

THE LOGIC OF DECISIONS IN MILITRIZED  
DISPUTES:  
THE EFFECT OF REGIME, POWER, ARMS  
CONTOROL AND AIRPOWER ON DECISION-  
MAKING IN MILITRIZED DISPUTES

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Doctor of Philosophy

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by  
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The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled

THE LOGIC OF DECISIONS IN MILITARIZED DISPUTES:  
THE EFFECT OF REGIME, POWER, ARMS CONTROL, AND AIRPOWER ON  
DECISION-MAKING IN MILITARIZED DISPUTES

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THE LOGIC OF DECISIONS IN MILITARIZED DISPUTES:  
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ABSTRACT

This study examines the causal relationship among pre and intradispute information and decision-makers' decisions determining evolution of militarized disputes. The identified causal factors are interconnected with one another throughout several decision-making stages of militarized disputes. As pre-dispute information, ex ante external and domestic contexts, expected outcomes, and the role of intergovernmental institutions affect decisions to initiate and to escalate disputes. Likewise, as updated information, ex post coercion by airpower affects the decisions to determine dispute duration. Empirical models test the effects of ex ante contexts, the probability of victory derived from expected outcomes, arms control agreements, and the use of airpower coercion on decision-making process of militarized disputes. The results reveal that (1) ex ante contexts, relative power and regime, can become a useful predictor of dispute outcome, (2) the probability of victory based on ex ante contexts exponentially increases the likelihood of initiation, (3) pre-dispute arms control agreements can reduce the incentive to escalate violence, and (4) the use of airpower coercion, as an ex post choice, is a significant determinant of dispute duration. These findings show that decisions to

terminate, to initiate, and to escalate militarized disputes can be linked to one another.

This also implies that pre-dispute information can guide the intradispute decisions and decision-makings are interconnected from the initiation to the termination of militarized disputes.

## **Chapter 1**

### **Introduction**

The study of international relations has investigated patterns in militarized disputes as conflict-oriented foreign policy behaviors. According to the Militarized Interstate Disputes (MID) data set, militarized disputes have two important characteristics: a set of interactions among states involving threats or use of military force and a product of government decision-making (Gochman and Maoz 1984). By this definition, militarized dispute events include both sub-war events as the processes that evolve into wars and war events as the highest hostile disputes (Jones, Bremer, and Singer 1996). Thus, the study of militarized disputes opens the puzzle of how states decide to initiate, to escalate, and to terminate most serious conflicts enough to become militarized.

In the study of war and disputes, empirical endeavors have identified important domestic and external factors that determine the pattern of disputes. Also, decision-theoretic literature has found strategic interactions based on the distribution of information between decision-makers. However, both empirical and theoretical studies have paid little attention to the distinction between *ex ante* and *ex post* contexts in decisions during a militarized dispute. As a result, existing studies tend to ignore the possible linkage between the decision-making stages of militarized disputes, from initiation to termination. Because decisions about initiation, escalation, and termination can be affected by decision-makers' information about the future and their responsiveness to an opponent's strategy, most decisions in militarized disputes can be linked to one another. This study opens the informational dynamics to describe how pre-dispute and

intradispute information is interconnected throughout several decision-making stages of militarized disputes. In this context, I raise the following research questions: (1) how does pre-dispute information impact the outcome of militarized disputes?; (2) how does the expected outcome of a militarized dispute, as a component of pre-dispute information, affect the decision to initiate it?; (3) how does pre-dispute intergovernmental, institutional context impact the escalation process during a militarized dispute?; and (4) how does the intradispute choice of coercion affect the decision to terminate militarized disputes?

These research questions, which show the interconnection of decision-making in militarized disputes focus on state behaviors in international affairs. Along the realistic foundations in international relations, the most important international affairs, war and peace, are embedded in the axioms of self-interested behavior (Bueno de Mesquita and Lalman 1992). Accordingly, the self-interested pursuit of gain by national leaders represents state behaviors. This premise provides a theoretical advantage, because structural opportunities and individual perception come together to shape decision-makers' choices. In this study, the investigation begins with this rationality of human behaviors. Here, the rationality does not mean that rational decision-makers have accurate and common criteria to compare all possible alternatives. Rather, rational decision-makers have complete and transitive preferences over alternatives under imperfect information (Zagare and Kilgore 2000).

This study examines how rational decision-makers select their hostile or cooperative choices with imperfect information prior to and during a militarized dispute. Under the imperfect information circumstance, the existence of private (secret) information makes it difficult for a rational decision-maker to credibly communicate that

information to adversary. Based on this theoretical basis, past seminal works on informational dynamics notably explained causes of war and intrawar bargaining (Fearon 1995; Powell 1999; Reed 2000). Using these achievements, my inquiry attempts to connect revealed logics of decision-making from beginning to ending interstate militarized disputes in order to shed light on linked information and empirically assesses these linkages against the short of war cases. Therefore, this study reviews general literature on war and disputes and deduces testable hypotheses from informational dynamics. Because theories are required to explain real events in the real world, their empirical validity should be tested (Walt 1999). Thus, for empirical evidence, all hypotheses are tested in four sets of empirical models as shown in Figure 1-1.

**[Figure 1-1 Here]**

In the Figure, the decision-making process that determines dispute outcome is related to the ex ante external and domestic contexts and different strategic positions between initiators and targets in the outcome model. The expected outcomes derived from the outcome model are connected with decisions to initiate a militarized dispute in the initiation model. Once a state initiates a dispute, the extent of pre-dispute information determined by intergovernmental institutions is linked to the decision to escalate disputes in the escalation model. In the duration model, the intradispute choice of airpower coercion affects the decisions of whether or not to continue disputes. I will deduce testable hypotheses and will test them in each empirical model.

These empirical models make it possible to find the effects of pre-dispute and updated information on linking decisions in before and during militarized disputes. Ex ante contexts, expected outcomes, and the role of intergovernmental institutions affect the

decision-making process as pre-dispute information. Likewise, as updated information, intradispute coercion by airpower affects the decisions to determine dispute duration. By incorporating these findings, this study clarifies the logic of decisions to show how decision-makers decide to initiate, to escalate, and to terminate a militarized dispute and how decisions in each stage link to others. This effort contributes to developing decision-making studies on war and disputes.

### **1.1 Previous Studies of War and Disputes**

In the general literature on war and disputes, relative power and regime types have been treated as external and domestic factors, respectively, that affect the decisions from initiation to termination. The empirical findings about the outcome of wars show that the distribution of power among disputants is a core determinant of outcomes (Organski and Kugler 1980; Maoz 1983; Stam 1996). In bargaining theories, because decision-makers evaluate and recognize relative power through extant information, termination of disputes is affected by both the perceived power status and the actual distribution of power (Wagner 1994; 2000; Powell 1999; Filson and Werner 2002). In contrast to the research on the external factor, the studies focusing on the domestic factor emphasize the effect of domestic regime types on the victory in wars. The proponents of democratic triumph have claimed two types of advantages for democracies in wars. First, democracies possess an effective war-fighting capability in terms of military performance (Lake 1992; Reiter and Stam 1998; 2002). Second, democracies carefully select opponents that they can defeat (Reed and Clark 2000; Gelpi and Griesdorf 2001; Gelpi and Grieco 2001; Reiter and Stam 2002).

However, these identified effects of relative power and domestic regime on wartime victories should be integrated with dispute initiators' strategic selection process under the informational dynamics. Because decisions of whether or not to initiate war and dispute depend on decisions-makers' pre-dispute information, the initiators' strategic position per se reflects disputants' optimistic expectations about the positive net balance of costs and benefits. Also, initiators' selection of dispute affects the chance of victory because a dispute is a choice of initiators who hope to win (Gartner and Siverson 1996; Clark and Reed 2003). Therefore, strategic selection process, relative power, and domestic regime types are incorporated as determinants of the chance of victory in militarized disputes. Based on this possible linkage, each factor affects intradispute decisions, so they become predictors of decisions to terminate militarized disputes.

Nevertheless, existing literature does not deal with the possible linkage between important components of pre-dispute information and the intradispute decision-making process to terminate militarized disputes. Whereas democratic triumph theories attempt to discover the combined effect of democracies and strategic positions as a pre-dispute determinant of outcomes, this line of research centers on empirical assessments rather than the investigation of the decision-making process. Although the strategic selection process has been examined as one of the important prewar factors to bring victory in war (Bueno de Mesquita 1981; Wang and Ray 1994; Gartner and Siverson 1996), these studies do not link decision-makers' pre-dispute expectations to the intradispute decisions to terminate militarized disputes.

In studies of dispute initiation, relative power and domestic regime type also have been considered as important factors in the decision to initiate disputes. The discussion



about relative power has concentrated on how the distribution of power between states affects the decision-makers' recognition and responsiveness. Power transition theory claims that the lack of preponderance of power, dissatisfaction with the status quo, and a rapid overtaking power are more likely to induce war between states (Organski and Kugler 1980; Kim 1992; Kugler and Lemke 2000; Tammen et al. 2000). In contrast to this theory focusing on the preponderance of power, balance of power theory suggests that power parity provides the systemic stability to prevent war between states (Morgenthau 1967; Mearsheimer 1990). Although these competing theories emphasize differently the influence of power parity, the commonalities are that the change of relative power creates an important signal in determining the likelihood of war.

On the other hand, the arguments about domestic regime type assert that dyadic regime types strongly affect the initiation of war and disputes. In democratic peace theory, democratic dyads have at least three war-averse mechanisms: institutional constraints, normative consensus, and information assessment. First, the logic of institutional constraints in democratic regimes suggests that the accountability of a democratic regime creates relatively high domestic costs, as well as punishments derived from failed disputes, which democratic leaders must face, thereby preventing aggressive foreign policies (Buono de Mesquita, Morrow, Siverson and Smith 1999; Huth and Allee 2002). Second, the logic of normative consensus suggests that internal democratic norms can be extended to the mutual expectation of war-averse behavior in democratic dyads (Russett 1993; Huth and Allee 2002). Third, the logic of information assessment claims that, in democracies, the high level of domestic audience costs and transparency in the decision-making process can build more credible signals, reducing the possibility of using bluffing

strategies. Therefore, democracies can prevent miscalculations that cause war and disputes (Fearon 1994a; Schultz 1998; 1999; 2001). These explanations about relative power and domestic regime identify significant contexts to influence the onset of war and disputes.

However, these theories do not directly capture the variation on the extent of observable pre-dispute information affecting the disputants' decisions to initiate militarized disputes. When decision-makers face impending militarized disputes, their cost-benefit calculus is highly affected by the expected probability of victory, as well as by the contexts for the decision. This expected probability of victory can be derived from ex ante factors such as the regimes' inherent ability for military performance, relative power prior to disputes, and strategic advantages of initiation. In this sense, the expected probability of victory represents observable pre-dispute information. In a similar vein, there is pre-dispute uncertainty that reflects unobservable information. Therefore, the combination of the expected probability of victory and uncertainty based on pre-dispute information can be linked closely to the decision to initiate militarized disputes. In terms of measurement, although existing research attempts to calculate the probability of victory based on pre-dispute relative capability (Bueno de Mesquita 1981), this calculation merely reflects the tangible power ratio. Because the tangible power ratio does not represent the complex of contextual factors (e.g., domestic societal characteristics and strategic choices), the expected probability of victory should be calculated by including factors that existed prior to the decision to initiate a dispute.

In the study of dispute escalation, existing research centers on a certain process that moves from a minimum level of dispute to full-scale war. In particular, the

International Crisis Behavior (ICB) project describes crisis escalation as the combination of the concept of nonviolent escalation derived from a psychological threat and reciprocal actions between trigger and response (Brecher and Wilkenfeld 1997; Wilkenfeld and Brecher 2000). In a similar vein, *Process of War*, a book that attempts to explain war as a process, emphasizes the effect of both contexts and reciprocal bargaining strategies on the decision to escalate disputes toward war (Gochman 1995; Siverson and Miller 1995; Stoll 1995). Additionally, the degree of violence and reciprocity is regarded as a core predictor of escalation (Leng 1993; 2000). According to these ideas, reciprocal violence has been captured as the core element of the escalation process. In this context, relative power and regime types can affect perception and the responsiveness of an opponent state's behaviors, thereby also influencing the escalation process. In terms of relative power, the bargaining models presume that information about distribution of power determines decisions of whether to negotiate or to go to war (Powell 1999; Wagner 2000). Thus, in intrawar bargaining, perceived power affects the decision to escalate militarized disputes. Likewise, the arguments regarding domestic regime types consider democracy as an important factor affecting the escalation process. These arguments, having focused on the role of democratic dyads, reveal their pacific effects on the escalation of disputes (Senese 1997; Reed 2000; Kinsella and Russett 2002).

However, these existing studies need more emphasis on the relationship between pre-dispute information and intradispute decisions in escalation process. Even after the initiation of militarized dispute, observable pre-dispute information can affect decision-makers' expectations and cost-benefit calculus, because the degree to which private information emerges can be an important factor of escalation. In the escalation stage,

because many disputants already have mobilized military forces in order to reinforce their own commitments, private information has been considered as an important cause of escalation toward war in the rational choice approach. Although the rational choice approach assumes that war is more costly than settlement, states have an incentive to misrepresent their own private information in order to establish better bargaining conditions (Fearon 1995). In this context, decision-makers create costly and credible signals through troop mobilization or higher domestic audience costs, thereby increasing the costs of backing down (Fearon 1997). Thus, these policies entail the risk of war even though decision-makers do not want to enter war (Fearon 1997; Slantchev 2005). As another path to war in the rational choice approach, states attempt to conceal private information in order to preserve military advantage. Because this incentive increases the costs of revealing information necessary for successful bargaining, the likelihood of war increases due to concealment (Lai 2004). Thus, private information induces the escalation of disputes by encouraging decision-makers to rely on military, rather than diplomatic, options. This means that the extent of revealed private information helps to explain whether or not militarized disputes will escalate.

Along this line, the intergovernmental institutional design to reveal private information, such as an existing restrictive agreement on arms, can reduce the possibility of escalation because such information alleviates the risk of war derived from private information. Since arms control agreements are designed for restriction of surprise attack and large-scale offensive movements (Goldblat 1994; Glaser and Kaufmann 1998), they can reduce the degree of private information withheld. Therefore, the existing arms control agreements can reduce the likelihood of escalation during a militarized dispute.

This implies that the extent of observable pre-dispute information can guide the intradispute decision of whether or not to escalate violence.

Finally, in the study of termination of militarized disputes, it is necessary to consider how decision-makers update information during a dispute. In this context, the combination of coercive foreign policy and military technology, as an intradispute choice, can update pre-dispute information. After dispute initiation, the use of military coercion based on modern technology can affect the outcome of militarized disputes. In the existing literature, the coercion studies focus on the tacit conveyance of commitment and resolve (Schelling 1966; Jervis 1970; Baldwin 1985; George 1994), so that the dispute initiators' implementation of military coercion affects the strategic calculation of all disputants. In militarized disputes, military technology changes the cost of fighting, so that a change of technology also affects resolve and commitment in war (Powell 1999). Furthermore, military coercion can communicate credible commitment to opponents (Slantchev 2005). In this context, airpower can represent modern military technology and can be considered as an effective coercive instrument (Pape 1996; 1998). In a similar vein, Warden (1998) asserts that the use of airpower coercion can weaken opposing leaders' situation awareness, an ability necessary for command and control in battles. Horowitz and Reiter (2001) find empirical evidence to support the effectiveness of airpower coercion in events after World War I. Extant literature shows that the use of airpower coercion can demonstrate the strong resolve of the coercer to the target state.

However, existing empirical endeavors do not investigate the effect of airpower coercion on the termination decision, which determines the duration of militarized disputes. In military studies, the role of airpower in war has been identified as a decisive

instrument of victory. Similarly, airpower coercion can be linked to the ability to influence costs in militarized disputes. In fact, airpower is considered as a component of national power, specifically, to represent the technological element (Powell 1999; Mearsheimer 2001). Therefore, the use of airpower coercion affects both expected outcomes of dispute and the ability to absorb costs during disputes, thereby influencing both disputants' incentives to escalate a dispute and the desire to continue a dispute. As updated information, the use of airpower in militarized disputes can affect the intradispute decision to determine dispute duration.

In short, existing studies of disputes do not consider how pre-dispute information guides the decision-making process and how intradispute choices update this pre-dispute information prior to and during militarized disputes. This means that the study of militarized disputes requires additional investigations into the role of pre-dispute information as a causal factor and possible linkage between pre-dispute and updated information throughout each decision-making stage of militarized disputes.

## **1.2 Outline of Research**

This study identifies major components of pre-dispute information such as relative power, regime types, strategic position of initiators, the expected outcome probability based on empirical observations, and arms control agreements as causal factors in the decision-making process. I argue that identified pre-dispute information per se has a causal effect on decisions to initiate, to escalate, and to terminate militarized disputes, as well as updated intradispute information (i.e. ex post choice of airpower coercion). As causal factors, pre-dispute information is linked with updated information

in the decision-making process, so that decisions are connected with one another throughout decision-making stages. This investigation clarifies the relationships among all decision-making stages of militarized disputes.

This study consists of six chapters as follows. After the introductory chapter, the second chapter examines how pre-dispute external, domestic, and strategic contexts impact the outcome of militarized disputes. All relevant components of pre-dispute information are carefully identified from existing war and conflict literature. As identified relevant pre-dispute information, advantages in relative power and democratic regime characteristics directly affect the disputants' chance of victory by intradispute bargaining and war-fighting performance. Furthermore, the selection effect derived from democracies cost sensitivity and prior belief about relative power indirectly affects probabilities of dispute outcomes. Based on these direct and indirect mechanisms, pre-dispute information can guide intradispute decisions to terminate disputes, thus affecting the dispute outcomes. In the empirical test section of the chapter, I test the effect of regime types, relative power, and the choice to initiate a dispute on militarized disputes' three possible outcomes (victory, draw, and defeat). The empirical test reveals that external relative power and domestic regime types are significant components of pre-dispute information affecting decisions to terminate militarized disputes. The outcome model also is designed to show the predictive ability. The result shows that the outcome model is acceptable. This means that the outcome model can provide expected probabilities of outcomes that potential dispute initiators may perceive as an ex ante expectation about future dispute outcomes. Thus, dispute outcomes are a source of pre-dispute information, so that the decision to initiate a dispute links to the decision to

terminate it.

Also, this model reveals that the decision to terminate is linked to the initiation of disputes because how they end is affected by how they begin (Reed and Clark 2000; Clark and Reed 2003). This means that initiators and targets have different strategic processes (Clark and Reed 2003). Thus, perceptions and responsiveness to relative power differ between initiators and targets in militarized disputes. Because initiators generally are resolved disputants (Maoz 1983), disputants' expectations are linked to strategic position. In this context, the initiators' strategic position cannot accept stalemate or compromise as a favorable result of disputes. In contrast, the targets' strategic position would consider draw as an acceptable outcome. Thus, initiators' advantage of relative power can induce the victory rather than draw. This implies that there are clearly different strategic positions between initiators and targets in a militarized dispute.

Chapter 3 investigates how the expected outcome of militarized dispute affects the decision to initiate it. As pre-dispute information, the expected outcomes consist of expected probability of victory and uncertainty. The former is derived from the outcome model in Chapter 2, so identified effects of democratic institutional characteristics and relative power in the outcome model are incorporated into the expected probability of victory. In contrast, uncertainty represents unobservable information. The decision-makers learn the effect of regime types and relative power on the outcome of disputes (Goemans 2000). Thus, the decision to initiate militarized disputes is affected by previous expectations about the outcome, so that the expected probability of victory can be considered as an important determinant of initiation. Because the expected probability of victory is induced from the outcome model, it represents *ex ante* contexts composed of



regime types and national power. In this context, decision-makers consider a high level of probability of victory as a preponderance of power and democratic advantage on military performance prior to disputes. Therefore, decision-makers have incentives to initiate a militarized dispute in order to obtain a favorable outcome by their advantage. However, in the empirical world, the chance of draw intervenes into decision-makers' calculation as well as the expectation based on probability of victory. Thus, the expected probability of victory is related exponentially to the likelihood of dispute initiation, because a certain magnitude of expected probability of victory, which entails a decrease in chances of both draw and defeat, drastically reinforces incentives to initiate a militarized dispute.

Likewise, uncertainty also affects the relationship between expected probability of victory and the likelihood of dispute initiation. In the rational choice approach, conflicting estimates of the outcome reduce bargaining range and instead increase the likelihood of war (Fearon 1995). Accordingly, decision-makers' incentives to misrepresent private information are reinforced when there is uncertainty of the distribution of power and resolve. In the empirical test section, the initiation model is designed to test the relationship between the combination of observable and unobservable pre-dispute information and decisions of initiation. This model shows that with a high magnitude of uncertainty about power and resolve, the increase in probability of victory is more likely to initiate a militarized dispute.

Chapter 4 examines how the extent of revealed private information by intergovernmental institutional designs impacts the dispute escalation process. After initiation of a dispute, more information is revealed periodically (Goemans 2000). In the escalation process, the target's reciprocal action which determines the escalation of

disputes is affected by the degree of private information revealed. A decision to escalate derived from reciprocal actions is affected by the disclosure of private information, because the change in the level of uncertainty induces a recalculation of the disputes' costs. In this context, an institutional design to reveal private information, such as an existing restrictive agreement on arms, can reduce the possibility of escalation because such information alleviates the risk of war derived from private information. Thus, arms control agreements designed to disclose private information can affect the targets' reciprocal actions. When disputants recalculate costs and benefits after entering a dispute, arms control agreements with on-site inspection systems reveal private information and thereby affect disputants' decisions to escalate disputes. The escalation model tests the effect of existing arms control agreements on decisions to escalate violence during a militarized dispute. This model reflects the recalculation of costs and benefits in initiators and targets because disputants update their facts from previously private information. The result reveals that arms control agreements significantly reduce the likelihood of escalation. This implies that pre-dispute information can guide intradispute decisions to escalate a militarized dispute.

Chapter 5 investigates how the intradispute choice of airpower coercion affects the decisions to terminate militarized disputes. Foregoing identified factors that affect decision-making stages in militarized disputes can be incorporated into the use of airpower which represents military coercion based on military technology. Thus, the use of airpower after the initiation of disputes can revise the prediction of the outcome of militarized disputes. The coercion literature has attempted to distinguish military coercion from traditional military strategies (Freedman 1998; Jakobsen 1998). In this context,

Pape (1990; 1996) attempts to show logical distinctions between airpower coercion and war-fighting in terms of different demands imposed by coercers. Since airpower can represent advanced military technology and coercive foreign policies, the use of airpower in militarized disputes can convey strong resolve and commitment. In militarized disputes, the use of airpower coercion entails not only the delivery of the message of the coercer but also the exhaustion of target capability. The use of airpower coercion can reduce the target's ability to absorb and to inflict costs during disputes. This results in a change of expected probability of victory that provides incentives to escalate disputes. Thus, the use of airpower coercion forces encourages disputants to pursue more favorable objects and entails expansion of dispute duration. Furthermore, the use of airpower coercion represents disputants' strong resolve to pursue decisive outcomes so that a dispute is prolonged. Thus, because a disputant with use of airpower coercion is less willing to accept outcomes other than victory, the duration of the dispute is expanded. In the empirical test section, the test is designed to capture the effect of use of airpower coercion on duration of militarized disputes.

The final chapter summarizes major findings and presents theoretical implications. Existing studies of conflict have expanded findings from full-scale war cases to short of war cases. Along this line, this study of militarized disputes opens the puzzle of how states decide to initiate, to escalate, and to terminate most serious conflicts enough to become militarized. Furthermore, this study finds the linkage between outcome and initiation models. The findings imply that decisions are interconnected with one another in militarized disputes. Therefore, this study can contribute to understanding the evolution of violence in international relations.

### **1.3 Method**

In terms of method, this study uses large N statistical analysis for empirical regularities. In order to sustain theoretical arguments, empirical propositions should survive the testing using natural history (Singer 2000; Bennett and Stam 2004). To test causal arguments about decision-making logic, directed dyadic analyses are used. Because directed dyadic analysis distinguishes a dispute initiator's behavior from that of a target, it allows one to explore decisions based on behavioral choices (Bennett and Stam 2000). The directed dyadic model fits into the test of causal arguments having internal logic and conceptual clarity. Thus, the logic of decisions deduced from actor-level analysis can be tested in an integrated research design across levels of analyses using the large N empirical method.

This study uses two different units of analysis that reflect the decision-making stages of militarized disputes. In the outcome, escalation, and duration models, the unit of analysis is directed dyadic militarized disputes involving the use of force. The initiation model uses directed politically active dyads as the unit of analysis. The politically active dyads consider alliance and geographic distance as opportunities for militarized disputes (Quackenbush 2006). Since states' ability to project their power is limited by the geographic distance, the proximity between states and major power status determines the opportunity for initiation of disputes (Most and Starr 1989). Additionally, alliance provides a certain political relation that can be another opportunity wherein noncontiguous minor powers are involved in militarized disputes (Quackenbush 2006).

For estimation of models, this study basically uses logit analysis. The outcome

models use multinomial logit analyses in order to estimate three outcomes of dispute. The initiation model uses logit spline procedure in order to correct temporal dependence in time-series cross-national data. The duration model uses both Cox proportional estimation and corrected estimation procedure for nonproportionality. With the escalation model, I use both ordered logit and two-stage probit selection models. The two-stage probit selection model offers the estimation of the effects of the exogenous variables on the two interrelated decisions (Poe and Meernik 1995; Blanton 2000). Since the two-stage model estimates the probit coefficients in the first stage and then systemically excludes the cases that are not connected with the decision to initiate militarized disputes in the second stage, the effect of decisions of responsiveness on escalation can be captured in the isolating factors that entail the militarized disputes. In other words, the second stage's test deals with selected cases in which the initiation of militarized dispute has already been decided.

## **Chapter 2**

### **Outcomes of Militarized Disputes**

The literature on international relations has attempted to find causal factors that determine the outcome of armed conflicts. This investigation of outcomes opens the puzzle of how decision-makers decide to terminate war and conflicts. The decision to terminate relies on both ex ante expected outcome and ex post cost-benefit calculus in a militarized dispute. In the nature of decision-making process under imperfect information, these ex ante and ex post contexts represent two sources of information that decision-makers can access prior and during a militarized dispute. The former represents pre-dispute information and the latter reflects the process to update information through fighting and the opponent's response. Before the initiation of militarized disputes, decision-makers depend solely on pre-dispute information based on observable measures. Therefore, if decision-makers who rely on only pre-dispute information select their states into a militarized dispute, they can choose to make intradispute decisions of whether states terminate a dispute. This means that pre-dispute information affects the decision to terminate a militarized dispute. Thus, it is necessary to explore this linkage between pre-dispute information and intradispute decision-making.

The idea of possible linkage between the two is not noble. Existing research concerning decision-making has focused on how this pre-dispute information (so-called beliefs) affects the interpretation of new information (George 1969; Jervis 1976; Calvert 1985) and how pre-dispute information is updated by additional information about uncertainty (Wagner 2000; Slantchev 2003b; Powell 2004). These studies consider pre-dispute information as a filter to view new information or a measure of uncertainty that

indirectly affects the decision-making process during a dispute. As a more empirical elaboration, war outcome studies emphasize the selection effects wherein the selection of war methodologically affects the inference of war outcomes (Hart and Reed 1999; Clark and Reed 2003). However, although the extant research reveals the effect of pre-dispute information on the information update process and the chance of victory, no one has investigated what mechanisms and what type of information create the direct relationship between pre-dispute information and dispute outcomes.

This chapter presents the effect of pre-dispute information on the outcomes of militarized disputes. I argue that relevant pre-dispute information guides intradispute decisions of whether to terminate a dispute and therefore is directly related to the dispute outcome. Because some types of prior expectations affect the probability of victory, these types of pre-dispute information are determinants of the termination decision during a militarized dispute. In order to develop and to test this logic of termination decisions based on pre-dispute information, this chapter is organized as follows. The first section discusses the linkage between *ex ante* expectations and dispute outcomes. The second section reviews theoretical and empirical endeavors to examine the outcome of armed conflicts and then identifies relevant *ex ante* contexts. In the third section, I investigate how these identified factors affect the logic of the decision to terminate militarized disputes. The fourth section presents the outcome model in order to test the effect of identified *ex ante* factors on the outcome of militarized disputes. Also, the predictive ability of the outcome model is discussed. Finally, I analyze the empirical testing result and provide implications that affect the decision to initiate militarized disputes.

## **2.1 Linking Information**

One sort of pre-dispute information tends to hold during the intradispute decision-making process that affects the termination of dispute, while others do not. For example, prior to and during the Yom Kippur War in 1973, Egyptian expectations about Israeli military force were preserved and affected the Egyptian defeat. Egyptian political and military leaders believed that the Israeli military possessed a better-qualified armed force that they could not overcome in battles. Due to the memory of the devastating defeat of the 1967 war and insufficient time to overcome the military gap, Egyptian President Anwar Sadat and Commander in chief Ahmad Ismail clearly understood that Egyptian armed force was in a position of military weakness (Gawrych 2000). In their view, the Israeli force had several advantages in technological and professional military skill, the capacity to train for armed combat, and widespread technological support (Monroe and Farra-Hockley 1975). Therefore, Sadat and Ahmad Ismail prepared a prudent and limited war plan instead of an ambitious plan for decisive victory (Gawrych 2000). Although they planned a surprise attack, they did not want decisive victory through a series of battles. The Egyptian prior belief about Israeli military quality continued during the war. As a result, even after the successful breakthrough of the Suez Canal, Egyptian leaders tended to consolidate the positions along the Canal they occupied in initial wartime and were reluctant to expand the military campaign in order to maximize the initial military achievements (Brzoska and Pearson 1994; Fraser 1995). Due to this belief, Egyptian leaders rapidly accepted the settlement derived from military defeat when their Third Army was trapped by the Israeli counteroffensive. In the Yom Kippur War, the Egyptian belief about Israeli military quality was derived from quite credible pre-dispute



information that affected Egyptian intradispute decisions, so that this type of pre-dispute information was related directly to dispute outcome.

