CHAPTER TWO

Defining Temporal Dependence: A Review of Existing Evidence

What Is Temporal Dependence?

The argument that military interventions exhibit temporal dependence suggests that these interventions are not independent events but are instead related in systematic and predictable ways over time. More specifically, temporal dependence predicts that the likelihood of an intervention in one year is a function of interventions in previous years. If this relationship is positive, the likelihood of a military deployment increases with the number of interventions in past periods, resulting in clusters of interventions over time. These clusters are not chance events but rather reflect a systematic relationship between interventions in one period and in the next.[1] The interventions in each group may overlap, but temporal dependence does not explicitly require or even predict this overlap, only a change in the likelihood of interventions. The size of an intervention cluster and its density, or the temporal proximity of related interventions, will depend on strength of the temporal dependence. Very strong temporal dependence may have a snowball-like effect, in which the related events aggregate at an increasingly fast rate. Weaker temporal dependence, however, may echo forward only one or two periods before petering out. Temporal dependence is also probabilistic: New interventions always increase the potential for an intervention cluster, but clusters will not always occur and will not aggregate infinitely. The likelihood or probability that the dependent cluster does occur is another measure of the strength of the temporal dependence. Strong temporal dependence may nearly guarantee the existence of a cluster, while weak temporal dependence may result in a cluster only sometimes.

[1] Throughout this report, when I refer to clusters, I am referring to clusters caused by temporal dependence, rather than any clusters that may occur by chance or randomly. I oppose this to interventions that are serially independent or that do not have a systematic relationship or correlation over time.

What Does the Literature Say About Intervention Timing and Temporal Dependence?

Existing scholarship on the drivers of U.S. military interventions consider timing and conflict duration when exploring where and when the United States is most likely to intervene but pays limited attention to the potential for or implications of temporal dependence. Literature on political instability, which is relevant to temporal dependence of interventions because instability and conflict create the conditions that demand these interventions, identifies a large number of factors that may affect the likelihood of political conflict and crisis. This literature offers only a limited treatment of regional and temporal spillover that might be associated with temporal dependence. Temporal dependence receives more significant discussion from other disciplines, including economics, and findings from other disciplines can often be generalized to interventions and conflict as well. This chapter discusses each of these major bodies of literature, points to the lack of work focused on temporal clustering of military interventions, and offers some initial explanation for why this gap may be problematic for an understanding of U.S. military interventions.

Interventions and Timing

A review of literature on U.S. military interventions is complicated by the many different definitions of intervention that are used by empirical and theoretical work. While some work describes any military activity as an intervention, others use the deployment of ground forces or include ground forces and air strikes. As already noted, this report focuses only on the deployment of ground forces of at least company size, for which force planning implications are likely to be meaningful. The use of many different definitions likely explains much of the disagreement over the primary factors that explain when and why the U.S. intervenes in some conflicts and not others. Despite the differences in definition, however, existing work on U.S. military interventions suggests three observations that are relevant to the questions of temporal dependence. First, this literature highlights and identifies a large number of international and domestic factors that may contribute to the U.S. decision to use military force. For example, several studies, particularly those focusing on Cold War–era interventions, suggest that international strategic factors, such as arms races or threats to U.S. international interests, along with patterns of political instability are most likely to drive intervention and uses of military force (James and O'Neal, 1991; Brands, 1988). Related studies support these findings, showing that U.S. military interventions are most likely in regions and countries that have strategic resources and areas where the United States seeks to expand its political or economic influence (Yoon, 1997; Pearson and Baumann, 1977; Klare, 1981). Competing arguments suggest, however, that domestic factors, such as upcoming elections, presidential discretion, economic conditions, and domestic atti-

