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Superpower rivalry in the Third World, 1948–1978: A systematic analysis of the dynamics of the U.S.-Soviet foreign policy interaction and its consequences

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Superpower Rivalry in the Third World, 1948-1978:
A Systematic Analysis of the Dynamics of the U.S.-Soviet Foreign Policy Interaction and its Consequences

DISSERTATION

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by

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To Mother

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This dissertation is a product of my seven-year long graduate study. Although I am alone responsible for every error, many people deserve credit for every merit in this work. Limited space would not allow me to do justice to all of them, including Dr. Yongjin Song and his family whose long frieldship and help have always been a fond part of my often rough memory, and the Department of Political Science of the Ohio State Univesity, chaired by Professor Randall Ripley, who kindly provided funding for my graduate study for five years and a trip to Ann Arbor for ICPSR Summer program.

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a spontaneous and natural process of reasoning on my part than an explicit guidance of his as advisor. Such an influence has been formed through my long association with him and his seminars on the CREON (Comparative Research on Events Of Nations) project as a student and as a research assistant. As advisor, his role has been helping me turn so acquired analytic skills into a research product. He has done a job which deserves credit for what I am and what I have done. I owe him my degree.

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The story of Mencius' mother, who moved three times for her son's education, a classic showing the commitment of a mother to her child's education. The story of mother of Han Seok-Bong, one of the greatest scriptors in Korean history, shows how dedicated she was to her son's education. The diary of Sha-Im-Dang Shin, mother of Yi Yul-Gok who was one of two greatest scholars in Korean history, shows how consistent she had been toward her son's education. To me, my mother is well beyond all three combined. Having been widowed in the wake of tragic history of modern Korea without a fortune had not discouraged her commitment to her son's education. Aging has not kept her from dedicated prayers and hard work. Being separated from her only son by the Pacific Ocean for seven long years did not disturb her consistent wishes for the child's success in education. She deserves far more than this work. Only if I could do more!

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CHAPTER I
INTRODUCTION

Statement of the Problem

Although the analogy of the Hobbesian state of nature, i.e., the state of war, may be a somewhat exaggerated description of the conflictual nature of international politics (Bull, 1966; Hoffmann, 1965), it certainly bears a bit of truth that large scale social conflict, with interstate wars as typical examples, have characterized international politics in the most fundamental manner. In the decades following World War II, the largest war that human species ever experienced, two types of conflict have characterized the world; one is that between two superpowers with unprecedented level of armament and tightly aligned allies. While it has hardly involved any direct military confrontation, it was as hostile as war and has shaped the fate of international politics in the era in a most profound way. The other one is relatively limited in scope but usually involves direct military clashes; interstate and/or intrastate wars. For whatever reasons, most of those non-superpower conflict were waged in the regions which are collectively called the Third World.

This research addresses where these two prominent types of contemporary conflict meet; the superpower rivalry and competition in the Third World. While two superpowers have continued to compete in various areas to produce a state of ever-increased insecurity, the rivalry is often provoked into a direct or indirect confrontation by events in the Third World. If the Arab-Israeli wars are examples in which two superpowers were involved by supporting opposing sides of an interstate war, the Angolan case of 1975 is an example of superpower intervention in an intrastate war. Examples are numerous, and I regard this intersection of two conflicts as especially problematic because (1) given the antagonism between, and the level of armaments of the superpowers, the competition could lead to direct superpower confrontation with a dreadful prospect of escalation into nuclear showdown, (2) it may also result in protracted/escalated conflict in the Third World, and thereby (3) it very likely could accelerate the trend of militarization and political instability in the region. This research examines this *problematic* sequence of events.

The issue in question is problematic not just from a practical perspective, however. It is also theoretically challenging to the students of international politics and foreign policy analysts alike because of the multiplicity and complexity of causal network among phenomena involved. Given the importance of the subject and apparent abundance of existing literature on this and related subjects, however, it is rather surprising to note that we hardly have any systematic effort to uncover the underlying process of the phenomenon and its theoretical underpinnings. Rather, most of the existing studies deal with specific cases of events, countries, or regions in one or more issue areas.[1] This research orientation is perhaps due to the complexity of the phenomenon which requires that one or more variables be held constant or assumed given so that some other aspects of interest are more closely investigated. On the contrary, this study attempts to be a *systematic* investigation of the problem in question.

Basically, this research is an effort to build a 'model' of the dynamic process of superpower foreign policy interaction in the Third World and its consequences. In building and analyzing the model, this study differs from many of existing approaches. It is particularly characterized by the following aspects. First, this study maintains a *symmetric focus* on both of the superpowers. Second, its *scope* is *global* or *systemic* rather than regional, and *comprehensive* and *systematic* in that most of the pertinent factors are taken into account. And finally, the *units of analysis* are behaviors and attributes conceived and measured at aggregate level, rather than discrete events.

Specifically, the model is a multi-level econometric model of a design of *three-block, block-recursive system of structural equations* representing the dynamics of superpower rivalry at three different levels.

1. *Domestic Level*: changing foreign policy dispositions of superpowers as a dynamic function of (1) domestic politico-economic conditions, (2) superpowers' political, economic interests in the Third World regions, and (3) bilateral military balance and political/diplomatic climate.

2. *Regional Level*: changing foreign policy activities and commitment by superpowers in the Third World regions as a dynamic function of (1) the rival's activity and commitment, (2) foreign policy dispositions of respective superpowers, and (3) regional political conflicts. Also, it contains models for the regional inter- and intrastate conflict as dynamic function of (1) superpowers' foreign policy competition in the region, (2) conflict linkage between inter- and intrastate conflicts, and (3) existing local sources of conflict.

3. *Systemic/Strategic Level*: changing military capabilities and dyadic conflict behaviors as dynamic function of (1) the rival's corresponding capabilities and conflict behaviors, and (2) foreign policy interaction and competition in the Third World region.

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[1] Recent studies in this tradition include Litwak and Wells (1988) and Spiegel, et al. (1988).

The Subjects

In developing and analyzing the model, I particularly ask and try to answer the following set of questions.

1. Is there any discernible *pattern of competitive interaction* between superpowers with respect to their foreign policy activities in the Third World over the long run?

2. If any, what are *factors* and *processes* which underlie such patterns of interaction?

3. What are the *consequences* of superpower competition in the Third World for (*a*) the local conflicts in the Third World and (*b*) for general conflict and cooperation for the superpower dyad?

PATTERNS OF INTERACTION: TWO EXAMPLES

In his classic book, Jervis (1976: 58ff) presents two models of strategic interaction between two powers; (*a*) the 'deterrence' model and (*b*) the 'spiral' model. The 'deterrence' model depicts the strategic interaction between two powers with asymmetric powers and interests, and most of all, different policy motives; a defender is a status quo power and a potential attacker is an imperialist or revisionist power. Facing an imminent or potential attack on a third party by the attacker, the defender threatens the attacker with firm and resolute policy stance implying retaliatory action or escalation of the conflict to an unacceptable level such that potential costs outweigh expected benefits, and the rational attacker is deterred from such an attack. If successful, the pattern of interaction will be an *alternative* or *submissive* scheme of action-reaction where an actor's high level action and commitment is matched by disproportionately low level of action and withdrawal of commitment by the opponent.

Yet, Jervis is quick to notice that deterrence attempt always runs the risk of provoking angry and vehement response and a matching commitment by the initiator, and thereby a conflict spiral. Whereas a defender sees in the opponent an unlimited lust for power in an extreme case or probing or opportunistic motive in a less extreme case, the initiator might be no less likely motivated to act because of the constant feeling of insecurity in the anarchical setting of international environment plus perceived threat in a particular situation. If this is the case, one's deterrent action out of an essentially defensive motive can provoke a vicious cycle of conflict spiral and a deep rooted security dilemma, one of the fundamental predicaments in modern international politics. In this 'spiral' model of interaction, the pattern of interaction will be *reciprocative* or *reactive* scheme of action-reaction where an actor's high level action and commitment is followed by matching commitment by the other.

What is striking here for both policy makers and analysts is that there is hardly any way to know whether an observed pattern of mutually reciprocative interaction, and ensuing crisis escalation is due to a deterrence failure or a mutual threat. What is even more striking is that two different explanations of conflict escalation yield conflicting policy prescriptions; failed deterrence prescribes more coercive policy stance whereas 'spiral' model prescribes conciliatory policy. Identification of the pattern of interaction thus is not enough. Behavioral pattern would be the same, but, explanations and policy prescriptions from two different models are fundamentally different and contradictory.

THEORETICAL UNDERPINNINGS AND POLICY PRESCRIPTIONS

The deterrence theory[2] is based on the premises and axioms from the rational choice paradigm where the actors are nation-states whose leaders are able to calculate relative size of expected benefits and costs and act accordingly (e.g., Achen and Snidal, 1989).[3] According to the literature in this tradition, the key to successful deterrence, generally defined as "dissuasion by means of threat," is the credibility of the threat. And, the credibility of the threat is, of course, the function of relative power. Bullying by the weaker is nothing but a paradox. But no less important is the defender's stake in a given situation. In ordinary circumstances, one cannot expect the opponent not to risk net loss of utility, and at the same time expect him to believe oneself willing to risk net loss (Russett, 1963).

Most important of all, however, is the reputation of the actor built around its past behaviors and bargaining strategy. In a 'Chicken' like situation where nobody gains from mutual confrontation, it is even paradoxical to note such an observation that "[i]t may be safer in the long run to hew to the center of the road than to yield" because it would "save both parties a collision" (Schelling, 1966, cited in Jervis, 1976: 59). That is to say, in a tightly interconnected world where similar situations repeatedly occur, the importance of reputation is the most important incentive to stand firm where there is nothing to gain from confrontation.

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2 Deterrence can take a variety of forms such as (1) 'deterrence by denial' vs. 'deterrence by punishment' (Snyder, 1961), (2) 'direct deterrence' vs. 'extended or third party deterrence', (3) 'general deterrence' vs. 'immediate deterrence' (Morgan, 1977). Empirically, three basic types of deterrence have been identified; (1) general direct deterrence, e.g., nuclear deterrence between superpowers in terms of Mutual Assured Destruction, (2) general extended deterrence, e.g., American nuclear umbrella for Western Europe, and (3) immediate extended deterrence (George and Smoke, 1974). Discussion in this section and this study is generally confined to the cases of extended deterrence by implication.

3 Most of all, however, the intellectual heir to theory is traced back to the classic realists' distinction between the "status quo" power and the "imperialist" power (Morgenthau, 1985), or "satiated" power and "unsatiated" power (Schumann, 1948). See also Wolfers (1962: 82ff).

Yet, a careful collection of historical cases of immediate extended deterrence shows that in substantial portion of those cases, the deterrence attempt failed, and the majority of cases of failed deterrence resulted in war.[4] Further, in recurring crises between same actors where relative power is relatively fixed, leaders are likely to attribute the deterrence failure to the lack of firmness in policy stance, and adopt even more coercive strategy in subsequent crises (Leng, 1983). If so, many of major power confrontations and especially confrontations between superpowers and ensuing conflict escalation during last decades might have been due to failed deterrence attempts. If deterrence attempt failed despite favorable balance of capabilities, the model prescribes, firmer and more coercive policy stance would be necessary for the prevention of future crises.

On the other hand, the 'spiral' model is based on the long tradition of balance-of-power theory which describes and explains, most of all, the systemic tendency of a roughly equal distribution of capabilities among nations or coalitions of nations.[5] In the self-help system under anarchical setting, because aggrandizement by a nation to a preponderant state or a nation's decline in relative power will endanger the security of the weaker nation(s), nations ceaselessly try to maintain balance-of-power with, if not to be predominant over, others through internal and external methods, and thereby the relative distribution of power in the system tends to converge on a rough equilibrium (Waltz, 1979: 118).[6]

Although internal efforts like economic growth and armaments may be the primary method of keeping balance-of-power in a bipolar system (Waltz, 1967c), the foreign policy of nations is still dominated by constant efforts to keep balance-of-power through external methods such as alliance formation and/or compensatory acquisition of territory (Morgenthau, 1985: 199ff). Further, because of the subjective nature of power and inherent uncertainty of balance-of-power, nations hardly feel secure, and are constantly

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[4] Although its validity has been disputed (e.g., Lebow and Stein, 1990), data collected by Huth and Russett (1988: 32) show that over 40 percent of 58 cases of attempted extended-immediate deterrence during the period of 1885-1984 failed and 58 percent of the 24 failed attempts culminated in war. Also, the findings from comparative case studies report that deterrence failure is so common that one might speak of the "failure of rational deterrence theory" (Achen and Snidal, 1989).

[5] Balance-of-power as a theory has long been central to the study of international politics such that Waltz (1979: 117) says "[i]f there is any distinctively political theory of international politics, balance-of-power theory is it." Yet, balance-of-power as a concept has long been noted to have multiple meanings or aspects and criticized for that matter. For example, see Claude (1962: 13ff), Morgenthau (1985: 188), and Wight (1966: 151). Ashley (1980: 36ff) recently distinguished four different "purpose-specific" models of balance of power; (1) consistency maintenance, (2) isolation avoidance, (3) preponderance opposition, and (4) threat assessment.

[6] Thus, one of the key assumptions in this theory which is markedly different from the deterrence theory is the assumption of the "uniformity" (Wolfers, 1962) or the "likeness" (Waltz, 1979) in behaviors of nations.

looking for sources of power, only to be matched by other powers who are equally obsessed with security concern. Furthermore, even when nations agree upon the existing balance-of-power and hence prefer the status quo to further expansion of power, they also prefer mutual expansion to running the risk of being left behind.[7] Many of the major power confrontations in modern history, and confrontations between superpowers in recent history, the model would argue, might have been but expressions of the modern security dilemma meaning "many of the means by which increase in one's security decreases the other's security" (Jervis, 1979).

If the 'spiral' model describes "what people would do if they did not stop to think," (Richardson, 1960: 12), and the balance-of-power theory predicts that the consequences of uncoordinated individual nation's strive for security is yet another stage of rough balance-of-power but with increased hostility and insecurity, embedded logic of the 'spiral' model is self-defeating (Jervis, 1976: 78ff; Wolfers, 1951: 82). A prudent policy for prevention of future crises is, the model prescribes, prudent and conciliatory policy stance, especially when the balance-of-power is favorable.[8]

Thus, as far as decision-makers are able to learn from history and theory, it is hard to tell whether an observed pattern of alternative interaction implies a success of deterrence attempt or moderation and conciliation of policy stance as policy-makers follow the prescription by the 'spiral' model. For example, Jervis (1976: 81) notes that "if spiral theory is correct, it is so partly because the actors do not understand it or follow its prescriptions. By acting according to a crude version of deterrence theory, states bring about results predicted and explained by the spiral theory. . . . Acting on the premises of deterrence theory creates a self-denying prophecy, and if statesmen understood the validity of the spiral theory they could behave in ways that would similarly undermine its validity."

CHANGING PATTERNS OF INTERACTION AND THEIR DETERMINANTS

Have the sporadic confrontations between superpowers over the Third World for the last several decades occurred as the results of failed deterrence perhaps due to inadequate policy maneuvers on the part of the United States? Or, alternatively, have they resulted from the mutual threat inadvertently posed by each other's defensive moves in the

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7 This is the Prisoners' Dilemma analogy of security dilemma where, while both prisoners prefer "reward" of cooperation to "punishment" of defection, both also prefer "punishment" of mutual defection to the risk of becoming a "sucker."

8 Thus, for example, even a writer as old as Thucydides (1943: 46; 61) attributes the "real but avowed cause" of the Pelophonesian war to "the growth of the power of Athens, and the alarm which it inspired in Lacedaemon," which made war "inevitable," even though the Athenians said "fear was [their] principal motive" to build empire.

Third World? Or, if there have been some cases of those confrontations which were resolved without major crises, did they result from successful coercion as prescribed by the 'deterrence' model, or caution and moderation fostered by decision-makers as prescribed by the 'spiral' model?

As a general rule, there may be three circumstances under which an actor may adopt a submissive or alternative response pattern. First is a situation where an actor's action effectively preempts the other's possible course of action (*forced* or *coerced* submission). This submissive reaction can occur either when the first actor explicitly aims at it (as in an immediate and/or general deterrence situation), or as an unintended consequence of the first actor's course of action. Second, an actor may voluntarily withdraw a commitment or refrain from further commitment upon the rival's strong commitment (*voluntary* submission). This might be the case when there are some overarching values which the actor fosters more than the values at the immediate stake. Finally, one or both superpowers may reduce their level of activity and commitment through certain bilateral arrangements (*collaborated* or *coordinated* submission).

On the other hand, one may conceive several other circumstances under which an actor *reciprocates* the rival's action and/or reaction. First is the case when the stakes in the immediate situation are so high that the actor prefers the confrontation and possible escalation (at the risk of total loss) to unilateral retreat and loss of the stakes (*defensive* reaction). Second, an actor may reciprocate the other's action in the belief that the other is taking chances, and in the hope to deter him not only from the further actions in the immediate situation but also from similar actions in the future (*deterrent* reaction). Or, finally, an actor, usually the initiator in the situation, may stand firm and reciprocate the rival's action in order to outwit or outlast the rival over the courses of events. This is likely the case when the actor believes that the rival is bluffing, or lacking firmness in policy stance because of either domestic entanglement or lack of short-term or long-term capabilities (failed deterrence attempt).

In referring to such terms as stakes, capabilities, overarching values, etc., the implication is that the patterns of interaction can differ according to the configuration of such factors as well as the decision-makers' perception of the configuration of the factors. After all, different patterns of interaction result from different responses of nations and their leaders to different settings of the environment. Thus in this research, instead of looking for a stereotyped pattern of interaction, I conceive that the patterns of interaction can change over time, and try to identify the *factors* and *variables* shaping an actor's foreign policy

orientations and behaviors and the *ways* and *processes* in which such factors and variables shape the actor's foreign policy.

STRUCTURAL CONSTRAINTS AND COMPARATIVE FOCUS

In discussing changing patterns of interaction, one of the interesting arguments is George's suggestion to view the global rivalry between superpowers "as composed of a *variety of competitive 'games' that have different structures and somewhat different logics*" (George, 1983: 381, emphasis original). George argues that such game structures are, most of all, the function of balance of interests between superpowers across different regions.[9] No less importantly, however, they are the function of other variables such as available capabilities and viable strategies, although he does not go any further with respect to these other variables for the sake of analytic simplicity. Among his arguments is one that the existence of any "norms, rules of engagement, and ad hoc ground rules" (George, 1983: 376), or simply a crisis prevention regime can yield different patterns of interaction and competition. He maintains that the existence and development of such rules are also the function of regional characteristics, and the way leaders learn from the past experiences of competition and history.

Accepting George's contention, this research assumes that the patterns of interaction can also vary across regions reflecting differences in the *structural* configuration of the relevant factors. Throughout this research, I maintain a comparative focus on the regional patterns which adds an additional dimension in examining the patterns of interaction.

SYSTEMATIC CONSEQUENCES OF SUPERPOWER COMPETITION IN THE THIRD WORLD

If different patterns of interaction 'result from' different responses of nations and their leaders to different settings of the environment, then different patterns of interaction can also 'result in' different settings of the environment. This is the nature of a dynamic process in a complex environment. Thus, examination of the *consequences* of superpower

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9 Specifically, he distinguishes six different 'game structures'; (1) *high-interest symmetry*: locales in which both sides have very strong, if not vital, interests, (2) *low-interest symmetry*: locales in which both sides have modest interests, (3) *interest asymmetry favoring the Soviet Union*: locales in which Soviet interests are clearly and substantially more important than those of the United States, (4) *interest asymmetry favoring the United States*: locales in which U.S. interests are clearly and substantially more important than those of the Soviet Union, (5) *disputed interest symmetry*: locales in which the United States and the Soviet Union do not agree on the relative balance of their interests, (6) *uncertain interest symmetry*: locales of an ambiguous or fluid nature in which one or both superpowers are not certain of their own or the other's interests and find it difficult to assess how and to what extent their interests will become engaged in a developing, unstable situation (George, 1984: 381-382).

rivalry and competition merits attention and efforts not just from a practical perspective as noted above, but is an *integral part* of studying the patterns of interaction. In building the model, therefore, three of the dimensions which are believed to be particularly important in shaping the patterns of interaction are incorporated in the light of their own, internal processes so as to examine the impact of the superpower competition in such dimensions. They are (1) the conflict events in the Third World regions around which most cases of the superpower competitions and confrontations emerge, (2) the military expenditures of the superpowers which, over the long run, determine the relative capabilities of superpowers, and (3) the dyadic conflict interaction between superpowers, the most direct expression of the rivalry and conflict.

The Methods

In building and analyzing the model in this study, the econometric method is employed among many others, such as more formal and deductive methods as game theory or simulation. The choice of the method is made in connection with the overall purpose of this research, which is to (1) identify the factors and variables to shape the superpowers' foreign policy orientations and behaviors with respect to their rivalry in the Third World, and (2) propose and examine the problematic sequences and linkages among major events in the contemporary world in hypothetical fashion. Such a research aim requires systematic ways to observe the relationships among factors and variables. It also requires use of solid and widely-accepted rules of inference and decision whether to accept or reject the observed relationships to be "real." Relatively speaking, the econometric method is one that provides such a way of examining the relationships and offers a widely practiced rule of inference based on the statistical theory in the field.

Theoretical Orientations

Despite the theoretical and policy implications of the two models of strategic interaction, the modeling effort in this research is generally built upon from the vantage viewpoint of the Richardsonian tradition of action-reaction process, which is generally seen as a 'spiral' model variant.[10] Such a theoretical orientation is made necessary and justified

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[10] I will return to this debate and reexamine two models at the conclusion of this thesis in the light of findings from the research, however. As will be seen in Chapter II, further, the action-reaction model can still capture the basic arguments of the 'deterrence' model especially on a short-term basis.

on the following grounds. First, it is dictated by the 'aggregate' nature of this research. Generally speaking, to identify whether a particular crisis and ensuing conflict escalation is due to the failed deterrence or the mutual threat, one needs information for the following, although they are closely interconnected.

1. *Clear identification of attacker and defender*: This involves identification of initiator of the crisis, protégé, and its political orientation or alliance affiliation or other significant ties with the defender.

2. *Unambiguous evidence of 'offensive' intention by the alleged attacker or initiator*: The initiator could be said to have 'offensive' intention if the expected utility of the initiator from the attack, after taking into account the likelihood of defender's response, is equal to or less than that of the status quo, hence *deterrable*, and have 'defensive' intention if the expected utility from attack is greater than that of the status quo, hence *not deterrable*, although from the perspective of 'spiral' model, the distinction between 'offensive' and 'defensive' intentions is hardly conceivable, and even irrelevant.

3. *Evidence of 'deterrent' intention by the defender*: This concerns, first, whether the defender perceives the attacker or initiator's intention offensive as defined above. Secondly, it also involves whether the defender is concerned more with reputation and future confrontation than the immediately projected loss in value. A defender is said to be motivated by the logic of deterrence if its perceived intention of the initiator is offensive and it is willing to risk immediate loss in net value in case of failure.

And, these conditions are in general pertinent to the discrete cases whereas the focus in this research is on the patterns of interaction in aggregate form. In aggregate form, then, the above conditions are reduced to the distinction between two types of nations; one being a "status quo" power and the other being an "imperialist" or "expansionist" power. And such a distinction and making an additional assumption is refrained for the sake of modeling or simplicity.

Third, due to the deductive and normative nature of the deterrence theory, it is hard to derive descriptive propositions from the theory to be incorporated in the model (George and Smoke, 1984). That is to say, from a hardly verifiable assumption that one of the actors is "expansionist," "imperialist," or "unsatiated" power, the theory makes a non-falsifiable prediction on the behavior of nations; the expansionist aim of the power can be contained or deterred by demonstration of resolve or credible threat of use of force. Whereas non-expansion of the power is taken as evidence of the success of deterrence, failure of a deterrence attempt is ascribed to the lack of credibility of threat or firmness of the policy stance, and the theory is always saved (e.g., Herrmann, 1985). Further, whereas the propositions from the theory are in general normative or prescriptive, there is no guarantee that decision-makers are following the prescriptions of the theory. Rather, it

has been a consistent finding in the case studies literature that American leaders have tended "lean more toward caution and prudence than the flavor of the [deterrence] theory indicates," and behave "a bit more conservative" and more hesitant to foreclose to options than the deterrence theory implies (Jervis, 1979: 303-4).

Lastly but not leastly, despite the difference in the respective theories' outlook, these two theories can be seen to be *nested* in a single, overarching theory; the Prisoners' Dilemma type view of international relations or more generally the Realist conception of international politics. The Prisoners' Dilamma game analogy has usually been identified with the notion of security dilemma where all the players are interested in the status quo but forced to act due to the fear of being left behind (e.g., Jervis, 1976; 1978). But, as Snyder (1971) rightly points out, it also contains another element which has often been neglected.

Snyder emphasizes a unique aspect of the Prisoners' Dilemma situation where players have *two* kinds of incentives to "double-cross" the other by playing the strategy of "defection"; (1) *offensive* incentive to make additional gain when the other plays the strategy of "cooperation" and (2) *defensive* incentive to minimize the maximum loss by preemptive "double-crossing" for the fear that the other might "double-cross" by playing the strategy of "defection" (Snyder, 1971: 67). The deterrence model and the spiral model are, according to him, truncated versions of the Prisoners' Dilemma situation by focusing on one of the two incentives; the deterrence model focuses on the offensive intention of the opponent whereas the spiral model focuses on the defensive intention of the both parties.[11] If so, Synder maintains, the Prisoners' Dilemma can be generally regarded as a overarching *supergame* in international politics (Snyder, 1971: 81, 91ff).[12]

The point is that, as far as the 'deterrence' and 'spiral' models are among the adequate ways of examining the superpower rivalry and competition in the Third World, and just as much as these theories are based on the Realist conception of international politics in its broadest sense, so is this study. The content of Realism is multi-faceted each of which could be invoked and debated based on the research interests.[13] While viewing Structural Realism, a somewhat narrower version of Realism, as a research program in

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11 Thus, Jervis (1976: 102) says the argument between the spiral and deterrence theorists is reduced to what Soviet intentions are (see also Chapter VIII below).

12 If contrary to the wide-spread belief that the deterrence situation is better modeled in terms of the "Chicken" (e.g., Brams, 1985), Snyder is not alone to believe a mutual deterrence can be better modeled as a Prisoners' Dilemma game. For example, see Zagare (1987), especially Chapter 2.

13 For example, Gilpin (1984: 289-90) says that the content of realism is so open-ended that it can be seen as "a philosophical disposition and set of assumptions about the world rather than as in any strict sense a 'scientific theory' " (Gilpin, 1984: 289-90).

Lakatosian sense (Lakatos, 1970), Keohane (1983: 510ff) identifies three hard-core elements derived from the Classical Realism as follows, which are at least implicitly adopted in this study.

1. The *state-centric* assumption: states are the most, if not the only, important actors in world politics.

2. The *rationality* assumption: world politics can be analyzed as if states were unitary rational actors, carefully calculating costs of alternative courses of action and seeking to maximize their expected utility.

3. The *power* assumption: states seek power (both the ability to influence others and resources that can be used to exercise influence); and they calculate their interests in terms of power, whether as end or as necessary means to a variety of other ends.

In this study, for example, the basic unit of analysis is the foreign policy actions and behaviors of the U.S. and USSR as totality, not any particular leaders or societal sectors of the nations. Also, the rationality assumption is explicit in the rational deterrence theory, and at least implicitly embedded in the balance of power theory, and often adopted in the subsequent discussion. Finally, as noted before, the power assumption is the essence to the balance of power theory and its 'spiral' model variant.

Yet, this study tries to go beyond the Realist assumptions in three ways. First, by recognizing the multiplicity or multidimensionality of the problem, I do not assume that power consideration is the 'sole' determinant of state actions. Institutions, domestic or international, may play certain roles in determining the foreign policy behaviors of nations. Second, instead of assuming a clear-cut distinction between domestic and international politics, I try to show how domestic and international politics are inter-linked, which is now a standard assumption in Comparative Foreign Policy (Rosenau, 1967; Hermann, et al., 1987). Finally, the arguments in this study do not require the full, "substantive rationality." Instead, the somewhat limited conception of rationality such as "procedural" or "bounded rationality," to borrow from Simon (1985), should be enough for the arguments in this research, if ever assumed.

Contents of the Thesis

The study consists of three large parts; the first three chapters including this deal with concepts, hypotheses and theories, although they are spread over the remaining chapters too; the next four chapters deal with data and their analysis; the last chapter returns to concepts, now with empirical findings and evidence. Specifically in the immediately

following chapter, the conceptual framework of the present research is presented. In the chapter, first of all, the superpower rivalry in general and that in the Third World in particular is conceptualized. Then the complex causal network among major factors in question is discussed in verbal form. It includes elaboration of concepts, introduction of new concepts, and interrelationship among concepts in terms of set of propositions.

This conceptual framework is formalized in Chapter III, where the proposed causal networks among concepts become explicit, with reference to their empirical or operational counter part. Therefore, Chapter III also discusses operationalization and measurement of concepts, data sources, and statistical method of analysis. As the model is complex, so is the method of analysis. The method is further discussed in Appendix A to provide the detail necessary for reproducibility.

In Chapter IV, the record of superpower foreign policy activities and involvement in the Third World is traced, not by chronology of historical events, but by systematic analysis of quantitative data used in this research. Specifically, the quantitative records of superpowers' foreign policy activities are discussed in terms of (1) the volume and intensity of activities, (2) the scope of actions in terms of (*a*) geographical dispersion and (*b*) major recipient nations, and (3) interrelationship between two superpowers' activities in terms of simple bivariate correlation and a simple regression analysis.

The next three chapters, Chapters V through VII, discuss specific results of empirical analysis of the model. In Chapter V, domestic context of superpowers' foreign policy activities are discussed in terms of foreign policy dispositions of superpowers and their determinants. In Chapter VI, foreign policy interaction between superpowers in terms of the context of regional conflict events and its domestic connection is discussed. In Chapter VII, the consequences of superpower foreign policy competition and interaction in the Third World for their strategic level interaction, or the way how the Third World issues and strategic issues are connected is discussed.

Chapter VIII, the conclusion, summarizes the findings from the research, and discusses their implications for the theory and policy. As much as the superpower competition in the Third World is seen to be "problematic," the conclusion particularly focuses on the way to manage this problematique, and suggests directions for future research. No study can be complete in scope and perfect in method. It is especially the case when the problem is complex and there are competing approaches with strong theoretical backgrounds. The chapter concludes this study by recognizing limitations of this study, and suggesting directions for further research.

CHAPTER II
CONCEPTUAL FRAMEWORK

This chapter presents the conceptual framework of this study that involves a theoretical description of the dynamic process of superpower rivalry and competition in the Third World. The process in question is an empirical and historical occurrence, thus, what follow are basically *descriptive statements* of interdependent relationships among some of major social phenomena in the contemporary world. Yet they are *theoretical arguments* as well because they are about *causal structure* among those phenomena which are conceptualized in a generalizable fashion. While they are about a *particular* process in that it occurs within the specific boundary of space and time in history, they are also *generalizable* in the sense that the process in question is but one expression of those recurrent in the history of international relations.

This chapter basically consists of two parts. In the first part, titled the *conceptual backgrounds*, superpower rivalry in general, and that in the Third World in particular are conceptualized so as to highlight the generalizable as well as the particular features. To do so, superpower rivalry as a conflictual relationship is conceptualized as one of the recurrent phenomena in international politics, and theoretical underpinnings of the phenomenon are explored so that it is meaningful in the context of existing theories of international relations.

What follows in the second part is a discussion of the *conceptual framework* where a 'general model' of superpower rivalry in the Third World is progressively developed from a simple, 'basic' action-reaction dynamic model through an 'extended' model of interaction. The model is elaborated by incorporating the complex decision-making process of superpowers in their domestic context and the exogenous and provocative effects of local conflict events on the dynamic process of action-reaction. The extended model evolves to a 'general' model by incorporating that local conflict events are not really 'exogenous' with respect to the superpower rivalry, but they are also affected and shaped by the superpower competition in very important ways. The model finally becomes 'general' by incorporating the effects of the competition in the Third World on higher and

more general dimensions of superpower rivalry, i.e., the bilateral arms race and dyadic conflict interaction.

In calling the model 'general,' two things must be carefully kept in mind. First, it is called 'general' by claiming that the process in question is now fully *contained* in the model, particularly because of the last phase of the model and feedback effects. That is, systemic dimensions of the rivalry are modeled so as to be affected by the competition in the Third World, and such feedback effects are taken into consideration at the initial stage of the model. Thus the modeling progression regresses to where it started. But more importantly, the model is called 'general' because the process the model represents is in an *ideal*, abstract form. Although such an abstraction is an integral part of a modeling process, the model is used more as a 'framework' of reference rather than being a specific set of hypotheses itself. Rather, the model can generate sets of hypotheses with more explicit reference to real world examples. In this regard, chapters to follow are in general extensions of this chapter put in the context of empirical data.

Conceptual Backgrounds

Conceptualizing Superpower Rivalry: An Introduction

A *rivalry* may be defined either as (1) a *state of affairs* in which two or more actors are competing in pursuit of a set of objectives to the exclusion of the other(s), or as (2) a *behavioral phenomenon* referring to the activities of the multiple actors involved in rivalry so defined. In either sense, the term refers to a *relationship* between multiple actors and the relationship is that of *conflict*, not cooperation or collaboration. And, the conflictual nature of the relationship has to do with the nature of the value in pursuit; it has properties of private goods, rather than public or collective goods. By implication, this means that one's success in obtaining the value precludes the others' success.

Rivalry is to a certain degree issue-specific in nature depending upon the values in pursuit. Sometimes, one speaks of superpower *military/security* rivalry in terms of alliance management, deployment of armed forces, and development, production and procurement of weapons system. Or, one may refer to the superpower *economic* rivalry in terms of relative economic performance of respective societies. Or, one may have in mind superpower *foreign policy* rivalry as one refers to competitive effort of superpowers to secure international support for particular foreign policy position, or to exert influence to settle regional conflict in the way favorable to them.

Whatever the issues may be, discussion of superpower rivalry over a range of issues means that inter-superpower relationship in general is better described as being *conflictual* and hostile, and such a conflictual relationship is *multi-dimensional.* Thus, in discussing superpower foreign policy rivalry in the Third World, I conceive it as a subset of general superpower rivalry. Yet, it is explicitly noted that rivalries in each issue areas or dimensions are not independent from one another, but inextricably intertwined in certain important ways.

Being characterized as a conflict relationship, a special and perhaps the most important characteristic of the superpower rivalry is, like any social conflict, what Boulding calls *reaction processes*: "processes in which a movement on the part of one party so changes the field of the other that it forces a movement of this party, which in turn changes the field of the first, forcing another move of the second, and so on" (Boulding, 1962: 25). Such a phenomenon is generally called a double, or *mutual contingency* of interaction such that "the actions of each side are *both determinants and consequences of the actions of the other*" (Gamson and Modigliani, 1971: 10, emphasis original).

Some of the actions taken by an actor are *tactically contingent* upon the other. This is when the actor is aware that the aim of its own action will not be achieved regardless the response by the other, and consciously aims at the other's response in a certain desired way. This notion of contingency may be seen equivalent to the concept of *reciprocity*, advanced by Axelrod and Keohane in the field of international relations (Axelrod, 1984; Keohane, 1986).[1] Sometimes, one's action is *nominally contingent* upon the other's action. A series of accusations and ejections of American diplomats following arrest and ejection by the U.S. of a Soviet diplomat for alleged spying, for example, can be seen in this way. The Soviet reaction in this case might not be because the U.S. action may seriously damage any Soviet interest, but because silence may imply acknowledgment of the U.S. claim.

More importantly, given the rivalry, one's action may be *substantively contingent* upon the other's action. This is the case when interests of two actors are interlinked and are at least partially incompatible, such that any of rival's prior actions may threaten and/or damage one's interests without proper responses. Thus, substantive contingency may involve not only a deliberate policy maneuver by the political leaders and foreign policy

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[1] It is important to note that, unlike reciprocity as conceived by Keohane (1986: 5-8), contingency does not require *equivalence* either in quality or in quantity. That is to say, the contingency as conceived here does not necessarily involve the behavioral pattern of *Tit-for-Tat* and equivalence, if rough, in amount of values.

decision-makers, but also the powers and preferences of some societal sectors whose interests are directly threatened by the other's actions. As will be noted soon, I explore this notion of a mutually contingent scheme of interaction as a key conceptual cornerstone upon which the entire modeling enterprise is built. In the following section, however, the conflictual nature of superpower rivalry is examined first in terms of its theoretical and historical underpinnings.

Superpower Rivalry: Theoretical and Historical Underpinnings

AN OVERVIEW

To conceptualize the superpower rivalry is indeed a theory-laden project as there are a variety of competing and/or supplemental theories and perspectives on the *origins* of the rivalry or *the Cold War* as a specific version of the conflict. Most of arguments on the origins of the Cold War, either orthodox or revisionist, attribute it to factors at the levels of nations, and/or individuals. The orthodox interpretation points out a series of Soviet behaviors during and after the World War II, which were seen as aggressive, and as primarily responsible for the Cold War. It finds roots for those aggressive behaviors in the nature of Soviet political-economic system and/or aggressive zeal of Soviet elites, especially Stalin. The revisionist argues that the inflexible, and often aggressive, foreign policy of the U.S. and its allies is responsible for the Cold War. The West, it is argued, pushed the Soviet Union to the limit and left no option. This inflexible foreign policy was not an accident, they further contend, but was either due to the anti-Communist bias in key western leaders, or the nature of American capitalist system, or both.[2]

From these perspectives, then, it can be argued that the Cold War, or superpower conflict thus far experienced could have been avoided or managed in a less conflictual and violent fashion in one way or another, because political leaders change and political systems evolve. That is, those factors listed as responsible for the Cold War are *variables* subject to intervention by deliberate endeavor or historical accident, allowing such counterfactual questions as 'what if Stalin had not been the Soviet leader at the time' or 'what if the Russian Revolution had failed in 1917.' These are seemingly ridiculous questions yet theoretically meaningful. Schlesinger (1980: 253), for example, says that "[t]he Cold War could have been avoided only if the Soviet Union had not been possessed

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2 For a good collection of literature on the origins of the Cold War, both orthodox and revisionist, see Hoffmann (1980:213-288).

by convictions both of the infallibility of the communist word and of the inevitability of a communist world."[3]

To some others, largely theoreticians in the field of international politics, the episode is inevitable either because it might be the consequence of long term historical trends beyond the reach of any individual, group of individuals, state, or group of states, or due to some invariant nature of international relations. Indeed, conflict and violence are seen as the nature of international relations where multiple 'powers' are contending for 'power' with each other under no higher authority.[4] It is contented that rivalry and competition between two superpowers is a solemn reality in international politics defying any scientific explanation at all; what is needed is a meaningful description.[5]

SUPERPOWER RIVALRY AND SECURITY DILEMMA IN INTERNATIONAL POLITICS

Yet, there are bodies of literature which try to theorize the conflictual nature of international relations. In particular, I identify three interrelated theories of international conflict which try to explain the prevalence and/or pervasiveness of conflict in international politics. The first one focuses on the effects of anarchical structure of international politics, the second one on the primacy of security as overarching values to nation-states and its effects on international interaction, and the third one is especially on the imperfection of human perception and associated psychological dynamics.

While the anarchical structure of international politics has been one of the most important themes in theories of international politics, Waltz (1957; 1979) is one of those who most eloquently argue for the overwhelming effect of the structure on the conduct of foreign policy by states and its systemic consequences. According to him, international conflict and violence, and especially war as the most outstanding example, are the direct consequence of the anarchic structure of the world.[6]

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3 Whether the Cold War could have been avoided or not is largely a matter of the levels of analysis problem or the choice of research question, however. Even though in no way could Roosevelt's vision of the post-War cooperation have come true, the particular pattern of conflict noted by 'the Cold War' could have been avoided and the conflict could have been managed in a less hostile way (e.g., see D. Larson, 1985).

4 This view of international politics in general is identified under the rubric of Political Realism. Indeed, realist historians and political scientists argue that given that superpowers are the only two nations that can pose significant military threat to each other, and the opportunity of expansion due to the power vacuum in Europe, the clash of interests and ensuing conflict between them was just determined course, hence inevitable. Or, in Aron's assessment, two superpowers are simply "enemies by position" (Aron, 1966: xi, cited in Snyder, 1971: 76).

5 For example, see Morgenthau (1970) and Rapoport (1976) for moderate expression of this view.

6 The anarchy here simply means the absence of a central authority which has the monopoly of the legitimate use of force and possibly coordinates the activities of multiple actors, and does not necessarily

That is, "war occurs because there is nothing to prevent it." In other words, "[a]mong states as among men there is no automatic adjustment of interests. In the absence of a supreme authority, there is then a constant possibility that conflict will be settled by force" (Waltz, 1957: 188). Thus, while Waltz is particularly interested in why inter-state conflicts [of interests] turn into a particular form of conflict, i.e., war, by implication, he conceives that conflict among nations is rather a natural phenomenon.

But there is more than that; the effect of anarchy is such that it turns a possibly cooperative situation in which every actor has interests in cooperation into a conflictual situation as he emphatically illustrates by the example of the 'Stag Hunt.' There is no conflict in isolation and, stated boldly, as there is need for cooperation, conflict comes to arise (Waltz, 1957: 168). If anarchy is really the problem and "conflict is the by-product of competition and attempts at cooperation in society," then, any assumption on human nature and/or on the attributes of states is irrelevant and unnecessary (Waltz, 1957: 171). Then, interaction among states and the absence of higher authority, i.e., the anarchical structure of international politics are *necessary* and *sufficient* conditions for international conflict and violence.

There is something more about anarchy, however. Under anarchy, the interaction among states exhibits a particular pattern of behaviors which Herz (1950) calls the *security dilemma*.

> Wherever anarchic society has existed, . . . , there has arisen what may be called the 'security dilemma' of men, or groups, or their leaders. Groups or individuals living in such a constellation must be, and usually are, concerned about their security from being attacked, subjected, dominated, or annihilated by other groups and individuals. Striving to attain security from such attack, they are driven to acquire more and more power in order to escape the impact of the power of others. This, in turn, renders the others more insecure and compels them to prepare for the worst. Since none can ever feel entirely secure in such a world of competing units, power competition ensues, and the vicious circle of security and power accumulation is on (Herz, 1950: 496).

While the anarchy is most often referred to as accounting for the security dilemma (Jervis, 1976: 62), there is something special that makes the phenomenon of security dilemma so perennial in the history of international relations; that is, *the nature of security as a value states pursue*. As noted by Jervis elsewhere (Jervis, 1980: 175), there are at least four distinctive characteristics of security as a value. First of all, security is by nature

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mean the state of chaos (Waltz, 1979: 102ff). Further, it should be clearly and carefully kept in mind that we do not take the anarchy as norm nor rule.

relative and zero-sum; when a state is better off, another is worse off.[7] Second, the motives involved in security pursuit, whether they are defensive or offensive, are irrelevant. Either defensive or offensive, the behaviors out of different motives are the same. Third, the stakes are higher than most other values in that security is a prerequisite for most other values states foster. And finally, security as ends and military power as means are illusive and uncertain. No one knows exactly how secure one is and how much power one needs for security.

Succinctly recapturing and further elaborating the theme of security dilemma in terms of what he calls 'the Spiral Model' of international conflict, Jervis (1976: 62-76) captures one further complicating factor in this dynamic; *imperfectness of human perception.* That is, while what generates security dilemma is a symmetric concern for security by multiple actors, perception of the situation by states or statesmen is not symmetric. Statesmen often fail to recognize that their partners in other states are concerned for security as much as themselves, or think others are as well aware of their "benevolent" intention as themselves.[8]

The effect of this misperception is self-fulfilling prophecy of the other state's "evil" intention, as they take the other's reaction as evidence of other's "aggressiveness." Taken reciprocally, the end result is ever deepening hole of conflict spiral. Altogether, the anarchical setting of interaction, the nature of security as overarching value of states, and imperfection of human knowledge and perception have characterized the interstate relationship with conflict and war, rather than collaboration and cooperation.

SECURITY DILEMMA AND EXPANSIVE FOREIGN POLICY

While the arms race, i.e., the competitive military buildup, is the most outstanding expression of interstate rivalry and the ensuing dynamics of the security dilemma, it is not the only expression. For example, Jervis (1976: 66, emphasis added) notes that "[a]rms races are only the most obvious manifestation of this spiral. *The competition for colonies at the end of the nineteenth century was fueled by the security dilemma.* Even if all

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[7] The term zero-sum should be understood with caution, however. The game of security, often referred to by Prisoners' Dilemma, is not zero-sum in strict game theoretical sense, because pursuit of security involves cost allowing some cooperative situation. Security itself as a value is zero-sum anyhow.

[8] Herbert Butterfield (1952: 21) puts it in the following way; "It is the peculiar characteristic of the situation ... of what I should call Hobbesian fear - that you yourself may vividly feel the terrible fear that you have of the other party, but you cannot enter into the other man's counter-fear, or even understand why he should be particularly nervous. For you know that you yourself mean him no harm, and that you want nothing from him save guarantees for your own safety; and it is never possible for you to realise [*sic*] or remember properly that since he cannot see the inside of your mind, he can never have the same assurance of your intentions that you have."

states preferred the status quo to a division of the unclaimed areas, each also preferred expansion to running the risk of being excluded." Also, Choucri and North (1975: 20-21) note that "[a] major factor in Bismarck's turn to imperialism and colonialism may have been the fear that 'if he failed to authorize the hoisting of the German flag, the flag of another European power would quickly go up.' The British, leaders of the world's largest empire, felt threatened on many occasions when it appeared that some other power might secure a territorial advantage in some part of the world."

Choucri and North further conceive such a dynamic as one of the expressions and consequences of a particular source of international conflict; *lateral pressure* (Choucri and North, 1975; see also Ashley, 1980). That is, as a society grows in terms of population and technology generating ever increasing demands for resources which are not met domestically and the society is equipped with specialized capabilities to satisfy the unmet demands from outside sources, the society tends "to *expand* its geographic compass, to push outward the boundaries that partition reality between the 'external' environment and the unit itself, and to draw an ever greater expanse of reality within itself" (Ashley, 1980: 14). And, as two or more societies expand outwardly, sooner or later their activities and resulted interests intersect and collide. Among patterns of *intersection*[9], when the capabilities of those societies are similar, *rivalry* and *competition* are likely to occur, and crisis and the conflict spiral are likely to follow as the competition process is accelerated.

Although conflict and hostility may be the most pervasive aspect of inter-national relations, it is not *equiprobable* for all pairs of nations. Rather, it is especially likely among nations expressing high and outwardly extended lateral pressure simultaneously and at the same time possessing high and comparable level of capabilities. Whether two superpowers are those who experience especially high lateral pressure or not is an empirical question and will require an extensive comparative analysis, yet history certainly coincides with these theoretical accounts.

HISTORICAL UNDERPINNINGS

Above all, superpowers are best characterized by their unprecedented, incomparable and insurmountable level of capabilities in various dimensions, but especially military. Indeed, in terms of the amount of their military spending, the size of their standing armed

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9 Ashley (1980: 29ff) explicitly identifies three patterns of intersection by the criterion of relative capabilities of the societies involved; (1) intersection between the stronger and the weaker such that the stronger absorbs the weaker, (2) intersection between the stronger and the weaker such that the weaker's expression of the lateral pressure is blocked and frustrated by the stronger, and (3) intersection between roughly equal societies resulting in rivalry and competition.

forces and armament/equipment, and especially their stock of nuclear weapons, they are incomparable to and, at least in foreseeable future, insurmountable by other powers. In the same way, the range of their foreign policy activities and interests is commensurate with the level of their capabilities and powers.

As it has often been the case in history, the "superpowers" emerged out of a general war, World War II. The War had not only left the two countries enormous military powers; for the USSR, huge size of the Red Army and for the U.S.A., (which had gone through a rapid process of demobilization,) the unprecedented atomic bombs, but also made them confronting face to face all over the world in the form of military occupation. While they were facing a stalemate on the issue of demilitarization and the dilemma of mutual threat, interests out of the empire were soon to follow, and in conjunction with their views of two worlds or two camp world,[10] they would also assume the honor of being the leader of each world. Thus, as the Athenians said following the Persian War, "it was not very wonderful, or contrary to the common practice of mankind, if [they] did accept an empire that was offered to [them], and refused to give it up, under the pressure of three of the strongest motives, fear, honor, and interest" (Thucydides, 1943:62). The resulting outcome is two competing empires.

In that superpowers are the only nations that can pose significant and substantial threat to each other's security, world-wide interests and respective leadership roles, they are rivals to each other. Put modestly, what characterize superpowers in the contemporary world are their globe-reaching capabilities and world-wide interests. Therefore, a superpower may be conceptually defined as a nation-state that is especially *willing* and *able* to commit resources anywhere on the globe whenever it is deemed necessary. If so, unless we assume that their interests are always congruent, we can conceive that their interests are sometimes incompatible with each other and often collide into conflict and violence. Thus, it is nothing strange for us to have observed sporadic clash of two superpowers.

The Nature of the Contemporary Superpower Rivalry

Foreign policy rivalry among nations may not be anything noble in this world or peculiar to the superpowers. Yet, the contemporary superpower rivalry is peculiar to a degree, if not in kind, in that it involves the respective societies as a whole to a greater

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[10] By 1947, the vision of two camps world was official on both sides of superpowers as appeared in the Truman Doctrine of March 1947 and Zhdanov's announcement at the founding of the Cominform in September of 1947.

extent than ever. The superpower rivalry profoundly affects and is affected by what happens in each society. That is, as Larson very aptly puts,

> [The] rivalry involves the viability of the two states, of the social systems they champion, and of the position in the world to which they aspire. And their relative strength and stability, their dynamism and appeal, is determined as much by what happens in areas isolated from direct competition as in those dominated by such competition. Soviet and American successes and failures in dealing with ethnic or racial problems, in educating and "socializing" their youth, in eliciting popular support for leaders, institutions, and national policies crucially affect the long term prospects of the two states (Larson, 1978: 15-16).

Thus, the superpower rivalry is a *multidimensional* phenomenon. Three related processes contribute to the multidimensionality of the rivalry. First, as Ashley (1980) points out, foreign policy activities of a society can become *politicized.* By politicization, he means "the process by which a society's political leaders (*a*) come to claim and believe that some of the society's outwardly extended activities constitute society-wide 'interests' that 'ought' to be fostered and protected and (*b*) can mobilize overall societal resources and energies at some costs toward the end of fostering and protecting them" (Ashley, 1980: 25). Further, "[t]he intensification of competition between two societies is likely to involve strong tendencies to draw more and more dimensions of each society's activities into the vortex of competition and under the rubric of overall 'societal interests' " (Ashley, 1980: 34, emphasis omitted), such that they become *socialized.* By socialization, I mean "the process by which people in the society in general come to believe in the political leaders' causes and provide some degree of legitimation to those causes, and ensuing use of resources."

Politicization and socialization of the foreign activity is especially manifest in the contemporary world where foreign policy is no longer exclusive matter of a small group of political elites but instead are rather closely tied with domestic politics. While political elites in democratic societies can be electorally "punished" domestically for what is happening in the international politics (e.g., Waltz, 1967a; Waltz, 1967b; Nye, 1984), they are also utilizing international events for the purpose of domestic politics (Lowi, 1967). In the same way, "Soviet leaders today cannot afford great political defeats abroad. . . . By same token, . . . foreign policy successes are for the Soviet elite a 'principal means of legitimizing their policy system' " (Dallin, 1981: 351).[11]

Furthermore, the processes of politicization and socialization can be *ideologized.* While ideologization of foreign activity is as old as aphorisms like "white men's burden" or

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[11] For the general discussion of the linkage between domestic and international politics, see Rosenau, ed. (1967), Hoffmann, ed. (1980) and Bialer, ed. (1981).

"making world safe for the democracy", ideologization of the contemporary superpower conflict is even deeper. The "dual policy" in Soviet foreign policy, i.e., the pursuit of the spread of world communism as the internationalist element and the pursuit of national interests as the traditional element (Hoffmann, 1987: 13) may be seen from this angle. The amalgamation of the Marxism and the Russian nationalism to produce the *Soviet Communism*, "internationalist in form and nationalist in essence," is further consistent with phrases like "the fatherland of socialism" (Ulam, 1981: 3). Put symmetrically, it is also noted that the Presidents of the U.S. since World War II have been forced to "oversell crises" by ideologizing the conflict (Lowi, 1967: 315ff; Jentleson, 1987: 674).

Thus, the Soviet-American rivalry in the contemporary world can be distinguished from those among great powers in nineteenth century Europe (Choucri and North, 1975) to a certain degree though not in kind. That is, it is a multidimensional phenomenon including one in international arena, and does constitute a psychological state or mentality of the rivalry at the level of the whole society over a range of issues at the global level.

Superpower Rivalry in the Third World for the Spheres of Influence

Given this general background of the rivalry between two superpowers as a totality, the overt expression of the rivalry, i.e., the competition in its most intense form, is in the international arena. In particular, I conceptualize superpower conflict in the globe as stemming from the competing pursuit of the *spheres of influence* at the global level. While the term 'spheres of influence' is a historical concept referring to a specific form of colonial control (Schumann, 1934; 1948: 530ff), I use it as an analytic concept. A superpower's spheres of influence in this study is defined as "a certain range of territorial states or groups of states or other comparable human organizations, other than direct jurisdiction of the superpower, to which the actor can access resources and limit political jurisdiction of the polities, *exclusively to the other superpower*."

At least two rather obvious implications are noteworthy in the given definition of a sphere of influence; (1) it is *relative* in that being one's sphere of influence precludes being the other's sphere of influence, and (2) it is *relational* in that it refers to the relationship between two actors, one of which is one *having* the sphere of influence and the other of which is one *being* the sphere of influence, implying *asymmetric* power relationship between two. The concept of spheres of influence is in nature political, thus necessarily vague and open-ended. The value of any particular territorial state, or any other form of polity, as a sphere of influence may not be fixed. It may be political or strategic as in cases

of military allies providing military bases, or economic, for example, as markets for surplus products and/or capital or suppliers of key resources. It may even be symbolic as in some cases like nations adopting similar economic/political systems. These dimensions are, however, not exclusive but rather closely connected.

Although the Third World may not be the only area qualified for the superpowers' spheres of influence, I contend that the superpower rivalry and competition over the spheres of influence in the world is especially intense in the Third World because of certain characteristics shared by the countries in the category. The Third World countries are usually characterized by one or combination of (1) small size, (2) economic underdevelopment, and (3) late entry into the system of modern nation-states, and relatedly, (4) the lack of stable government structure, i.e., political instability. As the Third World countries are grouped geographically, another empirical fact is that most of the interstate wars in the post World War II period have occurred between/among the Third World countries.[12]

These empirical and analytic characteristics of the Third World countries are all relevant in the context of superpower rivalry over the spheres of influence. First of all, Third World countries in general are *susceptible* to the penetration by superpowers because of the asymmetry of power and lack of firm political/ideological orientation as well as absence of stable governments. Further, they are even *receptive* to it in some cases, because of the aspiration for industrialized development and the need for political and material support from outside due to domestic political struggle and/or regional rivalry. For those, superpowers are the most natural sources for those needs in terms of their willingness and ability. Furthermore, those characteristics suggest that even if a Third World country is already in the spheres of influence of a particular superpower, the very status is also unstable because the Third World country is yet vulnerable to the penetration by the other superpower and the political regime itself may be unstable.

Then, it can be reasonably conjectured that superpowers are inclined or motivated to act toward the Third World countries so as to (1) induce them into their own spheres of influence (*expansive action*), (2) keep them there (*consolidatory action*), and (3) prevent

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12 Kende (1976) notes that 112 out of 120 local wars occurred in the period between 1945-1975, including civil wars, were fought in the regions usually called the Third World. Also, an analysis of *Wages of War* data collected by Singer and his colleagues (Singer and Small, 1968; Singer and Small, 1984) shows that all but one out of sixteen "interstate wars" in the period of 1945-1980 involve one or more of Third World countries, and thirteen of them are between/among the Third World countries. The same data further show that all but three of forty-four "civil wars" in the same period are also in the Third World countries.

them from falling into the rival's spheres of influence (*preventive action*). Since these foreign policy aims can not be simultaneously achieved by both superpowers, they are in the state of rivalry and often overtly compete as one's activity in pursuit of those goals collides with the other's. Uncoordinated, the competition may result in a spiral of conflict escalation.

Conceptual Framework

A 'Basic Model' of Superpower Rivalry

As superpowers are in rivalry over the pursuit of spheres of influence in the Third World, their ensuing pattern of behavior very likely assumes that of a conflict spiral noted earlier. That is to say, any action of an actor often becomes the other's matter of concern because the aim of one's action usually does, or at least is perceived to, undermine the other's short-term or long-term prospect of interests in the region regardless whether one intends to do so or not. Then, the other actor is very likely to think the rival is exploiting one's own weak points, and to react to the rival's prior action in order to (1) negate or neutralize the impact of rival's action (*a*) by directly denying its aim (*defensive reaction*) or by (*b*) compensating rival's gain through comparable gain elsewhere (*compensatory reaction*), or (2) deter the rival from further action by demonstrating strength and resolve (*deterrent reaction*).

No matter what the motive of reaction may be, the initial actor, convinced of self-righteousness, will very likely see the other's reaction as evidence of rival's aggressiveness, and reassert itself by furthering its activities and commitment. Reinforced of its earlier perception that the rival is exploiting one's weak points, and now with its reputation at stake, the other actor again stiffens own stance. As two actors continue to act and react to each other, the levels of commitment by both actors escalate and the range of available options narrows down so as to result in a protracted conflict with highly explosive implications for bilateral crisis.

This process of action-reaction dynamics is in essence what is described in the well-known model of action-reaction first developed by Lewis F. Richardson with respect to the prototype example of the arms race (Richardson, 1960). The model can be expressed in terms of a pair of difference equations as follows.

$$\Delta x_t = b_1 y_t - a_1 x_{t-1} + c_1 \qquad (2.1)$$

$$\Delta y_t = b_2 x_t - a_2 y_{t-1} + c_2 \qquad (2.2)$$

where x and y are the levels of war-preparedness of nations X and Y respectively, Δ is time difference operator, and a's, b's, and c's are constant coefficients.

Technically interpreted, the model says that "change in a nation X's war-preparedness or the level of armament is (1) the positive function of the opponent's war-preparedness or level of armament with the associated coefficient b_1 called *threat* or *defense* coefficient, (2) the negative function of its own level of armament due to budget constraint with the associated coefficient a_1 called *fatigue* coefficient, plus (3) certain constant c_1 reflecting whether the nation is satisfied with the status quo or not and to what degree, hence *grievances*." More substantively interpreted, the model says that "nations in arms race increase their level of armament due to the *threat* they perceive from opponent's level of armament under the constraint of usable resources and sometimes because of their *aggressive zeal* when they are dissatisfied with the current state of affairs."

The essence of the model is that it is formulated as a system of simultaneous equations so as to represent the mutual threat and reciprocal process of arms race or any hostile interaction. That is, while a nation may invoke any hostile behavior against the opponent because of the threat she feels from the opponent, the consequence is ensuing efforts by the opponent *regardless of the former's intention.* The initial actor, convinced of self-righteousness, may see the other's reaction as evidence of the opponent's "evil intention" or "aggressiveness," and further own commitment only to be followed by the opponent's matching commitment. The end result is a spiral of arms race or any other conflict behavior. Applied to arms races as prototype examples (e.g., Zinnes and Gillespie, 1973; Ward, 1984), then, the model is extremely parsimonious and powerful representation of modern security dilemma and the dynamics of conflict spiral noted before.

Another empirical area to which the model has been applied is general foreign policy interaction between nations (e.g., Azar, et al., 1974; Ward, 1982; Dixson, 1986; Smith, 1987). Along with earlier modeling effort of action/reaction dynamics in terms of a modified scheme of stimulus-response (Holsti, et al., 1967), and recent conceptual development of foreign policy reciprocity (Axelrod, 1984; Keohane, 1986), the model is an apt representation of reciprocal nature of foreign policy conflict and cooperation between nations. Further, applied to various dyads of nations, the model turned out to be highly robust empirically. Given the model's theoretical power and empirical robustness, it is my contention that the same model can be applied to the superpower foreign policy interaction in the Third World, the dynamics of which resemble that of an arms race and resulting

conflict spiral as discussed in an abstract form, or any other dimensions of the rivalry conceived as mutually contingent interaction.