In contrast, in the Second Moroccan Crisis in 1911, British expectations about German resolve to use force changed, so Britain chose more coercive diplomacy in the last phase of the crisis and forced Germany to back down. In July 1911, Imperial Germany sent the gunboat Panther to Morocco in order to compel a French concession regarding territorial and economic interests in African colonies (Kagan 1995). During this crisis, Germany gradually increased its territorial demands for French colonies and showed the resolve to use force by both the dispatch of the gunboat and a break in negotiations. As a member country of Triple Entente with France, Britain faced the decision of whether to intervene in this crisis. In the beginning phase of crisis, the British government expected that German resolve to use force was very credible, thinking the German aim was to smash Triple Entente and to obtain Moroccan territories (Mercer 1996). Therefore, Britain expressed support for France but maintained a policy of non-intervention (Barraclough 1982; Richardson 1994). However, after the Mansion House speech that rhetorically expressed British resolve to prepare for war, the German foreign minister Kiderlen reassured the British government that Germany did not want Moroccan territories. Furthermore, throughout the two cycles of negotiation and crisis between France and Germany, the retreat of the imperial German government faced serious criticism from the German nationalist press but the government was not affected by this criticism (Richardson 1994). This was a sign that Germany did not deliver a credible threat. Specifically, German diplomats did not seem to be accountable to the public pressure that criticized their crisis managements. It seemed that, despite domestic

pressure, it was not difficult for the German government to back down. Therefore, the British government changed its original expectations about German resolve and decided on naval preparation in order to compel Germany to retreat (Barraclough 1982; Richardson 1994). Because of the change of British expectations about German resolve, the Moroccan crisis ended when German conceded and withdrew its demands about Morocco. In this case, Britain's initial expectation based on pre-dispute information did not hold, because the imperial German threat did not entail credibility.

These two examples show that all types of pre-dispute information do not hold during a dispute, but certain types of ex ante conditions can be preserved in intradispute decision-making. Therefore, it is necessary to explore what types of pre-dispute information can directly guide intradispute decisions of termination that determine dispute outcomes. The linkage between pre-dispute information and dispute outcome is raised in strategic selection arguments. Because dispute initiators select themselves into a militarized dispute, how disputes end is influenced by how they begin (Reed and Clark 2000; Clark and Reed 2003). Therefore, dispute initiators and dispute targets differ in the strategic selection process. Generally, initiators are more resolved (Maoz 1983; Clark and Reed 2003) and have a more optimistic view about chance of success (Fearon 1994b; Slantchev 2004). In several war studies, initiators' advantages have been identified in terms of target selection, better preparation of war plan, and surprise-attack effect (Bueno de Mesquita 1981; Wang and Ray 1994; Stam 1996; Gartner and Siverson 1996).

Because the strategic selection process differs between initiators and targets, the effect of initiators' and targets' pre-dispute information on the outcome of disputes differs as well. Therefore, relevant pre-dispute information affects the chance of victory

differently, depending on strategic positions. In terms of strategic position, whereas dispute initiators select targets, targets' behaviors are conditioned by the initiators' selection (Hart and Reed 1999). Due to this strategic selection, some factors that affect dispute initiations indirectly impact the chance of victory, yet directly influence dispute outcomes (Clark and Reed 2003). Therefore, there are direct and indirect mechanisms that depict the linkage between pre-dispute information and intradispute decision-making. I will discuss these mechanisms later.

The identification of relevant pre-dispute information is a starting point to explain linking decisions from initiation to termination. Before the initiation of disputes, the circumstances of imperfect information force decision-makers to rely on only ex ante expectations when calculating the costs of impending disputes. This implies that pre-dispute information's predictive ability is acceptable to decision-makers. Thus, whether identified ex ante contexts are relevant pre-dispute information is tested by how accurately the identified information predicts the dispute outcomes.

Based on this predictive ability, decision-makers have an ex ante expectation of dispute outcome and then select their states into a militarized dispute wherein ex ante expectation, via the selection effect, indirectly affects the probability of dispute outcome, just as ex ante observable measures directly affect the chance of victory. This means that pre-dispute information affects the decision to terminate a militarized dispute in both direct and indirect ways. These dispute outcomes brought by decisions of termination are accumulated in observed experiences that become a source of the pre-dispute information. In this informational dynamic, pre-dispute information links to both decision to initiate and decision to terminate, so that initiation and termination decision stages are linked to

each other.

## **2.2 Identification of Ex Ante Contexts**

Relevant pre-dispute information is identified in existing research that has found several factors influencing the outcome of war and crisis. Several scholars have examined war outcomes, focusing on explanatory factors such as relative power and strategic behaviors (e.g. Gartner and Siverson 1996; Stam 1996) or regime types (e.g. Reiter and Stam 1998; 2002; Clark and Reed 2003). Others test the effect of power, regime, and resolve on crisis and short of war outcomes (Maoz 1983; Gelpi and Grieco 2001; Gelpi and Griesdorf 2001). These works emphasize external relative power, domestic regime type, and strategic positions as important ex ante contexts in outcomes of militarized disputes. These factors have been considered as important determinants of dispute outcomes in main lines of research on war termination and crisis management.

First, bargaining theory can provide a description of external relative power that affects the outcomes of war and crisis. In this line of study, war is assumed as a result of divergent belief about disputants' abilities to wage war (Fearon 1995; Powell 1999). Based on this assumption, bargaining theory emphasizes uncertainty regarding the distribution of power and the resolve to use force under the imperfect information condition. In this circumstance, decision-makers have an incentive to misrepresent their private information in order to obtain better deals (Fearon 1995). Thus, the uncertainty about the balance of power and the incentive to misrepresent it cause rational decision-makers to choose war despite the fact that they realize war is a costly instrument.

Based on this logic, Fearon (1994b) shows that crises are characterized by private

information and a costly signal, and only the costly signal entails credible information (Fearon 1994b). In this situation, ex ante expectations about the dispute counterpart's willingness to use force is an important determinant of strategic choice and crisis escalation. These ex ante expectations can be derived from observable relative power and interests (Fearon 1994c; 2002). Therefore, observable indicators about relative power are a primary predictor of disputants' decisions during a dispute.

Likewise, using a similar logic, some scholars emphasize intrawar bargaining as a process to treat disagreement over distribution of power between disputants. Because states have incentives to misrepresent private information about their own abilities, private information can be revealed through individual battles and diplomatic behavior during war. In this sense, even a military contest can be considered as tacit bargaining because fighting allows disputants to recognize their opponents' actual power and preference (Wagner 2000). Powell (2002) emphasizes the risk of military collapse as representing distribution of power in intrawar bargaining. Filson and Werner (2002) stress not only the outcome of battle but also defenders' response to the attackers' demands as new information to update previous information during war. The logic of bargaining in war termination can be applied at the dispute level, because the decision to terminate militarized disputes also results from a process to converge previous disagreements about relative power.

Although bargaining theory focuses on the logic of termination rather than determinants of victory, this line of study generally emphasizes information about relative power as a core component in determining rational actors' cost calculation. Accordingly, this relative power (specifically, material capability) can affect intrawar bargaining. In

fact, Slantchev (2004) suggests that rich resources in a state can reinforce previous beliefs about victory. Therefore, material capability in states can be considered as an ex ante context that affects the outcome of war and conflicts, because disputants' strong belief about victory enables states to preserve their original prospects in spite of new information about their opponents' unexpected abilities.

Second, war-fighting theory emphasizes exogenous factors affecting the outcome of militarized disputes. This line of study focuses on relative power, regime type, and strategic positions as determinants of victory. From the viewpoint of strengthening the role of relative power in war and conflicts, the traditional research emphasizes the preponderance of military, industrial, and demographic capabilities (Bueno de Mesquita 1981; Merritt and Zinnes 1989; Stam 1996). Specifically, power transition theorists place more emphasis on the socioeconomic component of material capabilities and the discrepancy between military and economic growth (Organski 1968; Organski and Kugler 1980). Along this line, material capabilities in states seem to be a useful predictor of war and conflict outcomes.

However, these material capabilities sometimes do not directly influence the outcome of disputes. In cases that are short of war, the relatively short duration and a low level of required resources induce a difficult transition from societal and economic capabilities into relevant power that influences dispute outcomes (Maoz 1983). Furthermore, weaker states tend to collude with one another in order to confront against stronger states and thereby counter advantages of material capability (Maoz 1990).

Therefore, as another aspect of relative power, conduct of war arguments focus on the conflict and battlefield management. This line of study extensively develops ways of

management by the introduction of several concepts: force employment, skills on the battlefield, military strategy, and military technology. Biddle (2004) explains how force employment induces victory on operational and tactical levels. Arquilla (1992) stresses the importance of skill on the battlefield, because superior skill can overcome disadvantages in material capabilities. In a similar vein, the type of military strategy also is considered as an influential factor in dispute outcomes (Mearsheimer 1983; Stam 1996; Reiter and Meek 1999). Military technology and organizational factors are also important because a revolution in military affairs has affected the outcomes of war (Mazarr 1993; Biddle 1996).

However, except for military technology, most factors justified by conduct of war arguments focus on ex post context rather than ex ante context, because the selection of choices in crises and skills for battlefields is intrinsically an ex post choice. Although military strategy generally is founded before war begins, it is difficult to judge whether published military strategy is just rhetorical service. By contrast, military technology and organizational advantages can be established only if technological and organizational innovations rose before a militarized dispute. Therefore, they can be considered as an ex ante context that represents the relative power of states, and they belong to pre-dispute information. Furthermore, sometimes technological and organizational advantages are considered as factors in overcoming material disadvantage. Therefore, military technology can be distinguished from material capabilities. In several empirical studies, military technology and organizational advantages have been captured by a concept of military quality that is distinguished from the concept of material capabilities (Stam 1996; Reiter and Stam 2002). Accordingly, military quality, as a representative of

technological and organizational advantage, is one of the ex ante external contexts that affects militarized dispute outcomes.

Like an emphasis on relative power, war-fighting theory also developed the effect of domestic regime type on the outcome of war and conflict. This argument derives from the puzzle of how domestic institutional characteristics affect the outcome of war and conflicts. Goemans (2000) argues that differences in regime types influence war-termination logic because the different probability of punishment in each regime type determines political leaders' expected outcome value in war. This means that democratic institutions differ from nondemocrac in terms of impact on war and conflicts outcomes.

In recognizing this difference, the war-fighting explanation emphasizes the efficiency of the democratic society beyond its institutional characteristics in terms of the conduct of war and mobilization. According to this explanation, democracies have greater ability to extract resources from society, stronger economies, and better military leadership than autocracies have (Lake 1992; Reiter and Stam 1998; Reed and Clark 2000). Furthermore, in light of cultural characteristics, democratic societies provide superior soldiers with high levels of morale and military professionalism that allow them to take the initiative in the battlefield, compared with the soldiers of autocratic opponents (Reiter and Stam 2002). Therefore, according to this line of reasoning, democracies are more likely than autocracies to win battles.

In addition, war-fighting theory also focuses on the difference between strategic positions. Maoz (1983) argues that the resolve explains the dispute outcomes because motivated disputants generally obtain favorable outcome in disputes. In this argument, due to an imbalance in stakes, the more motivated state selects escalation-prone conflict



management and thereby obtains favorable outcomes. In a militarized dispute, dispute initiators are more motivated and resolved parties than targets are. Therefore, the effects of strategic positions on dispute outcomes differ between initiators and targets.

Third, as a complementary explanation of war and conflict outcomes, the selection-effect theory focuses on regime types and strategic positions. This explanation begins with the assumption that states strategically select targets in order to win war and conflict (Clark and Reed 2003). In terms of institutional differences between regime types, the selection-effect explanation focuses on democratic institutional constraints that affect the decision-making process. During war and crisis, democratic leaders are constrained by public consent and the accountability of political leaders to the voters (Bueno de Mesquita and Lalman 1992; Reiter and Stam 1998; Bueno de Mesquita, Morrow, Siverson and Smith 1999). In this argument, victory in war comes from the democracies' careful selection of fighting opponents. Due to domestic constraints on political leaders in democracies, democratic leaders decide to initiate war under systemically different criteria than those used by autocratic leaders (Reed and Clark 2000). This selection induces risk-averse behavior, so that democratic leaders decide in favor of war when assured of the victory. Therefore, the selection effect enables democracies to achieve more favorable dispute outcomes than nondemocracies.

Similarly, the selection effect reinforces the difference between strategic positions. Dispute initiators either select themselves into a militarized dispute by use of military instruments or drop out of a dispute. Accordingly, targets have conditional choices to react to initiators' behaviors. In this sense, the differences between initiators and targets are significant in terms of dispute outcomes (Hart and Reed 1999; Sullivan and Gartner

2006). Therefore, strategic positions become a determinant of dispute outcomes.

In sum, although existing studies on war and crisis outcomes did not emphasize the identification of pre-dispute information, they have found several factors that affect the chance of victory. According to these findings, relative power, domestic regime types, and strategic positions determine typical pre-dispute conditions. Two types of relative power, material capabilities and military quality in states, not only affect political leaders' beliefs about the prospect of war but represent observable influential factors before war and conflicts. In a similar vein, democratic institutions can be distinguished from nondemocratic institutions as an important pre-dispute condition that affects the war-fighting and targeting process. Likewise, the different strategic selection between dispute initiators and targets also influence the outcomes of war and crisis. Thus, those factors are relevant pre-dispute information affecting outcomes of militarized disputes.

### **2.3 Linkage in Informational Dynamics**

Under the imperfect information condition, relevant pre-dispute information links to the dispute outcome. When it is assumed that termination of militarized disputes is a decision rather than a byproduct of the situation, the dispute outcome is determined by the exchange and update of information that decision-makers possess. For rational decision-makers, war is a costly instrument and therefore is ex post inefficient. Nonetheless, a state has an incentive to misrepresent private information for a better deal, so that this incentive generates disagreement about disputants' ability and resolve. In this sense, because war is incurred by the disagreement, war can be terminated when disputants' beliefs about relative power converge and they accept each other's proposals

(Goemans 2000; Wagner 2000; Filson and Werner 2002). Therefore, the decision to terminate war is influenced by a series of information exchanges from a war's beginning to end. According to this logic, both prewar information and new information acquired during war are linked. Thus, some relevant pre-dispute information can help predict intradispute information that affects the decision to terminate. This linkage between pre-dispute information and intradispute decisions is explained by both direct and indirect mechanisms.

First, the direct mechanism describes how relevant pre-dispute information guides intradispute decisions and thereby affects the probability of victory. As identified relevant pre-dispute information, relative power and domestic regime types affect the intradispute decision-making and the chance of victory through intradispute bargaining and war-fighting. On the one hand, relative power that represents the ability to absorb and to impose costs influences incentives to accept updated information in intradispute bargaining. The advantage in relative power makes it possible to hold to prior belief despite the appearance of new information. This tendency preserves disputants' initial optimistic belief during a dispute, and thereby allowing continuous fighting until favorable outcomes are reached. As a result, a pre-dispute advantage in relative power can improve the chance of victory. In intradispute bargaining, war and crisis become continuous when dispute costs are low and when disputants hold to their optimistic beliefs (Filson and Werner 2002). Based on this linkage between duration and final outcome of dispute, pre-dispute information directly links to dispute outcomes.

Accordingly, two types of relative power, material capability and military quality, directly affect the chance of victory. As a type of ex ante relative power, material

capability can be translated into instruments to impose costs against opponents and to absorb inflicted costs. In the termination decision-making process, unobserved factors before disputes increase the possibility of shifting previous beliefs about the chance of victory, so that a decision based on new information is sometimes quite distinct from the previous belief. However, when decision-makers perceive a high level of capability advantage and thereby hold strong pre-dispute beliefs about the chance of victory, their initial expectations decrease in very small increments and at a very slow rate (Slantchev 2004). Thus, if there exists a high level of imbalance of material capabilities, then the stronger state possesses a highly credible belief about possible victory and therein has a strong incentive to continue pursuing its previous prospect. Furthermore, the advantage of material capabilities can impose more efficient costs upon a weak state and thereby will directly affect its strategy. Thus, under an imbalanced material capabilities condition, pre-dispute information has more influence on the decision to terminate, *ceteris paribus*. In other words, the larger the imbalance of material capabilities, the greater the proportion of observable factors and the smaller the proportion of unobservable factors before a dispute occurs. Accordingly, the imbalance of material capability is a predictor of the intradispute process that determines decisions to terminate militarized disputes.

Another type of *ex ante* relative power, military quality, also can affect the termination decision-making process through a logic similar to that of material capability. However, because militarized dispute events are generally short in duration, there is not enough time to translate material capabilities into actual influential power. In contrast with the ability based on material capability, because the preponderance of military quality relies on standing forces' characteristics, this ability does not require mobilization.

Therefore, technological and organizational advantages in states can be better instruments for controlling short-term militarized accidents. For the same reason, advantages in military quality also can contribute to obtaining a decisive and quick victory so that the weaker state's costs of fighting are higher than those of the stronger state. The high costs of fighting will be a serious burden to the weaker state. Due to costly fighting, the weaker state is more likely to accept the stronger states' demand (Powell 1999). Similarly, Stam (1996) asserts that a state wins if the opponent's respective benefit is exceeded by imposed costs. Accordingly, the higher the costs of fighting, the greater the benefit that stronger states have. In this sense, a disparity in military quality strengthens the role of pre-dispute information in the outcome of militarized disputes. Therefore, imbalanced military quality also can be a good predictor of the intradispute process. In addition, the effect of military quality may be a better indicator than the influence of material capability, because of higher costs imposed by a disparity in military quality.

On the other hand, just as the ex ante advantage in relative power affects the decisions to terminate, distinctive democratic characteristics in domestic regime types also guide intradispute decisions by revealing democratic institutional advantages in a militarized dispute. Because democracies are highly sensitive to costs and domestic audiences, democratic leaders are reluctant to face the failure of dispute and the back down during a crisis in order to retain their offices from electorates' punishment. These institutional constraints make it possible to improve the credibility of costly signaling. Therefore, democratic regimes are more likely to win a dispute than nondemocracies are, because democracies send credible threat to dispute counterparts (Fearon 1994a; Reiter and Stam 2002; Filson and Werner 2004). This means that democratic regime

characteristics directly affect the chance of victory, so domestic regime types link to dispute outcomes.

As a source of democratic regime characteristics, domestic audience costs generate institutional constraints on democratic leaders. Because a democratic regime is more sensitive to domestic audiences, institutional constraints on decision-making lead to different foreign policy behaviors than those exhibited by of a nondemocratic regime. Democratic leaders face more serious domestic opposition and punishment when confronting the failure of foreign policy, compared with a nondemocratic regime. These high levels of audience costs in democratic regime affect political leaders' cost calculation in disputes. In democracies, because decisions to back down in disputes induce immediate domestic opposition and long-term punishment, democratic leaders with high levels of audience costs prefer moving forward to retreating (Fearon 1994a; Partell and Palmer 1999). Also, a high level of audience costs enhances the state's ability to signal resolve (Fearon 1994a; Schultz 1999). Because decisions to back down are associated with domestic opposition, a democratic state's threat is communicated credibly to the opponent state. Thus, a democratic state's decision to initiate or to respond to a dispute is a costly signal that delivers a high level of resolve to opponents. A democratic regime can signal stronger resolve than a nondemocratic regime can, so the democratic regime is more likely to induce opponent's concession in a militarized dispute. Therefore, the relatively high level of credibility in costly signals generated by democracies enhances the chance of victory in short of war cases. As a result, regime type can be a useful predictor of the intradispute bargaining that determines decisions to terminate a militarized dispute.

Second, in contrast with the direct mechanisms between pre-dispute information and the chance of victory, indirect mechanisms describe the selection effect linking prior beliefs and dispute outcomes. As relevant pre-dispute information, relative power and domestic regime types influence potential disputants' initial belief about their opponents' ability and resolve. Based on this initial belief, potential disputants perform the strategic selection process (i.e., selection of themselves into a dispute and selection of target types). Because the decision of initiation and target's response affect the chance of victory (Clark and Reed 2003), the pre-dispute information indirectly affect the dispute outcomes through the strategic selection process.

As an indirect mechanism to link pre-dispute information with dispute outcomes, relative power influences the probabilities of outcomes through its influence on disputants' selection of opponents and actual response. Pre-dispute relative power becomes a proxy for the disputants' initial beliefs about the opponents (Fearon 1994c). Therefore, a weaker disputant suffers uncertainty about a stronger disputant's resolve to use force. In this context, the weaker side attempts to initiate a dispute on dubious issues that the stronger disputant might consider as less important stake (Fearon 1994c). Because the weaker disputant expected the stronger side to show weak resolve, the stronger side's costly signal is more likely to induce the weaker side's concession. This implies that relative power indirectly deteriorates the weak opportunistic initiator's chance of victory. However, initial beliefs about the potential opponent influence what type of state would initiate a dispute (Fearon 2002, 14). In this sense, if a stronger disputant's resolve to use force is credible, only a resolved disputant can initiate a dispute. In case, even if the stronger disputant makes costly signals, the weaker resolved disputant

prefers mutual hostilities to its concession. Due to these conditional reactions, which are influenced by the action of opponents, relative power has a mixed effect on dispute outcomes as an indirect mechanism. This means that relative power as an indirect mechanism affects probabilities of both decisive outcome (victory) and indecisive outcome (draw).

By contrast, as another indirect mechanism, domestic regime characteristics straightforwardly affect the probabilities of outcomes. As democratic regime characteristics, democracies are sensitive to wartime costs (Reiter and Stam 2002). This cost-sensitivity assumption provides an explanation of how democracies prudently select themselves into a dispute and choose a target. For democratic initiators, dispute outcomes other than victory become serious costs that political leaders do not want to suffer. Therefore, democratic initiators do not start a militarized dispute when they have pessimistic beliefs about potential targets' resolve and capability. Due to this prudent selection of a dispute opponent, democratic initiators are more likely than nondemocratic initiators to reach favorable outcomes (Filson and Werner 2004). In other words, as an ex ante domestic context, domestic regime characteristic enhances democratic initiators' chance of victory via the selection effect. This tendency is consistent with the empirical findings that test the effect of a democratic initiator on the victory of war (Clark and Reed 2003). Similarly, democratic institutions sensitive to the cost of disputes often provoke weak states either to engage in or to be engaged in conflicts against democracies (Filson and Werner 2004). Thus, democratic targets are more likely than non-democratic targets to reach favorable outcomes, because the cost sensitivity of democracies causes weak states to select themselves as opponents of democracies in a militarized dispute. As a



result, democratic regime characteristics based on cost sensitivity indirectly affect the dispute outcomes.

In short, the direct mechanisms depict the relationship between relevant pre-dispute information and the chance of victory. As relevant pre-dispute information, both relative power and domestic regime type show fairly similar effects on dispute outcomes. Due to ability to absorb costs and to make credible costly signals, material capabilities, military quality, and democratic regime become relevant pre-dispute information to guide intradispute decisions. In contrast, the indirect mechanisms describe how relevant pre-dispute information links to dispute outcomes via the strategic selection process. These mechanisms reflect the important role of strategic positions when determining dispute outcomes. Although the explanation of indirect mechanisms shows that both relative power and democratic regime are linked with dispute outcomes, the effects of the relevant pre-dispute information on probabilities of outcomes differ from those indirect mechanisms. Within indirect mechanisms, the effect of relative power is mixed, whereas the effect of democratic regime is straightforward.

Based on these expectations, I deduce testable hypotheses that represent the effect of both initiators' and targets' relevant pre-dispute information on the outcomes of militarized disputes. For the empirical test, I use three possible outcomes (victory, defeat, and draw), in order to test the mixed effect of relative power as an indirect mechanism on dispute outcomes. Furthermore, three outcome probabilities can include indecisive outcomes such as stalemate and compromise. In fact, more than half of all militarized dispute outcomes are coded as indecisive consequences including stalemate and compromise cases in the Militarized Interstate Dispute (MID) 3 data set (Jones, Bremer,

and Singer 1996).

Then, I consider different strategic selection process, because dispute initiators have different strategic position from that of targets. The difference between initiators and targets' strategic positions can be understood more clearly in the determinants of draw rather than those of victory or defeat. "A draw occurs when both sides are willing to accept a status quo outcome through some form of negotiated settlement" (Stam 1996, 35). Based on this definition of draw, initiators' advantages in ex ante contexts are not connected to draw. Because initiators are highly resolved and have an optimistic view, it is difficult for initiators to prefer stalemate or compromise to concession. In other words, initiators cannot find a specific benefit to draw versus defeat, because both results lead initiators to abandon their original prospect. By contrast, in terms of targets' strategic position, a draw may be considered as a benefit, because targets can reject the initiators' demand even then. Due to these differences, I test each effect of pre-dispute information of initiators and targets, respectively.

Then, I raise six hypotheses to test the direct mechanisms that link the pre-dispute information to the probability of victory.

**Hypothesis 1:** Democratic initiators are more likely to win militarized disputes than are nondemocratic initiators.

**Hypothesis 2:** Initiators with better military quality are more likely to win militarized disputes.

**Hypothesis 3:** Initiators with more capability are more likely to win militarized disputes.

**Hypothesis 4:** Democratic targets are more likely to win militarized disputes than are

nondemocratic targets.

**Hypothesis 5:** Targets with better military quality are more likely to win militarized disputes.

**Hypothesis 6:** Targets with more capabilities are more likely to win militarized disputes.

Then, I raise additional hypotheses to test the indirect mechanisms. For expected mixed effects in indirect mechanisms, I test the effect of pre-dispute information on the probabilities of indecisive outcome.

**Hypothesis 4-a:** Democratic targets, more so than nondemocratic targets, increase the likelihood of draw in militarized disputes.

**Hypothesis 5-a:** Targets with better military quality increase the likelihood of draw.

**Hypothesis 6-a:** Targets with more capabilities increase the likelihood of draw.

## 2.4 Research Design

In this chapter, I test these hypotheses using directed dyadic disputes from 1816 to 1992. Although the MID 3 data set provides militarized disputes (Ghosn, Palmer, and Bremer 2004), this data set has some unclear coding rules regarding combination of multilateral disputes.<sup>1</sup> For example, this data set coded Poland as a winner in war between Germany and Poland in the World War II (Bueno de Mesquita 1981). Thus, this research uses the Dyadic Militarized Interstate Dispute (DYDMID 2.0) data set that corrects coding problems in multilateral disputes (Maoz 2005).

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<sup>1</sup> See Maoz's Dyadic Militarized Interstate Disputes (DYDMID 2.0) Dataset codebook in <http://psfaculty.ucdavis.edu/zmaoz/dyadmid.html>

For the empirical test, the selection effect should be treated as a methodological issue as well as theoretical issue. Because there is a different strategic selection process between initiators and targets, the likelihood of initiation differs from the likelihood that states are targeted in a militarized dispute (Clark and Reed 2003). Thus, selection of initiation is different from being targeted in a militarized dispute, so their influences on the chance of victory differ as well. Based on this difference, the decision to initiate a dispute influences the probability of outcomes. This selection effect may impede accurate statistical inference (Reed and Clark 2000). In order to correct this selection bias, it is necessary to separate initiators from targets in an empirical model. This separation reflects the different strategic selection processes of initiators and targets and enhances empirical leverage (Hart and Reed 1999; Clark and Reed 2003). The directed dispute dyad data set allows me to identify an initiator in each dispute, so that it is possible to separate the initiators' outcome model from the targets' outcome model. Then, in order to control the influence of decision of initiation, I include the factors that affect decision to initiate a dispute in the outcome model. This controls the selection effects (Rousseau, Gelpi, Reiter, and Huth 1996).

Thus, I construct both initiator and target models, and I test the effect of ex ante external and domestic contexts on outcomes of militarized disputes. For the dependent variable, the outcomes of militarized disputes are classified into three categories: victory, draw, and defeat. As discussed previously, in the pre-dispute stage, initiators' benefits do not differ between draw and defeat. This means that these three categories cannot be considered as ordered categories. Thus, I use a multinomial logit model in order to estimate the effect of ex ante contexts.

As the dependent variable, the three outcomes of militarized disputes are defined according to the MID classification of dispute outcomes. The MID data set provides six outcome categories: victory, yield, stalemate, compromise, released, and unclear (Jones, Bremer, and Singer 1996). In the MID data set, “victory for side A” and “yield by side B” are considered as the initiator’s victory. Likewise, “victory for side B” and “yield by side A” are regarded as the initiator’s defeat. Then, “compromise” and “stalemate” are considered as draws, and other values are removed. As a result, the dependent variable has three categories (victory, draw, defeat).

The primary independent variables consist of two democratic variables (democratic initiator and democratic target) and two relative power variables (capability ratio and military quality ratio). To measure democracy, I use the “polity 2” index which ranges from -10 (highly autocracy) to 10 (highly democracy) of the POLITY IV Project (Marshall and Jaggers 2000). I code any state with a polity score greater than 6 as a democracy. Although there is a debate regarding the use of a dichotomous coding of democracy and a continuous measure of democracy, I assume that democracy is qualitatively different from non-democratic regimes (Przeworski et al. 2000). In terms of the cut point of the polity score in a dichotomous measure, the empirical distribution of regime types over all interstate dyads shows that the polity score tends to cluster into a large number of dyads above scale 6 (Bennett 2006b). As a result, several scholars choose the polity score 6 as a cut point in dichotomous democracy (Rousseau et al. 1996; Senese 1997; Schultz 1999; Huth and Allee 2002). Accordingly, I construct the democratic initiator variable as a dichotomous variable, coded “1” when the dispute initiator is identified as a democracy. In a similar vein, I also generate the democratic target variable

as a dichotomous variable, coded “1” when the dispute target is a democracy. These democratic initiator and democratic target variables are tested in the initiator and target models, respectively.