tudes, have the strongest effect on the likelihood of U.S. military intervention (Ostrom and Job, 1986; Fearon, 1994; Meernik, 1994). For example, work focused on presidential discretion argues that the president's personality and the priorities of different administrations play a large role in determining when and where interventions occur (Meernik, 1994). Arguments about the relationship between interventions, economic conditions, and election proximity take several forms (Yoon, 1997; Meernik, 1994). Some studies argue that leaders use interventions to divert attention from weak economic conditions or other problems at home, especially close to elections. Others suggest that economic prosperity encourages military activity but that leaders are hesitant to enter into risky military operations overseas too close to an election. The lack of consensus on these points suggests that the specific context also plays a significant role in intervention time. Finally, there is evidence that the level of domestic support and the existence of an international coalition also increase the likelihood of an intervention (Regan, 1998; Regan and Stam, 2000; Kanter and Brooks, 1994).

Other empirical work on U.S. military interventions suggests that the decision to intervene can be considered as a cost-benefit analysis in which a country is most likely to intervene when it expects the military action to have a low cost and a high probability of success. Factors that affect this calculation include the type of conflict and target, the presence of a coalition or international support, the likely duration of the conflict, and expectations about success (Sullivan and Koch, 2009; Regan, 1998). In general, the United States is more likely to become militarily involved in humanitarian crises than contingencies, in conflicts when there are coalition partners, and when the local violence is not too intense (Regan, 1998). The same cost-benefit analysis also affects the timing of intervention, with interventions being most likely when the intervening party assesses the chances of success to be greatest. Finally, there is evidence that ethnic and religious affinities may also increase the likelihood of intervention, although this factor is less relevant for the United States than for other countries with more homogenous ethnic identities (Kauffman, 1996). Importantly, some of the language used in this body of work is similar to that used in force planning documents.

The second key observation from existing work on military interventions is that military interventions do appear to affect the development, length, course, and intensity of the conflicts in which they occur. Specifically, this work finds that, although diplomatic intervention sometimes reduces the duration of civil wars or is able to truncate periods of instability, military and economic intervention can lengthen conflict duration by providing resources without which one side would likely give up or be defeated (Regan and Aydin, 2006; Bercovitch, 1997; Zartman, 2000; Sullivan, 2009). This does not mean that military intervention is always counterproductive. Intervention may extend a conflict but reduce the level of violence or protect a key strategic interest. However, it does suggest that interventions may have a self-feeding and dynamic quality. By extending the conflicts in which they get involved, they contribute to a demand for continued deployment. A possible inference from this finding is that

a given intervention feeds not only itself but also the demand for future interventions. Existing literature does not explicitly address this issue, however.

The final observation from a review of existing work on military interventions is the limited attention paid to timing more generally and the lack of research focused specifically and directly on the question of temporal dependence. While literature on the drivers of U.S. military intervention offers insight into where and why the United States is likely to deploy military force and into the types of domestic and international changes that may affect deployment decisions, this research never explicitly asks whether military interventions are correlated over time or how recent and ongoing interventions affect the likelihood of future ones. Similarly, force size, deployability, and other logistics are not built in as constraints on intervention timing or likelihood. These omissions are significant, especially for studies that include post–Cold War interventions, when U.S. forces are often involved in multiple, smaller, and simultaneous interventions. They also limit the utility of this literature for force planners, who are primarily concerned with questions of resourcing and readiness.

Predictors of Armed Conflict and Political Instability

Understanding the causes and distribution of political instability and conflict is relevant to a study of temporal dependence because these events create demands for military interventions. Even if the United States does not respond to every international conflict (or if it intervenes where no conflict has started), the timing and drivers of instability and crisis events will play roles in the timing of military interventions.

Literature on political instability defines characteristics of the domestic context and the international system that increase the likelihood and duration of instability or conflict and uses forecasting models to predict where and when conflict is most likely. These analyses rely on several rich data sets that record information on conflict start, duration, participants, casualties, and outcomes. Some of these data sets include the Uppsala Conflict Data Program (UCDP) at the Peace Research Institute Oslo (PRIO) database of armed conflict, the Militarized Interstate Dispute data set, and data collected by the Political Instability Task Force. Empirical work on political instability using these data sets produces a myriad of theories and findings on what contributes to instability and conflict. Most of these analyses and their findings focus on a single type of conflict or context. Here, I will summarize some of the key drivers of instability, conflict, and crises across contexts, focusing less on differences across conflict type than on the factors that might contribute to temporal dependence of instability and interventions.