Specifically, I propose a 'basic model' of superpower rivalry in the Third World as the following set of dynamic equations which is a simple transformation of equations (2.1) and (2.2).

$$ACT(U.S.\rightarrow Third\ World)_t = b_1 ACT(USSR\rightarrow Third\ World)_t + a_1 ACT(U.S.\rightarrow Third\ World)_{t-1} + c_1 + e_{1t} \quad (2.3)$$

$$ACT(USSR\rightarrow Third\ World)_t = b_2 ACT(U.S.\rightarrow Third\ World)_t + a_2 ACT(USSR\rightarrow Third\ World)_{t-1} + c_2 + e_{2t} \quad (2.4)$$

where $ACT(A\rightarrow B)$ refers to A's action to B, subscripts t and t–1 are for time points, a's, b's, and c's are coefficients, and now stochastic disturbances are represented by e_t's. Specifically, the model says that a superpower's foreign policy activity toward the Third World in a period of time is seen to consist of three basic components; (1) *reactions* to the rival's action, with associated coefficient b, which is properly called the *reaction* coefficient, (2) *continuation* of previous action with associated coefficient a, called *inertia/commitment* coefficient, plus (3) certain constant representing the normal level interaction between the Third World recipients and the superpower in question.

PATTERNS OF INTERACTION: QUALITATIVE INTERPRETATION OF THE MODEL

With respect to Richardson's model applied to arms race, it has been noted that the assumption of 'positive' reaction coefficient could be too restrictive to explore the model's highly rich implications to its potential (e.g., Zinnes, et al., 1976). If the argument is valid for the arms race where there is strong theoretical logic and empirical evidence that the pattern of interaction will be that of a 'race,' it is even more valid for the case of superpower foreign policy interaction in the Third World where there have been contending arguments with logical persuasiveness that the pattern of interaction might be otherwise.

For example, recall the assumptions and contentions of the (extended) deterrence theory, as briefly discussed in the introductory chapter. This particular theory of the U.S. foreign policy sees that (1) the Soviet foreign policy in some gray areas like the Third World is characterized by ceaseless expansionism, if opportunistic, and (2) such an expansion can be contained or deterred by (*a*) various measures of foreign policy designed to demonstrate the U.S. commitment to the region (general deterrence measures), and (*b*)

vigorous objection and resistence to the Soviet action when the general deterrence is challenged (immediate deterrence measure). In the light of the present model, the argument can be represented by (1) positive constants (*c*'s) for both the U.S. (as general deterrence measures) and the Soviet Union (as expansionist or probing actions), (2) a positive reaction parameter (*b*'s) for the U.S. (as an immediate deterrence measure), and a negative reaction parameter for the Soviet Union (if deterrence attempt is successful, i.e., the Soviet Union is deterred).

Setting the validity of the claims of the deterrence theory aside, the point is that, on a short-term basis, an actor can take a negative, as well as a positive, reaction parameter under some circumstances. Generally speaking, there are two patterns of responses by an actor to the rival's action; (1) *reciprocation* or *reaction* when the actor matches the rival's action in kind and/or in level, i.e., matches the *high* level activity of the rival by *increasing* its own level of activity, which is captured by a *positive* reaction parameter, and (2) *submission* (or *alternation* using more general term) when the actor matches the other's action in opposite kind and/or level, i.e., matches the high level activity of the rival by *decreasing* its own level of activity, which is captured by a *negative* reaction parameter.

Conceivably, there are three circumstances under which an actor's reaction parameter can take a negative value. First is a situation where an actor's action effectively preempts the other's possible courses of action (*forced* or *coerced* submission). Submissive reaction can occur either when the first actor explicitly aims at it as in an immediate deterrence situation, or as an unintended consequence of the first actor's certain courses of action. Second, an actor may voluntarily withdraw commitment or refrain from further commitment upon the rival's strong commitment (*voluntary* submission). This might be the case when there are some overarching values which the actor fosters more than the values at the immediate stake. Finally, both superpowers may reduce their level of activity and commitment through certain bilateral arrangements (*collaborated* or *coordinated* submission).

A more formal analysis of various reaction patterns in terms of the signs and sizes of the reaction parameters of both actors can yield highly important insights into crisis dynamics, which is beyond the scope of this study. In the present context of research, suffice it to say that there are basically three different patterns and outcomes of interaction with the following characteristics.

1. *Escalation of crisis into a war or a deadlocked confrontation*; when both actors adopt reactive response patterns. In this pattern of interaction, the levels of activity of both actors either exponentially escalate to the point where the system breaks down, i.e., a bilateral war, if limited,

when the system is unstable, or escalate to a certain level, which is typically high, of activity to result in deadlocked confrontation, if the system is stable.

2. *Successful preemption or deterrence by an actor*, when one of the actors adopts a reactive response pattern and the other actor adopts submissive response pattern. Upon the rival's prior activity, the actor with negative reaction parameter adjusts its level of activity to the level *below* what it otherwise would do, and the actor with positive reaction parameter elevates its level of activity to the level *above* what it otherwise would do.

3. *Collaboration*, when both actors adopt submissive or alternative response patterns. Both actors reciprocally adjust their levels of activity to some lower level.

'COMMITMENT' AND 'REACTIVITY': QUANTITATIVE INTERPRETATION OF THE MODEL

The question of when a nation reciprocates or submits to the other nation's coercive policy measures is central to the theory of international politics, as well as the policy prescriptions, as briefly noted earlier. Yet, exclusive focus on this 'qualitative' aspect of reaction process (in terms of the *signs* of the reaction coefficient) may be misleading. Rather, its 'quantitative aspect' in terms of the *size* of the coefficient should also be given a due attention. For example, if the reaction coefficient can be properly called the *threat* coefficient, then its size must be commensurate with the degree to which the rival's action is seen as 'threatening,' or the degree of perceived challenge to the societal or national interests and values posed by the rival's activities. Further, as the reaction pattern in terms of the size of coefficient is the result of a deliberate policy choice to deal with the rival's action, it will reflect the decision-makers deliberation of appropriate courses of action including, for example, the likelihood of its escalation and the prospect of prevailing in the confrontation.

On the other hand, the effect of the previous level of activity on the current level of activity measured by the coefficients a's is seen as stemming from (1) *inertia* in bureaucratic process (Dixon, 1986; Phillips, 1978; Thompson and Rapkin, 1982) and/or (2) *commitment* to the future action embedded in any foreign policy action (Callahan, 1982). Such an inertial and/or commitment effect of the previous activity is not automatic, however. Rather, previous commitments are constantly questioned and challenged by various political entities, and consequently probed and reexamined by politically sensitive decision-makers. Also, the bureaucratic process is continually interrupted either by higher level decision-makers or by concerned groups of domestic constituents. Then, the size of the coefficient will vary along with the degree to which decision-makers are willing to commit society's scarce resources for the purpose of foreign policy at the expense of other valued societal activities.

From an aggregate point of view, thus, I conceive those coefficients as certain expressions of the general foreign policy dispositions of a society amongst which foreign policy officials act and interact to shape foreign policy behaviors; the coefficient *a*'s or the 'commitment' for an actor's *disposition to act* given the situation, and the coefficient *b*'s or the 'reactivity' for the actor's *disposition to react* given the rival's action. Our model of superpower rivalry in the Third World starts with the analysis of such foreign policy dispositions of superpowers.

Therefore, from a modeling point of view, I argue that those coefficients should treated as *variables* rather than *constants* reflecting the complex process of decision-making. And from a more substantive point of view, I argue that they must be explained in terms of domestic dispositions of superpowers as reflected in the decision-making process. In what follows, I extend the 'basic model' of superpower rivalry to reflect this argument of mine, toward the purpose of building a 'general model' of superpower rivalry in the Third World and its consequences.

An 'Extended Model' of Superpower Rivalry

The basic action-reaction model as discussed early in this chapter and applied to the superpower rivalry in the Third World can be extended in two ways. The first way, which is more conventional, is by adding more variables to the equations such that superpowers' foreign policy activity in the Third World is seen to be determined not only by the rivalry factor, but also by a whole lot more factors which are relevant in the context. An important setback of this approach is that there are almost endless list of factors to be added and soon any empirical model will run out of degrees of freedom.[13] A second way of extending the basic model is to 'variabilize' the coefficients such that many of the factors affecting the foreign policy behaviors do so indirectly by setting the coefficient values (Smith, 1987).

In the following, our 'basic model' of superpower rivalry is extended in both ways. First of all, a *domestic level dynamics* is modeled in which the decision-making process of superpowers with respect to their rivalry in the Third World is modeled in its domestic context. Then, such a dynamic is conceived to set the coefficient values to regulate and 'determine' the process of action-reaction dynamics between superpowers in their foreign policy activity in the Third World regions. Second, the model is also extended to incorporate two of the most prominent local factors to affect directly the foreign policy

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[13] For example, see East, et al. (1978) for a relatively comprehensive yet concisely packed list of variables to affect foreign policy and foreign policy behaviors.

behaviors of superpowers and thereby the action-reaction process of competition; those local factors are the *inter-* and *intra-*state conflicts events in the Third World regions, whose impact on the competition process is hypothesized to be *provocative.*

Domestic Level Dynamics

CONCEPTUALIZATION: TWO-STEP APPROACH

It is now a common place argument that foreign policies of nations are affected by domestic factors in very important ways. Some factors affect foreign policy behaviors as *sources* or *problems* which decision-makers have to deal with, and thereby motivate nations to act, as noted by a wide range of approaches, ranging from classical theories of imperialism such as Hobson's and Lenin's to Choucri and North's lateral pressure theory.[14] Some factors influence the behaviors as *constraints* limiting the *menu* from which decision-makers choose (Russett and Starr, 1989). Still some factors influence behavior by affecting the political *process* of foreign policy making, as noted in the literature of bureaucratic politics (Allison, 1971; Halperin, 1972) and interest group politics (Uslaner, 1986).

As theoretical traditions underlying each of those approaches are diverse and often incommensurable, if not incompatible, I do not take the vantage point of any of those approaches in discussing domestic factors of foreign policy. Rather in this study, in general, I believe that domestic factors broadly shape the *foreign policy dispositions* or *decision-making context* under which decision-makers or foreign policy officials perceive and define situations, formulate options and alternatives, and implement decisions. In so doing, decision-makers are not conceived as wandering around various, mostly conflicting interests of societal sectors to result in *ad hoc, inconsistent* foreign policy behaviors (Frieden, 1988). Nor are they seen as those who are better described as instruments or representatives of any particular group or sector. Rather, they are seen as a group of role occupants who are exposed to, yet interpret, adjust and moderate various societal inputs in such a way as to be consistent with their role expectations as well as their shared conception of *national* or *societal interests,* so as to make authoritative decisions regarding allocation of resources, given the situation.[15] Then, state as an institution and

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[14] In this regard, a rather provocative, if not surprising, argument and finding is reported in Ostrom and Job (1986) where they found that the propensity to use force by the American presidents is most importantly determined by domestic factors such as economic misery and declining presidential popularity.

[15] Thus, the state is regarded as "a set of central decision-making institutions and roles that must confront *internal* as well as *external* opponents" (Krasner, 1978: 55, emphasis added). In this sense, Putnam's two-level game players is a very apt descriptor (Putnam, 1988).

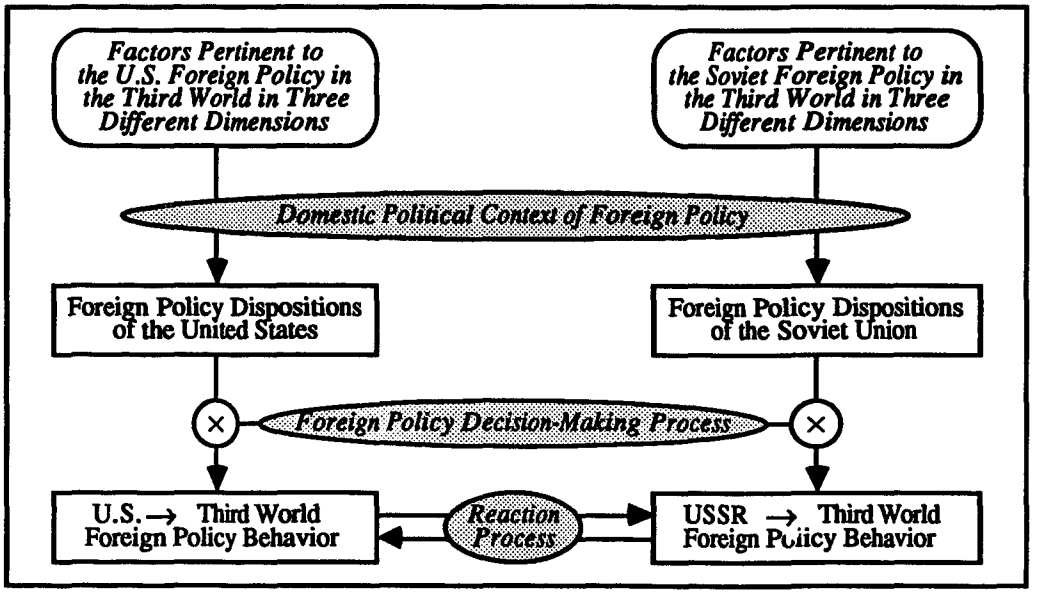

Figure 2.1. An Extended Model of Superpower Rivalry in the Third World: A Two Step Approach

decision-makers as role players within the state apparatus are, to a certain degree, autonomous and independent from the society (Krasner, 1978).

Then, those which affect foreign policy decisions and behaviors are not various domestic factors themselves, but decision-makers' images of those factors along with other relevant situational factors (Brecher, 1972: 11ff). Particularly in the context of this study, I conceive two dimensions of such elite images around which the effects of various factors converge; 'commitment' and 'reactivity' prevailing among political leaders at the moment of decision with respect to the foreign policy activities in a Third World region, as discussed before. Conceptually, 'commitment' is defined in this study as *the degree to which decision-makers are willing to commit society's scarce resources for the purpose of foreign policy.*[16] 'Reactivity' on the other hand is defined in this study as *the degree of perceived challenge to the societal or national interests and values posed by the rival's activities, and consequently the willingness to compete with the rival to defend the threatened interests and values.*

Broadly conceived, 'commitment' and 'reactivity' are certain expressions of the general foreign policy dispositions of a society amongst which foreign policy officials act

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16 Because the term "commitment' contains many meanings as noted by Callahan (1982) and the same term is often used in such ways in this study, when the term 'commitment' is used specifically in the way it is defined, it is within semi-quotation marks throughout this study, and so is the term 'reactivity.'

and interact to shape foreign policy behaviors. Particularly, 'commitment' reflects an actor's *disposition to act* given the situation, and 'reactivity' represents the actor's *disposition to react* given the rival's action. Narrowly conceived, they are the convergent elite images or decision-making filters on a particular foreign policy problem, especially in the context of rivalry between superpowers over the spheres of influence in the Third World. Figure 2.1 summarizes this idea of the 'two-step' approach in the context of action-reaction dynamics.

DETERMINANTS OF 'COMMITMENT' AND 'REACTIVITY'[17]

So conceived, these decision-making filters must reflect the influence of various factors pertinent to the situation. Carefully conceptualized and tested, it is believed that superpowers' attitudes toward changes in such factors, or the effects of such factors on superpowers' foreign policy dispositions would reveal foreign policy orientations of superpowers toward the Third World issues. I conceive three dimensions of the factors which are expected to shape and influence 'commitment' and 'reactivity' as decision-making filters.

1. *Domestic Dimension*: Superpowers' domestic politico-economic conditions as determinants of 'commitment.'
2. *Regional Dimension*: Superpowers' interests in the region as determinants of both 'commitment' and 'reactivity.'
3. *Strategic Dimension*: Relative capabilities and bilateral political relationship between the superpowers as determinants of 'reactivity.'

There are two related ways in which the concept of 'commitment' is conceptualized. From an analytic point of view, it is seen as the degree to which previous foreign policy commitments are 'realized' in terms of the current foreign policy behaviors. From a more aggregate point of view, then, it is believed to represent the willingness of decision-makers to commit society's scarce resources toward the foreign policy purpose *at the expense of* some other valued societal activities. Seen in either way, its level should reflect the degree to which various domestic politico-economic conditions are supportive or permissive to the end. Operationally, two variables are developed to measure the impact of domestic conditions on resource allocations and foreign policy commitment; (1) *economic performance of the society* measured by growth rate in gross national product which

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17 See Chapter V below for more precise discussion of determinants of the 'commitment' and the 'reactivity' and their theoretical underpinnings.

makes economic opportunity cost of foreign policy commitment more or less costly, and (2) *priority of national security issues in governmental agenda* or *the relative power of organizations and officials in charge of national security issues within the governmental power structure*, measured by the value of defense budget as a percent of the total governmental expenditure. This measure reflects the degree to which decision-makers can resist domestic pressures or can persuade an unconvinced public so as to elicit domestic support toward the foreign policy commitment.

A second group of variables which are seen to affect the level of 'commitment' is the *level of vested interests* in the Third World. I conceive two rather contradictory ways in which the level of interests in the region can affect the level of the 'commitment'. On one hand, if the level of interests is so high that there exists certain domestic *consensus about the national interests* to be defended, then the political leaders will be more likely able to elicit domestic support toward the foreign policy ends and ensuing commitment of resources. On the other hand, given that the Third World is relatively minor to some other areas of 'vital interests', for example, Western Europe, the impact of the level of interests on the level of commitment may reflect the *size and influence of sectorial interests* rather than national consensus. And if the interests and positions of those concerned and politically active societal sectors are not congruent, then the foreign policy process in bureaucratic organizations, if not top level leaders, may be interrupted in order that given courses of action may be reevaluated

On the other hand, the concept of 'reactivity' is defined as involving the strategic decision by national leaders on appropriate courses of action, *given the rival's action.* It is believed that the reaction process goes through three different stages or phases; (1) *perception of the threat/challenge* from the rival's action and its seriousness, (2) *decision to react to or to acquiesce in* the rival's challenging action, and (3) *choice of appropriate level of intensity* or the amount of resources with which the rival's action is challenged. Through these three stages of reaction process, there are three key factors to be considered; (1) the level of threat/challenge posed by the rival's action, (2) the likelihood of escalation once the rival's action is challenged, and (3) the prospect of prevailing in the potential confrontation. It is hypothesized that three factors play important role in these considerations.

In determining the level of 'reactivity,' first of all, the *level of interests* will less likely reflect the sectorial influences. Instead, it is hypothesized that the level of interests affects the level of 'reactivity' through decision-calculus of the decision-makers in three

related ways; (1) as a direct measure of the level of national interests that is being challenged and to be defended or, in other words, the *seriousness of the challenge* posed by the rival's action, (2) as a lens through which the rival's intention of action is perceived, and (3) as a gauge to determine the appropriate amount of resources to be used to defend the threatened interests. Generally speaking, *the higher the level of interests, the higher the level of 'reactivity.'*

Such a generalization is harder to obtain with respect to the effects of the two other factors, relative capabilities and bilateral relationship, on the level of 'reactivity' because at each stage of reaction process, their effects could be contradictory. First, when the military balance is favorable for a superpower, the perception of threat will be less because unresisted rival's action will not, or at least is believed not to, change the balance of power and interests substantially. On the other hand, a favorable military balance means that it is more likely that the actor will prevail in potential confrontation and consequently the rival will back off upon resistance, thereby the actor adopts a more coercive policy stance and a higher 'reactivity' level. Still, precisely because the rival is more likely to back off, the overall level of intensity required to 'win' the confrontation may be less.

As for the bilateral relationship, its effects on the level of 'reactivity' at different stages of reaction process are also often contradictory. First, the more congenial the bilateral relationship is, the less likely is the rival's action to be seen as directed against the actor, hence less threatening. Once the rival's action is determined to be threatening, however, the actor is more likely to decide to react to the rival's action because the likelihood of escalation is low and the rival is believed to be sensitive and responsive to the actor's reaction. Yet, such an expectation is apt to be disappointed precisely because of the more congenial relationship. That is, the rival may not take one's reaction very seriously, and it may take more commitment of resources to convince the opponent that one's reaction is real and serious.

Regional Level Dynamics

DECISION-MAKING IN REACTION PROCESS: EXTENSION OF THE BASIC MODEL

Given the conception and dynamics of foreign policy dispositions and decision-making context of superpowers, I define an 'extended model' of superpower competition as in Figure 2.2. In the figure, the impacts of the rival's activity and the actor's own previous activity are seen to be *contingent upon* the domestic dispositions, 'reactivity' and 'commitment.' In other words, the model implies that the inertia/commitment effect of own

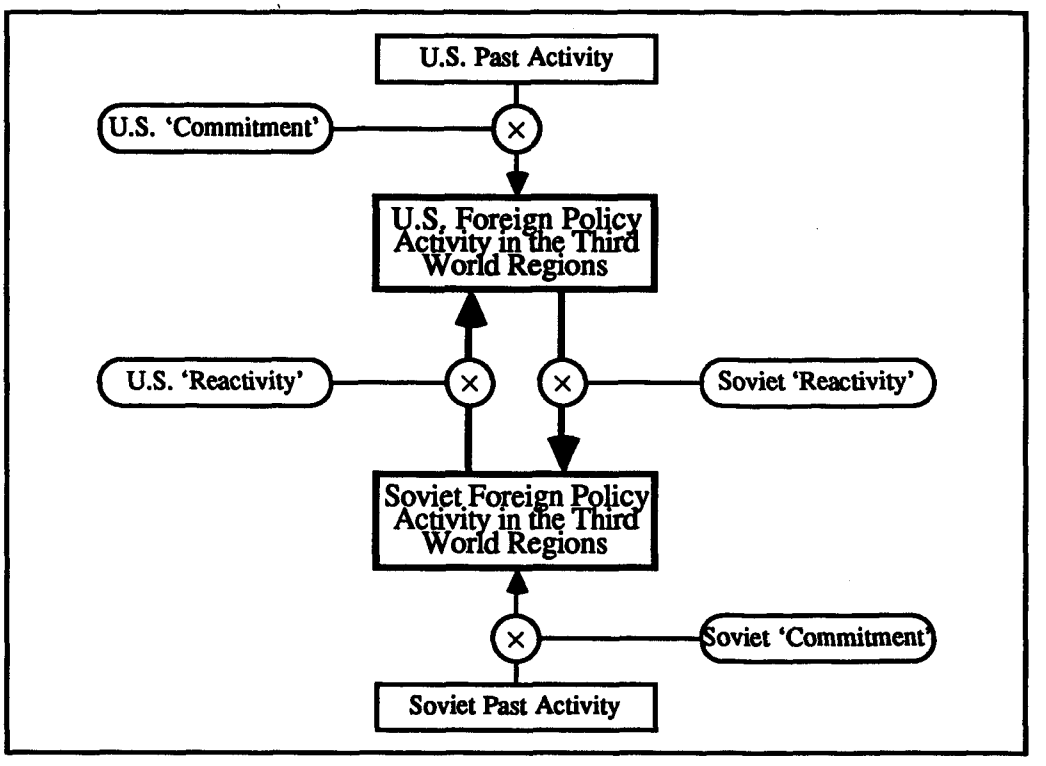

Figure 2.2. The Extended Model of Superpower Interaction

past behaviors is not automatic, but instead previous commitment is reevaluated in view of current domestic conditions. Likewise, the model implies that the reaction to the rival's action is decided through careful examination of pertinent factors such as the level of interests being challenged or threatened, the prospect of prevailing in the confrontation, and the likelihood of escalation. Thus, 'commitment' and 'reactivity' serve as decision-making filters through which the competition process is monitored and regulated.

REGIONAL SOURCES OF SUPERPOWER COMPETITION: 'PROVOCATION'

The dynamics of foreign policy competition between superpowers in terms of reciprocative interaction is often, if not necessarily, provoked by the outbreak or intensification of conflict events in the Third World. Such event are usually indigenous and the superpowers seldom have complete control over them. These conflict events, either inter- or intrastate, possibly change a region's internal political character, external orientation and alignment, and/or external economic relationships, and thereby *destabilize* the region. These destabilizing events, which may be properly called *provocations* following Ashley (1980), therefore either pose a *threat* to one or both

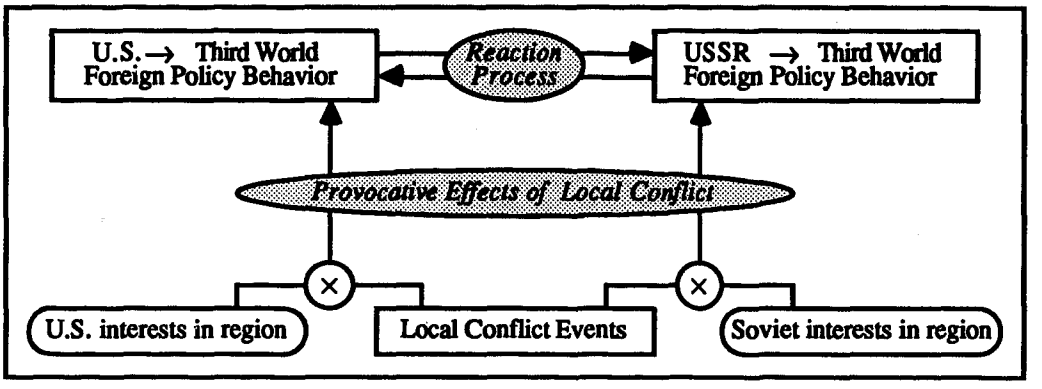

Figure 2.3. 'Provocation': Regional Sources of Superpower Competition

superpowers' established interests in the region or provide an *opportunity* to boost their interests. Upon provocations, then, superpowers are tempted to intervene in an attempt to defend the threatened interests or exploit the situation to further the interests. The other superpower, whose perception of threat is intensified, or perceived opportunity is frustrated by the rival's action, is likely to see the other as exploitive and inclined to intervene in its own cause, assuming the pattern of action-reaction and mutual confrontation.

From an actor's point of view, the provocative effect of the conflict events in the Third World will be proportionate to the degree to which such conflict events pose threat or provide opportunity in terms of the level of interests as well as the situational characteristics. From the systemic perspective, the provocative effect of local conflict events are especially notable when each superpowers' interests are symmetrically high or the region is *polarized.* In the context of superpower rivalry for spheres of influence, a Third World region may be divided and aggregated into two regional sub-blocs representing the respective spheres of influence of two superpowers, as result of superpowers' previous competition and resulting penetration over a period. When the penetration by both superpowers is to such a degree that a major part of the region may be considered being in the spheres of influence of either superpowers and the degree of penetration is relatively symmetric, a region may be called *highly polarized.*

Events in a highly polarized region are especially destabilizing from the perspective of superpowers, because (1) it is more likely that one or more client states for each superpowers are involved in the conflict, (2) commitment to clients/allies is interdependent, and most notably, (3) conflict in a polarized region is more likely to change delicate regional balance of interests significantly. A word of caution is needed at this point,

however; a provocation is neither a necessary nor a sufficient condition for the superpower competition. The superpowers can overtly compete *without* provocations and may not compete *with* provocations. They are just one of the most prominent sources provoking the superpower competition in the contemporary world.

In incorporating the provocative effects of local conflicts on the competition dynamics, they are seen as directly affecting one or both superpowers' foreign policy activity, thus implying that an intervention decision could be autonomous. Yet, placed in the context of the rivalry and the reaction dynamics, any unilateral decision by a superpower to intervene in a local conflict soon becomes a matter of strategic problem, as depicted in Figure 2.3.

CONSEQUENCES OF SUPERPOWER COMPETITION FOR THE LOCAL CONFLICTS

The outbreak of a local conflict may be indigenous, but its course of development is not. As superpowers are competing in the Third World over the spheres of influence, they come to affect the Third World politics, especially Third World conflicts to a larger or lesser degree (e.g., Goldberg, 1988). Conceivably, there are two major ways in which superpower competition comes to affect the Third World conflict, though they are interconnected in certain ways. One way is direct and immediate and the other is indirect, less observable, but more profound and pervasive.

First, when superpowers are competing for the spheres of influence, especially provoked by the events in the region, competition often takes the form of competitive, direct military and economic assistance to the parties involved. A possible direct consequence is (1) *escalation* in magnitude and/or (2) *protraction* in length of the conflict. This is the case because the competitive assistance (1) expands the means of violence, and (2) balances the relative capabilities among parties involved.[18]

The second major way in which superpower competition affects the Third World politics and conflicts is subtle yet more profound. As superpowers are competitively acting toward the Third World nations by providing war-time or peace-time assistance in terms of material support, transfer of technology, and advisorships in major policy planning, etc., superpowers come to penetrate, in its literal sense, and influence every major aspects of the society of recipient countries. The socio-politico-economic system of recipient countries is molded after that of the donor superpower. When superpowers successfully manage their

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[18] Relatedly, Sylvan (1976) carefully examines the effect of sharp increase in military assistance on the conflict behaviors of recipient nations and finds that such nations are more conflict-prone than other nations. Also, Gurr and Duvall (1973) and Gurr and Bishop (1976) note the positive correlation between foreign military intervention and the magnitude of domestic violence.

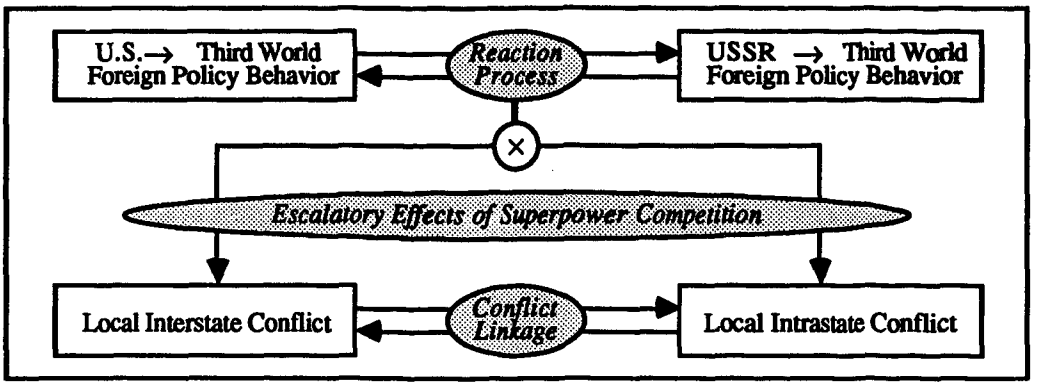

Figure 2.4. 'Escalation': Regional Consequences of Superpower Competition

games over spheres of influence in a Third World region, then, the result is that *the region is further polarized.* As polarization usually occurs along the existing line of local rivalries and conflicts, it not only makes future superpower competition more likely and intense, but also serves as a catalyst for future local conflict.

CONFLICT LINKAGE: A complicating factor in this dynamic is that two major dimensions of Third World conflict, i.e., domestic violence and interstate conflict are not independent but interrelated. On one hand, the increased insecurity in the region through escalated and protracted interstate conflict may increase the political instability of the nations in the region and enhance the likelihood of domestic violence.[19] On the other hand, political conflict and violence in a nation tends to be internationalized either because of external intervention or penetration or because of the foreign policy initiative of the government to induce domestic cohesion.[20]

The linkage between external and internal conflict has been the subject of lots of theoretical and empirical studies, and any decisive evidence is yet to be found, regarding

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19 Stohl (1980) summarizes arguments on this point such that the historical experience of especially modern era that most history-making revolutions have followed in the wake of war tells us that "external conflict and violence leads to an increase, not a decrease in internal violence, and thereby to major destabilizations." This is the case regardless whether the war is victorious or not because the social conditions generated by war, like general dislocation, the material losses and human sacrifices, the large armed population, etc., "create a climate conducive to radical change" (Tilly, 1978: 210, cited in Stohl, 1980: 298).

20 Stohl (1980: 298) further says on this point that "involvement in external conflict (usually war) increases internal cohesion and thus brings about internal peace" because, citing William G. Sumner, "[t]he exigencies of war with outsiders are what makes peace inside, lest internal discord should weaken the we-group for war." And, as a corollary, the external conflict and war may be utilized as a useful tool for policy intended to defend the group cohesion against (possible) internal conflict and violence.

the direction of causality and even the existence of linkage.[21] One intervening factor in this linkage may be the role of government. Notice that the "internal → external" linkage assumes a strong government that can effectively mobilize nation's scarce resources for interstate conflict upon domestic political conflict. Also, it has been noted that the existence of a strong, accommodative government may reduce the impact of international conflict on the domestic (Rasler, 1987). Thus, in as much as the Third World states in general lack such governments as well as resources, the conditions suggest that the "external → internal" linkage may be the case in the Third World. Yet, because of diversity in types of governments as well as societies in the Third World, such a generalization is highly abstract, and might be more an empirical question than a theoretical question, which will be examined with.empirical evidence later in this study.

Systemic Level Dynamics

The consequence of superpower competition in the Third World is not confined to the process of local conflict, but the competition sooner or later affects various dimensions of superpower general rivalry in one way or another. In this study, two dimensions are believed to be particularly affected by the competition in the Third World: (1) the bilateral arms race, and (2) dyadic conflict interaction.

COMPETITION IN THE THIRD WORLD AND SUPERPOWER ARMS RACE

Intensified competition in international arena often comes home in the form of increased feeling of insecurity and compensatory pursuit of security by means of the arms building. That is, while competition itself presupposes that a certain kind of "national interests" is being challenged, protracted and intensified competition may bring in a reappraisal of the rival's capabilities. Also, deteriorated political relationship with the rival, as will be discussed below, may also increases the feeling of insecurity. If one of the ways to compensate for the increased feeling of insecurity is the military preparedness for the worst case, i.e., war, an actor in protracted competition may try to insure its own security by building more arms. Further, historical experiences show that any massive (military) intervention in a Third World event had to be accompanied by ensuing efforts of military buildup as in the U.S. cases of the Korean and the Vietnam War.

Put in the context of bilateral arms *race*, the impact of a superpower's military buildup due to a Third World event is more than casual; rather it is *catalytic, cascading*, and *cumulative* to result in deep system-wide consequences. One of the deductions from

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21 See Stohl (1980) for an excellent survey, and also see, for examples, Wilkenfeld (1973).

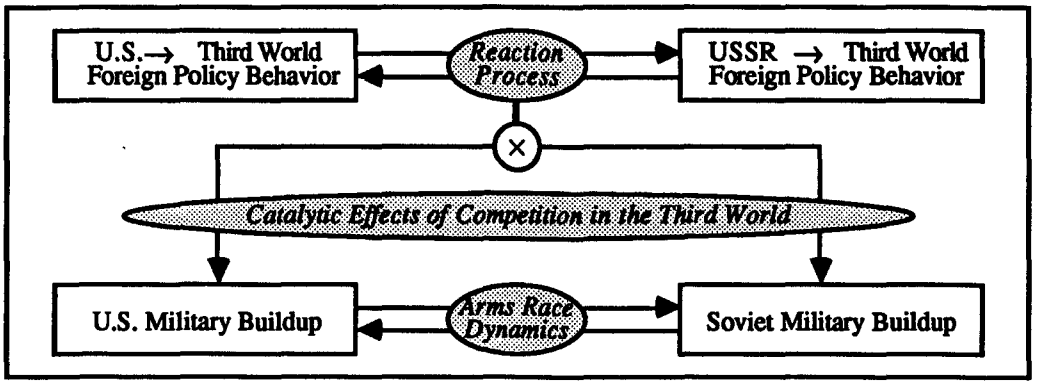

Figure 2.5. Systemic Consequences of Superpower Competition (1) Impact on Bilateral Arms Race

the Richardson's arms race model is that the arms race may end up with a 'non-race' in the long run or culminate at a state of equilibrium where both actors stop increasing armament. A new increase in an actor's armament level due to any external shock, however, can serve a *catalyst* to the dynamic to start a new stage of the arms race. Then, through the process of competitive arms building, the effect of the external shock is *cascading*. Furthermore, due to the domestic political process such as military-industrial complex, bureaucratic inertia, or the memory of past arms race, the impact is *cumulating*. Such a dynamic process is highlighted in Figure 2.5.

COMPETITION IN THE THIRD WORLD AND BILATERAL CRISIS

It has been said that superpowers have been relatively successful in managing their rivalry over the globe in such a way to prevent any immediate crisis between them over past several decades (e.g., George, 1984). Still, it is a matter of historical experience that the competition over the glove has dominated their bilateral relationship of conflict and cooperation during the same period. It is noted that for the past decades, "most crises in Soviet-American relations have occurred because of events in the Third World" (Hough, 1986: v). Indeed, it is highly likely that sooner or later theovert and extended competition in the Third World comes to affect the general relationship between the superpowers such that otherwise possible cooperative ventures halt and foreign policy crises ensue.

One can conceive two dynamic ways in which the competition in the Third World affects the bilateral relationship. First, when one superpower actively expands its presence in the Third World and the other fails to match it, either upon a provocation or not, the latter may directly invoke any conflict behavior toward the rival in order to deter it from a further

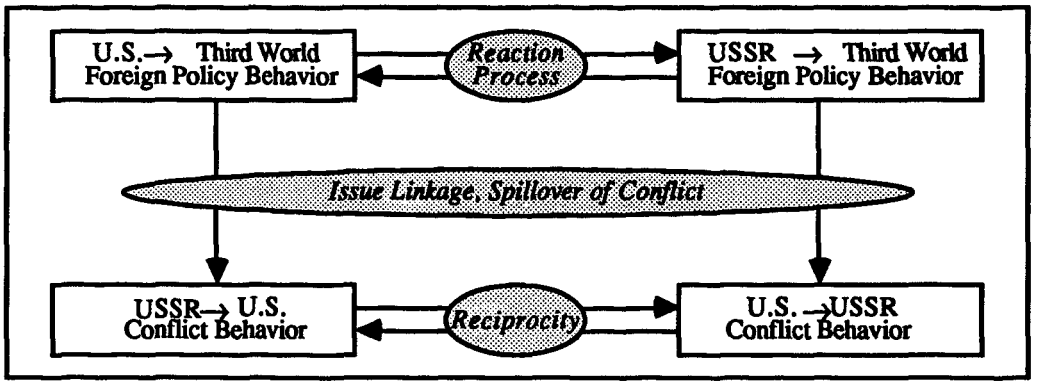

Figure 2.6. Systemic Consequences of Superpower Competition (2): Impact on Dyadic Conflict Interaction

expansion.[22] Those conflict behaviors may include warning, blaming, deployment of armed forces, and so on. Second, when two superpowers are simultaneously involved in a situation resulting in a competition, it does mean that each superpower is denying the other's "rightful" claim in the situation. Thus the process may assume a dynamic spiral of dyadic conflict.

In either case, the process is often escalating. Foreign policy activities are so deeply politicized and related national interests are so closely and complexly interconnected that conflict in one issue area often tends to *spill over* some other issue areas. What is especially notable in this process is the so-called *issue-linkage*.[23] Issues may be linked either *tactically* by deliberate policy-maneuver, or *substantively* due to some unavoidable reality (Haas, 1980; McGinnis, 1986). Further, issues may be linked *horizontally* across foreign policy issues or *vertically* through international politics-domestic politics linkage. As a variety of issues are linked with each other vertically and horizontally to constitute a complex network, conflict over one issue area may spill over into other issue areas in an escalatory fashion having broad and deep implications for the bilateral conflict and crises.[24]

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22 In this regards, one may recall Snyder's distinction between 'deterrence by denial' and 'deterrence by punishment' (Snyder, 1961: 21). That is, a superpower may try to deter the rival from further action either by a matching commitment in the Third World (deterrence by denial) or by direct conflict behavior (deterrence by punishment).

23 While the concept of issue area is developed for the purpose of distinction or categorization to serve an explanatory function (Rosenau, 1966; Potter, 1980; Hermann and Coate, 1982), it is also noted that the interconnectedness of issues or issue-linkage is one that should be kept in mind in studying international conflict and cooperation (Stein, 1980; Axelrod and Keohane, 1981).

24 One should be reminded that although it is widely held (e.g., see Jentleson (1987) for a brief review), the issue-linkage seen in this way is contrary to the arguments by some others. For example, works like Haas (1980) Stein (1980) and McGinnis (1986) emphasize the conflict-deterring or collaboration-stimulating aspect of issue-linkage.

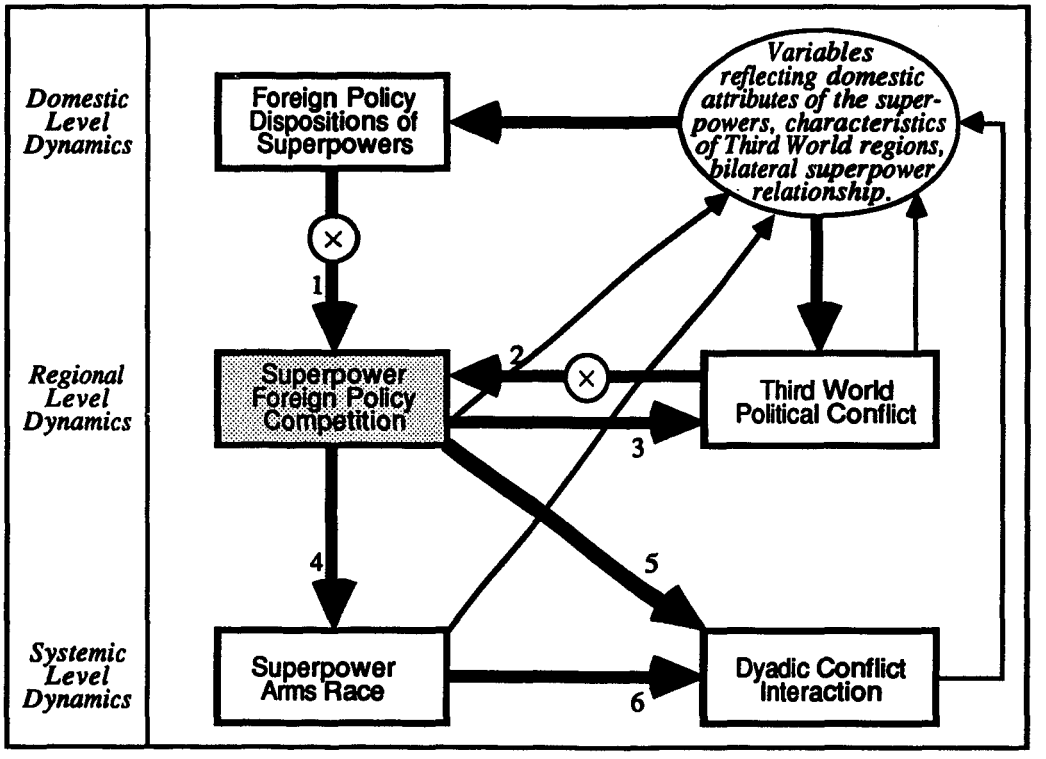


Figure 2.7. A 'General Model' of Superpower Rivalry in the Third World: Three Phases of Superpower Competition

A General Model of Superpower Rivalry in the Third World: Summary and Conclusion

So far, the conceptual framework of this study is discussed from the 'basic model' of reaction processes in superpowers' foreign policy activity in the Third World, through its extension in the domestic and regional contexts, to the system-wide consequences of the competition. In sum, the conceptual framework can be seen in terms of interrelationship within and among five classes of dynamics at three different levels; (1) *domestic level dynamics* of superpowers' foreign policy dispositions and decision-making context with respect to the foreign policy activities in the Third World, (2) *regional level dynamics* of (*a*) superpower foreign policy interaction and (*b*) regional political instability, and (3) *systemic level dynamics* of superpower strategic interaction in terms of (*a*) the bilateral arms race and (*b*) dyadic conflict interaction.

The conceptual framework is succinctly summarized in Figure 2.7, where five classes of dynamic processes are placed within boxes, relationships among the classes are

presented by solid and bold arrows, and light arrows represent feed-back effects. In the figure, it is important to distinguish between dynamics the *within-class dynamics* and the *between-class dynamics*. Within each classes, the phenomena are modeled in the light of their own internal dynamics; (1) reaction process in superpower foreign policy rivalry and competition in the Third World, (2) conflict linkage in the Third World regions, (3) bilateral arms race dynamics, and (4) foreign policy reciprocity in superpower dyadic conflict interaction, as presented in Figures 2.2 through 2.6. In the context of such internal dynamics, any external input into the processes, represented by bold arrows in the figure, is likely to bring about consequences which are *catalytic, cascading,* and *cumulative* as mentioned before.

Leaving the precise degree of such inter-class linkage and cumulative consequences as an empirical question, the arguments embedded in the model are summarized as follows.

1. The process of superpower foreign policy rivalry and competition in the Third World regions can be represented as a action-reaction dynamics (shadowed box).

2. The action-reaction process is subject to a deliberate decision-making process in its domestic context (Arrow 1).

3. This action-reaction dynamics of competition is often, if neither necessarily nor sufficiently, provoked by local conflict events which are perceived to be threatening or providing opportunity to one or both superpowers (Arrow 2).

4. The competitive interaction between superpowers, either or not upon the provocative local events, can bring about further escalation of local conflicts (Arrow 3).

5. Further, the consequence of competition in the Third World can be system-wide by (1) setting and furthering the paces in arms race between superpowers (Arrow 4), and (2) becoming a source of bilateral crises and conflict escalation (Arrow 5).

6. Each of these dimensions or classes of dynamics in turn shape the general context of superpower foreign policy rivalry such that the entire sequence can be reproduced and/or reinforced (light arrows for feedback effects.)

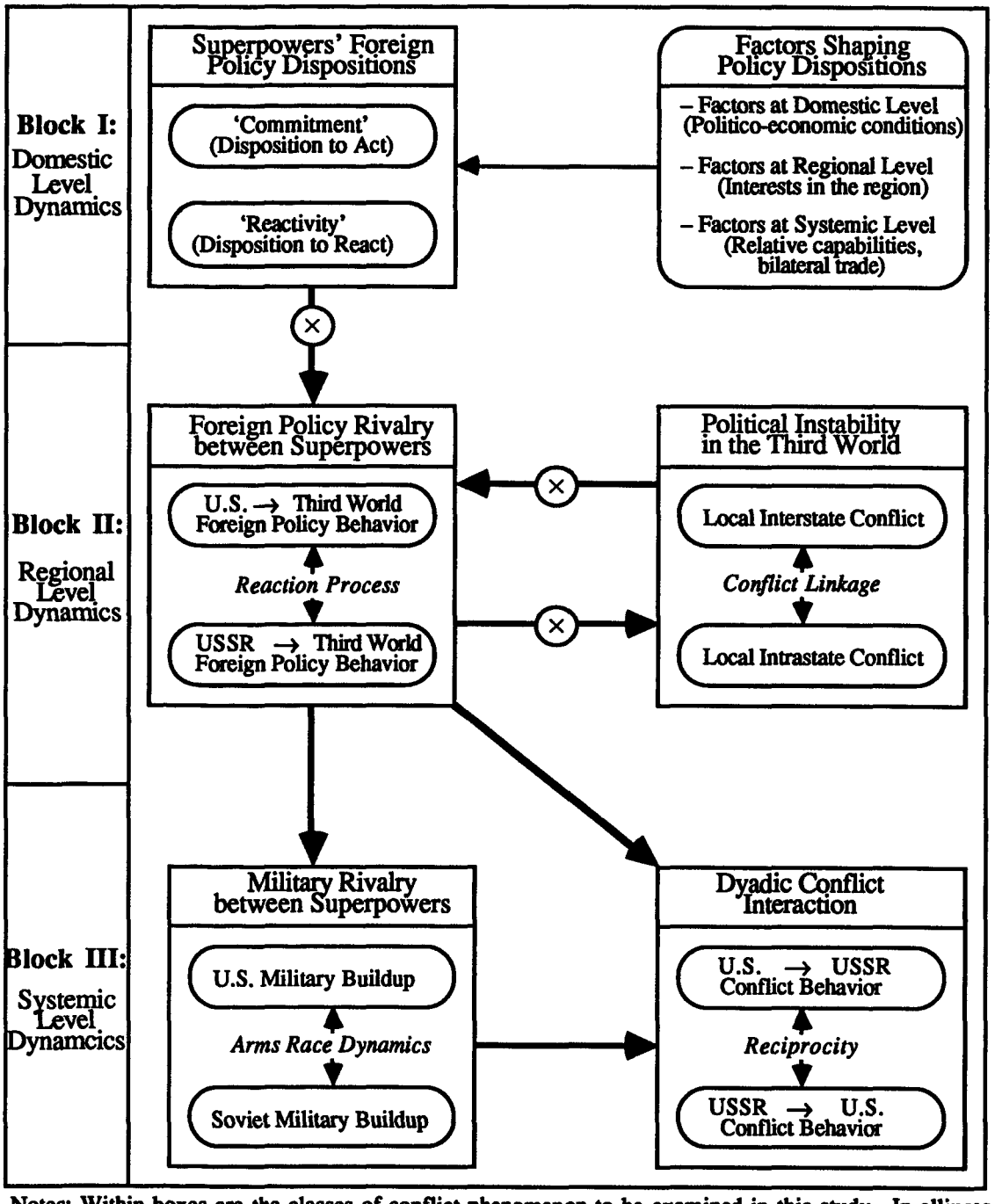
As noted at the outset of this chapter, however, it should be reminded that this set of propositions are yet far from generalizations. Instead, they must be regarded as a 'framework' of reference upon which the internal dynamics and inter-level linkages are more precisely modeled, and from which more readily testable hypotheses are derived. Then, those hypotheses are closely and specifically examined against empirical data. Thus, this research can be seen as an effort to build an *empirical theory* of superpower rivalry and competition in the Third World through interplays of theories, conjectures and data.

CHAPTER III
METHOD OF ANALYSIS

The purpose of this study is said to build an empirical theory of superpower rivalry and competition in the Third World and related phenomena through interplays of theories, conjectures and data. Toward the purpose, this chapter describes and discusses the empirical method of analysis employed in this research. Specifically, first, conceptual framework discussed in the previous chapter is formalized in terms of both schematic diagrams and system of equations. The transition from the conceptual framework in verbal form to a formal model is particularly accompanied by specification of equations for each classes of phenomena. Although a detailed discussion of the precise specification was often incomplete or almost completely skipped in the previous chapter, it becomes necessary in this chapter for both theoretical and methodological reasons.

Next, the overall design of the research is discussed along with operationalization and measurement of key concepts, and the issues of validity of the measures and the criteria of choice among multiple indicators. Finally, the statistical method of analysis employed in this study is discussed in terms of (1) the major statistical problems and their implications for the causal inferences, and (2) the methods used in this research to handle those problems.

In so doing, it is especially kept in mind that the research process is as open as possible so that the research results are reproducible and subject to criticism. Because a major part of this study involves statistical inferences so as to test proposed hypotheses, corroborate/refute implied theoretical claims, and thereby make generalizations and derive practical implications, sound and open method of statistical analysis is critical. This chapter attacks those methodological issues in general and is supplemented by Appendix A where more technical issues are discussed.



Notes: Within boxes are the classes of conflict phenomenon to be examined in this study. In ellipses within each boxes are the *endogenous* variables which are causally determined within the model. Double-headed arrows indicate reciprocal causal relationships between variables whereas single-headed arrows indicate unidirectional causal relationships. Symbol ⊗ represents non-linear relationship.

Figure 3.1. The Conceptual Model

The Model

Overview of Modeling Process

In the previous chapter, I have presented a 'general model' of superpower foreign policy competition in the Third World in terms of (1) action-reaction dynamics in superpowers' foreign policy activity in Third World regions (*a*) in its domestic context of decision-making and general political process of foreign policy making, and (*b*) in the context of regional conflict events, and (2) systematic consequences of the competition process for (*a*) the local conflicts events and (*b*) the bilateral strategic interactions. What is presented in the model is essentially a complex network of causal links within and among some of the major social phenomena in the contemporary world. In the next section, the causal links are made explicit and formalized in terms of (1) schematic diagrams and (2) systems of equations. Formal presentation of the conceptual framework is needed not only to make the causal links explicit, but to build a footstep toward empirical analysis of the overall model and thereby to test the propositions made in the conceptual framework.

In summarizing the conceptual framework in terms of Figure 2.7 and calling it a 'general model,' the model is seen to involve the interrelationships *between* and *within* five classes of conflict processes. And, with 'commitment' and 'reactivity' defined for both of the superpowers, the conceptual model is a system of twelve endogenous variables.[1] Figure 3.1 now extends Figure 2.7 and is especially designed to highlight both *within* and *between* classes dynamics. Notice in the figure, first, that for each pair of variables within each class there are specified the reciprocal causalities. Second, those variables are arranged along the three levels of analysis and the system is hierarchical in general. That is, vertically, variables are listed by the levels, from domestic to systemic, and the interlevel causalities are specified unidirectional, from lower to higher levels, or from top to bottom except feedback effects. This hierarchical structure of interlevel linkages has an important implication for the modeling effort in this study.

IDENTIFICATION AND USE OF EXOGENOUS VARIABLES

To build an econometric model, three requirements have to be met; mathematical completeness, identification, and estimation (Wonnacott and Wonnacott, 1979: 274ff,

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[1] An endogenous variable is one to be conceptually defined and determined within the system, hence what is to be explained by the theory. In contrast, an exogenous variable is (pre-)determined without the system, thus explains and not to be explained by the theory. Exogenous variables consist of two classes; (1) lagged endogenous variables which are predetermined by the system and (2) 'pure' exogenous variables determined out of the system.

472). Mathematical completeness of a system requires that there be as many linearly independent equations as endogenous variables to have unique solutions for them. Identification of an equation requires that there be some adequate number of exogenous variables in the system in order to get unique solutions for the structural parameters which represent relationships among the model variables. Estimation requires no perfect multicollinearity, or some degree of independence among explanatory variables. While the requirement for mathematical completeness is often simply assumed to be met, the requirement for identification is a highly complex issue involving the number of exogenous variables used in each equations as well as the structural relationship among endogenous variables. Basically, the condition for identification requires us to use some *adequate* exogenous variables.[2]

Mathematical adequacy in terms of number of exogenous variables is not enough, however. Exogenous variables must be adequate *explanatory* variables such that each equation is adequately specified. By including extraneous variables that do not really belong to the model, we will loose efficiency of estimates. By omitting variables that really belong to the model, our estimates of parameters will be biased. Then, a causal modeling enterprise not only consists of conjecturing and testing hypotheses on the relationships among the endogenous variables as the *main* theory, but also involves locating the theory on a set of *auxiliary* theories.

COMPLEXITY AND BLOCK-RECURSIVE STRUCTURE

Therefore, a multi-equation model is highly complex, and building and testing such a model are often cumbersome. High performance computers may enable statistical analysis of such a complex system, yet the model's overall property and behavior are incomprehensible and estimation steps are mystified. One way to deal with the problem of complexity in an econometric system is to insure a block-recursive structure.[3] Simon (1969) has argued that hierarchical social systems are often "near-decomposable" such that the whole system is divided into several subsystems and interactions within the subsystems are immediate and strong and interactions among the subsystems are weak and negligible in

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2 For example, order condition for identification of an equation in a system, which is necessary but not sufficient, states that, at minimum, there must be as many exogenous variables excluded from the equation as endogenous variables included in the right-hand side of equation. For a more detailed discussion of identification, see Appendix A.

3 A nonrecursive system of equations refers to a system in which reciprocal causalities among variables are specified, or more generally error terms in each equations are correlated with one another. A recursive system is, on the other hand, one in which causality among endogenous variables are unilateral and no correlation among error terms in pairs of equations is assumed.

the short run. A block-recursive system is analogous to a near-decomposable system, yet possesses somewhat stronger properties. In a block-recursive system, variables are divided into several groups or blocks such that there may be reciprocal causalities among variables within each blocks, hence nonrecursive within the block, but unilateral causation and independent error terms across different blocks, hence recursive among blocks (Berry, 1984: 84-86).

Figure 3.1 shows that simultaneous determination among variables within each class requires a nonrecursive specification at least for each level. Yet, hierarchical nature of between-class linkage allows block-recursive specification. Thus, the conceptual model of this study can be expressed as a three-block, block-recursive system of equations.[4]

The Model

Figures 3.2 through 3.4 present the conceptual model of this research in which twelve endogenous variables are grouped into three blocks and each blocks are complete with sets of exogenous variables. The conceptual model is also represented in terms of systems of equations (3.1) through (3.12). Before we discuss specifics of the model, i.e., specification of causality among endogenous variables, selection of exogenous variables and their indicators, etc., a few general points are to be noted here.

First, as mentioned earlier, the model may be better called a 'general model' serving heuristic purposes. It is a general model in that the same model is applied to each of the Third World regions. It is assumed that superpower competition and the Third World political dynamics follow the same process across all the regions. This may seem to be rather a strong assumption, stronger than necessary, but at the same time the model is heuristic in that some minor variations at empirical level are allowed to reflect the regional idiosyncrasies. During the estimation stage, for example, insignificant variables are dropped out of the equation, different functional forms are specified, and alternative indicators are tried out. Indeed, the conceptual model itself is a product of extensive experiment in terms of specification, functional forms, and empirical indicators.

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[4] Assumption on unilateral causation among blocks is a matter of specification, hence theory, and is not too hard to justify. But independence among error terms is rather a strong assumption. Of the sources of error terms are measurement errors in both dependent and independent variables. When endogenous variables from different blocks are from same data sources and/or they share same set of exogenous variables, the assumption of block-recursive structure may be unjustified. The assumption of block-recursiveness in this study may be particularly questioned on a conceptual ground because of the feedback effects of the Block II and Block III variables to the Block I equations. This problem is primarily handled by lagging those variables, and further aided by using different data sources to measure the variables reflecting the regional and systemic level dynamics, but treated exogenous in Block I.

Second, all the equations in the model are formulated in a dynamic form, i.e., include lagged dependent variables on the right hand side of the equation. Among many ways to interpret the dynamic model, one is that the impact of exogenous variables is carried over to the next period value such that the effects are *cumulating* overtime.[5] Finally, for the most pairs of equations within each classes, *reciprocal* causal relationships are specified between/among the endogenous variables. Given the reciprocal causal relationship, impact of any exogenous variable on one of the endogenous variable is also carried over to the other endogenous variable through indirect effect, yet it is cumulating over time through dynamic formulation, and then affects the other endogenous variable at the next period of time. Thus, in this system of simultaneous equations in dynamic form, the impact of an exogenous variable is *cascading*.

BLOCK I: DOMESTIC LEVEL DYNAMICS

Block I contains four equations, first two for 'commitment' and the other two for 'reactivity' of each superpower, as in Equations (3.1) through (3.4). In Chapter II, it is hypothesized that three groups of variables affect the level of these variables; (1) the domestic politico-economic conditions, (2) the level of interests in the Third World, and (3) the bilateral strategic relationship. More specifically, the level of 'commitment' is hypothesized to vary as the function of (1) the domestic conditions in two dimensions, i.e., (*a*) the general domestic economic condition and (*b*) the relative power position of foreign policy officials vis-à-vis other governmental agencies or any other domestic political forces, and (2) the level of interests in the Third World in two dimensions, i.e., (*a*) political and (*b*) economic. On the other hand, the level of 'reactivity' is hypothesized to vary as the function of (1) the level of interests in the Third World in two dimensions as 'commitment' but in different process, and (2) the bilateral superpower relationship in terms of (*a*) the relative (military) capabilities, and (*b*) the bilateral political climate. The equations are specified to examine these hypothesized relationships. Operationalization and indicators of these variables are discussed in the next section.

