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

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Abstract
We examine the strategic logic behind major powers’ decisions to place non-invasion military troops abroad. We argue that these decisions are driven by the goals to protect ideologically similar states and to signal the extent of one’s geographical reach. Major powers’ ability to pursue each of these goals is, however, constrained by similar ambitions on the part of other major powers. To overcome this constraint, major powers must strategically anticipate and react to the actions of other major powers. This theoretical framework leads us to anticipate temporal clustering in major power troop deployments, particularly if a rival recently placed troops within the same region. We also expect that geographically distant deployments will elicit an in-kind response by a rival major power. We test our hypotheses using cross-sectional time-series data on major power troop deployments using a Local Structure Graph model, a type of network estimator that allows for modeling each troop placement as a function of any concurrent or previous deployments in the system, weighted by geographical distance and ideological similarity. Our results provide evidence that major powers act strategically in a global competition for influence.

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Introduction

What are the strategies behind major power decisions to project influence abroad? How do they decide when to consolidate their existing sphere of influence, when to expand beyond it, and when to retreat? These types of strategic decisions are, of course, not made unilaterally. We contend that major powers strategically anticipate and react to the actions of other major powers as they seek to achieve their foreign policy goals. In other words, major powers often compete with one another in order to advance their global political interests.

Non-invasion troop deployments are one of the key indicators of power projection. As this type of deployments requires the agreement of the host state, placement locations of such deployments effectively correspond to major powers’ spheres of influence as well as powerful signals of commitment to the host state. In this paper, we zero in on the strategic logic behind the major powers’ decisions on where to deploy troops. We propose two complementary mechanisms behind major powers’ decisions of where to deploy troops: (1) protect and influence ideologically similar states—protégés—and (2) pursue prestige and signal capabilities. Our key insight is that, in making deployment decisions, major powers consider not just their immediate foreign policy goals, but also the current and expected actions of other major powers.

Our study is among the first to systematically and quantitatively explore the determinants of major power competition through troop deployments. By examining the determinants of troop deployments, we can draw inferences about the interactions among competing major powers. Doing so also helps us assess the conventional wisdom that major powers seek to set up spheres of influence while also reacting to the actions and expectations of their adversaries. This manuscript fills a major gap in the international relations literature, which despite the growing number of studies analyzing the effects of troop deployments abroad.\textsuperscript{1}

\textsuperscript{1}Gartzke and Kagotani \textsuperscript{2017}; Allen and Flynn \textsuperscript{2013}; Martinez Machain and Morgan \textsuperscript{2013}; Bell et al. \textsuperscript{2013}. 
is still lacking in theoretical explanations of non-invasion military deployments. Further, understanding why major powers seek to spread their influence to some areas and not others is itself an important question to answer.

We use a novel statistical estimator—a local structure graph model (LSGM)—to statistically model major powers’ interdependent decisions to deploy troops abroad. The estimator treats troop placements as network edges that form in response/anticipation of other troop placements: e.g., the US decision to place troops in an ideologically similar state affects, and is affected by, possible troop placements of US major power rivals, such as the Soviet Union/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. We find that major powers seek to develop ideologically coherent spheres of influence while simultaneously reacting to the efforts of other major powers to expand their own.

In the next section we review the literature on major power competition and troop deployments. We then turn to our theory of how ex ante conditions and expectations of the future affect the decision of a major power to consolidate and expand globally. In the section that follows, we present our research design and analysis. Finally, we discuss our results and conclude.

Major Power Competition and Troop Deployments

Major power politics during much of the Cold War was viewed through the prism of US and Soviet efforts to expand their influence throughout the world. Early on, both the US and USSR had clearly demarcated spheres of influence, defined primarily through geographical proximity (the Western Hemisphere and Eastern Europe, respectively). As the Cold War

\footnote{There is growing research that demonstrates the necessity to statistically model interdependence (Gallop 2016; Minhas, Hoff, and Ward 2016; Poast 2010).}
progressed, both powers competed for influence in what was referred to as 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 minor powers and former colonies. Much of this competition, particularly in the 1970s and 1980s, took the form of establishing a military presence abroad.

The competition between the US and USSR is consistent with the policy outlined by Kennan (1946), 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 (861).” 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 “counter-force” to the Soviet Union. This implied that US policy at the time was both the development of ideological and geographical spheres of influence, and building a counter to the actions of rival major powers.

As the Cold War continued, the Americans and Soviets placed military bases with their protégés, and it appeared that these decisions were not being made in isolation, but rather in reaction to the actions or expected actions of the rival superpower. For example, after the American defeat in Vietnam, the Soviets began to aggressively pursue new military deployments in the Pacific. While the Soviet Union was actively pursuing a greater military presence in several areas, these particular deployments were seen as a response to decreased US control over the islands of the Central Pacific after the Vietnam War. The Soviet Union also gained influence through military deployments and expanded their bases in Latin Amer-

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3Harkavy 1982.
ican, the Caribbean, Africa, the Middle East, South Asia, and Southwest Asia.

More recent interactions between the US and Russia have returned to this Cold War dynamic. Russia viewed NATO expansion with suspicion, and placed troops in Tajikistan and Uzbekistan in order to defend their territorial integrity. In addition, Russia expressed concern for the welfare of Russian-speaking populations in Estonia, Latvia, Lithuania, Moldova, and Ukraine. These Russian efforts were met with suspicion by the former Soviet states, who then sought protection from the US. Their suspicion increased further following Russia’s annexation of Crimea, its involvement in eastern Ukraine, and its holding of military exercises off the coasts of the Baltic states. In response to Russia’s actions, the United States deployed several Special Operations forces to NATO members Latvia, Lithuania, and Estonia in early 2017. In addition, the US and other NATO allies expect to send 8,000–12,000 troops to the Baltic States and Poland.

US-Russian dynamics are not the only instances of major powers reacting to the deployment of a rival’s troops with an in-kind response. During the imperial era, Great Britain competed with the US for influence in Latin America and Southeast Asia, while 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 two superpowers during the contemporary era. For example, despite being unable to compete globally with either the US or USSR/Russia, France has maintained a desire to lead pacts with minor powers outside of the superpower’s spheres. France has also resisted encroachments into areas where it has traditionally held influence, such as Francophone Africa, which French leaders refer to as *chasse gardée*, or its ‘exclusive hunting ground’. Acrimonious exchanges between US and

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4 Harkavy 1982
5 Gibler 1999
6 Gibler and Sewell 2006
7 Schmitt 2017
8 Schraeder 1995, p. 541.
French officials, for example, highlight that Francophone Africa has emerged as a publicly contested arena of Great Power competition. 9

As part of this competition, the US has made occasional forays into France’s sphere of influence. The US assisted the Sékou Touré regime in Guinea when France removed its support, as well as intervened in the Democratic Republic of the Congo. 10 The US justified these actions by charging France with being too tolerant of Marxist regimes within Francophone Africa. France, for its part, viewed US actions as problematic enough that its policymakers privately referred to US threat as equal to that of the USSR. 11 This assessment helps to explain why, even as France downsized their foreign engagements in the late 1990s, it maintained a military presence in Francophone Africa in order to dissuade additional encroachment by other major powers. 12 The US-France case, of course, lacks the intensity of the US-Russia engagement, but highlights that major power competition is alive and well, and can occur even among major powers with relatively positive overall relationships.