Empirical work identifies political, economic, demographic, and geopolitical factors that may drive or affect the incidence of international conflict, crises, and instability. First, some studies focus on economic determinants of political instability and find that weak domestic economic conditions, as measured by gross domestic product

(GDP) or low levels of economic development, economic protectionism that limits free trade, and domestic income inequality, are associated with a higher probability of such events as coups, riots, protests, and intrastate conflict (Goldstone et al., 2010; Alesina and Perotti, 1993). Other studies suggest that dependence on natural resources and the presence of exploitable commodities (e.g., oil, diamonds) contribute to inter- and intrastate conflict onset and duration and also make states more likely to experience instability caused by violent nonstate groups (Collier and Hoeffler, 2002; Fearon and Latin, 2003; Sambanis, 2005). Studies that focus on political determinants of conflict suggest that conflict and instability of all kinds are more likely to involve or occur in authoritarian countries than in democracies (Goldstone et al., 2010). In addition, strong democracies are typically less likely to enter into conflicts with each other than with authoritarian states and are less likely than than mixed regimes to enter intrastate disputes (Bueno de Mesquita et al., 2003). Incidence of inter- and intrastate conflict, as well as internal violence driven by nonstate groups, is also associated with weak state governance or institutions (Goldstone et al., 2010; Huntington, 1968). Finally, demographic factors also affect the likelihood of conflict and instability. Specifically, the likelihoods of civil war, domestic conflict, and internal instability appear to rise with ethnic diversity and with population size (Goldstone et al., 2010; Collier and Hoeffler, 2005; Sambanis, 2001).

There are also characteristics of the international system that are associated with conflict and instability. For example, a multipolar interstate balance of power (when many states are equally powerful) and world population growth have both been shown to increase the likelihood of instability and conflict (inter- and intrastate) systemwide (Goldstone et al, 2010; Siverson and Sullivan, 1983). Dyadic studies (focused on pairs of countries) of interstate conflict also suggest that power distribution and contiguity are important predictors of interstate dispute. Specifically, conflict appears especially likely between countries that share borders and compete over resources and between pairs of countries experiencing shifts in relative power (i.e., a formerly weak state rising past a formerly strong one) (Siverson and Sullivan, 1983).

Literature that explores the drivers of political instability and conflict considers regional spillover. As noted above, regional spillover can contribute to geographic concentrations of conflict in specific regions. A number of studies have documented evidence of regional contagion and spatial effects that make conflict more likely in countries with neighbors that are also experiencing conflict or instability (Buhaug and Gleditsch, 2008; Ward and Gleditsch, 2000). There are two primary explanations for observed regional spillover. First, instability or intrastate conflict in one country may produce or encourage instability in nearby nations, either because it leads to "copycat" insurrections or because it produces refugees or economic strains that induce conflict in neighboring countries (Buhaug and Gleditsch, 2008). An alternative explanation suggests that certain regions are simply more prone to conflict because of economic, political, or geographic features that they all share. For example, the fact that conflict

appears particularly likely in the Middle East may be due to historical religious grievances or the presence of lucrative commodities that raise the risk of conflict regionwide. Similarly, the fact that conflict appears especially likely in sub-Saharan Africa may reflect weak governance and widespread poverty throughout the region. The two explanations of regional spillover are not mutually exclusive and might work together to contribute to contagion of conflict. The explanations do have somewhat different implications. While the first suggests a real contagion of political conflict, the second simply emphasizes the importance of regional characteristics in predicting political instability (Buhaug and Gleditsch, 2008; Ward and Gleditsch, 2000).