The capability ratio variable is measured by the Correlates of War (COW) project’s composite capabilities index (Small and Singer 1982). Each disputant’s material capability ratio value is calculated by a ratio of the disputant’s capability to the sum of its capability index and that of its opponent. This variable represents industrial, demographic, and military national power. Then, I create the military quality ratio variable by the use of combining military expenditure and military personnel data from the COW data set. I assume that the spending per soldier corresponds to the level of training and military technology (Stam 1996; Reiter and Stam 1998). I also assume that the high level of spending per military person means increased investment for procurement and better military organization. Thus, I divide military expenditure by the number of military personnel in order to create the military quality ratio variable.

As control variables, I consider absolute attributes of disputants, dispute type, and contexts of disputes that affect the decision to initiate a militarized dispute. First, for the absolute attributes of disputants, I include national capability, population, and risk-taking propensity of initiators or targets in each model. Stam (1996) argues that the absolute capability of disputants determines the extent of ability to absorb the costs that the opponent state will impose. In a similar vein, the size of the population affects the ability of coercion because a larger population can absorb more costs (Stam 1996). Both indicators determine the desire to pursue ambitious military adventures. Therefore, they can affect the decision to initiate a militarized dispute. For risk-taking propensity, Bueno

de Mesquita (1985) finds the linkages among risk-accepting propensity and war initiation. According to this logic, risk-acceptant initiators have a relatively high likelihood of loss than risk-averse initiators have.

In terms of measurement, the national capability variable is measured by the COW composite capability index of each initiator or target in a militarized dispute. The population variable is measured by natural log values that come from total population data from the COW data set. The risk propensity variable is measured by Bueno de Mesquita's (1985) risk attitude score method that provides continuous values ranging from -1 to 1 wherein a +1 indicates a highly risk-acceptance attitude. Although Bueno de Mesquita's original method uses alliance portfolios as the policy indicator, the risk propensity variable is based on the method using an S score that is a spatial measure of policy position similarity (Signorino and Ritter 1999).

Second, the dispute type is stratified by the power status of disputants. Existing empirical findings report that the pattern of war differs between major and minor powers (Geller 2000). In order to test the effect of power status on dispute initiation and outcome, Maoz (1982) identifies several types of disputes that represent the combination of disputants' power status based on the difference between major powers and minor powers. Similarly, I create dummy variables (*Major-Major*, *Minor-Minor*, and *Minor-Major*) that reflect pairs of initiator's and target's power statuses. For example, the Major-Minor dummy variable designates a dispute that a major power initiates against a minor power. The concept of major power is defined by the status of the state in the international system over time (Small and Singer 1982).

Third, as contexts of disputes, I include contiguity and foreign policy similarity.

Contiguity, as a geographical constraint, can limit projection of national power so that relative power also is adjusted by contiguity (Boulding 1962; Bueno de Mesquita 1981; Stam 1996). Because contiguity does influence the decision to initiate a dispute as an ex ante external context (Bremer 1992), it becomes a control variable. It is measured by six categories including the COW data sets' five types of state-to-state contiguity: land contiguity or separated by 12, 24, 150, or 400 miles or less of water (Gochman 1991). The sixth category indicates that the states are not contiguous. I transform the fifth and sixth categories into a noncontiguous category and the others into a contiguous category in order to generate one dummy variable.

On the other hand, foreign policy similarity is based on a comparison of the two sides' portfolio of alliance commitments (Bueno de Mesquita 1981). As control variables, I consider both the foreign policy similarity between disputants and the foreign policy similarity with the dominant power. The former influences the magnitude of initiators' initial demand against targets. Thus, as an ex ante context, the foreign policy similarity reflects the satisfaction with targets. In power transition theory, dissatisfaction with potential rival state is an important cause of war (Organski and Kugler 1980; Lemke 2002; Kim 2002). Therefore, the foreign policy similarity between disputants can capture the initiator's intention to involve in a dispute. Likewise, the foreign policy similarity with the dominant power represents the degree of satisfaction with the international status quo. The extent of similarity with the dominant power means the degree to which a state shares a common view of the international system established and protected by that dominant power (Kim 1991; Hart and Reed 1999). Therefore, the different foreign policy similarity with a dominant power captures dissatisfaction with the international status quo



and affects the decision to initiate a militarized dispute. Those two variables are calculated by Signorino and Ritter's (1999) S score. Then, I generate both the S variable representing the extent of policy similarity between disputants and the S with leader variable indicating initiators' or targets' foreign policy similarity with a global system leader state.

Thus the set of outcome models is shown below:

Initiators' outcomes (victory / draw / defeat) =  $f$ (democratic initiator, capability ratio, military quality ratio, national capability, population, risk propensity, Major-Major, Minor-Minor, Minor-Major, contiguity, S, S with leader)

Targets' outcomes (victory / draw / defeat) =  $f$ (democratic target, capability ratio, military quality ratio, national capability, population, risk propensity, Major-Major, Minor-Minor, Minor-Major, contiguity, S, S with leader)

## 2.5 Data Analysis

For the empirical test, I estimate the effect of ex ante contexts in two separate multinomial logit models, as shown in Table 2-1. In these models, each victory and draw probability is compared with the probability of defeat.

[Table 2-1 Here]

In terms of a victory outcome, the Initiator and Target Models have similar results. Democracy and military quality variables have a significant effect on victory in both models. It supports Hypotheses 1, 2, 4, and 5. As the line of literature about political

violence suggests, the regime type and relative power seem to be important determinants of victory in militarized disputes. For the democracy variables, there remain significantly positive effects on both victory and draw across Initiator and Target Models. This result is consistent with existing empirical findings concerning the effect of regime type on war outcomes (Reed and Clark 2000; Reiter and Stam 2002). This means that the logic of selection of target, war-fighting ability, and credible costly signal effects on war outcomes extends to the dispute level outcomes. Accordingly, the regime type can be considered as a very important component of pre-dispute information that predicts dispute outcomes, regardless of distinction between initiators and targets. This implies that regime type can be a useful predictor of the intradispute bargaining that determines the decision in dispute termination.

In contrast, in terms of a draw outcome, the military quality ratio variable shows a significant impact in the Target Model only. This result supports the existence of different strategic selection processes between initiators and targets. As stated previously, initiators may consider draw as the failure to win. This means that the military advantage based on relative power does not affect stalemate or compromise, due to the initiator's specific expectation linked to strategic position. However, the Target Model shows that the military advantage is useful in both victory and draw outcomes in militarized disputes, because targets accept draw as survival from the attack. This result supports military quality hypotheses (Hypothesis 5 and 5a) that targets with relative advantage of military quality increase not only the likelihood of victory but also the likelihood of draw. Likewise, whereas the Target Model shows significant effects of Minor-Major dispute type on both victory and draw, the Initiator Model reveals evidence of that on draw only.

This also implies that targets do not distinguish draw from victory in terms of their benefit.

In both models, the democracy variables support the democratic advantage hypothesis (Hypotheses 1 and 4), whereas both capability ratio and national capability variables do not show a significant effect on victory. As Maoz (1983) argues, material capability seems problematic when translating into core influential power to affect outcomes of militarized disputes. By contrast, the military quality ratio variable shows significant impacts on victory in disputes. This implies that there is inherent difference between material capability and military quality. Unlike material capability, military quality does not require a mobilization process when being applied to military operation in disputes. Furthermore, as stated previously, an imbalanced military quality ratio increases the fighting costs of the weaker state. This change of costs seems to be more important than a disparity in material capability. Thus, the military quality ratio is a more plausible factor to affect the outcome of militarized disputes than is the material capability ratio, due to a high level of costs of fighting derived from imbalanced military quality. This phenomenon is consistent with the insignificant effect of the capability ratio variable in both models. The imbalanced military quality ratio entails the high level of costs of fighting, so that its impact on outcome of disputes can be distinguished from the effect of disparity of material capability. This implies that military quality is the best predictor of the effect of relative power on outcomes of militarized disputes. This reflects the militarized disputes' characteristics: short duration and low level of violence.

Among control variables, the contiguity variable shows significant effect on the likelihood of victory and draw outcome in the Initiator Model only. This means that

geographical factors significantly intervene in initiators' ability to absorb and to inflict costs, rather than targets' ability. The Initiator Model also shows that the population variable increases the likelihood of draw. In the Initiator Model, those effects of contiguity and population variables are consistent with the existing war outcome model constructed by Stam (1996). However, the effects of foreign policy similarity on dispute outcomes show mixed findings in terms of the tendency of difference between the two models. Whereas the S with leader variable has different effects on outcomes across Initiator and Target Models, there are similar effects of the S variable on dispute outcomes in both models. Nonetheless, the general pattern of control variables' effects on dispute outcomes reveals the different strategic process between initiators and targets.

Beyond the significance levels for the variables, Table 2-2 and 2-3 show the overall fit of the models by the comparison between predicted outcomes and actual outcomes.

**[Table 2-2 Here]**

**[Table 2-3 Here]**

As shown in both tables, the Initiator and Target Models correctly predict 75.8 % and 73.2 %, respectively. The modal outcome is draw in each model, predicting 95.3% and 93.8%, respectively. Although both models seem to need more accurate predictive capability, they perform quite well when predicting draw outcome. When initiators win targets in the realization, both models show relatively high levels of predictive ability. In this case, the Initiator Model predicts 94 observations (24.6%) and the Target Model predicts 132 observations (34.6%).

Figure 2-1 and 2-2 show the distribution of the predictions for each of three

outcomes in both models.

**[Figure 2-1 Here]**

**[Figure 2-2 Here]**

In each figure, three outcome predictions are distributed across the whole spectrum of probabilities. Overall, both models have meaningful predictive ability based on purely ex ante contexts. This implies that probability of outcomes based on pre-dispute information can be a factor to influence the decision-making process during militarized disputes.

In short, the outcome models reveal that ex ante external and domestic contexts can provide useful predictions about the dispute outcomes. In terms of external context, military quality can represent relative power in militarized disputes. This shows that military quality is more suitable for conducting militarized disputes. In a domestic context, the effect of democratic regime is so strong that the victory in militarized disputes in both initiators and targets is affected by regime types. This effect can be extended to the likelihood of draw outcome. Therefore, the outcome models include relevant external and domestic predictors.

## **2.6 Conclusion**

In this chapter, I seek how external and domestic ex ante contexts have effect on the outcome of militarized disputes in outcome models. The findings support the hypotheses regarding the effect of democratic regime and military quality on the victory of militarized disputes. This reveals that external relative power and domestic regime types are significant ex ante observable factors affecting decisions to terminate

militarized disputes. This also sheds light on the linkage between pre-dispute information and the termination logic of militarized disputes. Although the decision to terminate disputes is highly influenced by intradispute process and updated information, a certain type of pre-dispute information also is directly related to the termination logic of militarized disputes. In other words, ex ante observable factors, which are based on military quality and democratic institutional characteristics, are quite significant pre-dispute information that can be preserved during disputes. Evidence shows the linkage between pre-dispute information and the decisions to terminate militarized disputes.

These findings imply that the predicted probabilities derived from outcome models can provide an important ground of decision-making process prior to militarized disputes. Because the probabilities of outcomes provided by outcome models are entirely based on pre-dispute information, decision-makers can use the probability of victory as a key predictor of future actual outcomes. Therefore, the probability of victory based on pre-dispute information seems to be linked to the decision to initiate a militarized dispute.

Furthermore, outcome models show different effects of primary variables between the Initiator and the Target Models. In fact, the effects of primary independent variables in the Initiator Model are different from those in the Target Model. This implies that the decision of initiation affects not only the likelihood of victory per se but also decision-makers' preference about dispute outcomes. The essence of difference in outcome models is that initiators' strategic position is more sensitive to the victory than draw. Accordingly, the expected dispute outcomes may become a very important factor in the decision to initiate disputes.

At this point, the result of the Initiator Model can be incorporated into the logic of

decision to initiate disputes, because this model can provide the expected probability of victory for initiators. Thus, it is necessary to test whether this ex ante outcome model is linked to the initiation model. In the next chapter, I will focus on this linkage between the expected dispute outcome of initiators and the decision to initiate militarized disputes in the initiation model.

## **Chapter 3**

### **Initiation of Militarized Disputes**

In the previous chapter, I investigated the effects of relevant pre-dispute information on the outcome of militarized disputes. I modeled relative power and domestic regime types as ex ante contexts that affect decisions to terminate militarized disputes. The outcome models clarify three possible expected outcomes derived from observable ex ante factors that affect rational decision-makers' pre-dispute calculus. Based on this endeavor, this chapter examines how this expected outcome is linked to decisions to initiate militarized disputes. This investigation about the linkage between decision-makers' expectations and decision-making process prior to dispute opens the puzzle of why states initiate militarized disputes.

Decision makers form expectations regarding dispute outcomes based on pre-dispute information. When the expected probability of victory is derived from the observable ex ante factors, it represents pre-dispute information. However, because rational decision-makers do not have complete information prior to the disputes, uncertainty about private information also affects expected outcomes. Accordingly, existing studies have focused on both expected probability of victory and uncertainty in the logic of decisions to initiate disputes under the limited information condition.

The power centric approach emphasizes the observable distribution of power as the indicator of the probability of victory and uncertainty that determine the likelihood of disputes (Morgenthau 1967; Organski and Kugler 1980; Kugler and Lemke 2000). In bargaining theory, uncertainty derived from unobservable distribution of power and incentives to misrepresent private information may lead rational decision-makers to select



war despite the fact that decision-makers share pre-dispute information about the observable distribution of power (Morrow 1989; Wagner 1994; Fearon 1995). In those studies, however, the measure of the expected probability of victory concentrates on the external factor, i.e. relative power, and thereby excludes the domestic factor. Furthermore, most studies assume that there are two possible outcomes (victory and defeat) of war (Wagner 1994). Although this assumption makes it possible to delineate a dispute as a strategic game based on the zero-sum relationship between one side's probability of victory and the other side's chance of victory, it excludes additional possible outcomes such as stalemate and compromise. Unlike this zero-sum relationship, when predicting the expectations based on three possible outcomes (victory, defeat, and draw), the decrease in one side's probability of victory does not necessarily to increase the others in a militarized dispute. Accordingly, the combinations of three outcome probabilities are fundamentally different from the zero-sum approach based on two possible outcome probabilities (Stam 1996). Nevertheless, can we apply these probabilities derived from three possible outcomes of disputes to the decision logic in militarized disputes? How do they affect decision-makers' incentives to initiate a dispute under uncertainty about willingness to use force?

In this chapter, I examine how the expected probability of victory and uncertainty determines the decision-makers' incentives to initiate a militarized dispute. This investigation clarifies the relationship between extents of pre-dispute information and decision-making process prior to militarized disputes. Here, I argue that expected probability of victory derived from the ex ante context directly correlates with decision-makers' incentives to initiate a dispute. Furthermore, uncertainty about states' willingness

to use forces affects the relationship between expected probability of victory and the decision to initiate a militarized dispute.

This chapter consists of four parts. First, I review existing literature addressing the identified role of expected probability of victory and uncertainty in international conflicts. Second, I illustrate how expected probability and uncertainty are related to dispute initiators' incentives to initiate disputes. Third, I construct the initiation model in order to test the effects of expected probability of victory and uncertainty on the decision-making process when deciding to initiate militarized disputes. Finally, I present data analysis and suggest theoretical and practical implications of the expected probability of victory and uncertainty.

### **3.1 The Sources of Probability of Victory and Uncertainty**

Whereas existing conflict literature has extensively addressed the expected probability of victory and uncertainty, those terms are difficult to measure. Thus, their inference tends to depend on observable relative power and the effect of different domestic regime types. In terms of relative power, the power centric approach and bargaining theory have emphasized uncertainty and the expected probability of victory based on relative power.

First of all, the power centric approach has developed two theories with different interpretations of uncertainty. On the one hand, power transition theory considers uncertainty as the window of opportunity. The power transition theorists argue that a power shift toward parity or a rapid overtaking power between dissatisfied states increases chances to challenge the status quo, and thereby power parity leads to war. This

logic suggests that the combination of power parity, dissatisfaction with the status quo, and shift speed induce disputes (Organski and Kugler 1980; Kugler and Lemke 2000; Kim 2002). In this line of studies, observed dyadic power parity and power shift are associated with dissatisfaction with the status quo, because the existing status quo benefits the stronger side. Therefore, when the observable distribution of power is parity, the dissatisfaction induces the weaker side's militarized challenge (Organski 1958; Kim 1992; Lemke 2002). At the system level, a systemic power shift gives secondary powers an incentive to challenge the existing hierarchical system order constructed by the hegemonic power in order to solve its own dissatisfaction (Gilpin 1981; Lemke 2002). Thus, in power transition theory, changing expected probability of victory based on observable power influences dissatisfied states' incentives to choose military challenge against the status quo.

On the other hand, the more traditional power centric approach, balance of power theory, considers uncertainty as a constraint to reduce military challenges. Balance of power theorists suggest that power parity produces systemic and dyadic stability because contending states cannot be confident of military victory. Thus, power balancing is essential for stability in a society of sovereign states (Morgenthau 1967). At the system level, the balance of power derived from the bipolarity can induce stability that reduces the intention to change system order (Waltz 1979). Thus, war and disputes are minimized when inequalities of power are least (Mearsheimer 2001). According to this theory, uncertainty about the dispute outcome reduces the incentive to use military force.

Although both power transition and balance of power theories have different interpretations of the relationship between power parity and the military challenge, they

agree that the expected probability of victory based on relative power directly reflects the extent of the uncertainty, so that there is a monotonic relationship between observable distribution of power and the likelihood of disputes. Both theories agree that observable power parity maximizes the uncertainty (Reed 2003). However, as bargaining theory argues, when decision-makers decide to initiate disputes, uncertainty induces disagreement about distribution of power and incentives to misrepresent private information (Powell 1999; Wagner 2000; Filson and Werner 2002; Reed 2003). Because potential disputants do not share their own private information before disputes, they have different beliefs about the distribution of power and thereby these discrepancies intervene in the relationship between the observable distribution of power and the likelihood of disputes (Morrow 1989; Bueno de Mesquita, Morrow, and Zorick 1997). According to these explanations, the power centric approach tends to ignore a certain condition of bargaining theory, that uncertainty regarding private information leads decision-makers to have different beliefs about the distribution of power. As a result, the observable distribution of power sometimes does not reflect the extent of uncertainty in the power centric approach. In fact, in contrast to power transition theory, the weaker side, which disagrees with the existing observable distribution of power, may challenge against the stronger side. In a similar vein, unlike balance of power theory, maximized uncertainty may undermine accurate expectations of the future, so that states would be involved in militarized disputes until they reached agreement regarding the existing distribution of power.

In contrast to power centric approaches, several game theoretic arguments suggest that there is a nonmonotonic relationship between power and the likelihood of dispute

due to uncertainty about private information and the unobservable distribution of power (Bueno de Mesquita and Lalman 1992; Bueno de Mesquita, Morrow, and Zorick 1997; Reed 2003). In this logic, the potential disputants' highly unequal chances of victory entail the low likelihood of violence because a large probability of victory makes it possible to predict each other's willingness to use forces. However, an equal chance of victory between contenders increases the likelihoods of both dispute and negotiation, since the observable capability is not a clear signal to overwhelm the unobservable advantage under different beliefs about unobservable capabilities and willingness. In this case, the relationship between probability of victory and the likelihood of dispute is described as the curvilinear relationship in empirical observations (Bueno de Mesquita and Lalman 1992).

Similarly, bargaining theory focuses on the incentive to misrepresent private information, as well as decision-makers' different beliefs about relative power. Accordingly, the expected probability of victory based on observable relative power is not associated directly with the extent of uncertainty, due to unobservable factors that affect decision-makers' beliefs about observable relative power. Bargaining theory assumes that decision-makers do not know private information and thereby have incentives to misrepresent it (Fearon 1995; Wagner 2000; Powell 1999). Therefore, uncertainty regarding private information is the key element affecting the decision to initiate disputes. In fact, the uncertainty leads decision-makers to underestimate their opponent's power and willingness (Filson and Werner 2002).

Bargaining theory shows how uncertainty about private information affects decision-makers' confidence in the expected probability of victory based on relative

power. As a result, this argument clarifies the nonmonotonic relationship between the observable distribution of power and the likelihood of disputes, as well as the effect of asymmetric information and uncertainty on decisions to initiate disputes (Huth, Bennett, and Gelpi 1992; Bueno de Mesquita, Morrow, and Zorick 1997; Reed 2003). However, bargaining theory does not address the possibility of draw as a dispute outcome despite the fact that “a draw occurs when both sides are willing to accept a status quo outcome through some form of negotiated settlement” (Stam 1996, 35). Thus, it is necessary to include the draw outcome when testing deductive arguments in empirical observations.

Unlike the studies about external relative power, the literature on domestic regime type emphasizes the effect of different domestic institutions on the likelihood of disputes. Democratic peace theorists delineate the relationship between democratic regime characteristics and dispute-averse foreign behaviors. In order to explain distinguished dispute-averse patterns within democratic dyads, democratic peace theory has developed three explanations: institutional accountability, diplomatic signals, and normative consensus among democracies. First, because of domestic institutional constraints, democratic regimes create relatively high domestic costs for an aggressive policy. As a result, democratic leaders tend to avoid militarized challenges in order to protect their own political positions from public punishment (Bueno de Mesquita, Morrow, Siverson, and Smith 1999). Second, in terms of diplomatic signals, the high level of transparency and audience costs in democratic institutions can make credible signals to reduce misperception causing the conflicts in crises (Fearon 1994a; Schultz 1999; 2001). Finally, because democratic societies share nonviolent norms as a principle of democracy, this normative consensus leads political leaders to expect nonviolence. Thus, mutually

perceived internal democratic norms in democratic dyads reduce the likelihood of disputes (Maoz and Russett 1993; Oneal and Russett 1999; Russett and Oneal 2001; Huth and Allee 2002). These three mechanisms can provide the logic for how democratic regimes affect the likelihood of disputes.

Beyond democratic peace theory that emphasizes democratic institutional similarity, regime similarity per se also can influence the likelihood of disputes. Because regime similarity is considered as a group identity between states, a pair of states within a similar regime tends to jointly select cooperative actions that can lead to the dispute-averse pattern (Huth and Allee 2002). In empirical studies, the pacifying effect of regime similarity has been found even in autocratic dyads (Werner 2000; Peceny, Beer, and Sanchez-Terry 2002). Because domestic governance type affects other states' interests, regime similarity can reduce dispute-prone behavior in both democratic and autocratic dyads (Werner 2000; Bennett 2006b). Along this line, democratic peace can be considered as one of the aspects of regime similarity.

Although the regime similarity literature brings a domestic factor to international conflict studies, it does not provide well developed logic of decisions to initiate militarized disputes, because this line of literature concentrates on mutual dispute-averse behaviors instead of each state's incentives to use force. In discussions regarding the causes of disputes, the regime similarity literature provides useful conditional propositions that compliment existing arguments about the relationship between relative power and the likelihood of disputes. However, regime similarity explanations do not capture what guide decision-makers' incentives to initiate a militarized dispute.

Beyond previous arguments that emphasize each external relative power or

domestic regime type, the international interaction game model includes both domestic and international factors in order to more completely capture the decision-making process (Bueno de Mesquita and Lalman 1992). Under rational choice assumptions about utility maximization and transitive preference, expected costs and benefits of actions guide decision-makers' choices. In the international interaction game, domestic regime type can be considered as one of the sources that affects the expected utility in dispute decisions, because decision makers' calculation about expected utility is affected by the variation of domestic regime types. In a similar vein, the expected utility of decision-makers reflects the expected probability of victory and uncertainty about international affairs. In that sense, the international interaction game model presumes that the expected probability of victory is directly linked with uncertainty, because uncertainty is maximized when the probability of victory is equal to the chance of defeat (Bueno de Mesquita 1981; Bueno de Mesquita and Lalman 1992).

In this model, although the expected probability of victory reflects relative power, uncertainty is translated into preference about risk (Bueno de Mesquita and Lalman 1992). As a result, this model includes both external and domestic factors and thereby provides a rich description of how risk propensity affects the perception of relative power. However, despite the fact that this model emphasizes the effects of expected probability of victory and uncertainty on the likelihood of violence, the primary logic in this model is the zero-sum approach based on two possible outcomes (victory and defeat). Thus, the logic still excludes the draw outcome that can be discovered in empirical observations.

In short, in terms of the expected probability of victory and uncertainty, existing studies have modeled relative power and domestic regime as key factors that affect the



likelihood of disputes. Although this line of research captures the concepts of expected probability of victory and uncertainty, their logic of decision-makers' incentives to initiate a dispute does not consider expectations about all possible dispute outcomes. Furthermore, in terms of a measurement, most literature measures the expected probability of victory by external power. Thus, it is necessary to investigate how uncertainty and three outcome probabilities based on external and domestic factors affects decision-makers' incentives to initiate militarized disputes.

### **3.2 The Likelihood of Initiation and Pre-dispute Information**

When deciding to initiate a militarized dispute, decision-makers should consider expected outcomes. Because empirical observations about militarized disputes eventually show three outcomes (victory, draw, and defeat), the potential initiators' expectations derive from the combinations of three outcome probabilities based on pre-dispute information. However, the decision logic based on three outcome probabilities is different from existing decision-based literature based on the two possible outcomes (victory and defeat). Whereas the approach based on two outcome probabilities assumes that one side's probability of victory is one minus the other side's probability, three outcome probabilities do not always negatively correlate with one another. Nevertheless, Stam (1996) shows that probabilities of three outcomes covary under the mutual coercion situation. Because the decision to terminate a dispute depends on whether one side's ability to absorb costs can overcome the other side's ability to inflict costs, the change of net balance of costs and benefits determines dispute outcome (Stam 1996). In this logic, the draw outcome entails both sides' negative net balance but victory or defeat means one

side's positive net balance. According to the assumption to view a conflict as mutual coercion, "[as the net balance of costs and benefits for the two sides changes], the net between the two sides ... vary systemically from the situation where one actor anticipates much greater benefits than the other to the situation where both actors expect to have negative benefits" (Stam 1996, 43). Therefore, when probabilities of outcomes are calculated by cost-benefit balance based on disputants' capacity to absorb and to inflict costs, the pattern of changing net balance of costs and benefits induces the systemic change of combinations of three outcome probabilities. This means that three outcome probabilities can covary. In fact, theoretically, the probabilities of victory and defeat vary simultaneously and the probability of draw negatively correlates with other probabilities (Stam 1996). Thus, even in three outcome probabilities, the chance of victory correlates with other outcomes' probabilities.

This idea about the systemic covariation between three outcome probabilities allows decision-makers to depend on the extent of probability of victory per se when deciding whether or not to initiate a dispute. Because decision-makers can predict expected outcomes and future costs given the probability of victory, three outcome probabilities can guide the decision-making process prior to militarized disputes. In other words, decision-makers have an incentive to initiate a militarized dispute according to the changing three outcome probabilities, as the typical zero-sum approach based on two outcome probabilities delineates decision-making logic concerning militarized disputes.

Based on Stam's (1996) theoretical suggestion, there might be several patterns of probability changes: (1) the decrease in probability of draw increases both probabilities of victory and defeat; (2) the initial increase in the chance of victory entails the decrease of

probability of draw and the increase of the probability of defeat; and (3) additional increase in the chance of victory entails the decrease in probabilities of both draw and defeat. Under these patterns, if we assume that the increase in probability of victory promises the favorable future condition, the probability of victory positively correlates with the likelihood of dispute initiation. This relationship between the probability of victory and the likelihood of dispute initiation can be more correctly described by the pattern of the changing three outcome probabilities. When the chance of victory increases up to some limit, the likelihood of dispute initiation slightly increases. Then, after some point, the increase in the chance of victory entails the decrease in the probability of defeat, so that the likelihood of dispute initiation extremely increases. This means a curvilinear relationship between the probability of victory and the likelihood of dispute.

Not surprisingly, this curvilinear relationship is similar to the existing findings about the nonmonotonous relationship between the probability of success and the chance of conflict (Bueno de Mesquita and Lalman 1992; Bueno de Mesquita, Morrow, and Zorick 1997). In game theoretic arguments that concentrate on decision logic based on only two possible outcomes in their game structures, the increases in the probability of success are expected to produce a nonmonotonous response (decrease to increase) in the likelihood of the use of force. This theoretical expectation in part comes from uncertainty about nonobservable capability and resolve. Uncertainty about distribution of power allows disputants to have different expected outcomes causing a dispute (Reed 2003). Furthermore, the potential disputants face uncertainty about expected behaviors of all relevant states (Bueno de Mesquita 1981). Thus, a high magnitude of uncertainty incurs conflicts derived from imperfect information, because the level of uncertainty represents

the extent of available information. Bueno de Mesquita and Lalman (1992) show that a high magnitude of uncertainty increases the likelihood of conflict. Also, uncertainty about willingness to use force gives states an incentive to exploit opportunity. In bargaining theory, Filson and Werner (2002) assume that war occurs after the negotiations fail. Accordingly, if a state predicts failed negotiation, this state is willing to attack the opponent in order to maintain its own credible threat. Thus, under a high uncertainty circumstance wherein it is difficult to predict a success of negotiation, states have an incentive to initiate a dispute. Therefore, a high magnitude of uncertainty empirically and theoretically increases likelihood of disputes (Bueno de Mesquita and Lalman 1992; Reed 2003).

In addition, uncertainty leads both relatively weaker and stronger actors to have incentives to initiate a dispute. When there is a low level of probability of victory, a high magnitude of uncertainty can encourage a potential disputant to initiate a dispute. Because actual militarized disputes rarely end with complete military defeat in empirical observations, a state can expect that their opponents prefer a quick settlement with low costs to decisive outcomes entailing high costs (Slantchev 2003b). Thus, under uncertainty about private information, even a state with low probability of victory can initiate a dispute in order to exploit this informational uncertainty. In fact, in order to guarantee credible threat, a state can initiate disputes even though it has little chance to win a dispute (Filson and Werner 2002). This means that high magnitude of uncertainty allows a state with low probability of victory to initiate a militarized dispute.