**Major Powers, Host States, and Troop Deployments**

Major powers, by definition, have greater economic and military capacity than other states and can more easily pursue interests that extend beyond their own territorial integrity. 13 In addition to standard foreign policy tools, such as alliance formation or foreign aid, major powers can pursue even the most costly of foreign policy strategies, such as military interventions or non-invasion troop deployments. Large troop numbers, more sophisticated

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9 Schraeder 2000, p. 396.
10 Schraeder 1995; Schraeder 2000.
12 Schraeder 2000, p. 414. US-French competition, of course, extends beyond Africa to a number of other issues, including French re-integration into NATO and the most appropriate courses of action in which to engage Cuba, Iran, and Iraq under Hussein. In addition, as the US began to increase its emphasis on democratic principles relative to security and political interests in the post-Cold War era, France did not. These competing interests heightened a competitive tension that was already present, though to a lesser degree, during the Cold War era (Schraeder 2000).
13 Wolfers 1984; Chiba, Martinez Machain, and Reed 2014.
equipment, and logistical prowess enables major powers to pursue policies aimed at changing the status quo and moving it closer to their own preferences.\(^\text{14}\)

The decision to expand or consolidate one’s sphere of influence is undertaken with consideration of both ideological and geographic characteristics of existing major power deployments. In the geographic context, consolidation involves placing troops nearby while expansion involves moving troops further away from one’s territory. Within the ideological context, consolidation consists of placing troops with multiple protégés within the same region, whereas expansion entails deployments to a “new” region as a response to those by a rival power.

Non-invasion troop deployment, such as the establishment of foreign military bases or training exercises with allied states, is a long-standing tool for power projection and expansion. The acts of setting up military bases and placing troops abroad are a signal of a major power’s ability to project power beyond its geographical borders, i.e. a tool for demarcation of a sphere of influence.\(^\text{15}\) Deployment of troops to new locations or regions may indicate an intent to expand the existing sphere of influence, while additional deployments to the same locations and regions may signal an intention to consolidate the existing sphere of influence. Once a major power has deployed troops to one state, it will be both logistically easier to deploy troops to neighboring states and more efficient to continue to create a sphere of influence in that region. Moreover, spreading deployments to multiple states within a region not only increases the credibility of the major power’s commitment to each individual state in that region, but also allows the major power greater control over the region as a whole.\(^\text{16}\)

Deployment of troops abroad is among the most direct forms of control and influence, as it is associated with a tangible security mechanism for protecting the host-state from

\(^{14}\) Palmer and Morgan 2006.

\(^{15}\) Some other benefits of troop placements may involve specific policy concessions by the host states (Morrow 1991, Lake 2009, Johnson 2015), such as deference on foreign policy issues (Nieman 2016) or cooperation against intra- and extra-state terrorist organizations (Bapat 2006).

\(^{16}\) Allen, VanDusky-Allen, and Flynn 2010; Allen, Flynn, and Van Dusky-Allen 2016.
external threats, as well as an implicit form of coercion on the part of the major power. Foreign bases and deployments do not only carry strategic importance, but also symbolic value.\footnote{Harkavy 1982.} 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. First, the deployment itself is costly to the major power and is therefore a credible signal of the major power’s willingness to spend its resources on the host state as well as to facilitate a potential intervention to defend the protégé. Unlike an alliance commitment, which is not frequently updated, the signal of commitment that a major power’s deployed troops send is renewed every time that a military presence is maintained and troops continue to deploy to a host state.\footnote{Gartzke and Kagotani 2017.}

Second, even a small deployment can deter aggression against the protégé host, as the troops serve as a trip-wire.\footnote{Schelling [1960] 1981; Gartzke and Kagotani 2017.} If the major powers’ troops are killed in an attack on the protégé, this potentially commits the major power to engaging in a larger intervention.\footnote{Note that this intervention does not have to be completely certain for the signal of commitment to be credible. Schelling ([1960] 1981) argues that the threat that “leaves something to chance” is still an effective deterrent.} Once committed, there is little question that major powers can bring the full brunt of their capabilities to a conflict.\footnote{Chiba, Martinez Machain, and Reed 2014; Gartzke and Kagotani 2017.}

Finally, from the perspective of a minor power, hosting troops gains increased security and additional resources.\footnote{Morrow 1991; Johnson 2015.} Additional resources can take the form of either direct rent payments from the major powers, positive economic externalities associated with hosting a large military presence,\footnote{Jones and Kane 2012.} or simply the freeing up of resources that would otherwise have to be used for security purposes.\footnote{Martinez Machain and Morgan 2013.} Troops may be placed in an aligned minor power to assist the
minor power’s government in suppressing uprisings or other domestic threats. Whereas during the first half of the twentieth century, troop deployments to colonial (or colonial-like) holdings largely resulted from unilateral decisions on behalf of the major power, in recent years, host states are frequently able to negotiate additional benefits as part of the troop deployment agreements. Research also shows that troop deployments within a territory affect the security, economics, and human rights conditions of the host state.

**Strategy of Choosing Locations for Troop Placements**

While we have a strong understanding of the security/policy concessions trade-off associated with major power troop deployments to minor powers, little attention has been paid to the major power’s choice of location for troop deployments. What makes some strategic locations more attractive and feasible for deployment than others? What are the determinants and constraints that result in troop bases in some locations and not others?

Figure 1 provides a visualization of major power troop deployments to minor powers during two time periods. Subfigure 1a displays deployments of troops in 1985, while subfigure 1b shows deployments in 2005. It is evident from subfigure 1a that while the UK and France tended to deploy troops to their former colonies in Africa and the Middle East, the US placed troops in Europe, and the USSR placed theirs in the Middle East and Southeast Asia. In addition, each major power—and especially the US and USSR—had troop deployments in close proximity to those of one another.