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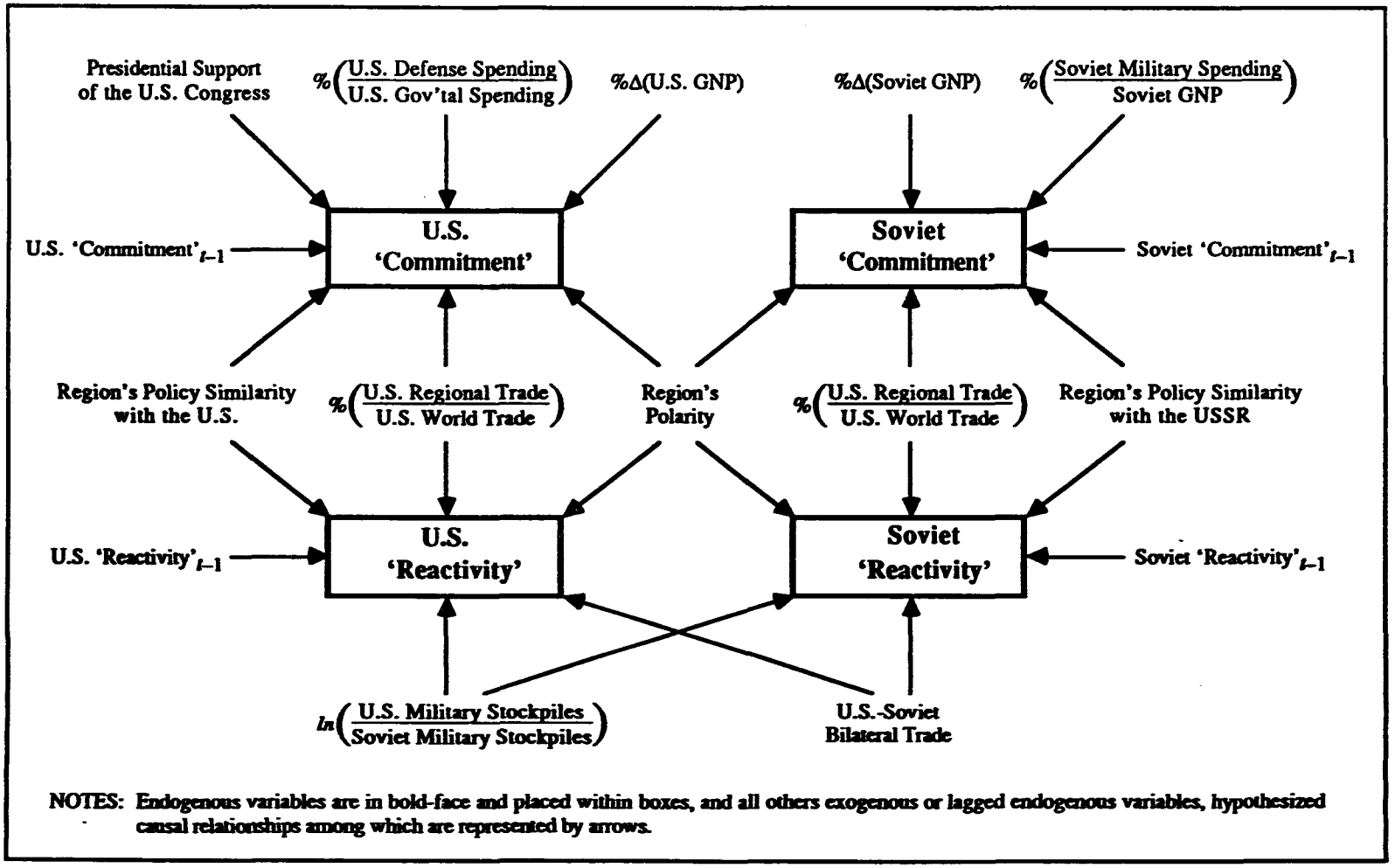
[5] The Koyck's distributed lag model is it (Koyck, 1954). For a dynamic equation such as $Y_t = aY_{t-1} + bX_t$, $0<a<1$, the impact of X variable is carried over to the next successive period with exponentially decreasing rate such that the long term effect of X on Y can be seen as the sum of infinite geometric series, i.e., $b/(1-a)$.

$$\text{U.S. 'Commitment' in a Third World region} = \alpha_{1.1}$$
$$+ \beta_{1.11}\ \text{U.S. Commitment}_{t-1}$$
$$+ \beta_{1.12}\ [\%\Delta(\text{U.S. Gross National Product})]$$
$$+ \beta_{1.13}\ \text{Presidential support of the U.S. Congress}$$
$$+ \beta_{1.14}\ \%\left(\frac{\text{U.S. defense spending}}{\text{U.S. governmental spending}}\right)$$
$$+ \beta_{1.15}\ \text{Region's policy similarity with the U.S.}$$
$$+ \beta_{1.16}\ \%\left(\frac{\text{U.S. regional trade}}{\text{U.S. total trade}}\right)$$
$$+ \beta_{1.17}\ \text{Region's polarity} + \mu_{1.1} \qquad (3.1)$$

$$\text{Soviet 'Commitment' in a Third World region} = \alpha_{1.2}$$
$$+ \beta_{1.21}\ \text{Soviet Commitment}_{t-1}$$
$$+ \beta_{1.22}\ [\%\Delta(\text{Soviet Gross National Product})]$$
$$+ \beta_{1.23}\ \%\left(\frac{\text{Soviet military expenditure}}{\text{Soviet Gross National Product}}\right)$$
$$+ \beta_{1.24}\ \text{Region's polarity}$$
$$+ \beta_{1.25}\ \%\left(\frac{\text{Soviet regional trade}}{\text{Soviet total trade}}\right)$$
$$+ \beta_{1.26}\ \text{Region's policy similarity with USSR} + \mu_{1.2} \qquad (3.2)$$

$$\text{U.S. 'Reactivity' in a Third World region} = \alpha_{1.3}$$
$$+ \beta_{1.31}\ \text{U.S. Reactivity}_{t-1}$$
$$+ \beta_{1.32}\ \text{Region's polarity}$$
$$+ \beta_{1.33}\ \text{Region's policy similarity with the U.S.}$$
$$+ \beta_{1.34}\ \%\left(\frac{\text{U.S. regional trade}}{\text{U.S. total trade}}\right)$$
$$+ \beta_{1.35}\ \text{U.S.-Soviet bilateral trade}$$
$$+ \beta_{1.36}\ ln\left(\frac{\text{U.S. military stockpiles}}{\text{Soviet military stockpiles}}\right) + \mu_{1.3} \qquad (3.3)$$

$$\text{Soviet 'Reactivity' in a Third World region} = \alpha_{1.4}$$
$$+ \beta_{1.41}\ \text{Soviet Reactivity}_{t-1}$$
$$+ \beta_{1.42}\ \text{Region's polarity}$$
$$+ \beta_{1.43}\ \text{Region's policy similarity with USSR}$$
$$+ \beta_{1.44}\ \%\left(\frac{\text{Soviet regional trade}}{\text{Soviet total trade}}\right)$$
$$+ \beta_{1.45}\ \text{U.S.-Soviet bilateral trade}$$
$$+ \beta_{1.46}\ ln\left(\frac{\text{U.S. military stockpiles}}{\text{Soviet military stockpiles}}\right) + \mu_{1.4} \qquad (3.4)$$



NOTES: Endogenous variables are in bold-face and placed within boxes, and all others exogenous or lagged endogenous variables, hypothesized causal relationships among which are represented by arrows.

Figure 3.2. Block I - Domestic Level Dynamics: Hypothesized Dynamics for the Superpowers' Foreign Policy Dispositions

BLOCK II: REGIONAL LEVEL DYNAMICS

Figure 3.3 and equations (3.5) through (3.8) represent Block II of the model consisting of a pair of symmetric equations for foreign policy activities of superpowers in the Third World regions, modeled in terms of reciprocal interaction between two superpowers, plus equations for the local conflict events, both interstate and intrastate. The first component in the equations is called the *threat/reactivity* term, measured by the rival's corresponding activity multiplied or weighted by 'reactivity,' as defined and determined in Block I. This specification implies that a major portion of a superpower's foreign policy activity can be regarded as reactions to the rival's actions. Further, the multiplicative interaction with 'reactivity' indicates that the threatening effect of rival's activity is contingent upon, or weighted by the prevailing level of threat one perceives, as emphatically discussed in Chapter II.[6]

The second component in the model is the inertia/commitment term specified as a multiplicative interaction between the commitment of the superpower, as defined and determined in Chapter 5, and the actor's previous level of activity. In general, a nation's foreign policy activity tends to be inertial, i.e., replicates itself over time, out of two primary sources; (1) the bureaucratic process, and (2) commitment to the future. First of all, it is well noted in a wide range of literature that, because of the embedded parochialism and the programmed character of practice, behaviors of organizations are highly inertial and incremental such that today's action is only marginally different from yesterday's action and tomorrow's action will be only marginally different from today's action (e.g., Allison, 1971). Seen as organizational output, thus, foreign policy behaviors of nations tend to perpetuate and be replicated over time (e.g., Phillips, 1978). Second, foreign policy behaviors of nations also tend to perpetuate because foreign policy behaviors themselves often involve binding commitment to the future action, or they are expressions of decision-makers' commitment to a particular outcome (Callahan, 1982). Then, from an aggregate point of view, the lagged value of the foreign policy activity as a regressor implies the proposition that "a major proportion of the level of a nation's foreign policy activity can be

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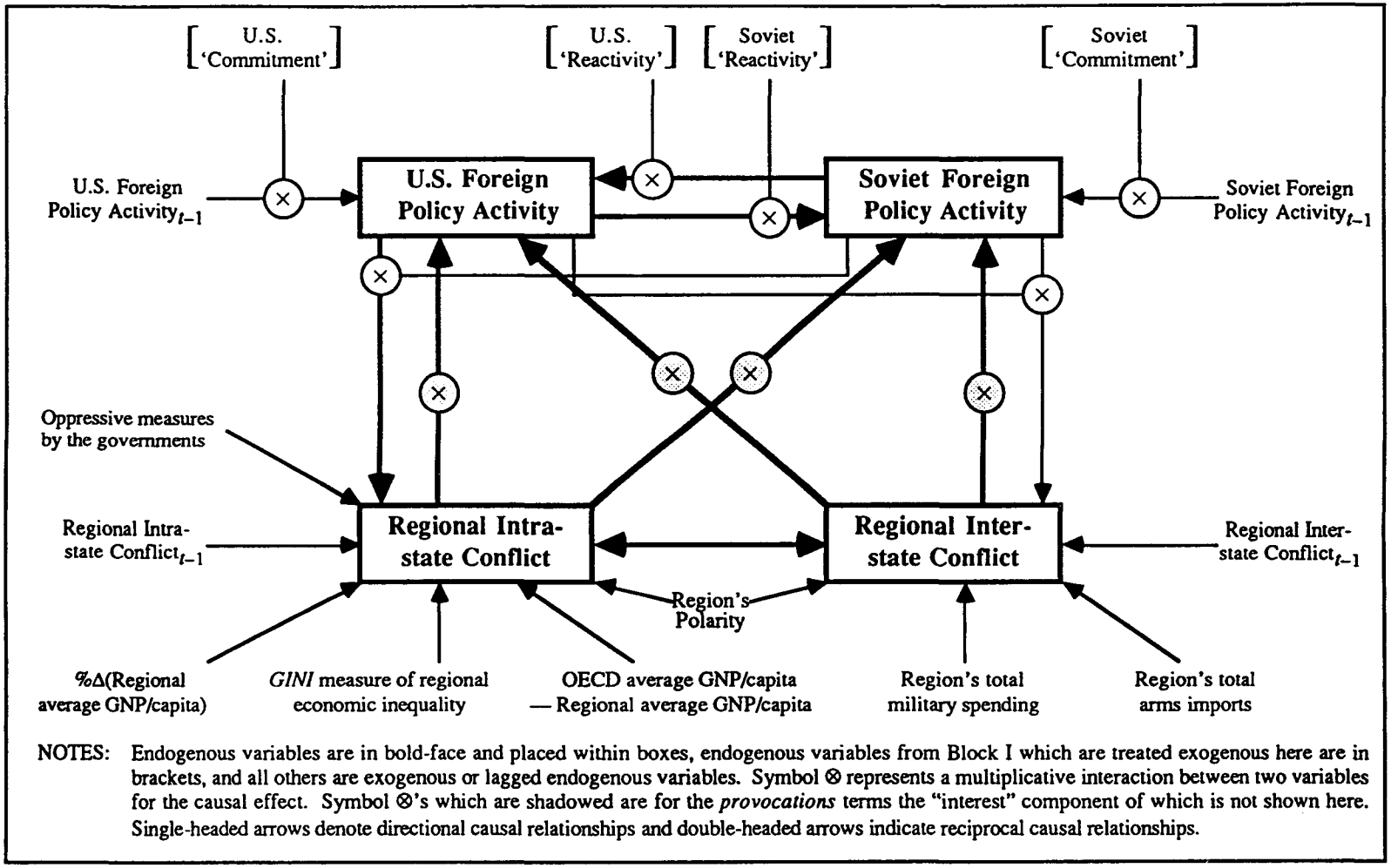
6 When a multiplicative interaction between two variables, say X_1 and X_2, is specified for the causal effect on another variable Y, it is in effect only when both X_1 and X_2 are present. In other words, if any of two is absent, the causal effect is not existent. Or, given the level of X_1, its effect on Y is weighted by the level of X_2 (Blalock, 1969; Alker, 1969). What is important to note in this regard is that if the proposed hypothesis is that the dependent variable is the function of interaction between X_1 and X_2, the *null* hypothesis is one that the dependent variable is the function of neither variables. Frequent use of multiplicative interaction terms in this research should not complicate the estimation procedure too much, however, because it is non-linear in variable, but linear in parameter.



NOTES: Endogenous variables are in bold-face and placed within boxes, endogenous variables from Block I which are treated exogenous here are in brackets, and all others are exogenous or lagged endogenous variables. Symbol ⊗ represents a multiplicative interaction between two variables for the causal effect. Symbol ⊗'s which are shadowed are for the *provocations* terms the "interest" component of which is not shown here. Single-headed arrows denote directional causal relationships and double-headed arrows indicate reciprocal causal relationships.

Figure 3.3. Block II - Regional Level Dynamics:
Hypothesized Dynamics for Superpowers' Foreign Policy Activity and Local Conflicts in a Third World Region

explained by its past level of activity." Multiplicative interaction with 'commitment' further denotes the proposition that the inertia/commitment effect of foreign policy is not automatic, but subject to reevaluation of the past commitment and achievement, and thus contingent upon the domestic disposition to act. That is to say, a high level activity in the past is not replicated at the present time unless the actor is domestically disposed to act in the Third World.

Finally, two measures for provocation terms complete each equation. Provocations are conceptualized in the conceptual framework as abrupt occurrences or intensifications of destabilizing events in Third World regions perceived by each superpower either to pose a threat to its vested interests in the region or to provide an opportunity to further the interests. Specified in terms of a multiplicative interaction between the level of the local conflict events and region's level of polarization, these measures imply the proposition that local events in a highly polarized region are particularly provocative as they are more likely to involve client states of one or both superpowers, and/or possibly change regional balance of interest significantly.

$$\begin{aligned}\text{U.S. Foreign Policy Activity in a Third World region} &= \alpha_{2.1} \\ &+ \beta_{2.11}\,(\text{U.S. Foreign Policy Activity}_{t-1} \times \text{U.S. 'Commitment'}) \\ &+ \omega_{2.11}\,(\text{Soviet Foreign Policy Activity} \times \text{U.S. 'Reactivity'}) \\ &+ \omega_{2.12}\,(\text{Regional Interstate Conflict} \times \text{Region's polarity}) \\ &+ \omega_{2.13}\,(\text{Regional Intrastate Conflict} \times \text{Region's polarity}) \\ &+ \mu_{2.1} \qquad (3.5)\end{aligned}$$

$$\begin{aligned}\text{Soviet Foreign Policy Activity in a Third World region} &= \alpha_{2.2} \\ &+ \beta_{2.21}\,(\text{Soviet Foreign Policy Activity}_{t-1} \times \text{Soviet 'Commitment'}) \\ &+ \omega_{2.21}\,(\text{U.S. Foreign Policy Activity} \times \text{Soviet 'Reactivity'}) \\ &+ \omega_{2.22}\,(\text{Regional Interstate Conflict} \times \text{Region's polarity}) \\ &+ \omega_{2.23}\,(\text{Regional Intrastate Conflict} \times \text{Region's polarity}) \\ &+ \mu_{2.2} \qquad (3.6)\end{aligned}$$

Equations for the political instability in Third World regions consist of four components; (1) the corresponding lagged dependent variables, (2) a term for the superpower foreign policy competition in the region, (3) a term for the conflict linkage, and (4) sets of exogenous variables. First, lagged dependent variables are expected to capture the "contagion" effect of the war or any large social conflict, both temporal addiction and spatial contagion (Levy, 1984). Second, the term for the superpower competition is

specified in terms of a multiplicative interaction between two superpowers' foreign policy activities to represent 'simultaneous' involvement by both superpowers in the region. Third, two dimensions of local conflicts are expected to influence the level of each other, reflecting the conceptual argument of the conflict linkage.

Among the exogenous variables, both equations contain a term called the polarity in the region, representing the degree to which the region is drawn into the politics of superpower rivalry. Except this variable, two equations contain unique set of exogenous variables, which are introduced largely for the purpose of statistical control and identification. The equation for the local domestic violence roughly approximates one of the established theory on the subject; the theory of relative deprivation (Gurr, 1970), although specification and measurement of variables do not exactly replicate existing studies in the tradition (e.g., see Gurr and Duvall, 1973; Gurr and Bishop, 1976). A group of exogenous variables thus measure various dimensions of value deprivation experienced by the peoples in the region, particularly (1) the domestic economic depression, (2) the regional economic inequality, and (3) the systemic economic disparity, plus (4) the political repression for political value deprivation.

Equation for the interstate conflict contains two exogenous variables which supposedly measure the level of existing hostilities and conflict among nations in the region; region's total military expenditure and total arms imports. Instead of making a theoretical argument that the arms race causes war, the specification is simply to suggest that the ongoing level of interstate hostilities as captured by the military preparedness of nations in the region provides a good predictor of the level of local interstate conflict behaviors, for the purpose of statistical control and identification.

$$\begin{aligned}\text{Regional Interstate Conflict} &= \alpha_{2.3} \\ &+ \gamma_{2.31}\ \text{Regional Intrastate Conflict} \\ &+ \omega_{2.31}\ (\text{U.S. Foreign Policy Activity} \times \text{Soviet Foreign Policy Activity}) \\ &+ \beta_{2.31}\ \text{Regional Interstate Conflict}_{t-1} \\ &+ \beta_{2.32}\ \text{Region's total military spending} \\ &+ \beta_{2.33}\ \text{Region's total arms imports} \\ &+ \beta_{2.34}\ \text{Region's polarity} \\ &+ \mu_{2.3}\end{aligned} \tag{3.7}$$

$$\begin{aligned}\text{Regional Intrastate Conflict} &= \alpha_{2.4} \\ &+ \gamma_{2.41}\ \text{Regional Interstate Conflict} \\ &+ \omega_{2.41}\ (\text{U.S. Foreign Policy Activity} \times \text{Soviet Foreign Policy Activity}) \\ &+ \beta_{2.41}\ \text{Regional Intrastate Conflict}_{t-1}\end{aligned}$$

$$+ \beta_{2.42}\,[\%\Delta(\text{Region's average GNP/capita})]$$
$$+ \beta_{2.43}\,\text{GINI Index measure of regional economic inequality}$$
$$+ \beta_{2.44}\left(\frac{\text{OECD average GNP/capita}}{\text{regional average GNP/capita}}\right)$$
$$+ \beta_{2.45}\,\text{Political repression in the region}$$
$$+ \beta_{2.46}\,\text{Region's polarity}$$
$$+ \mu_{2.4} \qquad (3.8)$$

BLOCK III: SYSTEMIC LEVEL DYNAMICS

Equations (3.9) through (3.12) show the system of equations included in Block III, which is graphically represented in Figure 3.4. This last block contains two sets of symmetric equations for the strategic level interactions between the superpowers; diplomatic and military. A common component in each set of equations is the 'reciprocity' term reflecting instantaneous reactivity and reciprocal threat, which is widely noted in the literature. Another common element is the lagged dependent variable. As for the diplomatic interaction, we would see the effect of bureaucratic inertia as in the case of Block II equations. As for the military expenditure, the lagged dependent variable will reflect various domestic influences such as the budgetary procedure, bureaucratic organizations, military-industrial complex or any other socio-political forces opposing any abrupt, particularly downward change in the level of military spending, or simply social viscosity. Following Choucri and North (1975: 237) and Ashley (1980: 146, 161), there is specified a relationship between military expenditure and conflict interaction such that the difference between two nations' military expenditure affects dyadic conflict behavior reflecting the so-called "compensatory logic." Following Ward (1984), on the other, it is specified that the past level of conflict behavior an actor received from the rival affects the current level of the actor's military spending.

But the key to the specification is to estimate the impact of the foreign policy competition in the Third World on these strategic level interactions between superpowers. It is hypothesized that the competition in the Third World, which is operationalized by a multiplicative interaction between the U.S. and Soviet activities, affects both the dyadic conflict behaviors and the military spendings. First of all, one's response to the rival's activity in the Third World will not be confined to matching activities in the region, which is discussed in Block II. Rather, it may also include direct warning, protest, or any other hostile action serving the purpose. Further, a protracted competition itself means to an actor that its own claim for 'legitimate right' is denied or frustrated by the rival's actions. Similarly, an intensified and protracted competition may affect the level of military

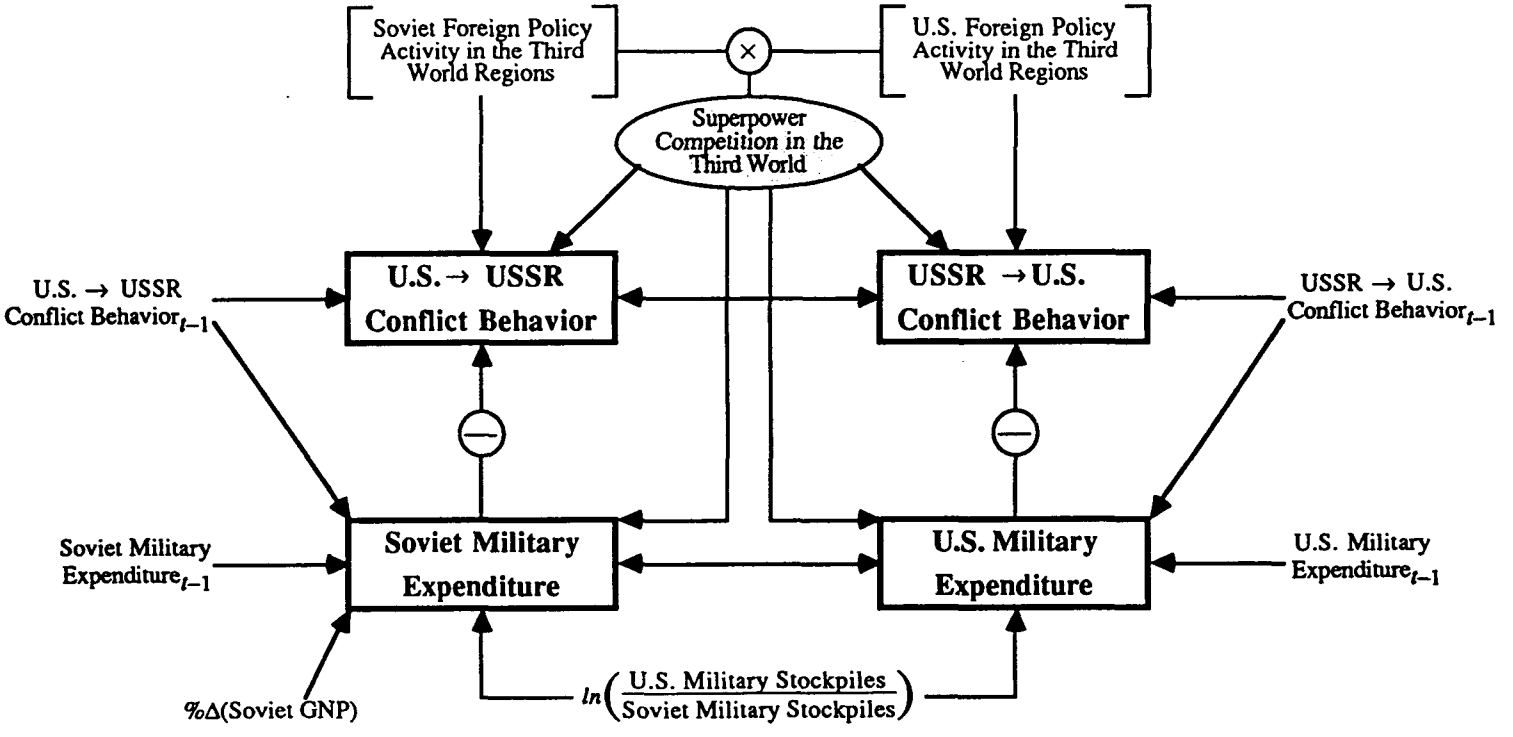
spending not only because the competition itself often involves use of military means, but also because the actor may want to (*a*) prepare for the worst contingency, i.e., a bilateral war, and (*b*) demonstrate its own strength and resolve through the military posture.

$$\begin{aligned}\text{U.S. Military Expenditure} &= \alpha_{3.1} \\ &+ \gamma_{3.11}\ \text{Soviet Military Expenditure} \\ &+ \beta_{3.11}\ \text{U.S. Military Expenditure}_{t-1} \\ &+ \beta_{3.12}\ ln\left(\frac{\text{U.S. military stockpiles}}{\text{Soviet military stockpiles}}\right)_{t-1} \\ &+ \beta_{3.13}\begin{pmatrix}\text{U.S. Foreign Policy Activity in the Third World} \\ \times\ \text{Soviet Foreign Policy Activity in the Third World}\end{pmatrix} \\ &+ \mu_{3.1}\end{aligned} \tag{3.9}$$

$$\begin{aligned}\text{Soviet Military Expenditure} &= \alpha_{3.2} \\ &+ \gamma_{3.21}\ \text{U.S. Military Expenditure} \\ &+ \beta_{3.21}\ \text{Soviet. Military Expenditure}_{t-1} \\ &+ \beta_{3.22}\ ln\left(\frac{\text{U.S. military stockpiles}}{\text{Soviet military stockpiles}}\right)_{t-1} \\ &+ \beta_{3.23}\begin{pmatrix}\text{U.S. Foreign Policy Activity in the Third World} \\ \times\ \text{Soviet Foreign Policy Activity in the Third World}\end{pmatrix} \\ &+ \beta_{3.24}\ [\%\Delta(\text{USSR GNP})] \\ &+ \mu_{3.2}\end{aligned} \tag{3.10}$$

$$\begin{aligned}\text{U.S.} \rightarrow \text{USSR Conflict Behavior} &= \alpha_{3.3} \\ &+ \beta_{3.31}\ \text{U.S.} \rightarrow \text{USSR Conflict Behavior}_{t-1} \\ &+ \beta_{3.32}\ \text{Soviet Foreign Policy Activity in the Third World} \\ &+ \beta_{3.33}\begin{pmatrix}\text{Soviet Foreign Policy Activity in the Third World} \\ \times\ \text{U.S. Foreign Policy Activity in the Third World}\end{pmatrix} \\ &+ \gamma_{3.31}\ \text{USSR} \rightarrow \text{U.S. Conflict Behavior} \\ &+ \omega_{3.31}\ (\text{Soviet Military Expenditure} - \text{U.S. Military Expenditure}) \\ &+ \mu_{3.3}\end{aligned} \tag{3.11}$$

$$\begin{aligned}\text{USSR} \rightarrow \text{U.S. Conflict Behavior} &= \alpha_{3.4} \\ &+ \beta_{3.41}\ \text{USSR} \rightarrow \text{U.S. Conflict Behavior}_{t-1} \\ &+ \beta_{3.42}\ \text{U.S. Foreign Policy Activity in the Third World} \\ &+ \beta_{3.43}\begin{pmatrix}\text{Soviet Foreign Policy Activity in the Third World} \\ \times\ \text{U.S. Foreign Policy Activity in the Third World}\end{pmatrix} \\ &+ \gamma_{3.41}\ \text{U.S.} \rightarrow \text{USSR Conflict Behavior} \\ &+ \omega_{3.41}\ (\text{U.S. Military Expenditure} - \text{Soviet Military Expenditure}) \\ &+ \mu_{3.4}\end{aligned} \tag{3.12}$$



NOTES: Endogenous variables in the block are in bold-face and placed within boxes, endogenous variables in the previous blocks, treated exogenous here, are in brackets, and all others are exogenous or lagged endogenous variables. In the shadowed ellipse is the identity defined as the multiplicative interaction between two variables. Single-headed arrows denote directional causal relationships and double-headed arrows indicate reciprocal causal relationships. Symbol ⊗ denotes multiplicative interaction between two variables, and symbol ⊖ represents difference between two variables for causal effects.

Figure 3.4. Block III - Systemic Level Dynamics: Hypothesized Dynamics and Consequences of Competition in the Third World for Dyadic Conflict Behaviors and Military Expenditures of the Superpowers

Method of Analysis

Research Design: An Overview

Given the conceptual framework which is presented in Chapter II and formalized in the preceding section, a formidable task is to test proposed hypotheses, and thereby validate the overall theoretical claims. Then, what is needed is a carefully designed empirical analysis which would enable us to corroborate theoretical arguments, test competing hypotheses and suggest the relative applicability of the contending theoretical traditions, and refute any of those so as to lead to further heuristic findings and discoveries.

Some of the key incredients in this research design are already laid out if implicitly; the statistical analysis of a multilevel causal model with time series observations. The statistical method provides a systematic way to sort out patterns out of a mass of information (*descriptive statistics*), and infer theoretical as well as practical implications therefrom (*inferential statistics*). Also, the focus on the dynamic processes of this research suggests a time series analysis is more appropriate than a cross-sectional analysis.

The time series design, however, has an important setback; it may obscure the structural configurations which underlie the processes. In as much as we cannot explain why a particular hypothesis is supported in the analysis instead of any of the rival hypotheses, the time series design is unable to specify the conditions under which the proposed process is realized. In this regards, two further characteristics of the present research design are to be noted. First of all, as far as it is feasible, models for the behaviors of the superpowers are deliberately specified *symmetrically* so as to insure the inter-actor comparability. Such a symmetric specification will provide an additional degree of freedom so that the different ways in which the process is unfolded can be compared.

Second, the Third World, which is operationally defined as a residual category, i.e., the group of states who belong to neither the First World, i.e., the group of advanced industrialized states, nor the Second World, i.e., the group of socialist states in Eastern Europe, is divided into four geographic regions and the model is also applied to each of them.[7] This regional segregation will provide some more degrees of freedom upon which we can *qualitatively* analyze structural conditions underlying the process.[8]

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[7] Four geographic regions are (1) Latin America, (2) Africa, (3) the Middle East, and (4) Asia. Conceivably, one might question this design of regional segregation on two grounds. First, as much as the demarcation between regions is arbitrary, regions may not be as distinct as the design assumes; e.g., Southwest Asia is geographically closer and culturally more similar to the Middle East than to the East Asia. Second, but not unrelatedly, one region is not as closed to other regions as it is assumed; a classical

Given the time series design and a multivariate model, the compatibility of various measures together with the availability of the data sources limits choice of the temporal units as well as the interval of research period. That is to say, while some of the data sources, especially events data, allow shorter temporal units, one-year time unit is chosen because many of the sources do not simply provide any shorter breakdown than one-year for this relatively long research period. Further, availability of a key data source limits the temporal scope of this research so that only a portion of relevant historic period is analyzed.

Operationalization, Measurement and Choice of Indicators

MEASURING ENDOGENOUS VARIABLES

Table 3.1 summarizes the measures/indicators of twelve endogenous variables in seven categories. As obvious in the table, majority of the endogenous variables concern some aggregate aspects of interstate interaction or foreign policy behaviors of various actors. To this extent, this research explores the foreign policy events data which have shown remarkable development in both the conceptualization of events and the collection of events during last decades. In particular, foreign policy events are aggregated around their behavioral attributes over the chosen time interval to measure the aggregate aspects of the phenomena in question. In this way of measurement, thus, the key conceptual basis is the attributes or properties of discrete events.

While overtime aggregation of events usually involves counting the number or frequency of events possessing certain attributes in question, two of such attributes especially provide the conceptually rich measures of aggregated foreign policy activities and/or interstate relations. One of them is the distinction between the conflictual and cooperative behavior yielding the interstate *affect* expressed in any dyad of nations (Dixon, 1984). The other is the *intensity* of commitment meaning the level of resources irreversably used in the behavior. Seen from the perspective of resource allocation, this attribute reflects the activism of an actor toward the classified recipients (Callahan, 1982).

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example is the role of Cuba in African conflicts. While the distinction follows the convention in the field, i.e., based on Singer-Small nation code, however, some empirical studies have demonstrated that geographic distinction of regions is still one of the most useful ways of compartmentalizing the world (Russett, 1967; 1968).

[8] Given the regional segregation, four regions could be pooled and a pooled cross-section time series analysis could be invoked (Stimson, 1985). This is not done here however mainly because of data problems. That is, measures of various variables do not yield stable or comparable variation across regions so that the basic assumption of pooled design, i.e., constant coefficients across sections, is not met.

Table 3.1. Indicators of Endogenous Variables

Conceptual Variables	Measures/Indicators	Remarks
A superpower's *'commitment'* in a Third World region	Average value of the *inertia* coefficient estimates from the 'moving-window' estimation of the basic action-reaction model for three-year, overlapping period using monthly aggregated events data.[a]	Reflects *continuity/consistency* in foreign policy behaviors of a superpower in the region. See text for a detailed discussion and Chapter IV for an illustration.
A superpower's *'reactivity'* in a Third World region	Average value of the *reaction* coefficient estimates from the 'moving-window' estimation of the basic action-reaction model for three-year, overlapping period using monthly aggregated events data.[a]	Reflects *sensitivity* of a superpower to the rival's foreign policy activity in the region. See text for a detailed discussion and Chapter IV for an illustration.
A superpower's *foreign policy activity* in a Third World region	Annual, weighted frequency of foreign policy behaviors of a superpower toward all the political entities in the region.[a]	Aggregates foreign policy behaviors in terms of both the volume and the intensity of commitment. See Chapter IV for a detailed discussion and summary statistics.
Interstate conflict in a Third World region	Regional aggregation of annual, weighted frequency of foreign conflict behaviors exchanged among nations in the region.[a]	See Chapter VI for summary statistics and illustrations.
Intrastate conflict in a Third World region	Regional aggregation of annual frequency of domestic conflict events which occurred within the states in the region.[b]	Conflict events include demonstrations, riots, assassinations, armed attack, etc. Yet, the measure is sensitive to large scale conflicts such as civil wars. See Chapter VI for summary statistics and illustrations.
U.S. → Soviet (Soviet → U.S.) *conflict behavior*	Annual, weighted frequency of the conflictul behaviors *minus* annual, weighted frequency of the cooperative behaviors initiated by a superpower toward the other superpower.[a]	Measures the *net* level of hostility expressed by a superpower toward the other superpower.
Military buildup of a superpower	Annual military spending of a superpower.[c]	Reflects both the current level of military preparedness and efforts of further buildup.

Data Sources:
[a] Edward Azar, *Conflict and Peace Data Bank* (COPDAB) (ICPSR Study No. 7767)
[b] Taylor and Jodice, *World Handbook of Political and Social Indicators III, 1948-1982* (ICPSR Study No. 7761)
[c] Stockholm International Peace Research Institute (SIPRI), *SIPRI Yearbook*, various volumes.

In measuring the level of foreign policy activities of superpowers in Third World regions, as well as the level of interstate conflict in the regions and dyadic conflict behavior between superpowers, the COPDAB (the *Conflict and Peace Data Bank*) events data set is used because it provides the most comprehensive temporal and spatial coverage. Also, each events are weighted by the COPDAB intensity score.[9] Further, for the measure of dyadic conflict behaviors between superpowers, the net conflict level is devised instead of the raw level, to measure the dyadic affect.

Measures for the 'commitment' and 'reactivity' variables are obtained by averaging short-term parameter estimates of the 'basic model,' a method first used by Azar, et al. (1974) and later called 'moving window' estimation by Smith (1987). That is, the basic model is applied to monthly aggregated foreign policy activity variables for the 36 monthly observations in three year period and successively with one-year increment, e.g., 1960-1962, 1961-1963, 1962-1964 and so on. Then, parameter estimates from each estimation where a particular year value is included are averaged to yield the annual value of the variables. This moving-window estimation is illustrated in Chapter IV.

INDICATORS OF EXOGENOUS VARIABLES

Table 3.2 summarizes indicators used for the 'pure' exogenous variables in this research, which are in general grouped into four categories; (1) the domestic attributes or conditions of the superpowers, (2) the attributes of Third World regions in relation to the superpowers, (3) the attributal/behavioral characteristics of the Third World regions and (4) those describing the general inter-superpower relationship. Reading the table, especially notice that these indicators are selected from a relatively long list of alternatives as the result of an extensive experiment. And, this process may be characterized as an interplay of two types of validity in measurement; the *face validity* and the *hypothesis validity* (Hermann, 1967). First, the face validity, meaning intuitive and intersubjective plausibility, is regarded as a necessary condition for an indicator to be selected. Among the multiple indicators which meet this condition, then, the one which supports the theory the most is selected (hypothesis validity). While the priority of the face validity guards the conceptual framework against a temptation of the 'pure' empiricism, the experiment with the multiple

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[9] See Table 4.2 in Chapter IV for COPDAB weighting scale. Presumably because events are seen as something 'reportable' or 'newsworthy' (Azar, 1980: 146) and collected from media reports which are especially sensitive to high intensity events, however, simple frequency and weighted frequency tend to be highly correlated. As seen in Table 3.1, the level of regional intrastate conflict is measured by aggregating events reported in another events data set, and not weighted simply because the particular data set does not provide comparable weighting scale. Also, in actual estimation of equations involving these events-count variables, two-year moving average values are used for the purpose of smoothing.

Table 3.2. Indicators of Exogenous Variables

Underlying Concepts	Operational variables	Measures/ Indicators	Remarks	Data Sources
Superpowers' *domestic politico-economic conditions*	Political Support and Opposition	Presidential Support of the U.S. Congress	Defined as annual percentage of presidential victories on congressional votes where the President took a clear-cut position.	Congressional Quarterly Inc. (1986), *Congressional Quarterly Almanac, 1985*, p.118.
		$\%\left(\frac{\text{U.S. defense expenditure}}{\text{U.S. gov'tal expenditure}}\right)$	Reflects relative power position of the political elites and/or bureaucratic organizations in charge of defense or foreign policy in governmental power structure, *or* priority of defense/foreign policy issues in governmental agenda as reflected in the process of resource allocation.	For both values, U.S. Congress (1988), *Economic Report of the President, 1987*
		$\%\left(\frac{\text{Soviet military expenditure}}{\text{Soviet GNP}}\right)$		For Soviet military expenditure values, various issues of *SIPRI Yearbook* are used. As for Soviet GNP values, U.S. ACDA, *World Military Expenditures and Arms Transfers, 1982*, is used and supplemented by Michievicz (1973) for earlier year values.
	Economic Performance	$\%\Delta$(U.S. GNP)	Measures the economic growth rate reflecting economic liveliness of a society; and also reflect relative priority of economic/domestic issues to defense/foreign policy issues in governmental agenda particularly in a centrally planned economy.	
		$\%\Delta$(Soviet. GNP)		
Superpowers' *interests* in the region	Political dimension of interests	Regional average of *policy similarity score* with U.S. [USSR][a,b]	Measures similarity in foreign policy orientations of the Third World states and a superpower as observed in their voting records in the United Nations General Assembly.	Constructed from ICPSR, *United Nations Roll-Call Data* (ICPSR Study No. 5512)
	Economic dimension of interests	$\%\left(\frac{\text{U.S.(Soviet) regional trade}}{\text{U.S. (Soviet) world trade}}\right)$	Reflects the relative importance of the region to the superpowers as trading partner. May also reflects the influence of the 'concerned' societal sectors.	International Monetary Fund, *Directions of Trade* (available in machine-readable form from ICPSR [ICPSR Study No. 7629])
Polarity in the region	Region's polarity score	Regional standard deviation of differences in individual states' *policy similarity score* with two superpowers.[b]	Underscores the notion that the more divergent nations in the region are in their relative similarity of foreign policy orientations with each of the superpowers, the more polarized is the region.	See above for *policy similarity score* measure.
Local *rivalries* and *hostilities* in the region	Military buildup in the region	Region's total military spending Region's total arms imports	Reflects existing rivalry, conflict and hostility among nations in the region.	SIPRI, *SIPRI Yearbook*, various issues Brzoska and Olson (1987)

Table 3.2. (Continued)

Underlying Concepts	Operational Variables	Measures/ Indicators	Remarks	Data Sources
	Political repression in the region	Number of oppressive policy measures by the governments in the region	Includes violent suppression of domestic uprisings by the governments.	Taylor and Jodice, *World Handbook of Political and Social Indicators III, 1948-1982* (ICPSR Study No. 7761)
Relative deprivation experienced by the people in the region	Domestic economic condition	Regional average economic growth rate [%Δ(GNP per capita)]	Measures economic satisfaction/grievances of the people in the region. Reflects relative deprivation felt at the *domestic* level.	For economic time series used for this group of domestic variables, World Bank, *Cross-national Socio-economic Time Series, 1950-1975* (ICPSR Study No. 7592) is primarily used, and supplemented by World Bank, *World Tables of Economic and Social Indicators, 1950-1981* (ICPSR Study No. 8197)
	Regional economic inequality	*GINI* Index measure of regional inequality in GNP per capita[c]	Measures economic inequality among nations within the region, and reflects relative deprivation experienced at the regional level.	
	Systemic economic inequality	(OECD average GNP/capita) – (Regional average GNP/capita)	Measures (systemic) economic disparity between people in OECD nations as the privileged and those in the region as the deprived.	
U.S.-Soviet bilateral relationships	Bilateral economic transactions	U.S.-Soviet bilateral trade volume (U.S. export to USSR + U.S. import from USSR)	Also reflects bilateral political climate as far as 'trade follows the flag' (Pollins, 1989), or political relationship affects dyadic economic transaction.	International Monetary Fund, *Directions of Trade* (see above); the value reported by the U.S. is used.
	Relative military capabilities of the superpowers	$ln\left(\frac{\text{U.S. military stockpiles}}{\text{Soviet military stockpiles}}\right)$	Directly measures the relative 'war-readiness' or 'war-preparedness' of superpowers, in terms of strategic and conventional military capabilities.	Ward (1984), p.312

Notes: [a] Each individual states' voting records in the U.N. General Assembly on every issues are compared with those of the superpowers, and assigned scores of similarity; 2 for agreement, 0 for disagreement and 1 for the cases in which one, but not both, of the parties abstains. The sum of scores across all issues in the session is compared to the highest possible score (= 2 × number of issues) to have an individual state's *policy similarity score* with the particular superpower in terms of percentage value. Average value of the scores across all the states in the region is taken as the region's *policy similarity score* with the superpower. See text for more discussion on this measure.

[b] Three-year moving average value is taken as the final score to be used in estimation.

[c] *GINI* index for a region ($GINI_r$) is calculated using the following formula taken from Taylor and Jodice (1983).

$$GINI_r = \left(\sum_{i=1}^{n-1} X_i Y_{i+1} \right) - \left(\sum_{i=1}^{n-1} X_{i+1} Y_i \right)$$

where X_i refers to cumulative percentage of nation numbers, Y_i refers to the cumulative percentage of GNP per capita, and n refers to the number of nations in the region.

indicators has often produced unexpected findings so as to lead to revisions, refinements and further developments of the conceptual framework. To this extent, as noticed before, the conceptual model itself is largely the result of this experimental process.

Also, some problems with respect to the question of reliability are also to be noted. Because the measures used in this study are in general drawn from the existing sources of data, reliability of the measures heavily depends upon the reliability of those data, which is beyond the control of this research. There are two related problems to be discussed in this regard. First, in measuring the characteristics of Third World regions, the fact that the Third World has not been constant during the research period poses a problem. That is to say, as the process of decolonization has accelerated and the number of states in the region has drastically increased, measurement of the regional characteristics by aggregating individual states' characteristics could be unstable.

Second, in measuring regional characteristics using existing time series data, some data points were missing for some, if not many, of the states. In this case, missing data points are interpolated by taking mean value of the previous and the next values. In so doing, it is expected that measurement errors for individual units are canceled out if the missing points are for multiple units, and the error is to a minor degree for the aggregate regional measure if the missing points are for few units. In reducing the complex world into quantified observations, one cannot expect no distortion at all. And such a distortion is one of the unavoidable costs of any quantitative approach.

Statistical Method of Analysis: A Practical Review[10]

Once the conceptual model is set up in a formal form and the relevant world is reduced to a set of quantified observations, the next step is 'fitting' the model to the real world, i.e., the empirical data. By applying or fitting a theoretical model to empirical data, we want to (1) establish the empirical 'fit' or the validity of the model (*goodness of fit*), (2) estimate the parameter values reflecting the hypothesized causal relationships between the dependent variable on one hand and the independent variables on the other (*parameter estimation*), and thereby (3) test hypotheses regarding the causal relationships (*statistical inference*).

Regression analysis is so far the most widely used method of applying or 'fitting' a theoretical model to the empirical data. Least squares solution, i.e., fitting parameter values

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10 See Appendix A for more detailed and formal discussion of this section.

such that the sum of squares of errors is minimized, is particularly useful because it involves relatively simple algorithm and possesses some strong properties. Statistical theory tells us that, properly conducted, i.e., if certain assumptions are met, OLS (Ordinary Least Squares) estimator is *BLUE*, *b*est among *l*inear *u*nbiased *e*stimators. Conceiving a hypothetical situation in which we repeat regression analysis of the same model on infinite number of samples with fixed size randomly drawn from the population, OLS estimator, a linear function of the dependent variable, is

1. *unbiased*, i.e., the expected value or mean of the estimates from the samples is equal to the population parameter, and *asymptotically consistent*, i.e., coefficient estimate from any sample approaches the population parameter as the sample size approaches infinity, if errors are distributed independent from, thus not correlated with any of the independent variables, and

2. *best*, i.e., has the least variance among the class of linear unbiased estimators if error terms are not serially correlated (no autocorrelation) and have uniform variances (homoskedasticity) over successive time points.

These properties have some important implications for the purposes of statistical analysis noted above because

1. least squares estimator by definition maximizes the goodness of fit in terms of the proportion of explained variances by minimizing sum of squared errors, i.e., unexplained variances,

2. unbiased and consistent estimator is what one would like to have in parameter estimation, and

3. being least dispersed about the population parameter, least squares estimator is the most likely to be close to the population parameter, hence the most efficient for the purpose of statistical inferences.

In this research, some of the assumptions are frequently violated due to the nature of the model. Since the data used in this research are time series observations, first of all, the assumption of no autocorrelation is often violated.[11] When autocorrelation in error terms is present, OLS estimator is no longer best and, further, estimates of coefficient variances are biased, if coefficient estimates themselves are not. Thus, statistical inference

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11 Throughout of this research, it is assumed that heteroscedasticity is not present. It may not be a realistic assumption, but a conservative assumption in terms of the research purpose, thus does not distort the research results very much. That is to say, while this research is more concerned to establish the causal relationships rather than to reject them, the consequence of heteroscedasticity is deflated t-ratio values leading to likely rejection of true causal relationships. Relatedly, King (1989) questions the adequacy of conventional regression technique for event count model because (1) dependent variables as frequencies of events involves high level of heteroskedasticity, hence big loss in efficiency and (2) taking logarithm to reduce heteroskedasticity sometimes leads to adding any arbitrary number because logarithm for zero value is not defined, and relatedly (3) the estimates are highly sensitive to the arbitrary number, hence unstable. His second and third points are not relevant here, however, and, we decided to suffer the effect of heteroskedasticity as noted.

may be misguided such that we may reject a true null hypothesis of no relationship (*Type I Error*) or accept a false null hypothesis (*Type II Error*). Second, because of the non-recursive structure of each blocks where errors are by definition correlated with the endogenous variable(s) within the block included in the equation as a regressor, OLS estimates of coefficients are both biased and inconsistent.

If autocorrelation is a problem, however, there is a rather simple solution; (pseudo-) GLS (Generalized Least Squares) estimation, which yields another BLUE estimator . GLS solution is equivalent to running OLS on the data transformed in a certain way. The way variables are transformed depends on the time dependent process in errors, which follows some typical patterns such as *autoregressive* process [AR(p)], *moving-average* process [MA(q)], or mixed *autoregressive-moving average* processes [ARMA(p,q)], with order p and/or q typically low, i.e., 1 or at most 2. These patterns and the associated coefficients can be inferred and estimated from the OLS residuals because the OLS estimator is still unbiased upon the presence of autocorrelation.

To estimate equations in a non-recursive system, on the other hand, Two Stage Least Squares (2SLS) method, which yields consistent, if still biased, is one that is the most widely used. Specifically, 2SLS applied to each equation in a system of simultaneous equations involves two stages of regression; (1) regressing the endogenous variables on all the exogenous variables in the system and taking the predicted values as instrumental variables (IVs) for the engogenous variables, and (2) conducting an OLS regression after replacing the endogenous variables in the equation by the IVs created at the fist stage.

In addition to the issue of identification discussed in Appendix A, however, 2SLS has two important problems; a *loss of efficiency* and the *multicollinearity*. First, 2SLS estimator is not as efficient as OLS estimator because IVs have less variances than the original variables by nature. The efficiency of 2SLS estimator depends upon how well the IVs represent the original variables, which can be noted by R^2 at the first stage regression. Second, there will be a relatively high degree of multicollinearity between an IV and the set of exogenous variables, or another IV plus the set of exogenous variables because IVs are essentially linear transformations of all the exogenous variables including those in the equation.

A rule of thumb to handle these problems is to *specify each equation as distinct as possible* such that all the equations in the system have one or more major explanatory factors which are uniquely specified for each of the equations. In a time series model, such variables are often found in the corresponding lagged dependent variables if error terms are

not serially correlated. As noticed above, when errors are serially correlated, the lagged endogenous variables become correlated with the errors, and they can be no longer treated as exogenous or predetermined. Further, since the OLS estimator is biased for a dynamic model with serially correlated errors, an analysis of the residuals does not yield any diagnostic measure. Thus, it has been suggested that it would be safe to treat all the lagged endogenous variables as *endogenous*, not predetermined (Berry, 1984).

Because of the problems of loss of efficiency and multicollinearity noted above, however, we still want to keep the lagged endogenous variables as predetermined after certain statistical manipulations. The method is essentially what Hibbs (1974) calls IV-GLS method applied to each stage of 2SLS estimation. IV-GLS method applied to a regression equation with the lagged dependent variable among regressors involves the following steps;

1. Regress the lagged endogenous variable on the current and lagged values of all other exogenous variables, and take the predicted value as IV for the lagged endogenous variable.

2. Run OLS on the model with the IV substituted for the lagged endogenous variable in the equation and retrieve residuals.

3. Examine the residuals via correlogram analysis[12] to check presence of autocorrelation. If the correlogram shows no significant autocorrelation at successive lags, run OLS on the model which will yield coefficient estimates with desirable properties, and take the result as final. If the correlogram shows significant autocorrelation, further examine the residuals to determine the model of time dependent process in errors and estimate associated coefficients.

4. Based on the information obtained at step 3, construct an $\hat{\Omega}$ matrix, i.e., the matrix of variance-covariance in errors to be used in GLS.

5. Using the $\hat{\Omega}$ matrix and original values of the lagged endogenous variable, run GLS on the model and take the result as final (Johnston, 1972: 303-320; Hibbs, 1974).

With the above steps of IV-GLS applied to each stages of 2SLS estimation of the equations in the system of simultaneous equations, the statistical method of analysis used in this research is summarized graphically in Figure A.1 in Appendix A.

SOME INTERPRETATIONAL STATISTICS

In the tables reporting the results of statistical analysis in the subsequent chapters, the following statistics and related information are especially reported.

R-square value as a measure of the goodness-of-fit. It is hard to build a model for complex social phenomena, and it is harder to establish the empirical validity of the

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12 Correlogram refers to the graphic presentation of autocorrelation coefficients over successive lags.

model. A conventional way is to check the 'goodness-of-fit', usually in terms of the proportion of the variation explained by the model to the total variation in the dependent variable, i.e., R^2 value. Problems with the R^2 statistic are that (1) there is no objective criterion to judge between a 'good fit' and a 'poor fit' in terms of its magnitude other than conventions, and (2) the measure is sensitive to the degrees of freedom, i.e., the number of independent variables with fixed number of observations. The latter is particularly problematic when models with different specifications are compared with each other. Therefore in the following chapters, the *adjusted R-Square*[13] is instead reported to control the degree of freedom factor. An alternative or supplementary statistics is F-statistics which provides a way testing explanatory value of the model by the probability theory.

Unstandardized regression coefficient. Since we hardly have any standardized unit of measurement for variables, the absolute numerical value of regression coefficient is often meaningless. Nonetheless, its sign, positive or negative and relative magnitude in relation to the standard error, i.e., t-ratio, are highly meaningful. The sign is particularly important because different signs usually involve competing theoretical claims, hence important theoretical implications.

Student's t-statistics, which is measured by the ratio of unstandardized regression coefficient to its standard error, is also important especially for the statistical inference. It shows whether the size of estimated regression coefficient is significantly different from zero such that we may conclude the hypothesized causal relationship between dependent and independent variables is real, hence hypothesis test. In this regard, the level of statistical significance of the statistics, given the degree of freedom, is also given to show the likelihood that our inferences of causality could be errorneous.

Notice however that we are dealing with a historical process for which the conception of sample and population falls short of what the statistical theory requires. Nonetheless, the statistics may still provide certain intersubjectively established rules of decision involved in theoretical inference. Another relative measure of regression coefficient, i.e., the standardized regression coefficient or *beta* coefficient, which measures the statistical association between dependent and independent variables in terms of the units

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[13] The formula to compute Adjusted R^2 varies from a statistical package to another and this study adopts the following formula used in SAS;

$$\textit{Adjusted } R^2 = 1 - \left((1-R^2) \times \frac{N}{N-k}\right)$$

where N is the number of observations, and k is the number of parameters to be estimated.

of standard deviation, is often invoked, if not provided in the tables, to compare relative importance of variables within an equation to determine the level of dependent variable.

Time-dependent process in error terms. The model of time dependent process in errors and estimates of associated coefficients used in GLS estimation is reported to alert readers of the problems of autocorrelation and, most of all, to insure the reproducibility of the research results. Detailed description of the various models of time dependent process is in Table A.1 in Appendix A.

Concluding Remarks

In this chapter so far is discussed the strategy of empirical and quantitative analysis of the conceptual framework discussed in Chapter 2, the results of which are reported and analyzed in the following chapters. In so doing, first of all, the conceptual framework discussed in Chapter II is formalized in terms of schematic diagrams and systems of equations and embedded hypotheses are made explicit. Then, the concepts are operationalized and their measurements are are discussed. Finally, the statistical methods employed are briefly summarized along with major statistical problems, adequate treatment of which is essential for sound causal inferences and thereby hypotheses testing.

It should be emphasized again that the discussion of the conceptual model is especially designed to demonstrate the propositions and hypotheses contained in the conceptual framework are highly sensitive to the contextual factors and thus subject to alternative interpretations, and that the research is especially designed to reveal those contextual factors. Thus, the overall research is designed to allow comparative analysis across different actors and regions, the key ingredients in which are symmetric specification of models for two superpowers and regional segregation. Inter-actor symmetry and regional segregation are of course not to ignore important differences between two superpowers in terms of politico-economic-social systems as well as historical backgrounds, and regional idiosyncrasies. Rather, it is a consistent thesis throughout this study that such cross-actor differences and regional characteristics are pivotal points. Part 2, which discusses the results of empirical analysis, begins by exploring such differences and characteristics.

CHAPTER IV
PRELIMINARY DATA ANALYSIS

Part 2, consisting of this and following three chapters, discusses the empirical analysis of the conceptual model discussed in chapters II and III. While the results of regression analysis of the full model and their theoretical implications shall be discussed in Chapters V through VII, this chapter in particular analyzes the historical records of superpowers' foreign policy activity in the Third World in two ways; (1) in terms of some aggregate attributes of the measured foreign policy behaviors, and (2) through a regression analysis of the basic action-reaction model applied to the measured level of foreign policy activity.

The first section begins with a discussion of some attributes of foreign policy behaviors; (1) the *level* of foreign policy activity as an expression of foreign policy activism of superpowers, which are broken down into (*a*) the *volume* of foreign policy behaviors, and (*b*) the *intensity* of behaviors, (2) the *scope* of activity in terms of geographic dispersion of foreign policy recipients, and (3) from a relational point of view, the interactivity between two superpowers. Then, the records of superpower foreign policy activity in the Third World in terms of these attributes are analyzed so as to discover any trend over time and tendency across actors and regions. While any causal proposition is refrained until the following chapters, cross-actor and cross-regional comparisons are frequently made so as to uncover the structural configuration of relative capabilities and interests of the superpowers, and relative salience or importance of different regions to each superpower.

Then in the second section, the 'basic model' in terms of simple action-reaction dynamics is applied to the measured level of superpowers' foreign policy activity in the Third World regions and parameters are estimated using regression technique. The purpose of this analysis is primarily to test the basic conceptual argument that superpower foreign policy activity in the Third World follows the action-reaction process. Yet, in many ways, the analyses in this chapter are to place some starting points of arguments in the following chapters, thus they are called 'preliminary.'

The Records

Attributes of Foreign Policy Behaviors

In this section, some of the properties of foreign policy behaviors of nations, either discrete or aggregate, are discussed, and their indicators are developed to analyze foreign policy activity of the superpowers in the Third World in the following sections. In so doing, I start with the following set of analytic assumptions regarding the foreign policy process widely shared among scholars and explicitly laid out in Callahan (1982), Hermann (1983), and Hermann and Coate (1982).

1. Any foreign policy behavior of a national actor stems from an *political-level decision* to commit the nation's resources made by authoritative and responsible political leaders motivated by the perception of a *foreign policy problem.*

2. A *foreign policy problem* is a discrepancy between the existing state of affairs and the desired state of affairs, sources, impacts, and solution of which involve something "foreign", meaning external to the political jurisdiction of the national government.

3. *Political-level decision to commit resources* is made by explicit or implicit comparison of (*a*) expected values or benefits to result from implementation of the decision and (*b*) costs to be incurred from the decision and its implementation. Therefore, the decision and ensuing behavior can range from non-decision or non-action through verbal action with minimal commitment to highly visible action with substantial level of commitment, as the function of (*a*) seriousness of the problem, (*b*) available resources, and (*c*) decision-makers' ability to mobilize such resources.

From this set of assumptions about decision-making process, we can conceive the following three dimensions of a foreign policy behavior, which are closely interrelated with each other.

1. *Interest* dimension: the pervasiveness and seriousness of the foreign policy problems reflecting the scope and level of the actor's foreign policy interests.

2. *Capability* dimension: the amount of available resources and the leadership's ability to persuade the general populace or its segment concerned of the interests at stake so as to justify the use of resources and thereby mobilize the resources for the purpose of foreign policy behavior.

3. *Cost* dimension: the amount of resources used, or the opportunity cost lost in the foreign policy behavior, and particularly, any political cost incurred to the decision-maker in the attempt to use resources, or simply due to loss of the opportunity cost.

In a word, a foreign policy behavior of a national actor is an expression of the nation's (*a*) interests in the occasion or the situation, and (*b*) the nation's capabilities in

terms of available societal resources and the leadership's ability to mobilize the resources, with (*c*) imbedded political cost to decision-makers. Then, can one infer a nation's interests and capabilities from observed behaviors? The answer will be affirmative only if one has well conceptualized and measured data of behaviors and employ a careful comparative analysis of discrete and/or aggregate attributes of behaviors across different actors, targets, issue categories or different time intervals depending upon the research interest.

ATTRIBUTES OF DISCRETE FOREIGN POLICY BEHAVIORS

Along with the efforts to build large scale foreign policy event data sets, such as *World Event/Interaction Survey* (WEIS), *Comparative Research on Events of Nations* (CREON) and *Conflict and Peace Data Bank* (COPDAB), very substantial number of studies have been done to conceptualize behavioral properties or attributes of such events.[1] In general, a discrete foreign policy behavior is characterized by (1) actor or initiator of the behavior, (2) target or recipient of the behavior, (3) affect, the manifest feeling of the actor toward the target in terms of whether it is supportive or hostile, or negative or positive, (4) instrumentality which refers to the skills and resources used in the foreign policy behavior, (5) (intensity of) commitment referring to the amount or degree of the resources used and its reversibility, and (6) substantive problem area or issue area (Callahan, et al., 1982).

While many of theoretical efforts utilizing foreign policy events data have been paid to the distinction between conflict and cooperative behaviors, i.e., affect (e.g., Azar, 1980; McClelland and Hoggard, 1969; Rummel, 1968),[2] one of particular interest here is the intensity of commitment. Explicitly viewing foreign policy behavior in terms of resource allocation, for example, CREON project has developed commitment intensity scores in eleven ordinal scales in terms of three dimensions of the commitment; (1) the amount of resources allocated, (2) the kinds of resources, and (3) the reversibility of the allocation (Callahan, 1982: 184), as in Table 4.1. Also, COPDAB has developed fifteen event categories along the continuum of conflict-cooperation and, most of all, an interval level scale of intensity score through magnitude scaling of experts judgments, as in Table 4.2.