Using the same logic, high magnitude of uncertainty also leads a state with relatively high probability of victory to initiate a dispute. Because military operations can

reveal private information about relative power, the stronger side has an incentive to show its real power by a military contest (Wagner 2000). In this sense, the presence of high magnitude of uncertainty leads a state with high probability of victory to initiate a dispute in order to reveal private information. Therefore, the presence of uncertainty affects any type of states' decisions to initiate a dispute.

In sum, in three outcome probabilities, the probability of victory correlates with the likelihood of dispute. The extent of the expected probability of victory exponentially increases the likelihood of dispute initiation. The initial increase in the probability of victory does not promise the decrease of chance of defeat, so that the likelihood of dispute slightly increases. However, additional increase in the probability of victory entails decreases in probabilities of draw and defeat, so that it extremely increases the likelihood of dispute. Furthermore, uncertainty encourages states to have incentives to initiate a militarized dispute in order to pursue information exploitation and to reveal private information.

These expectations lead to three hypotheses. The first two hypotheses reflect the relationship between probability of victory and likelihood of dispute initiation.

**Hypothesis 1:** A potential disputant's expected probability of victory positively correlates with the likelihood to initiate militarized disputes.

**Hypothesis 1-a:** The likelihood to initiate a militarized dispute slightly increases at first with increases in the probability of victory and then exponentially rises with further increases in the probability of victory.

The next hypothesis represents the effect of uncertainty on the likelihood of

dispute initiation.

**Hypothesis 2:** The increase in uncertainty positively associates with the likelihood to initiate militarized disputes.

### **3.3 Research Design**

In this chapter, the unit of analysis is directed politically active dyads, 1816-1992. Since states' ability to project their power is limited by geographic distance, the proximity between states and the status of power determine the opportunity for initiation of disputes (Most and Starr 1989). Thus, the analysis of all dyads includes a large number of dyads that do not have the opportunity for conflict. To solve this problem, politically relevant dyads which consist of contiguous states-dyads and dyads having at least one major power are typically used (Lemke and Reed 2001). However, these politically relevant dyads include only approximately 75% to 85% of all militarized interstate disputes (Bennett 2006a). In order to overcome this problem, politically active dyads consider an additional indicator of opportunity, alliances (Quackenbush 2006). Thus, the directed politically active dyads include politically relevant dyads and additional noncontiguous minor power dyads that have an ally with another contiguous state or a major power. As a result, the directed politically active dyad can include more dispute cases (95% of militarized interstate disputes) rather than the politically relevant dyads can.

Based on these politically active dyads, I construct the initiation model in order to test the impact of the expected probability of victory on the decision to initiate militarized disputes. This model has a binary dependent variable to represent whether or not a Side A state initiates a militarized dispute in the directed dyads. This dependent variable is

measured by the Dyadic Militarized Interstate Dispute (DYDMID) data set (Maoz 2005). However, this binary dependent variable that represents the occurrence of disputes between pairs of states is temporally dependent in time series cross section data. Thus, I use logit spline procedure in order to correct temporal dependence by a cubic spline procedure. This procedure adds a series of dummy variables (cubic splines) to the logit estimation (Beck, Katz, and Tucker 1998; Bennett and Stam 2000). Because this procedure is incorporated with a peace year between MIDs, these spline variables can capture the effects of serial autocorrelation (Bennett and Stam 2004).

In the initiation model, the primary independent variables are expected probability of victory (the “win” variable) and uncertainty level (the “uncertainty” variable). The expected probability of victory is calculated from the outcome model described in the chapter 2. The multinomial logit estimation of the outcome model provides the probability for victory in each dispute dyad. According to the idea of the outcome model, three probabilities of outcomes represent pre-dispute information based on the external relative power and domestic regime types. Then, I apply the expected probability of victory derived from initiators’ ex ante factors to the decision-making logic in both dispute and nondispute dyads. Accordingly, this initiation model assumes that, in all politically active dyads, potential dispute initiators share a way to obtain the expected probability of victory before deciding to initiate. As stated previously, I expect that the win variable positively associates with the likelihood of dispute initiation.

In addition, to test the curvilinear relationship between the probability of victory and decisions to initiate a dispute, I include win<sup>2</sup> term (the “win\*win” variable) in the binary logit model. However, if we put both win and win<sup>2</sup> terms in the same model, these

two terms might be statistically highly correlated because the single variable is used in both first and second powers in the model. In order to solve this problem, I create centered independent variables by subtracting arithmetic mean value from original values of the win and win\*win variables in the quadratic model. Thus, when both win and win\*win variables are used in the model, these variables' values are centered.

The next primary variable, the uncertainty variable, is measured by the variance in year based risk-taking score calculated by Bueno de Mesquita and Lalman's (1992) work. They assume that a principal source of uncertainty derives from the possibility of states' response against risky choices. In this measurement, the increase in uncertainty value reflects a situation that decision-makers are highly uncertain how other states will respond (Bueno de Mesquita and Lalman 1992). The EUGene software (Bennett and Stam 2003) provides a continuous value of uncertainty ranging from "0" to "1" based on foreign policy similarity score (S score).

As control variables, the initiation model includes regime similarity, foreign policy similarity, and geographical contiguity. First of all, the argument that similar regime reduces the likelihood of war and disputes is widely accepted (Bennett 2006b). Because domestic rules and actions affect other states' interest and counterpart leader's political positions, regime similarity influences foreign policy preference and thereby affecting conflict behaviors (Werner 2000; Peceny, Beer, and Sanchez-Terry 2002). The measurement of the regime similarity variable is based on the polity regime score in the POLITY IV Project (Marshall and Jaggers 2000). I use a linear similarity measure that subtracts the absolute value of the difference in the polity regime scores from 20, as follows:  $20 - |\text{Initiator's democracy level} - \text{Target's democracy level}|$  (Bennett 2006b).



This variable has a range of values from 0 to 20 least similar to most similar.

Second, the foreign policy similarity represents shared alignment and foreign policy preference between potential disputants and it is a measure of the degree of dissatisfaction with the status quo. Therefore, high level of foreign policy similarity is symptomatic of similar views of the status quo, so that the likelihood of disputes becomes reduced (Kim 1991; Lemke and Reed 1996; Lemke 1997). The foreign policy similarity variable is measured by an S-score that is a spatial measure of policy position similarity (Signorino and Ritter 1999). This foreign policy similarity compares both states' alliance portfolio in a dyad. Because the degree of each state's dissatisfaction with another state affects the decision to initiate disputes, the foreign policy similarity variable has an effect on the initiators' decision-making logic. Thus, the initiation model includes an S-score as the foreign policy similarity.

Third, I consider geographical contiguity as the control variables. Because the geographic contiguity of the disputants limits the projection of military force and thereby confining the resolve to use force, contiguity has an important effect on the likelihood of disputes (Bremer 1992; Hensel and Diehl 1994). Accordingly, geographical proximity limits the opportunity to initiate a dispute. The geographical contiguity is measured by six categories including the Correlates of War (COW) data set's five types of state-to-state contiguity: land contiguity or separated by 12, 24, 150, or 400 miles or less of water (Gochman 1991). The sixth category indicates that the states are not contiguous. I transform the fifth and sixth categories into a noncontiguous category and the others into a contiguous category in order to generate one dummy variable.

### **3.4 Data Analysis**

For the empirical test, I estimate the effect of primary and control independent variables on the initiation of militarized dispute in the logit spline model. Table 3-1 presents the results from this initiation model, which includes the expected probability of victory derived from the outcome model.

**[Table 3-1 Here]**

In the model 1, the win variable has a significantly positive effect on the decision to initiate militarized disputes. For decision-makers, the probability of victory can be generally considered as an indicator of ability to obtain favorable outcomes. This result is consistent with intuitive expectation and supports Hypothesis 1. In the model 2, the win\*win variable shows a significant impact on the likelihood of dispute initiation. This means that there is a curvilinear relationship between the probability of victory and the likelihood of dispute initiation. The Figure 3-1 presents an exponential increase of effect of probability of victory on the likelihood of a decision to initiate a militarized dispute.

**[Figure 3-1 Here]**

The curve in Figure 3-1 begins to rise exponentially at probability of victory approximately 0.5. Thus, until about 0.5 point, the initial increase in the probability of victory seems not to entail the decrease in chance of defeat despite the decrease in probability of draw. Then, after this point, probability of defeat may begin to decrease. This curve shape supports Hypothesis 1-a. Therefore, the relationship between the probability of victory and likelihood of dispute is described as a curvilinear pattern rather than linear pattern. Also, probabilities based on three outcomes seem to covary with one another and to correlate with the likelihood of dispute initiation.

This significant effect of expected probability of victory in the initiation model also reveals the relationship between pre-dispute information and decisions to initiate disputes. Probabilities derived from ex ante contexts could be an important predictor in decision-making logic prior to a dispute. This implies that the expected outcomes based on ex ante contexts are linked to decision-making logic both during and prior to a dispute.

In both models 1 and 2, the uncertainty variable has a significantly positive effect on decisions to initiate a dispute. It is consistent with existing game theoretic argument based on two outcome probabilities (Bueno de Mesquita and Lalman 1992). Under a high magnitude of uncertainty, states have incentives to initiate a militarized dispute regardless of their chance of success. The result supports Hypothesis 2. Figure 3-2 shows combined effects of uncertainty level and probability of victory.

**[Figure 3-2 Here]**

The figure reveals that the estimated probability of dispute initiation is a function of uncertainty level and probability of victory. As uncertainty grows higher, the function of probability of victory moves to steeper exponential curve. This means that the increase in probability of victory is more likely to initiate a militarized dispute under a high level of uncertainty. Furthermore, the different effects of uncertainty level are more significant at the relatively high probability of victory. This implies that a state with high probability of victory has a strong incentive to initiate a dispute in order to deal with uncertainty by revealing private information.

An example of the relationships between the likelihood of initiation, probability of victory and uncertainty is useful at this point. The post World War II relationship between Iran and Iraq shows how the changes in probability of victory and uncertainty affect the

decision to initiate militarized disputes. As regional contenders, Iran and Iraq have fought for border territories and have engaged in proxy wars to support rebellions. During these competitions, arms imports from major powers and the rise in oil price affect the military buildups, while Iraqi shift of foreign policy goals from Pan-Arab ideology to regional power and Iranian regime collapse by revolution changes alignment patterns with other states (Cordesman 1994). Both variations in military balance and alignment pattern induce the changes in the pre-dispute probability of victory and uncertainty about resolve to use force in military incidents, respectively. The Figure 3-3 shows pattern of changes in both states' pre-dispute probabilities of victory and uncertainty from 1950 to 1982.

**[Figure 3-3 Here]**

As shown in the Figure, Iranian probability of victory was increased in the late 1950s because of Iranian efforts to align with the U.S. pillar and Iran's oil wealth (Cordesman 1994). In mid 1970s, the increase in Iraqi probability of victory depended on both the close tie with the Soviet Union and arms-for-oil deals with France (Brzoska and Pearson 1994). The pattern of uncertainty represents the different alignments between two states. From the early 1970s, Iran accelerated to align with the West and conservative Gulf regimes, while Iraq maintained the relationship with the Soviet bloc and the southern Gulf states (Cordesman 1994). These tendencies on arms build-up and alignment make it possible for both states to initiate militarized disputes.

When removing just one day militarized disputes, Iran initiated five militarized disputes from 1950 to 1982. Consistent with the relationship between the likelihood of initiation and the probability of victory, the years with Iranian initiations of militarized dispute matched the increases in Iranian pre-dispute probability of victory. After initial

increase in Iranian probability of victory in the late 1950s, Iran decided to initiate two militarized disputes (First Shatt-al-Arab clash in 1959 and Shatt-al-Arab shipping dispute in 1961). Then, the second increase in probability of victory in the late 1960s induces additional disputes initiated by Iran (Khanagin clash in 1971 and Occupation of Abu Musa and the Tunbs Islands in 1971).

For Iraqi decisions to initiate militarized disputes, the level of uncertainty and Iraqi probability of victory were connected by each other. During the 1970s, Iraqi decisions to initiate militarized disputes (Badrash clash in 1974 and Kurdish Revolt in 1974) occurred after the increase of uncertainty level in 1970. The increase of uncertainty level reached to the apex after Iranian Revolution in 1979. This increased uncertainty level and the steeply rise in Iraqi probability of victory in 1979 entailed the Iran-Iraq War in 1980. This example fits the argument that increases in expected probability of victory and uncertainty strengthen decision-makers' incentives to initiate militarized disputes.

These results of empirical test and historical illustration are consistent with existing bargaining theory's main arguments. According to bargaining theory, the uncertainty derived from private information induces the disagreement about potential disputants' capability and resolve, so this uncertainty can be solved by revealing private information (Wagner 2000). The initiation of militarized disputes exposes private information to disputants.

Additionally, the effects of other control variables in this model associate with existing studies about the likelihood of militarized disputes. The regime similarity variable shows significantly negative effects on the decision to initiate disputes. This result is consistent with existing findings about the relationship between domestic regime

types and the likelihood of disputes. Bennett (2006b) finds that similar regime dyads reduce the likelihood of disputes. Also, existing democratic peace theory suggests that, empirically, democracies do not fight each other (Oneal and Russett 1999; Russett and Oneal 2001; Huth and Allee 2002). The effect of regime similarity variable on the initiation of militarized disputes in the initiation model is consistent with those existing findings.

The contiguity variable also shows that contiguous states have a relatively high likelihood of disputes. Because projection of power is limited by geographical factors, proximity is still an important factor that affects the decision to initiate disputes. This relationship between geographical contiguity and the likelihood of dispute has been suggested in existing empirical literature (Hensel 2000). Likewise, the S-score (foreign policy similarity) variable shows the negative relationship with the decision to initiate militarized disputes. This means that the similarity between foreign policies could prevent use of force. Thus, contiguous and foreign policy similarity variables significantly affect the decision to initiate militarized disputes.

In short, the initiation model shows that the expected probability of victory and uncertainty are important determinants of decisions to initiate militarized disputes. When rational decision-makers consider pre-dispute information concerning expectation about disputes outcomes, the extent of the expected probability of victory and uncertainty represents the amount of information prior to disputes. Thus, those two factors determine the decision-makers' incentives to reveal private information by initiating a militarized dispute. In that sense, the expected outcome of militarized disputes is linked with the decisions to initiate militarized disputes.

### **3.5 Conclusion**

In this chapter, I construct the initiation model that includes the probability of victory derived from the three possible outcomes based outcome model. Despite the fact that the combination of probabilities in outcome model is different from the approach based on two possible outcome probabilities, the expected probability of victory plays a significant role in the initiation model. The initiation model shows that the extent of the expected probability of victory determines the likelihood of initiation of militarized disputes. This reveals the linkage between the expected outcome of disputes and decision-makers' incentives to initiate a militarized dispute. Under the limited information conditions, uncertainty about private information and incentives to misrepresent private information are main causes of disputes. Accordingly, the initiation model shows that the extent of uncertainty associates with the likelihood of initiation of militarized disputes.

This finding also reveals how decision-makers' perception regarding pre-dispute information affects decisions to initiate militarized disputes. Because in the initiation model the expected probability of victory is derived from ex ante contexts, the pre-dispute information based on ex ante factors is linked with the perception about private information that induces the initiation of militarized disputes. This linkage sheds light on the degree to which pre-dispute information determines the reference point where decision-makers begin to reveal private information by the initiation of militarized disputes.

Also, this finding implies that the logic of termination is linked with the logic of

initiation in the decision-making process because the expected probability of victory is derived from the outcome model. The initiation model shows that the decision-makers' rational decisions to initiate militarized disputes are affected by the expected outcomes. In other words, ex ante information about disputes affect the decision to initiate disputes. Thus, the outcome model, which is based on pre-dispute information, is linked to the initiation model. This linkage between two models can reveal a series of links among causal factors that are interconnected throughout several decision-making stages of militarized disputes. In the next chapter, I will explore this series of links in the logic of decisions to escalate militarized disputes.



## **Chapter 4**

### **Escalation of Militarized Disputes**

The previous chapter presented the effect of expected dispute outcomes on decisions to initiate militarized disputes. It showed how pre-dispute information, specifically the extent of probability of victory and uncertainty, is linked with decision-makers' incentives to initiate a militarized dispute. This pre-dispute linkage can be applied to the decision-making process during disputes. In this chapter, I examine how the linkage between pre-dispute information and decision-makers' incentives to misrepresent private information that evolves into violence, once states are already involved in militarized disputes. This investigation opens the puzzle of why some disputants escalate violence while others do not.

Once conflict between states becomes militarized, decision-makers' later decisions determine whether to escalate violence or not. During a militarized dispute, uncertainty about adversaries and the crisis structure affects the decision-making process (Snyder and Diesing 1977; Fearon 1995; Gochman 1995). Whereas bargaining theory claims that uncertainty comes from decision-makers' cost-benefit calculation under the incomplete information conditions (Wagner 1994; Fearon 1995; Schultz 2001), empirical studies emphasize the effects of strategic choice and contextual factors on the escalation of violence under the uncertainty (Leng 1993; Siverson and Miller 1995; Brecher, James, and Wilkenfeld 2000). However, empirical studies have paid little attention to the role of ex ante intergovernmental institutional arrangements as an instrument to affect the extent of uncertainty during disputes. In the area of security issues, an intergovernmental institutional arrangement can enhance the level of pre-dispute information by the

exchange and the inspection of private information, so that this arrangement can reduce the uncertainty regarding adversaries and the crisis structure even after states enter into a dispute. Thus, arms control agreements designed to reveal the private information of member states changes the extent of pre-dispute information and thereby are linked with the decision to escalate violence during a militarized dispute.

In this chapter, I explore the effects of arms control agreements in escalation models. During a militarized dispute, decision-makers cannot directly obtain private information about relative power and resolve unless battle outcomes expose actual capability and willingness to resort to forces (Blainey 1988; Fearon 1997; Wagner 2000). Accordingly, an agreement about relative power and the credibility of resolve can reduce uncertainty about private information and subsequently decrease incentives to misrepresent it. In this context, arms control agreements with on-site inspection system reveal private information about relative power prior to a dispute, and thereby improve the credibility of disputants' signals during a dispute.

This chapter is organized as follows. The first section reviews existing studies explaining the escalation of militarized disputes. The second section addresses the concept and types of arms control agreements and their function in revealing the private information of member states. In the third section, I construct escalation models testing the effects of arms control agreements on the decision to escalate militarized disputes. The next section presents data analysis in an empirical test. The empirical test includes logit estimations and two-stage probit estimations. The final section discusses theoretical and practical implications.

#### **4.1 Paths to Escalation**

In existing literature, the escalation of militarized disputes is defined in two ways: reciprocated violence and increase of violence toward war. On the one hand, when a state initiates a militarized dispute, the other side's response determines the escalation of disputes, because refusal to fight makes it impossible to induce escalation (Hensel and Diehl 1994; Schultz 2001). Accordingly, reciprocated violence between disputants is a clear sign of dispute escalation. On the other hand, in terms of the relationship between disputes and war, escalation means increasing the levels of violence toward war (Snyder and Diesing 1977; Siverson and Miller 1995; Brecher, James, and Wilkenfeld 2000). In this context, the escalation process exists when a militarized dispute proceeds from less-intensified to more-intensified violence. Based on these two conceptualizations, after entering into a militarized dispute, either a target's violent response or both sides' increased violence induces dispute escalation. The paths to escalation have been theoretically and empirically explained in both bargaining theory and empirical study.

In bargaining theory, decisions to reciprocate and to intensify violence derive from the decision-makers' uncertainty regarding private information. In militarized disputes, states do not fully access each other's private information, and decision-makers have incentives to misrepresent the private information in order to obtain better bargaining position (Fearon 1995). This private information and the incentives to misrepresent it induce both disagreement between disputants about relative power prior to dispute and incredible signals of resolve during a dispute.

Before the dispute, the lack of private information about relative power leads decision-makers to disagree with each other's abilities to resort to force (Morrow 1989;

Wagner 1994; 2000). As a result, a target underestimates an initiator's threat, or an initiator offers a demand that a target does not accept (Filson and Werner 2002; Reed 2003). This disagreement about relative power is solved when private information is revealed by both battles and wartime negotiations (Filson and Werner 2002). Thus, the extent of revealing private information about relative power prior to disputes can affect later decisions of violence during a dispute.

On the other hand, in terms of credibility, uncertainty about private information results from the fact that disputants cannot directly know each other's resolve (Fearon 1997). Because the initiator has incentives to use bluffing, it is logical that a target will resist an initiator's threat until the reliability of this threat is assured. Thus, in crisis bargaining, political leaders who decide to initiate disputes must persuade a target by conveyance of a credible signal regarding the use of force (Fearon 1994a; 1997). In this context, the extent of uncertainty significantly influences the decision-making process in a militarized dispute. During a dispute, this uncertainty can be affected by pre-dispute information such as domestic regime types and prior belief about diplomatic behavior.

As a way to generate a credible signal, proponents of domestic audience costs emphasize the characteristics of democratic regime. Fearon (1994a) argues that a threat becomes a credible signal when political leaders publicize it to powerful domestic audiences who watch and punish the result of foreign policy. Specifically, in a democratic regime, backing down in a crisis makes it possible for domestic opponents to criticize the loss of reputation, because domestic audiences evaluate political leaders' skill and performance in foreign policies. Thus, once a crisis is publicized, democratic leaders are reluctant to back down in crises and, therefore, a threat in high audience-cost states

(democratic states) is more credible (Fearon 1994a; 1997).

Along this line, Schultz (1998; 2001) asserts that democratic competition enhances the credibility of signals in international crises. In a competitive political system, the opposition party that attempts to take office can find a chance to deplore the incumbent government for deciding to bluff during a crisis. Thus, when a government chooses a bluff, opposition parties prefer the challenge to collusion with the government. It follows, then, that the opposition party's support for governmental choice assures the signal is not a bluff. In that sense, the signal derived from democracies can convey more credible resolve than that of non-democracies, and thereby a democratic initiators' threat is less likely to induce violent response.

Beyond domestic institutional characteristics, Sartori (2002) argues that honest diplomacy can generate a credible costly signal through repeated interactions. During repeated interactions between states, accumulated honest diplomatic signals allow states to learn that honest states deliver credible signals. Thus, a priori beliefs about states can make credible signals and thereby reduce escalation of violence, regardless of the domestic regime types.

In bargaining theory, arguments about the credibility of signals suggest that pre-dispute conditions affect the escalation process. Because decision-making during disputes is based on the degree to which disputants reveal private information about relative power and resolve, pre-dispute conditions determining the levels of disclosure affect the escalation of violence. In this context, uncertainty about private information during a dispute is linked with the pre-dispute information.

In contrast with bargaining theory which focuses on decision-makers' incentives

to choose violence, empirical studies have emphasized the effects of exogenous factors on intensified violence. Along this line, some scholars have attempted to distinguish the characteristics of escalation from the onset of dispute. As a result, they identify that the effects of domestic regime and relative power differ between onset and escalation (Reed 2000). First, in terms of domestic regime, although democratic norms generally have negative effects on escalation of disputes (Gochman 1995; DeRouen and Goldfinch 2005; Sullivan and Gartner 2006), a dispute between democracies is more likely to escalate until reaching a certain level of violence (Senese 1997). This finding is different from the notion of democratic peace (i.e., that democracies rarely fight each other). In other words, democratic dyads have different effects prior to and during a dispute (Reed 2000).

Second, empirical studies also find that the effect of relative power differs throughout the onset and escalation of disputes. Although power parity has been expected as the predictor of the onset of disputes (Kugler and Lemke 2000), a discrepancy in relative power is associated positively with escalation (James 1988; Brecher 1993; Brecher, James, and Wilkenfeld 2000). This means that the empirical relationship between distribution of power and intensity of violence is nonmonotonous (Bueno de Mesquita, Morrow, and Zorick 1997).

Beyond the difference between onset and escalation of disputes, empirical studies have found additional factors that affect escalation of disputes. Gochman (1995) claims that the pattern of alignments and the third-party intervention affect the escalation of disputes. Similarly, the large number of disputants incurs intensified violence due to a high level of uncertainty (James 1988; Brecher 1993). Additionally, power status also affects decisions to escalate disputes. Whereas disputes between minor powers often

escalate toward use of force, major powers disputes are less likely to go beyond the threat (Gochman 1995; Jones, Bremer, and Singer 1996). In terms of type of strategy, Leng (1993) introduces the psychological view of the self-reinforcing characteristic in escalation. Because escalation per se entails high risk of war and aggressive intentions, resolute signals may increase fear, promoting preemption (Leng 2000; 2004). Therefore, a brutal strategy is more likely to escalate violence compared to a careful strategy to consider the counterpart's actions.

In sum, both bargaining theory and empirical studies identify several factors that affect decisions to escalate violence during a militarized dispute. Previous arguments in bargaining theory emphasize that, with private information about relative power and resolve, decision-makers have incentives to misrepresent private information. In this context, decision-makers logically select reciprocal and intensified violence until they reach an accurate estimation regarding power and resolve. According to empirical findings, the characteristics of contexts and choice of strategies in disputes determine the escalation process. Because some dangerous exogenous factors increase the level of the uncertainty of dispute, decision-makers tend to depend more on intensified violence.

However, although both lines of study concentrate on the role of uncertainty in the escalation process, they seem to ignore the variation of pre-dispute uncertainty derived from the intergovernmental institutional arrangements. Although bargaining theory realizes the role of domestic institution in signaling, it does not capture the similar role of intergovernmental arrangements in the function that reveals private information prior to dispute. Likewise, despite the fact that empirical studies have discovered effects of both ex ante and ex post exogenous factors, they have not found the institutional factors

between states. Thus, it is necessary to investigate the linkage between an intergovernmental institution in security issues and ex post decisions of whether or not to escalate violence.

#### **4.2 Arms Control and Uncertainty**

As an intergovernmental arrangement to manage potential violence between states, arms control agreements have been developed substantially since the end of World War II. Conceptually, arms control agreements are designed to reduce the likelihood of war, levels of violence in wars, and costs of preparing for war (Schelling and Halperin 1985; Kartchner 1996). Accordingly, arms control agreements can be considered as useful institutional arrangements to manage crises, because these agreements can reduce incentives to select preemptive attack and the possibility of accidental wars. Both preemptive attack and accidental wars come from the misinterpretations of a counterpart's intention and the belief of the impending onset of war. In this context, arms control agreements provide opportunities to observe each other's force deployment, to enhance communication facilities between governments, and to limit the use of decisive weapons, as well as the ability for quick response necessary for preemptive attack (Schelling and Halperin 1985). Therefore, arms control agreements can reduce both the incentives to select preemptive attack and the likelihood of misinterpretation of signals, thus moderating the military tension in crises.

In order to achieve these objectives, arms control planners have developed several types of institutional designs. In terms of restrictions on the force deployment, arms control agreements have incorporated several responsibilities, including the notification



and monitoring of military activities, the exchange of military information, and the redeployment of forces in order to eliminate surprise attacks. In a similar vein, arms control agreements also have integrated constraints on force structure, such as limits on the quantity of arms and cutoffs on force size (Darilek 1990; Han 1993; Moon 1996). These institutional designs in arms control agreements primarily reveal private information in the area of security issues.

In terms of involvement in the area of security issues, the role of arms control agreements differs from that of typical intergovernmental organizations (IGOs) in international relations. Previous studies suggest that IGOs can reduce the risk of disputes between member states, because IGOs can advance cooperation of states in four ways: (1) the exchange of information, (2) the reduction of transaction costs, (3) the increase of expected cooperation in the future, and (4) the reciprocal strategy, which prevents cheating (Lipson 1993; Axelrod and Keohane 1993; Keohane and Martin 1995). Also, IGOs reduce uncertainty and mediate conflict between member states (Russett and Oneal 2001). Nevertheless, even with IGOs, it is unsure how states reach cooperation in competitive issue areas where one participant has a gain at the expense of the other. Critics argue that in the zero-sum game, the exchange of information and reciprocal strategy in IGOs does not always serve to solve conflictual issues (Grieco 1993; Bueno de Mesquita 2000). Accordingly, it is unclear whether typical IGOs can reduce the risk of violence in the area of security issues.

However, in contrast to IGOs, arms control agreements are designed to manage intrinsically conflictual security issues. In fact, they empirically cover a wide range of the security spectrum from alliances to hostile relationships ready to use force (Talyor 1996).

For example, the Brussels Treaty of 1948 is a cooperative military agreement among seven states in Western Europe. Because its signatories are members of the North Atlantic Treaty of Organization (NATO), this agreement is designed to deal with coordination among allies. By contrast, the Intermediate-Range Nuclear Force Treaty (INF Treaty) between the United States and the Soviet Union in 1987 is an example of an arms control agreement between rival states. This treaty successfully eliminated all intermediate nuclear forces in signed states under the forceful on-site inspection of the Special Verification Commission (Goldblat 1994). This means that an arms control agreement can be considered as an institutional design to manage conflictual security issues regardless of whether signed states are allies or contenders, in contrast to typical IGOs which lack cooperative motivation in the area of security issues. Thus, arms control agreements can affect the extent of uncertainty of disputes by revealing private information in security issue areas, unlike typical IGOs.