Subfigure 1b demonstrates that in 2005, these four major powers continued to deploy

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25 Westad 2005
26 Harkavy 1982
27 Lake 2009; Allen and Flynn 2013; Martinez Machain and Morgan 2013; Bell, Clay, and Martinez Machain 2016; Nieman 2016
28 Major power troop deployments to other major powers, e.g. US deployments to the UK are excluded from the data, as our focus is on the dynamics of how major powers account for and react to one another’s deployments.
It is clear from the figures that each major power did not place troops randomly, but instead accounted, to some degree, for the presence of troops by other major powers. While the US and USSR, in particular, place troops near one another, they also appear to have relatively clear spheres of influence. The tendency to place troops in the vicinity of a rival’s troops and the demarcation between spheres suggest that both superpowers accounted for one another’s troop placements when deciding where to deploy their own troops.

We build on the literature to propose two distinct (yet complementary) mechanisms of major power’s selection of locations for their overseas bases and troop deployments: (1)
protection and influence over ideologically similar states vs. (2) pursuit of prestige via demonstrating the ability to project power beyond one’s borders. The goal of protection and influence over ideologically similar states is best achieved by placing troops in states of similar ideological preferences (to the major power).\(^{29}\) Coupled with the system’s tendency towards geographical clustering of ideologically similar states, this strategy for selecting locations for bases and deployments will also lead to an establishment and consolidation of ideologically cohesive “communities” of states within the same region.\(^{30}\) For example, the US did not just deploy its troops to a single state in Western Europe during the Cold War. As the map of major power deployments in Subfigure 1a shows, the US placed troops in Belgium, the Netherlands, Spain, Germany, Italy, Greece, and Turkey. This is a clear example of a major power carving out a relatively ideologically coherent regional sphere of influence. This outcome is not an accident, but instead the result of an intentional strategy first laid out in the writings of Kennan (1946) on the containment strategy. Based on the aforementioned observations, we may posit that, the tendency to develop ideologically coherent spheres of influence is a general phenomenon common to other major powers. 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.

*Hypothesis 1: Major powers are more likely to deploy troops to protégé if they (or their major power allies) have deployed troops to other protégés within a region.*

As discussed earlier, as part of a policy of containment, Kennan (1946) did not only call for expanding US military influence abroad, but also emphasized the need to react to Soviet expansion abroad. Major powers may also seek to expand their presence into regions

\(^{29}\)And vice versa, some degree of ideological similarity between the major power and the host is a pre-condition for troop placement, i.e. major powers would have a hard time convincing an ideologically dissimilar state to accept non-invasion troops.

that are currently within the sphere of influences of ideologically dissimilar major powers. Such expansion is especially likely as an attempt to “contain” a growing presence of an ideologically dissimilar major power within a region.  

In other words, major powers’ incentives to deploy forces abroad are amplified by geographical expansion in deployments of a rival major power. A rival’s troops can create a competitive environment in which a major power, in order to maintain its influence in a region, may be compelled to respond to the placement of a rival power’s troops near one of their protégés. In fact, the protégé itself may request additional troops from a major power in reaction to the growing presence of a rival major power or in cases in which a neighboring adversary has recently begun hosting troops from a major power’s rival. For example, in 2012 the United States announced a new deployment of 2,500 US marines to Australia, an allied state. While the official reason for the deployment was the conduct of joint exercises between American and Australian troops, the move was largely perceived as a way to counter growing Chinese influence in the South China Sea. In fact, since then, both American and Australian forces have engaged in “freedom-of-navigation” operations as a way to challenge China’s claim on waters surrounding artificial islands it has created in the South China Sea. As the Chinese themselves have suggested, this dynamic is reminiscent of US Cold War placements of troops along the perimeter of members of the Warsaw Pact to contain the influence of the Soviet Union. More recently, in 2017, the US established an air defense base in Israel, just eight months after Russia expanded its naval base in Syria. These process described above suggests that we may observe clusters (cascades) of temporally proximate deployments to ideologically dissimilar states within the same region: an action by one major power triggers a reaction by a rival (ideologically dissimilar) major

\[31\] Thompson and Dreyer 2012

\[32\] McDonald 2012

\[33\] Perlez 2015

\[34\] McDonald 2012

\[35\] Gross 2017
Hypothesis 2: Major powers are more likely to deploy troops to a protégé in response to a rival major power deploying troops to its own protégés within a region.

Hypothesis 2 suggests that major powers deploy troops to protégés in regions where their major power adversaries also have a presence. However, it is also possible that major powers react to the geographical reach of their adversaries’ troop deployments—the second mechanism proposed here. Instead of seeking to counter a major power deployment only by placing troops in ideologically similar states, a major power might become more willing to engage in geographic expansion and place troops further afield as their adversaries begin placing their troops further afield. In other words, rather than reacting to the ideology and geographic proximity of an adversaries’ deployments, a major power may react to their adversary’s ability to project force abroad.

By deploying troops to geographically distant locations, major powers do more than just expand their sphere of influence and demonstrate their ambition. Rather, expanding and maintaining a troop presence in a distant or remote location demonstrates their logistical prowess and material capabilities. Demonstrating such reach not only showcases the strength and prestige of a major power, but serves as a warning to rival major powers. These rivals, of course, are likely to provide an in-kind response in order to highlight their own strength. This action/reaction dynamic manifests in that when one major power seeks to expand their positions abroad, a rival major power is likely to respond with distant troop placements of its own.

This logic is nicely demonstrated by the deployment choices made by the US and Soviet Union in the early 1960s. In 1961 the US presence in Turkey became a particularly contentious issue as it deployed Jupiter missiles there, increasing the perceived threat of the US presence in Turkey. The response by the Soviet Union was not to just place troops or
armaments near Turkey, but also to expand and place more troops and missiles in Cuba, a more distant deployment.\(^{36}\)

This set of interactions is consistent with the idea that major powers react to one another, but rather than following each other into protégés within a region, they mimic one another’s strategy in terms of how distant they spread through troops geographically. If major powers are acting in this fashion, we should see support for the following hypothesis:

*Hypothesis 3: Major powers are more likely to deploy troops to more geographically distant minor powers as rival major powers deploy troops to more distant minor powers.*

Our theory makes predictions as to the behavior of major powers in reaction to the observed and expected actions of other major powers. In particular, it suggests that major powers will choose to deploy their troops to a minor power in response to either the observed or expected actions and attributes of another major power. In particular, we are interested in how likely deployments are to occur given the presence of other deployments. We thus require a methodology that takes into account how the formation of one such agreement within a network affects the probability of a different deployment agreement forming. In the following section we will test our four hypotheses using a LSGM estimator, which allows us to represent the network in a way that is consistent with the theoretical set-up.