Attention to temporal dependence between instances of conflict and crisis has been more limited. There are no empirical studies of temporal dependence between instances of political instability or conflicts at the international or global level. However, several studies do identify a wavelike pattern, with periods of general stability punctuated by concentrated periods of overlapping conflicts (Mansfeld, 1988; Pollins, 1996). These waves may be created by temporal dependence, but they may also result from other factors, such as youth bulges, economic conditions, or political instability (Urdal, 2006; Goldstone, 2002). Existing work does not attempt to separate out these different effects. Evidence of temporal dependence at the domestic level is more straightforward. For example, studies that use time-series cross-sectional data on conflict find significant temporal dependence in the likelihood of civil war within a single country (Beck, Katz, and Tucker, 1998). This type of within-country temporal dependence is different from the systemwide temporal dependence that is the focus of this report. However, the existence of temporal dependence between conflicts within states at least justifies a test for temporal dependence between similar events at the international level.

Literature on political instability provides a good taxonomy for the factors that affect the likelihood of political instability, crisis, and conflict and identifies factors that may indirectly contribute to the timing of military interventions because they are strong drivers of conflict and political crisis. However, its treatment of time and, particularly, temporal dependence remains insufficient. Specifically, existing work does not define the underlying mechanisms that might contribute to the observed temporal dependence between conflicts at the state level, provide good estimates of the size and strength of these temporal and regional spillover effects, or consider the implications of these interdependencies at the international level.

Temporal Dependence in Financial Markets

Literature focused on the spread of financial crises provides some additional insight into temporal dependence, despite its focus on a different type of instability from the one addressed in this report. This literature is especially useful given the dearth of in-depth attention to temporal dependence in studies of conflict. Studies of financial

markets and cycles find evidence of waves in which markets across sectors and across the international system move in the same direction, particularly when considering market collapse and financial crises. While some portion of these observed waves can be explained by economic interdependence that extends past national borders, several studies find evidence of temporal dependence that exists even when this interdependence is controlled, suggesting a more complicated relationship (Corsetti, Pericoli, Sbraicia, 2005; Caramazaa, Ricci, and Salgado, 2000). Other studies go a step further and argue not only that contagion exists but also that the degree or extent of contagion is predictable based on underlying characteristics of the economic system (Bae, Karolyi, and Stulz, 2003).

Economic literature also defines several mechanisms to explain the temporal dependence of financial crises that may be relevant to questions asked in this report. This work identifies the structure of economic institutions, political leadership, and individual behavior and expectations as key drivers of temporal contagion in the financial sector (Allen and Gale, 2000; Kodres and Pritsker, 2002; Huang and Xu, 2000). Some studies are even able to quantify the contributions of specific mechanisms to performance. Applied to international conflict and military interventions, this literature suggests that temporal dependence between interventions may be simultaneously driven by many different mechanisms but may ultimately be explained by some combination of domestic and international political, economic, and strategic characteristics. The literature also suggests that it should be possible to place some quantitative bounds, if not on the mechanisms themselves, at least on the size of any temporal correlation.

Summary

Existing work on military interventions and political instability identifies a large number of political, economic, social, and demographic characteristics that contribute to each type of event but pays considerably less attention to either timing or temporal dependence. Political and military leaders and analysts, as well as scholars of conflict, can use existing literature to identify the contexts in which instability or military interventions are likely. However, existing literature does not provide military planners with good or guiding information on the potential existence, size, or implications of temporal correlations between military interventions. Instead, like force planning processes, existing scholarship relies on the untested assumption that these events are independent and can be modeled and considered without direct attention to past interventions. The discussion above challenges this assumption and suggests instead that there are many reasons to expect that not only military interventions but also political instability and conflict are likely to exhibit temporal correlation that leads to clustering in both types of events. The next chapter of this report will offer some empirical assessment of these hypotheses.