However, not all arms control agreements effectively reveal private information. The ability to reduce uncertainty by revealing private information depends on the characteristics of restrictions and verification. In terms of membership and institutional performance, characteristics of restrictions in arms control agreements are classified into three categories: “arms control for everyone,” “arms control for them,” and “arms control for us” (Taylor 1996). First, “arms control for everyone” concerns global applications of arms restrictions so that most states in the world become member states. As a result, it is not easy to verify agreed restrictions on all member states, and this type of agreement tends to impose relatively loose restrictions. The Biological and Toxin Weapons Convention (BWC) is an example of arms control for everyone. This agreement having

139 signatories has faced several violations of member states such as the Soviet biological weapons program (see Larsen and Rattray 1996). Second, “arms control for them” is designed for nonproliferation of weapons and technology. Thus, this type is characterized by an unequal restriction, because states that are already-holder remain free from arms restrictions. In other words, the inspection and verification designs are imposed only on the non-holder states. By this reasoning, agreed restrictions do not affect the extent of uncertainty among all member states. Typical examples are nonproliferation agreements such as the nuclear Non-Proliferation Treaty (NPT) having 188 signatories (see Larsen and Rattray 1996). Finally, “arms control for us” restricts on selected member states, such as states in a certain geographical region and / or member states in a regional IGO. For example, the Treaty on Conventional Forces in Europe (CFE), signed in 1990, is an example of “arms control for us,” because all signed states are members of NATO or the former Warsaw Treaty Organization. Given that the first two types of agreements have loose or unequal restrictions, only the “arms control for us” type has equal and effective restraints on an appropriate number of member states. In fact, among all types of arms control agreements, only “arms control for us” provides effective restrictions to reveal private information in a conflictual security issue. Thus, regional or bilateral arms control agreements based on the principle of “arms control for us” can provide efficient institutional performance to reduce the level of uncertainty in a militarized dispute.

Within the “arms control for us” type, the characteristics of the verification process determine the ability to reveal private information. In fact, the verification process makes it possible to collect information about other member states and to interpret it accurately (Goldblat 1994). Accordingly, the verification process can reveal

private information in a conflictual security issue. The verification measures consist of a noninterference measure with national technical measures, on-site inspection, data exchange, and cooperative measures (Pilat 1996). Among these measures, on-site inspection can be considered the most effective and reliable measure for quantitative weapon restraints (Oelrich 1990). Therefore, “arms control for us” with an on-site inspection system is an efficient intergovernmental arrangement to reveal private information, thereby reducing the extent of uncertainty during a militarized dispute.

When member states of arms control agreements with on-site inspection system engage in a dispute with one another, opened private information and the communication channel between disputants provide a mutual expectation of predictable behaviors. Also, other member states have an incentive to mediate a militarized state between signatories in order to retain benefits of arms control regime. Therefore, the escalation process between member states is different from that between non-member states. In crisis bargaining, incentives to misrepresent private information, disagreement about relative power prior to the dispute, and the incredibility of resolve during a dispute can induce reciprocal and intensified violence (Fearon 1995; 1997; Wagner 2000). In this context, under the arms control agreements, on-site inspection systems reveal private information prior to dispute and thereby affect the credibility of signals after entering in a militarized dispute.

Just as the domestic regime type and a priori diplomacy patterns generate credible signals in bargaining theory, the credibility of resolve also is determined by a priori revealed private information about relative power. When the observable discrepancy of power between disputants is manifest, militarized action guarantees high resolve (Filson

and Werner 2002). Using the same logic, because the on-site inspection system in arms control agreements improves the accuracy of revealed private information, militarized threat and actions of member states enhance the credibility of the signal and thereby reduce the uncertainty about resolve during a dispute.

This improvement of credibility by arms control agreements affects the escalation process in two ways. First, for a target, the credible signals and a low level of uncertainty reduce the target's incentive to manipulate uncertainty. Thus, the target state is more likely to select negotiation than reciprocal violence. As a result, an arms control agreement with an on-site inspection system reduces the likelihood of escalation derived from reciprocal violence.

These expectations lead to the first hypothesis.

**Hypothesis 1:** In a militarized dispute between member states of an arms control agreement, dispute targets are less likely to select reciprocal violence.

Second, for a target with high resolve, the initiator's credible signals induce the resolved response. In this case, because the target's response is based on revealed private information, the initiator can realize the target's high resolve. Thus, after the target with high resolve reciprocates, both disputants can agree with each other's relative power and resolve and thereby prefer negotiation to further intensified violence. Likewise, a target with low resolve does not respond initiator's threat, and thereby both sides can avoid the choice of more intensified violence. Therefore, arms control agreements with on-site inspection systems can prevent escalation by the low likelihood of intensified violence.

From this logic I deduce the second hypothesis.

**Hypothesis 2:** In a militarized dispute between member states of an arms control agreement, disputants are less likely to select the intensified violence.

In short, “arms control for us” with on-site inspection exposes private information prior to dispute so that it produces credible signals during dispute and thereby reduces uncertainty. Consequently, member states of arms control agreements have a relatively low incentive to manipulate uncertainty during disputes. Thus, when member states of arms control agreements enter into militarized dispute, they are less likely to decide to escalate violence.

### **4.3 Research Design**

In order to test these two hypotheses, I generate two dependent variables: reciprocal violence and intensified violence. First, reciprocal violence is measured by the reciprocated dispute variable in the Militarized Interstate Disputes (MID) 3 data set (Ghosn, Palmer, and Bremer 2004). This is a dummy variable to represent whether or not a militarized dispute is reciprocated. Also, it is used in the Dyadic Militarized Interstate Dispute (DYDMID) 2.0 data set. In this chapter, reciprocal violence is coded as “1” when a militarized dispute is a reciprocal dispute. Otherwise, it is coded as “0.” This variable represents whether a target selects reciprocal violence necessary for escalation when facing an initiator’s militarized action. Second, intensified violence is measured by five categories: no militarized action, threat to use force, display of force, use of force, and war, based on levels of hostility in the MID 3 data set. According to the definition of *hostility* (Jones, Bremer, and Singer 1996), the “threat to use force” is the verbal

indication of hostile intent, so this category represents the lowest level of hostility. The “display of force” is military demonstration without combat interaction, whereas the “use of force” means the active military operation. The “war” is a military combat that results in at least 1000 total battle deaths, and therefore is the highest level of hostility. These five categories represent the sequence of hostility escalation through which a militarized dispute evolves: threat, display, use, and war (Senese 1997). In this context, the five categories are ranked ordinally and “war” represents the most intensified violence.

For the empirical test, I construct two sets of escalation models. The first set of models assumes that the decision to escalate violence is independent of the decision to initiate a militarized dispute. Thus, the first model tests hypotheses in the population of directed dyadic disputes from 1946 to 2000, based on the DYDMID 2.0 data set.<sup>2</sup> Because all primary arms control agreements appeared after World War II, I select this time span to represent post-World War II. In this set of models, reciprocal violence is measured as a binary dependent variable that comes from the MID 3 reciprocated dispute variable. So, I utilize logit estimation for this dependent variable. The intensified violence is measured as five ordered categories based on MID 3 levels of hostility, and therefore I use ordered logit estimation.

The second set of models does not assume the independence of decisions between initiation and escalation. Because Reed (2000) shows that the onset of a dispute is empirically linked to the escalation of a dispute, the second set of models attempts to test whether decisions to initiate a militarized dispute are linked with decisions to escalate

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<sup>2</sup> In the Dyadic Militarized Interstate Disputes (DYDMID) 2.0 data set, the reciprocal dispute variable and the levels of hostility variable come from the MID 3 data set. The data set and codebook are downloadable from <http://psfaculty.ucdavis.edu/zmaoz/dyadmid.html>

violence. Accordingly, I use two-stage probit selection models that estimate the effects of the variables on the two interrelated decisions between initiation and escalation stages (Poe and Meernik 1995; Blanton 2000). These two-stage probit selection models estimate the probit coefficients in the first stage and then systemically exclude the cases that are not connected to the decision to initiate militarized disputes in the second stage. Therefore, the effects of the primary independent variables on the decision to escalate violence can be captured in the selected cases in which the initiation of militarized dispute has been decided already.

In these two-stage probit selection models, the unit of analysis is politically active dyads 1946 to 2000. Politically active dyads represent the opportunity for initiation of disputes and exclude cases with a rare possibility of disputes (Quackenbush 2006). Among the politically active dyads, the dispute dyad-years come from the DYDMID 2.0 data set. In these models, the selection variable is a binary variable to represent the occurrence of militarized dispute between pairs of states. In the selection stage, I add cubic splines in order to compensate for temporal dependency (Beck, Katz, and Tucker 1998; Bennett and Stam 2000). For dependent variables, reciprocal violence is measured by the reciprocated dispute variable in the MID 3 data set, whereas the intensified violence is measured as a binary variable to represent whether or not a militarized dispute escalates toward war, the highest intensified violence in terms of MID 3 hostility levels.

In escalation models, the primary independent variable is the arms control agreement. This is measured as a binary variable to represent dyad-years between arms control agreement member states. In order to satisfy with the conditions of “arms control for us” and an on-site inspection system, I carefully select dyad-years with regional and



bilateral arms control agreements adopting an on-site inspection measure. The selected arms control agreements consist of nine regional and three bilateral agreements (See Appendix A). The regional agreements are the Brussels Treaty of 1948, the Modified Brussels Treaty of 1954, the Treaty of Tlatelolco of 1967, the Treaty of Rarotonga of 1986, the Stockholm Confidence and Security-Building Measures (CSBMs) of 1986, the CFE Treaty of 1990, the Treaty of Bangkok of 1995, the Treaty of Pelindaba of 1996, and the Florence Agreement of 1996. The bilateral agreements are the INF Treaty of 1987, the Treaty on the Reduction and Limitation of Strategic Offensive Arms Reduction (START I) of 1991, and the Declaration on the Denuclearization of Korea of 1992. These selected arms control agreements exclude global level agreements and non-proliferation agreements, so that I capture all the “arms control for us” agreements that satisfy the restriction criteria of equal restrictions and efficient institutional performance. Also, in terms of the verification characteristics, all selected cases adopt on-site inspection measures that satisfy the criteria of systemic and challenge inspections. In fact, these agreements accepted standing verification organizations necessary for systemic inspection and specific measures to challenge each member state’s internal security (Goldblat 1994). Thus, these twelve arms control agreements can be considered as effective intergovernmental arrangements to reveal private information in member states. In models, the effect of arms control variable is tested on only the dispute escalation. This variable is not included in the first stage of the two-stage probit selection models, because none of existing studies consider arms control agreements as a cause of dispute initiation.

As control variables, I consider power parity, democratic initiator, contiguity, foreign policy similarity, major power, third party, and peace year variables. First, the

power parity variable is measured by the Correlates of War (COW) data (Small and Singer 1982). The distribution of power per se has been regarded as one of the important factors affecting decisions to escalate violence (Morrow 1989; Wagner 2000). In dyadic level analysis, the extent balance of dyadic capabilities affects both status quo defenders and challengers' decisions to escalate violence. For status quo challengers, the increase in military capabilities relative to status quo defenders reduces the costs of militarized disputes, thereby reinforcing an incentive to coerce rival states (Huth, Bennett and Gelpi 1992). Furthermore, using a similar logic, a declining advantage relative to status quo challenger enables status quo defenders to have incentives to initiate war and disputes (Maoz 1982; Levy 1987). Therefore, the balance of dyadic capabilities can encourage both sides in a dyad to involve in militarized dispute, thereby increasing the likelihood of reciprocal and intensified violence. In terms of the judgment of power parity, Organski and Kugler (1980) define power parity as existing when the ratio of capability is greater than 80%. I take this 80% threshold and create a dummy variable for power parity. The power parity variable is coded "1" when the dyadic disputants' capability ratio lies between 0.8 and 1.2; otherwise, it is "0." This variable reflects whether the capability ratio in a dyad satisfies the status of power parity.

Second, the democratic initiator (Demo initiator) variable is measured on the polity regime score in the POLITY IV Project (Marshall and Jaggers 2000). The initiator's domestic regime type is expected to be the determinant of credibility of signals affecting escalation of dispute (Fearon 1997; Schultz 2001). In democracies, domestic political monitor and punishment improve the credibility of signal, and thereby democratic contenders can reveal credible information about their own resolve in a

militarized dispute (Kinsellan and Russett 2002). Due to this high level of credible information, democratic initiators can induce targets' concession more likely. Also, Filson and Werner (2004) identify important democratic initiators' conflict behaviors. Because of relatively high level of sensitive to the costs of dispute in democracies, democratic initiators only engage in a dispute when the probability of victory is expected to be high. Furthermore, using the same logic, democratic initiators tend to make reasonable demanding proposals that target can accept during a dispute (Filson and Werner 2004). Therefore, democratic initiators can reduce targets' reciprocal violence when involving in a militarized dispute. For measurement, I code a state with a polity score greater than 6 as a democracy in terms of dichotomous measure of democracy. Accordingly, I construct the democratic initiator variable as a dichotomous variable, coded "1," when the dispute initiator is identified as a democracy.

Third, the geographical contiguity affects the decisions to escalate violence. Contiguous dyads are more likely to fight each other than non-contiguous dyads because shared access to a physical area can lead to interstate friction that would become violence (Bremer 1992). Also, Brecher and Wilkenfeld (2000) find that geographical proximate become a factor to increase the likelihood of violence. The contiguity variable is measured by six categories including the COW data set's five types of state-to-state contiguity: land contiguity or separated by 12, 24, 150, or 400 miles or less of water (Gochman 1991). The sixth category indicates that the states are not contiguous. I transform the fifth and sixth categories into a noncontiguous category and the others into a contiguous category in order to generate one dummy variable.

Fourth, the foreign policy similarity (Foreign policy) variable is measured by an S-

score that is a spatial measure of policy position similarity (Signorino and Ritter 1999). This foreign policy similarity compares the alliance portfolio of both states in a dyad. Because the degree of each state's dissatisfaction with another state affects the decision to initiate disputes, the foreign policy variable has an effect on the initiators' decision-making logic (Kim 1991; Lemke 1997). Thus, the escalation models include an S-score as the foreign policy similarity.

Fifth, the major power variable is measured as a dyad between major powers. The existing studies suggest that the pattern of escalation in major power dyads is different from other dyads (Gochman 1995; Jones, Bremer, and Singer 1996). Bremer (1992) posits that major powers are more war prone than minor powers. Thus, a dispute dyad including a major power can become a more intensified dispute. In terms of measurement, the definition of major powers status in international system comes from the COW data set (Singer, Bremer, and Stuckey 1972).

Sixth, the third party variable reflects third-party participation in a militarized dispute. The number of participants in a militarized dispute has been considered as a cause of escalation (James 1988; Brecher 1993). Once states entered militarized disputes, disputants are sensitive to the presence of third party involvement (Senese 1997). Therefore, the third party involvement can affect decisions to escalate violence during a militarized dispute. The MID 3 data set provides the number of third parties in each dispute. As a dummy variable, the third party variable is coded "1" when another state enters into a militarized dispute. Otherwise, the rest are coded as "0." Finally, in the directed dispute dyads unit of analysis, I include the peace year variable to count the number of years between the onset of dispute in a dyad. This variable represents the

conflictual relationship between states in the history of disputes, so that the shorter the peace year, the more likely that states resolved their crisis through war (Lai 2004). The COW data set provides the peace year between militarized disputes.

#### **4.4 Data Analysis**

The result of test about the effect of arms control agreement on decision to escalate a dispute in direct dispute dyads is shown in Table 4-1.

**[Table 4-1 Here]**

The first column in Table 4-1 reports results from the ordered logit model in directed dispute dyads. The arms control variable has significantly negative effects on escalation of intensified violence. This means that both initiator and target in a militarized dispute between member states of arms control agreement are reluctant to escalate violence. This result supports Hypothesis 1. Because an arms control agreement reveals private information about relative power prior to a dispute, both disputants do not necessarily escalate violence until the full disclosure of private information. In the second column, the binary logit model in directed dispute dyads also shows that the arms control variable has significantly negative impacts on a target's selection of reciprocal violence. This is evidence to support Hypothesis 2. According to this result, a member state of an arms control agreement is less likely to select reciprocal violence against another member state's initiation of a militarized dispute. As anticipated, an arms control agreement with on-site inspection measures is quite a strong predictor of the decision not to escalate violence.

Not surprisingly, in Table 4-1, both models show that the democratic initiator

(Demo initiator) variable has a significantly negative effect on the escalation. This is consistent with the domestic audience cost arguments. Because a democratic regime generates credible signals due to a powerful domestic audience, a democratic initiator is more likely than another type of regime to coerce a target (Schultz 2001). This finding is consistent with the existing formal argument about democratic contenders' conflict behaviors (Filson and Werner 2004). Additionally, the major power variable is negatively associated with escalation of violence. Although the major power variable shows a weak negative relationship with reciprocal violence, it is strongly associated with escalation of violence in the ordered logit model. This result is also consistent with the existing argument that major power dyads are less likely than other type of dyads to escalate violence (Gochman 1995).

By contrast, the power parity variable does not have effects on the decisions to escalate violence in both models. Although the distribution of capability was expected to be a significant factor affecting escalation decision, this variable does not play in militarized dispute events. As Maoz (1983) argues, it is not easy for national capability to be translated into core influential power to affect decision-making process in the short of war level. The transition from material capability in a state to actual militarized threat requires a certain time enough for mobilization process. Therefore, whereas power parity based on national capabilities could be an important influential factor in war cases, it may not affect decision-making process in relatively short time disputes.

For other control variables, contiguity, foreign policy, third party, and peace variables have significant effects on only reciprocal violence. These variables seem to lose their influences during a decision-making process considering more intensified

violence. This implies that those variables' influences are mainly related to targets' initial decision whether or not to choose reciprocal violence.

Table 4-2 shows two-stage probit selection estimation in the politically active dyads.

**[Table 4-2 Here]**

The effects of the arms control variable in those models on escalation are consistent with logit models in directed dispute dyads. In the intensified violence model, the arms control variable shows significantly negative effect on the escalation toward war. In a militarized dispute between member states of arms control agreement, disputants are reluctant to escalate a dispute toward war. Likewise, the reciprocal violence model also shows the same result about the effect of the arms control variable. When member states of an arms control agreement enter into a militarized dispute, the target is less likely to select reciprocal violence. Thus, two-stage probit selection models also support both Hypotheses 1 and 2. As stated previously, because arms control agreements can open private information and thereby reduce uncertainty, both initiator and target have weak incentives to misrepresent private information. In this context, arms control agreements can reduce the likelihood of escalation during a militarized dispute.

These two-stage probit selection models in Table 4-2 also show how outcome and selection equations are correlated with each other. These two equations' error terms have the correlation  $\rho$  that indicates the relationship between two equations in the model. In these models, the coefficient on  $\rho$  (selection effect) is not significant. The chi-square test of independence of the two equations shows the insignificant statistic. In contrast with the finding that there is an empirical linkage between onset and escalation of disputes in the

nondirected politically relevant dyads (Reed 2000), these models using directed politically active dyads reveal that the decision to escalate violence is unrelated to the decision to initiate a militarized dispute. This implies that the initiation of dispute does not always entail targets' reciprocal violence or intensified military responses. This interpretation is consistent with Hensel and Diehl's (1994) finding that target states are typically reluctant to select militarized response unless disputes are related to critical interest or threat.

Nevertheless, the strong relationship between the arms control variable and the dependent variables reveals the fact that pre-dispute information is linked to the decision to escalate violence. Because an arms control agreement adjusts the extent of pre-dispute information by revealing private information prior to dispute, the effects of the arms control variable in the models becomes evidence of the linkage between pre-dispute information and ex post decisions during a dispute.

In Table 4-2, the democratic initiator (Demo initiator) variable does not have a significant effect on the selection of war, whereas it shows a significantly negative effect on decisions to select reciprocal violence or to initiate militarized disputes. This implies that the effect of a democratic regime differs between decisions of war and target states' selection of reciprocal violence. Whereas the democratic initiator can coerce targets by credible signals, the difference between the credibility of democracies and non-democracies' signals does not affect decisions when entering into the highly intensified violence stage.

Furthermore, the effect of the foreign policy and the third party variables differs between intensified and reciprocal violence models. This implies that the choice of highly



intensified violence is different from the targets' decision to choose reciprocal violence. It means that the effect of domestic regime types on the decision-making process differs according to levels of violence and the strategic position of the initiator during a dispute.

In short, both two-stage probit selection models in politically active dyads and logit models in directed dispute dyads strongly support the negative effect of the arms control variable on decisions to escalate violence. Because two-stage probit selection models shows an insignificant selection effect, both ordered and binary logit models in directed dispute dyads seem to survive the harm of the omitted variable problem that could damage models' accuracy. This is quite strong evidence to support the notion that an arms control agreement with on-site inspection can reduce the likelihood of escalation during militarized disputes.

#### **4.5 Conclusion**

This chapter presents how ex ante intergovernmental arrangements designed to reveal private information affect the decisions to escalate violence during a militarized dispute. As a prominent intergovernmental arrangement, the arms control agreement reveals the private information about relative power prior to dispute and thereby enhances the credibility of signals during a dispute by reducing uncertainty. The empirical models show that arms control agreements have very strong effects on both reciprocal and intensified violence necessary for escalation. This implies that pre-dispute information is linked to the ex post decisions to escalate violence during a dispute, because arms control agreements are ex ante institutional designs that adjust the extent of pre-dispute information by revealing private information.

In terms of crisis bargaining, the combination of private information about power or resolve and incentives to misrepresent it induces decisions to enter militarized disputes. After an incidence of militarized dispute, the updated information provided by battles and wartime negotiation reduces incentives to exploit incomplete information circumstance, and thereby guides intra-dispute decisions to terminate threats or militarized actions. According to the results of escalation models, this intra-dispute bargaining is affected by the extent of pre-dispute information as well as updated information during a dispute. In this chapter, the effect of an arms control agreement on escalation shows this linkage between the pre-dispute information and intra-dispute bargaining.

In terms of practical implication, arms control agreements can be considered as useful instruments of crisis management. Although arms control agreements per se may not alter the fundamental political relationship between member states, they affect the escalation ladder after states enter into a conflict. This ability of conflict resolution seems to come from two institutional characteristics: the coherence among member states and the existence of efficient verification systems. Therefore, the number of member states and the compulsory function can be indicators to assess the efficiency of intergovernmental institutions in the area of security issue. This sheds lights on the idea in designing future arms control agreements.

In the next chapter, I will focus more on intra-dispute bargaining. Beyond the examination of pre-dispute information, I will test the effect of ex post choice of violence on decisions to terminate militarized disputes.

## **Chapter 5**

### **Termination of Militarized Disputes**

In the previous chapter, I investigated how arms control agreements affect the escalation process. The escalation models showed the linkage between pre-dispute intergovernmental arrangements and intradispute decisions to escalate violence. Moving beyond these findings, this chapter presents the link between intradispute choice and decisions to terminate a militarized dispute. This investigation can reconcile the effects of pre-dispute information and updated information during disputes on decisions to terminate militarized disputes.

After states enter into disputes, the decisions of whether or not to continue fighting rely on two mechanisms: updated information and accumulated costs. The former depicts a dispute per se as a source of information with which their disputants revise ex ante expectations. Because decision-makers update their own information by outcomes of battles and responses of their counterparts, disputes end when revealed information leads disputants to reach agreement about relative power and resolve (Fearon 1995; Goemans 2000; Wagner 2000; Slantchev 2003b). However, the latter mechanism describes a dispute as mutual coercion. Accordingly, when accumulated costs imposed by counterparts exceed expected benefits, disputants prefer negotiation or settlement to fighting (Stam 1996; Bennett and Stam 1996). With both mechanisms, if a certain ex post choice, specifically selection of a coercive instrument, affects the extent of revealed information or accumulated costs, then it impacts the decisions to continue fighting in a dispute and thereby determines dispute duration. Thus, it is necessary to examine the effect of the ex post choice of coercion on the decisions to terminate militarized dispute.

As an ex post choice of coercion, airpower has been considered an important instrument to convey resolve and to affect the expectations regarding military operations (Pape 1996; Byman, Waxman, and Larson 1999). Unlike non-military coercive instruments, airpower coercion entails additional imposed costs with destruction of capability. Furthermore, airpower coercion is distinguished from other types of military coercion, because it aligns counter-military targeting with specific demands instead of unlimited bombardment to destroy all capabilities (Pape 1996; Horowitz and Reiter 2001). Therefore, the use of airpower coercion can affect the extent of revealed information and accumulated costs during a dispute.

In this chapter, I argue that information and costs made by airpower coercion affect the likelihood of termination of militarized disputes. Accordingly, the termination model tests the relationship between the use of airpower coercion and dispute duration. This chapter proceeds as follows. First, I review existing studies concerning termination of war and disputes. Second, I develop the concept of airpower coercion as an ex post choice to affect decisions to terminate militarized disputes. Third, I construct dispute duration models based on militarized dispute events after the emergence of the airpower era. Fourth, I analyze the effect of ex post coercion on dispute duration. Finally, I present theoretical and practical implications.

### **5.1 The Logic to Terminate Disputes**

In the existing termination literature, the decision to terminate war and disputes has been explained by both endogenous and exogenous logics. Whereas endogenous logic emphasizes the process toward termination of war by the exchange of demands and

concessions between disputants, exogenous logic focuses on the competition for fixed and exogenous expected benefits of war (Werner 1998). As the endogenous logic of termination, bargaining theory suggests that the decision to terminate disputes results from intradispute bargaining. Due to incomplete information, states do not agree about each other's relative power and willingness to use force before a dispute. In this circumstance, each state has incentives to misrepresent its own private information for better deals. Due to these asymmetric and incomplete information conditions, decision-makers rationally enter into militarized disputes despite the fact that fighting is a very costly instrument (Fearon 1995; Reed 2003). During disputes, military operations reveal information about relative power and damage each state's abilities to endure costs, so that a militarized dispute per se provides the opportunity to expose private information (Wagner 2000). Based on revealed information during disputes, states learn their counterparts' resolve and change their own demands in response. Accordingly, a militarized dispute leads states to exchange information. This exchange helps to reach convergence of expectations regarding military outcomes. When disputants reach this convergence, decision-makers end disputes because the continuation of dispute is unprofitable (Slantchev 2003b).

In the paths toward the convergence, not only a decisive military victory but also the change to demands that counterparts can accept will lead to the end of disputes (Filson and Werner 2002). Accordingly, conditions affecting the demands of disputants influence the duration of militarized disputes. During disputes, the demands of disputants are adjusted by the balance between the gains from and the risks of fighting (Slantchev 2004). Therefore, if an ex post choice affects the expected gains in a dispute, disputants

have incentives to change their own demands. In this case, disputants delay agreements about future expectations until they acquire better information about each other.

Therefore, the extent of uncertainty derived from asymmetric information is a determinant of the duration of a dispute, because agreements about future expectations are delayed by a high level of uncertainty regarding private information (Slantchev 2004). According to bargaining theory, the decision to terminate militarized disputes is highly affected by the factors determining the extent of uncertainty, because a high level of uncertainty impedes agreement between disputants. Therefore, ex post choices that increase uncertainty may decrease the likelihood of dispute termination, so that the duration may increase.

In contrast with the endogenous logic literature, the line of literature of exogenous termination logic suggests that dispute termination results from accumulated costs under the concept of mutual coercion, because disputants attempt to impose costs simultaneously after entering into a militarized dispute. When expected benefits are greater than imposed costs, states decide to continue their involvement in militarized disputes (Stam 1996). Accordingly, the termination of dispute is determined by the losing side's decision to accept the coercive demand of their opponent. In other words, when the expected benefits are fixed, the costs of dispute and the ability to bear these costs are key factors affecting decisions to terminate militarized disputes. These costs increase over time, so that accumulated costs increase the likelihood of dispute termination (Bennett and Stam 1996). Thus, the duration of disputes depends on the varying factors that affect accumulated costs.

According to empirical findings, Bennett and Stam (1996) identify the effects of

military imbalance, democratic regime, and geographical characteristics on the duration of interstate wars. Also, Bennett and Stam (1998) find the linkage between democracy and duration of war. Along these lines, Bueno de Mesquita et al. (2004) report that the dispute durations within democratic dyads are shorter than those involving a nondemocratic regime. However, those findings emphasize ex ante contexts such as domestic regime types rather than ex post choice. The studies that focus on the ex post factors found reciprocal action and leadership change to have important effects on the duration of militarized disputes. In fact, a reciprocated dispute is less likely to end than a non-reciprocated dispute (Jones, Bremer, and Singer 1996). McGillivray and Stam (2004) argue that the change of leadership during the coercive diplomacy has a significant effect on the duration of coercion. In sum, the empirical literature on the exogenous logic of termination has found that several ex ante and ex post factors are related empirically to the duration of militarized disputes.

Among those identified factors, ex post choice of coercive instrument can represent disputants' willingness to pursue favorable outcomes. According to the concept of mutual coercion, a militarized dispute ends when the cost-benefit balance changes. In this context, the desire to continue to accumulate costs until a significant change of the cost-benefit balance is an important determinant of dispute duration. Therefore, the more ambitious the disputants are, the more they will pursue accumulated costs. In other words, if disputants seek to pursue decisive outcomes, they prefer an aggressive ex post choice that can induce a high level of accumulated costs. Thus, the type of ex post choice can reflect the disputants' aspiration for decisive outcomes that impact the duration of disputes.

In short, bargaining theory focuses on endogenous dispute termination by intra-dispute bargaining and adjustment of the disputants' aims. In this context, the extent of uncertainty during the dispute is an important factor that affects the decision to terminate militarized dispute. From the perspective of mutual coercion, benefits and dispute aims are fixed and exogenous. A key point, therefore, to explain the decision to terminate a dispute is an increase of costs such that they exceed benefits. Incorporating both logics, the extent of uncertainty during a dispute and the desire to impose costs are important factors determining the duration of militarized disputes. In this context, if the selection of ex post choice is related to the extent of uncertainty and the ambitions of the disputants, the choice per se can affect the likelihood of dispute termination.