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1 See, e.g., Azar (1972), Hermann, et al., (1973), McClelland and Hoggard, (1969). Perhaps the most comprehensive is Callahan, et al. (1982).

2 This orientation presumably reflects the primacy of the issue of conflict-cooperation in the field of international politics and foreign policy. For example, from McGowan and Shapiro (1973) survey of comparative foreign policy research, Brady (1982) finds that 37 out of 122 propositions are about conflict-cooperation, the modal category of 13 dimensions of foreign policy research identified by McGowan and Shapiro.

Table 4.1. CREON Categorization of Commitment Scale*

Commitment Score	*Description*
11	Irreversible resource allocations
10	Partially reversible resource allocations
9	Reversible resource allocations and no resource allocations
8	Formal international agreements
7	Unconditional statements of intention by top policy officials
6	Conditional statements of intention by top policy officials
5	Unconditional statements of intention by lower policy officials
4	Conditional statements of intention by lower policy officials
3	Verbal evaluations of own policy or statements of general policy
2	Symbolic, insignificant nonverbal behaviors
1	No commitment

* SOURCE: Callahan (1982: 194-5).

Table 4.2. COPDAB Categorization of Events and Intensity/Commitment Score*

Type of Behavior	*Description of Behavior*	*Intensity Score*
15	Extensive war acts; full scale invasions; bombing of civilian areas	102
14	Limited war acts; sporadic shelling; mining of territorial waters	65
13	Small-scale military acts; imposition of blockades; border skirmishes	50
12	Breaking diplomatic relations; aid to guerilla activities	44
11	Recalling ambassadors; increasing troop mobilizations; boycotts	29
10	Strong expressions of hostility; warning of retaliation; making threatening demands	16
9	Mild verbal objections to policies or behaviors	6
8	Neutral acts; rhetorical policy statements	1
7	Minor official exchanges; expressions of mild verbal support	6
6	Official support of goals, values and regime	10
5	Beginning diplomatic relations; technological and scientific cooperations	14
4	Granting economic loans; establishing economic pacts	27
3	Military, economic, or strategic support; concluding military agreements	31
2	Establishing a military alliance; establishing a common market	47
1	Voluntary unification into one nation	92

* SOURCE: Smith (1987: 11).

For the purpose of this study, this notion of the intensity of commitment is particularly interesting because, from the set of analytic assumptions above, it presumably reflects (1) the seriousness, if not pervasiveness, of foreign policy problem (*interests* dimension), (2) the amount of resources available and the leadership's skill and ability to mobilize those resources (*capability* dimension), and especially (3) actual amount of resources allocated (*cost* dimension). Yet, these dimensions are so closely interrelated that decomposition of three dimensions requires extensive cross-examination of multiple measures.

ATTRIBUTES OF AGGREGATE FOREIGN POLICY BEHAVIORS

Use of foreign policy events data has more often been in terms of aggregation of events over chosen interval of time period and along the attributes of events in research interest. One of the most often used measures is the volume of foreign policy activities of a national actor which is simply the frequency of the events initiated by the actor in given period of time. From the set of analytic assumptions discussed before, this volume measure will reflect frequency or pervasiveness of foreign policy problems perceived by political leaders, thereby the scope of interests, even though all the perceived foreign policy problems may not result in observable behaviors.

Combination of the intensity measure and the volume measure, then, will yield a general measure of the level of foreign policy activity of an actor reflecting all three dimensions of interests, capabilities, and costs. This level measure, used throughout this research, is measured by annual, weighted frequency of the superpower's foreign policy behaviors toward nations or other political entities in the region, i.e., aggregation of foreign policy behaviors initiated by the superpower (actor) toward nations or other political entities in the region (target or recipient), which are weighted by associated intensity score (intensity of commitment) for a one-year time period (see Table 3.5 in Chapter 3 and Table 4.3 below). It is believed that this measure will reflect (1) both the scope and the level of foreign policy interests of a nation, (2) the capabilities of the nation in terms of (*a*) overall national resources, and (*b*) leadership's ability to persuade the populace of the interests and justify the use of resources, and thereby mobilize the resources, together with (3) whatever costs that are to be incurred to the leadership from the foreign policy activities and ensuing use of resources in the given period of time.

Disaggregation of the level of activity by dividing it by the volume of activity yields the average score of intensity of commitment of behaviors initiated in the given period of

time. If the volume measure reflects the pervasiveness of foreign policy problems, hence overall scope of interests, this aggregate measure of intensity will particularly reflect the general seriousness of foreign policy problems, hence the level of interests as well as the capability of the national actor and the political costs incurred to its political leaders and/or decision-makers.

On the other hand, from the target property of discrete foreign policy behaviors, one can develop an aggregate property, called the scope of action referring to "the distribution of a government's foreign policy activity across potential targets or recipients in the international area" (East and Hermann, 1982: 117). East and Hermann particularly developed two measures; (1) the *selection ratio* indicating the extent of a government's scope of action, and (2) the *concentration ratio* indicating the relative salience of a particular recipient to the actor. Operationally, the selection ratio is measured by the number of actual targets toward which foreign policy activity is addressed divided by the total number of possible targets. On the other hand, the concentration ratio is classified into two further categories; (1) *salience index* of a particular recipient indicating the relative salience of the recipient which is measured by the percentage of an actor's behaviors directed to a particular recipient, and (2) *concentration index* measuring how focused or dispersed an actor's behaviors toward (groups of) multiple recipients.

In the following, I generally adopt East and Hermann conceptualization and measures of scope of action to analyze the scope of superpowers' foreign policy activity in the Third World. Over-time, cross-actor and cross-regional examination of three level measures discussed above and the scope measures to be further discussed below would reveal (1) relative capabilities and interests of superpowers in general, (2) relative salience of particular regions to each superpowers, and (3) relative scope and level of interests of superpowers in the particular regions, and (4) over-time trends thereof. In the following section, I use the following set of measures for either one-year time interval or for entire research period, i.e., 1948-1978 to analyze the records of superpowers' foreign policy activity in the Third World.

1. *The Level of Activity*

1.1. *Level*: This is a combined measure of an actor's interests in terms of both scope and level and capability in terms of both resources and mobilization. Cross-actor comparison will reveal relative capabilities and interests of superpowers with respect to the Third World. Cross-regional comparison will reveal relative salience of the regions to each of superpowers.

1.2. *Volume*: This measure particularly reflects the pervasiveness of foreign policy problems to an actor, thus, will measure the scope of interest of the actor. Cross-actor comparison will reveal the relative scopes of interests of superpowers in the Third World.

1.3. *Intensity*: This measure reflects the seriousness of foreign policy problems, thus, will measure the level of interest of the actor. Cross-regional comparison will particularly reveal not only the relative salience of the regions, but also the degree to which foreign policy issues with respect to the Third World regions are politicized, and thereby the political costs incurred to the decision-makers.

2. *The Scope of Activity*

2.1. *Number of recipients and selection ratio*: Cross-actor comparison of the number of different political entities addressed by each superpowers during the time span and/or its annual average in the overall Third World as well as across different regions will reveal the relative scope of superpowers' foreign policy activity, and thereby, the relative scope of interests in general and within particular regions. Division of annual average by total number of recipients is analogous to East and Hermann's measure of selection ratio. Cross-actor comparison of this ratio across different regions will reveal the relative scope of superpower's interests in general and in particular regions.

2.2. *Regional distribution* (regional salience index): This index is measured by percentage value of activity addressed to each regions to the total foreign policy activity initiated by the actor. Cross-regional comparison will particularly reveal the relative salience of the regions to the actor.

2.3. (Regional) *Dispersion index*: This index is created by the following formula; [1 - {(standard deviation of regional distribution of the volume measure in proportion) ÷ 0.433)], where division by 0.433 is necessary to make the index vary between 0 (when all the behaviors address one region) and 1 (when the behaviors are equally distributed across four regions). This index measures how concentrated or balanced of an actor's foreign policy activity in terms of its distribution over different targets. Cross-actor comparison of this index will reveal the relative scope of foreign policy activity and interests of superpowers.

The Records:
Superpowers' Foreign Policy Activity in the Third World, 1948-1978

Tables 4.3 and 4.4 present time series observations of (1) the *level* of foreign policy activity which is further broken down into (*a*) the *volume* measure and (*b*) the *intensity* measure, and (2) the *scope* of activity in terms of (*a*) the number of recipients addressed each year, (*b*) percentage distribution across four Third World regions and (*c*) dispersion index, for the U.S. and USSR respectively. The level and volume measures are also presented with regional breakdown in Figures 4.1 through 4.4. And, two measures of the scope of activity, i.e., the number of recipients and the dispersion index for each superpowers are plotted over time in Figures 4.5 and 4.6. All these figures appear at the end of this chapter.

Table 4.3. U.S. Foreign Policy Activity in the Third World, 1948-1978

Year	*Level of Activity*			*Scope of Activity*					
	Level	Volume	Intensity	Number of Recipients	Regional Distribution (%)[a] L.America	Africa	Mi.East	Asia	Dispersion Index
1948	4023	225	17.9	47	62.4	6.7	16.7	14.2	0.615
1949	1263	83	15.2	26	12.8	3.2	61.5	22.4	0.473
1950	11939	283	42.2	38	3.1	0.5	6.8	89.6	0.385
1951	6729	291	23.1	46	14.0	3.4	19.7	62.8	0.611
1952	3622	180	20.1	44	17.6	9.2	25.3	47.9	0.720
1953	5855	393	14.9	47	13.7	3.9	34.6	47.9	0.651
1954	3632	222	16.4	38	8.9	6.5	42.2	42.4	0.541
1955	4689	344	13.6	51	13.5	6.3	29.7	50.5	0.654
1956	4040	257	15.7	52	16.7	5.2	46.6	31.4	0.623
1957	6921	547	12.7	56	6.3	12.2	61.0	20.5	0.487
1958	6551	422	15.5	56	15.8	7.9	48.9	27.4	0.668
1959	5270	300	17.6	52	15.2	13.4	32.9	38.6	0.782
1960	5032	292	17.2	60	16.7	11.8	35.5	36.0	0.768
1961	6551	483	13.6	77	29.0	18.1	15.8	37.0	0.855
1962	10069	607	16.6	66	35.7	5.9	16.2	42.2	0.700
1963	8369	520	16.1	66	28.0	8.0	22.6	41.4	0.732
1964	8325	497	16.8	79	22.0	25.4	10.6	42.0	0.760
1965	16074	496	32.4	68	8.5	4.2	12.3	75.1	0.516
1966	22971	1001	22.9	84	7.2	9.1	10.3	73.3	0.520
1967	13800	811	17.0	79	26.3	14.2	23.5	36.1	0.813
1968	10639	695	15.3	77	32.6	12.5	15.4	39.5	0.697
1969	12523	571	21.9	70	8.3	4.6	5.9	81.2	0.457
1970	7067	384	18.4	69	16.2	8.6	19.5	55.6	0.749
1971	10297	453	22.7	64	7.1	5.8	11.8	75.3	0.523
1972	25207	775	32.5	74	5.3	3.0	6.6	85.1	0.478
1973	22523	1152	19.6	80	18.1	5.8	13.5	62.6	0.669
1974	7402	593	12.5	67	20.6	7.5	50.1	21.8	0.665
1975	7774	542	14.3	76	29.1	8.4	36.2	26.3	0.744
1976	6766	435	15.6	75	15.1	28.0	35.6	21.2	0.801
1977	9448	744	12.7	85	24.0	25.4	35.3	15.3	0.840
1978	8569	657	13.0	71	28.2	21.8	31.8	18.2	0.813
Total	283940	15255	18.6	62.6[b]	16.8	9.3	21.1	52.8	0.765

NOTES: [a] Percentage distribution of the level of foreign policy activities in Third World regions.
[b] Average number of recipients during the thirty-one year period.

Table 4.4. Soviet Foreign Policy Activity in the Third World, 1948-1978

Year	*Level of Activity*			*Scope of Activity*					
				Number of	Regional Distribution (%)[a]				Dispersion
	Level	Volume	Intensity	Recipients	L.America	Africa	Mi.East	Asia	Index
1948	564	45	12.5	16	12.9	14.9	34.9	37.2	0.748
1949	481	20	24.1	6	0.0	2.1	92.3	5.6	0.132
1950	194	16	12.1	6	3.1	6.2	76.3	14.4	0.414
1951	338	21	16.1	9	3.0	0.0	80.2	16.9	0.299
1952	418	25	16.7	15	26.3	6.2	27.0	40.4	0.652
1953	979	75	13.1	18	13.8	0.0	53.6	32.6	0.531
1954	529	37	14.3	18	7.4	3.0	70.9	18.7	0.462
1955	1817	136	13.4	21	0.0	2.3	48.4	49.3	0.463
1956	2513	190	13.2	31	2.5	7.0	62.1	28.4	0.486
1957	2575	180	14.3	32	0.2	2.7	74.3	22.8	0.377
1958	1861	126	14.8	32	5.2	7.7	54.3	32.8	0.576
1959	3023	179	16.9	34	4.9	9.1	45.8	40.1	0.574
1960	2928	165	17.7	37	10.2	25.3	27.9	36.6	0.786
1961	2244	139	16.1	35	7.0	34.5	33.5	25.1	0.779
1962	3540	210	16.9	41	23.1	17.4	24.5	35.0	0.910
1963	3172	178	17.8	45	7.3	18.9	40.9	32.9	0.720
1964	3356	208	16.1	51	5.0	41.9	28.4	24.6	0.688
1965	2968	197	15.1	40	3.9	26.6	30.5	39.1	0.659
1966	4769	316	15.1	64	6.0	25.2	29.4	39.3	0.721
1967	5559	348	16.0	52	5.0	26.4	48.4	20.2	0.627
1968	3125	204	15.3	49	13.4	22.0	35.1	29.5	0.799
1969	2091	148	14.1	48	18.0	15.9	28.2	37.9	0.787
1970	2487	181	13.7	43	12.1	13.0	45.3	29.7	0.689
1971	3296	210	15.7	48	8.3	11.3	40.2	40.3	0.650
1972	4107	243	16.9	38	7.6	10.9	57.9	23.5	0.528
1973	3660	256	14.3	52	16.0	13.1	44.3	26.7	0.717
1974	2872	184	15.6	35	12.8	17.7	49.1	20.3	0.596
1975	2050	119	17.2	46	17.8	25.6	33.5	23.1	0.813
1976	2737	198	13.8	43	11.1	18.9	43.3	26.7	0.687
1977	3203	213	15.0	45	4.2	45.0	38.0	12.8	0.605
1978	2169	121	17.9	36	9.4	39.7	34.0	16.8	0.736
Total	75625	4888	15.5	34.9[b]	8.8	19.8	42.2	29.2	0.712

NOTES: [a] Percentage distribution of the level of foreign policy activities in Third World regions.
[b] Average number of recipients during the thirty-one year period.

While tables and figures are presented for further comparison of measures across two superpowers and four different regions, comparison is explicitly made in Tables 4.5 and 4.6. Table 4.5 particularly presents some descriptive statistics of superpowers' foreign policy activity measures and its cross-actor comparison, and correlation coefficients between two superpowers' activity measures as a rough measure of interactivity. Table 4.6 is for cross-regional comparison of the level and scope of activity of superpowers, and further yield cross-actor comparison across different regions together. A close look at the tables and figures yields some general observations regarding overtime trends, and patterns and tendencies across actors and regions.

OVERTIME TRENDS

First of all, an initial look at Tables 4.3 and 4.4 as well as time plots in figures yields that the levels of both superpowers' foreign policy activity have highly fluctuated over time, although it is hardly surprising in that the measures in general represent the flow variables rather than the stock variables. It is further evident in the standard deviations and particularly in terms of the coefficient of variability reported in Table 4.5. While the levels of both superpowers have highly fluctuated over time, yet, one thing further remarkable is that there have been upward trends over time in both superpowers' foreign policy activity, both in the level and the scope measures. This indicates that both superpowers have increasingly been active in the Third World.[3] This upward trend may be mainly due to the

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[3] To measure the trend factor, simple bivariate regression analyses using each of the measures as dependent variable and a time index variable running from 1 to 31 as the independent variable are performed and yield the following results, where figures in parentheses under each coefficients are the standard errors for corresponding coefficient estimates.

U.S. Level	= 4283	+ 305 × TIME		R^2=.230
	(1896)	(103)		
U.S. Volume	= 201	+ 18.2 × TIME		R^2=.478
	(65)	(5.2)		
U.S. Intensity	= 20.2	− 0.102 × TIME		R^2=.020
	(65)	(0.133)		
U.S. Dispersion	= 0.573	+ 0.005 × TIME		R^2=.131
	(0.045)	(0.002)		
Soviet Level	= 931	+ 94.3 ×TIME		R^2=.418
	(379)	(20.7)		
Soviet Volume	= 62.4	+ 5.95 × TIME		R^2=.414
	(24.1)	(1.32)		
Soviet Intensity	= 15.4	+ 0.009 × TIME		R^2=.001
	(0.840)	(0.046)		
Soviet Dispersion	= 0.465	+ 0.010 × TIME		R^2=.277
	(0.050)	(0.003)		

increase in the number of the Third World nations through the decolonization process, as evident in the number of recipients addressed by each superpowers.

Yet, the upward trend is more evident for the Soviet Union than the U.S. who set the tone of Third World policy in terms of a series of multilateral alliance and intervention in the Korean War early in the period. And, a closer look reveal that increasing Soviet activism has followed a pattern of gradual increase rather than monotonic increase. First, in general, the Soviets were non-existent in the Third World until 1952-1954 period when the number of recipients has doubled. Even during this period, the Soviet level of activity remained low, thus largely negligible. This earlier period of inactivism could have been due to (1) lack of vested interests, (2) inward policy orientation for the after-war rebuilding efforts, and arguably (3) the successful U.S. containment policy.

Second and major step toward the Third World activism took place in 1955 when its level of activity, particularly the volume measure nearly quadrupled, due to the accelerated decolonization process accompanied with the Arab-Israeli conflict. Still in this period, the Soviet activity was not highly visible in that the intensity score remained low and the geographic locus of the activity was mostly the Middle East and Asia. It was during 1959 and 1960 period when, first, the behaviors became more intense and then geographic scope of the activity reach the global level. Since then, the Soviet Union has been remained active in the Third World with certain fluctuations which particularly goes along with the evolution of the Arab-Israeli conflicts.

As for the United States, the upward trend is more evident in the volume and the scope measures than the level and intensity measures. The upward trend in the former measures may largely reflect decolonization process and ensuing expansion of the Third World. The upward trend in the level measure is relatively marginal reflecting the intensity component which has extremely fluctuated without any trend. Fluctuation in the intensity measure rather reflects three major crises in the U.S. foreign policy; the Korean War in 1950-3, the Cuban Missile Crisis in 1962, and the Vietnam War in 1965-1973. It is rather interesting to note that the intensity measure in the U.S. foreign policy shows a downward trend, if insignificant. This might be because of gradual disengagement from the Third World after initial, highly active containment policy and especially as the result of the Vietnam War. The disengagement especially from Asia following the Vietnam War is reflected in the increased scope measure meaning more balanced foreign policy activity at the global level.

Table 4.5. Superpowers' Foreign Policy Activity in the Third World Regions: Simple Descriptive Statistics and Cross-Actor Comparison[a]

Region	U.S.A.		USSR		U.S.-Soviet Comparison	
	Mean	Coefficient[b] of Variability	Mean	Coefficient[b] of Variability	U.S./USSR Ratio	Bivariate Correlation
The Overall	9159	0.620	2440	0.535	3.754	0.625
Third World	492	0.480	158	0.525	3.114	0.772
Latin	1541	0.682	216	0.838	7.134	0.681
America	107	0.673	14	0.857	7.643	0.662
Africa	852	0.981	482	0.905	1.768	0.870
	55	0.800	30	0.867	1.833	0.820
Middle	1935	0.485	1028	0.584	1.882	0.577
East	138	0.536	67	0.597	2.060	0.588
Asia	4832	1.060	713	0.610	6.777	0.471
	193	0.741	47	0.617	4.106	0.682

NOTES: [a] In each regions, figures in the first row are statistics for the *level* measure and those in the second row are for the *volume* measure.

[b] the size of the standard deviation relative to that of the mean obtained by dividing the standard deviation by the mean.

CROSS-ACTOR COMPARISON

Second general observation from the set of tables and figures is that the asymmetry in the levels of two superpowers' foreign policy activity in the Third World. The United States has been far more active than the Soviet Union in most of the measures employed here with certain regional variations; the level, the volume, and the intensity of activity as evident in Table 4.5, and the number of recipients, the selection ratio, and the dispersion index as seen in Tables 4.3, 4.4, as well as Table 4.6. Without prematurely referring to the foreign policy orientations of each superpowers, such an asymmetry in foreign policy activity may indicate that (1) the U.S. has possessed superior overall capability, (2) the U.S. has had wider range and higher level of interests in the Third World, and (3) the Third World issues have been more highly and deeply politicized in the U.S.

What is more remarkable than the asymmetry is the interactivity between superpowers' foreign policy in the Third World. As seen in Table 4.5, the bivariate Pearson correlation coefficients between two superpowers' foreign policy activity ranges from low 0.47 in Asia and to high 0.87 in Africa for the level measure, and from low 0.59

in the Middle East to high 0.82 in Africa for the volume measure, all of which are statistically significant at $p<0.05$ level. While any causal inference from this correlation measure is refrained, this high correlation measure means that superpowers have tended to be simultaneously involved in foreign policy activity in the Third World.

REGIONAL PATTERNS

In speaking of asymmetry between superpowers in their foreign policy activity, hence capabilities and interests, however, one should be careful. Cross-regional comparison reveals that the asymmetry does not hold across all the regions, and some further interesting observations. First of all, the level of foreign policy activity is clearly asymmetric in favor of the U.S. in regions such as Latin America (the U.S. to USSR ratio is 7.1:1 for the level measure and 7.8:1 for the volume measure) and Asia (the ratio is 6.8:1 for the level measure and 4.1:1 for the volume measure). Yet, it is virtually symmetric in the regions of Africa (the ratio is 1.7:1 for the level measure and 1.8 for the volume measure) and the Middle East (the ratio is 1.9 for the level measure and 2.1 for the volume measure). Thus, tentatively, we might call the first two regions the regions of interest asymmetry and the latter two the regions of interest symmetry following George (1984).

Second, the order of regions in terms of relative salience is, (1) for the U.S., (*a*) Asia, the Middle East, Latin America, and Africa in terms of the level and the volume measures, and (*b*) the Middle East, Latin America, Asia, and Africa in terms of the selection ratio, and (2) for the USSR, the Middle East, Asia, Africa, and Latin America in terms of all three measures. Therefore, it is not hard to ascertain that (1) Latin America is the region of interest asymmetry in favor of the U.S. and, (2) Africa is the region of low-interest symmetry, and (3) the Middle East is the region of high-interest symmetry.

Yet, it is hard to call Asia the region of interest asymmetry for several reasons. First of all, Asia is noted to be the second important region to the Soviet Union and it is hardly surprising in terms of its geographic proximity. Secondly, the asymmetry in activity is high in the level measure but much lower in the volume measure. This disparity between two measures of activity is further clear in the interactivity measure in terms of correlation coefficient which is 0.47 for the level measure but 0.68 for the volume measure. And, the first place of Asia in its importance to the U.S. is disputed in the selection ratio. After all, Asia has been the second important region to the Soviet Union as reflected in its foreign

Table 4.6. Foreign Policy Activities of the Superpowers in the Third World Regions: Cross-Regional Comparison of Level, Volume, Intensity and Scope of Activity

Actor	Region	*Level of Activity*			*Scope of Activity*						
		Level	Volume	Intensity	# Recipients[a]	Top Five Recipients (% within Region)					Total %
	The Overall Third World	283940	15255	18.6	119 [62.6] (52.6)	N.Vietnam[b] (22.8)	N.Korea (5.5)	Israel (5.0)	Egypt (4.1)	India (4.1)	41.5
U	Latin America	47644	3319	14.4	28 [19.8] (70.7)	Cuba (14.2)	Brazil (8.3)	Chile (6.2)	Panama (5.8)	Mexico (5.8)	40.3
S	Africa[c]	26042	1689	15.6	49 [15.6] (31.8)	Morocco (10.2)	Tunisia (9.1)	Lybia (8.0)	Algeria (7.3)	S.Africa (6.4)	40.9
A	Middle East	59989	4279	14.0	14 [10.5] (75.0)	Israel (23.6)	Egypt (19.6)	Jordan (12.3)	Iran (9.3)	Turkey (9.0)	73.8
	Asia	149785	5968	25.1	25 [16.7] (66.8)	N.Vietnama (43.3)	N.Korea (10.5)	India (7.8)	S.Vietnam (6.5)	Pakistan (5.5)	73.6
	The Overall Third World	75625	4888	15.5	107 [34.9] (32.6)	Egypt (12.3)	India (7.9)	Israel (5.7)	Syria (5.5)	Iraq (5.2)	36.6
U	Latin America	6685	427	15.7	22 [4.6] (20.9)	Cuba (42.1)	Brazil (10.2)	Argentina (10.4)	Chile (8.7)	Peru (7.4)	78.9
S	Africa	14950	929	16.1	46 [11.0] (23.9)	Algeria (15.2)	Sudan (8.5)	Morocco (8.4)	Somalia (8.0)	Ethiopia (5.8)	45.9
S	Middle East	31879	2064	15.4	14 [8.4] (60.0)	Egypt (29.3)	Israel (13.7)	Syria (13.3)	Iraq (12.5)	Iran (11.5)	80.3
R	Asia	22111	1468	15.1	25 [10.9] (43.6)	India (27.2)	N.Vietnam[b] (14.0)	Pakistan (11.5)	Afghan. (9.6)	N.Korea (4.5)	66.8

NOTES: [a] Number of political entities which were ever addressed by the superpower during the period. Figures in brackets are annual average number of recipients and figures in parentheses are percentage of annual average recipients to total recipients, analogous to the selection ratio in East and Hermann (1982).

[b] Includes Viet Cong and the united Vietnam after 1975.

[c] Major sub-Saharan recipients are Ethiopia (6.1%), Congo (5.9%), Zimbabwe (4.7%) and Nigeria (4.0%).

policy activity.[4] Noticing that the U.S. activity in Asia is presumably unduly elevated due to the "extraordinary" behaviors it has taken, Asia might be better called the region of disputed-interest symmetry.

Finally, in view of highly volatile nature of the Third World politics, the interest symmetry in the regions of Africa and the Middle East may also be uncertain, and could be disputed. An analysis of the data collected in World Handbook of Political and Social Indicators (Taylor and Jodice, 1983) shows that the Middle East and Africa were top two regions in order in terms of number of governmental change per nations, and my regional polarity measure also shows these two regions are top two regions in annual average value of polarity score during the period.[5]

Cross-regional comparison of the intensity scores does not yield any clear pattern either for capabilities or interests. For example, the intensity score for the U.S. is the second highest in Africa which is determined to be a low-interest region. Also, top two regions in the Soviet intensity scores are Africa and Latin America both of which are determined as relatively low-interest regions. then, it rather appears that the intensity scores tend to be inversely correlated with the level of interests. And this is probably because foreign policy activity in the regions of high-interest or salience is better characterized by the relative dominance of normal or ordinary interaction, while that in the regions of low-interest or salience is better characterized by the relative dominance of high-commitment, strategic behaviors.

This point is further supported by two additional observations. First, foreign policy activity in a low-salience region tends to be more versatile than other regions. As seen in Table 4.5 in terms of the size of the coefficient of variability, it is the case in the U.S. activity in Africa, if we regard the U.S. case in Asia as an exception, and the Soviet activity in both Africa and Latin America. The relative dominance of strategic behaviors in the regions of low-interest is further evidenced by relatively high interactivity in Africa which is determined as a region of low-interest symmetry.

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[4] This point is further supported by an analysis of the interest variables measured for this study. For example, the percentage of a superpower's regional trade to its total trade is used to measure the economic interests of the superpower in the region. According to this, Asia had been the largest trading partner to the Soviet Union among the Third World regions.

[5] Annual averages of governmental change per nation are 2.71 in Latin America, 3.17 in Africa, 4.75 in the Middle East and 2.51 in Asia. Annual average of polarity scores are 17.95 for Latin America, 22.23 for Africa, 22.79 for the Middle East and 19.74 for Asia. See Table 3.2 in Chapter III for the measurement of polarity score.

Thus, the intensity score do measure certain dimension of foreign policy activity and its decision-making context; the cost dimension. High intensity activity is likely to be politicized as it involves allocation of substantial amount of resources. It is especially the case when the activity is addressed to regions of low-interest because the expected benefit from the activity is likely low and decision-makers' justification for the activity is likely to be disputed. Therefore, it can be said that foreign policy activity in the regions of low-interest tends to be politicized and involves certain political costs to decision-makers. Relatively speaking, Africa is the case to the U.S., and Latin America and Africa are the cases to the Soviet Union. The same can be true for the foreign policy activity of especially high intensity and commitment regardless the relative salience of the region; Asia is the case to the U.S. These patterns are in general agreement with the results from regression analysis of the basic model to be seen below.

Analysis of the Basic Model

The Model and Hypotheses

In Chapter II, it was argued that the process of superpower rivalry in the Third World can be represented by the simple action-reaction model as follows.

$$ACT(U.S.\rightarrow Third\ World)_t = a_1 ACT(U.S.\rightarrow Third\ World)_{t-1} + b_1 ACT(USSR\rightarrow Third\ World)_t + c_1 + e_{1t} \quad (4.1)$$

$$ACT(USSR\rightarrow Third\ World)_t = a_2 ACT(USSR\rightarrow Third\ World)_{t-1} + b_2 ACT(U.S.\rightarrow Third\ World)_t + c_2 + e_{2t} \quad (4.2)$$

which are the same as (2.3) and (2.4) except now stochastic errors (e_1 and e_2) are introduced. In the model, it is hypothesized that the level of a superpower's foreign policy activity toward the Third World recipients in a period is as a function of (1) the rival's level of activity, (2) its own previous level of activity, and (3) certain constant.

The key component in the model is the rival superpower's level of activity as an explanatory variable of a superpower's foreign policy activity implying that a major portion of a superpower's foreign policy activity in the Third World can be regarded as reactions to the rival's actions. Further, the model is formulated as a system of equations such that even an actor's *reaction* can also be reacted to. Thus, over the long run, this reaction component will reflect the dynamic process of mutual threat as discussed in the conceptual

model in Chapter II, and the associated coefficients (b_1 and b_2) are properly called *threat* or *reactivity* coefficient.

Second component in the model is the actor's own previous level of activity as a explanatory factor of the current level of activity. The effect of one's previous level of foreign policy activity in terms of the coefficients (a_1 and a_2) is seen to reflect two related processes in foreign policy; (1) the bureaucratic inertia, and (2) the commitment effect embedded in any foreign policy behavior. First of all, since bureaucratic organizations are those who eventually implement of foreign policy decisions, foreign policy behaviors are to reflect the organizational characteristics being insensitive to new information and resistant to external intervention and innovative efforts. Thus, today's action is best predictor of tomorrow's action. On the other hand, as seen earlier, many of foreign policy behaviors involve 'commitment' to the future action such that many of the subsequent actions may be seen as implementation of the previously made commitment.

The model is now applied to the level measure of foreign policy activities of superpowers for the period of 1948-1978 in four Third World regions as well as the overall Third World and regression analysis is performed to estimate parameter values as well as to see the fit of the model. Although it is more appropriate to use system-method of estimation such as 2SLS as it is formulated as a system of simultaneous equations, single equation estimation method is used for this set of equations because of some technical reasons.[6] Yet such a method is rather a conventional method in the action-reaction tradition (Ward, 1981). Second, because two year moving average values are taken for the estimation as discussed in Chapter III, error terms are to be serially correlated following the first-order moving average process. It has been shown that the process can be approximated such that

$$e_t = \varepsilon_t + 0.268\varepsilon_{t-1} \qquad (4.3)$$

where ε's are serially uncorrelated disturbances or white noises (see Smith, 1987). Because the process is known *a priori*, GLS method as discussed in Chapter III and Appendix A is directly applicable. The results reported in Table 4.7 are from this method. For the purpose of comparison, however, OLS results are also reported in Table 4.8 at the end of this chapter.[7]

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6 See Appendix A for a discussion of issues involved in estimation of simultaneous equations.

7 The comparison of results from two methods of estimation (in Table 4.7 and Table 4.8) yields text-book illustration of the consequence of serially correlated disturbances in dynamic models; overestimation of the effect of lagged dependent variable at the expense of other model variables' explanatory effects (see Hibbs, 1974).

Table 4.7. Empirical Results: GLS Estimation of the Basic Model

Actor	*Variables Statistics*	*Region*				
		Third World	L. America	Africa	M. East	Asia
U	Constant	1642 (0.935)	367* (1.585)	179** (1.995)	279 (0.900)	272 (0.170)
S	Inertia/ Commitment	0.362** (2.153)	0.188 (1.235)	0.071 (0.526)	0.526*** (3.973)	0.402** (2.455)
A	Threat/ Reactivity	1.774** (2.366)	3.911*** (4.429)	1.273*** (6.630)	0.660*** (3.120)	3.795** (1.935)
	R^2	0.643	0.721	0.873	0.696	0.534
	$F_{2,26}$	23.4	33.6	88.8	29.7	14.9
U	Constant	331 (1.122)	−3 (0.084)	−51 (1.025)	217 (1.069)	161* (1.524)
S	Inertia/ Commitment	0.656*** (5.607)	0.379*** (2.955)	0.360*** (3.680)	0.459*** (2.701)	0.657*** (5.033)
S	Threat/ Reactivity	0.061** (2.170)	0.094*** (4.264)	0.440*** (6.881)	0.184* (1.673)	0.019* (1.680)
R	R^2	0.824	0.790	0.920	0.624	0.729
	$F_{2,26}$	60.7	48.8	150.1	21.6	34.9

Notes: Results from GLS (single equation) estimation with disturbance time-dependent process assumed to be first-order moving average process (θ=–0.268). N=29 after losing two observations due to moving averaging and lagging. F-statistics are all significant at $p < 0.001$. In parentheses below coefficient estimates are t-ratios statistical significance of which are marked as follows.

*** Coefficient estimates are statistically significant at $p<0.01$ (one-tailed test).
** Coefficient estimates are statistically significant at $p<0.05$ (one-tailed test).
* Coefficient estimates are statistically significant at $p<0.10$ (one-tailed test).

Estimation Results

Table 4.5 presents the results of estimation when the model in equations (4.1) and (4.2) is applied to yearly observations of the superpowers' foreign policy activity in the Third World analyzed so far. For two actors and five regions (four regions as well as the overall Third World), the estimation involves 10 separate regression runs. In 8 out of 10 different estimations, reactivity is observed at $p<0.05$ level, and in all 10 equations, reaction parameters are significant at $p<0.10$. Although we may be sensitive to the fact that simultaneity is not controlled for, t-statistics for reaction parameters are high enough in most regions to conclude observed reactivity is more than by chance. Furthermore, estimated values of reaction parameters are all *positive*, consistent with our earlier discussion of long-term dynamics of mutual threat and reciprocal action-reaction. In terms of goodness-of-fit statistics, the model accounts for about 50 to 90 percent of over-time variations in superpowers' levels of foreign policy activity, and F-statistics are all statistically significant at $p < 0.01$. Such a fit is rather remarkable when the earlier observation that the time series are highly fluctuating over time meaning large over-time variations.

In terms of the goodness-of-fit statistics, it is even more remarkable that the model performs better for the regional data where overtime variation is higher. For example, R^2 values are the highest in Africa for both superpowers (0.873 for the U.S. and 0.920 for the Soviet Union) and it happens to be that these two regions are whether the coefficients of variability (i.e., standard deviation to mean ratio) are the highest (0.981 for the U.S. and 0.905 for USSR).[8] The same pattern is also observed for the next region, i.e., Latin America where, compared across regions, both R^2 values and the coefficient of variability are next to Africa. How well perform the model in explaining variation is of course the function of how important each individual components in the model do, and in this case it is largely the function of the performance of the reaction component.

What is interesting and somewhat counter-intuitive to observe in this regard is that the rivalry factor or the reaction component appears to be *more* important to determine superpowers' foreign policy activity, or simply the model performs *better*, in regions where *the rivalry has been less intense*. That is, while historical experience show that superpower competition has been more intense in regions of the Middle East and Asia than

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[8] Actually it is the second highest for the U.S. next to Asia (see Table 4.3 above). However, in many ways, Asia is an exceptional region.

in Latin America and Africa, *beta* coefficients suggest that the reactivity component is more important to determine the level of foreign policy activity of superpowers in latter two regions than in the former regions.[9] This pattern is also consistent with the model's overall performance in terms of the goodness-of-fit statistics, as just seen. The model performs better in explaining the variation in a superpower's level of activity in the regions of Latin America and Africa than the Middle East and Asia.[10]

There may be two ways to explain this seemingly contradictory finding. First of all, this finding simply suggests that stochastic elements including dyadic interactions and otherwise motivated actions play more important role in determining superpowers' foreign policy activity in these two regions than other regions. Or, there are more dimensions than the rivalry dimension in foreign policy behaviors of superpowers in these two regions such that a simple interaction model performs relatively poor in explaining overtime variation. Then, this finding underscores that these two regions are relatively more *salient* to the superpowers such that there are more elements than the rivalry factor to determine foreign policy activity of superpowers.

Second explanation can be traced to the fact that superpower rivalry in the Third World can be seen as a *sub-game* in the general *game* of superpower rivalry which most prominently includes the nuclear arms race, and to the argument that in a bipolar world, superpowers are more likely to foster some caution in their conduct of foreign policy upon prospect of nuclear holocaust, a spiral model variant (e.g., Waltz, 1967). And, such a caution is more likely to be observed where each actor acknowledges the rival's 'legitimate' interests in the region. Reciprocally, then, in the regions where superpowers' interests are *symmetrically high*, superpowers may be relatively cautious in reacting to, hence opposing the rival's prior activity. Presumably, the Middle East and Asia are two of such regions.

Similar line of argument can be advanced with respect to the inertia/commitment component. That is to say, relatively higher commitment coefficients in regions of the Middle East and Asia than Latin America and Africa for both superpowers indicate that

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9 Since unstandardized reactivity coefficients also sensitive to the relative size of the levels of each superpowers' activity, standardized, or *beta* coefficients are measured to insure cross-actor as well as cross regional comparison. *beta* coefficient for the reactivity component for the U.S. are 0.678 and 0.879 for Latin America and Africa respectively, and 0.419 and 0.334 for the Middle East and Asia respectively. Those for the Soviet Union are 0.542, 0.637, 0.290, and 0.215 in the same order of the regions. To be more precise, the order of regions in terms of the magnitudes of *beta* coefficient is Africa, Latin America, the Middle East and Asia for both superpowers in descending order.

10 Whereas the order of the regions in the sizes of R^2 values are the same as that of *beta* coefficient for the U.S., R^2 is higher for Asia than the Middle East for the Soviet Union. This is because of the other component in the model, i.e., the inertia/commitment term to be discussed later.

these two regions are relatively more salient to both superpowers such that foreign policy leaders are willing to abide with the commitment made in earlier behaviors, and able to elicit domestic support toward such an end.[11] Compared across superpowers, a slight tendency is that the inertia/commitment is higher for the Soviet Union than the U.S. Such a difference can be explained by the difference in two superpowers' foreign policy system and the bureaucratic element in the component. That is, foreign policy process is relatively open to the societal influence in the U.S. than in the Soviet Union such that bureaucratic or organizational process in foreign policy is more often disrupted by such influences in the U.S. than in the Soviet.

Another interesting pattern to observe is that constants are consistently insignificant across actors and regions, except the Soviet case in Asia where coefficient estimate is marginally significant at $p < 0.10$. In view of our earlier interpretation of the constant term, this finding could be interpreted in two related ways; (1) superpowers hardly initiate any significant new foreign policy ventures in the Third World, and/or (2) normal or regular dyadic interaction between superpowers on one hand and the Third World nations on the other hands are in general negligible. Although both of these interpretations are consistent with our general conception that superpowers' foreign policy activity is largely determined by the rivalry factor rather than any intrinsic dyadic relationship, such an assertion by the way of statistics requires further qualification and careful comparative study.

Finally, notice in Table 4.5 that the model performs as well for the overall Third World as for the subregions of the Third World. If interaction occurs specifically within certain geographic and/or contextual boundary, then the observed reactivity at the highly aggregate level may seem strange and need to be explained. And there may be several ways to explain the observed cross-regional or aggregate level reactivity. First, one might argue that superpowers are basically interacting within specific regions, but such a interaction occurs in one region at a time so that the interactivity still holds even after the regional activities are aggregated. Or, it may be argued that superpowers are often reacting to the rival's activity in a compensatory fashion; i.e., trying to compensate the rival's gain in a region by a comparable gain in another region instead of trying to deny the rival's aims of action in the particular region. Finally and somewhat relatedly to the second, a superpower may take advantage of the rival's inability to counter when the rival is deeply committed to a particular region by acting in some other regions. For example, the Soviet

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[11] There could be expected a rough correspondence between the overall level of activity and the size of commitment coefficient because high level activity itself means high level commitment and such a correspondence is indeed observed.

activism in the Third World during late 1960's and early 1970's could be explained in terms of the U.S. inability to react due to the involvement in Vietnam.

The first explanation may seem to be based on an arbitrary assumption and hardly plausible, but still involves an interesting implication; i.e., when superpowers are involved in a competitive foreign policy interaction in a Third World region, then their activities in other regions are often negligible. The second explanation involves more general claim on the patterns of interaction, and the third explanation is made in terms of particular historical context. Relative validity of these explanations involves important implications for the theories of interstate interaction as well as the U.S. and Soviet foreign policies. Thus, precise evaluation of these explanations may be worth of another research.

Short-term Perspective and Changing Patterns of Interaction

Whereas the estimation results of the basic model for the observations over the relatively lengthy period of time in general support my conceptualization of the rivalry as the process of mutual threat and reciprocal interaction, it has been argued that the assumption of constant reactivity as well as inertia/commitment over the 30 years of period is not only unrealistic, but also disguises the model's richer implications. Such an argument is further intriguing as my interests evolve from long-term dynamics to the short-term patterns of interaction and their determinants. In this regards, it was argued, first of all, the model can also be utilized to examine short-term patterns of interaction, i.e., mutual reciprocation and alternation, in terms of the signs and the degree of competitiveness in terms of the sizes of reactivity coefficient compared over time. Then, such an overtime variation can further be explained by some circumstantial factors with highly revealing implications for the foreign policy orientations of superpowers as well as for crises management. Correspondingly, similar overtime comparison of the commitment factors along with its relationship to the domestic politico-economic factors could be equally revealing. In this regard in this section, short-term behavior of model parameters are illustrated and discussed as a way leading to the discussion in the next Chapter, and the full, extended model.

The method to examine the short-term behavior of the model and obtain changing parameters is first developed by Azar, et al. (1974) and named as 'moving window' by Smith (1987). First of all, the foreign policy events are now aggregated for a shorter period of time, i.e., for a month. Since monthly aggregation yields more observations, the model can be estimated for much shorter time interval, say 3 year. Comparison of model

parameters will yield successive 'snap shots' or 'window view' of the reaction process. It is called a 'moving' window because whereas the estimation involves monthly observation for three year period, the increment of time point in each estimation could be shorter, say one year. Thus, the windows are partially overlapping and pictures look more lively, like a motion picture film.

Figures 4.7 through 4.10 in the appendix presents such moving windows for the data used in this study. They present the results from moving window estimation using the data for the overall Third World, and those for the regional data are not presented for the sake of space. In the figures, bold, horizontal bars represent parameter estimates for the period which the length of bar covers, and the fluctuating line connects the average values of parameters which cover the particular year in the estimation data. Those average values are what is used for annual observations of the 'reactivity' and 'commitment' analyzed in the next Chapter. Although precise analysis of overtime variation in such values is to be done in the next chapter in terms of their determinants, a cursory look at the figure yields the following general observations.

First of all, not surprisingly, they are changing overtime rather rapidly ranging from negative to positive values. Yet, the overtime fluctuation does not look random or arbitrary, but seem to follow some pattern, at least in terms of overtime trend or cycle. Although there are observed some outlying values, they yield much smoother time series when they are averaged. Second, although the reactivity values vary from negative to positive values indicating that the behavioral patterns of interaction vary from confrontation or mutual reciprocation to collaboration or mutual alternation/submission, the pattern of mutual reciprocation is still the modal category.

Finally, looking at the reactivities of both superpowers, there seems to be certain 'covariation' between two superpowers' reactivities with local peaks around the years of 1955, 1962, and lower points in the years of 1959 and 1968, and upward trends afterward. Such a correspondence is substantively meaningful and revealing; *reaction patterns are also reciprocal.*[12] Precise degree of such covariation is yet to be examined.

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12 Technically, such a correspondence was not expected or a rough inverse correspondence was rather expected because the size of reactivity coefficient is sensitive to the relative size of each actors' level of activity, i.e., when an actor's reactivity is high, it automatically implies the other actor's reactivity is low.

Concluding Remarks

So far, the superpowers' foreign policy activities in the Third World regions during the period of 1948-1978 are analyzed from both descriptive and analytic perspectives. Yet, even descriptive analysis of the records is not merely for descriptive purposes, but more importantly for the purpose of inferring relative capabilities and interests of superpowers, and relative salience of the Third World regions to each of superpowers. In so doing, the regions are characterized in terms of symmetry of interest between two superpowers and possibility of disputes for the symmetry following George (1984). It has been found that the U.S. has been more actively involved in the Third World affairs presumably reflecting its superiority of overall capabilities and interests. Further, Latin America is determined to be the region of interest asymmetry in favor of the U.S., Africa to be the region of low-interest symmetry and the Middle East to be the region of high-interest symmetry, the symmetry in both regions might be uncertain, thus could have been disputed. Finally, the Third World Asia is determined to be a disputed high-interest symmetry, the U.S. foreign policy activity in which involved extreme level of commitment and high degree of domestic politicization.

Regression analysis of the basic model shows that those regional characteristics are highly important in understanding the process of superpower competition, and their respective foreign policy activities. Precise nature of such characteristics and their impact on the competition process is subject to and worth further analysis.

Table 4.8. Empirical Results: OLS Estimation of the Basic Model

Actor	*Variables*	*Region*				
		Third World	L. America	Africa	M. East	Asia
U	Constant	1136	287	155**	225	−26
		(0.759)	(1.475)	(2.017)	(0.834)	(0.019)
S	Inertia/ Commitment	0.468***	0.290**	0.209	0.593***	0.539***
		(3.082)	(1.986)	(1.484)	(4.835)	(3.599)
A	Threat/ Reactivity	1.576**	3.563***	1.096***	0.588***	3.213**
		(2.419)	(4.291)	(5.740)	(3.017)	(1.873)
	R^2	0.602	0.695	0.856	0.650	0.484
	$F_{2,27}$	19.6	29.7	77.1	24.2	12.2
U	Constant	279	−7.2	−56	184	122
		(1.123)	(0.250)	(1.318)	(1.025)	(1.438)
S	Inertia/ Commitment	0.707***	0.466***	0.428***	0.583***	0.757***
		(6.753)	(3.879)	(4.464)	(3.765)	(6.922)
S	Threat/ Reactivity	0.055**	0.085***	0.410***	0.139	0.013
		(2.073)	(3.996)	(6.380)	(1.369)	(1.317)
R	R^2	0.802	0.778	0.911	0.570	0.728
	$F_{2,26}$	52.8	45.5	133.8	17.3	34.8

Notes: Results from OLS, single equation estimation. N=29 after losing two observations due to moving averaging and lagging. F-statistics are all significant at $p < 0.001$. In parentheses below coefficient estimates are t-ratios statistical significance of which are marked as follows.

*** Coefficient estimates are statistically significant at $p<0.01$ (one-tailed test).
** Coefficient estimates are statistically significant at $p<0.05$ (one-tailed test).
* Coefficient estimates are statistically significant at $p<0.10$ (one-tailed test).

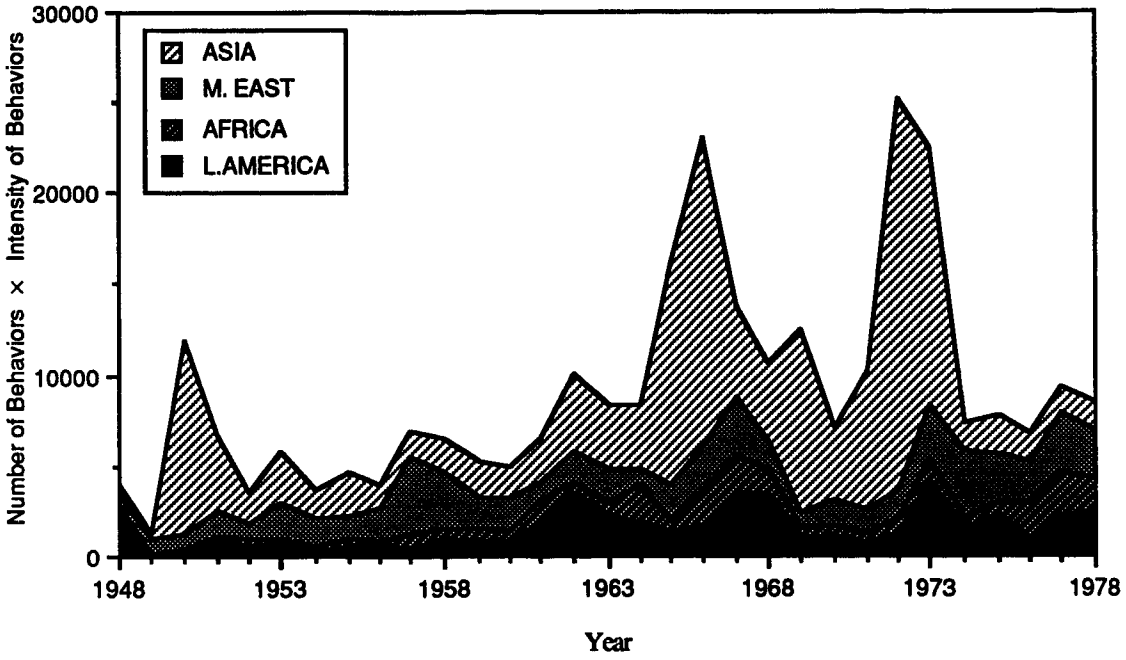

Figure 4.1. The 'Level' of the U.S. Foreign Policy Activity in the Third World: Cumulative Regional Distribution

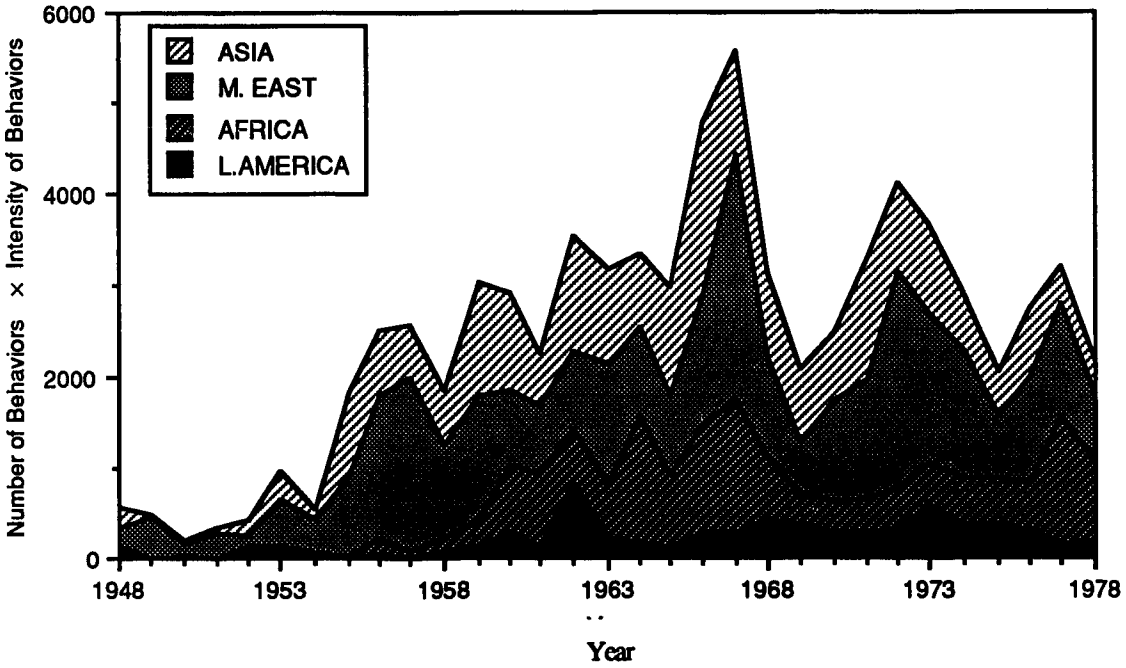

Figure 4.2. The 'Level' of the Soviet Foreign Policy Activity in the Third World: Cumulative Regional Distribution

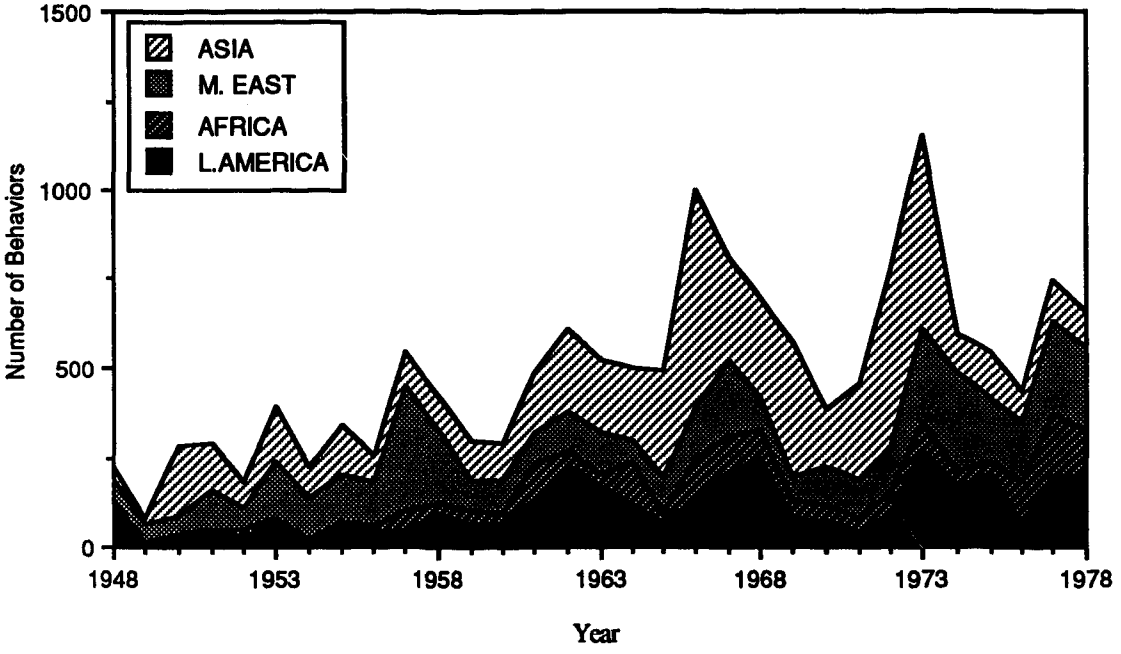

Figure 4.3. The 'Volume' of the U.S. Foreign Policy Activity in the Third World: Cumulative Regional Distribution

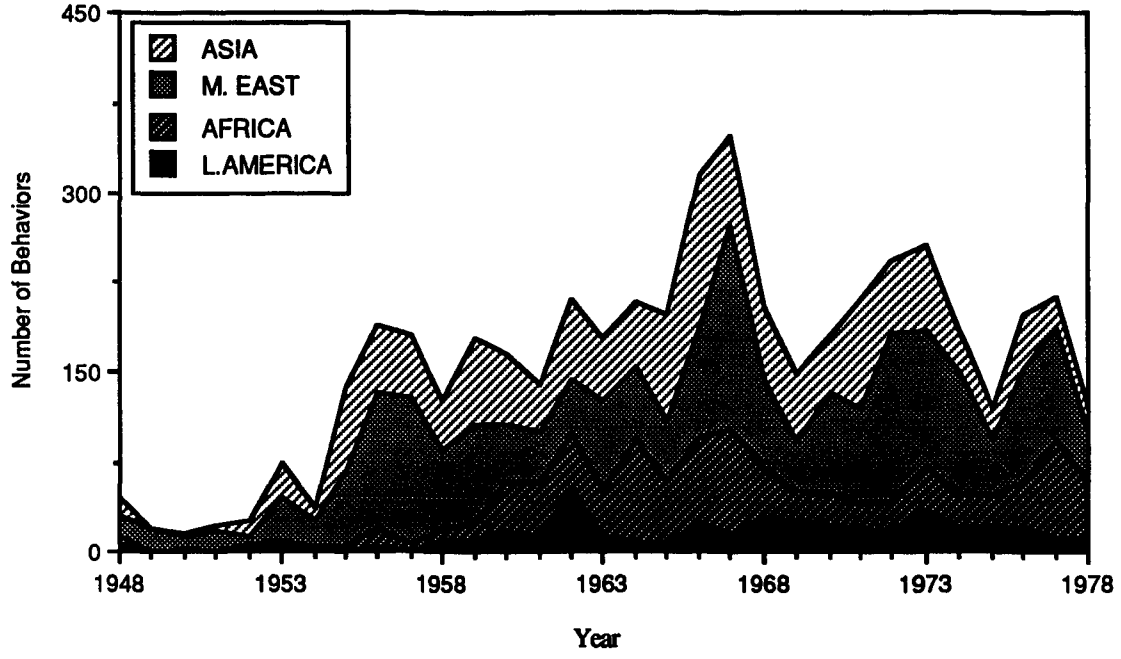

Figure 4.4. The 'Volume' of the Soviet Foreign Policy Activity in the Third World: Cumulative Regional Distribution

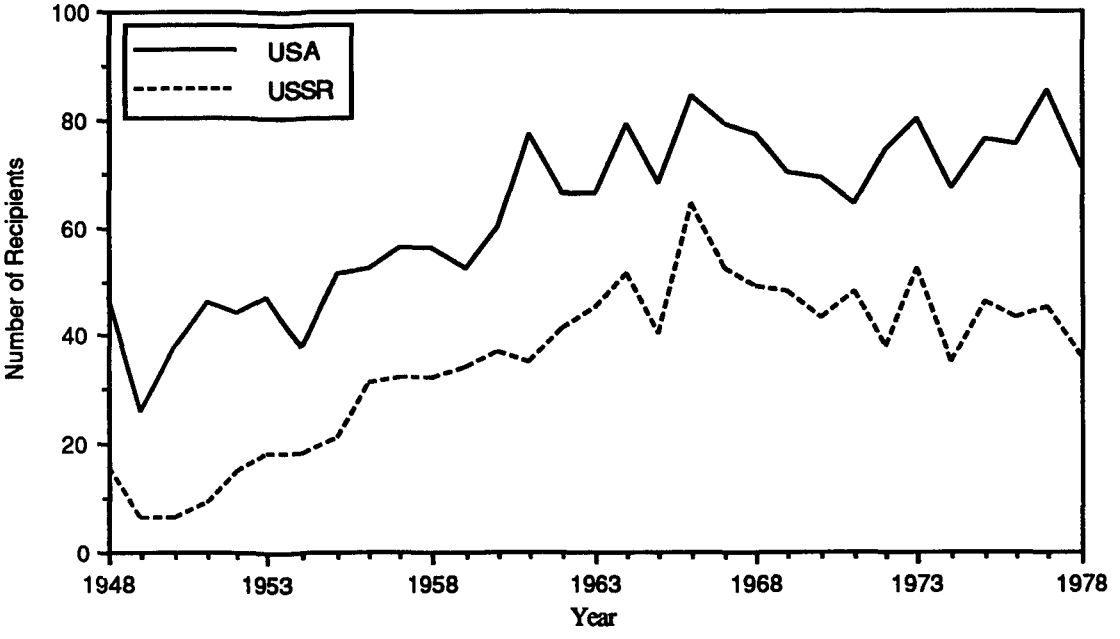

Figure 4.5. The 'Scope' of the Superpowers' Foreign Policy Activity in the Third World: Annual Plots of Number of Recipients