**Research Design**

We focus our analysis on major power troop deployments. We define and code a state as a major power if it is one of the five permanent members of the UN Security Council—US, UK, France, USSR/Russia, and China. This conceptual and coding decision is consistent with the previous literature which has defined major powers in terms of their economic power,

\(^{36}\)In the case of the US and the Soviet Union, the two main drivers of this competition, deployments that were distant from the US were often close to the USSR, and vice versa.
large military capabilities (in both absolute and relative terms), and active involvement in the international system.\footnote{Copeland 2000; Rasler and Thompson 2000.}

Table\footnotemark[3] reports the total number of troop placements abroad, measured in country-years, from 1981-2007. As evidenced in the table, major powers do tend to be more active than other states. In addition to the US, USSR, France, and the UK being the most active in terms of troop deployments, they are also more likely to place troops across the globe (than the other states listed in the table).

The unit of analysis is an major–minor power dyad-year or, in the parlance of network analysis, an edge between each of the major powers and all minor power states.\footnote{Dyads between pairs of major powers are excludes from the analysis.} The sample contains observations for all such pairs of states that could deploy/receive troops in a given year between 1981–2007, for a total of 18119 observations, consisting of 830 unique dyads between the 5 major powers and 166 minor powers. The dependent variable, Troop

\footnotetext[3]{Copeland 2000; Rasler and Thompson 2000. Given a lack of consensus on the major power status of states which are economically powerful but lack great power military capabilities, such as post-WWII Japan and Germany (both of which are coded as major powers by the Correlates of War Project in this time period) (Singer and Small 1984), we chose to restrict our sample to permanent members of the Security Council. The five major powers that are members of the UN Security Council are also the five recognized nuclear powers, according to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), which is yet another determinant of major power status (Jo and Gartzke 2007). Being both a member of the P5 and the NPT’s nuclear powers implies recognition as a major power by other major powers in the system, which another important qualification for major power status (Fordham 2011, Rasler and Thompson 2000).}
Table 1: Total Troop Placements Abroad in Country-Years, 1981-2007.

<table>
<thead>
<tr>
<th>Country</th>
<th>Placements</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>600</td>
</tr>
<tr>
<td>USSR/Russia</td>
<td>361</td>
</tr>
<tr>
<td>France</td>
<td>223</td>
</tr>
<tr>
<td>UK</td>
<td>202</td>
</tr>
<tr>
<td>Italy</td>
<td>76</td>
</tr>
<tr>
<td>East Germany</td>
<td>68</td>
</tr>
<tr>
<td>Netherlands</td>
<td>66</td>
</tr>
<tr>
<td>Singapore</td>
<td>62</td>
</tr>
<tr>
<td>Australia</td>
<td>62</td>
</tr>
<tr>
<td>Cuba</td>
<td>61</td>
</tr>
</tbody>
</table>

*Placement*, equals 1 if a major power deployed new troops to a minor power in a given year (i.e., an edge is realized), and 0 otherwise. Figure 2 provides a visualization of all realized new troop placements that occurred in 1985 as network edges. The major powers that deployed new troops in that year, according to our data, are denoted by triangles, while minor powers that received new troops are denoted as circles.

**Methodology**

Our theoretical focus is on the relational action–reaction processes that take place among major powers and result in their decisions to place troops in some locations rather than others in each time period. To model these action–reaction processes, we use a local structure graph model (LSGM) which 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).

40LSGM is similar to a spatial autoregressive model (SAR) Anselin 2013, yet employs a logistic distribution for an easy application to binary outcome variables. LSGM is also similar to an ERGM Wasserman and Faust 1994 in that it models network outcomes as a function of endogenous network dynamics, yet while ERGMs have been primarily applied to model global network outcomes (e.g., occurrence of triangles), LSGM allows for modeling formation of edges between nodes (here, troop placements) as a function of other edges. Given our interest in a binary outcome variable and treating edge formation as a function of other edges,
Figure 3: Ideological Distance among Troop Deployments, 1985

Figure 3 provides a visual re-conceptualization of the network in which the unit of analysis is a state (Figure 2), as a network in which the unit of analysis is a major-minor power dyad. Figure 3 displays each individual troop placement as a point in a two-dimensional ideological space with coordinates defined as state $i$’s and state $j$’s ideal points scores.\(^\text{11}\) The $y$-axis is the ideal point scores for minor powers, while the $x$-axis is the ideal point scores for the Soviet Union. LSGM is the most natural choice of a statistical estimator.

\(^\text{11}\)International states’ ideal point scores align all international states on a [-3,3] ideological scale, such that higher scores are associated with ideological proximity to the US, while lower scores are associated with ideological proximity to Russia/USSR. Ideal point scores are obtained from Bailey, Strezhnev, and Voeten (2015). We discuss them in detail in the Independent Variables section below.
major powers. The major powers shown in the figure are the USSR (on the far left, near the ideal point score $-2.0$), France and the UK (on the right), and the US (on the far right, near ideal point score $2.0$).

A conceptualization of a network of relationships (ideological or physical distances) among major–minor power dyads (as in Figure 3) provides several new insights over a more traditional approach of treating international states as nodes and relationships among them as edges (e.g., Figure 2). First, minor powers that receive troops tend to have similar ideal point scores as 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. Second, edges that contain France, the UK, and the US as major powers are more ideologically similar than those edges in which either the US or USSR are the major powers. Third, minor powers receiving troops from the USSR are much more ideologically similar than the those receiving troops from the US. All minor powers receiving Soviet troops have ideal point scores less than $-0.5$, while the US sends troops to Pakistan, which has an ideal point of approximately $-0.5$. Finally, there is evidence of at least some geopolitical balancing by the major powers, as Soviet troops placed in Albania are countered by American troops in Greece and British troops in Cyprus.

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 and/or geographic 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 or geographical) 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 ob-
servations as well as exogenous covariates. Neighborhoods can be defined by either binary characteristics (presence or not within a geographical region) or continuous characteristics (intensity/distance within a lattice).

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

The binary random variable \( y(s_i) \) records the realization of the dependent variable (edge) as:

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

We assume that \( i \) is affected only by its neighborhood, but not the indirect effects of its neighbor’s neighbors. That is, a troop deployment is conditioned by the realization of every other deployment in its neighborhood \( N_i \), but not those outside of its neighborhood. Thus, we make a Markov assumption of conditional spatial independence of the form:

\[
f(y(s_i) | y(s_j) : s_j \neq s_i) = f(y(s_i) | y(N_i)) \tag{1}
\]

Since the realization of an edge is binary (i.e. new troops are either deployed or not), we

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44Edges have no connectivity with themselves.
assume a binary conditional distribution:

\[ P(Y(s_i) = y(s_i) | y(s_{-i})) = \exp \left[ y(s_i) A_i(y_{-i}) - B(y_{-i}) \right], \tag{2} \]

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

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

where \( \log \left( \frac{\kappa_i}{1 - \kappa_i} \right) = X_i \beta, \) \( X_i \) is a vector of exogenous covariates, \( \beta \) is a vector of parameter estimates, \( w \) is a matrix of connectivities among edges, and \( \eta \) is a dependence parameter. \( \beta \) represents the instantaneous effects of the exogenous covariates, while \( \eta \) captures dependence among observations.