## **5.2 Airpower and Dispute Duration**

Airpower has been employed as an ex post choice of coercive instrument in international relations. According to coercion literature, coercive instruments are designed to convey commitment and resolve in order to influence policy behaviors of other states by imposed costs and threat without a full-scale military operation (Schelling 1966; Baldwin 1985; George 1994; Byman and Waxman 2002). Among coercive instruments, airpower has important features in that it can use military force in a limited way and can convey resolve without a brutal military campaign. These characteristics provide abilities to reduce political costs by minimizing collateral damage and to control intensity of military operations by limiting violence (Byman and Waxman 2002). Whereas land- and sea-based forces are limited by the boundaries of land and sea in terms of range and operation tempo, airpower is characterized by the mobility that



enables aircraft to operate freely in anywhere. In other words, airpower can not only rapidly reach selected targets, but also can retreat at ease. As a result, disputants using airpower can change both range and time of military operation more easily and rapidly than other types of military instruments (Allen 2007). Thus, the use of airpower affects both the escalation of violence and credibility regarding the continuity of violence.

In empirical endeavors on the effectiveness of airpower coercion, Pape (1996) argues that airpower is an effective coercive instrument if it is used to deny target states' military achievements. Likewise, Horowitz and Reiter (2001) find that aerial bombing on military targets is more effective than attack on civilian assets. These findings demonstrate that the airpower coercion is one of the most effective instruments to change other states' behaviors. In this context, the use of airpower coercion during militarized disputes can affect decisions to terminate disputes. This use of airpower affects dispute duration in two ways: updated information and accumulated costs. On the one hand, the combination of airpower's combat effectiveness and signals update information about probability of victory and credibility of signals. This information affects airpower attacker's incentive to escalate violence and target's assessment of attacker's willingness. On the other hand, the choice of airpower coercion can represent disputants' strong resolve to inflict accumulated costs in order to pursue more favorable outcomes. This means that disputant using airpower coercion is more likely to continue fighting until reaching a decisive outcome. Thus, updated information and accumulated costs made by the use of airpower coercion influences the level of violence and disputants' expectations that determines dispute duration.

In terms of updated information, the airpower's combat effectiveness and mobility

updates information about both the probability of victory and the credibility of signals in militarized disputes. When the dispute initiator uses airpower coercion, the updated information affects an initiator's incentive to escalate violence and a target's uncertainty about the initiator's demands. These tendencies increase the extent of uncertainty and thereby expand the length of disputes durations. First, the combat effectiveness of airpower coercion increases the probability of victory which therefore enables initiators using airpower to strengthen their incentive to continue fighting rather than negotiate. Because a dispute initiator is generally a resolved disputant, the initiator that has a relatively high probability of victory is more likely to expand its original demands. As a result, uncertainty about the initiator's demands increases, thus delaying agreement between disputants. Airpower's combat effectiveness, which concerns how to efficiently demolish a target's assets, has improved since the first emergence of airpower due to accurate bombing technology (Pape 1997/98). Due to these improvements in military technology, airpower can reach the center of gravity in the target. Thus, bombing on selective assets related to the command and control system can paralyze opposing leaders' ability to conduct war (Warden 1997/98). Based on this technological advancement, airpower coercion not only delivers the resolve of the coercer but also undermines the target's ability to wage war. Therefore, airpower coercion can directly weaken opponents' war-fighting capability and thereby influence the probability of victory in a military campaign.

The effect of airpower coercion on the probability of victory is reinforced when used by the dispute initiator. In a militarized dispute, the initiator has strategic advantages such as selection of target, surprise attack, and better preparation time (Wang and Ray

1994; Stam 1996; Gartner and Siverson 1996). As a result, if the initiator's strategic position incorporates the use of airpower coercion, the probability of victory can be improved extensively. A high probability of victory induces a high expectation of payoff from war, so this circumstance makes war-fighting the more favorable selection (Slantchev 2005). This condition strengthens the initiator's incentive to pursue escalation that increases uncertainty and thereby prolongs the dispute.

For example, when Israel invaded Lebanon in 1982, the use of airpower led Israeli decision-makers to expand military operations into Syria. The Israeli invasion of Lebanon resulted from the northern border confrontations with the Palestine Liberation Organization (PLO). Although Israeli hardliners, including Prime Minister Menachem Begin and Defense Minister Ariel Sharon, sought to remove the capacity of PLO artillery in southern Lebanon, the moderates in the cabinet hesitated to permit the ambitious operation. As a compromise with the moderates, the initial invasion plan was limited to a 25-mile incursion and the avoidance of confrontation with Syria. Moderates in the Israeli cabinet agreed to this plan (Yaniv 1987). During the first week of the operation, Israeli forces advanced rapidly towards Beirut, but the troops' flank was exposed to Syrian artillery. Despite the fact that Syrian forces did not intervene in Lebanon, their air defense system was reinforced in the Bekaa Valley. Defense Minister Sharon requested the use of the Israeli Air Force (IAF) to destroy the air defense system in Bekaa in order to provide massive air support for troops. Then, as a result of the air battle over the Bekaa Valley, the IAF destroyed the entire air defense system in Bekaa and 30% of Syrian combat aircraft that had crossed into Lebanon. With this victory in the air battle, Israeli decision-makers began to consider expansion of the campaign in order to avoid the return of the PLO and

possible assistance from Syria. As a result, Israel decided to expand the aim of military operation to take the Beirut-Damascus highway in order to deny any Syrian influence in Lebanon (Schiff and Yaari 1984). This decision to expand diverged from the initial plan of the invasion. The use of the IAF in the Bekaa Valley changed the probability of victory and the anticipated future, so that Israeli decision-makers exposed the temptation to increase the intensity of military operation in order to obtain more favorable results. In fact, after the air battle in the Bekaa Valley, military operations were expanded and prolonged.

Second, airpower differs from routine military mobilization, because the technology offers great mobility. This characteristic deteriorates the credibility of signals, so that the dispute target faces a relatively high level of uncertainty about the initiator's demands in a militarized dispute. Military mobilization per se, which influences opponents' ability to use force, affects the credibility of costly signals during disputes. According to Fearon's (1997) argument, it is difficult for military mobilization to create ex post costs because the costs of military mobilization are paid already. Nonetheless, preemptive military mobilization undermines the opponent's preparedness time and thereby increases the coercer's probability of victory (Slantchev 2005). Because the rising probability of victory increases the expected utility of war, if hostilities cease, then the initiator using airpower coercion loses the chance of victory. As a result, escalation toward war becomes a credible threat, so that the actual use of force can become a costly signal that generates ex post costs.

However, the very mobility of airpower coercion deteriorates the credibility of signals unlike other routine military mobilization. Because the high mobility of airpower

assures rapid concentration and dispersion of force, airpower coercion can be retreated easily for both political and military reasons. Unlike a ground campaign, a bombing campaign does not entail initiators' severe collateral casualties. By this reasoning, initiators using airpower coercion can easily back down without serious military loss. This easy retreat undermines the credibility of signals during a militarized dispute. As a result, the target logically resists until the disclosure of the initiator's intention. Therefore, despite the nature of military mobilization that can produce credibility of signals in crises, the mobility of airpower increases uncertainty so that the dispute duration is expanded.

In sum, if a dispute initiator uses airpower coercion, both sides have incentives to prolong a militarized dispute. Because initiators can expect an increased probability of victory, they are more likely to pursue the escalation of violence that increases the length of the dispute. In terms of the target's assessment of the initiator's demand, the mobility of airpower enables initiators' easy retreat and thereby decreases the credibility of signals. As a result, targets are more likely to choose resistance rather than concession. Therefore, a dispute initiation associated with airpower coercion increases the duration of disputes.

Meanwhile, under the concept of mutual coercion, disputants' willingness to pursue favorable outcomes affects the choice of military instrument that determines the ability to accumulate costs. The high level of resolve leads disputants to choose more effective instrument that can induce decisive outcomes. In this sense, a militarized dispute associated with airpower coercion is prolonged, because a side using airpower coercion is less willing to accept outcomes other than victory. During a militarized dispute, disputants attempt to inflict costs on each other while denying their counterparts' ability to impose costs (Slantchev 2003a). As Stam (1996) suggests, states become

involved in a process of mutual coercion in a militarized dispute. In this condition, airpower coercion can directly influence the adversary's cost-benefit balance because the destruction of core assets by air attack changes strategic calculation (Pape 1997/98; Byman and Waxman 2002). Therefore, airpower coercion can be considered as an effective instrument in a mutual coercion circumstance.

Based on the effectiveness of coercion in a dispute, airpower coercion represents the ambition to pursue decisive outcomes in a militarized dispute. In other words, the use of airpower coercion is a sign of a disputant's resolve to pursue more decisive outcomes such as victory and yield, in terms of ability to inflict costs and the level of hostility. In this context, regardless of whether its role is initiator or target in a militarized dispute, a disputant using airpower coercion is more likely to continue fighting until reaching a decisive outcome. Accordingly, despite the fact that many militarized disputes result in stalemates, disputants are less likely to accept stalemate in a militarized dispute associated with airpower coercion. This means that highly resolved disputants who pursue decisive outcomes may select airpower coercion. In other words, when a disputant's position becomes hardened, the disputant may use airpower coercion. Therefore, the use of airpower coercion represents the drive to demand victory or yield rather than stalemate or compromise. Those disputants that pursue decisive outcomes are motivated to continue fighting until a militarized dispute ends with unambiguous outcomes. Thus, the duration of the dispute is prolonged.

For instance, in the 1982 the Falkland crisis, Britain's use of airpower was a firm sign to reoccupy the Falkland Islands. After the Argentine invasion of the Falkland Islands, Britain faced a decision between negotiating with Argentina and deploying a task

force. British Prime Minister Margaret Thatcher decided to send a task force to manage the crisis. Although the direct attack by deployed task force depended on the status of diplomacy, Britain did not want to provide sufficient time for Argentina to reinforce its defenses in the Falkland Islands. As a result, Britain declared a Total Exclusion Zone (TEZ) and entered combat with an attack on Port Stanley airfield in order to seize the Argentine air force and logistics (Freedman 1997). On the first day of the military operation, the British Air Force launched long-range bombers from Ascension Island and combat aircraft of the task force. The continuous air strikes by the long-range bombers and the airpower of the task force maintained during the campaign in order to damage the Argentine airfield and ground-based airpower (Armitage and Mason 1985). When Britain decided to send a task force, the campaign pursued a decisive outcome: the recapture of Falkland Islands. Because this aim did not change during the three-month crisis, Britain continued to use airpower in spite of the hardship of conducting a military operation 8000 miles away from home base. British use of airpower in the South Atlantic represents the drive to pursue the victory rather than stalemate. Therefore, the military operation was continued until the Argentine surrender and the duration of disputes was prolonged.

In short, the use of airpower coercion can increase the duration of militarized disputes. A dispute initiator using airpower coercion has strong incentives to escalate violence, while disputants' selection of airpower coercion signifies the desire to pursue decisive outcomes. In both cases, militarized disputes are prolonged by the escalation of violence and the conviction that stalemate is an unacceptable outcome. These expectations lead to hypotheses. The first hypothesis reflect the extent of uncertainty in intradispute bargaining. As stated previously, both initiator and target have incentives to

escalate a dispute and prolong dispute durations due to a change in the probability of victory and degree of the credibility of signals.

**Hypothesis 1:** A militarized dispute initiated by a state using airpower coercion will last longer than that initiated by a state using other types of instruments.

The remaining hypotheses represent the desire to pursue decisive outcomes that affect the duration of disputes under the mutual coercion circumstance.

**Hypothesis 2-a:** A militarized dispute associated with airpower coercion is more likely to end as a decisive outcome than as a stalemate.

**Hypothesis 2-b:** A militarized dispute associated with airpower coercion will last longer than other types of disputes will.

### **5.3 Research Design**

In this chapter, the unit of analysis is directed dispute dyads, based on the Dyadic Militarized Interstate Dispute (DYDMID) 2.0 data set. The time span of dispute dyads is from 1919 to 2000, because effective airpower appeared after World War I. In order to test hypotheses about the length of militarized disputes, I construct two duration models, one of which captures the effects of dispute initiators' use of airpower coercion and the other, the effects of militarized disputes associated with airpower coercion. For these duration models, I measure the dependent variable of militarized disputes duration using the number of days between the dyadic start and end dates. In order to estimate duration of dispute, I use a Cox proportional hazard model. Then I compensate the effects of nonproportional variables by the addition of interaction with natural log of time (Box-



Steffensmeier and Zorn 2001).

In order to test the effect of militarized disputes associated with airpower coercion on decisive outcomes, I construct a binary logit model. For the dependent variable, I code “victory for side A/B” and “yield by side A/B” as the decisive outcome in the DYDMID data set. These selected categories reflect victory or defeat in militarized disputes. Likewise, “compromise” and “stalemate” are considered as draws that represent non-decisive outcomes and other values are removed. Then, I utilize logit estimation using this binary dependent variable consisting of decisive outcome and draw.

The primary independent variable, airpower coercion, stems from two major sources. Whereas Pape (1996) identifies 30 airpower coercion cases from 1917 to 1991, Byman, Waxman, and Larson (1999) identify 16 cases dating after World War II. I transform those cases into dyadic cases and identify interstate airpower coercion cases associated with militarized interstate dispute cases. Specifically, I consider 9 more cases in the time period from 1945 to 1990, following Flintham (1990). These cases also include new airpower coercion events in 1999. Using those sources, I aggregate interstate airpower coercion cases from 1919 to 2000 (see Appendix B). From these data, I identify 64 dyadic-year cases associated with militarized disputes and 41 dyadic-year cases involving in dispute initiators, as shown in Table 5-1.

**[Table 5-1 Here]**

In the first duration model, in order to test the effect of dispute initiators’ use of airpower coercion on the duration of disputes, I generate the initiator’s airpower variable as a dichotomous variable. This initiator’s airpower variable reflects only cases in which dispute initiators use airpower coercion. It is coded “1” when a dispute initiator uses

airpower coercion in given a year. Otherwise, it is coded “0.” Likewise, in the second duration model that tests the effect of militarized disputes associated with airpower coercion on the duration of disputes, I create the disputant’s airpower variable. It is a dichotomous variable representing dispute dyads in which at least one side used airpower coercion. Therefore, the disputant’s airpower variable is coded “1” if one or both states in a dispute dyad used airpower coercion and “0” otherwise.

As control variables, I consider democratic initiator, democratic dyad, military power ratio, third party with initiator, third party, contiguity, alliance, and reciprocal action. To measure democracy, I use the “polity 2” regime score which ranges from -10 (highly autocratic) to 10 (highly democratic) of the POLITY IV Project (Marshall and Jaggers 2000). I code states with a polity regime score greater than 6 as a democracy. Accordingly, I construct the democratic initiator variable as a dichotomous variable, coded “1” when the dispute initiator is identified as a democracy. Then I construct the democratic dyad variable by use of dichotomous measure and code “1” when the both states in a dyad have a polity regime score of 6 or higher, otherwise I coded “0.”

The military power ratio variable is measured by the Correlates of War (COW) project’s composite capabilities index (Singer, Bremer, and Stuckey 1972). Each dyad’s military power ratio value is measured by the absolute value of difference in the military expenditures. This value ranges from 0 to 1, with higher values indicating severe disparity of military power and lower values indicating near-parity of military power.

The third party with initiator variable indicates whether any other state joined to the initiator’s side in a militarized dispute. Likewise, the third party variable captures the third party involvement per se in a militarized dispute regardless of which side. Whether

or not a third party is involved in a militarized disputes affects the number of actors and then influences the duration of the disputes (Bennett and Stam 1996). The DYDMID data set identifies the number of third parties in each militarized dispute. Based on this, I construct two dichotomous variables. The third party with initiator variable is coded “1” when any other state participates on the side of the initiator. Otherwise, I code “0.” For the joiners variable, I code “1” if any state is involved in a militarized disputes and otherwise code “0.”

Geographical proximity or distance has important effects on dispute duration (Bueno de Mesquita, et al. 2004). To control for proximity, the contiguity variable is measured by six categories including the COW data sets’ five types of state-to-state contiguity: land contiguity or separated by 12, 24, 150, or 400 miles or less of water (Gochman 1991). The sixth category indicates that the states are not contiguous. I transform the fifth and sixth categories into a noncontiguous category and the others into a contiguous category in order to generate one dummy variable.

An existing study demonstrates that the alliance status generates costs in a dispute and affects the duration of disputes (Bueno de Mesquita, et al. 2004). The alliance variable is coded “1” if a dyad is allied formally and otherwise coded 0. Additionally, reciprocal action also affects the duration and outcome of militarized disputes (Jones, Bremer and Singer 1996). Therefore, I generate the reciprocal violence variable which is measured as a dummy variable that comes from the reciprocated dispute identified by the Militarized Interstate Dispute (MID) 3 data set (Ghosn, Palmer, and Bremer 2004). The reciprocated dispute means that the states on side B respond to the initiative from the states on side A.

Accordingly, the duration models are shown in below:

MID Duration =  $f$  (initiators' airpower, democratic initiator, democratic dyads, military power ratio, contiguity, alliance, third party with initiator, reciprocal violence)

MID Duration =  $f$  (disputants' airpower, democratic dyads, military power ratio, contiguity, alliance, third party, reciprocal violence)

Also, the decisive outcome model is shown in below:

Decisive outcome in MID =  $f$  (disputants' airpower, democratic dyads, military power ratio, contiguity, alliance, third party, reciprocal violence)

#### **5.4 Data Analysis**

I first estimate the effects of independent variables on MID duration using the Cox proportional hazards model in terms of the initiator's strategic position. In this model, a positive coefficient means that the risk of termination (the hazard rate) increases. Thus, a positive coefficient implies shorter duration of militarized disputes. In Table 5-2, Model 1 shows that the initiator's airpower variable has a significant effect on the duration of MID.

**[Table 5-2 Here]**

This reveals that the dispute initiator using airpower coercion prolongs a militarized dispute. When an initiator chooses airpower coercion, the dispute is less likely to end than other disputes in which the initiator does not use airpower coercion. This result supports Hypothesis 1, which emphasizes the role of initiators using airpower coercion. As previously discussed, if initiators select airpower coercion, they have a strong incentive to escalate disputes due to higher probability of victory. Furthermore,

due to the characteristics of airpower that make it possible to deploy and retreat forces, the credibility of signals during the dispute is undermined. Therefore, the selection of airpower coercion by the initiator increases the extent of uncertainty in a militarized dispute and thereby increases the duration of dispute.

The effects of other variables are consistent with existing research. The effect of military power ratio variable indicates that as disputants approach military parity the duration of a dispute is slightly longer than disputes between disputants with asymmetric power. This result is consistent with the expectations of bargaining theory. Because military parity increases the uncertainty during a dispute, agreement between disputants is delayed (Slantchev 2004). Furthermore, the result reveals that reciprocal action by the target increases the duration of the dispute. This fact is consistent with existing empirical findings (Maoz 1983; Jones, Bremer, and Singer 1996). Also, the third party's participation on the side of the dispute initiator prolongs the duration of dispute. Because the participation of the third party helps initiators to pool resource for fighting, this collaboration during a dispute increases its duration (Vasquez 1993).

Although the Cox proportional model assumes that the effect of the covariate values on the relative hazards is proportional, the effects of variables on the hazard ratio may not constant over time. Thus, it is necessary to correct nonproportional effects by interaction with a transformation of time (Box-Steffensmeier and Zorn 2001). Grambsch and Therneau's (1994) global test allows us to find nonproportionality. Using this test, I find nonproportionality in the measures for initiators' airpower and democratic initiator. Model 2 complements nonproportionality by including interactions of the two offending covariates with the natural log of time. In Model 2, the time-fixed effect of initiators'

airpower appears positively significant. This means that the initial effect of initiators' airpower strongly prolongs the dispute duration but this influence weakens over time. Figure 5-1 appears the hazard ratio for the initiators' airpower as a function of time.

**[Figure 5-1 Here]**

The effect of initiators' airpower rapidly decreases as time progresses. Nevertheless, there is the clear evidence of difference between initiators with airpower and initiators without airpower despite the nonproportionality. When initiators use airpower coercion, dispute duration is more likely to increase. Likewise, the democratic initiator variable shows initially a positive coefficient but later this effect wanes.

Table 5-3 reveals the effects of independent variables on decisive outcomes.

**[Table 5-3 Here]**

This logit estimation shows that the disputant's airpower variable has a significantly positive effect on decisive outcomes. Although more than half of militarized dispute events are coded as stalemate rather than as decisive outcomes such as victory and yield (Jones, Bremer, and Singer 1996), disputes associated with airpower coercion tend to achieve a decisive outcome and are more likely to end that way than other disputes not connected with the selection of airpower coercion. As stated previously, the use of airpower coercion reflects the resolve of disputants because airpower can be considered as both an effective instrument to inflict costs and a high level of hostility. In this context, the disputants using airpower coercion are more likely to pursue victory than stalemate. This supports Hypothesis 2-a. Likewise, the military power ratio variable shows a weak sign that an asymmetric military balance is more likely to be associated with decisive outcome. This implies that disputants with better opportunities to win a

dispute and a strong resolve regarding the status quo become ambitious disputants that do not accept stalemate.

This result also suggests a sense about the effect of disputant's airpower on the duration of disputes. The result of the decisive outcome model is consistent with the second set of duration models, which test the effect of militarized disputes associated with airpower coercion on the duration of disputes. In Table 5-4, Model 1 shows that a dispute associated with airpower coercion is more likely to have a longer duration than other disputes.

**[Table 5-4 Here]**

Because disputants using airpower coercion are more resolved and possess an ambitious goal regarding the dispute, they are more likely to continue fighting until they reach decisive outcomes. Therefore, disputes associated with airpower coercion last longer than other disputes. In Model 1, the disputants' airpower variable has a significant effect on the duration of militarized disputes. This result means that a dispute associated with airpower coercion is less likely to end than other disputes in which neither side uses airpower coercion. This supports Hypothesis 2-b.

The test shows that effects of other variables are very similar to those of independent variables in the first set of duration models that test the effect of the initiator's airpower coercion on the dispute duration. The participation of a third party on one or both sides increases the duration of a dispute. The alliance variable also shows a significant effect, increasing the duration of a dispute. This means that the effects of most variables are consistent with the test of the initiator's role in dispute duration.

Model 2 amends nonproportionality by the addition of interactions with the

natural log of time. The global test reveals the nonproportional effects of disputants' airpower, third party, and reciprocal violence. For the disputants' airpower variable, the initial effect is consistent with the results in Model 1. Furthermore, the strong effects of disputants' airpower decrease with time. Figure 5-2 plots the hazard ratio for the disputants' airpower variable by duration. Although the hazard ratio decreases over time, the clearest evidence of difference between disputants with airpower and disputants without airpower is found.

**[Figure 5-2 Here]**

In short, duration models reveal that the use of airpower coercion contributes to prolonging the duration of disputes. This implies that a specific ex post choice of coercion has a significant impact on the uncertainty level of disputes. In the case of airpower coercion, the combat effectiveness to inflict costs and the mobility of airpower deployment affect both probability of victory and credibility of signals and thereby increases the duration of disputes associated with airpower coercion. In all termination models, ex post variables have significant impacts on the duration and outcomes of disputes. Therefore, termination of dispute is seriously affected by the ex post context.

### **5.5 Conclusion**

This chapter presents the effect of ex post choice of coercion on decisions to terminate militarized disputes. Specifically, the use of airpower coercion prolongs the dispute duration and increases the likelihood of decisive outcomes. As an ex post choice, airpower coercion can affect the decisions to terminate militarized disputes. This means that ex post contexts have significant effects on both the duration and decisive outcomes



of disputes. Empirical tests reveal that the coercive instrument, third-party intervention, and reciprocal violence are significant factors affecting the decision to terminate disputes. In a similar vein, domestic regime types and relative power still show significant effects on the duration of dispute. This implies that both ex ante and ex post contexts are important determinants of the logic of termination. Therefore, as shown in the outcome models in the previous chapter, domestic regime types and relative power generate significant contexts affecting the decision-making process throughout several stages of decisions in militarized disputes.

Meanwhile, the effect of airpower coercion shows the inconsistent result with the conventional wisdom based on the optimism of military technology. Although the development of military technology seemed to promise a quite rapid victory, a militarized dispute associated with airpower coercion has an increased duration. Despite the fact that airpower can be considered a useful instrument to inflict costs on adversaries, disputants in a militarized dispute associated with airpower coercion have incentives to escalate both violence and ambitions. This implies that the effects of military instruments on the decision-making process in a militarized dispute are complicated. During a dispute, military instruments not only generate costly signals but also affect strategic circumstances such as probability of victory and uncertainty of demands. Furthermore, airpower coercion significantly affects the effectiveness of the military operation and the mobility of airpower influences the credibility of signals. By this reasoning, the use of airpower coercion intervenes in the process of updating information during the dispute and increases the extent of uncertainty due to the change in disputants' previous expectations.

Along this line, this chapter also provides the practical implication regarding the use of airpower coercion. Unlike the proponents of decisive victory by airpower, airpower coercion tends to become an instrument of the gradual communication during a militarized dispute. The result of the duration models shows that the use of airpower coercion tends to increase the uncertainty. Therefore, the decision-makers who face airpower coercion may wait until disclosure of the demands and resolve that airpower coercion entails. In this context, the use of airpower coercion in a militarized dispute is a continuous communication between disputants under the uncertainty. This means that those planning to use airpower coercion should develop enough useful tactics to be suitable for circumstances requiring gradual communication.

## **Chapter 6**

### **Conclusion**

This study explores the logic of initiation, escalation, and termination decisions in militarized disputes. Chapter 2 examines how ex ante external and domestic contexts affect the outcome of militarized disputes. Because the decision to terminate war is affected by a series of information prior to and during a dispute, ex ante contexts based on pre-dispute information can provide a certain predictive ability about dispute outcomes. According to the existing dispute outcome studies, relative power, domestic regime types, and strategic position are important determinants of decisions to terminate a dispute. The outcome models reveal that ex ante contexts are empirically related to the victory of disputes. Despite the fact that the outcome models are fully based on ex ante variables, the predictive ability about actual observations is not weak. This result shows that pre-dispute information is connected with intradispute decisions.

Chapter 3 explores how expected outcomes derived from outcome models affect the decisions to initiate a militarized dispute. Consistent with the previous finding about the relationship between pre-dispute information and intradispute decisions in chapter 2, certain components of pre-dispute information, i.e. the expected probability of victory and uncertainty, determine the decision-makers' incentives to initiate a militarized dispute. In militarized disputes, the pattern of change in the net balance of costs and benefits induces the systemic change of combinations of three dispute outcome probabilities, so that those probabilities can covary. Accordingly, decision-makers can predict expected outcomes and future costs given expected probability of victory, so three dispute outcome probabilities can guide the decision-making process prior to militarized disputes. In this

sense, because probabilities of draw and defeat decrease after the chance of victory increases up to some limit, the relationship between the expected probability of victory and the likelihood of dispute initiation is curvilinear. Likewise, uncertainty allows potential disputants to have incentives to initiate a militarized dispute because incomplete information leads disputants to exploit opportunity and to predict a failed negotiation. The initiation model reveals that estimated probability of dispute initiation is a function of both uncertainty level and the probability of victory. Thus, the chance of victory derived from combinations of three outcome probabilities is linked to the decision-making process prior to disputes. This means that the expected dispute outcomes are connected with the decisions to initiate militarized disputes.

Chapter 4 investigates how the pre-dispute intergovernmental institutional designs impact the escalation process. The arms control agreements designed to reveal private information of member states can reduce uncertainty about private information and thereby decrease incentives to misrepresent it. Conceptually, arms control agreements are designed to reduce the incentive of preemptive attack and the possibility of accidental wars. Also, arms control agreements have practically developed the ability to reveal private information by institutional restrictions and technical verification systems. Therefore, arms control agreements with onsite inspection system reveal private information and improve disputants' credibility of signals, so that they can reduce both reciprocal and intensified violence even after entering into a dispute. The escalation models show that the presence of arms control agreements reduces the likelihood of reciprocal and intensified violence necessary for escalation of disputes. This implies that pre-dispute information is linked to intradispute decisions to escalate violence.

Chapter 5 examines how ex post choice affects the decision to terminate militarized disputes. As a distinguished type of military coercion, airpower coercion affects the extent of revealed information and accumulated costs during a dispute. Due to the combat effectiveness of airpower, dispute initiators using airpower have improvements in probability of victory and thereby strengthen their incentive to continue fighting rather than negotiate. Furthermore, the effectiveness of coercion by airpower leads disputants to have the ambition to pursue decisive outcomes, so that the disputant with airpower coercion is less willing to accept outcomes other than victory. Consequently, the use of airpower coercion delays the agreement between disputants until reaching the decisive outcome. The duration models reveal that the use of airpower coercion prolongs the duration of disputes. This implies that an ex post choice of airpower coercion has a significant impact on the decision to terminate a militarized dispute. Therefore, both ex ante and ex post contexts are important determinants of the logic of termination. This is a sign of interconnection among decisions in militarized disputes.

This study contributes to the development of war and dispute research in three ways. First, this study clarifies the theoretical and empirical connection between pre-dispute information and intradispute decisions. Although existing studies do not distinguish differences between ex ante and ex post contexts, this study finds that ex ante contexts alone can provide the predictive ability about militarized dispute outcomes. As outcome models show, decision-makers' pre-dispute calculus based on ex ante contexts is empirically related to dispute outcomes. Furthermore, decision-makers can use the expected probability of victory as a key predictor of future dispute outcomes, despite the

fact that the probabilities of outcomes provided by outcome models are entirely based on pre-dispute information. Empirical findings show that certain types of pre-dispute information such as relative power, domestic regime type, and intergovernmental institutions are meaningful predictors of intradispute decisions. Thus, pre-dispute information still affects the intradispute decision-making process when decision-makers decide to escalate and terminate violence during a dispute. This finding unearths the role of pre-dispute information in the decision-making process of militarized disputes. So far, existing studies have focused on how pre-dispute information is updated rather than what pre-dispute information guides. However, this study reveals that pre-dispute information is related to intradispute decision-making, so it can guide decisions during a militarized dispute.