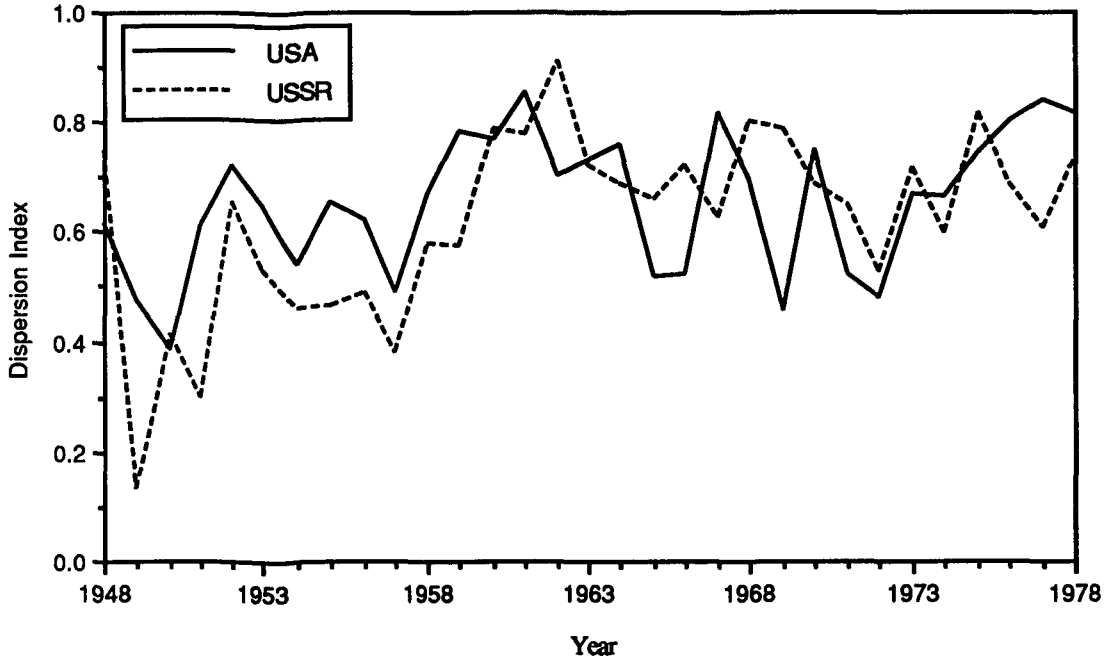

Figure 4.6. The 'Scope' of the Superpowers' Foreign Policy Activity in the Third World: Annual Plots of Dispersion Index

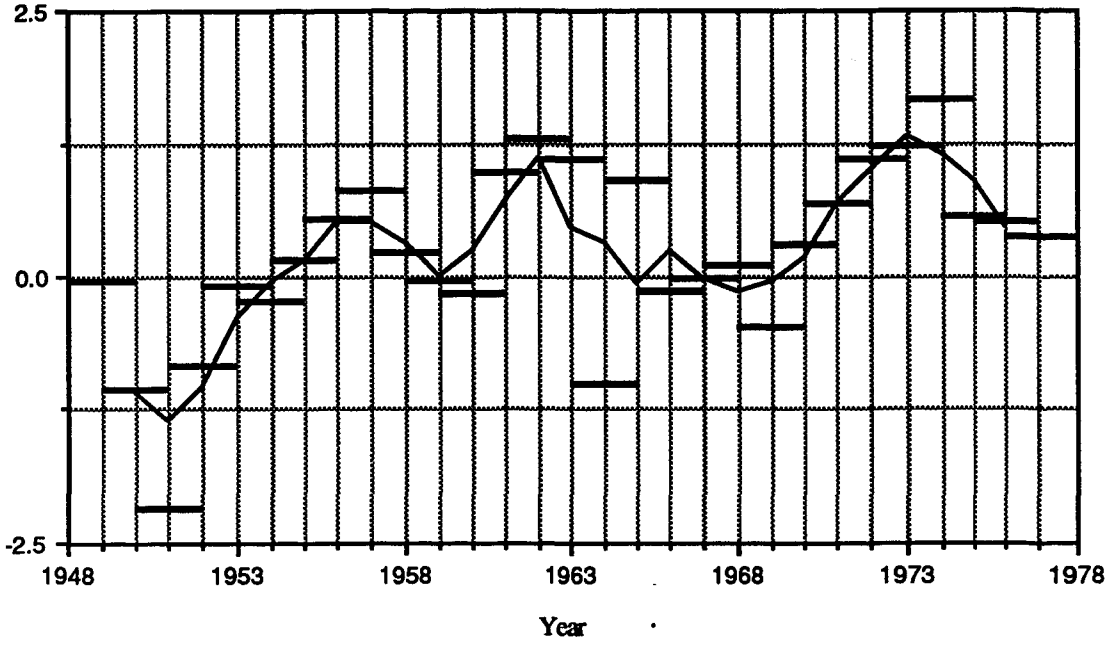

Figure 4.7. Moving Window View of the U.S. 'Reactivity'

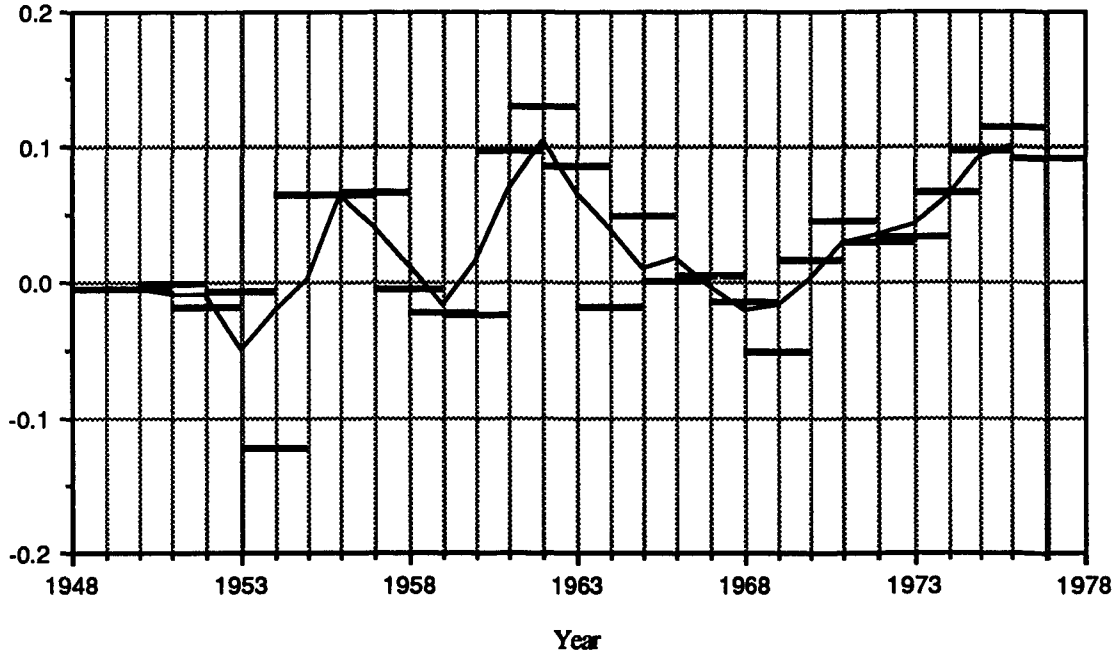

Figure 4.8. Moving Window View of the Soviet 'Reactivity'

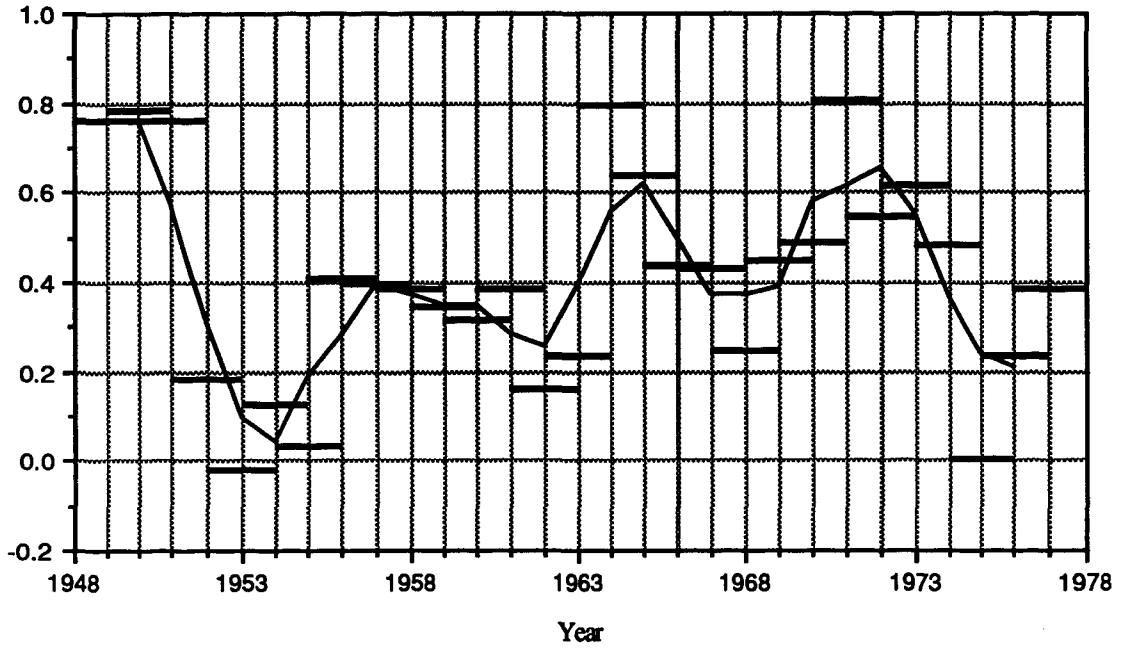

Figure 4.9. Moving Window View of the U.S. 'Commitment'

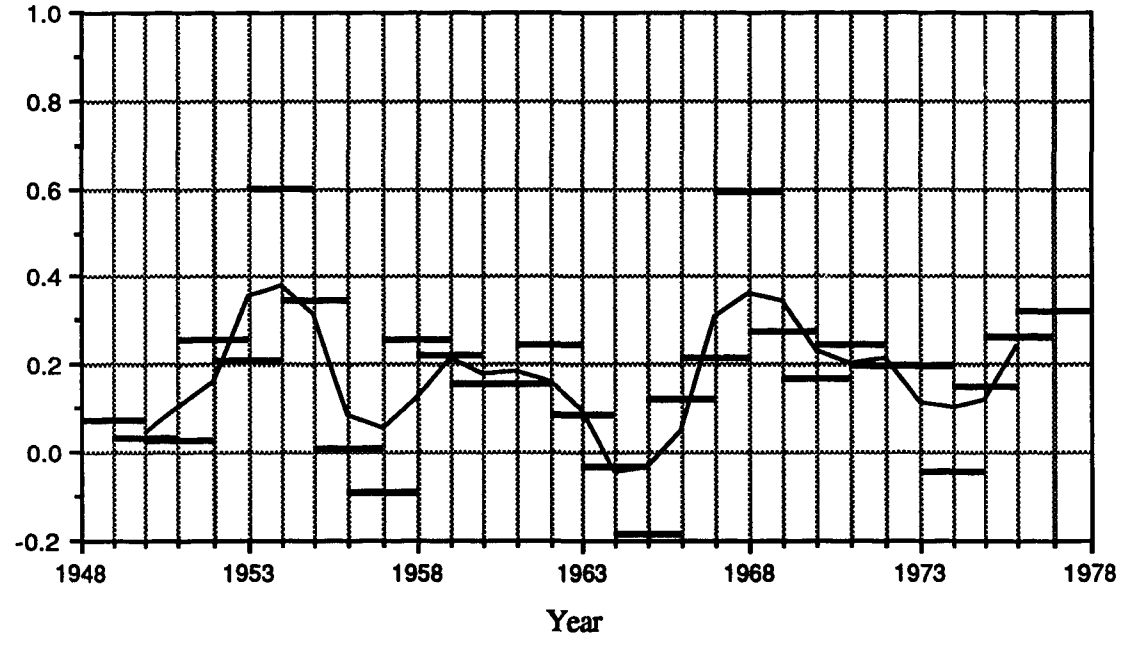

Figure 4.10. Moving Window View of the Soviet 'Commitment'

CHAPTER V
DOMESTIC LEVEL DYNAMICS

This chapter analyzes results from the regression analysis of the equations contained Block I, named the *domestic level dynamics*. To be precise, this block contains models for 'commitment' and 'reactivity' of superpowers with respect to their foreign policy rivalry and ensuing behaviors in the Third World, presented in Chapter III. Further in Chapters II and IV, the concept and measurement of these variables have been discussed in connection to the 'basic' model of superpower competition in terms of action-reaction dynamics. Although the concepts are defined and measured with specific reference to Third World regions and their hypothesized determinants include factors other than those 'purely domestic,' the discussion in this chapter is still called the 'domestic' level dynamics because the concepts are conceptualized as (1) *decision-making context* of the political leaders in making decisions for the foreign policy in the Third World from an analytic point of view, and (2) expressions of *general societal dispositions* of the respective superpowers from a more aggregate point of view. Simply, they are conceived as the *domestic context of superpower foreign policy rivalry in the Third World.*

In the following sections, first, the concepts of 'commitment' and 'reactivity' are more precisely defined and conceptualized in terms of their proposed determinants and the hypothesized causal relationships. Then, the hypothesized relationships are represented in terms of a multi-equation, dynamic model which is estimated via regression analysis so as to test the proposed hypotheses. Empirical results are discussed in the last section.

For the purpose of referernce, the measured values of 'commitment' and 'reactivity' are summarized in terms of simple descriptive statisticsin Tables 5.1 and 5.2. As seen in the table, the measured values fluctuate over time with regional variations. In Chapter II, it has been hypothesized that such over time variations can be explained by three groups of variables; (1) domestic politico-economic conditions, (2) the level of vested interests in the region, and (3) general bilateral relationships. The following section begins with more precise discussion of the hypothesized relationships and the underlying processes.

Table 5.1. Measuring Foreign Policy Dispositions of Superpowers: Some Descriptive Statistics of 'Commitment' Measure

Region	U.S.A				USSR			
	Mean	Standard deviation	Min	Max	Mean	Standard deviation	Min	Max
The Overall Third World	0.349	0.185	−0.018	0.744	0.174	0.120	−0.048	0.391
Latin America	0.032	0.117	−0.121	0.476	−0.017	0.074	−0.147	0.164
Africa	0.035	0.153	−0.207	0.358	0.097	0.139	−0.142	0.448
Middle East	0.173	0.127	−0.139	0.404	0.099	0.085	−0.055	0.259
Asia	0.344	0.215	0.002	0.786	0.044	0.169	−0.288	0.358

NOTES: Numbers are statistics over the thirty-one year (1948-1978) observations.

Table 5.2. Measuring Foreign Policy Dispositions of Superpowers: Some Descriptive Statistics of 'Reactivity' Measure

Region	U.S.A				USSR			
	Mean	Standard deviation	Min	Max	Mean	Standard deviation	Min	Max
The Overall Third World	0.059	1.603	−4.260	1.990	0.011	0.042	−0.055	0.121
Latin America	0.573	2.260	−4.866	5.433	0.032	0.038	−0.064	0.115
Africa	0.561	0.583	−0.655	2.212	0.131	0.087	−0.004	0.341
Middle East	0.459	0.244	−0.340	0.818	0.223	0.155	−0.092	0.626
Asia	0.373	1.731	−3.473	4.477	0.022	0.080	−0.189	0.185

NOTES: Numbers are statistics over the thirty-one year (1948-1978) observations.

Concepts, Model and Hypotheses

Concept and Determinants of 'Commitment' of Superpowers

Operationally and behaviorally, 'commitment' is defined in terms of the impact of the past level of behaviors on the current level, while threatening impact of the rival's behavior is held constant. Such an 'inertia' in foreign policy behavior is seen to be generated by two sources; (1) bureaucratic procedures in the foreign policy process and (2) commitment to the future action imbedded in any foreign policy behavior. The question here is why such an inertia in behavior changes over time. Since the inertial tendency in the bureaucratic procedures is something inherent in any large organization, it is rather a constant and cannot generate the short-term, overtime variation in the level of 'commitment.' Also, since any foreign policy action imbeds larger or lesser degree of commitment effect, the level of previous behaviors cannot explain the degree to which the level of past behavior affects the current level of behavior.

It is proposed here that the short-term variation in the degree to which the past behavior affect the current behavior may be seen as the degree to which past commitments are *realized* at the current period of time. Since foreign policy commitment mostly involves use of scarce resources at the expense of some other valued societal activities, past commitments must be either explicitly or implicitly 'ratified' to be realized, either by the constitutional institutions, coalition members, or any other constituents including the general public.[1] Generally speaking, therefore, the level of 'commitment' varies as the function of the degree to which those relevant constituents are *willing* to approve foreign policy commitments and ensuing use of resources.[2] And such a willingness is the function of general societal conditions such as the economic condition against which the 'cost' of foreign policy commitment is measured, the general social 'mood' in which foreign policy commitment is *valued*, and etc.

From a slightly different angle, some of past commitments may be simply *binding*, either as the results of international agreements, or *ad hoc*, expedient adjustments to

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1 Discussion in this section as well as the ratification analogy is partially adopted from Robert Putnam's *two-level game* discussion of domestic politics-foreign policy linkage. See Putnam (1988).

2 Or, using Putnam's terminology, the size of "win-set," i.e., "the set of all possible [international] agreements what would 'win'" the ratification (Putnam, 1988: 437), affects the degree to which previous foreign commitment is domestically sanctioned and behaviorally realized. And, "the size of the win-set depends on the distribution of power, preferences, and possible coalition among [domestic] constituents" (Putnam, 1988: 442).

changing international environment. Then, the degree to which past commitment is realized is also a function of the political leadership's *ability* to persuade the constituents so as to elicit domestic support necessary to abide with the commitments. And such an ability is seen as the function of (1) leadership's power position vis-à-vis the 'unwilling' constituents, (2) information or other types of resources at disposal with which decision-makers justify a commitment and persuade the constituents toward approval of the commitment, and (3) their political skill and tactic in using such resources and information.

Operationally, I conceive two groups of variables which reflect domestic *willingness* to approve, and/or leadership's *ability* to abide with past foreign policy commitment; (1) the domestic politico-economic conditions, particularly (*a*) the domestic economic conditions, and (*b*) the relative power position of foreign policy leadership vis-à-vis their domestic constituents, and (2) the level of vested interests in the Third World regions in their political and economic dimensions. In this study, the domestic economic condition is measured by the economic growth rate, or percent change in the Gross National Product. Its hypothesized relationship to the level of 'commitment' is such that *the higher economic growth rate, the less is the 'opportunity cost' of the foreign policy commitment, and the higher is the level of 'commitment'* (Hypothesis 5.1).

The relative power position of foreign policy officials to their domestic constituents can be measured by the resource/budget allocation process. Particularly in this study, the level of defense spending as percent to the total governmental spending is devised in order to measure the relative position of foreign policy officials to their competitors within the administrative branch, as reflected in the initial budget allocation process. In that it should be approved and appropriated by the Congress, it also reflects the relative importance of the defense issues upon which both the administration and the legislature, i.e., the political leadership in general, agree upon. A similar measure is devised for the Soviet Union, but the military spending as percent of the total Gross National Product is used this time due to a data problem. Yet, in view of the centrally planned system of Soviet economy, this measure may be seen analogously. Thus, the hypothesized relationship of this measure to the level of 'commitment' is that *the higher the defense spending relative to the total government spending, the higher is the level of 'commitment'* (Hypothesis 5.2).

For the U.S., another measure is constructed to reflect the relative power position of the foreign policy officials vis-à-vis their principal domestic constituent, the Congress. The measure is the Presidential support ratio of the Congress which the *Congressional Quarterly* measures and reports every year, with the hypothesized relationship that *the*

higher the Presidential support ratio of the Congress, the higher is the level of 'commitment' (Hypothesis 5.2.1).

The second group of variables is to measure the superpowers' interests in Third World regions. There are conceived of two related processes in which the level of interests affects the level of 'commitment'; one on the part of the political leadership or foreign policy officials and the other on the part of the general public. For the foreign policy leadership, first, high level of vested interest means more resources which they can identify with *national* or *societal interests*. Thus, the higher the level of vested interests, the more likely are the political leaders successful in eliciting domestic support for foreign policy commitment, and the higher is the level of 'commitment.'

On the part of the general public or constituency, on the other hand, a similar line of argument can still be made but with some qualifications. First, it seems plausible that the higher the level of interest is, the more likely the public will believe that foreign policy commitment is worthwhile, and is willing to approve the commitment. Yet, such an assertion is based upon an assumption that people's interests and stakes are *homogeneous*. If the constituents' interests are *heterogeneous* instead, there is a likelihood that the constituents are divided over the appropriateness of commitment, and the "ratification" process is deadlocked.

Having these processes in mind, there are conceived and measured two dimensions of superpowers' interests in Third World regions; political and economic. Political dimension of interest is operationalized by the level of *influences* exerted by the superpowers on the behaviors of the Third World nations, and measured by the *rate of agreement* between a superpower on one hand and the Third World nations on the other in their voting records in the United Nation General Assembly, called the *policy similarity score* (see Table 3.6).[3] Economic dimension of interests is measured by the region's importance to the superpower as trading partner; the value of a superpower's regional trade as percent to the total trade. While some radical literature emphasize capital export like foreign direct investment more than trade value, trade measure is preferred because of the comparability across the superpowers.

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[3] To construct a policy similarity score of the region with each of the superpowers, the voting records of each member states in the region are compared to that of superpowers, and a score of agreement (which can range from 0 to 100) is constructed for the individual states. Average value across all the states in the region is the region's policy similarity score. It turns out, however, that as the issues in the General Assembly have moved away from the East-West issues to the North-South issues, the score for the U.S. has continuously deteriorated and that for the USSR has continuously improved. To control this compounding effect of the issue characters, system-wide score, i.e., the score for the overall Third World, is subtracted from the region's score except the score for the overall Third World.

In general, the political dimension of interest is more 'symbolic' or 'intangible' than the economic dimension which is relatively 'substantive' or 'tangible' at least to the eyes of general public. Then, it is hypothesized that the first process noted above is more likely to work for the political dimension and the second process is more likely to work for the economic dimension. Specifically, *the higher the measured level of political interests, the more likely foreign policy leaders are successful in eliciting domestic support for foreign policy commitment, hence the higher the level of 'commitment' is* (Hypothesis 5.3).[4] On the other hand, depending on the homogeneity/heterogeneity of interest among active constituency groups, it may be the case that *the higher the level of economic interests*, either *the higher the level of 'commitment' is if the interests are 'societal' or homogeneous* (Hypothesis 5.4.1), or *the lower the level of 'commitment' is if the interests are 'factional' or heterogeneous* (Hypothesis 5.4.2).

Figure 5.1 illustrates the hypothesized process in which the level of 'commitment' is determined as a function of the factors discussed so far, for the U.S. case for an illustrative purpose. Notice however that in the figure there are several additional variables whose effects on the level of 'commitment' are not explicitly discussed; (1) the lagged dependent variable, (2) rival's disposition variables (Soviet 'commitment' and 'reactivity' levels), and (3) a measure for the region's *polarity*. Except the polarity measure, all these variables are in the model empirically. That is, it is found that they posses significant explanatory power upon experiments with various alternative specifications. Yet, *post hoc*, they reveal a highly important aspect of the political process of foreign policy; the degree to which the foreign policy process is *politicized* or the degree to which 'politicking' gets involved in the policy making process, as discussed later with the empirical findings.

The polarity measure was initially specified in the model as a way to measure the degree to which the political leadership and foreign policy officials can elicit public support by referring to *relative* level of interests, i.e., "ideologizing" foreign policy commitment in the Third World in the context of general superpower rivalry and the Cold War, comparable to such terms as the "Missile Gap" (see fn. 4). Based on empirical results and by *post hoc* interpretation, it appears that they had better be discussed along with the issue of *politicization* of foreign policy process, like the lagged dependent variable and the rival's dispositions.

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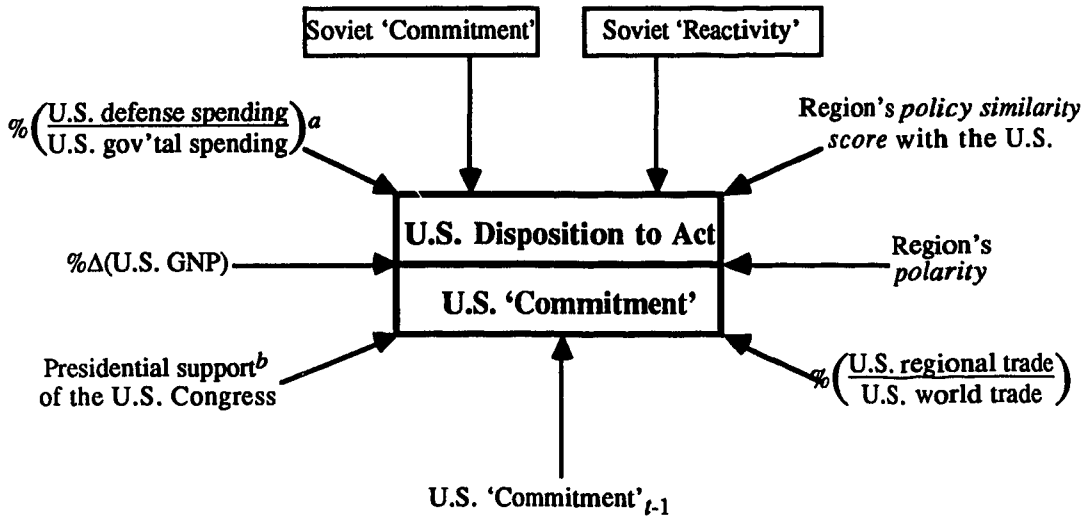
[4] Such a leadership ability could be further enhanced when the level of interests is compared to that of the rival's by making it look 'vital.' Explicit modeling of such an effect is not done here however, yet the *polarity* measure may reflect similar process. See discussion about the hypothesized and empirically found impact of the polarity measure below.



Notes: In boxes are the endogenous variables within this block although reciprocal causalities are not shown for the sake of simplicity, while all other variables are exogenous or predetermined variables. The model for Soviet 'commitment' is symmetrically identical except (*a*) GNP value is used for governmental spending in the denominator in this measure and (*b*) comparable term of this measure does not appear in the Soviet case. In equational form, the model is expressed as follows.

$$\begin{aligned}
\text{U.S. 'Commitment'}_t &= \alpha_{1.1} \\
&+ \beta_{1.11}\ \text{U.S. 'Commitment'}_{t-1} \\
&+ \beta_{1.12}\ \%\Delta(\text{U.S. Gross National Product}) \\
&+ \beta_{1.13}\ \text{Presidential support of the U.S. Congress} \\
&+ \beta_{1.14}\ \%\left(\frac{\text{U.S. defense spending}}{\text{U.S. governmental spending}}\right) \\
&+ \beta_{1.15}\ \text{Region's polarity} \\
&+ \beta_{1.16}\ \text{Region's policy similarity with the U.S.} \\
&+ \beta_{1.17}\ \%\left(\frac{\text{U.S. regional trade}}{\text{U.S. world trade}}\right) \\
&+ \gamma_{1.11}\ \text{Soviet 'Commitment'} \\
&+ \gamma_{1.12}\ \text{Soviet 'Reactivity'} \\
&+ \mu_{1.1}
\end{aligned} \tag{5.1}$$

Figure 5.1. Determinants of U.S. 'Commitment': Hypothesized Dynamics

The Concept and Determinants of the 'Reactivity' of Superpowers

Operationally and behaviorally, the concept of 'reactivity' is defined as the units of actions taken by an actor in response to the rival's unit action, and this concept can be seen to be more *strategic* and *utilitarian* than that of 'commitment.' That is, it reflects the degree to which decision-makers perceive the rival's action challenging or threatening, and the degree of 'competitiveness' or 'firmness' which decision-makers think appropriate in response to the rival's action. To model how the level of a superpower's 'reactivity' is determined, it is necessary to have in mind that (1) not every actions of the rival are seen to be threatening, (2) not every threatening actions are responded to, and (3) reactions to the rival's action can be done in many different ways, e.g., in a single action or in a series of actions, and most of all, with different level of intensity. From a more analytic point of view, thus, this concept reflects the calculus of the decision-makers at three successive stages; (1) the decision-maker's judgment whether the rival's particular action or series of action is threatening, thus poses a problem to be dealt with, (2) if it poses a problem, actual decision whether to react to or acquiesce the rival's action, and (3) the choice of appropriate level of commitment or firmness, or the intensity of reaction.

Figure 5.2 represents a decision tree based on this picture of three stages of decisions. In the following, I will discuss the decision calculus of superpowers at each stages in terms of three basic factors; (1) the level of vested interests in the region by the superpower, (2) the level of capability of the actor relative to the rival's, and (3) bilateral relationship between two superpowers. At the first stage which may or may not involve any explicit "decision," the judgment involves whether the rival's action bears some implications for own interests either through explicit policy aim of the rival's action or by any unintended consequence of the action in question. Thus, upon initial thought, it can be said that the likelihood for decision-makers to perceive the rival's action threatening is proportional to the level and scope of vested interests of the superpower in the region, other things being equal. Yet, because the perception of threat is highly subjective, there may be several more elements than such an utilitarian consideration, especially perceptual factors. And the perceptual process may particularly be affected by two factors. First of all, when the relative capability of an actor is favorable, the rival's action may be seen less threatening because given the superior capability of the actor, the success of the rival in a third area may not be seen to affect the overall balance of power significantly. Also, when the bilateral political relationship between two superpowers is more congenial, the rival's

action will be seen less threatening because the actor will less likely see the rival's aim of action is directed against it.

The decision at the second and third stages involves more utilitarian calculation of expected benefits and potential costs as vast amount of literature on bargaining suggests. At the second stage of decision, first of all, a decision to react rather than to acquiesce will be made if the decision-makers' calculus shows that either (1) the rival actor will back off upon reaction or resistance or (2) the reaction at the risk of potential confrontation with the rival is still worthwhile. The first will be likely the case when the rival's aim of action is seen to be 'probing' without firm commitment, and such a probing aim of action will be likely perceived when either the balance of interest or the balance of capability is believed to be in favor of the actor. Second, the actor will decide to react at the risk of confrontation if

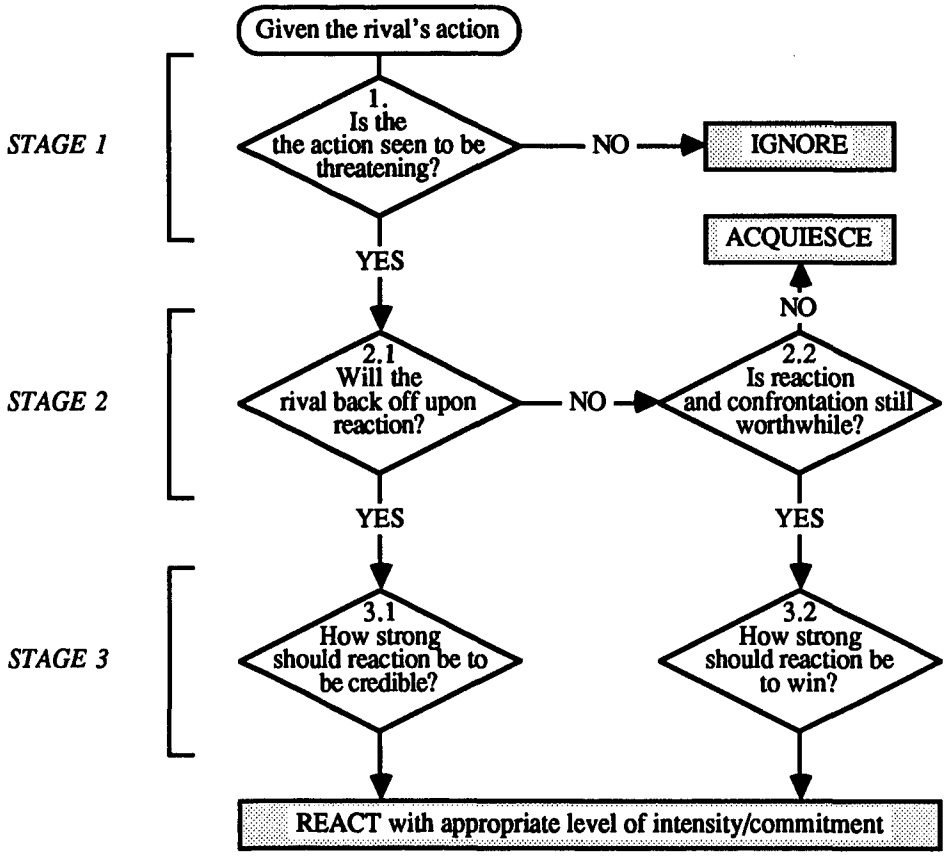


Figure 5.2. Reaction Process: A Decision Tree

(1) the actor is expected to prevail in the projected confrontation over the long-run, or (2) the stakes are so high that confrontation is worthwhile to risk. And the first will be the case when the long-term balance of capability and/or situational circumstances are in the actor's favor, and the second will be the case when the actor possesses high level of interests in the region overall and/or the issues are so highly interconnected that policy stance on one occasion can also affect other areas of issues.

Finally, the intensity of the reaction will be determined upon the decision-makers' judgment of how strong the commitment should be either (1) to make own policy stance look *credible* enough for the rival to back off, or (2) to win the confrontation and defend the challenged or endangered interests depending upon the circumstance. The credibility requirement will be less if the actor possesses high intrinsic interests in the situation or relatively superior capabilities. Yet, to win the confrontation, an actor with superior capability will more likely be willing and able to launch reactions with higher level of intensity and commitment.

As obvious from the discussion so far, key elements in the decision-making calculus which affect the level of a superpower's 'reactivity' are (1) the level of interests in the region, (2) the relative capabilities between superpowers, and to some degree (3) bilateral relationship between superpowers. What is not obvious, however, is the expected effect of such variables on the level of 'reactivity' because the same factors have different effects in different stages of decisions and different situations in each stages while 'reactivity' is an aggregate measure reflecting all the stages and situations. Table 5.3 summarizs hypothesized effects of these three variables on the level of 'reactivity.' It is clearer that the same variable often affects 'reactivity' measure in opposite directions at different stages of decision such that the overall impact of the variable on 'reactivity' could be obscured and unambivalent prediction on the relationship can hardly be made.

One of the ways in which the overall effect of such variables may be that since the decision goes through stages, impact of the factors at the first stage could be *overarching*. Or alternatively, one may think of the 'cumulative' effect of a variable through the stages of decision such that if a variable affects the level of 'reactivity' *positively* more often than *negatively*, the overall impact could be *positive*, and so on. Thus, in the following, a set of general hypotheses are proposed based on the following two rules; (1) if a variable's effect on the level of 'reactivity' is positive more often than negative, the overall effect is positive, and vice versa, and (2) if the predicted effect based on the first rule is not obvious, more weight goes to the earlier stage effect than later stage effect.

Table 5.3. Determinants of the Superpowers' *Reactivity* and Hypothesized Relationships

Variables	*Hypothesized Effects on Decision Stage* 1	*Hypothesized Effects on Decision Stage* 2	*Hypothesized Effects on Decision Stage* 3
Level of interests of a superpower in the Third World region	*Positive*: The higher an actor's level of interests in the region is, the more likely one or more areas of the actor's interests get threatened, and the more likely the rival's action poses problem.	*Positive*: The higher an actor's interests in the region, the higher the stakes are not only because the threatened interests are high but also because the reputation to other nations in the region gets important.	*Negative*: The higher an actor's interests are, the more credible of the actor's policy stance and reaction aim is, and therefore, the less the intensity and commitment of the reactive actions.
Relative capabilities between superpowers	*Negative*: The more favorable the relative power position of the actor is, the less likely the rival's aim of action is seen threatening because given the superior capability of the actor, the effect of success of the rival in the third area is less likely to change the overall balance of power.	*Positive*: The more favorable the balance of power is, the more likely the actor is going to believe that it will prevail in the confrontation, and conversely the rival is seen more likely to back off, therefore the more likely to react.	*Negative*: The more powerful an actor is, the more credible of the actor's policy stance and reaction aim is, and therefore, the less the intensity and commitment of the reactive actions.
Bilateral super-power relationship	*Negative*: The more congenial the bilateral relationship is, the less likely the rival's aim of action is seen to be directed against the actor	*Positive*: The more congenial the bilateral relationship is, the more likely the actor believes the likelihood of escalation is low, and the more likely to react. *Negative*: The more congenial the bilateral relationship is, the more things the actor is to lose if the confrontation gets escalated, thus the less likely the actor will react.	*Positive*: The more congenial the bilateral relationship is, the less credible of the actor's policy stance and reaction aim is because the rival may not believe in seriousness of the actor's reaction, and therefore, the higher is the intensity and commitment of the reactive actions.
Region's *polarity*	*Positive*: The more polarized a region is, the more likely the rival's action changes delicate regional balance of interests, and thus the more likely the rival's action is seen to be threatening.	*Positive*: The more polarized a region is, the more significant change will result from unresisted rival's action and the higher the stakes get. Also reputation factor becomes an even more important issue.	*Positive*: The more polarized a region is, the more symmetric the actors' interests are. Thus, through the reciprocal process, the level of intensity gets the higher.

Hypothesis 5.5: *The higher the level of a superpower's vested interests in the Third World region, the higher the level of 'reactivity.'* This is the case because (1) the higher the level of interests, the more likely a rival's action is seen to be threatening regardless whether it is intended so or not, and (2) the more likely the actor will choose to react to rather to acquiesce the rival's threatening action.

Hypothesis 5.6: *The higher the level of capability of a superpower relative to the rival, the lower the level of 'reactivity.'* This rather counter-intuitive hypothesis is based on that (1) the more favorable a superpower's relative capabilities, the less likely the rival's aim of action is seen to be threatening, and (2) the more powerful an actor is, the more credibility its reaction carries, thus the lower the intensity of reaction will be.

Hypothesis 5.7: *The better bilateral relationship between superpowers, the lower a superpower's the level of 'reactivity'.* This hypothesis is based on the arguments that (1) the more congenial the bilateral relationship is, the less likely the rival's aim of action is seen to be directed against the actor, and (2) the better the relationship is, the more to loose if the confrontation in the Third World gets escalated.

Yet, there is a factor whose hypothesized effect on the level of 'reactivity' is unambiguous and cumulatively reinforcing; the region's *polarity*. Polarity of a region is defined in this study as "the degree to which a Third World region is divided into the superpowers' respective spheres of influence *and* the degree to which the division is symmetric."[5] When a region is polarized, then, ranges of superpowers' interests are more likely to collide, any change in political orientation of local states is more likely to change regional balance of interests significantly. Therefore, any action by a superpower is more likely to be seen threatening regardless the initial actor's goal (*stage* 1). Further, because unresisted rival's action could change delicate regional balance of interests substantially, the stakes are high (*stage* 2). Furthermore, since highly polarized region means that superpowers' interests in the region are symmetrically high, both superpowers are likely react to each other with increasingly intense level of commitment (*stage* 3). Thus, *the more polarized a region, the higher the level of 'reactivity' in the region* (Hypothesis 5.8).

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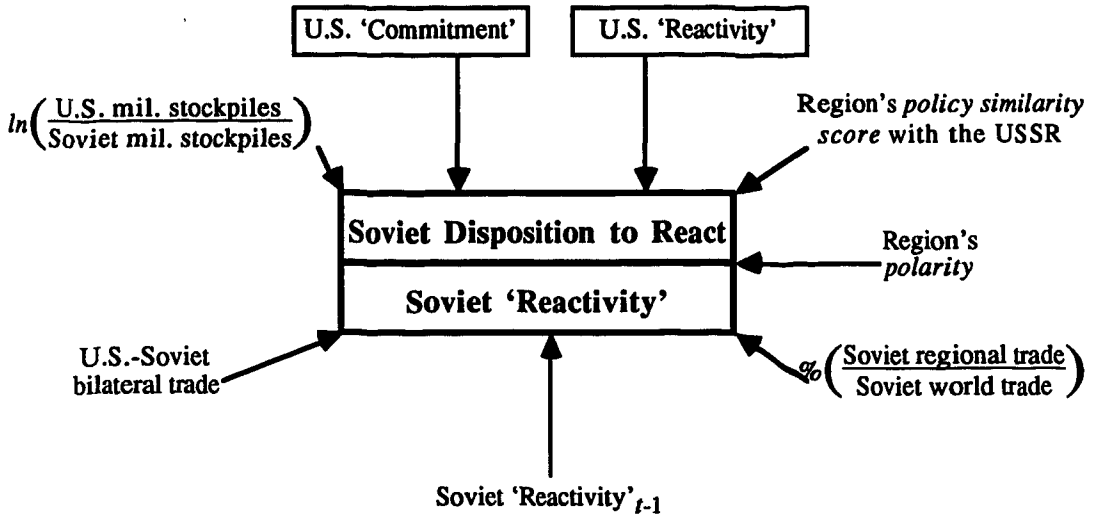
[5] Precisely, a region's polarity score is measured by taking standard deviation across all the states in the region of the differences in their policy similarity scores with each of the superpowers, i.e., the policy similarity score with the U.S. minus the policy similarity score with the USSR. The value is zero either when all the states are indifferent in their relative policy orientations or when all the states are similarly close to one of the superpowers. The value is maximum when all the regional states are exactly divided into two groups each of which are highly similar to each of the superpowers in their policy orientation. Thus, a highly polarized region is the region of high-interest symmetry in George's terminology (George, 1983).



Notes: In boxes are the endogenous variables within this block although reciprocal causalities are not shown for the sake of simplicity, while all other variables are exogenous or predetermined variables. The model for U.S. 'reactivity' is symmetrically identical. In equational form, the model is expressed as follows.

$$\begin{aligned}\text{Soviet 'Reactivity'} &= \alpha_{1.4} \\ &+ \beta_{1.41}\ \text{Soviet 'Commitment'}_{t-1} \\ &+ \beta_{1.42}\ \text{Region's polarity} \\ &+ \beta_{1.43}\ \text{Region's policy similarity with the USSR} \\ &+ \beta_{1.44}\ \%\left(\frac{\text{Soviet regional trade}}{\text{Soviet world trade}}\right) \\ &+ \beta_{1.45}\ ln\left(\frac{\text{U.S. military stockpiles}}{\text{Soviet military stockpiles}}\right) \\ &+ \beta_{1.46}\ \text{U.S.-Soviet bilateral trade volume} \\ &+ \gamma_{1.41}\ \text{U.S. 'Commitment'} \\ &+ \gamma_{1.42}\ \text{U.S. 'Reactivity'} \\ &+ \mu_{1.4}\end{aligned} \tag{5.2}$$

Figure 5.3. Determinants of Soviet 'Reactivity': Hypothesized Dynamics

Figure 5.3 presents a model for the dynamic process in which the level of Soviet 'reactivity' is determined for the illustrative purpose, along with the regression equation which is estimated so as to test the proposed hypothesis. In the model, the same two 'interest' variables are used as those used for the level of 'commitment'. The relative capability is measured by taking natural logarithm of the U.S. to Soviet ratio in their military stockpiles (see Table 3.6 for their measure and data source). Because of the way the indicator is constructed, notice that when the hypothesis relationship is *positive*, it will be *negative* in regression coefficient for the Soviet case. Indicator for the bilateral superpower relationship is the U.S.-Soviet bilateral trade volume. The trade volume is used as a measure of bilateral 'political' relationship rather than the economics itself.[6]

Like one for the level of 'commitment' in Figure 5.1, there are several more variables whose effects on the level of 'reactivity' are not explicitly discussed; (1) the lagged dependent variable, and (2) the rival's disposition variables (U.S. 'commitment' and 'reactivity' levels). Again, these variables are included in the model on an experimental basis. Still, they could yield some important insights into the foreign policy process in the superpowers, as to be discussed later with the empirical results.

Empirical Results

General Observations

Tables 5.4 through 5.8 at the end of this chapter present the estimation results of four equations in Block I, those for 'commitment' and 'reactivity' of two superpowers for four Third World regions as well as the overall Third World, totaling 20 equations. Thus, discussion of results equation by equation will not be worth efforts and space. Rather, comparison of the results across actors and regions for each components of the model will yield more useful observations. Thus, this section discusses overall, general patterns of statistical association of each components of the model, and the following sections more specifically focus on cross-actor, and cross-regional comparison of the results, before I derive some implications from such observations.

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6 At least one alternative indicator has been tried out; the political climate variable measured from COPDAB events in terms of the proportion of cooperative interaction to total interaction exchanged between superpowers. While this measure is not adopted primarily to insure block-recursive structure of the model (conflict-cooperative interaction is a component in Block III), it also turned out that, during experimental stage of model specification, the 'trade' variable generally outperformed the 'climate' variable.

Generally speaking, the results look 'good.' Many of the model variables turn out to be statistically significant with the predicted or interpretable signs. In terms of the goodness-of-fit statistics, the model also turns out to be rather surprisingly powerful, and robust; the adjusted R-square values range from 0.63 (Soviet 'commitment' in Africa) to 0.94 (Soviet 'commitment' in Asia) and F-statistics for all equations are statistically significant at $p<0.001$. Speaking of the goodness-of-fit statistics, there is observed an interesting pattern across actors and regions, especially for the 'commitment.' That is, the model tends to perform better (1) in explaining U.S. commitment than Soviet 'commitment,' and (2) for the regions of Asia and the Middle East (and the overall Third World) than for the regions of Latin America and Africa, particularly for U.S. commitment.

That a model performs better for a sample than another means that there are more *systematic* elements, as hypothesized and specified in the model, opposed to *stochastic* or *random* elements, in the sample data than the other. And, such cross-actor and cross regional patterns are consistent with the model's general conception of 'commitment' variable in terms of the domestic political process. That is, the more the foreign policy process is politicized within the domestic setting, the more are there *systematic* elements relative to the random elements and the better does the model perform. In terms of the relative political accountability of two superpowers, foreign policy process in the U.S. is more likely politicized than in the Soviet Union. Also, in view of the overall level of American foreign policy activity and commitment in the regions of the Middle East and Asia, the policy process in these two regions are more likely to be politicized than in other regions.[7] Although similar regional pattern may also be expected for the Soviet Union, the observed pattern is not quite clear. Even though the model performs extremely well in explaining Soviet 'commitment' in Asia, the large R^2 value could also be attributed to the impact of lagged endogenous variable, the subject to which we now turn to.

Relatively large impact of the lagged dependent variable in this case means that the foreign policy process is *less* politicized. The impact of lagged dependent variable is in general bigger when there is less variation or fluctuation in a time series such that "yesterday's value is a better predictor for today's value." Because we have hypothesized that the overtime variation/fluctuation is generated by 'shocks' or intervention from forces and factors outside of the decision-making circle, a 'consistency' or 'tenacity' in the level of 'commitment' in terms of large impact of the lagged dependent variable may indicate one

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[7] Such an observation is further consistent with the number of model variables which turn out to be significant.

or combination of the following three cases; (1) decision-making process is closed to the outside influences (*political accountability*), (2) outside influence is negligible, i.e., either non-existent or inactive (*salience/politicization* factor), and (3) decision-makers are able to resist such outside influences.

Results from the overall Third World data support the first case; the lagged dependent variable is more important in explaining Soviet 'commitment' (also 'reactivity') than that of the U.S., although regional patterns are ambivalent. Second, when results are compared across regions, salience or politicization factor seems to be working; lagged dependent variable plays bigger roles in explaining U.S. 'commitment' in Latin America and Africa than in the Middle East and Asia, one of the consistent pattern so far. The Soviet case is at best ambivalent, however. It is the lowest in the Middle East, but the highest in Asia.

As conceptualized earlier, 'reactivity' is more strategic in nature than the 'commitment,' and decision-makers are presumably in a better position to resist societal influence in strategic decisions. Thus, it is expected that explanatory power of the lagged endogenous variable is bigger for 'reactivity' than the 'commitment.' Such an expectation is in general supported for the U.S. case, but the finding is nearly opposite for the Soviet case. Then, what is operating is an interaction effect between the political accountability and the nature of issue; whereas the U.S. decision-makers are relatively successful in resisting societal influence in making strategic decisions, such strategic decisions may be subjected to more intense *inner-circle* debates and disputes for the Soviet case.

In speaking of politicization of the foreign policy process, what is interesting to observe is the impact of the *polarity* measure on the level of the commitment. Initially, an expectation was that the more polarized a region is, the more likely the political leaders will be able to elicit domestic support for the foreign commitment by speaking of 'vital interests' in the context of the Cold War. It turns out that its effect on 'commitment' measure is generally insignificant, and in some regions for the U.S. case, they are *negative*. That is, the more polarized a region is, the less the U.S. 'commitment' level, meaning that there is more domestic resistance to foreign commitment than otherwise. In that such a pattern is observed in Latin America and Africa which have been relatively outside of the main theater of the U.S.-Soviet rivalry, the result can be interpreted in the following way; (1) they are two of regions in which the foreign policy is less politicized, (2) when these regions get polarized, there will be increasing attention to the political development in the region and policy process is increasingly politicized, (3) identification of 'vital interests' in the context

of the Cold War may have been hardly attempted or hardly convincing if ever attempted, and instead, (4) the American public may have wanted just to stay out of the way when a region is turbulent and confrontation is likely. The measure does have positively significant impact on Soviet 'commitment' in one of the regions, however, and the region is the Middle East. Without loss of consistency, we can interpret that the Middle East is the region where some 'vital' interests are at stake when there is increasing presence of the U.S. at the same time with the Soviets.

Another empirically identified pattern is that the rival's disposition variables proved to be good predictor of a superpower's dispositions, both 'commitment' and the 'reactivity.' Although their effects are not specified *a priori*, they may be *post hoc* interpreted in the following ways. First, notice that Soviet dispositions, and especially Soviet 'reactivity' have in general negative effects on U.S. 'commitment.' It may indicate certain 'war-aversion' factor within the American public; when there is superpower confrontation in the Third World, people tends to be weary of the likelihood of direct superpower nuclear war. Similar pattern is observed and might be interpreted accordingly for the Soviet case. And in both cases, the Middle East is an exception.

Second, Soviet 'commitment' has in general *positive* impact on the U.S. 'reactivity' level whereas U.S. 'commitment' has in general *negative* impact on Soviet 'reactivity' level, unless insignificant. The first case indicates that when the Soviets are more tenacious in their Third World foreign policy activity, U.S. 'reactivity' goes up perhaps because it takes more commitment to win the confrontation. The second case indicates that when the American public or other domestic forces are more supportive, the Soviets tend to back off perhaps because it would take higher commitment that the Soviets could afford. The other side of the coin is that the Soviet Union may have taken advantage of the tendency of domestic entaglement in the U.S. In other words, when the American leadership was unable to elicit the domestic support for the foreign policy commitment, the Soviet Union tended to adopt firmer policy stance. As far as these empirical patterns are unexpected *a priori*, however, all these interpretations are but speculations, and more careful study will be needed to meaningfully interpret the patterns.

Determinants of the 'Commitment': Testing Hypotheses (1)

Earlier, the following set of hypotheses are proposed with respect to the determinants of the level of 'commitment'.

Hypothesis 5.1: *The higher economic growth rate, the less is the 'opportunity cost' of the foreign policy commitment, hence the higher is the level of 'commitment'.*

Hypothesis 5.2: *The higher the defense spending relative to the total government spending (or Gross National Product), the higher is the level of 'commitment'.*

Hypothesis 5.2.1: *The higher the Presidential support ratio of the Congress, the higher is the level of 'commitment' of the U.S.*

Hypothesis 5.3: *The higher the measured level of political interests, the more likely foreign policy leaders are successful in eliciting domestic support for foreign policy commitment, hence the higher the level of 'commitment' is.*

Hypothesis 5.4.1: *The higher the level of economic interests, the higher the level of 'commitment' is if the interests are 'societal' or homogeneous.*

Hypothesis 5.4.2: *The higher the level of economic interests, the lower the level of 'commitment' is if the interests are 'factional' or heterogeneous.*

While the findings are ambivalent in many cases in that the causal associations vary across regions, the impact of economic growth rate on the level of 'commitment' is at least consistent. It has *positive effects on the U.S. 'commitment' level*, and *negative effects on the Soviet level*, other than insignificant cases. Although the Soviet pattern is contrary to the hypothesis, it can be meaningfully interpreted in view of the centrally planned system of the Soviet economy where economic growth is also the function of economic policy especially during the earlier period, as well as relatively closed system of Soviet foreign policy. That is to say, Soviet economic growth rate reflects the policy priority among the Soviet elites such that the higher the economic growth rate, the higher priority is given to the domestic/economic issues than to the defense/foreign policy issues. Then, naturally, when the domestic issues is on the top of the agenda as reflected in higher growth rate, the Soviet elites are less willing to abide with or approve previous foreign policy commitments.

With this 'trade-off' relationship between foreign and domestic issues in mind, the finding on the impact of defense spending to GNP ratio on Soviet 'commitment' level is highly intriguing. Contrary to the hypothesis 5.2, it has in general *negative* effects on the level of 'commitment'. That is, even when the defense issue takes high priority, Soviet elites are less willing to honor the foreign policy commitment. One of the ways to interpret

this finding may be found in the nature of the indicator. Originally, the indicator was devised to measure the relative power position of the defense/foreign policy officials vis-à-vis other governmental agencies and/or other domestic constituency. An implicit assumption in the measure was that the defense issues and the foreign policy issues are on a single dimension as opposed to other policy issues, particularly domestic economic-welfare issue. This distinction may be right, but the defense (now strategic) issues and the Third World issues may not be on a single dimension, but rather in another trade-off relationship such that vertical linkage between the strategic/defense issue and the Third World issues does not hold.

On the other hand, the U.S. case is more supportive to the hypothesis. The measure, the ratio of defense spending to the total governmental spending in this case, turns out to have positive effects, as hypothesized, on the level of 'commitment' in the Middle East and Asia. Yet, in that (1) these two regions are the regions strategically more important, and (2) the measure has negative effect on the level of 'commitment' in the case of the overall Third World, and insignificant effects in the cases of Latin America, and Africa, the linkage between defense/strategic issues on one hand and the Third World issues on the other does not hold *necessarily.*

As for the hypothesis 5.2.1, the presidential support ratio of the Congress has positive and significant effect on the level of U.S. 'commitment' for the overall Third World and Asia, as hypothesized, and negative and significant effect for the Middle East contrary to the hypothesis. Insignificant association in the cases of Latin America and Africa is understandable in view of the relatively low level of overall commitment in two regions, meaning that 'commitment' of resources in these two regions has not been so high as to require the Congressional approval. The deviant case of the Middle East may be understood in terms of the general disagreement between the executive and the legislative branches perhaps due to ethnic lobby and influences in the Congress.

In the light of factional interests and influence, the empirical results are more supportive of the hypothesis 5.4.2 than the hypothesis 5.4.1. That is, when as the superpowers' trade with the Third World increases, more societal sectors, usually with conflicting interests with each other, get involved in the policy process so as to disrupt the policy process and lower the level of 'commitment'. As for the political dimension of interests which is seen more symbolic than substantive, at least to the public eyes, unequivocal prediction was made as in the hypothesis 5.3; the higher the level of political interests, the higher the level of 'commitment'. This hypothesis is generally supported by

the empirical results. The Middle East in the Soviet case and Africa in the U.S. case are exceptions such that the found effect is contrary to the hypothesis.

Determinants of the 'Reactivity': Testing Hypotheses (2)

With respect to the causal effects of proposed determinants of the 'reactivity,' the following set of hypotheses were proposed with possibility of alternative findings reserved.

Hypothesis 5.5: *The higher the level of a superpower's vested interests in the Third World region, the higher the level of 'reactivity.'*

Hypothesis 5.6: *The higher the level of capability of a superpower relative to the rival, the lower the level of 'reactivity.'*

Hypothesis 5.7: *The better bilateral relationship between superpowers, the lower a superpower's the level of 'reactivity'.*

Hypothesis 5.8: *The more polarized a region, the higher the level of 'reactivity' in the region.*

Starting from the less disputed hypothesis, the hypothesis 5.8 on the impact of polarization in the region is basically supported. It has positive and significant effects in most cases with exceptions of the Soviet case in Africa where it has negative and significant effects and in the Middle East where it turns out to be insignificant. The exceptional case of Africa may be related to the nature of the indicator as well as the peculiarity of African region. That is, until 1960 when most of the former colonies in the region became independent, the number of nations in the region was small and the measured value of indicator is very sensitive to addition of one or more nations to the sample such that the measure is not stable enough to measure the underlying construct. This interpretation is also consistent with the finding that the same measure hardly have significant effects on the U.S. 'reactivity' level either, though in expected direction. The exceptional case of the Middle East requires more substantive interpretation/explanation however. It may be the case that the stakes for the Soviet Union in the Middle East are particularly high, and the political configuration of the region is highly volatile so that the Soviet Union does react to the U.S. activity anyhow. Insignificant effect of the political interests measure on Soviet 'reactivity' level is consistent with this interpretation.

Unlike 'commitment' case, the difference between the political dimension and the economic dimension of superpowers' interests is hardly mentioned in terms of their hypothesized effects on the level of the 'reactivity.' Yet, the results suggest that there may

be some important differences. First of all, the level of political interests has positive effects on Soviet 'reactivity' in general, and especially in Latin America and Africa, whereas the measure has significant effects on U.S. 'reactivity' in all the regions, but the effect is negative, contrary to the hypothesis, in those two regions. Possible interpretation of this regional variation may be found in our earlier discussion of the reaction process. First, the level of interests can have negative impact on the level of 'reactivity' *only* when the situation involves the 'deterrent reaction,' i.e., the rival is seen to back off upon reaction and the purpose of reaction is to demonstrate 'resolve.' It was reasoned that in such a circumstance, the higher the interests, the less commitment is required to establish credibility. When the purpose of reaction is not to deter off the rival, but to win the confrontation, on the other hand, the level of commitment/intensity of the reaction may rather be commensurate with the level of interests. If so, the negative effect of the interests measure in some regions may indicate that the situations in those regions are more often that of 'deterrence' than of 'confrontation.'

This line of reasoning gets lost when the results regarding the effects of the economic dimension of interests on the level of 'reactivity' is considered. It has positive effects on U.S. 'reactivity' level in the overall Third World and Latin America, but negative effect in Africa and the Middle East. Possibly, the U.S. decision-makers may have thought that the U.S. economic interests, particularly the trade flow, in those regions could be hurt not by Soviet activity, but more likely by the U.S.-Soviet confrontation and resulting regional destabilization. As for the Soviet case, the measure has positive effects in the Middle East and negative effects in Africa and Asia. Whether the same reasoning as the U.S. case may require further research on the patterns in Soviet conduct of foreign policy

The hypothesis 5.6 which is positing, contrary to intuitive logic, the negative effect of relative capability on the levels of superpowers' reactivity is in general supported by the estimation results. That is, it appears that the U.S. tends to be less sensitive and reactive to Soviet action when the military balance is in its favor with exception in the case of Asia where the opposite is the case, and the Soviet Union tends to be more reactive when the military balance is in its disfavor with exceptions in the regions of Africa and Asia, where the Soviet Union appears to have been more reactive when the military balance is in its favor. With respect to the exceptional cases, with the so-called "correlation of force" in its favor in terms of relative capabilities and world-wide political development in the form of decolonization and to a degree de-Westernization, this result shows that the Soviets have been more assertive in two regions where decolonization primarily took place. For the

U.S., the exceptional finding in Asia coincides with that Asia was where the most serious tests of containment and intensive U.S. military interventions took place.

Finally, the hypothesis 5.7 regarding the impact of bilateral relationship on the level of 'reactivity' is also generally supported by the empirical results. The measure has invariably negative, if not insignificant, impact on the level of Soviet 'reactivity' suggesting that the Soviet Union has been less reactive to the U.S. action when the bilateral relationship is better. As for the U.S. case, the finding is mixed; in the overall, it has negative effect, but in Asia it has positive effect on U.S. reactivity. Yet, the same empirical pattern can be interpreted differently. In Table 5.3, it is shown that there are at least two ways in which congenial bilateral relationship can have negative impact on the level of 'reactivity'; (1) the rival's action is less likely perceived to be directed against the actor, or (2) there are more things to lose if the confrontation in the Third World gets escalated and consequently the bilateral relationship turns bad.