The dependence term, \( \eta \sum_{j=1}^n w_{ij}(y_j - \kappa_j) \), can make either a positive or a negative contribution to the natural parameter function. The dependence term makes a 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 in ideological close locations, \( y_j = 1 \), has a positive effect and the absence of edges, \( y_j = 0 \), has a negative effect on the probability that \( y_i = 1 \). In contrast, if \( \eta < 0 \), the presence of edges in ideologically close locations, \( y_j = 1 \), has a negative effect and the absence of edges in a neighborhood, \( y_j = 0 \), has a positive effect on the probability that \( y_i = 1 \).

An important feature of this parametrization—and one of the key improvements over a naïve model such as a logit—is the global parameter centering of the dependence term, \( y_j - \kappa_j \). This specification effectively prevents over-estimating 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 insures 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, i.e. do two units share an outcome because both are exposed to the same exogenous factor or due to their mutual influence on each other? In the above model specification, the common exposure is modeled via the global term $\log \left( \frac{\kappa_i}{1 - \kappa_i} \right)$, which is also used for centering of the dependence term to avoid misattributing a local effect to what in fact is simply the effect of common exposure. 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.

The estimator obtains parameter estimates by maximizing the log pseudo-likelihood (PL), which is the summation of the logs of the conditional distributions:

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

where

$$p_i = \frac{\exp(A_i(y(N_i)))}{1 + \exp(A_i(y(N_i)))}. \quad (5)$$

We also must account for temporal dependencies and possible asymmetric effects regarding the realization of ideologically similar edges on the likelihood of observing $i$ (e.g., $i$ is affected by positive outcomes in its neighbors, but not affected by negative outcomes). Substantively, such dependencies imply that recent troop deployments by a major power to a minor power affect the probability that a rival major power deploys troops to a nearby minor power.

\[45\] Kaiser and Caragea 2009.  
\[46\] Besag 1975. In order to specify a full conditional distribution, which is necessary to identify the joint distribution, the estimator requires the connectivity matrix $w$ must be symmetric for all pairs of edges (i.e. $w_{ij} = w_{ji}$) Kaiser and Cressie 2004. Maximizing the pseudo-likelihood recovers consistent point estimates for Markov Random Fields models, of which LSGM is a special case Casleton, Nordman, and Kaiser 2016; Guyon 1995.
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 weighted by 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. We do this by including a new term, \[ \sum_{s_j \in N_{it}^1} \alpha w_{ij}(1 - \kappa_{jt}), \] to the natural parameter function reported in Equation 2, where \( N_{it}^1 \) denotes \( i \)'s neighbors with an outcome \( y(s_j) = 1 \) in the previous time period \( t - 1 \), or \( N_{it}^1 = \{y_{jt}: y_{j(t-1)} = 1\} \), \( w_{ij} \) is the \( ij^{th} \) cell of the connectivity matrix \( w \), and \( \alpha \) is the parameter associated with the temporal lag. We operationalize the lag to account for troop placements made in the previous year.

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.

The final natural parameter function includes the asymmetric temporal lag as follows:

\[
A_{it}(y_{it}) = \log \left( \frac{\kappa_{it}}{1 - \kappa_{it}} \right) + \eta \sum_{j \in N_i} w_{ij}(y_{jt} - \kappa_{jt}) + \alpha \sum_{j \in N_{it}^1} w_{ij}(1 - \kappa_{jt}).
\]  

(6)

Maximizing the PL function recovers consistent point estimates.\(^{47}\) We estimate standard errors from 100 bootstraps after a 50 iteration burnin, as pseudo likelihoods return inconsistent standard errors.\(^{48}\)


\(^{48}\)We thin the bootstraps by keeping every 10\(^{th}\) iteration.
Dependent Variable

Our dependent variable is the realization of an edge, which we treat as new troop deployments by a major power in a foreign state. Included in this measure is both initial deployments and increases in the number of troops deployed. We operationalize this using data from Braithwaite (2015), who measures the total number of troops from one state deployed to another in a given year. The data was gathered by Braithwaite from the International Institute for Strategic Studies’ (IISS) publication *The Military Balance*, which gathers yearly information on the military capabilities of states in the international system.\(^{49}\) There are 354 instances of new or increased troop placements by major powers in our dataset. We treat all new deployments the same, regardless of size or whether they involve a permanent military installation (base) or not. While we recognize that large deployments can be meaningful in terms of coercive power, we note that in this study we are focusing on non-invasion deployments. This means that even a small deployment can be a strong signal of commitment by the major power to its protege, as it can serve as a trip-wire mechanism to involve the major power in conflict if the protege is targeted.\(^{50}\) This logic is illustrated by the recent US deployments to the Baltic states in light of Russia’s active foreign policy in the region. The deployments involve only a few dozen troops, but send a strong signal of US commitment to the region.\(^{51}\) Further, we argue theoretically that given that we are dealing with only major powers, there is little uncertainty as to whether the major powers have the capacity to significantly increase the size of an existing deployment if they chose to do so.\(^{52}\) Table 2 displays how the dependent variable of new and increases in troop deployments vary by geographical region.

\(^{49}\)Braithwaite’s data excludes both strictly naval and U.N. mission deployments
\(^{50}\)Schelling [1960], 1981.
\(^{51}\)Schmitt 2017.
\(^{52}\)Gartzke and Kagotani 2017; Schelling [1960], 1981.
Table 2: Distribution of Major Power Troop Deployment Increases by Region, 1981–2007.

<table>
<thead>
<tr>
<th>Region</th>
<th>Troop Increases</th>
</tr>
</thead>
<tbody>
<tr>
<td>North &amp; South America</td>
<td>51</td>
</tr>
<tr>
<td>Europe</td>
<td>107</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>50</td>
</tr>
<tr>
<td>Middle East &amp; North Africa</td>
<td>65</td>
</tr>
<tr>
<td>Central &amp; East Asia</td>
<td>54</td>
</tr>
<tr>
<td>Southeast Asia &amp; Oceania</td>
<td>27</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>354</strong></td>
</tr>
</tbody>
</table>

Note: Geographical regions are based on Correlates of War country codes.