Second, this study identifies how three possible dispute outcome probabilities are related to decision-makers' cost-benefit calculus. Despite the fact that the combination of three outcome probabilities includes the possibility of draw, decision-makers can systemically calculate net balance of costs and benefits by the use of three probabilities. Consistent with existing studies concerning the probability of victory based on two possible dispute outcomes (victory and defeat), this study finds that the chance of victory derived from the combination of three outcome probabilities is systemically related to the likelihood of dispute. The initiation model shows that the combination of three outcome probabilities can explain disputants' incentives to initiate a dispute. The covariation among probabilities and decision-makers' calculation of net balance allow the combination of three outcome probabilities to be included in the decision-making process of militarized disputes.

Third, the influence of intergovernmental institutions in decision-making process is embedded in the decision-makers' cost-benefit calculus. Although the existing institutional approach has focused on the international cooperation by socialization among states and existing international regime, this study extends the role of institutions to the informational dynamics between decision-makers. The empirical relationship between the arms control agreements and decisions to escalate violence reveals that the institutional design affect the flow of information determining the decision-makers' expectations. This study finds that intergovernmental institutional designs are directly related to the decision-making process during a militarized dispute.

Nevertheless, future study about the decision-making process in militarized disputes needs to overcome problems derived from large N statistical analysis. First, empirical findings based on large N statistical analysis in this study tend to lack the intensive explanations and detailed contextual descriptions. Although the generalization across countries' decisions can clarify regularities in the decision-making process of militarized disputes, a decision per se may be contingent upon historical configuration in each country. Historical case analysis can complement the lack of intensive explanation about a particular case. The question of how pre and intradispute information influence a specific country's foreign policy decision-making is unearthed through careful case analysis. Thus, further research needs to include selected case studies in order to use detailed contextual description and intensive explanation.

Second, decision models based on rationality assumptions may be complemented by individual level psychological decision-making processes. In fact, the psychological characteristics of individual decision-makers may have important effects on foreign

policy decisions. In international relations, cognitive perspective theories have identified the psychological factors and the internal dynamics in decision making processes. This attempt seems to be a relevant analysis for explanation of idiosyncratic decisions, because cognitive psychologists attempt to find cognitive mechanisms to explain individual choice. In fact, cognitive analysis has emphasized accurate descriptions, whereas rational choice stresses logical consistency. In this sense, cognitive perspective can complement rationality assumptions, because it can open the unrecognized stage prior to cost-benefit calculus. Future study needs to investigate how individual psychological constraints are incorporated into the decision-making process before and during militarized disputes.



**Table 2-1. Multinomial Logit Estimation in Outcomes of MIDs, 1816-1992**

<i>Variables</i>	<i>Initiator Model</i>		<i>Target Model</i>	
	<i>Victory</i>	<i>Draw</i>	<i>Victory</i>	<i>Draw</i>
Democracy	0.653*** (0.228)	0.885*** (0.199)	1.363*** (0.242)	1.501*** (0.206)
Capability Ratio	-0.648 (0.478)	-0.695* (0.383)	0.424 (0.544)	-0.353 (0.455)
Military Quality Ratio	1.113*** (0.392)	-0.272 (0.304)	0.997*** (0.383)	1.189*** (0.275)
National Capability	-0.522 (1.906)	-2.671 (2.223)	-3.008 (2.293)	-1.674 (1.863)
Population	0.105 (0.100)	0.306*** (0.073)	-0.093 (0.089)	0.019 (0.070)
Risk Propensity	-0.067 (0.155)	0.367** (0.132)	-0.004 (0.152)	0.421*** (0.120)
Minor-Major dummy	-0.506 (0.405)	-1.208*** (0.279)	-1.199*** (0.334)	-1.057*** (0.250)
Minor-Minor dummy	1.294*** (0.405)	-0.00004 (0.365)	0.683 (0.446)	-0.185 (0.358)
Major-Major dummy	0.068 (0.447)	-1.023** (0.440)	0.161 (0.442)	-0.594 (0.367)
Contiguity	0.525** (0.226)	0.653*** (0.170)	-0.339 (0.226)	0.265 (0.169)
S	0.720 (0.503)	-0.832** (0.365)	0.056 (0.527)	-0.823** (0.371)
S with Leader	2.143*** (0.352)	-0.304 (0.298)	-1.659*** (0.394)	-3.015*** (0.330)
Constant	-3.608*** (1.115)	-0.051 (0.742)	1.288 (0.872)	3.443*** (0.703)
<b>Pseudo R<sup>2</sup></b>	0.142		0.156	
<b>N</b>	2332		2336	
<b>Log likelihood</b>	-1585.65		-1561.33	
<b>X<sup>2</sup></b>	403.81		425.82	

Standard errors in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table 2-2. Observed and Predicted Outcomes in the Initiator Model**

<u><i>Predicted</i></u>	<i>Observed</i>			<u><i>Total</i></u>
	<u>Victory</u>	<u>Defeat</u>	<u>Draw</u>	
Victory	94	13	70	177
Defeat	2	6	9	17
Draw	286	264	1,588	2,138
Total	382	283	1,667	2,332
% Correct	24.6	0.02	95.3	
<b>Pearson X<sup>2</sup></b>	197.09			
<b>Total Correct</b>	75.8 %			

**Table 2-3. Observed and Predicted Outcomes in the Target Model**

<u><i>Predicted</i></u>	<i>Observed</i>			<u><i>Total</i></u>
	<u>Victory</u>	<u>Defeat</u>	<u>Draw</u>	
Victory	12	2	12	26
Defeat	25	132	92	249
Draw	246	248	1,563	2,057
Total	283	382	1,667	2,332
% Correct	0.04	34.6	93.8	
<b>Pearson X<sup>2</sup></b>	304.11			
<b>Total Correct</b>	73.2 %			

**Table 3-1. The Estimation of Logit Spline in Dispute Initiation, 1816-1992**

<i>Variables</i>	<i>Model 1</i>	<i>Model 2</i>
Win	0.973*** (0.368)	-0.515 (0.527)
Win*Win		6.303*** (1.596)
Uncertainty	0.812* (0.434)	0.870** (0.421)
Regime similarity	-0.056*** (0.008)	-0.055*** (0.008)
S-score	-1.170*** (0.238)	-1.089*** (0.242)
Contiguity	2.496*** (0.122)	2.509*** (0.122)
Spline 1	0.001*** (0.00008)	0.001*** (0.00008)
Spline 2	-0.001*** (0.00005)	-0.001*** (0.00006)
Spline 3	0.001*** (0.00001)	0.001*** (0.00001)
Constant	-3.740*** (0.217)	-3.514*** (0.195)
<b>Log likelihood</b>	-7416.95	-7392.38
<b>N</b>	191,622	191,622
<b>Pseudo R<sup>2</sup></b>	0.17	0.17
<b>X<sup>2</sup></b>	864.83	844.65

Standard errors in parentheses  
 \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table 4-1. The Effect of Arms Control on Escalation in MID, 1946-2000**

<i>Variables</i>	<i>Ordered Logit Model for Intensified Violence</i>	<i>Binary Logit Model for Reciprocal Violence</i>
Arms control	-0.671*** (0.151)	-1.503*** (0.209)
Demo initiator	-0.708*** (0.109)	-1.107*** (0.175)
Power parity	0.268 (0.192)	0.046 (0.315)
Major power	-0.487** (0.236)	-0.636* (0.379)
Contiguity	0.008 (0.141)	0.750*** (0.205)
Foreign policy	-0.229 (0.271)	-2.470*** (0.492)
Third party	0.166 (0.127)	-0.522*** (0.165)
Peace year	-0.001 (0.003)	-0.011*** (0.004)
Constant		4.426*** (0.421)
Cut 1	-6.533 (0.510)	
Cut 2	-3.595 (0.240)	
Cut 3	-1.278 (0.207)	
Cut 4	2.325 (0.214)	
<b>N</b>	2014	2014
<b>Log likelihood</b>	-1901.427	-685.511
<b>X<sup>2</sup></b>	92.84	172.85

Standard errors in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table 4-2. Two-Stage Probit Estimations of Escalation in Politically Active Dyads, 1946-2000**

<i>Variables</i>	<i>Intensified Violence Model</i>		<i>Reciprocal Violence Model</i>	
	<u>Outcome</u>	<u>Selection</u>	<u>Outcome</u>	<u>Selection</u>
Arms control	-1.350(0.388)***		-0.925(0.132)***	
Demo initiator	-0.129(0.126)		-0.317(0.108)***	
Power parity	0.142(0.200)		0.003(0.190)	
Major power	-0.294(0.331)		-0.491(0.312)	
Contiguity	-0.674(0.296)**		0.191(0.358)	
Foreign policy	0.586(0.280)**		-0.906(0.333)***	
Third party	1.215(0.166)***		-0.209(0.096)**	
<i>Initiation Constant</i>	-1.528(0.807)		2.519(0.694)***	
Demo initiator		-0.089(0.031)***		-0.088(0.031)***
Power parity		-0.263(0.081)		-0.026(0.081)
Major power		1.025(0.233)***		1.026(0.233)***
Contiguity		1.133(0.051)***		1.132(0.051)***
Foreign policy		-0.558(0.90)***		-0.556(0.090)***
Spline 1		0.001(0.0001)***		0.001(0.0001)***
Spline 2		-0.001(0.0001)***		-0.001(0.0001)***
Spline 3		0.0001(0.0001)***		0.0001(0.0001)***
<i>Escalation Constant</i>		-2.128(0.064)***		-2.129(0.063)***
$\rho$ Selection effect		-0.250(0.272)		-0.168(0.294)
<b>N</b>	1732	291240	1732	291240
<b>Log-likelihood</b>	-8838.686		-9133.710	
<b>X<sup>2</sup></b>	83.55		100.11	

Note: Wald chi-square test for independent equations= 0.33 (Not significant). For the selection equation, n= 291,240; for the outcome equation, n= 1732.

Standard errors in parentheses, \* significant at 0.1%; \*\* at 0.05%; \*\*\* at 0.01%

**Table 5-1. Frequency of Airpower Coercion Associated with MID, 1919-2000**

	<i>Number (Proportion)</i>
Number of airpower coercion in MID	64 (2.51%)
Number of airpower coercion by MID initiators	41 (1.61%)
<b>Total number of MID</b>	2554

**Table 5-2. The Duration Model for Initiators' Use of Airpower in MID, 1919-2000**

<i>Variables</i>	<i>Model 1</i>	<i>Model 2</i>
Initiator's airpower	-0.708*** (0.073)	-1.514*** (0.381)
Democratic initiator	-0.062 (0.065)	0.180** (0.080)
Democratic dyads	0.309 (0.128)	0.113 (0.097)
Military power ratio	0.001*** (0.001)	0.001*** (0.001)
Contiguity	-0.099* (0.052)	-0.097* (0.057)
Alliance	-0.248*** (0.053)	-0.290*** (0.070)
Third party with initiator	-0.028*** (0.026)	-0.618*** (0.048)
Reciprocal violence	-0.496*** (0.047)	-0.469*** (0.071)
Initiator's airpower × ln(time)		0.163** (0.058)
Democratic initiator × ln(time)		-0.066*** (0.018)
<b>N</b>	2247	2247
<b>Log likelihood</b>	-15070.52	-15062.92
<b>X<sup>2</sup></b>	288.75	322.47

Standard errors in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table 5-3. Logit Estimation for Decisive Outcomes in MID, 1919-2000**

<i>Variables</i>	<i>Coefficient</i>
Disputant's airpower	1.999 (0.352) ***
Democratic dyads	-0.229 (0.294)
Contiguity	-0.204 (0.168)
Military power ratio	0.001 (0.001) **
Alliance	-0.602 (0.189) ***
Third party	0.172 (0.010) ***
Reciprocal violence	0.098 (0.211)
Constant	-1.876 (0.300) ***
<b>N</b>	2274
<b>Log likelihood</b>	-842.41
<b>X<sup>2</sup></b>	387.61

Standard errors in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%



**Table 5-4. The Duration Model for Disputants' Use of Airpower in MID, 1919-2000**

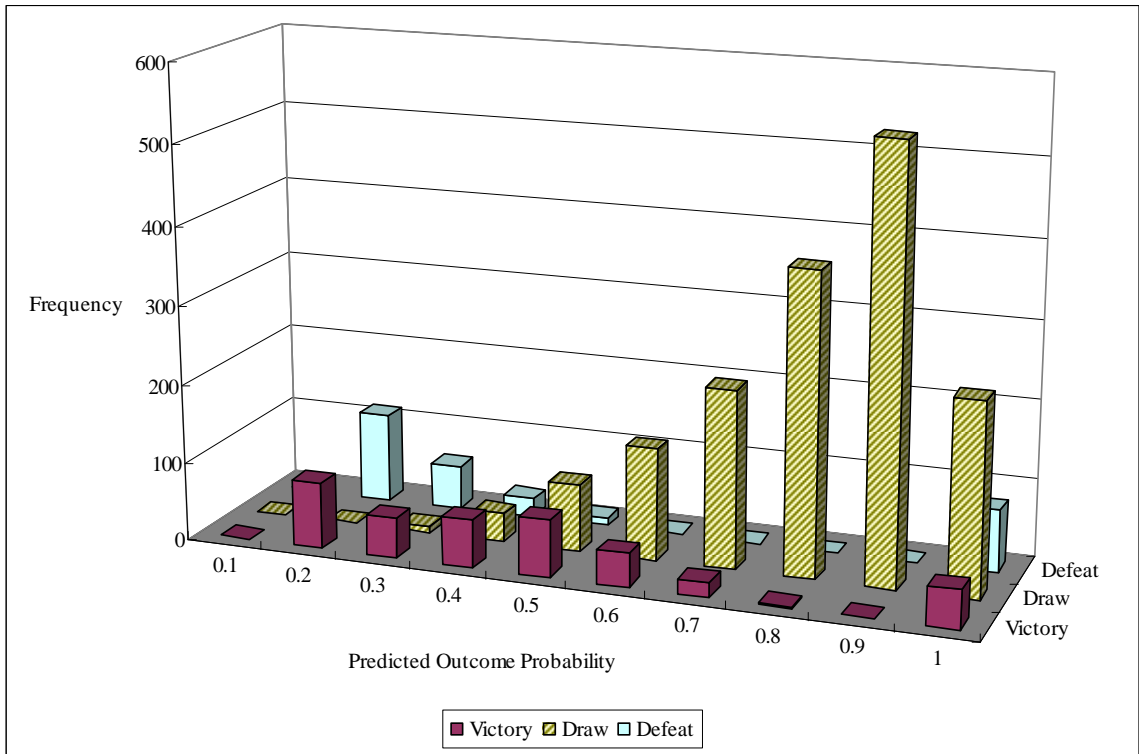
<i>Variables</i>	<i>Model 1</i>	<i>Model 2</i>
Disputants' airpower	-0.649*** (0.053)	-1.848*** (0.338)
Democratic dyads	0.256** (0.131)	0.209** (0.095)
Military power ratio	0.001*** (0.001)	0.001*** (0.001)
Contiguity	-0.091 (0.055)	-0.103* (0.059)
Alliance	-0.242*** (0.057)	-0.241*** (0.071)
Third party	-0.028*** (0.003)	-0.035*** (0.005)
Reciprocal violence	-0.466*** (0.057)	-0.844*** (0.076)
Disputants' airpower × ln(time)		0.228*** (0.064)
Third party × ln(time)		0.002* (0.001)
Reciprocal violence × ln(time)		0.149*** (0.026)
<b>N</b>	2247	2247
<b>Log likelihood</b>	-15095.89	-15076.12
<b>X<sup>2</sup></b>	160.52	309.36

Standard errors in parentheses

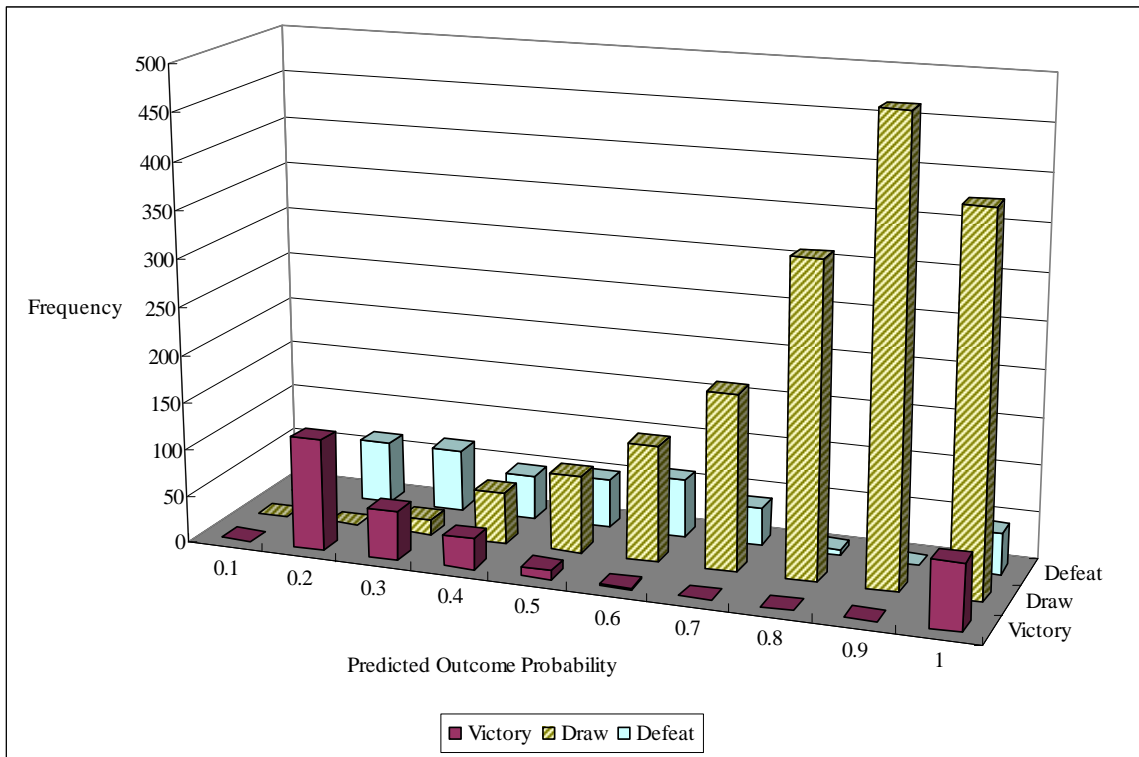
\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%



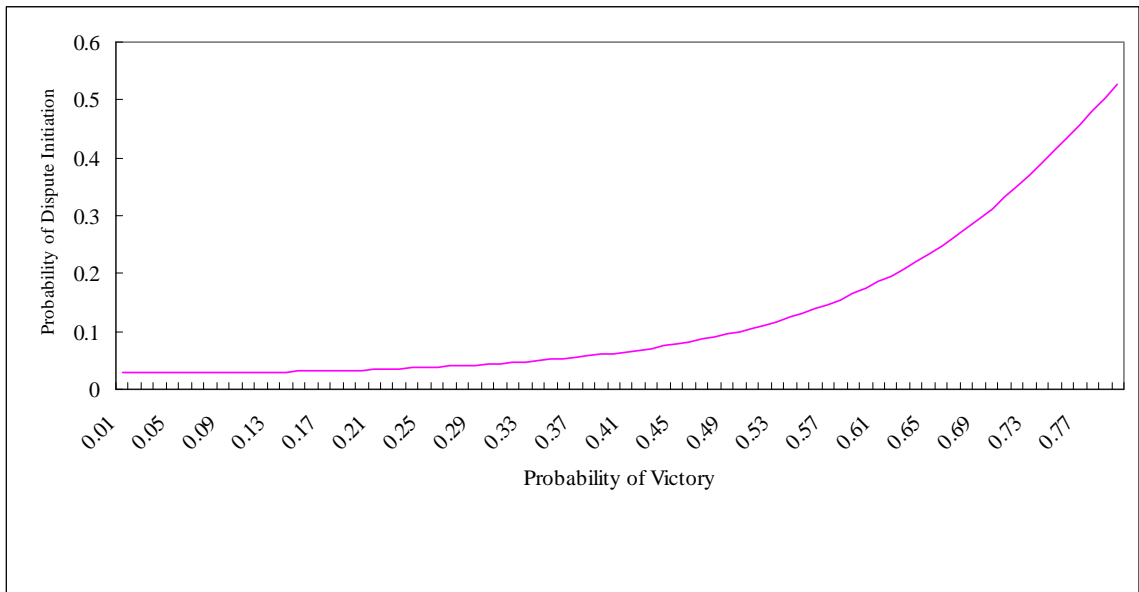
**Figure 2-1 Distribution of Predictions for Observed Outcomes in the Initiator Model**



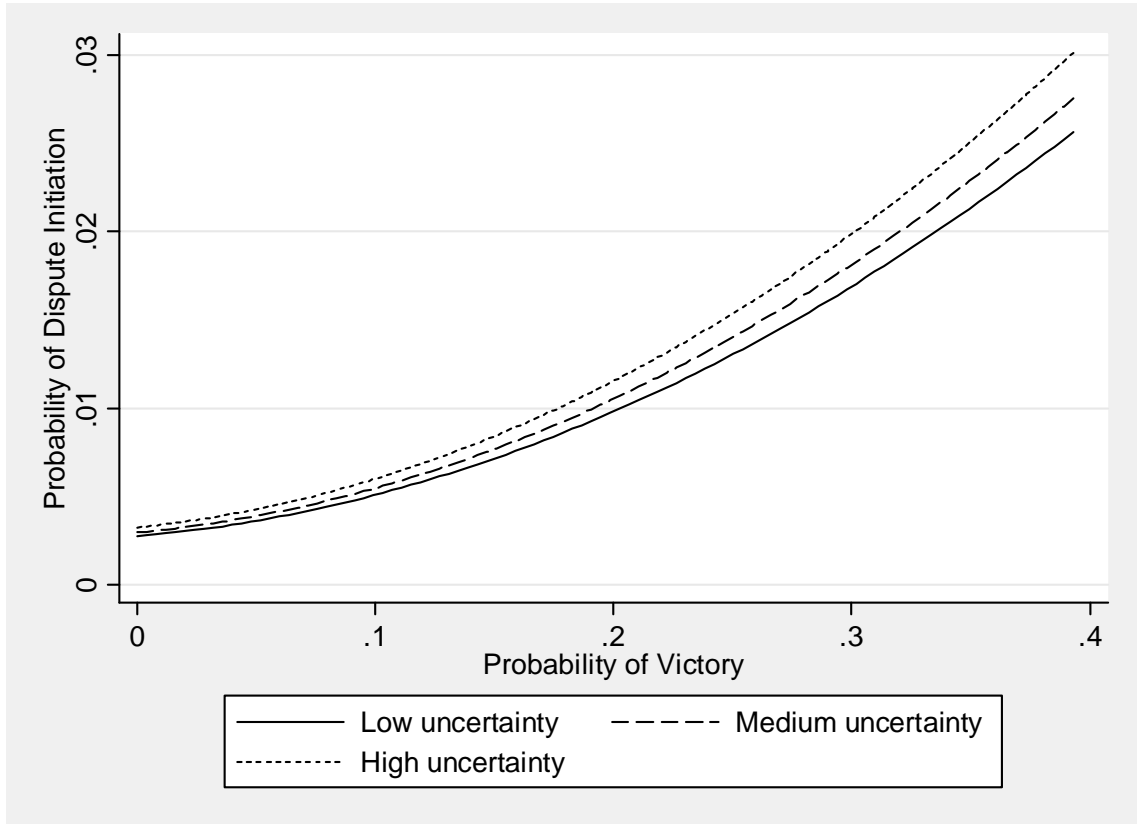
**Figure 2-2. Distribution of Predictions for Observed Outcomes in the Target Model**



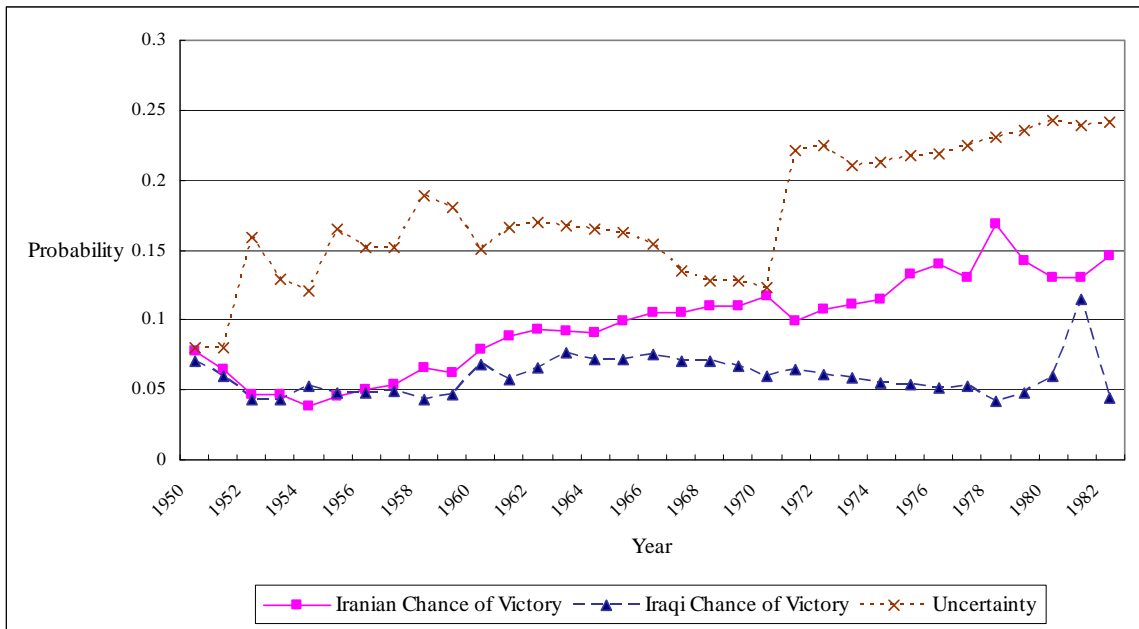
**Figure 3-1. Probability of Dispute Initiation as a Function of Probability of Victory**



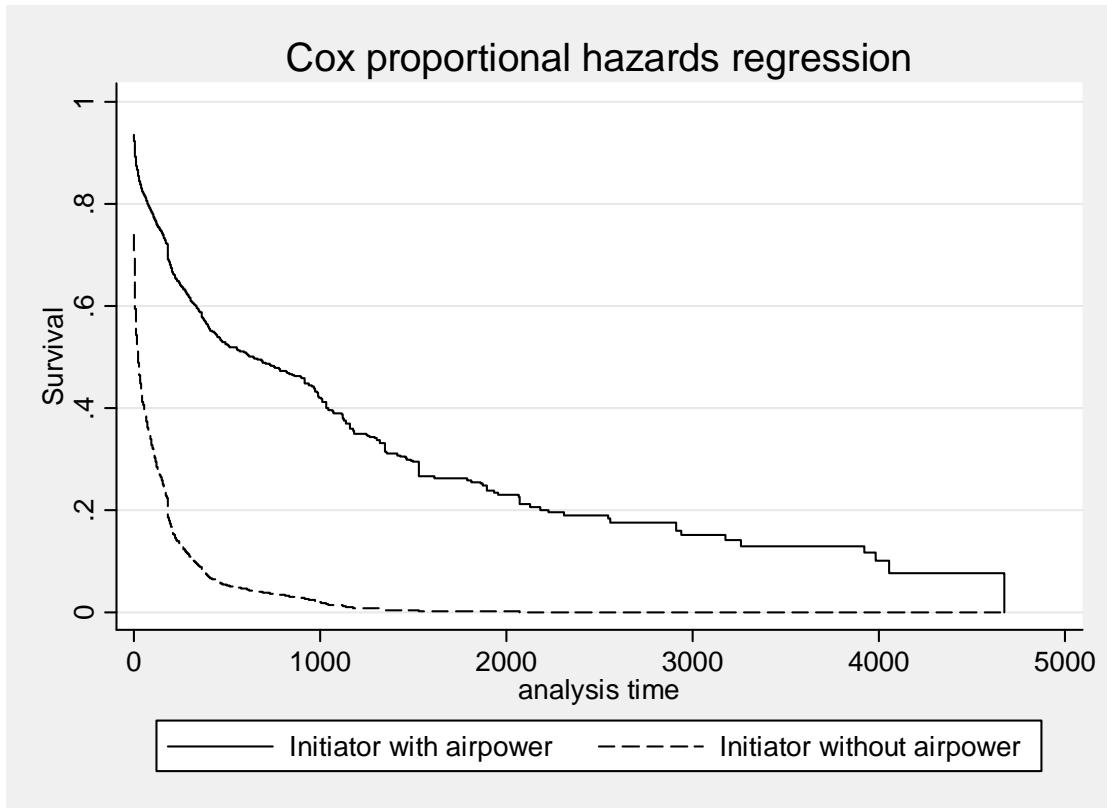
**Figure 3-2. Probability of Dispute Initiation as a Function of Uncertainty and Probability of Victory**