The latter interpretation seems more convincing, particularly for the Soviet case, on two grounds. The first is that the indicator is particularly measured in bilateral trade volume, and the stakes are higher for the Soviet Union than for the U.S. in keeping bilateral trade relationship. Second, the results show that the bilateral trade measure has negative impact on Soviet 'reactivity' level in Latin America, the Middle East, and Asia, and insignificant effects in Africa. In that those three regions are more salient to the U.S., the result suggests that the Soviets were more careful in reacting to the U.S. action in those regions, especially when they have some stakes in keeping good (trade) relationship with the U.S.

Whether the same kind of logic can be applied to the U.S. case too is not clear at all. First of all, the measure has negative impact on the level of U.S. 'reactivity' in the overall Third World either because Soviet activity was seen less threatening or because the U.S. fostered the good relationship with the Soviet Union in terms of the détente more than the rivalry over influence in the Third World or both. Yet, more significant finding to me is that the measure has positive impact on U.S. 'reactivity' level in Asia, for which the logic discussed in the third stage of reaction process provides more convincing explanation. That is, such an association may indicate the U.S. determination and signal that the normalization and improvement of the bilateral relationship should not be construed as evidence of weakening stance of the U.S. in Asia and especially in the Vietnam war.

Summary and Propositions

So far in discussing empirical results with respect to the proposed hypotheses, it has been found that many of the empirical associations between the various circumstantial factors on one hand and the levels of 'commitment' and 'reactivity' on the other very often vary from region to region and from a superpower to the other. Although those cross-regional and cross-actor variations are hardly subject to any unambivalent pattern, the following general observations can be summarized from the discussion in the form of propositions.

Proposition 1: *The foreign policy issues tend to be more deeply politicized in the U.S. than the Soviet Union, and domestic factors tend to be more important in explaining the U.S. foreign policy than Soviet foreign policy.*

The proposition that the Third World issues are more deeply politicized in the U.S. than in the Soviet Union is in general supported by three observations; (1) the model based on the domestic 'ratification' analogy of prior commitment does better job in general to explain U.S. 'commitment' level than Soviet 'commitment' level, (2) the lagged dependent variable whose impact is inversely correlated with the degree to which outside forces are involved in the policy process plays more important role in determining Soviet dispositions than the U.S. dispositions, and (3) variables specifically measuring the domestic dimension are more important than variables measuring interests in the Third World regions in determining U.S. 'commitment' level, the pattern of which is not observed in the Soviet case. The third point is especially conspicuous for U.S. 'commitment' in the overall Third World, the Middle East, and Asia and not necessarily the case in the regions of Latin America and Africa. Together with that the level of American activity is much higher in former regions than in the latter region as noted in Chapter IV, this observation leads to another proposition.

Proposition 2: *The higher the level of foreign policy activity and ensuing commitment of resources, the more highly the foreign policy issues are politicized and domestic factors get involved in foreign policy process.*

This proposition is further supported by observations that (1) the model does relatively poor in explaining the level of U.S. 'commitment' in Latin America and Africa, and (2) lagged dependent variables are the most important variables in explaining U.S. 'commitment' level in these two regions. In view of the differences in two superpowers' foreign policy making processes, that is, that Soviet policy making process is relatively

more closed to the outside influence than the U.S., it is not surprising that we do not observe the same pattern in the Soviet case. Yet, there is a remarkable and a consistent finding about Soviet behavior.

Proposition 3: *The Soviet Union tends to subject the Third World issues to the overarching strategic consideration than the U.S.*

This proposition is based on the observations that (1) Soviet foreign policy commitment in the Third World tends to be inversely correlated with Soviet efforts of military buildup, i.e., negative impact of Soviet military expenditure to GNP ratio on the level of Soviet 'commitment,' and (2) the Soviets tend to be less reactive to the U.S. action when bilateral relationship is better. Although this proposition may seem unconventional to many, this is consistent with Breslauer's proposition that the Soviet policy in the Middle East during 1967-1972 could be better described as "collaborative competition" rather than "unalterable antagonism" (Breslauer, 1984). And, he based his argument on that the Soviets maintained a hierarchical order of policy preferences ranging from maintenance of local influence so as to secure strategic assets in the context of geostrategic rivalry with the U.S., to avoidance of direct superpower confrontation and maintenance of a dialogue with the U.S. and was willing to subjugate lower order interests to the higher order interests.

If such a subordination of the Third World issues to the strategic consideration is less conspicuous in the U.S. case, it is presumably due to the domestic consequences of the foreign policy. In their study of the presidential popularity, for example, Ostrom and Simon (1985) has shown that the U.S. presidents could not afford to be "soft" on the Communism. And, such a tendency has often been attributed to the McCarthian charge over the "loss of China" (Spanier and Uslaner, 1989). In that the application of the proposition 3 to the U.S. case is defied particularly because of the exceptional case of Asia, this kind of inference may work.

In many occasions, however, the U.S. pattern shows some moderation in its competitive stance vis-à-vis the Soviet Union. The first is the generally negative impact of relative capability measure on the level of 'reactivity' indicating that the U.S. has moderated its competitive stance when the military capability is favorable. Second is the empirical finding that U.S. 'reactivity' level is often inversely affected by Soviet 'reactivity' indicating that when the Soviet Union is particularly assertive in its competitive stance against the U.S., the U.S. tends to moderate its own stance. Finally, if the domestic politics and public opinion have affected in such a way as to reinforce the U.S. competitive stance against the Soviet Union, such a domestic-foreign linkage has another aspect and the

public opinion is double-edged; the "war-aversion" factor. It has been noted that the public or other domestic groups are less willing to endorse foreign commitment when (1) a region is highly polarized, and (2) the Soviet Union is highly reactive and competitive.[8]

Concluding Remarks

Although the discussion so far has led to a tentative conclusion that there has been some moderation in their competition process on both sides of the superpowers either because of the issue hierarchy where the Third World issues are relatively subordinate to the strategic level factors, or because of the domestic influence. Yet, one finding especially deserve careful attention; the effect of polarization of the Third World regions on the competition process. Earlier, it was hypothesized that the competitive stance of superpowers can be very importantly affected by increasing polarization in the region. The logic behind the hypothesis is that (1) when a region is polarized, ranges of superpowers' interests are more likely to collide and any change in political orientation of local states is more likely to change regional balance of interests significantly, therefore any action by a superpower is more likely to be seen threatening regardless the initial actor's goal, (2) because unresisted rival's action could change delicate regional balance of interests substantially, the stakes are high and superpowers are more likely to react to the rival's action, and (3) since highly polarized region means that superpowers' interests in the region are symmetrically high, *both* superpowers are likely react to each other with increasingly intense level of commitment. Empirical results strongly support the hypothesis.

If such a tendency is deeply rooted in the nature of international politics as discussed in early part of the thesis, moderation by superpower decision-makers alone may not be enough to prevent and manage the real and potential superpower crises over the Third World issues because the political development in the Third World regions is often beyond the control of the superpowers. In the next Chapter, the interrelationship between the superpower foreign policy competition and the Third World conflicts are more precisely examined.

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[8] That is, the U.S. 'commitment' level is inversely affected by (1) region's polarity measure and (2) the Soviet 'reactivity' level.

Table 5.4. Determinants of U.S. 'Commitment' in the Third World: Estimation Results

Explanatory Variables	*Region*				
	Third World	L. America	Africa	M. East	Asia
Constant	0.714 (3.406)***	0.108 (1.881)*	0.436 (6.971)***	−0.507 (3.408)***	−0.277 (1.152)
U..S. Commitment$_{t-1}$	0.111 (0.967)	0.981 (7.083)***	0.658 (9.044)***	0.554 (4.717)***	0.456 (4.836)***
Soviet Commitment	−0.179 (1.380)	-	-	−0.573† (4.066)***	-
Soviet Reactivity	−1.215 (4.016)***	−1.155 (2.944)***	−1.163 (5.039)***	0.452† (4.621)***	−1.211 (4.567)***
%Δ(U.S. GNP)	1.946 (4.141)***	1.184 (1.853)*	-	-	1.056 (1.579)
Presidential support of the Congress	0.624 (5.745)***	-	-	−0.221 (2.433)**	0.672 (5.458)***
%(U.S. defense spending + U.S. governmental spending)	−1.043† (4.361)***	-	-	1.271† (5.806)***	2.376† (5.256)***
Region's *polarity* score	-	−0.527† (1.435)	−2.078 (6.543)***	-	-
Region's *policy similarity score* with the U.S.	1.277† (4.100)***	-	−4.424† (5.379)***	-	11.828‡ (5.600)***
%(U.S. regional trade + U.S. world trade)	−3.470† (8.134)***	-	-	4.462 (3.984)***	−7.851† (2.883)**
$\bar{R}^2$	0.909	0.745	0.756	0.872	0.888
F-ratio (*d.f.*)	32.2 (8,17)	19.2 (4,21)	20.3 (4,21)	29.5 (6,19)	29.2 (7,18)
GLS Correction	*AR*(2) ϕ_1=0.197 ϕ_2=−.489	None	*AR*(2) ϕ_1=0.616 ϕ_2=−.508	None	*AR*(2) ϕ_1=−.142 ϕ_2=−.448

Notes: Results are from 2SLS estimation with IV-GLS treatment, if necessary as indicated, for the system of simultaneous equations in this block. After variable-wise deletion of early period missing cases, there are 26 observations remained for estimation. All coefficient estimates are multiplied by 100 except the constant, lagged dependent variable, and the rival's disposition variables. Variables are generally specified in contemporaneous value unless either explicitly specified in the model, or marked by (1) † (lagged value) or (2) ‡ (differenced value). Figures in parentheses under each coefficient estimates are *t*-ratios in absolute value whose statistical significances are marked by (1) *** (p<0.01), (2) ** (p<0.05), and (3) * (p<0.10), all at two-tailed test.

Table 5.5. Determinants of Soviet 'Commitment' in the Third World: Estimation Results

Explanatory Variables	*Region*				
	Third World	L. America	Africa	M. East	Asia
Constant	0.081 (0.362)	−0.031 (0.413)	0.341 (3.108)***	−0.099 (1.365)	−0.711 (0.099)
Soviet Commitment$_{t-1}$	0.672 (5.460)***	0.661 (4.940)***	0.518 (4.822)***	0.179 (1.405)	0.761 (10.156)***
U.S. Commitment	−0.229 (2.400)**	0.287 (2.924)***	−0.341 (3.342)***	0.252† (1.909)*	0.404 (5.874)***
U.S. Reactivity	−0.092† (4.370)***	−0.023† (3.231)***	-	0.293† (3.139)***	−0.033 (3.842)***
%Δ(Soviet GNP)	−1.250 (1.800)*	-	-	−1.060 (2.340)**	−0.923 (2.641)**
%(Soviet military spending ÷ Soviet GNP)	−2.018† (2.231)**	−1.608† (3.277)***	−1.836 (2.723)**	-	0.634† (1.205)
Region's *polarity* score	-	-	-	0.482 (2.211)**	-
Region's *policy similarity score* with USSR	0.422 (1.926)*	1.293 (3.721)***	1.517‡ (2.930)***	−1.576 (2.934)***	1.975‡ (2.811)**
%(Soviet regional trade ÷ Soviet world trade)	0.919† (2.429)**	−1.846 (2.820)**	−1.659 (1.458)	-	−1.815† (3.864)***
$\bar{R}^2$	0.749	0.693	0.626	0.663	0.942
F-ratio (*d.f.*)	32.2 (7,18)	19.2 (6,19)	20.3 (5,20)	9.18 (7,18)	58.8 (7,18)
GLS Correction	None	None	*AR*(2) ϕ_1=0.325 ϕ_2=−.686	*AR*(2) ϕ_1=0.396 ϕ_2=−.324	*MA*(2) θ_1=−.412 θ_2=−.600

Notes: Results are from 2SLS estimation with IV-GLS treatment, if necessary as indicated, for the system of simultaneous equations in this block. After variable-wise deletion of early period missing cases, there are 26 observations remained for estimation. All coefficient estimates are multiplied by 100 except the constant, lagged dependent variable, and the rival's disposition variables. Variables are generally specified in contemporaneous value unless either explicitly specified in the model, or marked by (1) † (lagged value) or (2) ‡ (differenced value). Figures in parentheses under each coefficient estimates are *t*-ratios in absolute value whose statistical significances are marked by (1) *** (p<0.01), (2) ** (p<0.05), and (3) * (p<0.10), all at two-tailed test.

Table 5.6. Determinants of U.S. 'Reactivity' in the Third World: Estimation Results

Explanatory Variables	*Region*				
	Third World	L. America	Africa	M. East	Asia
Constant	0.229 (0.598)	−3.179 (2.399)**	0.840 (3.129)***	1.119 (6.541)***	−5.802 (6.325)***
U.S. Reactivity$_{t-1}$	0.200 (2.511)**	0.962 (8.924)***	0.758 (6.563)***	0.664 (5.560)***	0.505 (6.257)***
Soviet Commitment	1.861† (4.372)***	10.975† (4.156)***	−1.504 (2.378)**	0.417† (1.673)	4.200† (6.096)***
Soviet Reactivity	11.170† (6.248)***	−8.082† (1.164)	4.223† (4.278)***	−0.465† (3.321)***	−12.454† (4.471)***
Region's *polarity score*	7.558‡ (2.430)**	19.325 (3.242)***	3.839‡ (1.658)	1.508 (3.985)***	27.113† (6.383)***
Region's *policy similarity score* with the U.S.	2.117† (3.080)***	−25.063† (3.644)***	−8.857‡ (1.850)*	7.558† (6.296)***	90.249 (7.864)***
%(U.S. regional trade + U.S. world trade)	4.671‡ (2.092)*	22.795 (2.667)**	−17.557† (3.286)***	−18.539† (7.442)***	-
ln(U.S. military stockpiles + Soviet military stockpiles)	−74.870† (6.808)***	−9.166† (2.331)**	−26.806† (3.070)***	−16.627† (4.730)***	151.718† (6.675)***
U.S.-Soviet Bilateral Trade	−3.122† (4.745)***	-	-	-	7.424 (4.466)***
$\bar{R}^2$	0.832	0.867	0.785	0.867	0.744
F-ratio (*d.f.*)	16.4 (8,17)	24.4 (8,17)	14.1 (7,18)	15.9 (7,18)	11.4 (7,18)
GLS Correction	*MA*(1) θ_1=0.619	None	None	None	*MA*(1) θ_1=0.810

Notes: Results are from 2SLS estimation with IV-GLS treatment, if necessary as indicated, for the system of simultaneous equations in this block. After variable-wise deletion of early period missing cases, there are 26 observations remained for estimation. All coefficient estimates are multiplied by 100 except the constant, lagged dependent variable, and the rival's disposition variables. Variables are generally specified in contemporaneous value unless either explicitly specified in the model, or marked by (1) † (lagged value) or (2) ‡ (differenced value). Figures in parentheses under each coefficient estimates are *t*-ratios in absolute value whose statistical significances are marked by (1) *** (p<0.01), (2) ** (p<0.05), and (3) * (p<0.10), all at two-tailed test.

Table 5.7. Determinants of Soviet 'Reactivity' in the Third World: Estimation Results

Explanatory Variables	*Region*				
	Third World	L. America	Africa	M. East	Asia
Constant	−0.077 (4.418)***	−0.027 (1.473)	0.275 (7.870)***	0.174 (4.358)***	0.057 (1.622)
Soviet Reactivity$_{t-1}$	0.441 (4.054)***	0.561 (5.064)***	0.300 (2.679)**	0.753 (8.386)***	0.292 (2.841)**
U.S. Commitment	-	-	−0.149 (3.044)***	−0.476 (3.838)***	-
U.S. Reactivity	0.017 (2.681)**	−0.004 (1.896)*	-	-	-
Region's *polarity score*	0.275† (4.281)***	0.478 (3.794)***	−0.643 (5.731)***	-	0.749 (6.353)***
Region's *policy similarity score* with USSR	0.344‡ (3.197)***	0.379† (2.280)**	1.431 (6.155)***	-	-
%(Soviet regional trade + Soviet World Trade)	-	-	−3.470 (5.027)***	1.402‡ (5.566)***	−1.325‡ (6.083)***
ln(U.S. military stockpiles + Soviet military stockpiles)	2.942‡ (3.025)***	3.127‡ (3.605)***	−6.257 (3.042)***	-	−4.772† (5.904)***
U.S.-Soviet bilateral trade	-	−0.128 (2.149)**	-	−1.039† (4.651)***	−0.653† (6.116)***
$\bar{R}^2$	0.860	0.853	0.885	0.866	0.930
F-ratio (*d.f.*)	31.6 (5,20)	25.3 (6,19)	32.9 (6,19)	41.6 (4,21)	67.0 (5,20)
GLS Correction	*ARMA*(1,1) ϕ_1=−.611 θ_2=−.928	None	None	None	*AR*(2) ϕ_1=0.810 ϕ_2=−.504

Notes: Results are from 2SLS estimation with IV-GLS treatment, if necessary as indicated, for the system of simultaneous equations in this block. After variable-wise deletion of early period missing cases, there are 26 observations remained for estimation. All coefficient estimates are multiplied by 100 except the constant, lagged dependent variable, and the rival's disposition variables. Variables are generally specified in contemporaneous value unless either explicitly specified in the model, or marked by (1) † (lagged value) or (2) ‡ (differenced value). Figures in parentheses under each coefficient estimates are *t*-ratios in absolute value whose statistical significances are marked by (1) *** (p<0.01), (2) ** (p<0.05), and (3) * (p<0.10), all at two-tailed test.

CHAPTER VI
REGIONAL LEVEL DYNAMICS

In this chapter is discussed the 'regional level dynamics' of the conceptual model, which consists of two equations for the superpowers' level of foreign policy activity in the Third World regions, called the 'extended model' of superpower rivalry, and another two equations for two dimensions of local conflicts, inter- and intrastate. Together, these four equations constitute Block II of simultaneous equations, because there are specified reciprocal causal relationships among all four endogenous variables. Yet, it is convenient to distinguish two sets of equations for presentational purpose for the time being.

In the first part, the 'extended model' of superpower rivalry is discussed, first in terms of model specification and implied hypotheses, then examination of the hypotheses in view of the empirical results. It is an extension of the 'basic' model of superpower rivalry in terms of an action-reaction process, as proposed in Chapter II and analyzed in Chapter IV. The extension is made in two ways. First, two variables reflecting the decision-making calculus and domestic political process of superpowers, i.e., the 'commitment' and 'reactivity' of superpowers, which are conceptually defined and empirically analyzed in the previous chapter, are incorporated into the model. The purpose of this extension is to represent the conceptual argument that *the reaction process is not automatic but made through a complex process of decision making under the influence of various pertinent factors*. Second, the effects of the local conflict on the competition process which are hypothesized to be *provocative*, are explicitly incorporated in the model.

Discussion of the effects of local conflict events on the superpower competition process leads to a discussion of the effect of superpower competition on the local conflict, which is hypothesized to be *escalatory*. Thus, in the subsequent section, models proposed for the dynamic process of local conflict events are discussed so that the hypothesized escalatory effect of the competition may be examined. Because the focus is particularly on the events in the Third World regions, this dimension of superpower rivalry is called a 'regional level dynamics.'

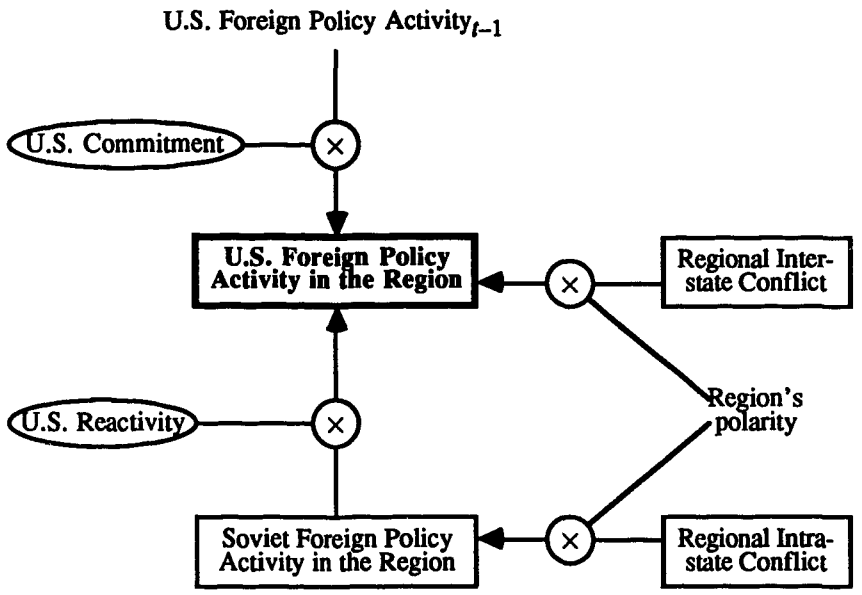
The Extended Model of Superpower Competition in the Third World

Model and Hypotheses

It has turned out that the 'basic model' of superpower rivalry and competition in the Third World in terms of simple action-reaction dynamics provides rather powerful and robust explanation for the overtime variation in the level of superpower foreign policy activity in the Third World regions, as reported in Chapter IV. Yet, the model can be said to be 'defective' on conceptual and empirical grounds. Conceptually, on one hand, the model has problems for two things. The first is that the model leaves no room for the complex and deliberate decision-making in the reaction process. Instead, the decision-making process is reduced to a set of 'constant' coefficients, whereas the decision-making calculus is not 'constant.' Second, as a model for the superpowers' foreign policy behaviors in the Third World, the model is too simple while there are increasing number of researches to unfold dimensions and determinants of foreign policy behaviors in the field of comparative foreign policy. Thus, the model provides at best a *partial theory* of foreign policy (Dixon, 1986; Ward, 1982).

Empirically, on the other hand, the model turns out to be defective in that the findings from its estimation results defy the empirical and intuitive expectation; while it is a matter of a historical experience that the superpower competition and rivalry has been more intense in the regions of the Middle East and Asia than the regions of Africa and Latin America, the model's finding indicates otherwise. Although there have been suggested some interpretations/explanations for such counter-intuitive findings, they are at best *post hoc*. Thus, on an empirical ground, the model is defective as a *model of superpower rivalry and competition in the Third World.*

Upon these conceptual and empirical problems, the simple 'basic model' is extended in two directions. First, in response to the first conceptual problem, the coefficients in the model are 'variabilized' to represent the proposition that *the reaction process is not automatic but made through a complex process of decision-making under the influence of various factors pertinent in the context.* Second, in response to the second conceptual problem, the model now contains two additional variables which are seen to be particularly important to determine the level of superpowers' foreign policy activity in the Third World region. They are the levels of local conflicts in two dimensions; *inter-* and *intra-state.*



Notes: In boxes are endogenous variables within the block even though reciprocal causalities are now shown in the figure for the sake of simplicity. In ellipses are endogenous variables in the previous block, which are treated exogenous in this block. All other variables are treated exogenous or predetermined. Symbol ⊗ represents non-linear relationship or multiplicative interaction between two variables for the causal effects on the dependent variable. Model for the Soviet foreign policy activity is symmetrically identical. In equational form, the model is expressed as follows.

$$\begin{aligned}\text{U.S. Foreign Policy Activity}_t = {} & \alpha_{2.1} \\ & + \beta_{2.11}\text{U.S. Foreign Policy Activity}_{t-1} \\ & + \beta_{2.12}\,(\text{U.S. Foreign Policy Activity}_{t-1} \times \text{U.S. Commitment}) \\ & + \omega_{2.11}\,(\text{Soviet Foreign Policy Activity} \times \text{U.S. Reactivity}) \\ & + \omega_{2.12}\,(\text{Regional Interstate Conflict} \times \text{Region's polarity}) \\ & + \omega_{2.13}\,(\text{Regional Intrastate Conflict} \times \text{Region's polarity}) \\ & + \mu_{2.1} \end{aligned} \tag{6.1}$$

Figure 6.1. The 'Extended Model' of the Superpower Rivalry in the Third World: Hypothesized Dynamics for U.S. Foreign Policy Activity in the region

Figure 6.1 illustrates the extension of the basic model as discussed. First of all, the impact of rival's level of activity is now seen to be contingent upon by the level of 'reactivity,' and the impact of previous activity is also modeled to be contingent upon the level of 'commitment.' Then, local conflict events in two dimensions are incorporated in the model, and they are seen to be provocative to the decision-makers of the superpowers. Thus, the extended model contains three basic components; (1) *threat/reactivity*, (2) *inertia/commitment*, and (3) *provocations*.

THREAT/REACTIVITY

As suggested in Chapter II, interaction among the multiple actors in a rivalry situation are characterized by a mutual contingency of actions by the multiple actors; an actor's action is the function of the other's action and vice versa. Or, put in other words, an actor's action is both the cause and the consequence of the other's action (Gamson and Modigliani, 1971). As superpowers are in rivalry over spheres of influence in the Third World, the pattern of their ensuing behaviors very likely assumes that of mutual reciprocation. That is to say, any action of an actor often becomes the other's matter of concern because aim of one's action usually does, or at least is perceived to, undermine the other's short-term and/or long-term prospect of interests regardless whether one intends to do so or not. The other actor is very likely to think that the rival is exploiting its own weak points, and to react to the rival's prior action in order to (1) negate or neutralize the impact of rival's action by (*a*) directly denying its aim (defensive reaction) or by (*b*) compensating rival's gain through comparable gain elsewhere (compensatory reaction), or (2) deter the rival from further action by demonstrating strength and resolve (deterrent reaction).

No matter what the motives of reaction may be, the initial actor, convinced of self-righteousness, will likely see the other's reaction as evidence of its aggressiveness, and reassert itself by furthering its activity and commitment. Reinforced of earlier perception that the rival is exploiting one's weak points, and now with its reputation at stake, the other actor again stiffens its own stance. As two actors continue to act and react to each other, the levels of commitment by both actors escalate and the range of available options narrows down so as to result in a protracted conflict with highly explosive implications for a bilateral crisis.

Although the basic model succinctly captures such a dynamic of conflict spiral at the descriptive level, it does not explicitly say why the actors in conflict choose to react rather than to submit to the rival's action, or why a particular level of reactivity is chosen. In a

word, the model does not have a decision-making component which really explains an observed pattern of behavior. In Chapter V, reaction process is conceived in three phases; (1) perception of the threat from the rival's action, (2) decision to react or to acquiesce/ignore after considering (*a*) the size of stakes, (*b*) the likelihood of escalation, and (*c*) the prospect of prevailing in potential confrontation, and (3) selection of appropriate level of intensity to be incorporated in the reaction.

In specifying threat/reactivity in terms of a multiplicative interaction between 'reactivity' and the rival's activity, such a reaction process is 'approximated' by the short-term 'reactivity' measure.[1] Since they are shown to be linear combination or weighted average of pertinent factors, such a specification is equivalent to weighting the rival's level of activity by the level of interests threatened and/or the level of capabilities to react with, etc. Notice that in multiplicative interaction, the dependent variable is seen to respond to the both components of the interaction term and absence of any of two means no impact on the dependent variable.

> **Hypothesis 6.1:** A superpower's level of foreign policy activity is a positive function of both the rival's level of activity and its domestic disposition to react, i.e., 'reactivity,' such that *the higher both the rival's activity and the 'reactivity,' the higher the level of the actor's activity.*

INERTIA/COMMITMENT

The second component in the model to determine a superpower's level of foreign policy activity is the inertia/commitment term specified as a multiplicative interaction between 'commitment' of the superpower, as defined and determined in Chapter V, and the actor's previous level of activity. In general, a nation's foreign policy activity tends to be inertial, i.e., replicate itself over time, out of two primary sources; (1) bureaucratic procedures in the foreign policy process, and (2) commitment to future action imbedded in most of the actions. It is well noted in a wide range of literature that, because of parochialism embedded in the hierarchical structure of the bureaucratic organizations and its routinized or programmed character, behaviors of organizations tend to be highly inertial and incremental such that today's action is only marginally different from yesterday's action and tomorrow's action will be only marginally different from today's action (e.g.,

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1 'Approximation' is an appropriate term because this specification involves a somewhat circular logic; measuring the reactivity level from the model and putting it back into the model. Yet, the 'reactivity' level is measured using different time unit and period, and turns out to be adequate summary of many relevant factors to be considered. In other words, at the short-term basis, the measure is a good approximation of the reaction process to be modeled.

Allison, 1971). Seen as organizational output, then, foreign policy behaviors of nations tend to perpetuate and be replicated over time (e.g., Phillips, 1978).

Second, foreign policy behaviors of nations also tend to perpetuate because foreign policy behaviors themselves often involve binding commitment to future action or they are expressions of decision-makers' commitment to a particular outcome (Callahan, 1982).[2] Then, from an aggregate point of view, inclusion of the lagged variable of foreign policy activity in the model implies the proposition that "a major proportion of the level of a nation's foreign policy activity can be explained by its past level of activity."

Specification of a multiplicative interaction with 'commitment' term implies the proposition that the inertia/commitment effect of foreign policy behavior is not automatic, but contingent upon the actor's domestic 'disposition to act.' That is to say, previously made commitments are reexamined and reevaluated *in view of current domestic circumstances* whether they are sanctioned by domestic constituent groups, and/or the bureaucratic process is often interrupted by politically active sectors of the society.

> **Hypothesis 6.2:** An actor's level of foreign policy activity is the positive function of both the actor's past level of activity and its domestic disposition to act, i.e., 'commitment,' such that *the higher both the past level of activity and 'commitment,' the higher the level of the actor's activity.*

PROVOCATIONS

The third component of the model is called *provocations* meaning local conflict events, either inter- or intrastate, as perceived by the actor posing either a threat to the actor's established interests in the region or an opportunity to further its interests. Upon provocations, it is hypothesized that the superpowers are tempted to intervene in an attempt to defend the threatened interests or exploit the situation so as to boost their own interests. Placed in the context of dynamic interaction model, it can be seen that the other actor, whose perception of threat is intensified, or perceived opportunity is frustrated by the rival's action, is likely to see the other as exploitive and inclined to intervene in its own cause, to assume the pattern of action-reaction and mutual confrontation.

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[2] Callahan (1982: 179-80) specifically discusses four different meanings of the commitment in foreign policy; (1) resource commitment, (2) binding commitment, (3) situationally imposed commitment, and (4) internal commitment. Although ambiguous operationally, the binding commitment meaning "binding or pledging of oneself to some outcome, course of action, or nation," and the internal commitment meaning "a psychological state of the decision maker or the political disposition of a government, in which a decision-making unit is committed to the extent that it feels obligated to attempt to bring about some outcome," are also relevant in this context.

From a systemic point of view, on one hand, provocative effect of the local conflict events is especially high when the region is highly polarized. It is so because when a region is highly polarized, (1) it is more likely that one or more client states for each superpowers are involved in the events, (2) action in an event has broader regional implications as commitments to clients/allies are interdependent and consideration for the reputation factor becomes more important, and (3) conflict in such a region is more likely to change the regional balance of interest between superpowers significantly. From an actor's point of view, on the other hand, provocative effect of the conflict events in the Third World will be proportional to the degree to which such conflict events pose a threat or provide an opportunity in terms of the level of interests as well as the situational characteristics.[3]

To incorporate these propositions, the measures for provocation terms are constructed as multiplicative interactions between local conflict measures on one hand and region's polarity measure or a measure of the actor's interests in the region on the other. That is, the subjective provocative effects of local conflict events are seen to be commensurate to the level of interests or the degree to which a region is polarized. An implication is that the superpowers do not intervene in local conflicts unless they possess some level of interest to be threatened by the local events, nor act upon existing level of interests unless there are some conflict events to threaten such interests. Thus, the proposed hypothesis is that *the higher a measured level of provocation, the higher a superpower's level of activity* (Hypothesis 6.3).

Empirical Results

GENERAL OBSERVATIONS

Tables 6.1 and 6.2 present the estimation results for the U.S. and Soviet foreign policy activities in Third World regions, respectively. Notice in the tables that the model specification reported is the result of extensive experiment of different measures of the provocation terms, and the commitment/inertia term. Experiment with commitment/inertia term is done because the initial specification of the interaction term alone did not do good, and when it is specified along with one of its components, the measure turns significant. The meaning of such a specification will be discussed later.

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[3] Perception of threat or opportunity is highly subjective and it is hardly feasible to distinguish whether a particular actor intervenes out of threat or opportunity from an observer's point of view, however.

Table 6.1. Extended Model of Superpower Rivalry in the Third World: Estimation Results for the U.S. Foreign Policy Activity in the Third World:

Explanatory Variables	*Region*				
	Third World	L. America	Africa	M. East	Asia
Constant	3508 (2.763)**	1604 (8.302)***	378 (5.193)***	695 (2.270)**	2955 (5.716)***
U.S. Activity$_{t-1}$	-	-	-	0.733 (4.428)***	−1.312 (4.063)***
U.S. Commitment	-	−6236 (2.357)**	1672 (2.334)**	-	-
U.S. Activity$_{t-1}$ × U.S. Commitment	1.068 (3.678)***	4.844 (2.718)**	−1.264 (1.659)	−1.233 (3.325)***	3.190 (6.152)***
Soviet Activity × U.S. Reactivity	1.211 (2.007)*	0.579 (2.547)**	1.125 (7.486)***	0.624 (2.652)**	1.980 (3.886)***
Provocation #1 (Interstate Conflict)	−0.046 (2.855)***	−0.082 (4.736)***	0.067 (5.534)***	0.019 (4.704)***	−0.059 (2.597)**
Provocation #2 (Intrastate Conflict)	−1.176 (1.265)	0.603 (4.498)***	−2.207 (3.445)***	−0.177 (0.943)	−0.285 (1.078)
$\bar{R}^2$	0.607	0.720	0.845	0.734	0.818
F-ratio (*d.f.*)	10.7 (4,21)	13.8 (5,20)	28.3 (5,20)	14.8 (5,20)	23.5 (5,20)
GLS Correction	None	None	*AR*(2) ϕ_1=0.429 ϕ_2=−.312	*MA*(2) θ_1=−.239 θ_2=0.488	*AR*(2) ϕ_1=−.205 ϕ_2=−.557

Notes: Results are from 2SLS estimation with IV-GLS treatment, if necessary as indicated, for the system of simultaneous equations in this block including equations for local conflicts. After variable-wise deletion of early period missing cases, there are 26 observations remained for estimation. Figures in parentheses under each coefficient estimates are *t*-ratios in absolute value whose statistical significances are marked by (1) *** (p<0.01), (2) ** (p<0.05), and (3) * (p<0.10), all at two-tailed test. Specification of provocation terms for each regions are as the following table where RIC abbreviates *regional interstate conflict* and RDC abbreviates *regional domestic conflict*, subscript $t-1$ for lagged values and Δ for time difference operator.

Region	*Provocation #1*	*Provocation #2*
Third World	RIC × Δ%(regional trade)	RDC × (region's polarity)$_{t-1}$
Latin America	RIC × %(regional trade)$_{t-1}$	RDC × (region's policy similarity)$_{t-1}$
Africa	RIC × %(regional trade)$_{t-1}$	ΔRDC × %(regional trade)$_{t-1}$
Middle East	RIC × Δ(region's polarity)	ΔRDC × Δ(region's polarity)
Asia	RIC × (region's polarity)	ΔRDC × (region's policy similarity)

Table 6.2. Extended Model of Superpower Rivalry in the Third World: Estimation Results for the Soviet Foreign Policy Activity in the Third World:

Explanatory Variables	*Region*				
	Third World	L. America	Africa	M. East	Asia
Constant	3203 (12.150)**	79 (2.388)**	−14 (0.241)***	1081 (13.270)**	378 (4.434)***
Soviet Activity$_{t-1}$	-	0.550 (4.210)***	0.543 (5.137)***	-	0.460 (4.303)***
Soviet Commitment	6278 (4.692)***	-	-	4173 (4.788)***	-
Soviet Commitment × Soviet Activity$_{t-1}$	1.378 (3.462)***	2.131 (2.633)**	−1.370 (3.810)***	3.404 (4.501)***	0.275 (1.389)
U.S. Activity × Soviet Reactivity	0.853 (2.605)**	0.698 (2.341)**	2.384 (3.537)***	0.383 (3.903)***	0.450 (4.826)***
Provocation #1 (Interstate Conflict)	0.276 (2.392)**	−0.015 (2.769)**	0.034 (1.866)*	−0.372 (2.951)***	−0.507 (1.569)
Provocation #2 (Intrastate Conflict)	−0.071 (2.060)*	0.081 (2.197)**	0.016 (0.340)	0.193 (1.614)	0.452 (2.814)***
$\bar{R}^2$	0.666	0.698	0.816	0.620	0.802
F-ratio (*d.f.*)	11.0 (5,20)	12.5 (5,20)	23.1 (5,20)	9.1 (5,20)	21.3 (5,20)
GLS Correction	None	None	*MA*(2) θ_1=0.307 θ_2=0.693	*MA*(2) θ_1=−.241 θ_2=0.484	*AR*(2) ϕ_1=0.085 ϕ_2=0.447

Notes: Results are from 2SLS estimation with IV-GLS treatment, if necessary as indicated, for the system of simultaneous equations in this block including equations for local conflicts. After variable-wise deletion of early period missing cases, there are 26 observations remained for estimation. Figures in parentheses under each coefficient estimates are *t*-ratios in absolute value whose statistical significances are marked by (1) *** (p<0.01), (2) ** (p<0.05), and (3) * (p<0.10), all at two-tailed test. Specification of provocation terms for each regions are as the following table where RIC abbreviates *regional interstate conflict* and RDC abbreviates *regional domestic conflict*, subscript $t-1$ for lagged values and Δ for time difference operator.

Region	*Provocation* #1	*Provocation* #2
Third World	ΔRIC × (region's policy similarity)	RDC × Δ%(regional trade)
Latin America	RIC × (region's polarity)	RDC × (region's polarity)
Africa	RIC × %(regional trade)$_{t-1}$	RDC × (region's polarity)$_{t-1}$
Middle East	ΔRIC × (region's polarity)$_{t-1}$	ΔRDC × (region's polarity)
Asia	ΔRIC × %(regional trade)$_{t-1}$	ΔRDC × %(regional trade)$_{t-1}$

Being an 'extended' model, the model's performance should be discussed in comparison to the 'basic' model's performance as a benchmark. Such a comparison is further useful because it is not possible to evaluate the separate effect of threat/reactivity component as a determinant of the level of activity. In other words, the size or statistical significance of threat/reactivity term alone does not tell us anything about whether decision-makers really go through the decision process as discussed or not. Results show that the extended model performs much better than the basic model in explaining the overtime variation in the superpowers' foreign policy activity in the regions of Asia for both superpowers and in the Middle East for the U.S., judged in terms of the R^2 values.[4] Further, judging from the statistical significance of the threat/reactivity term, the extended model reports highly significance statistics for these two regions, which are barely or not significant in the basic model. Recalling that these two regions are where the basic model performs relatively poor enough to be an 'anomaly,' the extension of the model pays off.

Surprisingly, for remainder of the regions, the extended model performs no better than the basic model, and even worse for the Soviet Union in particular. Thus, a comparison of the results from estimation of two models leads to two conclusions. First, decision-makers in the superpowers *do* follow a complex decision-making process in deciding their courses of action where both superpowers have high stakes and consequently the competition has been intense. Second, the basic model is indeed a good representation of the competition process where superpowers have low or asymmetric stakes. And such a finding is consistent with results of Block I equations reported in Chapter V, where superpowers' 'commitment' and 'reactivity' are more *systematically* determined for the former type of regions than the latter type of regions. Implication is more important; in regions of low-interests, *the competition process may be directed by the habitual behaviors of bureaucratic organizations without being checked by higher level officials and public attention.* And such a process could have very important implications for crisis prevention and management.

INERTIA/COMMITMENT

Extension of the inertia/commitment has resulted in some strange findings. Fist, extension of the component in terms of an interaction term did not yield significant coefficient estimates for many of the equations, and then consequent modification of the

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[4] Estimation results for the basic model are reported and discussed in Chapter IV. In comparing results from two models, it should be noted that in Table 4.7 in Chapter IV, raw R^2 values are reported and in Tables 6.1 and 6.2 are reported the adjusted R^2.

model has yielded rather complex pattern of findings. First, notice that when the interaction term is specified along with both of its components, statistical significance of at least one of the components vanished off and the variable is dropped out of the equation. Then, the signs of coefficients of remaining variables vary widely across regions. But, compared across the actors, one pattern is consistent; for the Soviet Union, two terms are of the same sign, and for the U.S., two terms are of different signs. And this pattern should suggest something systematic in the foreign policy process of superpowers.

This pattern of finding can be explained in terms of two different sources of foreign policy inertia, bureaucratic procedure and commitment effects, which are not necessarily equivalent. One of the sources is in the nature of organizational process which is relatively stable over time. The other resides in decision-makers' choice which can vary as function of a variety of factors. The bureaucratic inertia stems from a routinized procedures in large, established organizations, and the commitment effect is subject to policy debates and decisions within and without the decision-making circle.

As for the Soviet pattern, two terms in this component are in general of the same sign indicating that bureaucratic inertia and the commitment effects are reinforcing each other. Previously made commitments are kept without much interference. As for the U.S. case, they are often in conflict with each other. Unless previous behaviors and commitments are 'sanctioned' domestically in terms of a high level 'commitment,' it results in reduction of current level of behaviors, a *fatigue* effect, as observed in Asian case. Or, when previous behaviors and commitments are subject to domestic political debates, they end up with a deadlock so as to reduce the current level of activity as observed in the Middle East.[5] Or, the domestic political debates on the policy options and outcomes will reduce the current level of activity unless there is certain momentum of activity built up as in Latin American case, or domestic political debates will turn to halt foreign policy courses and behaviors when the previous level of activities reaches certain level as observed in Africa.[6]

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5 For better understanding of the pattern of specification observed in Asia, consider this. Let x be previous level of the U.S. activity, y be the level of the U.S. 'commitment,' a be the coefficient for the interaction term and b be the coefficient for the lagged variable. Then define a third variable z such that $z = axy - bx = x(ay - b)$, $a > 0$ and $b > 0$. Given that x is always greater than or at least equal to zero, z will be less than zero unless $ay \leq b$ or $y \leq (b/a)$. That is, the impact of prior level of activity on the current level of activity is negative, i.e., fatigue factor unless the level of the 'commitment' reaches certain level. As for the Middle East case, $z = -axy + bx = -x(ay - b)$. z will be less than zero if $ay > b$ or $y > (b/a)$. Same kind of inference can be made for the Soviet case in Africa.

6 Analogously to the previous inference, let x be previous level of the U.S. activity, y be the level of the U.S. 'commitment,' a be the coefficient for the interaction term and b be the coefficient for the

In as much as they look complex, however, extension of the inertia/commitment term at the expense of parsimony may not be worthwhile, although the analysis of the short-term pattern in Chapter V is highly suggestive.

PROVOCATIONS

If 'variabilization' of the coefficients may be called an *internal* extension of the basic model, inclusion of the provocation terms may be called an *external* extension of the model. If the internal extension was necessitated by the conceptual problem from a modeling perspective, the external extension involves a more practical and substantive question; what is the extent to which the superpowers have been sensitive and responding to the political developments in the Third World?

What is remarkable in the results is that despite highly extensive experimentation with respect to the dimensions of interest and their functional form, i.e., lagged or differenced as well as the contemporaneous form,[7] the provocation terms often fail to obtain statistical significance, and statistically significant coefficient estimates are as often negative as they are positive. That they often fail to obtain statistical significance indicates that holding the rival's level of activity constant, superpowers *do not* intervene in the local conflicts. That statistically significant provocations terms are often negative indicates that holding the rival's level of activity constant, superpowers *decrease* their presence in the Third World regions upon provocations.[8] In a word, *the rival's action is the dominant factor to determine the superpowers' intervention in local conflicts, if they have ever intervened.* And this finding is consistent with the proposition that provocation is neither a necessary nor a sufficient condition for the supepower competition in the Third World.

Yet, there are some regions where provocation terms turn out to have positive and significant effect on the superpowers' level of activity, indicating that the superpowers are indeed sensitive ro and have autonomously acted upon local conflict events. Latin America is a region where both superpowers have autonomously acted upon local *domestic* conflict events, and Africa is the region where both superpowers have autonomous acted upon local

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'commitment.' Then define a third variable z such that $z = axy - by = y(ax - b)$, $a > 0$ and $b > 0$. Given that x is usually greater than or at least equal to zero, z will be less than zero unless $ay \leq b$ or $y \leq (b/a)$. That is, the impact of the 'commitment' on the current level of activity is negative unless the level of the previous activity reaches certain level. As for African case, $z = -axy + by = -y(ax - b)$. z will be less than zero if $ax > b$ or $x \geq (b/a)$.

7 Experimentation also includes the local conflict events alone without the interaction component with interests measures. As reported in the tables, however, interaction measures in general perform better.

8 Because of the multiplicative interaction with the interests measures, the negatively significant coefficients may also be interpreted that superpowers are willing to intervene in local conflict events to take advantage of the situation as to further own interests when the level of interests is low.

interstate conflict events. These two cases are highly suggestive; superpowers tend to intervene in events in the regions of low-interest or of perimeter of competition because *the rival's response is believed to be less likely*. Yet, precisely because of such a reasoning which is mirrored, competition may become more intense and precipitating in such regions (George, 1983).

Local Conflicts in Third World Regions

To say that local conflict events by themselves play less important role than the rivalry factor in determining competitive foreign policy activities of the superpowers in the Third World is never to say that they are irrelevant in the context of superpower rivalry. Estimation results in Tables 6.1 and 6.2 still show that at least one of the superpowers has been initiatively involved in local conflicts, and given the observed action-reaction dynamics, such events can always serve a *provocation* or a *catalyst* in its literal sense. Further, as shown in Table 6.3 and Figures 6.2 and 6.3, which are provided for informational purpose, Third World regions are highly conflict-prone such that crisis-precipitating events can always happen. Therefore, understanding local conflict process is important in understanding process of the superpower competition itself. Furthermore, it has been hypothesized that competitive involvement by the superpowers in Third World conflicts can have unintended consequences; escalation, or prolongation of local conflicts. This section is to examine this hypothetical relationship.

Table 6.3. Political Instability in the Third World: Some Descriptive Statistics of Local Inter- and Intra-state Conflict

Region	*Interstate Conflict*					*Intrastate Conflict*				
	mean	s.d.	$\frac{\text{s.d.}}{\text{mean}}$	max	min	mean	s.d.	$\frac{\text{s.d.}}{\text{mean}}$	max	min
Third World	18635	10440	(0.56)	45806	3901	984	248	(0.25)	1414	445
Latin America	1580	1225	(0.78)	4210	16	198	104	(0.52)	434	69
Africa	2740	3607	(1.32)	16749	0	224	156	(1.32)	652	31
Middle East	9833	7418	(0.75)	28697	1037	161	98	(0.60)	438	36
Asia	4482	4606	(1.03)	23412	774	401	195	(0.49)	825	86

NOTES: Statistics are for the thirty-year (1948-1978) observations. s.d. abbreviates standard deviation, and (s.d./mean) is the standard deviation to mean ratio, i.e., the *coefficient of variability*.

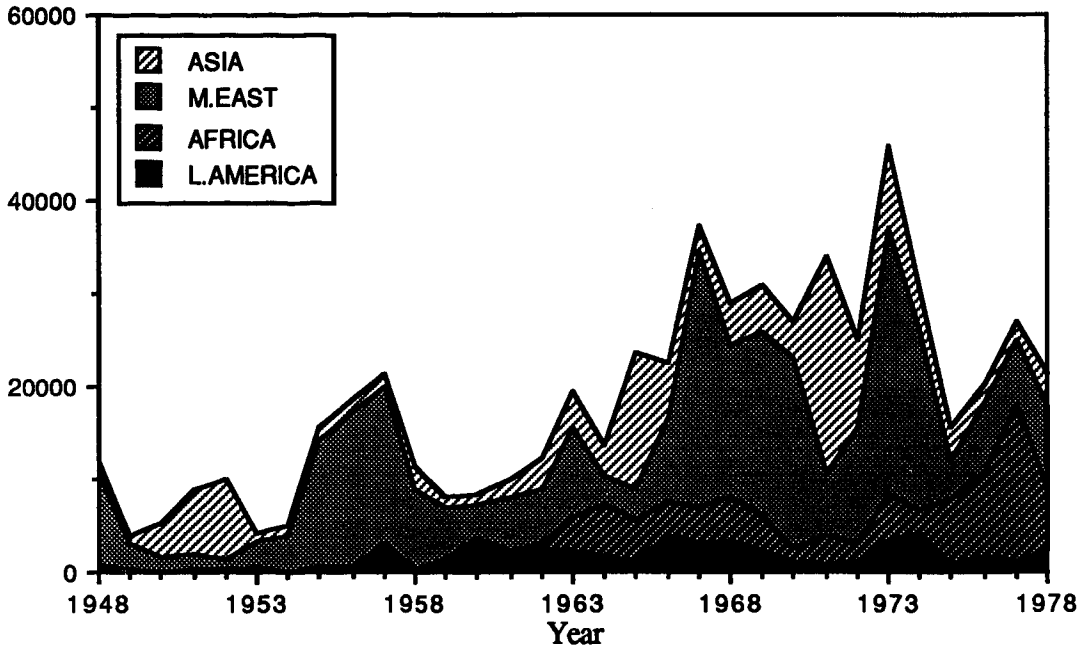


Figure 6.2. Local Interstate Conflicts in the Third World, 1948-1978: Cumulative Regional Distribution

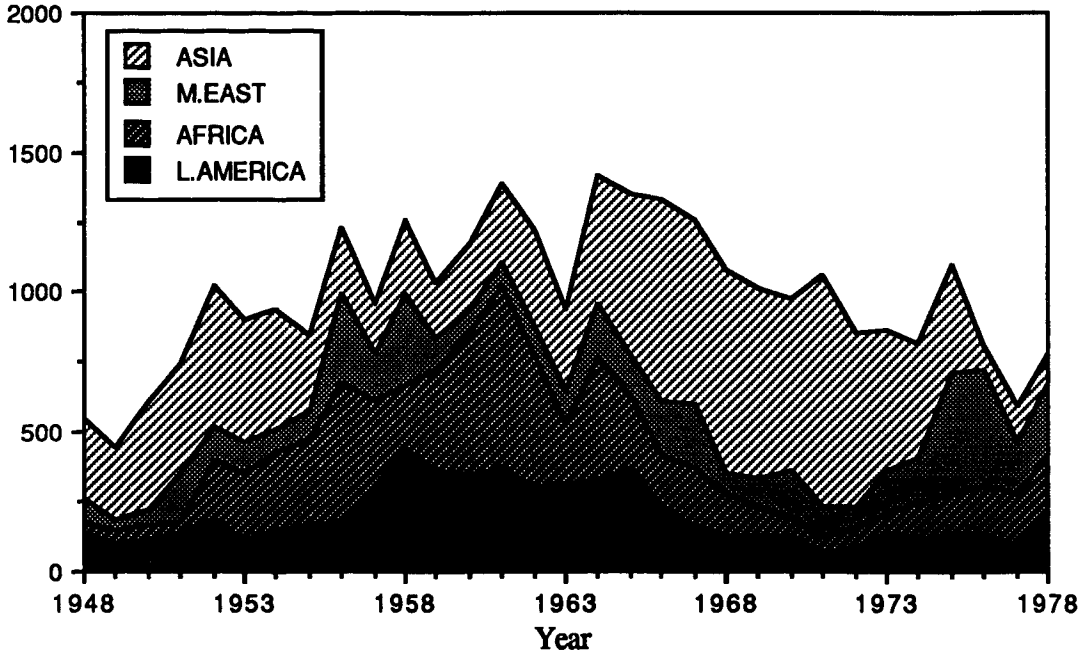


Figure 6.3. Local Intrastate Conflicts in the Third World, 1948-1978: Cumulative Regional Distribution

Model and Hypotheses

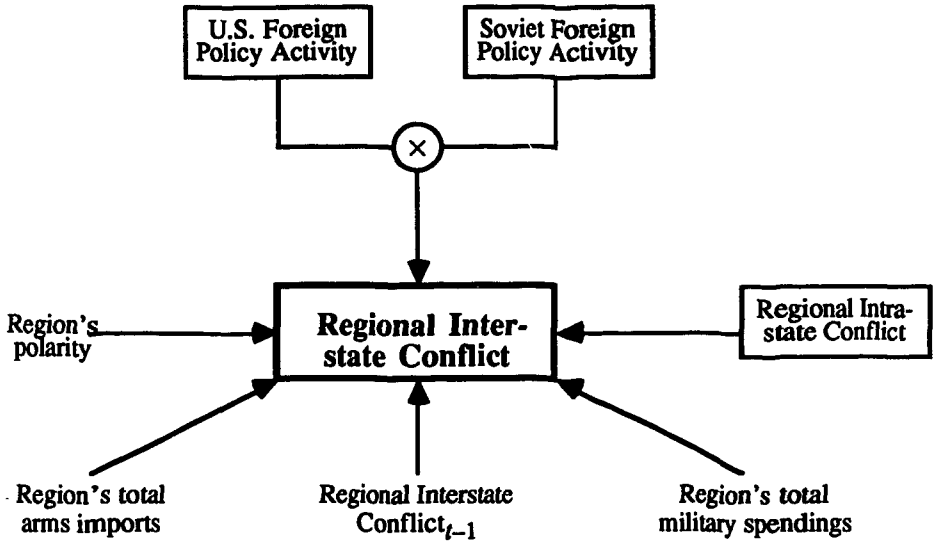
Figures 6.4 and 6.5 as well as Equations (6.2) and (6.3) represent the dynamic model of two dimensions of the Third World political instability; interstate and intrastate conflicts. Although this research is not precisely designed to model the conflict process in the Third World, the equations for the local conflicts are included in the overall model for two primary purposes; (1) to control for the possible reciprocal causal relationships between superpowers' foreign policy activities and local conflicts in terms of provocations as discussed above, and more importantly, (2) to measure the impact of superpower competition on the local conflicts, one of the problematic consequences of superpower competition in the Third World hypothesized in this study.

Thus, both equations contain a component reflecting the superpowers' foreign policy activities and competition among regressors. Then, with no less substantive and theoretical implications, a reciprocal causal relationship between two dimensions of local conflicts to incorporate one of the major themes in conflict analysis and peace studies; the linkage between domestic and foreign conflicts in the region. Finally, a set of exogenous variables for each equations are specified primarily for the purposes of controlling and identification, yet with some important substantive implications.

SUPERPOWER COMPETITION AND ESCALATION/PROTRACTION OF LOCAL CONFLICTS

It has been hypothesized in Chapter II that simultaneous intervention by both superpowers in the local conflict may either protract or escalate or both protract and escalate local conflict by (1) providing means of conflict, (2) balancing relative capabilities of warring parties, and (3) further polarizing the region. Yet, the polarization effect is indirect and subtle, and the specification is more suitable for the first two ways of escalation and protraction. Specifically, the escalation effect of superpower intervention is specified by multiplicative interaction between both superpowers' foreign policy activities. This specification indicates that for the hypothesized effects, simultaneous involvement of superpowers is necessary. The protraction effect on the other hand is specified by lagging the superpowers' foreign policy activity and the interaction term.

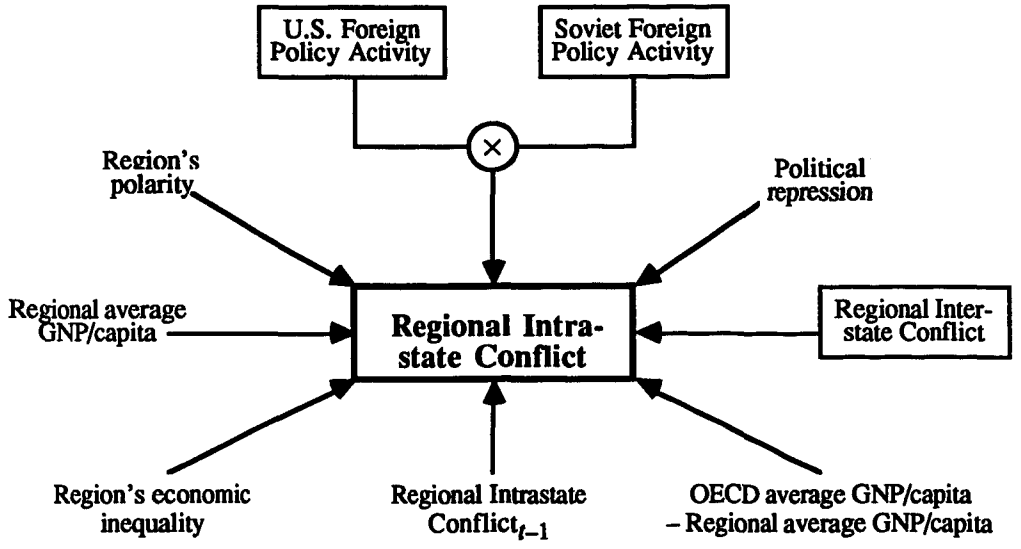
Notice however that the model specification here is very loose in at least two points. First, the superpower intervention in local conflict is not precisely defined and operationalized. Rather, it is presumed to be an intervention if a superpower launches substantial amount of foreign policy activity toward the region coincidentally with the high



Notes: In boxes are endogenous variables within the block even though reciprocal causalities are now shown in the figure for the sake of simplicity. All other variables are treated exogenous or predetermined. Symbol ⊗ represents non-linear relationship or multiplicative interaction between two variables for the causal effects on the dependent variable. The model is expressed in equations as follows.

$$\begin{aligned}\text{Regional Interstate Conflict} = {} & \alpha_{2.3} \\ & + \gamma_{2.31}\ \text{Regional Intrastate Conflict} \\ & + \omega_{2.31}\ (\text{U.S. Foreign Policy Activity} \times \text{Soviet Foreign Policy Activity}) \\ & + \beta_{2.31}\ \text{Regional Interstate Conflict}_{t-1} \\ & + \beta_{2.32}\ \text{Region's total military expenditure} \\ & + \beta_{2.33}\ \text{Region's total arms imports} \\ & + \beta_{2.34}\ \text{Region's polarity} \\ & + \mu_{2.3}\end{aligned} \tag{6.2}$$

Figure 6.4. Determinants of Local Interstate Conflicts: Hypothesized Dynamics



Notes: In boxes are endogenous variables within the block even though reciprocal causalities are now shown in the figure for the sake of simplicity. All other variables are treated exogenous or predetermined. Symbol ⊗ represents non-linear relationship or multiplicative interaction between two variables for the causal effects on the dependent variable. The model is also expressed in equational form as follows.

$$\begin{aligned}\text{Regional Intrastate Conflict} = {} & \alpha_{2.4} \\ & + \gamma_{2.41}\ \text{Regional Interstate Conflict} \\ & + \omega_{2.41}\ (\text{U.S. Foreign Policy Activity} \times \text{Soviet Foreign Policy Activity}) \\ & + \beta_{2.41}\ \text{Regional Intrastate Conflict}_{t-1} \\ & + \beta_{2.42}\ (\text{Region's average GNP/capita}) \\ & + \beta_{2.43}\ \text{GINI Index measure of } \textit{regional economic inequality} \\ & + \beta_{2.44}\ (\text{OECD average GNP/capita} - \text{Regional average GNP/capita}) \\ & + \beta_{2.45}\ (\textit{Political repression} \text{ in the region}) \\ & + \beta_{2.46}\ \text{Region's polarity} \\ & + \mu_{2.4} \end{aligned} \tag{6.3}$$

Figure 6.5. Determinants of Local Intrastate Conflicts: Hypothesized Dynamics

level local conflicts. Second, escalation or protraction effect is not as precisely defined and conceptualized as it should be in that the model does not precisely ask the reference of escalation or protraction, for example, such questions as "bigger than what" or "longer than what." While a careful quasi-experimental design would be helpful to incorporate such a notion of escalation and/or protraction, it is presumed to be an escalation in this research if high level of superpowers' activity is coincident with high level of local conflict after the simultaneous provocative effect of local conflict on superpowers' level of activity is taken into account. Likewise, it is presumed to be a protraction if high level of superpowers' activity is followed by high level of local conflict. In this regard, the hypotheses to be tested are rather loosely formulated as follows.

Hypothesis 6.4.1: The level of local conflicts is higher when not one, but both superpowers are actively involved in the region in terms of high level foreign policy activity (*escalation effect*).

Hypothesis 6.4.2: The level of local conflicts is higher after not one, but both superpowers are actively involved in the region in terms of high level foreign policy activity (*prolongation effect*).