Independent Variables

Our first independent variable concerns the degree of local ideological spatial dependence between edges—captured by a neighborhood—within a network. Each (potential) major-minor power relationship (edge) where troops are deployed is treated as a node within a network of edges. The ideological score of each of these nodes serves as the $x$ and $y$ coordinate 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 United Nations General Assembly voting.\(^5\) The Euclidean distance between a pair of nodes (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—$w$ in Equation [3]—as the degree of connectivity between these edges (major-minor power pairs) within a neighborhood.

We calculate our measure of ideological similarity among major-minor powers dyads

within a shared geographical region. We use the Correlates of War country codes to identify six regions: the Americas (country codes <200), Europe (200–399), sub-Saharan Africa (400–599), the Middle East and North Africa (600–699), Central and East Asia (700–799), and Southeast Asia and Oceania (800–999). This measure serves to test our first hypothesis; a positive coefficient indicates that major powers are more likely to deploy troops to minor powers when they have deployed troops to ideologically similar states within the region, whereas negative valued indicate that major powers are less likely to do so.

To account for short-term temporal dependence, we include a weighted, asymmetric temporal lag. An asymmetric measure of temporal dependence is necessary as initial troop placements and increases in the number of troops deployed is a relatively rare event. The inclusion of an asymmetric lag, of course, 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 non-deployments have no effect. When the coefficient on the temporal term is positive, it indicates that the likelihood of troop deployments increases in response to the number of deployments in the previous year on the opposite part of the ideological spectrum. When the coefficient is negative, it indicates that the likelihood of troop deployments increases in response to the number of deployments on the same part of the ideological spectrum.

In addition to ideological dependence, we also include an additional spatial lag, Geographical Distance, to account for dependence in the geographic proximity of troop placements of rival powers. This variable captures whether major power deployments are determined not only by the ideological similarity or dissimilarity of nearby deployments, but also by the actual physical location of their rivals’ deployments. Similarly to how we restricted neighborhoods to specific geographic regions when calculating ideological space, for our geographical

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54We treat the US as the primary rival to Russia/USSR and China, and Russia/USSR as the primary rival to the US, UK, and France.
spatial lag we consider a major power’s reaction to only deployments by rivals. Thus, the variable treats the relevant neighborhood as the continuous geographical distance between all pairs of major-minor power edges where the major powers are rivals. The inclusion of Geographic Distance serves to test both Hypothesis 2 (on whether major powers deploy troops as a reaction to rival deployments) and Hypothesis 3 (on preventive deployments). For example, an edge would include a US-Canada deployment compared to a Russia-Estonia deployment (or a US-Estonia deployment compared to a Russia-Cuba deployment).

We measure Geographic Distance as the product of the Euclidean distances between state capitals for each dyad-pair. More formally, denote major powers as $M = \{M_1, M_2, \ldots, M\}$, protégés as $p = \{p_1, p_2, \ldots, p_m\}$, and the latitude and longitude of each state’s capital as $x$ and $y$. Then the geographical dependence between the first major-minor power dyad, $\{M_1, p_1\}$, and the second major-minor power dyad, $\{M_2, p_2\}$, equals to $\sqrt{(x_{M_1} - x_{p_1})^2 + (y_{M_1} - y_{p_1})^2} \times \sqrt{(x_{M_2} - x_{p_2})^2 + (y_{M_2} - y_{p_2})^2}$ as long as the two major powers are ideological rivals, and 0 otherwise.

This measure assigns lower values if both major powers are geographically proximate to their corresponding minor powers (e.g., US–Mexico and USSR–Belarus dyad-pair). In contrast, cases in which two rival major powers are both geographically distant from the corresponding minor powers would score larger values (e.g. US–Turkey and USSR–Venezuela dyad-pair). We again include a weighted, asymmetric temporal lag. In this case, the asymmetric lag accounts for changes in the likelihood of troop placements if a rival major power deployed troops to a minor power in the previous year, weighted by geographical distance, whereas non-deployments have no effect. Positive coefficients indicate that a major power, in response to rival major power deployments, is more likely to deploy troops at greater geographical distances. A negative coefficient, on the other hand, suggests that a major power is more likely to deploy troops to more proximate geographical distances, as a response to rival troop deployments.
Control Variables

We take into account how economic factors influence troop deployments. The dynamics of troop placements by major powers are the result of strategic reactions to the behavior of other major powers in the international system. At the same time, we also recognize that the attributes of the actors involved may also have an effect on how this relationship plays out.

Altering the status quo is generally more expensive than maintaining it. In terms of troop deployments, we can think of them as an effort by the major power to expand its military presence and therefore gaining influence and the ability to alter the policies of the host states. As such, a major power’s decision to begin or increase troop deployments may be conditioned by its current economic climate. When the economy is strong, the pursuit of foreign policy change is more attractive than when the domestic economy is stagnant. Thus, in times of economic prosperity major powers will be more willing to expand their spheres of influence through troop deployments and even challenge their rivals’ spheres of influence by deploying troops to areas in which a rival has an existing military presence. In times of economic hardship, we certainly do not expect major powers to completely give up on their global military presence, but we do expect to see a relative reduction in it. We operationalize the degree of prosperity or hardship as economic growth and measure it as the growth in energy consumption from the previous to the current year. We obtain energy consumption data from the Correlates of War.

We also control for the military capabilities of minor powers, whether a minor power is engaged in an international war, the amount of trade between a major and minor power, and whether major and minor powers share an alliance. Military capabilities is measured as the military capabilities of the minor power. Military capabilities data are obtained from Bell

55Palmer and Morgan 2006.
56Singer, Bremer, and Stuckey 1972. We use energy consumption rather than GDP growth based on data availability for Russia/USSR prior to 1991.
Minor powers that are currently engaged in an international war may affect troop deployments by major powers to contain a conflict. We measure international war using data from the Correlates of War project. We expect that major powers that have a defensive pact with a minor power are more likely to send troops to their ally. We measure alliances using data obtained from Gibler (2009). Finally, we expect that major powers with large trade volumes with a minor power are more likely to deploy troops with the minor power. We measure trade between a major and minor power using data from the Correlates of War project and log it to control for skewness.

Finally, we want to account for whether major powers act to preempt expected increases in a rival’s material power. Existing research suggests that states in general, including major powers, do not conduct foreign policy solely on what is observable in the present, but also what they expect in the future. Research on preventive war, for example, illustrates that leaders’ expectations of an adversary’s future growth in power influences the decision to take preventative action. To model this we employ a measure of expected military power developed by Bell and Johnson (2015, pp. 126-127). Bell and Johnson estimate a model to generate predicted future values of power for each state. We subtract this predicted value by the current year to calculate the expected change in power. We expect that major powers are responsive to expected changes in power for rival major powers.