**Figure 3-3. Probability of Victory and Uncertainty in Iran and Iraq, 1950-1982**

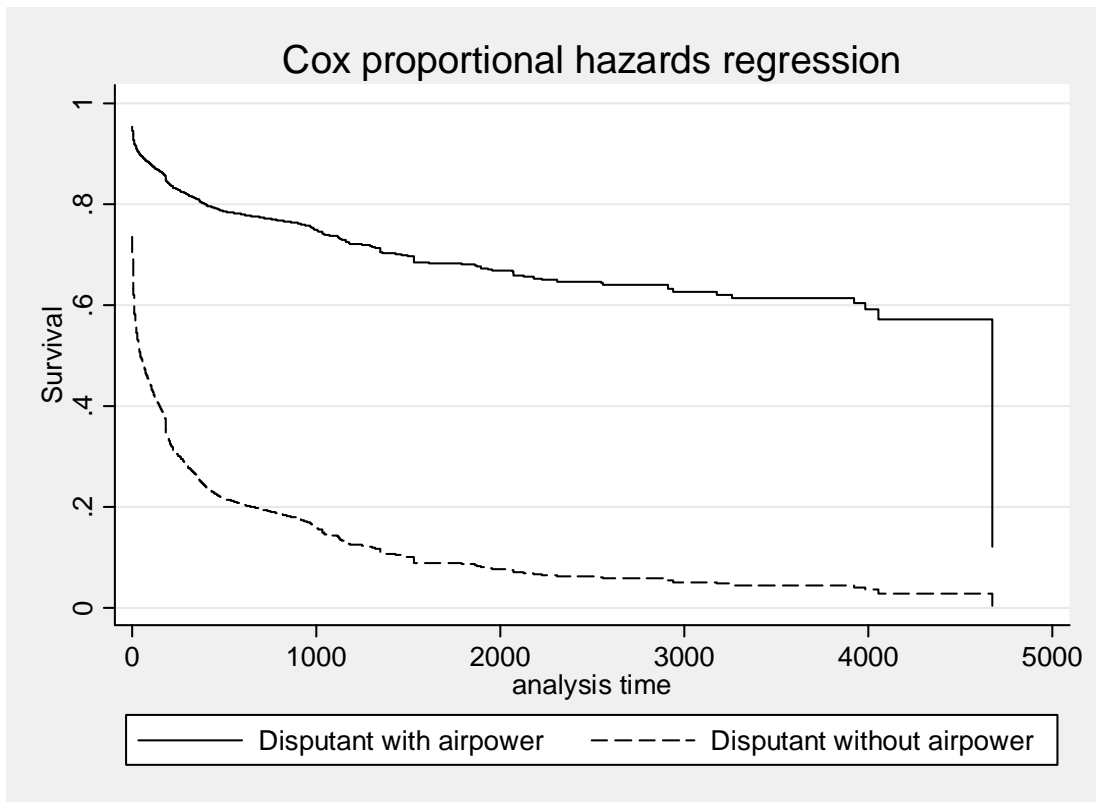


**Figure 5-1. Hazard Ratio by Duration: Initiators' Airpower Variable**





**Figure 5-2. Hazard Ratio by Duration: Disputants' Airpower Variable**



## Appendix A. Arms Control Agreements Associated with MID 1946-2000

<i>Column</i>	<i>Description</i>
<b>MID Number</b>	MID number
<b>COW code A</b>	COW number of state A in dyad
<b>Name A</b>	Abbreviated name of state A
<b>COW code B</b>	COW number of state B in dyad
<b>Name B</b>	Abbreviated name of state B
<b>T1</b>	The Brussels Treaty (1948-1954) / <i>Agency for the Control of Armament*</i>
<b>T2</b>	The Modified Brussels Treaty (1954-present) / <i>Agency for the Control of Armament</i>
<b>T3</b>	The Treaty of Tlatelolco (1967-present) / <i>Agency for the Prohibition of Nuclear Weapons in Latin America</i>
<b>T4</b>	The Treaty of Rarotonga (1985-present) / <i>Consultative Committee</i>
<b>T5</b>	The Stockholm CSBM (1986-present, succession by Vienna CSBM) / <i>Conference on Security and Cooperation in Europe</i>
<b>T6</b>	The INF Treaty (1987-present) / <i>Special Verification Commission</i>
<b>T7</b>	The CFE Treaty (1990-present) / <i>Joint Consultative Group</i>
<b>T8</b>	The Declaration on the Denuclearization of Korea (1992-2002) / <i>Joint Nuclear Control Commission</i>
<b>T9</b>	START I (1991-present) / <i>Joint Compliance and Inspection Commission</i>
<b>T10</b>	The Treaty of Bangkok (1995-present) / <i>International Atomic Energy Agency</i>
<b>T11</b>	The Treaty of Pelindaba (1996-present) / <i>International Atomic Energy Agency</i>
<b>T12</b>	The Florence Agreement (1996-present) / <i>Organization for Security and Cooperation in Europe</i>
<b>Side A A</b>	State A on initiator's side (1: Yes, 0: No)
<b>Side A B</b>	State B on initiator's side (1: Yes, 0: No)

\* *Verification institution or authority*

MID Number	COW code A	Name A	COW code B	Name B	Year	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	Side A A	Side A B
3135	200	UKG	235	POR	1966	0	1	0	0	0	0	0	0	0	0	0	0	1	0
1609	155	CHL	160	ARG	1967	0	0	1	0	0	0	0	0	0	0	0	0	1	0
1115	40	CUB	101	VEN	1967	0	0	1	0	0	0	0	0	0	0	0	0	1	0
2940	40	CUB	101	VEN	1968	0	0	1	0	0	0	0	0	0	0	0	0	0	1
1172	160	ARG	165	URU	1969	0	0	1	0	0	0	0	0	0	0	0	0	1	0
1206	91	HON	92	SAL	1969	0	0	1	0	0	0	0	0	0	0	0	0	0	1
1717	200	UKG	230	SPN	1969	0	1	0	0	0	0	0	0	0	0	0	0	1	0
2239	101	VEN	110	GUY	1969	0	0	1	0	0	0	0	0	0	0	0	0	1	0
2942	90	GUA	92	SAL	1970	0	0	1	0	0	0	0	0	0	0	0	0	1	0
2240	101	VEN	110	GUY	1970	0	0	1	0	0	0	0	0	0	0	0	0	1	0
1189	110	GUY	140	BRA	1975	0	0	1	0	0	0	0	0	0	0	0	0	0	1
2318	110	GUY	115	SUR	1976	0	0	1	0	0	0	0	0	0	0	0	0	0	1
1190	91	HON	92	SAL	1976	0	0	1	0	0	0	0	0	0	0	0	0	1	0
1191	135	PER	155	CHL	1976	0	0	1	0	0	0	0	0	0	0	0	0	0	1
2317	101	VEN	110	GUY	1976	0	0	1	0	0	0	0	0	0	0	0	0	1	0
2081	155	CHL	160	ARG	1977	0	0	1	0	0	0	0	0	0	0	0	0	1	0
2120	130	ECU	135	PER	1977	0	0	1	0	0	0	0	0	0	0	0	0	1	0
2326	110	GUY	115	SUR	1977	0	0	1	0	0	0	0	0	0	0	0	0	1	0
3013	93	NIC	94	COS	1977	0	0	1	0	0	0	0	0	0	0	0	0	1	0
2143	135	PER	155	CHL	1977	0	0	1	0	0	0	0	0	0	0	0	0	0	1
3018	135	PER	155	CHL	1977	0	0	1	0	0	0	0	0	0	0	0	0	1	0
3009	145	BOL	155	CHL	1978	0	0	1	0	0	0	0	0	0	0	0	0	1	0
2082	155	CHL	160	ARG	1978	0	0	1	0	0	0	0	0	0	0	0	0	0	1
2346	93	NIC	94	COS	1978	0	0	1	0	0	0	0	0	0	0	0	0	1	0
2325	91	HON	93	NIC	1979	0	0	1	0	0	0	0	0	0	0	0	0	1	0
2083	155	CHL	160	ARG	1980	0	0	1	0	0	0	0	0	0	0	0	0	1	0
3120	93	NIC	100	COL	1980	0	0	1	0	0	0	0	0	0	0	0	0	0	1
2085	155	CHL	160	ARG	1981	0	0	1	0	0	0	0	0	0	0	0	0	0	1
2084	155	CHL	160	ARG	1981	0	0	1	0	0	0	0	0	0	0	0	0	1	0
2119	130	ECU	135	PER	1981	0	0	1	0	0	0	0	0	0	0	0	0	0	1
2347	91	HON	93	NIC	1981	0	0	1	0	0	0	0	0	0	0	0	0	0	1

MID Number	COW code A	Name A	COW code B	Name B	Year	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	Side A A	Side A B
2237	101	VEN	110	GUY	1981	0	0	1	0	0	0	0	0	0	0	0	0	1	0
2323	100	COL	101	VEN	1982	0	0	1	0	0	0	0	0	0	0	0	0	0	1
2348	70	MEX	90	GUA	1982	0	0	1	0	0	0	0	0	0	0	0	0	0	1
3085	101	VEN	110	GUY	1982	0	0	1	0	0	0	0	0	0	0	0	0	1	0
3058	53	BAR	55	GRN	1983	0	0	1	0	0	0	0	0	0	0	0	0	1	0
2983	140	BRA	160	ARG	1983	0	0	1	0	0	0	0	0	0	0	0	0	0	1
2086	155	CHL	160	ARG	1983	0	0	1	0	0	0	0	0	0	0	0	0	0	1
3058	40	CUB	58	AAB	1983	0	0	1	0	0	0	0	0	0	0	0	0	0	1
3058	40	CUB	53	BAR	1983	0	0	1	0	0	0	0	0	0	0	0	0	0	1
3058	40	CUB	54	DMA	1983	0	0	1	0	0	0	0	0	0	0	0	0	0	1
3058	40	CUB	51	JAM	1983	0	0	1	0	0	0	0	0	0	0	0	0	0	1
3058	40	CUB	56	SLU	1983	0	0	1	0	0	0	0	0	0	0	0	0	0	1
3058	40	CUB	57	SVG	1983	0	0	1	0	0	0	0	0	0	0	0	0	0	1
3058	54	DMA	55	GRN	1983	0	0	1	0	0	0	0	0	0	0	0	0	1	0
3058	55	GRN	58	AAB	1983	0	0	1	0	0	0	0	0	0	0	0	0	0	1
3058	55	GRN	56	SLU	1983	0	0	1	0	0	0	0	0	0	0	0	0	0	1
3058	55	GRN	57	SVG	1983	0	0	1	0	0	0	0	0	0	0	0	0	0	1
3058	51	JAM	55	GRN	1983	0	0	1	0	0	0	0	0	0	0	0	0	1	0
2349	93	NIC	94	COS	1983	0	0	1	0	0	0	0	0	0	0	0	0	1	0
2087	155	CHL	160	ARG	1984	0	0	1	0	0	0	0	0	0	0	0	0	0	1
2118	130	ECU	135	PER	1984	0	0	1	0	0	0	0	0	0	0	0	0	0	1
2541	220	FRN	230	SPN	1984	0	1	0	0	0	0	0	0	0	0	0	0	1	0
2350	70	MEX	90	GUA	1984	0	0	1	0	0	0	0	0	0	0	0	0	0	1
2352	91	HON	92	SAL	1985	0	0	1	0	0	0	0	0	0	0	0	0	1	0
2546	93	NIC	94	COS	1985	0	0	1	0	0	0	0	0	0	0	0	0	1	0
2356	100	COL	101	VEN	1986	0	0	1	0	0	0	0	0	0	0	0	0	0	1
2597	260	GFR	315	CZE	1986	0	0	0	0	1	0	0	0	0	0	0	0	0	1
2354	41	HAI	42	DOM	1986	0	0	1	0	0	0	0	0	0	0	0	0	0	1
2353	91	HON	93	NIC	1986	0	0	1	0	0	0	0	0	0	0	0	0	0	1
2573	93	NIC	94	COS	1986	0	0	1	0	0	0	0	0	0	0	0	0	1	0
2598	200	UKG	230	SPN	1986	0	1	0	0	1	0	0	0	0	0	0	0	0	1

MID Number	COW code A	Name A	COW code B	Name B	Year	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	Side A A	Side A B
2233	2	USA	365	RUS	1986	0	0	0	0	1	0	0	0	0	0	0	0	1	0
3637	2	USA	365	RUS	1986	0	0	0	0	1	0	0	0	0	0	0	0	0	1
2737	20	CAN	220	FRN	1987	0	0	0	0	1	0	0	0	0	0	0	0	1	0
2812	100	COL	101	VEN	1987	0	0	1	0	0	0	0	0	0	0	0	0	1	0
2816	260	GFR	290	POL	1987	0	0	0	0	1	0	0	0	0	0	0	0	0	1
2736	41	HAI	42	DOM	1987	0	0	1	0	0	0	0	0	0	0	0	0	0	1
2735	93	NIC	94	COS	1987	0	0	1	0	0	0	0	0	0	0	0	0	1	0
2827	365	RUS	385	NOR	1987	0	0	0	0	1	0	0	0	0	0	0	0	1	0
2738	365	RUS	380	SWD	1987	0	0	0	0	1	0	0	0	0	0	0	0	1	0
2773	20	CAN	220	FRN	1988	0	0	0	0	1	0	0	0	0	0	0	0	1	0
2768	100	COL	101	VEN	1988	0	0	1	0	0	0	0	0	0	0	0	0	1	0
2770	94	COS	95	PAN	1988	0	0	1	0	0	0	0	0	0	0	0	0	0	1
2771	91	HON	93	NIC	1988	0	0	1	0	0	0	0	0	0	0	0	0	1	0
3905	91	HON	93	NIC	1989	0	0	1	0	0	0	0	0	0	0	0	0	1	0
3904	91	HON	92	SAL	1989	0	0	1	0	0	0	0	0	0	0	0	0	0	1
3900	2	USA	20	CAN	1989	0	0	0	0	1	0	0	0	0	0	0	0	0	1
3976	305	AUS	345	YUG	1991	0	0	0	0	1	0	0	0	0	0	0	0	0	1
3987	130	ECU	135	PER	1991	0	0	1	0	0	0	0	0	0	0	0	0	0	1
3977	310	HUN	345	YUG	1991	0	0	0	0	1	0	0	0	0	0	0	0	0	1
3972	2	USA	20	CAN	1991	0	0	0	0	1	0	1	0	0	0	0	0	1	0
3564	371	ARM	373	AZE	1992	0	0	0	0	0	0	1	0	0	0	0	0	1	0
3551	211	BEL	345	YUG	1992	0	0	0	0	1	0	0	0	0	0	0	0	1	0
3551	20	CAN	345	YUG	1992	0	0	0	0	1	0	0	0	0	0	0	0	1	0
3551	220	FRN	345	YUG	1992	0	0	0	0	1	0	0	0	0	0	0	0	1	0
3551	255	GMY	345	YUG	1992	0	0	0	0	1	0	0	0	0	0	0	0	1	0
3551	325	ITA	345	YUG	1992	0	0	0	0	1	0	0	0	0	0	0	0	1	0
3553	223	LIE	225	SWZ	1992	0	0	0	0	1	0	0	0	0	0	0	0	0	1
3558	359	MLD	365	RUS	1992	0	0	0	0	0	0	1	0	0	0	0	0	0	1
3551	210	NTH	345	YUG	1992	0	0	0	0	1	0	0	0	0	0	0	0	1	0
3575	910	PNG	940	SOL	1992	0	0	0	1	0	0	0	0	0	0	0	0	1	0
3551	235	POR	345	YUG	1992	0	0	0	0	1	0	0	0	0	0	0	0	1	0

MID Number	COW code A	Name A	COW code B	Name B	Year	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	Side A A	Side A B
3570	731	PRK	732	ROK	1992	0	0	0	0	0	0	0	1	0	0	0	0	1	0
3561	365	RUS	372	GRG	1992	0	0	0	0	0	0	1	0	0	0	0	0	1	0
3563	365	RUS	380	SWD	1992	0	0	0	0	1	0	0	0	0	0	0	0	1	0
3551	230	SPN	345	YUG	1992	0	0	0	0	1	0	0	0	0	0	0	0	1	0
3551	200	UKG	345	YUG	1992	0	0	0	0	1	0	0	0	0	0	0	0	1	0
3551	2	USA	345	YUG	1992	0	0	0	0	1	0	0	0	0	0	0	0	1	0
3551	345	YUG	390	DEN	1992	0	0	0	0	1	0	0	0	0	0	0	0	0	1
3551	345	YUG	350	GRC	1992	0	0	0	0	1	0	0	0	0	0	0	0	1	1
3564	371	ARM	640	TUR	1993	0	0	0	0	0	0	1	0	0	0	0	0	0	1
4014	80	BLZ	90	GUA	1993	0	0	1	0	0	0	0	0	0	0	0	0	1	0
4016	41	HAI	160	ARG	1993	0	0	1	0	0	0	0	0	0	0	0	0	1	0
4010	91	HON	92	SAL	1993	0	0	1	0	0	0	0	0	0	0	0	0	1	0
4051	359	MIL	365	RUS	1993	0	0	0	0	0	0	1	0	0	0	0	0	0	1
4075	910	PNG	940	SOL	1993	0	0	0	1	0	0	0	0	0	0	0	0	1	0
4106	290	POL	365	RUS	1993	0	0	0	0	1	0	1	0	0	0	0	0	0	1
4022	731	PRK	732	ROK	1993	0	0	0	0	0	0	0	1	0	0	0	0	1	0
4021	731	PRK	732	ROK	1993	0	0	0	0	0	0	0	1	0	0	0	0	1	0
3564	365	RUS	373	AZE	1993	0	0	0	0	0	0	1	0	0	0	0	0	1	0
3564	365	RUS	640	TUR	1993	0	0	0	0	0	0	1	0	0	0	0	0	0	1
4219	100	COL	101	VEN	1994	0	0	1	0	0	0	0	0	0	0	0	0	0	1
4040	350	GRC	640	TUR	1994	0	0	0	0	0	0	1	0	0	0	0	0	0	1
4016	41	HAI	42	DOM	1994	0	0	1	0	0	0	0	0	0	0	0	0	1	0
4332	310	HUN	345	YUG	1994	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4145	93	NIC	100	COL	1994	0	0	1	0	0	0	0	0	0	0	0	0	1	0
4087	731	PRK	732	ROK	1994	0	0	0	0	0	0	0	1	0	0	0	0	1	0
4050	365	RUS	369	UKR	1994	0	0	0	0	0	0	1	0	0	0	0	0	1	0
4046	2	USA	345	YUG	1994	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4318	371	ARM	373	AZE	1995	0	0	0	0	0	0	1	0	0	0	0	0	1	0
4015	80	BLZ	90	GUA	1995	0	0	1	0	0	0	0	0	0	0	0	0	1	0
4031	20	CAN	230	SPN	1995	0	0	0	0	1	0	1	0	0	0	0	0	1	0
4009	100	COL	101	VEN	1995	0	0	1	0	0	0	0	0	0	0	0	0	0	1

MID Number	COW code A	Name A	COW code B	Name B	Year	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	Side A A	Side A B	
4143	130	ECU	135	PER	1995	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
4013	130	ECU	135	PER	1995	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0
4092	350	GRC	640	TUR	1995	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
4012	91	HON	93	NIC	1995	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0
4011	91	HON	93	NIC	1995	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
4102	310	HUN	345	YUG	1995	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
4002	775	MYA	800	THI	1995	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
4146	93	NIC	94	COS	1995	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
4008	800	THI	816	VTM	1995	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
4319	371	ARM	373	AZE	1996	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
4086	355	BUL	705	KZK	1996	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
4004	811	CAM	816	VTM	1996	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
4309	437	CDI	438	GUI	1996	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
4231	344	CRO	346	BOS	1996	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
4095	350	GRC	640	TUR	1996	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0
4109	372	GRG	373	AZE	1996	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
4003	775	MYA	800	THI	1996	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0
4076	910	PNG	940	SOL	1996	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
4173	365	RUS	640	TUR	1996	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
4098	365	RUS	369	UKR	1996	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
4149	52	TRI	101	VEN	1996	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
4150	80	BLZ	90	GUA	1997	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0
4135	800	CAM	811	THI	1997	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0
4172	100	COL	101	VEN	1997	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
4230	344	CRO	345	YUG	1997	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
4144	130	ECU	135	PER	1997	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0
4323	350	GRC	640	TUR	1997	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
4193	350	GRC	640	TUR	1997	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
4171	91	HON	93	NIC	1997	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
4107	290	POL	365	RUS	1997	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1
4108	360	RUM	369	UKR	1997	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1

MID Number	COW code A	Name A	COW code B	Name B	Year	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	Side A A	Side A B
4096	365	RUS	372	GRG	1997	0	0	0	0	0	0	1	0	0	0	0	0	1	0
4153	92	SAL	93	NIC	1997	0	0	1	0	0	0	0	0	0	0	0	0	1	0
4154	52	TRI	101	VEN	1997	0	0	1	0	0	0	0	0	0	0	0	0	0	1
4183	2	USA	20	CAN	1997	0	0	0	0	1	0	1	0	0	0	0	0	0	1
4174	2	USA	365	RUS	1997	0	0	0	0	1	1	1	0	1	0	0	0	1	0
4175	371	ARM	373	AZE	1998	0	0	0	0	0	0	1	0	0	0	0	0	1	0
4137	211	BEL	345	YUG	1998	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4137	20	CAN	345	YUG	1998	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4189	130	ECU	135	PER	1998	0	0	1	0	0	0	0	0	0	0	0	0	1	0
4137	220	FRN	345	YUG	1998	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4137	255	GER	345	YUG	1998	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4137	325	ITL	345	YUG	1998	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4137	212	LUX	345	YUG	1998	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4147	93	NIC	94	COS	1998	0	0	1	0	0	0	0	0	0	0	0	0	1	0
4137	210	NTH	345	YUG	1998	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4137	235	POR	345	YUG	1998	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4321	365	RUS	385	NOR	1998	0	0	0	0	1	0	1	0	0	0	0	0	0	1
4137	230	SPN	345	YUG	1998	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4137	200	UKG	345	YUG	1998	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4137	2	USA	345	YUG	1998	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4329	816	VTM	840	PHI	1998	0	0	0	0	0	0	0	0	0	1	0	0	0	1
4137	345	YUG	390	DEN	1998	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4137	345	YUG	350	GRC	1998	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4137	345	YUG	395	ICE	1998	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4137	345	YUG	385	NOR	1998	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4137	345	YUG	365	RUS	1998	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4342	211	BEL	365	RUS	1999	0	0	0	0	1	0	1	0	0	0	0	0	0	1
4342	20	CAN	365	RUS	1999	0	0	0	0	1	0	1	0	0	0	0	0	0	1
4137	316	CZR	345	YUG	1999	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4342	220	FRN	365	RUS	1999	0	0	0	0	1	0	1	0	0	0	0	0	0	1
4342	255	GER	365	RUS	1999	0	0	0	0	0	0	1	0	0	0	0	0	0	1



MID Number	COW code A	Name A	COW code B	Name B	Year	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	Side A A	Side A B	
4133	350	GRC	640	TUR	1999	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
4140	91	HON	93	NIC	1999	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
4137	310	HUN	345	YUG	1999	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
4342	325	ITL	365	RUS	1999	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1
4138	775	MYA	800	THI	1999	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0
4342	210	NTH	365	RUS	1999	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1
4137	290	POL	345	YUG	1999	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
4342	235	POR	365	RUS	1999	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1
4125	731	PRK	732	ROK	1999	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
4338	365	RUS	373	AZE	1999	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
4342	365	RUS	390	DEN	1999	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
4212	365	RUS	372	GRG	1999	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
4342	365	RUS	385	NOR	1999	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
4335	365	RUS	385	NOR	1999	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1
4344	365	RUS	640	TUR	1999	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
4342	365	RUS	640	TUR	1999	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
4342	230	SPN	365	RUS	1999	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1
4155	52	TRI	101	VEN	1999	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
4342	200	UKG	365	RUS	1999	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1
4334	200	UKG	365	RUS	1999	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0
4342	2	USA	365	RUS	1999	0	0	0	0	1	1	1	0	1	0	0	0	0	0	1
4260	101	VEN	110	GUY	1999	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0
4330	816	VTM	840	PHI	1999	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0
4232	371	ARM	373	AZE	2000	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
4221	371	ARM	640	TUR	2000	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
4343	305	AUS	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
4186	211	BEL	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
4343	211	BEL	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
4151	80	BLZ	90	GUA	2000	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
4152	80	BLZ	90	GUA	2000	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
4197	20	CAN	365	RUS	2000	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1

MID Number	COW code A	Name A	COW code B	Name B	Year	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	Side A A	Side A B
4295	20	CAN	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4186	20	CAN	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4343	20	CAN	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4262	100	COL	101	VEN	2000	0	0	1	0	0	0	0	0	0	0	0	0	0	1
4298	344	CRO	345	YUG	2000	0	0	0	0	0	0	0	0	0	0	0	1	0	0
4343	220	FRN	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4186	220	FRN	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4186	255	GER	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4343	255	GMY	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4210	350	GRC	640	TUR	2000	0	0	0	0	0	0	1	0	0	0	0	0	0	1
4156	110	GUY	115	SUR	2000	0	0	1	0	0	0	0	0	0	0	0	0	0	1
4157	110	GUY	115	SUR	2000	0	0	1	0	0	0	0	0	0	0	0	0	0	1
4141	91	HON	93	NIC	2000	0	0	1	0	0	0	0	0	0	0	0	0	1	0
4343	310	HUN	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4186	310	HUN	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4343	205	IRE	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4343	325	ITA	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4186	325	ITL	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4186	212	LUX	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4343	212	LUX	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4186	210	NTH	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4343	210	NTH	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4343	290	POL	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4186	290	POL	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4186	235	POR	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4343	235	POR	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4218	731	PRK	732	ROK	2000	0	0	0	0	0	0	0	1	0	0	0	0	1	0
4221	365	RUS	640	TUR	2000	0	0	0	0	0	0	1	0	0	0	0	0	0	1
4186	230	SPN	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4343	230	SPN	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4343	225	SWZ	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	0	1

MID Number	COW code A	Name A	COW code B	Name B	Year	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	Side A A	Side A B
4343	200	UKG	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4295	200	UKG	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4186	200	UKG	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4197	2	USA	365	RUS	2000	0	0	0	0	1	1	1	0	1	0	0	0	0	1
4220	2	USA	365	RUS	2000	0	0	0	0	1	1	1	0	1	0	0	0	0	1
4343	2	USA	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4298	2	USA	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4186	2	USA	345	YUG	2000	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4343	345	YUG	355	BUL	2000	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4343	345	YUG	390	DEN	2000	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4186	345	YUG	390	DEN	2000	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4343	345	YUG	375	FIN	2000	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4343	345	YUG	350	GRC	2000	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4186	345	YUG	350	GRC	2000	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4343	345	YUG	395	ICE	2000	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4186	345	YUG	395	ICE	2000	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4343	345	YUG	385	NOR	2000	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4186	345	YUG	385	NOR	2000	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4186	345	YUG	360	ROM	2000	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4343	345	YUG	365	RUS	2000	0	0	0	0	1	0	0	0	0	0	0	0	1	0
4343	345	YUG	380	SWD	2000	0	0	0	0	1	0	0	0	0	0	0	0	1	0

### Appendix B. Interstate Airpower Coercion 1919-2000

Attacker	Target	Date	Data Source	Associated MID Number
Britain	Turkey	1922-1924	Pape	328
Italy	Ethiopia	1936	Pape	111
Germany/Italy	Spanish loyalists	1936-1939	Pape	210
Japan	China	1937-1945	Pape	157
Germany	Britain/France	1938	Pape	12
Germany	Poland	1939	Pape	258
Germany	Britain/France	1939	Pape	258
USSR	Finland	1939-1940	Pape	179
Germany	Netherlands	1940	Pape	258
Germany	Britain	1940-1941	Pape	258
United States/Britain	Germany	1942-1944	Pape	258
United States	Germany	1945	Pape	258
United States	Italy	1943	Pape	258
Germany	Britain	1944-1945	Pape	258
United States	Japan	1944-1945	Pape	258
United States	North Korea/China	1950-1951	Pape	51/2052

### Appendix B - continued

Attacker	Target	Date	Data Source	Associated MID Number
China	Taiwan	1954	Flintham	2987
France	Algeria	1954-1962	Pape	N.A
Britain/France	Egypt	1956	Pape	200
USSR	Britain/France	1956	Pape	200
USSR	Hungary	1956	Flintham	606
France	Tunisia	1958	Flintham	266
Taiwan	China	1958	Flintham	173
France	Tunisia	1961	Flintham	28
United States	Dominican Republic	1961-1962	Byman et al.	1801
United States	USSR	1962	Pape	61
United States	Cuba	1962	Byman et al.	61
Turkey	Cyprus	1964	Flintham	N.A
United States	North Vietnam	1965-1968	Pape	611
Israel	Egypt	1969-1970	Pape	3387
Israel	Lebanon	1970-1982	Byman et al.	1061/3994
United States	North Vietnam	1972	Pape	611
Turkey	Cyprus	1974	Flintham	1293
Iran	Iraq	1974-1975	Byman et al.	1134
USSR	Afghanistan	1979-1988	Pape	2053/2054
USSR	Pakistan	1979-1986	Pape	N.A

### Appendix B - continued

Attacker	Target	Date	Data Source	Associated MID Number
Iraq	Iran	1980-1988	Pape	2115
Israel	Iraq	1981	Flintham	3101
Britain	Argentina	1982	Byman et al.	3630
Israel	Lebanon	1982-1999	Byman et al.	4182
Israel	Syria	1982	Flintham	3995/3442
United States	Iran	1987-1988	Byman et al.	2740
United States	Libya	1986	Pape	3636
United States	Iraq	1991	Pape	3957
Iraq	Saudi Arabia	1991	Pape	N.A
Iraq	Israel	1991	Pape	N.A
United States	Iraq	1991-1998	Byman et al.	3974/3552/3568/4299
				4269/4270/4271/4273
United States	Haiti	1994	Byman et al.	4016
NATO	Bosnian Serb	1995	Byman et al.	N.A
NATO	Yugoslavia	1999	New	4137

\*Pape: Pape's (1996) cases

\*Byman et al.: Byman, Waxman, and Larson's (1999) cases that are not included in Pape's cases

\*Flintham: Flintham's (1990) cases

\*New: coded by author

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