Notice that both equations contain the region's "polarity" variable among exogenous variables. Although the model does not ask whether superpower foreign policy competition has any causal impact on the level of polarization in the region, and the polarity measure is treated as an exogenous variable, this variable would measures the indirect impact of superpower competition on the Third World conflicts. On the one hand, as the regional polarization occurs along the existing line of conflict and rivalry, the polarization may provide further sources of local conflict. On the other hand, if increasing polarization in the region by any means implies increased control of the local nations by the respective superpowers, polarization could either increase or decrease the level of local conflict depending upon the policy orientation of the superpowers.

CONFLICT LINKAGE

The model specification involves another heavily researched thesis in the field of international relations and foreign policy analysis as well as conflict resolution; the linkage between foreign and domestic conflicts. Although empirical findings from quantitative researches have been at best ambivalent, theoretical logic is highly persuasive enough to generate continuing effort to empirical research. Logically, the linkage between domestic and foreign conflicts can be seen four different ways based on the direction and the sign of causality as follows.

1. foreign conflict (+) → domestic conflict
2. foreign conflict (+) → domestic conflict
3. domestic conflict (–) → foreign conflict
4. domestic conflict (–) → foreign conflict

First, increased insecurity in the region through escalated and protracted interstate conflict may increase political instability of the nations in the region and enhances the likelihood of domestic violence. This is the case because foreign wars, whether they are victorious or not, and ensuing social mobilization may result in major social destabilization and "a climate conducive to radical change" (Tilly, 1978: 210). Second, but no less persuasively, it can be argued that high level interstate conflict in the region may reduce domestic conflict and violence because "conflict with out-groups increases internal cohesion" (Coser, 1973).[9] By a simple corollary, then, political leaders may deliberately initiate foreign conflict in an attempt to divert people's attention away from domestic difficulties and grievances and induce domestic cohesion by invoking the feeling of "we versus they" such that high level domestic conflict in the region leads to high level international conflict.[10] Finally, it should not be assumed that initiation of foreign conflict for the purpose of diverting attention is useful or available tactic to all the nations. For some nations which are especially riddled with high level of domestic conflict may be so absorbed with such problems that they can not initiate any substantial foreign policy behaviors or even have to reduce their foreign policy involvements.

Yet, especially notice that one or combination of hypotheses can be true depending upon the type of nations, particularly the governmental structures (Wilkenfeld, 1973). From example, some nations "may be able to withstand large amounts of domestic disorders without resorting to attention-diverting devices such as foreign violence" and some other nations "may be unable to resort to foreign violence because of the severity of the domestic violence they are undergoing" (Wilkenfeld, 1973: 4). Also, some governments may be strong or accommodative enough to absorb the shock of foreign conflict so that the foreign conflicts do not lead to the domestic conflicts (Rasler, 1987). In

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9 In American foreign policy, this hypothesis is well established in terms of the phenomenon of rally-'round-the flag, the tendency in people to strongly support political leaders, particularly the President, during international crises and conflicts (Mueller, 1970; Ostrom and Simon, 1985).

10 In American foreign policy, it is well observed that Presidents have tended to use armed forces to divert attentions and appeal to the tendency of the rally-'round-the flag (1) when the popularity is declining, (2) then the economy is suffering, and (3) near or on the election year (e.g., see Ostrom and Job, 1986; Stoll, 1984).

that the Third World nations are in general, relatively speaking, characterized by weak and/or unstable government and riddled with domestic political instability, and that the impact of major foreign intervention is controlled for by specifying superpower competition in the model, the internal → external linkage might be weak. On the other hand, by the same reasoning, the external → internal linkage might be relatively strong. It is not intended to test these competing hypotheses in this study, however. Instead, it is regarded as one of the contexts in which the problem in question can be better understood.

IMPACTS OF EXOGENOUS VARIABLES

Equations for both types of local conflict include sets of exogenous variables including the lagged values of corresponding dependent variables. While specification of these exogenous variables is primarily for the purpose of control, including the trend factor if any, and identification, each sets of the variables also involve certain substantive implications, hence sets of auxiliary hypothesis. First of all, the lagged dependent variable would reflect the notion of *contagion effects* of war, or any social conflict including both "spatial infection" and "temporal addiction" (e.g., Davis, et al., 1978; Levy, 1982).

Second, two exogenous variables reflecting the existing local rivalries and disputes among nations in the region are specified for the equation for the interstate conflict; (1) total military spending by nations in the region and (2) total arms flow into the region. In so much as these variables are the expressions of existing local rivalries and consequent arms races, the impact of these variables on the level of local interstate conflict is seemingly obvious, i.e., positive resulting in higher level of local interstate conflict. Yet, there may be two exceptional circumstances; (1) when arms race measured in terms of military spending and/or arms imports occurs not as prelude to wars, but as consequences of wars, i.e., rebuilding efforts after preceding wars, and (2) when competitive military buildup brings about the effect of mutual deterrence between local rivals.

Finally, four additional variables are specified for the equation for the local intrastate conflict, three of which are measuring certain dimensions of relative deprivations experienced by the people in the region at three different levels; (1) region's overall growth rate in personal income to measure domestic economic grievance, (2) GINI index measure of income disparity among nations in the region, and (3) the difference in personal incomes between OECD nations and nations in the region to measure systemic level income disparity. By measurement, it is expected that the first variable will have negative effect,

and the second and the third variables will have positive on the level of local intrastate conflict, although no specific hypotheses are proposed.

Estimation Results

GENERAL OBSERVATIONS

Tables 6.4 and 6.5 present estimation results for two equations applied to four regional data as well as for the overall Third World, totaling 10 equations. In many aspects, the results are encouraging. First, the overall performance of the model is in general 'good'; it explains a great deal of overtime variation in local conflict events, and many of the explanatory variables turn to be significant in predicted or interpretable direction. Further, cross-regional comparison of the model's performance may provide certain dimensions of contemporary and suggest further research direction. For example, consider the results for interstate conflict in Africa and the Middle East. The model explains 93% of overtime variation in African conflict with most of the model variables significant in predicted direction,[11] while it explains about 70% of overtime variation with most explanatory variables in opposite directions in the case of the Middle East. Also, as for the intrastate conflict, the model explains over 94% of overtime variation in Asian conflict with most of the model variables in predicted signs, yet the model explains only about 58% of variation in the Middle Eastern conflict with some of the model variables in opposite signs. This simple comparison may suggest that the Middle Eastern conflicts are of far more dimensions than in other regions. To explore such cross-regional differences is not the purpose of this research, but it certainly bears some implications for peace research.

In this regard, a substantively more interesting finding is one on the *conflict linkage*. The linkage between foreign and domestic conflicts is observed in all the regions except Africa, but the directions of linkage, and even the signs of linkage vary across regions. It is positive and reciprocal in Asia, one of the most problematic form in practical standpoint, domestic $\rightarrow$ foreign linkage is observed in Latin America and in the Middle East, but the sign is negative in the latter region. Again, the Middle Eastern conflict is an exceptional case, and may need careful research by motivated researchers. With this rather powerful performance of the overall model, after all, we can now examine the hypothesized *escalatory* effects of the superpower competition on local conflicts with more confidence.

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11 This result in Africa is especially interesting because, first, conflict in this region is highly fluctuating (coefficient of variability is 1.32, the highest among regions as noted in Table 6.3), and second, the lagged dependent variable shows hardly significant explanatory power.

Table 6.4. Determinants of Local Interstate Conflict in the Third World: Estimation Results

Explanatory Variables	*Region*				
	Third World	L. America	Africa	M. East	Asia
Constant	12895 (2.236)**	−572.3 (1.166)	−318.6 (0.904)***	16450 (4.617)***	3217 (1.416)
Regional Interstate Conflict$_{t-1}$	0.569 (5.360)***	0.335 (2.256)**	0.276 (1.699)*	0.551 (4.856)***	0.472 (2.230)**
Regional Intrastate Conflict	-	2.785† (2.627)**	-	−36.270† (4.388)***	31.040‡ (4.897)***
U.S. Activity	0.942 (1.342)	-	-	-	1.152 (3.366)***
Soviet Activity	6.258 (3.059)***	-	-	-	6.575 (2.581)**
U.S. Activity × Soviet Activity	−2.174 (1.223)	8.106 (2.502)**	13.810 (3.555)***	20.930 (3.859)***	−9.779 (3.194)***
Region's *polarity*	−726.4 (3.521)***	-	-	−400.4 (3.921)***	−329.7† (3.449)***
Region's total arms imports	-	−0.255 (1.641)	2.763‡ (4.073)***	−0.046‡ (0.191)	0.990 (2.954)***
Region's total military spending	−0.158 (3.080)***	0.140† (2.096)**	0.185 (2.203)**	−0.884‡ (2.427)**	−0.264† (2.194)**
$\bar{R}^2$	0.889	0.592	0.925	0.695	0.821
F-ratio (*d.f.*)	34.5(6,19)	8.3 (5,20)	78.6 (4,21)	10.5 (6,19)	15.4 (8,17)
GLS Correction	None	*MA*(2) θ_1=0.132 θ_2=0.868	None	*MA*(2) θ_1=−.054 θ_2=0.810	None

Notes: Results are from 2SLS estimation with IV-GLS treatment, if necessary as indicated, for the system of simultaneous equations in this block. After variable-wise deletion of early period missing cases, there are 26 observations remained for estimation. Coefficient estimates for the competition term are multiplied by 10000 for scaling purposes. Variables are generally specified in contemporaneous value unless either explicitly specified in the model, or marked by (1) † (lagged value) or (2) ‡ (differenced value). Figures in parentheses under each coefficient estimates are *t*-ratios in absolute value whose statistical significances are marked by (1) *** (p<0.01), (2) ** (p<0.05), and (3) * (p<0.10), all at two-tailed test.

Table 6.5. Determinants of Local Intrastate Conflict in the Third World: Estimation Results

Explanatory Variables	*Region*				
	Third World	L. America	Africa	M. East	Asia
Constant	−669 (1.497)	−168 (1.047)	480 (4.315)***	108 (3.716)***	48 (1.343)
Regional Intrastate Conflict$_{t-1}$	-	0.925 (7.905)***	0.473 (3.150)***	0.688 (5.136)***	0.826 (11.700)***
Regional Interstate Conflict	−0.812‡ (2.060)**	-	-	-	0.014‡ (4.341)***
Region's *polarity*	-	−4.131 (1.770)*	-	-	−8.804‡ (2.211)**
Regional average GNP per capita	−3.620 (2.487)**	−0.493 (2.391)**	1.615 (1.298)	−1.048‡ (3.221)***	−3.764‡ (3.852)***
Regional economic inequality (*GINI*)	29.240 (2.498)**	18.110 (2.066)**	−17.150† (2.626)**	10.270‡ (2.317)**	3.837‡ (0.547)
Systemic economic disparity	0.396† (2.986)****	-	-	−0.492‡ (2.544)***	-
Political repression in the region	0.846 (5.764)***	-	0.430 (1.973)*	-	0.843 (3.404)***
$\bar{R}^2$	0.781	0.874	0.785	0.579	0.941
F-ratio (*d.f.*)	18.8 (5,20)	44.2 (4,21)	23.8(4,21)	9.6 (4,21)	67.8 (6,19)
GLS Correction	None	*ARMA*(1,1) ϕ_1=−.816 θ_1=−.265	*AR*(2) ϕ_1=0.396 ϕ_2=−.501	None	None

Notes: Results are from 2SLS estimation with IV-GLS treatment, if necessary as indicated, for the system of simultaneous equations in this block. After variable-wise deletion of early period missing cases, there are 26 observations remained for estimation. Coefficient estimates for the competition term are multiplied by 10000 for scaling purposes. Variables are generally specified in contemporaneous value unless either explicitly specified in the model, or marked by (1) † (lagged value) or (2) ‡ (differenced value). Figures in parentheses under each coefficient estimates are *t*-ratios in absolute value whose statistical significances are marked by (1) *** (p<0.01), (2) ** (p<0.05), and (3) * (p<0.10), all at two-tailed test.

SUPERPOWER COMPETITION AND ESCALATION OF LOCAL CONFLICTS

The estimation results are highly intriguing in many aspects. First of all, hypothesized effects are observed for the interstate conflicts in all the regions, but no such effects are observed for the intrastate conflicts in any region at all. Recalling the finding in the previous section that superpowers have often acted upon the local domestic conflicts, such a finding is highly illuminating for further research in conflict process and resolution; that the domestic conflict process in the Third World is more indigenous and further beyond the control of one or both superpowers than the interstate conflict. This finding is particularly significant when it is contrasted to the interstate conflict case where escalation effects are observed in all the regions.

Second, while both the 'escalation' and 'prolongation' effects have been hypothesized, the prolongation effect is not observed. In other words, the lagged value of the competition variable does not have significant effects on the current level of local conflicts. Possible collinearity between the current and lagged values of the competition variable was checked by specifying the lagged value alone, but the variable turns out to be significant only in Latin America, which becomes insignificant again when the contemporary value is entered. Thus, at least in the context of this research, the impact of superpower competition on the local interstate conflict is generally immediate.

The most significant finding to me is in the cases of the overall Third World and especially in Asia where both superpowers' level of activity has significant positive effects on the level of local conflicts whereas the interaction effect is *negative*.[12] This result suggests that whereas each superpowers' intensive involvements in the Third World conflict have resulted in escalation of the conflict, *when both superpowers are simultaneously involved and the degree is 'symmetric,' their involvements result in moderation of local conflicts.*[13]

To examine the moderation effects more precisely, in Figure 6.4 are plotted the escalation effect of both superpowers' activity and the moderation effect of interaction term and the total effects meaning the escalatory effects of both superpowers' activity subtracted by the moderation effects for the case of Asia.[14] As obvious in the figure, the escalation effect is still dominant even after the moderation effect is subtracted. But interestingly, if

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12 This possibility is checked out for all other regions but not observed.

13 Notice that being a multiplicative interaction, the moderation effect is higher when the levels of each superpowers activity are symmetrically high.

14 What are plotted are the levels of variables multiplied by associated coefficients as estimated.

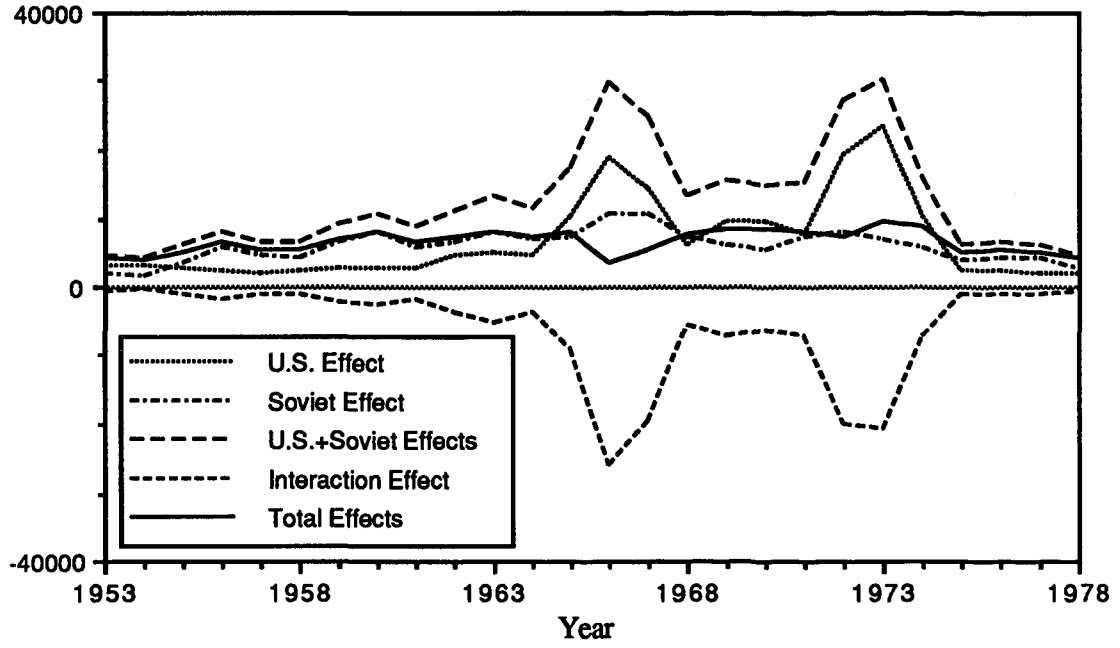

Figure 6.6. 'Escalatory' and 'Moderation' Effects of Superpower Competition in the Third World for the Local Interstate Conflicts: The Case of Asia

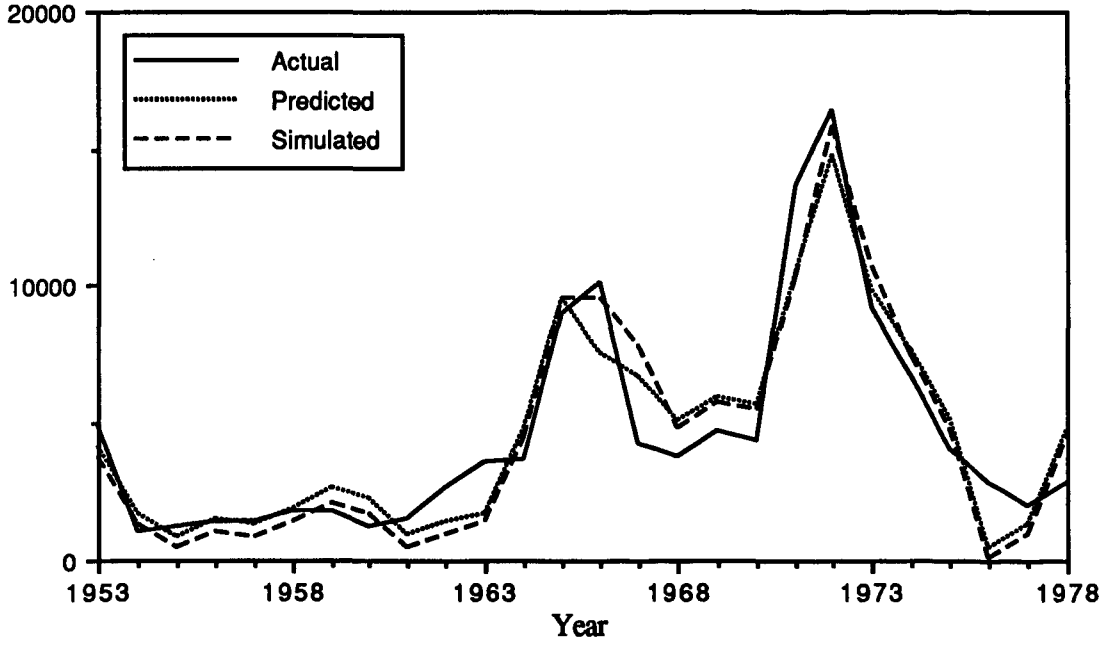

Figure 6.7. The Impact of Superpower Competition in the Third World for the Local Interstate Conflicts: A Simulation for the Case of Asia

not unexpectedly, total effect is *lower* than otherwise when both superpowers' levels of activity are high.

In Figure 6.5 on the other hand, the annual level of interstate conflict in Asia is plotted along with (1) the *predicted* value generated by the regression equation, and (2) the *simulated* value when both superpowers' levels of activity are reduced by 10%. The figure shows that the predicted level of local interstate conflict goes even higher when the level of both superpowers' activity are reduced in the years of 1966-1967 and 1972-1973, when the level of local conflict is particularly high. This finding thus indicates an important element in the pattern of superpower competition in the Third World; when local conflicts are high, simultaneous involvement by superpowers in the Third World affairs often involves *collaborative efforts to moderate the local conflicts.*

This interpretation of the results is consistent with another finding in the results; the effects of polarization in the region on the local conflicts. It was expected that the more polarized a region is, the higher the level of local conflict, because the more polarized a region is, the more sharply divided the nations in the region in their policy orientations.[15] And such an effect is also expected for local intrastate conflict because the more polarized a region is, the more unstable and conflict-prone the region is, although the effect is expected to be higher in interstate conflict. The finding is opposite; *the more polarized a region, the less the level of conflict in the region.* Such a pattern is observed in the overall Third World, the Middle East and Asia for local interstate conflict, and in Asia for domestic conflict. If a polarized region means that both superpowers have more control over the local states, this finding may suggest that superpowers have been *willing* and *able* to restrain their respective allies/clients with respect to their management of conflict with local enemies. And this finding and interpretation is consistent with earlier finding of moderation effects of competitive involvement.

Summary and Conclusion

In this chapter so far, the 'extended model' of the superpower rivalry consisting of equations for the foreign policy activity of each superpowers, and the models for local conflict in two dimensions, inter- and intrastate, are discussed in terms of specification of the model, hypothesized causal effects, and the estimation results. The findings can be summarized into the following set of propositions.

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15 According to Bueno de Mesquita, expected utility from a war is higher when policy orientations are more different among potential enemies, hence the war is more likely (Bueno de Mesquita, 1980).

First, in regions where both superpowers have recorded higher level of foreign policy activity and involvement, the 'extended model' performs better meaning that the reaction process involves a deliberate process of decision-making in such a way as it is envisioned. In other regions, the 'basic model' of competition performs as well as or better than the extended model meaning that the competition process is often directed by habitual behavior of bureaucratic organizations without involving higher level decision-makers.

Second, the role of local conflict events on the competition process is *provocative* in that (1) at least one of the superpowers is sensitive and acted upon outbreak and/or intensification of local conflicts, and more importantly (2) the other superpower either willingly or reluctantly follows the rival's lead to assume the pattern of action-reaction dynamics. More significantly, in some regions of less salience in the context of superpower rivalry, both superpowers have initiatively or autonomously acted upon the local conflicts. In that at least one of the superpowers is not so willing to act upon on local conflicts perhaps because of the prospect of bilateral confrontation in regions of higher salience, this pattern means that both superpowers have not expected the rival's response in such a region of lower salience, and such an expectation becomes mirrored to have important implication for bilateral crisis.

Third, the 'escalation' effect is observed in all the regions for the local interstate conflict although the hypothesized effect is not observed for the local intrastate conflict in none of the regions. Highly importantly however, there are observed some moderation effects or efforts by the superpowers for the local conflicts. That is, whereas foreign policy activity and involvement by each superpowers have resulted in heightened level of local interstate conflict, when both superpowers are involved simultaneously, and the degree of involvements by both superpowers is symmetric, it has resulted in lowered level of local conflict. In that such an effect is observed when the local conflict level is particularly high, simultaneous involvement by both superpowers not only means 'competition' but also means 'collaboration' toward management of local conflict so as to prevent further escalation of local conflicts and possible bilateral crisis. As much as the observed collaborative effects are real, this chapter concludes by repeating the concluding theme in the previous chapter; the superpower competition in the Third World can be better called a 'collaborative competition' (Breslauer, 1983) or, to a certain degree, '*competition in form* and *collaboration in essence.*'

CHAPTER VII
SYSTEMIC LEVEL DYNAMICS

In this chapter is discussed the systemic level *consequences* of the superpower rivalry and competition in the Third World. In particular, this chapter discusses and analyzes the ways in which the competition in the Third World affects two dimensions of the superpower rivalry at the strategic level; (1) the bilateral arms race and (2) the dyadic conflict interaction. As far as the contemporary international system can be properly called *bipolar*, such dimensions of the superpower interaction can be seen at the *systemic* level, and the dynamics discussed in this chapter may be called "systemic level dynamics."

In the following, first of all, some of the ways in which the competition over the Third World affects the bilateral conflict interaction are hypothesized, and modeled along with the well-observed notion of *reciprocity* in interstate interactions. Then, some of the ways in which the rivalry and competition in the Third World can affect the bilateral arms race are hypothesized and modeled along with the well-known model of arms race in the tradition of Lewis Richardson. As these two dimensions of the strategic level rivalry are inter-connected with each other, the model becomes the Block III of the conceptual model presented earlier in Chapter III.

In the subsequent sections, the estimation results of the model are presented and analyzed. Upon the empirical results and findings, the proposed hypotheses are tested, reevaluated, and modified, if necessary, to gain insight into the complex linkage among dimensions of superpower rivalry in the contemporary world.

Model and Hypotheses

Competition in the Third World and Dyadic Conflict Interaction

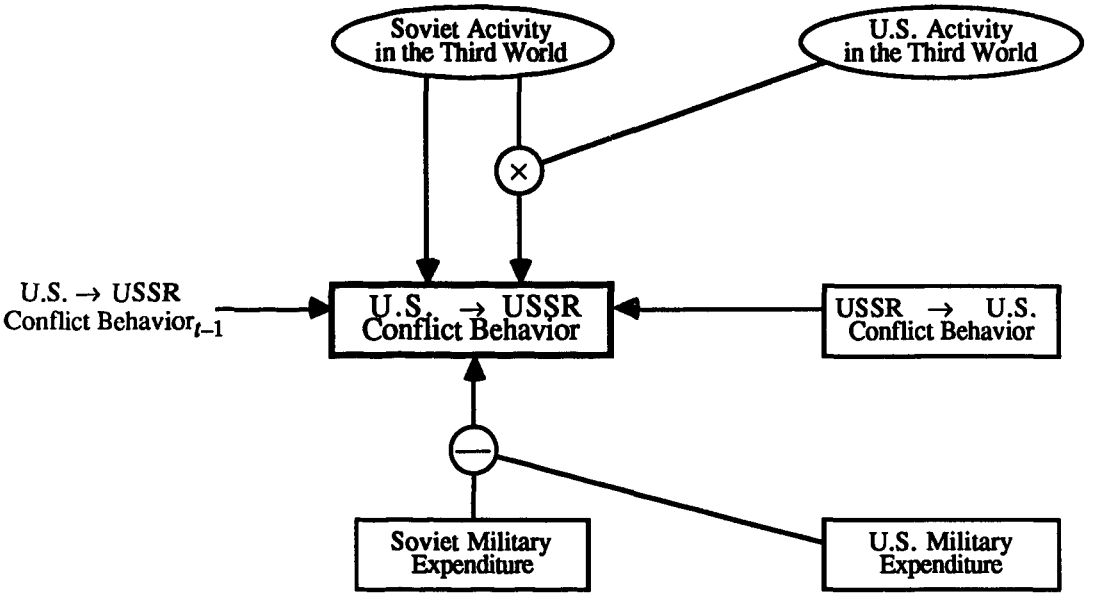
It has been suggested that intensified competition in the Third World is sooner or later to affect the bilateral political relationship between the superpowers. Foreign policy activities in the contemporary world are so deeply politicized and related national interests

are so closely and complexly interconnected, conflict over an issue area tends to *spill over* into some other areas through the complex network of *issue linkage*. Issues may be linked either *tactically* by deliberate policy-maneuver, or *substantively* due to some unavoidable reality (Hass, 1980; McGinnis, 1986). Further, issues may be linked *horizontally* across foreign policy issues or *vertically* through international-domestic politics linkage. As a variety of issues are linked with each other vertically and horizontally to constitute a complex network, conflict over one issue area tends to spill over into other issue areas so that otherwise possible cooperative ventures halt and/or foreign policy crises follow.

From a more analytic point of view, in particular, there are proposed two major ways in which the rivalry and competition over the Third World affects the bilateral conflict interaction. First, an intense competition often involves escalating hostilities between two nations because one or both of the superpowers feel that (*a*) the rival is denying its own 'legitimate' claims or (*b*) the rival is not yielding to its own 'rightful' protest. Second, there may be circumstances where while the rival is acting and expanding its activities and influences in the Third World regions, a superpower may be unable or unwilling to counter such activities for domestic and/or logistic reasons. Then, the actor may compensatorily invoke direct conflict behaviors against the rival through a more established and readily available channel.

In either way, the process is very likely *escalating*. What is particularly notable in this regard is the conceptually plausible and empirically well sustained notion of *reciprocity* in interstate interaction, either conflict or cooperation (e.g., Axelrod, 1984; Dixon, 1986; Keohane, 1985; Ward, 1982). That is, it has been suggested and noted that nations tend to "reciprocate" others' behavior *in kind* or in *tit-for-tat* fashion such that "conflict begets conflict and cooperation begets cooperation" (Ward, 1982). If so, a superpower's conflict behavior directed against the rival for the issues in the Third World is likely to be reciprocated in kind. And, since such a reciprocal pattern of interaction is *mutual* or *mirrored*, the exchange of conflict behavior between superpowers is very likely to result in an escalation of conflict in a spiral fashion.

Figure 7.1 shows hypothesized dynamics in which U.S. conflict behavior directed to the Soviet Union is determined for an illustrative purpose. In the figure, especially notice that there are two terms specified for the 'competition' component; one is the level of the rival's activity and the other is the rival's activity matched by own activity (i.e., Soviet activity in the Third World multiplied by the U.S. activity in the region). Such a specification is designed to capture two hypothesized ways in which the competition for the



Notes: In boxes are endogenous variables within the block even though reciprocal causalities are not shown for the sake of simplicity. In ellipses are endogenous variables in the previous block, which are treated exogenous in this block. All other variables are treated exogenous or predetermined. Symbol ⊗ represents non-linear relationship or multiplicative interaction between two variables for the causal effects on the dependent variable, and symbol ⊖ represents the difference between two variables for the causal effect on the dependent variable. Model for the Soviet case is symmetrically identical. In equational form, the model is expressed as follows.

$$\begin{aligned}
&\text{U.S.} \rightarrow \text{USSR Conflict Behavior} = \alpha_{3.1} \\
&+ \beta_{3.11}\ \text{U.S.} \rightarrow \text{USSR Conflict Behavior}_{t-1} \\
&+ \beta_{3.12}\ \text{Soviet Foreign Policy Activity in the Third World} \\
&+ \beta_{3.13} \left(\begin{array}{l} \text{Soviet Foreign Policy Activity in the Third World} \\ \times\ \text{U.S. Foreign Policy Activity in the Third World} \end{array} \right) \\
&+ \gamma_{3.11}\ \text{USSR} \rightarrow \text{U.S. Conflict Behavior} \\
&+ \omega_{3.11}\ (\text{Soviet Military Expenditure} - \text{U.S. Military Expenditure}) \\
&+ \mu_{3.1}
\end{aligned} \tag{7.1}$$

Figure 7.1. Directed Conflict Behavior of the U.S. to the Soviet Union: Determinants and Hypothesized Dynamics

Third World affects the dyadic conflict interaction, as discussed above. On one hand, the multiplicative interaction term represents one of two cirsumstances from the actor's point of view; (1) a superpower is 'rightfully' acting in the Third World and the rival is denying its rightfulness by challenging to it, or (2) whereas a superpower sees the rival's action as threatening and accordingly reacts to it, the rival is not yielding to it. The specfication implies the hypothesized response by the actor in such circumstances; invoke direct conflict behaviors against the rival. Thus, *the higher both superpowers' levels of foreign policy activity in the Third World, the higher the level of conflict behavior by a superpower directed to the rival* (Hypothesis 7.1.1).

On the other hand, given the interaction term is specified, the rival's activity alone is to capture the second way of hypothesized effect of the Third World issues on the dyadic conflict behavior. That is to say, if the rival is expanding its activities and influences in the region and an actor is unable to counter it, the actor may invoke direct conflict behaviors in order to deter the rival from further expansion and to let the rival know non-reaction in the region does not mean to acknowledge the rival's claim. Then, *the higher the level of rival's activity in the region which is not reacted to, the higher the level of conflict behavior by a superpower direct to the rival* (Hypothesis 7.1.2.).

This set of hypothesized relationships is placed in the context of two conceptual arguments; (1) the reciprocal nature of foreign conflict interaction specified in terms of the rival's directed conflict behavior, and (2) the compensatory conflict behavior when a superpower's military capability is lagging behind the rival's, specified in terms of the difference between the rival's level of military expenditure and own military expenditure. Along with terms for the competition in the Third World, reciprocity term here implies an important proposition; *the superpower competition over the Third World tends to turn into direct, dyadic confrontation and potential crisis* through action-reaction dynamics for its own sake. Specification of the difference in military expenditures is specified following Ashley's discussion of the 'compensatory logic,' although the specification is not precisely the same as his (Ashley, 1980).

Competition in the Third World and the Bilateral Arms Race

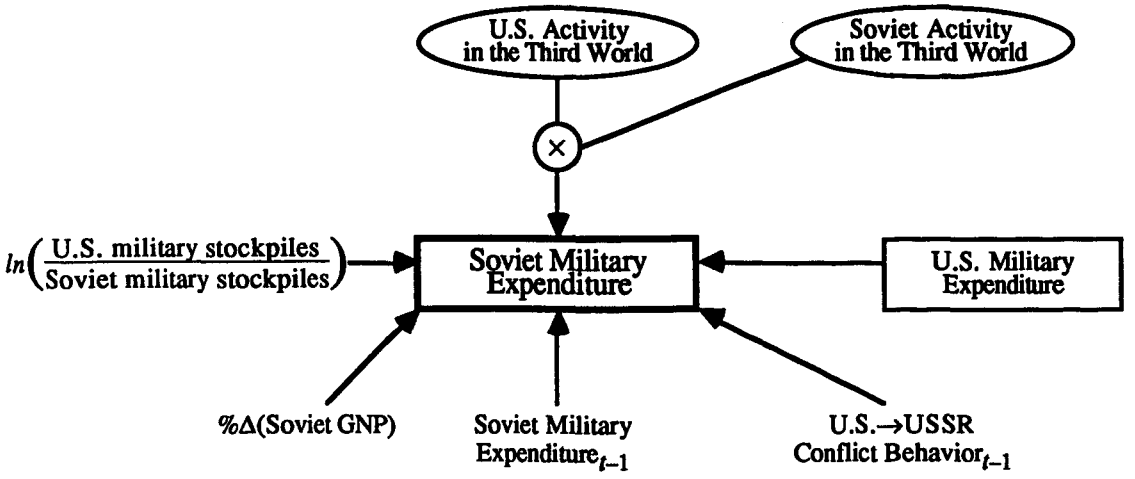
Conceivably, there are two major ways in which an intensified competition in the Third World affects the phase of competitive military buildup by two superpowers. The first is that as the competition in the Third World escalates into a direct and dyadic confrontation and crisis such that a direct war between two superpowers becomes imminent

or at least probable, two superpowers prepare for the prospective war accordingly through the competitive buildup of armament. Even though there has hardly been any historical incidence of crises over the Third World affairs to involve an imminent war, and this way of causal relationship may seem too hypothetical, recurrent crises and increasing hostilities between superpowers may provide a strong temptation and justification for increased armament on one or both parts of the superpowers, and ensuing arms race.

The second way is that one or both superpowers' foreign policy behaviors in the Third World directly involve an overt military activity such as the U.S. cases in Korean and Vietnam Wars and the Soviet case in Afghanistan, which are likely motivated and intensified by a rivalry consideration. Such an effect of competition in the Third World on the level of military expenditure and armament is more than casual, however. That is, in the context of the bilateral arms race, it is likely that a superpower's increased armament or military expenditure, which may be due to events in the Third World and not necessarily directed against the rival, becomes a threat to the rival and leads to an ensuing effort of armament buildup on its part; a prototype expression of the modern security dilemma. The initial actor, who is as much concerned with its own security as its rival, feels threatened by the rival's effort, and launches own effort to counter the threatening level of the rival's armament, which in turn leads to the rival's counter-effort, and so on. As noted in the conceptual framework, thus, a seemingly unrelated event can serve as a *catalyst* for another round of the arms race, and result in a *cascading* and *cumulative* increase in armament level in both parts of the superpowers.

Figure 7.2 presents this hypothesized consequence of the competition in the Third World for the Soviet military expenditure for an illustrative purpose. First, notice in the figure that the first way of hypothesized effect in terms of increased hostility and ensuing war-preparation effort is specified *indirectly* through the rival's conflict behavior at previous period of time, which is supposed to be affected by the level of competition in the Third World, as noted in the previous section. The variable is specified in lagged form because it is believed to take time for the threat felt from the rival's behavior to be realized in the level of military expenditure.

Second, the competition in the Third World is specified in terms of a multiplicative interaction between its own level of foreign policy activity in the Third World and the rival's as it has been throughout this study. Inclusion of the competition term in the model is to capture the second way of causal effects discussed above, i.e., the direct involvement in the Third World affairs with military means. Although simple specification of its own



Notes: In boxes are endogenous variables within the block even though reciprocal causalities are not shown for the sake of simplicity. In ellipses are endogenous variables in the previous block, which are treated exogenous in this block. All other variables are treated exogenous or predetermined. Symbol ⊗ represents non-linear relationship or multiplicative interaction between two variables for the causal effects on the dependent variable. Model for the U.S. case is symmetrically identical. In equational form, the model is expressed as follows.

$$\begin{aligned}\text{Soviet Military Expenditure} = {} & \alpha_{4.3} \\ & + \beta_{4.31}\ \text{Soviet Military Expenditure}_{t-1} \\ & + \beta_{4.32}\ \text{U.S.} \rightarrow \text{USSR Conflict Behavior}_{t-1} \\ & + \beta_{4.33}\ ln\left(\frac{\text{U.S. military stockpiles}}{\text{Soviet military stockpiles}}\right) \\ & + \beta_{4.34}\left(\begin{array}{l}\text{Soviet Foreign Policy Activity in the Third World} \\ \times\ \text{U.S. Foreign Policy Activity in the Third World}\end{array}\right) \\ & + \beta_{4.35}\ \%\Delta(\text{Soviet Gross National Product}) \\ & + \gamma_{4.31}\ \text{U.S. Military Expenditure} \\ & + \mu_{4.3}\end{aligned} \tag{7.2}$$

Figure 7.2. Determinants of the Soviet Military Expenditure: Hypothesized Dynamics

could serve the purpose as well, this specification of an interaction term underscores two propositions; (1) an intense involvement by one or both superpower in the Third World affairs is mostly driven by the rivalry factor, and (2) existence of the rival's activity provides to certain degree a domestic justification for increased military spending and highly intense involvement in the Third World affairs through the military means. Thus, it is hypothesized that *the higher the level of both superpowers' foreign policy activity and involvement in the Third World, the higher the level of military spending of the superpowers* (Hypothesis 7.2).

Third, notice that impact of the Third World activity and competition is placed in the context of the bilateral arms race; the rival's level of military expenditure and own previous level of military expenditure. Rval's level of military expenditure as a regressor means that the competition in the Third World may also have indirect effect on a superpower's level of military spending as the superpower tries to catch up with the rival's level of expenditure. The lagged dependent variable as a regressor means such direct and indirect effects are carried over to the next period of time and hence cumulating over time through the bureaucratic momentum and/or other domestic political dynamics.

There are two exogenous variables specified for determinants of the Soviet military expenditure largely for modeling and estimation purposes; (1) the relative military capability measure in terms of the logged ratio of the military stockpiles of two super-powers, and (2) the economic growth rate. The economic growth rate is to approximate Ward (1984) who notes that the Soviet domestic economic plan has to do with its level of military expenditure. The relative capability measure has more substantive meaning than simple modeling and estimation purpose; a *catching-up effort* by a superpower when its military capability is lagging behind the rival's such that the less favorable the military balance, the more effort and higher level of military spending to redress the military imbalance.

Empirical Results

Table 7.1 presents the estimation results for four equations in this block; two for each superpower's level of military expenditure, and two for each superpower's directed conflict behavior. The finding is not very encouraging at the initial look and from the modeling perspective. First of all, some of the hypothesized relationships are not found, and some others are statistically significant but not in theoretically interesting ways. For example, hypothesized linkage between the military expenditures and the dyadic conflict interaction is

Table 7.1. Impact of the Competition in the Third World on Bilateral Superpower Interaction: Estimation Results

Explanatory variables	*Military Expenditures*		*Conflict Behaviors*	
	U.S.A.	USSR	U.S.A.	USSR
Constant	38.2 (2.193)*	9.0 (0.539)	−31.5 (0.176)	210.7 (1.069)
Lagged dependent variable	0.658 (5.630)***	0.796 (7.057)***	0.620 (3.146)***	0.536 (3.696)***
Reciprocity (rival's military expenditure or conflict behavior)	0.412† (1.057)	0.231 (2.060)**	0.085 (0.476)	0.464 (1.814)*
$ln\left(\frac{\text{U.S. military stockpiles}}{\text{Soviet military stockpiles}}\right)$	2.081 (0.799)	−6.643 (2.609)**	-	-
%Δ(Soviet GNP)	-	−0.597 (1.408)	-	-
U.S. Activity in the Third World	-	-	-	−0.046 (1.184)
Soviet Activity in the Third World	-	-	0.091 (0.918)	-
U.S. Activity in the Third World × Soviet Activity in the Third World	0.252‡ (3.191)***	-	−6.940‡ (2.331)**	11.294‡ (1.523)
$\bar{R}^2$	0.840	0.965	0.758	0.745
F-statistic	33.8 (5,21)	175.5 (5,21)	20.6 (5,21)	19.3 (5,21)
GLS Correction	*AR*(1) $\phi_1 = 0.445$	*AR*(2) $\phi_1 = 0.580$ $\phi_2 = -.174$	*AR*(2) $\phi_1 = 0.566$ $\phi_2 = -.519$	None

Notes: Results are from 2SLS estimation with IV-GLS treatment, if necessary as indicated, for the system of simultaneous equations in this block. After variable-wise deletion of early period missing cases, there are 26 observations covering the period of 1953-1978 remained for estimation. Figures in parentheses under each coefficient estimates are *t*-ratios in absolute value. Military spending is measured in billion U.S. dollars in 1980 value.

† Difference in Soviet military expenditure is specified instead of raw level.
‡ Coefficient estimates are multiplied by 10^6 for scaling purposes.
*** Coefficient estimates are significant at $p<0.01$ at two tailed test.
** Coefficient estimates are significant at $p<0.05$ at two tailed test.
* Coefficient estimates are significant at $p<0.10$ at two tailed test.

not sustained, and subsequently dropped out of the equations.[1] Also, the reciprocity terms in the equations for both the military expenditures and conflict behaviors do not appear strong.[2] The relative capability term measured in terms of the logged ratio between two superpowers' military stockpiles is specified with an expectation that the term would capture the 'catching up' effort by one or both superpowers, but the signs are the opposite to the ones expected.[3] The competition term(s) produce results which are more complex than initially expected and to some degree in unexpected signs.

Still, the estimation results yield some important findings. First of all, the level of foreign policy activity and ensuing competition in the Third World *does* appear to have impact on the level of the U.S. military expenditure, and the Soviet Union responds to the U.S. level of military expenditure in the way the arms race model describes. That is, whereas the competition term has significant impact on the level of U.S. military spending, the U.S. military spending in the Soviet equation yields statistically significant coefficient estimate. Thus, the competition in the Third World has a direct effect on the U.S. military expenditure and at least an indirect effect on the Soviet military expenditure.

In a sense, it is not surprising to note that the level of U.S. foreign policy activity in the Third World has positive effects on the U.S. military expenditure as a major portion of the U.S. military spending went to its war-efforts in two Third World wars, the Korean and Vietnam Wars (Cusack and Ward, 1981; Ward, 1984; Zuk and Woodbury, 1986). It is not surprising either to note that similar effect is not observed for the Soviet case in that the Soviet did not launch a comparable level of Third World involvement until its invasion of Afghanistan, which is not covered in this research period. What is particularly interesting to observe, if as hypothesized, is that it is not the level of U.S. activity alone but

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1 That is, in specification of the model, the difference between two superpowers' military expenditure is expected to have positive effect on the level of conflict behavior as a 'compensatory' effort to fill the gap in military capabilities. On the other hand, previous level of the rival's conflict behavior is expected to have positive effect on the current level of military spending as a response to the threat and hostility expressed in the conflict behavior. None of such relationships is statistically significant, however.

2 Results from this particular set of equations are affected very much by the problem inherent in the method of estimation, however. The reciprocity terms whose statistical significance is relatively high in single-equation estimation method lose statistical significance in system estimation method (see Table 7.3 in the appendix to this chapter for the results from single-equation estimation method). This result is suspectedly due to the problems of either loss of efficiency at the first stage of 2SLS estimation or multicollinearity with other variables in the equation at the second stage of 2SLS estimation, as discussed in Chapter III and Appendix A, and particularly the latter problem. Instead of dropping the reciprocity terms out of the equations, however, they are retained because (1) there are strong theoretical reasons and empirical evidence, (2) these technical problems are correctable, and most of all (3) establishing the reciprocity in conflict interaction is not the primary purpose of this study.

3 Instead of the 'catching up' efforts, this measure may reflect the 'maintenance' cost of the stockpiles, and still is a good predictor of the level of military expenditure and thus retained in the model.

Table 7.2. Explaining the U.S. Military Expenditure: Different Model Specifications

Explanatory Variables	*Model* 1 (OLS)	*Model* 1 (GLS)	*Model* 2	*Model* 3
Constant	26.5 (1.645)	39.3 (1.926)*	26.2 (1.770)*	28.7 (2.087)**
U.S. Military Expenditure$_{t-1}$	0.800 (7.713)***	0.720 (5.355)***	0.701 (7.673)***	0.708 (8.675)***
Δ(Soviet Military Expenditure)	0.826 (2.371)**	0.547 (1.725)*	0.827 (2.858)**	0.705 (2.660)**
$ln\left(\frac{\text{U.S. military stockpiles}}{\text{Soviet military stockpiles}}\right)$	0.337 (0.149)	0.290 (0.100)	2.634 (1.315)	2.558 (1.429)
U.S. Activity in the Third World	-	-	1.165† (3.292)***	-
U.S. Activity in the Third World × Soviet Activity in the Third World	-	-	-	0.267‡ (4.176)***
R^2	0.778	0.762	0.854	0.879
F-statistic ($d.f.$)	25.7 (3,22)	23.5 (3,22)	30.6 (4,21)	38.1 (4,21)
GLS Correction	None	$AR(1)$ ϕ_1=0.421	None	None

Notes: Results are from single-equation estimation method. $N = 26$ covering the period of 1953-1978. Figures in parentheses under each coefficient estimates are t-ratios in absolute value.

† Coefficient estimates are multiplied by 10^3 for scaling purposes.
‡ Coefficient estimates are multiplied by 10^6 for scaling purposes.
*** Coefficient estimates are significant at $p<0.01$ at two tailed test.
** Coefficient estimates are significant at $p<0.05$ at two tailed test.
* Coefficient estimates are significant at $p<0.10$ at two tailed test.

interaction between the U.S. activity and the Soviet activity which has significant causal effect on the level of U.S. military spending.

To speak more precisely, the interaction term explains the overtime variation in the U.S. military expenditure level *better than* the level of U.S. activity alone. To examine this more closely, see Table 7.2 where estimation results from different model specifications for the U.S. military expenditure are reported; 'model 1' is one without the term for the competition in the Third World, 'model 2' is one with the level of U.S. activity, and 'model 3' is one with the interaction term.[4] The finding includes, first of all, that one should really take into consideration the U.S. involvement in the Third World to account for the U.S. military spending adequately. Not only does the inclusion of the Third World factor significantly enhance the model's explanatory power, but also the exclusion of the term results in serially correlated disturbances indicating something systematic is missing from the model.

Second, as comparison of the 'model 2' and 'model 3' shows, the interaction term is a better predictor of the U.S. military expenditure than the U.S. activity alone, although it is hard to tell whether such a difference is statistically significant or not, i.e., whether it is due to something systematic in the process of military spending or just a matter of chance.[5] When substantiated, this finding yields an important implication for the military spending and arms procurement process in the U.S.; *the Soviet foreign policy activity in a competitive manner with the U.S. has yielded higher level military spending by the U.S. presumably by providing some degree of rationale and justification for such spending.*

Now recall that in Table 7.1 the reciprocity term in the Soviet military spending is statistically significant indicating that the Soviets are really responding to the change in the U.S. military spending. Then, the competition in the Third World has indirect effects on the Soviet level of military spending such that a unit level competition accounts for 58 million U.S. dollars in Soviet military spending per year ($0.252 \times 0.231 = 0.058$), and

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4 Unlike ones in Table 7.1, the estimation method used here is not system-method but a single-equation estimation method. Thus, the results may show somewhat over-rated impact of the reciprocity term, i.e., the rival's military spending, which become significant in this method. Yet, the method should not affect the comparison of different model specifications in this section, as far as the same method is applied to all the models.

5 Thus, a caution is deserved in emphasizing and substantiating the difference in the alternative measures' explanatory power noted in this study. First, there is no established procedure to check the statistical significance of such differences. Second, there are alternative data sources for the U.S. military expenditure, and the finding could be sensitive to data sources. Thus, a more systematic study with alternative data sources may be required for further substantiation of the argument in this section.

over the long run permanent increase in the competition level by one unit result in 767 million dollar increase in Soviet military spending.[6] And it is an irony that the Soviet foreign policy activity in the Third World results in increase in Soviet military spending not because its activity has involved significant military activity, but because the activity has provided reasons for the increase in the U.S. military spending.

A more interesting finding from the estimation results is the way the U.S. has responded to the intense competition in the Third World in terms of its conflict behavior directed against the Soviet Union. Whereas the competition term turns out to be insignificant in general for the Soviet conflict behavior, it turns out to be *negatively* significant for the U.S. case, opposite to the hypothesis. The finding is highly suggestive in a few ways. First of all, generally insignificant coefficient estimates indicate that the *linkage between the Third World issues and strategic issues* are not as strong as expected, or the decision-makers in the superpowers have tended not to link issues in the Third World to the direct, bilateral conflict.

Second, the interaction term has negative and significant effects on the U.S. conflict behavior suggests that the U.S. has tended to initiate some cooperative behaviors to the Soviet Union perhaps to prevent the escalation of confrontation in the Third World into bilateral crisis, especially when the U.S. is deeply involved in the Third World, and the Soviet has responded to such initiatives. This inference is made based on the following points. First, the measure of conflict behavior is in *net* level, i.e., the level of conflict behavior *minus* the level of cooperative behavior, where negative coefficient can be more easily interpreted as initiation of cooperative behaviors, rather than reduction of conflict behaviors.[7] Second, the U.S. cooperative behavior upon the Soviet activity in the Third World is the case especially when the U.S. involvement in the Third World is very high because the U.S. tends to respond to the 'uncontested' activity by the Soviet Union by conflict behavior, if the coefficient estimate is not statistically significant.

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[6] Seen in terms of Koyck distributed lag model, the *long-run effect* of a permanent shift in exogenous variable can be calculated by the formula $b/(1-a)$ where b is the coefficient associated with the exogenous variable, and a is the coefficient associated with the lagged endogenous variable. Thus, the increase of 58 million in Soviet military spending through indirect effect can be accumulated up to 767 million over the long run (i.e., 0.058 + (1–0.658) = 0.767), so to speak.

[7] The choice of *net* level conflict behavior instead of the raw level conflict behavior is made upon experimentation. That is, when the conflict level is measured in raw level, the competition term did not produce any significant coefficient at all, and in net level measure, the competition term turns out to be significant. Figures 7.3 and 7.4 show annual plot of directed conflict, cooperation, and net level conflict behaviors exchanged between two superpowers for the period of 1948-1978.

For example, let x the U.S. level of activity in the Third World, y the Soviet level of activity in the Third World, and z the overall impact of the competition term in the Third World on the U.S. (net) conflict behavior directed toward the Soviet Union. From Table 7.1, we can express

$$z = 0.091\, y - 0.00000694\, xy$$

$$= y\,(0.091 - 0.00000694\, x) \qquad (7.3)$$

z becomes negative when x is greater than $(0.091 \div 0.00000694 \approx 13000)$. In other words, the U.S. initiates some level of cooperative behavior upon the Soviet activity in the Third World when the level of the U.S. activity in the Third World reaches around 13000 which have occurred at the height of the U.S. involvement in Vietnam War.[8]

Finally, notice in Table 7.1 that the reciprocity term is statistically significant for the Soviet conflict behavior at $p < 0.05$, despite possible multicollinearity problem.[9] That is, the Soviet Union has tended to respond to the U.S. behaviors directed toward itself *in kind*, including the inferred cooperative initiatives by the U.S. around the Third World competition. This finding is highly significant because it is consistent with the historical experience that despite sporadic and highly intense confrontation between superpowers over the Third World affairs during last decades, the superpowers have been relatively successful in managing such confrontations and crises in such a way to prevent further escalation into bilateral crises and potential wars (George, 1984). It is also consistent with the scattered findings throughout this research that the superpowers have fostered some moderation and caution in conducting their foreign policy activities in the Third World and managing the ensuing confrontations between them.

Concluding Remarks

In this chapter so far, the hypothesized consequences of superpower competition in the Third World for the strategic level interactions between two superpowers in two dimensions; bilateral arms race and dyadic conflict interaction. The finding is mixed in supporting the proposed hypotheses. First, the hypothesized positive impact of

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[8] See Table 4.3 in Chapter IV for the time series of the level of U.S. activity in the Third World. Yet, it is necessary to keep in mind that the benchmark level of 13000 is not absolute because the coefficient estimate associated with the Soviet activity alone (=0.091) is not significantly differently from zero in statistical sense.

[9] The statistical significance here is at one-tailed test, unlike in Table 7.1, because for this particular term, I posit the sign of coefficient is *positive*.

competition in the Third World on the level of military expenditure is observed for the U.S. case, if not in the Soviet case, which in turn has indirect impact on the Soviet military expenditure, as the Soviet Union responds to the change in the U.S. military spending in competitive fashion. What is significant in this regard is the proposition that the competition in the Third World has positive effects on the U.S. military expenditure not just because the U.S. has intensively involved in the Third World warfares with military means, but also because the Soviet role in such Third World affairs has provided some degree of justification for such active military involvements.

As for the hypothesized impact of competition in the Third World on the dyadic conflict behavior through issue-linkages and direct protest, the results from statistical analyses do not support the hypotheses very strongly. Rather, it is the case either that the linkage between the Third World issues and direct political interaction is weak, or that the dyadic interaction is used as a channel through which the differences between superpowers over the Third World issues are worked out and possibly resolved so as to prevent the escalation of the confrontation and competition in the Third World into bilateral crises and potential wars.

And this latter pattern of finding has been consistently noted throughout this study in one way or another; in Chapters IV through this chapter. The next chapter concludes this research by (1) summarizing such findings comprehensively, (2) proposing noted or potential explanations for such observed patterns, and (3) suggesting directions for further research.

Table 7.3. Impact of the Competition in the Third World on Bilateral Superpower Interaction: Estimation Results

Explanatory variables	*Military Expenditures*		*Conflict Behaviors*	
	U.S.A.	USSR	U.S.A.	USSR
Constant	28.7 (2.348)*	4.7 (0.500)	125.8 (0.878)	101.9 (0.577)
Lagged dependent variable	0.708 (8.675)***	0.782 (11.738)***	0.360 (2.528)**	0.435 (3.493)***
Reciprocity (rival's military expenditure or conflict behavior)	0.705† (2.670)**	0.206 (3.854)***	0.386 (3.085)***	0.733 (3.968)***
$ln\left(\frac{\text{U.S. military stockpiles}}{\text{Soviet military stockpiles}}\right)$	1.790 (1.429)	−4.571 (2.613)**	-	-
%Δ(Soviet GNP)	-	−1.013 (2.031)**	-	-
U.S. Activity in the Third World	-	-	-	−0.032 (0.886)
Soviet Activity in the Third World	-	-	−0.026 (0.336)	-
U.S. Activity in the Third World × Soviet Activity in the Third World	0.267‡ (4.176)***	-	−3.920‡ (1.553)	10.473‡ (1.485)
$\bar{R}^2$	0.856	0.970	0.812	0.768
F-statistic	33.1 (5,21)	200.3 (5,21)	27.9 (5,21)	21.7 (5,21)

Notes: Results are from OLS estimation of the model reported in Table 7.1. This table is provided not for any statistical inference, but for a comparative purpose, and to suggest possible multicollinearity problem noted in footnote 2. Figures in parentheses under each coefficient estimates are *t*-ratios in absolute value.

† Difference in Soviet military expenditure is specified instead of raw level.
‡ Coefficient estimates are multiplied by 10^6 for scaling purposes.
*** Coefficient estimates are significant at $p<0.01$ at two tailed test.
** Coefficient estimates are significant at $p<0.05$ at two tailed test.
* Coefficient estimates are significant at $p<0.10$ at two tailed test.

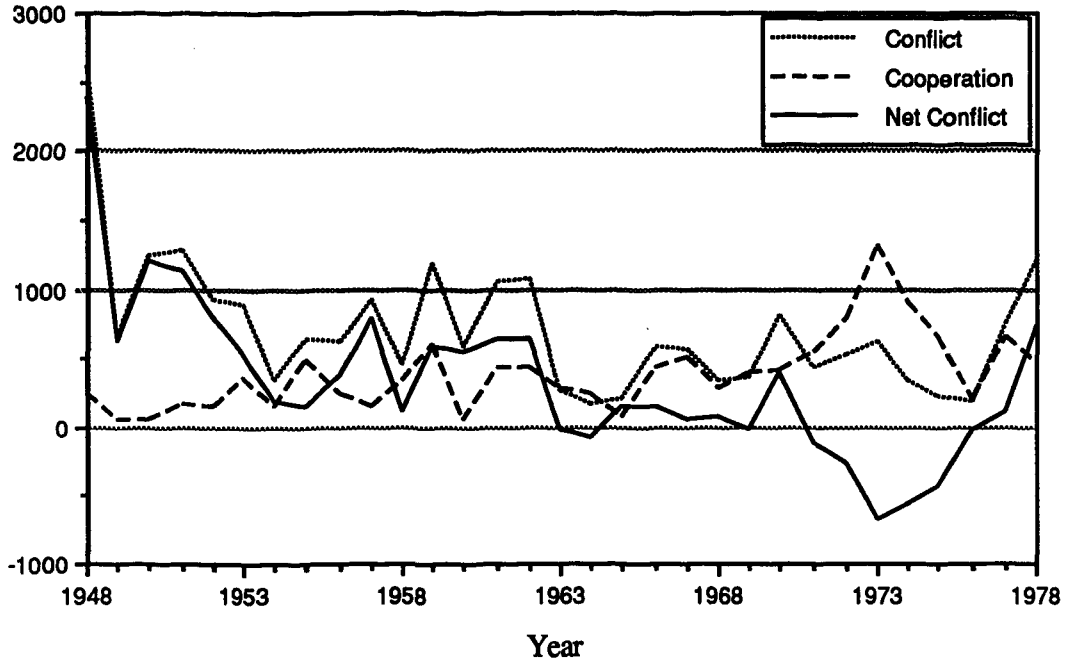

Figure 7.3. U.S. → USSR Conflict and Cooperative Behaviors

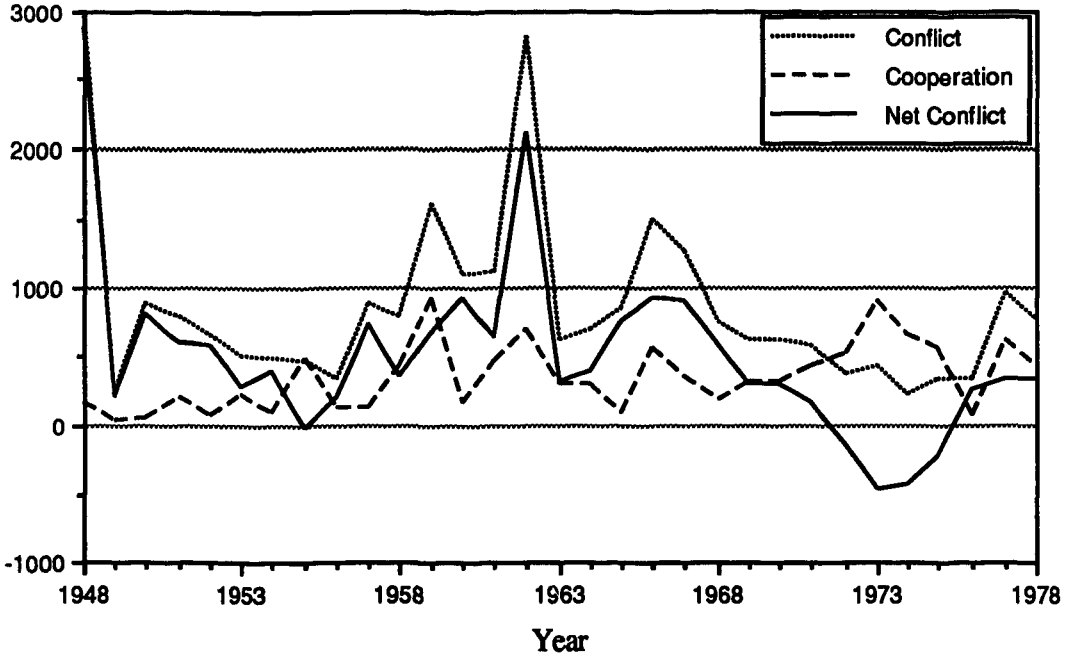

Figure 7.4. USSR → U.S. Conflict and Cooperative Behaviors

CHAPTER VIII
IMPLICATIONS AND CONCLUSION

So far in this study, a model of superpower rivalry and competition in the Third World in terms of the dynamics of foreign policy interaction between superpowers and its consequences is proposed (Chapters II and III), and analyzed (Chapters IV through VII). In this chapter, general findings from the analysis are summarized and their theoretical and policy implications are discussed.