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57 Sarkees and Wayman 2010.
58 Barbieri, Keshk, and Pollins 2009.
59 Levy 1987; Bell and Johnson 2015.
60 The dependent variable in the Bell and Johnson study relies on two observable components—military spending and military personnel—from the composite index of national capabilities Singer, Bremer, and Stuckey 1972. The dependent variable is regressed on a set of covariates that are expected to predict military power that are readily observable to other states: economic capacity, the presence of international threats, and domestic political factors. The resulting coefficients and the values for the current year’s covariates are then used to generate fitted values for the next year. For additional details on how the variable is constructed, see Bell and Johnson 2015, pp. 126-127.
61 We follow the same coding rules to identify rivals as in fn 54.
Results

To highlight the value-added of the LSGM, we present a set of models estimated using LSGM (Models 3 and 4 of Table 3) alongside the naïve models estimated using a logistic regression (Models 1 and 2). This side-by-side presentation highlights the similarities and differences in inferences associated with each of the estimation approaches. Both pairs of relevant models (Models 1 and 3, and Models 2 and 4) recover very similar estimates of the coefficients and the standard errors on all (exogenous or global) variables, any difference are in the effects of the spatial and temporal lags.

Given the discussed advantages of the LSGM, we focus our interpretation on Models 3 and 4 that present LSGM results. The results of the logistic regressions, which, of course, are interpreted analogously are briefly discussed at the end of this section. In Model 3, spatial dependence is measured in terms of ideological distance, while in Model 4, spatial dependence is measured in terms of geographical distance. The first three variables in the table relate to the three lagged dependent variables capturing spatial (in the case of the first two) and asymmetric temporal (in the case the third one) dependence.

*Ideological Distance* spatial lag captures the degree of connectivity between (potential) troop deployments within a geographical region. In the model, larger values indicate greater ideological dissimilarity among the observed deployments. The negative and statistically

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62 In the naïve models, the key independent variables—*Ideological Similarity* and *Geographical Distance* are measured as static equivalents of spatial lags in the LSGM. Mathematically, the values for these variables are calculated by performing matrix multiplication on W and Y. Thus, in Model 1, the value of *Ideological Similarity* (and its temporal lag) for each observation equals to the number of instances of troop increases within the same geographical region weighted by the ideological distance between each placement and the given observation in the current (or previous) time period. Higher values on this measure correspond to a greater number of ideologically dissimilar troop placements within a region, i.e. the level of a rival’s expansion within that region. For instance, the US’ decision to place troops in West Germany may be affected by the level of the Soviet expansion within the European region. In Model 2, *Geographical Distance* equals to the number of rival’s troop placements weighted by geographical dependence among observations. Higher values on this measure correspond to a greater level of a major power rival’s expansion into geographically remote locales, i.e. a potential US–Turkey placement would take on a greater value on this measure as a result of a Soviet increase in troops placed in Cuba.

<table>
<thead>
<tr>
<th>Spatial Lags:</th>
<th>Logistic Regression</th>
<th>LSGM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ideological Similarity (by Region)</td>
<td>-0.1919</td>
<td>-0.3262</td>
</tr>
<tr>
<td></td>
<td>(0.0981)</td>
<td>(0.1562)</td>
</tr>
<tr>
<td>Geographical Distance (from Rival)</td>
<td>-0.0001</td>
<td>-0.0002</td>
</tr>
<tr>
<td></td>
<td>(0.0001)</td>
<td>(0.0001)</td>
</tr>
<tr>
<td>Spatial Lag (t-1)</td>
<td>-0.4764</td>
<td>1.5493</td>
</tr>
<tr>
<td></td>
<td>(0.1139)</td>
<td>(0.2486)</td>
</tr>
<tr>
<td>Economic Growth</td>
<td>0.2994</td>
<td>-0.0097</td>
</tr>
<tr>
<td></td>
<td>(0.6612)</td>
<td>(0.4680)</td>
</tr>
<tr>
<td>Rival Major Power Changes in Power</td>
<td>-0.0215</td>
<td>0.0197</td>
</tr>
<tr>
<td></td>
<td>(0.0261)</td>
<td>(0.0273)</td>
</tr>
<tr>
<td>Minor Power Capabilities</td>
<td>0.2436</td>
<td>0.1973</td>
</tr>
<tr>
<td></td>
<td>(0.0810)</td>
<td>(0.1052)</td>
</tr>
<tr>
<td>Minor Power in International War</td>
<td>0.4266</td>
<td>0.4757</td>
</tr>
<tr>
<td></td>
<td>(0.1335)</td>
<td>(0.1386)</td>
</tr>
<tr>
<td>Alliance</td>
<td>1.7115</td>
<td>1.6407</td>
</tr>
<tr>
<td></td>
<td>(0.1369)</td>
<td>(0.1683)</td>
</tr>
<tr>
<td>Trade</td>
<td>0.2636</td>
<td>0.2711</td>
</tr>
<tr>
<td></td>
<td>(0.0542)</td>
<td>(0.0632)</td>
</tr>
<tr>
<td>Constant</td>
<td>-4.1488</td>
<td>-4.4995</td>
</tr>
<tr>
<td></td>
<td>(0.1010)</td>
<td>(0.0637)</td>
</tr>
<tr>
<td>(Pseudo) Log-likelihood</td>
<td>-1510.888</td>
<td>-1495.465</td>
</tr>
<tr>
<td>Observations</td>
<td>17289</td>
<td>17289</td>
</tr>
</tbody>
</table>

Notes: 166 minor powers, 830 unique edges. in Models 3-4, standard errors estimated from 100 bootstraps via a Gibbs sampler (concliques algorithm) after 50 burnin simulations and thinning every 10 iterations.

A significant coefficient on the Ideological Distance spatial lag variable 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 is consistent with an empirical observation of multiple temporally proximate instances of troop deployments by the US and Britain to post-WWII Europe. 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 previous deployments.
or those by the allied states.

The coefficient on the temporal lag variable in Model 3 is positive and statistically significant, which indicates a positive relationship between new troop deployments by rival (ideologically dissimilar) major powers within the same region in subsequent time periods. This result mirrors the dynamic posited in hypothesis 2, which stated that major powers respond to their rival’s placements of troops within a geographic region.

In Model 4, Geographical Distance models major powers responses to the geographical location of deployments by rival major powers. In the model, larger values indicate greater geographical distance between deployments. The negative and statistically significant coefficient on the Geographical Distance indicates that a geographically distant deployment decreases the probability of a geographically proximate deployment by a rival. Although this is not a prediction from our theoretical model, we speculate that this finding is simply an artifact of the geographical locations of the major powers in our data: what is a geographically distant deployment for the Soviet Union turns out to be a deployment proximate to the US. This finding may then reflect rival powers’ tendencies to deploy to the same regions, similar to the logic behind Hypothesis 2.

