample predictions; the thick line represents out-of-sample predictions. The training fraction is 0.8, which resulted in five folds of testing/training data. To model spatial dependence in the data, each fold consists of randomly selected years of data rather than individual observations. The dashed line gives the expected number of correct positives and false positives that would result from random guessing. Color version available as an online enhancement.

of minor powers (e.g., their capabilities) may have affected troop placements during the Cold War, they no longer have an effect in the post-Cold War subsample. Conversely, major powers' domestic economic conditions, as well as their bilateral trade with the minor powers, became more important determinants of troop placements in the post-Cold War era. The negative coefficient on Major Power Economic Growth may suggest that major powers project force abroad to compensate for the loss of status associated with economic decline at home.

In the post-9/11 subsample, several control variables—Change in Rival Major Power Capabilities, Minor Power Capabilities, Minor Power in International War—are no longer statistically significant compared to the full sample. In contrast, Major Power Economic Growth, which is not statistically significant in the full sample, becomes statistically significant in the post-9/11 subsample. These results are similar to those of the post-Cold War subsample. The lack of statistical significance on Change in Rival Major Power Capabilities may indicate that Russia's declining military capabilities during the post-9/11 time period became a less relevant consideration for the geopolitical strategies of the United States and its allies.

To assess the fit of our model, we constructed receiver operating characteristic (ROC) curves, for both in- and out-of-sample predictions (fig. 6). ROC curves show the trade-off between true positive rates and false positive rates when varying the thresholds of classification from 0 to 1. The area under the curve statistics, reported in the figure, give the proportion of correctly classified observations. The value of 0.5 on this measure would indicate that the estimator performs as well as random guessing. The upper limit of 1, in turn, would tell us that the estimator correctly classifies all observations. We can see that, although predicting a rare event (New Troops occur in less than 2% of the data) is challenging, the area under the prediction curve is about 0.8 for both in- and out-of-sample predictions.

## CONCLUSION

Much of the growing literature on power projection through troop deployments has focused on the effects of troop presence on the host country. Much less, at least from the quantitative side, has been written on how the decision to engage in this form of power projection is made by major powers. This article is among the first studies to quantitatively analyze the interactive dynamics among major powers as they decide where to deploy their troops. We demonstrate that major powers expand and consolidate their global and regional influence through troop deployments abroad. From the perspective of a protégé, major power troop deployments are a strong security commitment. For a major power, overseas troop deployments demarcate its spheres of influence around the globe.

Our empirical results show that major power troop deployments are an action-reaction process that involves cooperation and competition among allied and rival major powers. This process follows two general strategies. First, major powers build up and cluster their deployments with ideologically similar states within a region, as well as further reinforce their influence by cooperating with their major power allies. Second, major powers react to and counter rival deployments by sending reinforcements or establishing additional placements in threatened regions.

While our findings are driven, in part, by competition between the United States and USSR/Russia, we note that France and the United Kingdom follow the same strategies in building their own spheres of influence. Further, by considering both the Cold War and post-Cold War eras, this study helps us understand what competitive force projection dynamics between the United States and an increasingly active Russia will look like as a post-Cold War Russia takes on a more active posture in Europe.

In recent years, Russia has engaged in aggressive territorial expansion targeted at two of its neighbors, Georgia and Ukraine. Following these conflicts, there is a growing possibility that Russia may continue its territorial expansion into other former Soviet states, specifically, Estonia, Latvia, and Lithuania. These three states are particularly relevant because they are all NATO members, and an attack against them could lead to invoking NATO's Article V and potentially drawing the United States and its NATO allies into direct conflict with Russia.

A recent policy suggestion to avoid the scenario of direct conflict between nuclear powers has been for the United States to preemptively deploy troops to the Baltic states in effort to deter a possible Russian encroachment (Shlapak and Johnson 2016). Our findings suggest that this is unlikely to happen and that the United States would be more likely to deploy troops to areas in which it already has built up a military presence, such as Central Europe, rather than place troops closer to Russia's sphere of influence.

Although our current temporal domain excludes China's recent deployments to the Horn of Africa, this work may also speak to future interactions between China and the United States, as China begins to more actively deploy its troops abroad. A future research question to address would be whether interactions between the United States and China will be similar to those between the United States and Russia or whether China will pursue some other strategy. Given that China has not traditionally been active in projecting force, it is likely that almost any deployment could be perceived as an encroachment on the American sphere of influence and thus be more likely to prompt a reaction from the United States and its allies.

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