The positive and statistically significant coefficient on the the one-year lag of the Geographical Distance variable indicates, however, that geographically remote deployments do increase the probability of the same type of deployments by a rival major power in the next time period. This result is consistent with Hypothesis 3, which expected that major powers are more likely to deploy troops to geographically distant minor powers when their rivals are doing the same.

All control variables behave as expected or are not statistically significant. Minor Power Capabilities is positive and statistically significant in Model 3, but not model 4. Both Alliance and Trade are also positive and statistically significant. Each of these control variables increases the probability of troop deployments to minor powers.
The results indicate that major powers are less likely to place troops in a region if an ideologically distant major power has placed troops there. A major power is more likely to place troops, however, in regions where ideologically similar troops are also being deployed. This is consistent with the idea that major powers form and maintain spheres of influence, and indicates that they simultaneously increase their troop presence among multiple minor powers within these spheres. There is also evidence that major powers react to the placement of troops by rival major powers by placing troops in their rivals’ ideological sphere of influence. Additionally, major power rivals also appear to respond to power projection by the rival by mimicking this behavior and also engaging in geographically distant deployments. Taken together, the results on the spatial lags are consistent with our expectations that major power actions are interdependent. That is, major powers respond to the actions of one another when deciding where to deploy troops.

Now that we have interpreted all of the main results, let us briefly compare the inferences provided by an LSGM to those of a naïve logit. A comparison between Models 1 and 3 reveal one point of major disagreement in inferences from the two models: the coefficient on the temporal lag is positive and statistically significant according to an LSGM and negative and statistically significant according to the logit model. Thus, while the LSGM provides evidence that troop placements increase the likelihood that a rival major power will also place troops within the same region in the subsequent time period—a lagged action–reaction process, the logit regression coefficient provides evidence of the opposite. A comparison between Model 2 and Model 4 reveals two additional differences: neither the coefficient on Geographical Distance nor its lag is statistically significant in the logit model, while both are statistically significant in the model estimated using an LSGM.

We attribute these differences to LSGM’s built-in ability to separate the effect of dependence from that of dyad-level covariates by “adjusting” the dependence part of the model by

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63 The p-values associated with Geographical Distance and its lag in Model 2 are 0.27 and 0.95, accordingly.
the effect of dyad-level exogenous covariates (recall the subtraction of $\kappa_j$ in the second term of equation 6). In other words, an LSGM effectively weights the effect of “less expected” troop placements more heavily than those that are expected based on dyad-level covariates. Meanwhile, the spatial terms in the naïve model are (by necessity) constructed in a way that would bias the estimates of dependence effects: the naïve estimation procedure is unable to separate the effects of exogenous covariates from those of dependence. The logit attributes any correlation in edge formation among neighbors to spatial effects. LSGM, on the other hand, is able to find the coefficients that jointly maximize the fit of the global and local parts of the function, thus avoiding mis-attributing undue effects to the neighborhood structure.

To further highlight LSGM’s advantages over a naïve logit, we calculated percent correctly predicted troop placements for each model. The results for Models 1 and 3 are presented in Figure 4. We can see that, although predicting a rare event (troop placements occur in less than 2% of the data) is challenging for both estimators, LSGM has a substantially higher average rate of correctly predicted observations (in sample).

**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 geographic and ideological expansion is made by major powers. This paper is among the first studies to quantitatively study the interactive dynamics between major powers as they decide where to deploy their troops.

We argued that major powers are able to expand and consolidate their influence in the international system through the deployment of their forces abroad. For a major power, the use of a pseudo-likelihood, of course, precludes the use of likelihood ratio tests. For other goodness-of-fit tests that may be used for LSGM, see Kaiser, Lahiri, and Nordman 2012.
Note: Density for logit is shown in red; density for LSGM is shown in green. Kernel density plots are based on simulations from Model 1 and 3 (100 each).

placing troops in a protégé state is a particularly strong way to signal its commitment to protecting that particular minor power and thus deter attacks against it. A troop presence adds credibility to the commitment, even in the presence of an existing alliance, as having the trip-wire of the major power’s forces physically present is a way in which the major power strengthens its promise to support its protégé. By placing troops across various minor powers, major powers are able to establish spheres of influence beyond their geographic borders. Consistent with this explanation, we find that once a state deploys forces to a minor power, it is more likely to consolidate its influence in the region by deploying forces to other states that are ideologically similar to it.

Or course, major powers are not deploying their forces in a vacuum, and several major powers may be competing for influence within a region. We find that rival major powers
are more likely to deploy troops to a region if an ideologically distant edge is formed within the same region. That is, major powers respond to their rivals’ troop deployments within a geographical region by again consolidating their sphere of influence with additional troop deployments of their own.

In addition, we find that major powers respond to their rival’s distant deployments by expanding their own geographical spheres of interests. Cases in which a major power chooses to expand its influence by projecting its power to a geographically distant location are likely to elicit a similar attempt at a geographical power projection by a rival.

While many of our findings are driven by the competition between the US and USSR/Russia, we note that other major powers, such as France, also actively use troop deployments to consolidate their spheres of influence in response to other major powers’ deployments. Further, this study also helps us understand what competitive force projection dynamics between the United States and 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, there is concern about what would happen if Russia carried out attacks against Estonia, Latvia, and Lithuania. These three states are particularly relevant because they are all NATO members, and an attack against them could lead to an invoking of NATO’s Article V, potentially drawing the United States and the other NATO allies into a conflict with Russia.\(^65\)

If Russia were to indeed invade, or otherwise attempt to annex, parts of Estonia, Latvia, or Lithuania, their NATO allies would find themselves in a position of being forced to intervene against Russia, or of having to consider threatening the use of nuclear weapons. Recently, Shlapak and Johnson \cite{Shlapak and Johnson 2016} has suggested that one option the United States

\(^{65}\) Shlapak and Johnson \cite{Shlapak and Johnson 2016}.
could take would be to deploy US troops to the Baltic States as a deterrent against an initial Russian invasion. Our findings seem to 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\textsuperscript{66}, rather than place troops closer to Russia’s sphere of influence and risk the possibility of conflict.

Though 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 US as China begins to more actively deploy its troops abroad. A future research question to address would be whether interactions between the US and China will be similar to those between the US and Russia, where each state tends to deploy forces within its established sphere of influence rather than in reaction to the other’s deployment, or whether they will be more likely to encroach on each others’ sphere of influence. Given that, at least from a military force point of view, 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 US and its allies.

\textsuperscript{66}Szayna et al. 2015.
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