In the following section, first, the findings are summarized in such a fashion as to highlight the ways in which the arguments in the conceptual framework are supported or refuted. Then, it is attempted to provide some interpretations and explanations for the ways arguments in the conceptual framework are supported and not supported. This interpretive task is done particularly in the context of contending theories of superpower rivalry, i.e., the 'spiral' model and the 'deterrence' model briefly mentioned at the outset of this study. In this regard, I particularly ask what the superpowers are competing for in the Third World, and examine two related theses in this regard; (1) the Soviet Union has involved in the Third World affairs for the strategic asset for the defensive purpose, and (2) the United States policy in the Third World has been motivated and guided by the logic of deterrence.

Synopsis and reinterpretation of the empirical findings in the light of contending theories naturally lead to a discussion of implications of the research findings for the U.S. foreign policy as well as the contending theories. Particularly in the last section, implications of the findings from this research for the U.S. foreign policy are derived from a vantage point of the prevention and management of foreign policy crises between the superpowers over the Third World issues. Then, the last section concludes this research as well as this chapter by suggesting some directions for further research.

Empirical Findings of the Study: A Synopsis

Conceptual framework of this study presented in Chapter II posits a portrait of "two intemperate giants fighting each other on a turbulent field." Or, it is a highly problematic sequence of events or a network of causal relationships among major political, conflict phenomena in the contemporary world in terms of the following set of propositions and hypotheses.

1. Process of the superpower foreign policy rivalry and competition in Third World regions can be represented as an action-reaction process in the Richardsonian tradition with implied pattern of mutual reciprocation, especially over the long run.

2. This action-reaction process is however subject to the deliberate process of decision-making in its domestic political context.

3. This action-reaction dynamics is often, if neither necessarily nor sufficiently, provoked by local conflict events which are perceived either to pose a threat or to provide an opportunity to one or both superpowers.

4. Competitive interaction between the superpowers, either upon the provocative local events or not, can bring about further escalation of local conflicts.

5. Consequence of the competition in the Third World can be system-wide by (1) setting and furthering the paces in the bilateral arms race between the superpowers, and (2) becoming a source of the bilateral conflict and crisis.

6. Dimensions or classes of dynamics which are affected by the competition in the Third World in turn shape the general context of the superpower foreign policy rivalry such that the entire sequence can be reinforced and/or reproduced.

And, empirical results are in many ways commensurate with the projected dynamics. First of all, analysis of the basic action-reaction model clearly shows that the pattern of foreign policy interaction between superpowers is that of mutual reciprocation, if over the long run (*action-reaction dynamics and mutually reciprocative interaction pattern* observed in Chapter IV). Second, at least one of the superpowers has actively and initiatively involved in one or both dimensions of local conflict events in most regions, holding the level of the rival's activity constant. More interesting to note is that, after the provocative effects of the local conflict events are controlled for, the reactivity still remains significant for both superpowers, a finding consistent with the proposition that a provocation is neither a sufficient nor a necessary condition for the competition (*provocative effects of the local conflicts* observed in Chapter VI).

As for the consequences of the superpower competition, further, it is found that the level of simultaneous involvements by superpowers in the Third World is indeed related to

the magnitude of local interstate, if not intrastate, conflict across all the Third World regions (*escalatory consequences of superpower competition for the local conflicts* observed in Chapter VI). Furthermore, it is found that active involvement in the Third World affairs by the U.S., accompanied by that of the Soviet Union, has a positive impact on the level of U.S. military expenditure, which is in turn found to have a positive impact on that of the Soviet Union. Through action-reaction process in the competitive arms race, thus, such an impact of competition in the Third World on the bilateral arms race is cascading (*catalytic and cascading effects of competition in the Third World on the bilateral arms race* observed in Chapter VII).

Furthermore, *self-reproduction/reinforcement of the process* and feedback property of the model are well observed in several ways.[1] The first is a combination of the provocative effect of local conflict and the escalatory effect of the competition on local conflicts; "further provocative effect of the 'escalated' local conflict." Second, it is found that enhanced influence of the superpowers in the Third World furthers the paces and phases of the superpower competition over the region in two ways; (1) by helping political leaders of the superpowers elicit domestic supports for foreign policy commitment, and (2) by letting the superpowers take more competitive stance in confrontations (positive impact of the 'policy similarity' measure on the level of 'commitment' and 'reactivity' noted in Chapter V).

Third, when such an increase in influence is high and symmetric for both superpowers and consequently a region is highly *polarized*, superpowers tend to adopt more competitive stance in confrontation. This finding is particularly notable in that it almost invariably holds across the actors and regions (positive impact of the 'polarity' measure on the level of 'reactivity' noted in Chapter V). Fourth, enhanced power of the defense sector vis-à-vis other sectors of the government to which the competition in the Third World is found to help the U.S. leaders elicit domestic support for the foreign policy commitment (positive impact of the U.S. defense spending as percent of the U.S. governmental spending on the level of U.S. 'commitment' noted in Chapter V). Finally, improvement in Soviet relative power position vis-à-vis the U.S., the effort for which is at least partly or indirectly influenced by competition in the Third World, leads the Soviet

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[1] Discussion on this point in a summary fashion requires a couple of qualifying remarks, however. First, regional patterns are so diverse that unequivocal generalization is hard to make. Second, some of the following arguments implicitly assume that increased influence of the superpowers over Third World nations (measured by the policy similarity score) is the result of superpowers' activity, i.e., that superpowers are *successful* in obtaining and increasing its influence over Third World nations through foreign policy activity. This assumption may look intuitively plausible, but is not tested in this study.

leaders to take more competitive stance against the U.S. in foreign policy confrontations in the Third World (positive impact of changing military balance in favor of the Soviet Union on the level of Soviet 'reactivity' noted in Chapter V).

However, there are some findings which defy the projected dynamics and suggest that there have been some moderate elements in the superpowers' foreign policy orientation and behaviors in the Third World vis-à-vis the rival. First, whereas the superpowers show the pattern of mutually reciprocative interaction in their foreign policy activities across all the regions in the Third World, reactivity of both superpowers is to a lesser degree in the regions of the Middle East and Asia than in the regions of Latin America and Africa. In that a historical intuition shows that the competition has been particularly intense in the former regions than in the latter two regions, this finding is counter-intuitive to a degree. And, such a counter-intuitive finding has been interpreted as the result of moderation or caution fostered by the superpowers (Chapter IV).

Second, in some regions, particularly in Asia, while active involvement by each superpower is associated with the magnitude of local conflicts in a positive way, it appears that *simultaneous involvement by both superpowers* has had a negative impact, i.e., a moderating effect on the level of local conflicts. It has been inferred that such a finding might be the result of 'collaborative efforts' by both superpowers to manage local conflicts and the superpower competition (Chapter VI). Finally but most of all, it is shown that the United States has tended to take some cooperative policy initiatives toward the Soviet Union when the competition in the Third World is particularly intense, and to which the Soviet Union has responded in kind (Chapter VII).

Interpreting the Results: Implications from the Theories

Can these findings tell us anything about proper directions of the U.S. foreign policy toward the Third World and the Soviet Union in such a way as to manage the superpower rivalry and competition and prevent the bilateral crisis over the Third World issues? The answer requires a careful qualification because (1) empirical results seldom provide any unequivocal pattern across regions and actors, and more importantly (2) the mixed and somewhat contradictory findings as summarized are subject to alternative interpretations and explanations from different theoretical perspectives. To some, for example, moderate elements in the U.S. policy are what have brought about moderate elements in the Soviet policy, and explain how superpowers have managed their competition in the Third World without major foreign policy crises (George, 1983; George,

1984; Leng, 1983). To some others, moderate or "soft" elements in the U.S. policy are what are responsible for competitive elements in the Soviet policy, and moderate elements in the Soviet policy stance, if any, are the result of competitive or "tough" elements in the U.S. policy. Thus, the point of argument is regressed to the debate between the 'spiral' model and the 'deterrence' model, which are briefly referred to in the introductory chapter.[2]

One of the key differences between the 'deterrence' model and the 'spiral' model is indeed found in their relative conceptions on the effectiveness of threat and coercion in changing the adversary's behaviors; the 'deterrence' model emphasizes the cooperation-inducing aspect of threat and coercion whereas the 'spiral' model emphasizes the conflict-provoking aspect of threat and coercion.

On one hand, the 'deterrence' theorists believe that firm and coercive response to Soviet action in the Third World is *necessary* not only because aims of the Soviet action are detrimental to the U.S. and Western interests in the region, but also because, first, failure to resist will bring about skepticisms and doubts on the part of the U.S.'s allies on its resolve and commitment to the defense of the allies in terms of the nuclear umbrella, and second, it may encourage further Soviet expansion. Firm and coercive stance of the U.S. is also *desirable* because, by successfully resisting Soviet expansion in the regions of relatively low salience, it will bring about, first, a "deterring effect" of the opponent's expansionist or aggressive intention in some other areas of higher salience, and second, a "soothing effect" of the skeptics in the U.S. allies over the U.S. commitment to their defense. After all, the 'deterrence' theorists maintain, coercion and threat is *effective* because the Soviet Union is a "paper tiger" riddled with many domestic problems and is inherently weak.

On the contrary, the 'spiral' theorists or the critics of the 'deterrence' model doubt necessity and effectiveness of coercion and threat, let alone its desirability. First of all, they question the interdependence of commitment or the linkage between Third World issues and other issues, like the defense of Europe. It is argued that there is neither a compelling reason nor empirical evidence that U.S. inaction/retreat on a Third World issue would lead to the Soviets to believe that the U.S. will give up Berlin, so to speak (e.g., see

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2 The terms 'spiral model' and 'deterrence model' are from Jervis (1976) as referred to in Chapter I. Although these two models or theories can be seen as "general" theories of international relations and interaction, they can be effectively reduced to theories about the general foreign policy orientations and the intentions of the Soviet Union when applied to the U.S.-Soviet relations (Jervis, 1976: 102). Or, to extend it a bit more, what is in dispute is not only Soviet 'intentions' but also Soviet 'perceptions' of U.S. intentions (Herrmann, 1985), or even Soviet perception of U.S. perception of Soviet intention (e.g., see Gamson and Modigliani, 1971).

Jentleson, 1987: 686; Jervis, 1979: 303). Second, the 'spiral' model by implication doubts effectiveness of coercion because the Soviet stakes in the Third World could be higher than that which the 'deterrence' theory implies, i.e., not to such a degree that it would readily give up upon a reaction. Rather, encircled by the U.S. allies world-wide, confronted with a neighborhood threat from China, and haunted by a history of endless foreign invasion and prospect of global encirclement, it is argued, Soviet moves in the Third World may be seen essentially defensive. Then, it is maintained, counter-action by the U.S. on a limited scale is hardly enough to resist Soviet expansion, but only to make the Soviets suspicious of the status quo intention of the U.S. Thus, U.S. reaction on minor issues for deterring effect is counter-productive; it only makes the Soviets more suspicious and hostile.

To what degree do the findings from this research bear implications for this important policy debate, and how? As a way to provide an answer, I will examine the following two questions in the light of the findings from this research.

1. To what degree are the Soviet behaviors consistent with the assumptions and predictions of the 'spiral' model? That is, how much valid is the thesis that the Soviet Union has been interested in and has competed for the strategic asset in the Third World for the "defensive" purpose?

2. To what extent has the U.S. Third World policy been influenced and shaped by the logic of deterrence? In other words, how much consistent has the U.S. behavior been with the assumptions and predictions by the deterrence theory?

If one recalls the list of contending theories of the Cold War in Gamson and Modigliani (1971), one would question whether these two questions can provide an effective and complete answer to the policy debate. To Jervis (1976: 102) and many others including Leng (1983), however, the arguments between two models are effectively reduced to the *intention of the Soviet Union.* And accordingly, explanations for the confrontations and crises over the Third World issues are provided in terms of *failed deterrence attempt by the U.S.* but for contrasting reasons. The 'deterrence' model on one hand sees that confrontations and crises are due to the lack of credibility of threat or coerciveness on the part of the deterrer, i.e., the U.S. or because the U.S. did not follow the prescriptions by the deterrence theory. The first question is to examine this claim. The 'spiral' model on the other hand sees that the deterrence attempt did not work because the Soviet Union was simply undeterrable, or the Soviets had more stakes in the Third World than the deterrence theory assumed. The second question is to examine this thesis. If answers to both questions are affirmative, then the spiral model will be relatively more

valid than the deterrence argument. If answers to both questions are negative, then the 'deterrence' model will be relatively more valid than the 'spiral' model argument.

Then, these two questions involve a central question; *what the superpowers are interested in and competing for in the Third World.* Before I try to answer the set of question I raised, therefore, I will discuss the *dimensions* of superpowers' interest in the Third World, as a way to derive some behavioral characteristics from those arguments, which could be readily examined in view of the findings from this research.

Superpowers' Interest in the Third World and Its Dimensions: Insights from Bargaining Theory

It is quite surprising to note that many of the existing studies on crisis bargaining do not pay enough attention to the dimensions of interests at stake, while such dimensions could yield quite distinct behavioral patterns, with possible exceptions of Jervis (1979), Snyder (1961), and Snyder and Diesing (1977). And even they do not give an unequivocal classification of the dimensions of interest. Jervis (1979: 314), for example, lists three dimensions of the values that would be sacrificed by a retreat in a bargaining situation; (1) *intrinsic* interest meaning the "inherent value that the actor places on the object or issue at stake," (2) *strategic* interest, i.e., "the degree to which a retreat would endanger the state's position on other issues, irrespective of its efforts to commit itself to a firm stand," and (3) *commitment* which is "manipulated by the state to increase its costs of retreating and thereby improve its bargaining position." These three dimensions are seemingly correspondent with *intrinsic*, *strategic*, and *reputational* interests respectively, listed by Snyder and Diesing (1977: 183-4). Yet, Jervis on one hand and Snyder and Diesing on the other often disagree on their contents. For example, the "strategic" interests in Jervis' sense has more to do with the "reputational" interest in Snyder and Diesing, and the "strategic" interest in Snyder and Diesing as well as Snyder (1961) is incorporated in the "intrinsic" interest in Jervis' notion.[3]

Generally speaking, it seems to me that the superpowers' stakes and interests in the Third World in general and in a confrontation over a Third World issue in particular can be distinguished into two categories; (1) *substantive* and (2) *strategic-situational.* Substantively, the Third World allies/clients are valued because of either their *intrinsic*

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[3] For example, Snyder and Diesing (1977: 183, italic mine) defines the *strategic* interests as "interests derived from the *material* power content of the object in dispute," and Snyder (1961: 32, italic mine) defines *strategic* value as "the potential contribution of the territorial prize to the *military capabilities* of either side."

values or *power* or *instrumental* values or both (Snyder, 1961: 30). Intrinsic value of a Third World client is the *end* value for its own sake, and may be (*a*) economic like being a market for the export of commodities (including armaments) and capital, or a supplier of important resources, (*b*) political such as a source of political support in international political arena like the United Nations, including such symbolic values as being a "free country," a "peace-loving country" or "socialist vanguard," etc. Power value of a Third World client is *instrumental* in that it is valued not for its own sake but its contribution to the security of the intrinsic values that the superpower foster, including most of all, its own security. Thus, the power-instrumental values of Third World clients may particularly include military allies whose military assets can be utilized by the superpower during a time of peace, as well as a crisis and/or a war (against the rival). One important characteristic of this dimension of interest is that the *strategic-instrumental* value of a Third World client is zero-sum in the particular context of the superpower rivalry.

In a situation of crisis bargaining or confrontation over a Third World issue, however, the stakes of a superpower are not only the substantive (either intrinsic or strategic) values in dispute, but also situational-strategic, i.e., the effects of outcome of the crisis bargaining to the superpower's position in future confrontations and in other issues, especially the *reputational* value (Snyder and Diesing, 1977: 184ff). And the reputational values have two dimensions, one being directed to the opponent, i.e., *deterrent* value, and the other being directed to its own allies, i.e., *political* value (Snyder, 1961: 30ff).[4]

What is often neglected in the literature of crisis bargaining, but provides a pivotal point of difference in the two models is that the reputational value can also be conceived along another dimension; 'offensive' and 'defensive' dimensions of the value however hard it is to operationally distinguish them. The defensive dimension of the reputational value, for example, is the value to be 'given up' by a failed resistance or retreat, whereas the offensive dimension of the reputational value is the value to be 'obtained' by a (successful) resistance and coercion, especially from the perspective of the U.S. as a status quo power.[5] And these two dimensions do not necessarily mirror each other. For

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[4] Also situationally, one may think of the *commitment* made by a state toward a particular outcome of the crisis. Although the commitment can be discussed along with the reputational value, it is not necessarily the same, however. For example, whereas the likelihood of success of a policy stance will be proportional to the level of commitment made by the actor, the reputational value to be given up by the retreat later will also be proportional to the level of commitment (e.g., Jervis, 1979: 314-5).

[5] In this regard, Jervis is misleading in saying that "[a]ll deterrence theorists agree that one determinant of whether a state stands firm is *what it will lose if it retreats*" (Jervis, 1979: 314, emphasis added), and neglecting the other dimension, i.e., *what it will win if it stands firm*..

example, the reputational value to be given up by a retreat and concession in a crisis bargaining will be proportional to the subjective size of the intrinsic or the substantive value in dispute, whereas the reputational value to be obtained by a firm policy stance, regardless its success or failure, will vary inversely with the size of the substantive value.[6]

If so, the 'deterrence' theorists would argue, relatively marginal importance of the Third World allies to the U.S. is even a better reason that the U.S. stands firm against the Soviet Union in its policy stance during a crisis bargaining over the Third World issues. Yet, this argument holds only if the assumption that the Soviet Union is 'offensively' motivated so as to damage the Western influence and interests whereas the intrinsic and/or strategic value of the Third World allies to the Soviet Union is marginal or insignificant. Otherwise, the 'spiral' theorists would argue, the U.S. action for the deterrent effects could be seen 'blackmailing' to the Soviet eyes and is only to make the Soviets more hostile.

For this very reason, the debate between the 'spiral' model and the 'deterrence' model particularly among North American scholars is reduced to the one around the Soviet intentions and policy objectives in the Third World. For example, Herrmann (1985: 10-18) carefully summarizes and assesses three contending (American) views of Soviet foreign policy objectives; (*a*) *communist expansionism*, (*b*) *realpolitik expansionism*, and (*c*) *realpolitik self-defense*, each of which are corresponding to Gamson and Modigliani's (*a*) *destructionist*, (*b*) *expansionist*, and (*c*) *consolidationist* respectively (Gamson and Modigliani, 1971). While they alike see the U.S. essentially a status quo power, they differ in their respective views of the Soviet foreign policy policy. The first particularly focuses on the communist ideology as well as its political system as sources of 'endless

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[6] To speak highly hypothetically and simplemindedly, if the U.S. makes a retreat/concession in a dispute for a value of X, for example, then both the opponent and the allies would expect a similar concession in a dispute for a value of X or less. On the other hand, if the U.S. stands firm in a dispute for a value of X, both the opponent and the allies would expect similar policy stance in a dispute for a value of X or more. Snyder (1961: 36-8) puts it in the following way. "[A] failure to resist effectively a Communist attack on the offshore islands of Quemoy and Matsu might not increase perceptively the chances of Chinese Communist attacks on other non-Communist countries in Asia, if the Communists did not believe we placed a high intrinsic and strategic value on these islands. . . . It is hard to believe . . . that a Communist Chinese conquest of Quemoy and Matsu would have reduced the confidence of the European allies in the willingness of the United States to defend Europe." Yet, he further argues that "if the objective is to 'draw a line' to deter future aggression, perhaps the best place to draw it is precisely at places like Quemoy and Matsu. *The enemy would reason that if the United States were willing to fight for a place of such trivial intrinsic and strategic value to itself, it must surely be willing to fight for other places of greater value.*" Furthermore, he continues, "for deterrent reasons it might be desirable to *attempt* (italic original) resistance against a particular limited enemy attack *even though we knew in advance that our resistance would fail.* The purpose would be to inform the enemy, for future reference, that although he could expect to make gains from limited aggression in the future, these gains could be had only at a price which . . . the enemy would not want to pay" (emphasis by italic added unless noted otherwise).

expansionism' embedded in Soviet foreign policy. The second view focuses on the limited capabilities of the Soviet Union and decolonization and political instability in the Third World as sources of the Soviet 'opportunistic expansionism.' Together, they provide the conceptual background of the arguments by the 'deterrence' model.

What is explicit in the 'deterrence' argument is that the objectives of the Soviet foreign policy are seen to be 'offensive,' i.e., that the Soviets are interested in what they could 'get by acting,' and particularly what they could do to undermine the interest and influence of the U.S. and its Western allies (e.g., see Donaldson, 1981). What is less explicit but implicitly clear is that the dimensions of the Soviet interest are seen to be largely political-strategic, and the emphasis is particularly on the zero-sum nature of the interest.

The 'spiral' model and/or the third view of the Soviet Union sees the nation as essentially 'defensive,' like any nation-state in the anarchical structure of international system. The Soviets are seen 'defensive' in two related senses; (1) the Soviets are more concerned with 'what they could lose by failure to act' rather than what they could get by acting over the Third World events, and (2) the Third World clients are valued by the Soviets for their direct or potential contribution to the security of the nation rather than the potential damage to the U.S. interest and indirect benefits to the Soviet Union (Herrmann, 1985: 16-8, 23-4). What is implicit in this argument is that the dimension of the Soviet interests in the Third World is particularly the 'defensive' aspect of military-strategic (and political to an extent) values. The second question is on this thesis.

On the other hand, the 'deterrence' model and the 'spiral' model alike blur on the U.S. interest in the Third World, although by implication, the 'deterrence' model tends to emphasize the reputational value, if without disregarding the intrinsic value, whereas the 'spiral' model tends to emphasize the intrinsic-strategic value.[7] In the following section, I will examine two theses as a 'partial' test of these competing models and arguments; (1) the Soviet Union is interested in and has been competing for the strategic/military assets in the Third World for the defensive purpose or for the security reason, and (2) the U.S. Third World policy has been heavily influenced by the 'ill-formed' logic of deterrence (e.g., Jentleson, 1987). I do so, first of all, by deriving some hypotheses out of the characteristics of the value dimensions and then by evaluating such hypotheses in the light

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[7] A recent trend in the deterrence theory is to emphasize the (balance of) *intrinsic* interests as a determinant of the success in deterrence attempt, which is particularly evident in what Jervis calls the 'Third Wave' of the deterrence theory (Jervis, 1979). But the importance of intrinsic value as a determinant of deterrence success has nothing to do with the question of what a superpower, particularly the U.S., is interested in the Third World for.

of the empirical results from this research, particularly in terms of the impacts of key three variables on the level of the reactivity discussed in Chapter V; (1) the level of superpowers' projected interests in the Third World regions, (2) relative military capability between superpowers, and (3) general bilateral (political) relationship.

Implications for Theory: Evidences For and Against the 'Spiral' and 'Deterrence' Models

SOVIET INTEREST IN THE THIRD WORLD: Evidence For the 'Spiral' Model

Let me first examine the thesis that "the Soviet Union is interested and has been involved in the Third World for the strategic/military assets for the security/defensive purpose.' From this thesis and by focusing on the nature of the value of interest, we can derive the following propositions and hypotheses.

1. Marginal utility of the strategic asset in the Third World for the defensive purpose diminishes relatively sharply, meaning that the added contribution of new acquisition of a military ally to the Soviet defense declines as the Soviets acquire more allies.[8] Then, a hypothesis is that the higher the level of projected interest and influence of the Soviet Union in the region, the less intense the Soviet activity in the region.

2. The subjective value of the strategic asset in the Third World for the defensive purpose is inversely correlated with the relative military capability of the Soviet Union vis-à-vis the United States. Therefore, the more favorable the relative capability of the Soviet Union, the less intense the Soviet activity in the region.

3. The subjective value of the strategic asset in the Third World for the defensive purpose is proportionally correlated with the tension between two superpowers. Therefore, the more congenial bilateral relationship between two superpowers, the less intense the Soviet activity in the region.[9]

Table 8.1 is an excerpt from Table 5.7 where the estimation results for the determinants of Soviet 'reactivity' are shown in full to recapture the impact of three sets of the variables on the level of Soviet 'reactivity.' At the first glance, the results in the table hardly support the above hypotheses, but are quite contrary to the hypotheses in general. First of all, the higher level of interest and influence in terms of the policy similarity score has *positive*, unless insignificant, impact on both Soviet 'commitment' (see Table 5.5) and 'reactivity' in all the regions. Second, improved military capability of the Soviet Union vis-à-vis the U.S. over the long run has positive impact on Soviet 'reactivity,' i.e., the more favorable the military balance, the firmer the Soviet policy stance against the U.S. and by the flip side of the coin, the weaker the Soviet Union in its military capability, the more

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[8] If destruction or reduction of the Western influence is the Soviet goal, such a diminishing marginal utility will not be expected.

[9] The latter two hypotheses are adopted from Herrmann (1985: 18).

Table 8.1. Determinants of Soviet 'Reactivity' in the Third World: An Excerpt

Explanatory Variables	*Region*				
	Third World	L. America	Africa	M. East	Asia
Region's *polarity score*	0.275† (4.281)***	0.478 (3.794)***	−0.643 (5.731)***	-	0.749 (6.353)***
Region's *policy similarity score* with USSR	0.344‡ (3.197)***	0.379† (2.280)**	1.431 (6.155)***	-	-
%(Soviet regional trade + Soviet World Trade)	-	-	−3.470 (5.027)***	1.402‡ (5.566)***	−1.325‡ (6.083)***
ln(U.S. military stockpiles + Soviet military stockpiles)	2.942‡ (3.025)***	3.127‡ (3.605)***	−6.257 (3.042)***	-	−4.772† (5.904)***
U.S.-Soviet bilateral trade	-	−0.128 (2.149)**	-	−1.039† (4.651)***	−0.653† (6.116)***

Notes: This table is an excerpt from Table 5.7 in Chapter V, where figures are coefficient estimates multiplied by 100 for the scaling purpose, figure in the parentheses under each coefficient estimates are *t*-ratios in absolute value whose statistical significances are marked by (1) *** (p<0.01), (2) ** (p<0.05), and (3) * (p<0.10), all at two-tailed test. All the variables are generally specified in contemporaneous value unless either explicitly specified in the model, or marked by (1) † (lagged value) or (2) ‡ (differenced value).

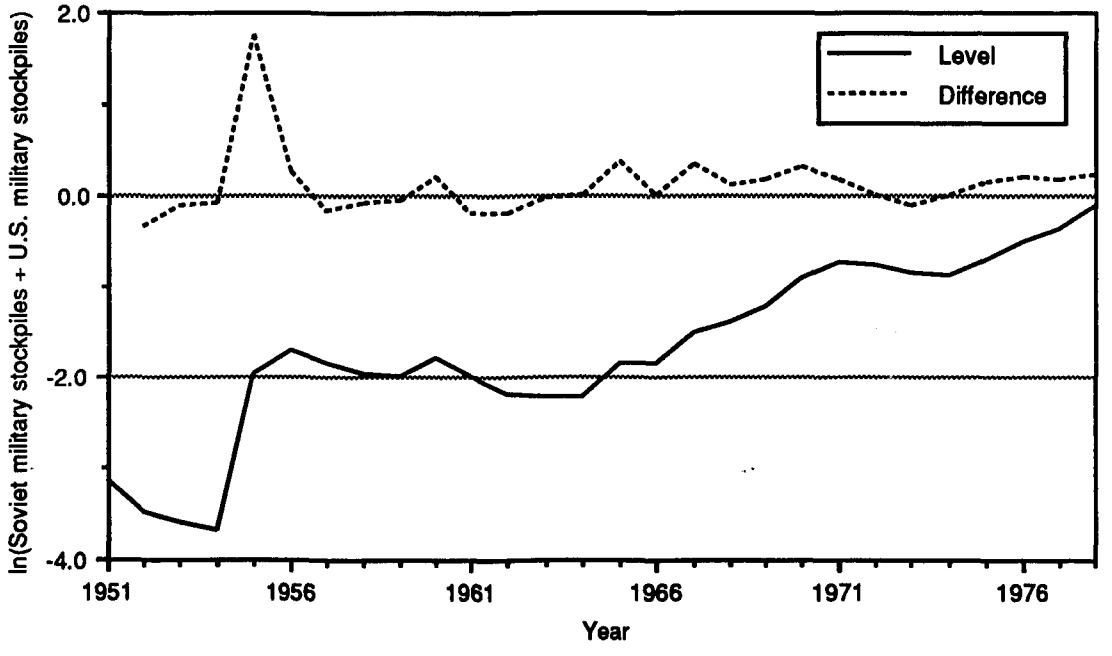

Figure 8.1. Relative Military Capabilities of the USSR vis-à-vis the U.S.

docile its policy stance. These patterns of behavior may seem to be contrary to the Soviet image portrayed by the 'spiral' model and more consistent with those of the 'deterrence' model.

Yet, a hasty conclusion in favor of the 'deterrence' assumptions is not warranted. First, notice that the bilateral superpower relationship measured in terms of the bilateral trade volume has negative impact on Soviet 'reactivity' in general, as predicted by the 'spiral' model. This pattern of behavior is particularly contrary to the view of the Soviet Union being risk-averse and opportunistic. Second, as for the impact of military balance on the Soviet policy stance, evidence in favor of the 'deterrence' model is not conclusive and the findings are at best ambivalent. That is to say, whereas improvement of the Soviet military capability relative to the U.S. over the long run has led the Soviets to adopt more assertive stance (particularly in the regions of Africa and Asia), short-term change in the military balance against the Soviet favor has led the Soviet Union to adopt more assertive policy stance (in the overall Third World and Latin America), consistent with the 'spiral' model prediction.[10] Furthermore, notice that the policy similarity measure has a *positive* impact on Soviet 'reactivity' particularly in Latin America and Africa where Soviet influence and military presence are relatively marginal and the logic of diminishing marginal utility may not be applicable. Rather, increased political influence in the region may have provided some degree of 'legitimacy' which the Soviets might count on in confrontations with the U.S.

On balance, therefore, it seems true that the Soviet Union has taken advantage of the highly volatile Third World politics and its improving military capability and actively involved in the Third World affairs,[11] but not necessarily to undermine the U.S. interest and influence, but largely as a way to improve its strategic position vis-à-vis the U.S. in the global context. Thus, an overall conclusion from this test of hypotheses are in a general favor of the 'spiral' model. In the next section, I will try to test some other hypotheses which may seem more relevant to the 'deterrence' model than the ones examined here.

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10 And this pattern is further contrary to the argument and finding in the deterrence literature that short-term rather than long-term military capability in favor of the defender is more likely associated with the success of deterrence (e.g., Huth and Russett, 1988), although its research context and measurement of the concept are quite different from this. See Figure 8.1 for a graphic representation of the long-term trend and short-term change in the Soviet military capability relative to that of the U.S., and particularly recall that in statistical estimation, the relative military capability is measured in terms of the U.S. to the Soviet ratio, so the sign of coefficient estimates are reversed.

11 Notice that the regions of Africa and Asia where the improved strategic/military position of the Soviet Union vis-à-vis the U.S. over the long run has a *positive* impact on Soviet 'reactivity' are particularly characterized by the decolonization process.

U.S. INTEREST IN THE THIRD WORLD: Evidences For the 'Deterrence' Model

To the 'deterrence' theorists who believe that the Soviets are *deterrable* expansionist, the only sensible explanation for the confrontations and crises between the superpowers in the Third World is that the U.S. policy was not up to the prescriptions by the theory. As to the some 'spiral' theorists who believe that the Soviets are essentially *defensive* in their policy in the Third World, hence *undeterrable*, a sensible explanation is that the U.S. policy was or at least was seen to be *offensive* to the Soviet eyes.

The thesis that the U.S. Third World policy has been heavily influenced and shaped by the deterrence theory means by implication that (1) the U.S. objective in its Third World policy is not only to fight off the Soviet expansion, but more importantly to establish the U.S. reputation for resolve so as to deter the Soviets from further expansion, and (2) in so doing, the U.S. decision-makers have followed the prescriptions by the deterrence theory. From this thesis, we can develop the following set of hypotheses.

1. The U.S. has reacted firm to the Soviet action *regardless* the size of substantive-intrinsic interest at stake because (*a*) when the substantive interest is high, the reputational value to be lost by retreat is high, and (*b*) when the value at stake is low, the reputational value to be obtained by firm response is high. Specifically in the light of this research, an expectation is that the size of the U.S. interests in the Third World regions does *not* affect the U.S. 'reactivity' or is *inversely* related with the 'reactivity' as the deterrence theory particularly emphasizes the "offensive" aspect of reputational value.

2. The U.S. policy stance vis-à-vis the Soviet Union has been firm particularly when the military balance is asymmetrically in its favor because such a "bullying" strategy requires rather highly asymmetric military balance. Thus, the higher the U.S. military capability relative to the Soviet Union, the higher the U.S. 'reactivity.'

3. If the U.S. foreign policy activity in the Third World is for the deterrence purpose, then improved relationship and reduced tension between the superpowers (in terms of the increased bilateral trade volume) should have affected the U.S. policy toward the direction of even firmer stance for two reasons. First, the U.S. should have acted so as to assure the Soviets that the improved bilateral relationship did not construe a decrease in its commitment to the defense of allies. Second, the increased trade volume would have given asymmetric leverage to the U.S. in view of the relative importance of the bilateral trade to the superpowers' overall trade volume, and the U.S. should have taken advantage of the leverage.

Empirical results in Table 8.2, which is an excerpt from Table 5.6, yield an impression that the influence of the deterrence theory on the U.S. Third World policy may be overstated or exaggerated. First, the U.S. policy stance vis-à-vis the Soviet Union in terms of the size of 'reactivity' is determined *systematically* by the size of the U.S. interests in the region. Further, sign of its impact is by and large *positive* which is more consistent with the defensive reaction pattern, rather than the offensive-deterrent reaction

Table 8.2. Determinants of U.S. 'Reactivity' in the Third World: An Excerpt

Explanatory Variables	*Region*				
	Third World	L. America	Africa	M. East	Asia
Region's *polarity score*	7.558‡ (2.430)**	19.325 (3.242)***	3.839‡ (1.658)	1.508 (3.985)***	27.113† (6.383)***
Region's *policy similarity score* with the U.S.	2.117† (3.080)***	− 25.063† (3.644)***	− 8.857‡ (1.850)*	7.558† (6.296)***	90.249 (7.864)***
%(U.S. regional trade + U.S. world trade)	4.671‡ (2.092)*	22.795 (2.667)**	− 17.557† (3.286)***	− 18.539† (7.442)***	-
ln(U.S. military stockpiles + Soviet military stockpiles)	− 74.870† (6.808)***	− 9.166† (2.331)**	− 26.806† (3.070)***	− 16.627† (4.730)***	151.718† (6.675)***
U.S.-Soviet Bilateral Trade	− 3.122† (4.745)***	-	-	-	7.424 (4.466)***

Notes: This table is an excerpt from Table 5.6 in Chapter V, where figures are coefficient estimates multiplied by 100 for the scaling purpose, figure in the parentheses under each coefficient estimates are *t*-ratios in absolute value whose statistical significances are marked by (1) *** (p<0.01), (2) ** (p<0.05), and (3) * (p<0.10), all at two-tailed test. All the variables are generally specified in contemporaneous value unless either explicitly specified in the model, or marked by (1) † (lagged value) or (2) ‡ (differenced value).

pattern. Second, impact of the relative military capability on U.S. 'reactivity' is generally *negative*, quite contrary to the deterrence argument. This finding indicates that despite the highly belligerent policy declaration during the early period of the Cold War when the U.S. had enjoyed predominance in nuclear arsenal, its policy behaviors during the period were rather moderate and modest. Third, instead of taking advantage of the increased bilateral trade volume and perhaps increased political leverage, the result suggests that the U.S. has moderated its policy stance when the bilateral trade volume was high and thereby the bilateral political tension was low.

If the assumption that the Soviets are deterrable expansionist is right, the general finding so far that the U.S. policy behaviors were not consistent with the deterrence prescriptions would be in general favor of the 'failed deterrence' explanation of the superpower competition, consistent with the 'deterrence' model argument. Yet, such an assumption is not sustained in general, as examined before. On the other hand, the findings on the U.S. pattern also work against a 'spiral' model explanation of the superpower competition; deterrence attempt on an undeterrable power. That is to say, although the Soivet pattern examined before may be consistent with this explanation, the

U.S. pattern is not quite consistent with the explanation. On the contrary, the U.S. pattern is generally commensurate with the pattern of the 'strategic defense' which I examined for the Soviet case. In other words, findings suggest that U.S. policy stance has been based on the level of substantive interests at stake rather than the reputational effects of the confrontation outcomes, and those interests are gauged in terms of the strategic-military interest rather than simply symbolic or vaguely defined political interest. Taking the U.S. and Soviet patterns together, then, the findings suggest that the pattern of superpower competition is more commensurate with that of *mutual threat* imbedded in the modern security dilemma, rather than any of 'U.S. bullying - Soviet defense' or 'Soviet expansion-U.S. defense,' etc. This inference is further supported by the finding on impact of the *polarity* measure on the level of both superpowers' reactivity levels, as noted in Chapter V. Thus, an implication is that reduction of the 'spiral' and 'deterrence' models into the views on Soviet intentions is too narrow-minded, and examination of the Soviet intention alone holding the U.S. intention constant can not provide an adequate picture of the dynamics.

Questions still remain. If the pattern of the U.S.-Soviet rivalry and competition over the Third World is that of mutual threat under the general setting of security dilemma in an anarchical world, how can one explain moderate elements in their foreign policy behaviors? And what are proper ways of dealing with the dilemma so as to avoid the potentially costly direct confrontations and to insure a stable system of further cooperation?

Implications for Theory and Policy

Let me start with the question of how to explain some moderate elements in the superpowers' foreign policy competition over the Third World issues before moving toward the question of enduring cooperation between superpowers. The most plausible explanation to me is found in terms of the "unilateral caution and moderation" by both superpowers in their conduct of foreign policy activity in a *third* area upon an overarching goal; prevention of escalation of a local conflict into a general nuclear war.[12] An implicit assumption behind this explanation is that even though the superpowers may have competed for strategic assets in the Third World, there is kept a hierarchical structure of issues such that the Third World issues are subordinate to the general strategic issues or "national security" issues.

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12 To the deterrence theorists, this could be the very area where the deterrence worked, but not an extended deterrence but a mutual nuclear deterrence. If this inference is valid, then the conventional distinction of deterrence categories in a hierarchical fashion (e.g., George and Smoke, 1974; Morgan, 1980) should be reconsidered, or at least the linkage across the levels of deterrence situations should receive a due attention.

Findings from this research are generally consistent with this explanation. First of all, the hierarchical issue-structure is well noted throughout the research. For example, in Chapter V, it was noted that the Soviets were less active in the Third World when their efforts were concentrated on strategic military buildup, and as just noted, they were also willing to moderate their competitive stance when they kept better economic, hence political for that matter, relationship with the United States. Also in Chapter VII, it is noted that the Soviets tended *not* to link the Third World issues into direct, dyadic conflict behaviors. Similar pattern is also noted, if less conspicuous, for the U.S. case.

But, unilateral caution and moderation "for the fear of" escalation or confrontation is often insufficient and ineffective to prevent the bilateral crisis and unstable over the long run. The situation like this may be characterized by the problem of "common aversions" distinguished from the problem of "common interests," a distinction made by Stein (1982).

> One example of this dilemma is provided by the simultaneous arrival of a north- or southbound and an east- or westbound car at an intersection. In this case, both drivers most want to avoid a collision. They would also prefer not to sit at their corners staring at one another. There are two ways for them to move through the intersection safely: either A goes first, or B does. *The problem is that neither wants to be the one to wait* (Stein, 1982: 311, italic added).[13]

In such a situation, unilateral, or self-imposed caution and moderation is not sufficient for crises prevention for at least two reasons. First, because payoff of an equilibrium outcome is asymmetric, there is always a strong temptation for preemption, which becomes especially strong when the actor knows that its rival is as afraid of the collision as himself, a classic example of "chicken"-like bargaining situation. The second problem seems more important as to be discussed later; an incremental engagement on a limited scale. That is, when the risk seems controllable and the cost seems low, one or both actors may engage in a Third World conflict on a limited scale, resulting in a protracted conflict in the region recent examples of which include Afghanistan and Central America.[14]

In such a situation, and especially if recurrent, unilateral caution is further problematic particularly because expectations of different actors likely diverge. For example, a concession by a driver at an occasion may lead the driver to expect a concession

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[13] Stein describes this situation more generally in terms of game theory. Games of "common aversions" are characterized by the existence of a single outcome which both actors least prefer and two equilibrium outcomes which each player prefers different one, where players have common interests in avoiding the least preferred outcome. The game of chicken is an example.

[14] Preemption and incremental involvement are corresponding to two of three common types of deterrence failures identified by George and Smoke (1974); *fait accompli* and *controlled pressure.*

by the other driver on the next occasion whereas the other driver may expect a similar concession on the next occasion. Or, in that payoff of an equilibrium outcome is asymmetric, not only the temptation for preemption is always strong, but also repeated concession by a driver may result in accumulation of dissatisfaction or grievance on the conceding part. Therefore, long-term stability of such an equilibrium could be highly unstable. Thus in a situation of "common aversions," Stein says, what is required is a "coordination" of behaviors to avoid mutually undesirable outcome as distinguished from "collaboration" of behaviors to achieve mutually desired outcomes, based on mutually accepted rules of coordination such as *ad hoc ground rules for escalation control* (George, 1983: 389).

The cases of competition/confrontation on a limited scale pose even harder problems for the crises prevention. That is, when the risk involved in the situation seems controllable, then the payoff structure of the players turn into the games of "common interests" in Stein's terminology. The Prisoners' Dilemma is a prototype example of the games of "common interests" in which whereas both players have "a common interest" to depart from a Pareto-inferior equilibrium outcome so as to achieve a Pareto-optimal outcome, the Pareto-optimal outcome is not an equilibrium outcome so that the temptation for defection is extremely high for both players. To solve the dilemma of "common interests," Stein argues, what is required is more than simple coordination of behaviors, but "collaborative" efforts by both players. And such a collaboration requires rather a highly formalized rules which "specify what constitutes cooperation and what constitutes cheating," and how cheating can be spotted immediately and punished (Stein, 1982: 312), or *explicit rules of engagement* in the Third World (George, 1983: 378ff)

Both Stein and George lead their arguments to a necessity for *regimes*, and the conditions for their creation/existence and the ways they function are of course well beyond the scope of this study.[15] In the light of the findings from this research, instead, I derive the following implications for the U.S. policy.

Development and maintenance of bargaining leverage vis-à-vis the Soviet Union, coupled with development of shared expectation on the issue-structure and issue-linkage: It has been found in Chapter V of this research that the improved trade relationship (and the political relationship to an extent) with the Soviet Union may provide

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15 International regimes are generally defined as "sets of implicit or explicit principles, norms, rules, and decision-making procedures around which actors' expectations converge in a given issue area in international relations" (Krasner, 1982: 186).

an effective bargaining leverage to manipulate the Soviet policy stance in the Third World, while direct opposition in the Third World turns out in general ineffective.[16] It is also a consistent finding in Chapter VII that the Soviet behavior directed toward the U.S. is significantly affected by the American behavior directed toward the Soviet Union while the issues in the Third World do not affect the Soviet behavior directed to the U.S. significantly.[17] Then, an effective method to manipulate the Soviet behavior in the Third World should be found at the bilateral, strategic level rather than at the regional level. Toward the purpose, the U.S. may try to develop and keep some stable relations with the Soviets at the dyadic level which may include not only the bilateral trade but other areas for mutual cooperation such as the arms control, which can turn to a bargaining leverage in the U.S. favor. For such bargaining leverages to be effective, however, a key ingredient is that there must be some shared expectations on the issue-structure and issue-linkage, such as what constitutes "a proportionate way of dealing with a particular Third World issue" in terms of the *kind* and the *degree* of issue-linkage.

Selective and prudent use of the bargaining leverage: Further, the finding that the U.S. has initiated some cooperative behaviors toward the Soviet Union when the competition in the Third World is especially intense and that *the Soviet Union has responded to such initiative in kind* not only suggest that such a linkage could be effective, but also suggest *how* the leverage should be used. It seems to me that this pattern of U.S. initiative-Soviet response is consistent with findings from the bargaining literature which argue for the effectiveness of firm-but-flexible or tit-for-tat strategy (Huth and Russett, 1988), or "carrot-and-stick" inducement to leave room for face-saving retreat by the opponent (Leng, 1983). Therefore, a prudent use of such bargaining leverages might be a disproportionate use of "backscratching" strategy rather than "blackmailing" strategy (e.g., Axelrod and Keohane, 1986). Precise balance between "blackmailing" and "backscratching" or "stick" and "carrot" is a matter of the political prudence, and generally beyond the realm of this study.

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16 Recall that increased bilateral trade volume has *negative* impact on Soviet 'reactivity' whereas the level of U.S. 'reactivity' hardly affects the level of Soviet 'reactivity.' See Table 5.7.

17 Also recall from Table 7.1 that the competition in the Third World does not affect Soviet conflict-cooperation toward the U.S. whereas the U.S. conflict-cooperation toward the Soviets has a positive and significant impact on the Soviet behavior, i.e., the Soviets responded to the U.S. in *tit-for-tat* fashion.

Closing Remarks and Directions for Further Research

The picture portrayed in this research, i.e., "two intemperate giants fighting on a turbulent field" may look nothing but an anachronism to even those who are not very forgetful Or, even to those who had not been surprised at the collapse of the Soviet Empire and the "official" end of the Cold War, recent developments could be amazing; the United States has massed up nearly a half million troops and high-technology weapons system and waged a war against a former Soviet client located nearby, while the Soviet Union has generally been aligned with its rival! Yet, perhaps nobody could say with confidence whether or not the picture will be an anachronism for good or how long it will remain so before history repeats itself.

One point can be made with more certainty, however; it is right time for the superpowers to develop a stable system of crisis management. It seems likely that the "turbulent field" will remain turbulent, and it has been well noted in this research that the field is generally beyond the control of the superpowers. If so, the sources and dimensions of the Third World conflict should receive more attention in terms of scientific research efforts. Despite realization of the point and highly endeavoring effort of data collection and analyses, this research has not paid enough attention even to the interpretation of the empirical results, largely because of the highly extensive scope of this research. And it should certainly be an area for further research.

One of conclusions from this research is that pattern of the superpower competition in the Third World has been that of mutual threat and reciprocal pattern of interaction; a conclusion consistent with the 'spiral' model of the Cold War generally if not completely. If the conclusion is not completely consistent with the 'spiral' model, it is so because there were some moderating elements on *both* parts of the superpowers. And, recall the remark that this pattern of behavior can be consistently explained by the deterrence theory. But, not that of 'Soviet expansionist-U.S. deterrer' but a 'mutual deterrence,' or an extension of the mutual nuclear deterrence. If so, a recent trend in research on deterrence, i.e., 'clear-cur' distinction between the direct deterrence and the extended deterrence and generally separate research endeavors considering possibility of the linkage should be reexamined.[18]

In this regard, and in that evaluation of the contending theories of the 'spiral' and 'deterrence' models in this research has not been quite complete, this study leaves a big research question unanswered. While the question will remain among the research agenda of mine, more research efforts toward the direction are called for.

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18 Such a trend is particularly evident in Huth (1988).

APPENDIX

APPENDIX
STATISTICAL NOTES

In this Appendix, the statistical method of analysis used in this research is discussed along with some of major statistical issues involved. In so doing, the intention is primarily to alert readers to the major statistical problems involved and their consequences, inform readers of the method used in this research to deal with those problems, and thereby insure the research results reproducible and open to criticism. It is my firm belief that only through scientific honesty and openness to criticism a scientific research can cumulatively develop.

This chapter begins with, first of all, derivation and assumptions of familiar OLS (Ordinary Least Squares) estimator with a focus on the violations of assumptions and their consequences, which is followed by the discussion of the GLS (Generalized Least Squares) solution for one particular type of violations of assumptions, i.e., serially correlated disturbances. Then, system of simultaneous equations is reviewed in matrix form and the issue of identification is discussed. Finally, one of methods of estimating simultaneous equations, 2SLS (Two Stage Least Squares) is discussed in paralell with the earlier discussion of OLS and the application of GLS solution, which is essentially the method used in this research. In writing the following, it is assumed that readers are familiar with multiple regression analysis and some of major concepts and operations in matrix algebra. Also, unless noted otherwise, the following is a general summary of related discussion in Kmenta (1971), Johnston (1972), Wonnacott and Wonnacott (1974), and Hanushek and Jackson (1977), with overall level of difficulty at that of Hanushek and Jackson.

Ordinary Least Squares (OLS) Regression: A Review

Assumptions and Properties of OLS Estimator

Consider a multiple regression equation with K independent variables

$$y = X\beta + \varepsilon \tag{A.1}$$

or for a sample of N observations

$$y = Xb + e$$

where, y is a $(N \times 1)$ data vector for the dependent variable, X is a $(N \times K)$ data matrix for K independent variables, the first column of which is a vector of 1 for the intercept term, b is a $(K \times 1)$ vector of coefficients, and e is a $(N \times 1)$ vector of disturbances. OLS estimator of coefficients (b) is obtained from the sample by the formula

$$b = (X'X)^{-1}X'y \tag{A.2}$$

if

$$\text{rank of } X = K < N, \qquad \text{[Assumption 1]}^1$$

or, plainly speaking, if the number of observations is greater than the number of exogenous variables and there is no linear dependence, i.e., perfect multicollinearity among independent variables.

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[1] Least squares solution of b is one such that sum of squares of errors, i.e., $e'e$, is minimized. That is,

$$\begin{aligned} e'e &= (y - Xb)'(y - Xb) \\ &= y'y - b'X'y - y'Xb + b'X'Xb \\ &= y'y - 2b'X'y + b'X'Xb \end{aligned}$$

(because $b'X'y$ and $y'Xb$ are identical scalars).

$e'e$ is minimum when its first order partial derivative with respect to b is zero, i.e.,

$$\frac{\partial e'e}{\partial b} = -2X'y + 2X'Xb = 0, \text{ or}$$

$$X'Xb = X'y.$$

If $(X'X)$ is invertible, i.e., nonsingular, by premultiplying both sides by $(X'X)^{-1}$, we get

$$b = (X'X)^{-1}X'y \tag{A.2}$$

$(X'X)$ is nonsingular when X is nonsingular, thus, [Assumption 1] is needed.

OLS estimator is *unbiased*, i.e., $E(b) = \beta$ if

the values of X's are fixed over different samples [Assumption 2]

and

$E(e) = 0$ [Assumption 3][2]

Further, given the assumption, OLS estimator is asymptotically *consistent*, i.e., estimates converge on true parameter value as sample size approaches the infinity.

Also, OLS estimator is *best*, i.e., has the least variance among all unbiased linear estimators with variance of

$$\text{var}(b) = E[(b-\beta)(b-\beta)'] = \sigma^2(X'X)^{-1} \quad \text{(A.3)}$$

if

$E(ee') = \sigma^2 I$ [Assumption 4]

where σ^2 is variance of error terms, which is population parameter hence unobserved.[3] But an unbiased estimate of σ^2 (s^2) can be obtained from OLS residuals such that

$$s^2 = e'e/(N - K) \quad \text{(A.4)}$$

Notice that $E(ee')$ is a variance-covariance matrix of errors such that

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2 By replacing (A.1) for y in (A.2), we get

$b = (X'X)^{-1}X'(X\beta + \varepsilon) = \beta + (X'X)^{-1}X'\varepsilon$

By taking the expected value of both sides of equation, we get

$$\begin{aligned} E(b) &= E(\beta) + E[(X'X)^{-1}X'\varepsilon] \\ &= \beta + (X'X)^{-1}X'E(\varepsilon) && \text{(by [Assumption 2])} \\ &= \beta && \text{(by [Assumption 3])} \end{aligned}$$

This set of assumptions is very strong in non-experimental social research, and almost stronger than necessary. Notice that an especially important corollary of these two assumptions is that X's and e's are uncorrelated, i.e., $E(X'e)=0$.

3 From (A.2), $b = \beta + (X'X)^{-1}X'\varepsilon$, hence $b - \beta = (X'X)^{-1}X'\varepsilon$. Then

$$(b-\beta)(b-\beta)' = (X'X)\text{-}1X'\varepsilon\varepsilon'X(X'X)^{-1}$$

By taking the expected value and by [Assumption 4], we get

$$E[(b-\beta)(b-\beta)'] = (X'X)^{-1}X'E(\varepsilon\varepsilon')X(X'X)^{-1} = \sigma^2(X'X)^{-1}$$

$$E(ee') = \begin{bmatrix} E(\varepsilon_1^2) & E(\varepsilon_1\varepsilon_2) & E(\varepsilon_1\varepsilon_3) & \cdots & E(\varepsilon_1\varepsilon_N) \\ E(\varepsilon_2\varepsilon_1) & E(\varepsilon_2^2) & E(\varepsilon_2\varepsilon_3) & \cdots & E(\varepsilon_2\varepsilon_N) \\ \cdots & \cdots & \cdots & \cdots & \cdots \\ E(\varepsilon_N\varepsilon_1) & E(\varepsilon_N\varepsilon_2) & E(\varepsilon_N\varepsilon_3) & \cdots & E(\varepsilon_N^2) \end{bmatrix} \quad \text{(A.5)}$$

From that $E(\varepsilon_i^2) = \text{var}(\varepsilon_i)$ and $E(\varepsilon_i\varepsilon_j) = \text{cov}(\varepsilon_i\varepsilon_j)$, [Assumption 4] entails that

$$\text{var}(\varepsilon_1) = \text{var}(\varepsilon_2) = \text{var}(\varepsilon_3) = \ldots = \text{var}(\varepsilon_N) = \sigma^2,$$

and

$$\text{cov}(\varepsilon_1\varepsilon_2) = \text{cov}(\varepsilon_1\varepsilon_3) = \ldots = \text{cov}(\varepsilon_1\varepsilon_N) = 0$$

That is, the meaning of [Assumption 4] is that main diagonal elements of variance-covariance matrix of error terms are constant σ^2, and its off-diagonal elements are zeros. In other words, [Assumption 4] requires that error terms has constant variance over all observations, hence be *homoskedastistic*, and *no serial correlation among error terms over successive lags.*

Statistical Inferences

With another assumption that error terms are normally distributed, i.e.,

$$\varepsilon \sim N(0,\sigma^2 I) \qquad \text{[Assumption 5]}$$

b, a linear function of e, is also distributed normally with mean of β and variance of $\sigma^2(X'X)^{-1}$. That is,

$$b \sim N[\beta, \sigma^2(X'X)^{-1}] \qquad \text{(A.6)}^4$$

From (A.6), $(b_k - \beta_k)/\sigma\sqrt{m_{kk}}$ is standard normal, i.e., $N(0,1)$, where m_{kk} is kth main diagonal element of $(X'X)^{-1}$ and $\sigma\sqrt{m_{kk}}$ is standard error of estimate of kth coefficient. Further, since σ is unobserved, its estimate (s) by (A.4) can be used for it, and $(b_k - \beta_k)/s\sqrt{m_{kk}}$ is distributed as Student's t with $(N - K)$ degrees of freedom.

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4 *Central limit theorem* says that sampling distribution of a statistic approaches normality when sample size becomes large, regardless the population distribution. Thus, [Assumption 5] can be relaxed if the sample size is large.

Usually, we want to establish relationship between dependent variable and a particular independent variable, which we normally do by rejecting the null hypothesis $\beta_k = 0$. The null hypothesis is rejected if $(b_k - \beta_k)/\sigma\sqrt{m_{kk}}$ $(= b_k/\sigma\sqrt{m_{kk}})$ is greater than t value at chosen level of significance, p, given degrees of freedom $N-K$. That is, for example, if $b_k/\sigma\sqrt{m_{kk}} \geq t$ at p = 0.05, then we reject the null hypothesis with 95% confidence or 5% risk of making type I error, i.e., falsely rejecting the null hypothesis that is true, and thereby infer that the particular variable has nonnegligible impact on the dependent variable.

Violations of OLS Assumptions and Consequences: Some Examples

MULTICOLLINEARITY

If [Assumption 1] is violated, i.e., either the number of observations is less than the number of independent variables or one of independent variables is linear transformation of one or more of other independent variables, then OLS estimator is undefined and estimation is technically impossible. In a less extreme case, some of independent variables may be very highly correlated, if not perfectly. In this case, joint confidence interval is elongated and tilted such that confidence intervals for individual variables are unduly extended and it is more likely that individual confidence intervals may include zero value while joint confidence interval does not. Thus, the problem of multicollinearity is not in bias or inconsistency of estimates but in statistical inferences. Some of major consequences of multicollinearity are that (1) it is very difficult to disentangle the relative influence of the various independent variables, (2) researchers are sometimes led to drop variables incorrectly from equation, and (3) estimates of coefficients become very sensitive to particular sets of sample data (Johnston, 1972: 160).

AUTOCORRELATION IN DISTURBANCES

When autocorrelation in error terms is present, OLS estimates of coefficients are still unbiased but the estimates of their variances are biased, obvious by (A.3) and [Assumption 4]. Because estimates of coefficient variances are biased, statistical inference based on t-statistics may be misguided. Particularly, when autocorrelation is positive, which is usually the case, OLS estimates of coefficients variances by (A.3) underestimate true variances and inflate the t-ratios, thus type I error, i.e., rejecting true null hypothesis is more likely to occur. When autocorrelation is negative, on the other hand, OLS estimates of coefficients variances overestimate true variances and deflate the t-ratios, thus type II error, i.e., accepting false null hypothesis is more likely (Hibbs, 1974: 256-7, 265-6).

INDEPENDENT VARIABLES CORRELATED WITH ERROR TERMS

If any of independent variables are correlated with the error terms, OLS estimator is no longer unbiased and consistent, as obvious from earlier discussion. There are two primary instances that explanatory variables are correlated with error terms. First, in a nonrecursive system of equations, endogenous variable included in an equation as a regressor is correlated with errors in the equation by the definition of nonrecursiveness. That is, Because a nonrecursive system is one in which error terms in each equations are correlated with one another and error terms are one of the components of the endogenous variable the equation explains, when the endogenous variable appear in another equation, it becomes correlated with the errors in the equation.

Second, in the case of dynamic equation, i.e., one with lagged dependent variable as regressor, autocorrelation in error terms cause the lagged dependent variable to be correlated with errors in a similar way with the first case. That is, errors at time t-1 which is a component of lagged dependent variable is correlated with errors at time t, and so the lagged dependent variable is correlated with errors at t. The consequence of serially correlated errors in a dynamic model is that OLS estimation typically produces upwardly biased coefficient estimate for lagged dependent variable and downwardly biased coefficient estimates for other exogenous variables (Hibbs, 1974: 294).

All these statistical problems are frequently encountered in this research due to its nature; (1) the data used in this study are time series observations, hence the assumption of no autocorrelation is often violated, (2) the model is in the form of systems of simultaneous equations, thus the assumption of independence between disturbances and independent variables is violated by definition, and (3) as Two Stage Least Squares (2SLS) method is invoked to deal with simultaneity problem, multicollinearity becomes a very serious problem. The following is a summary of how econometric literature deals with each of these problems and how those methods are utilized to obtain more efficient, unbiased and consistent estimates of coefficients and their variances.

Serially Correlated Disturbances and GLS Solution

An Overview of GLS Estimator

When errors are homoskedastistic but serially correlated, $E(\varepsilon\varepsilon')$ can be written as (A.7), where ρ_k is autocorrelation coefficient at lag k.

$$E(ee') = \sigma^2\Omega = \sigma^2\begin{bmatrix} 1 & \rho_1 & \rho_2 & \rho_3 & \cdots & \rho_{N-1} \\ \rho_1 & 1 & \rho_2 & \rho_3 & \cdots & \rho_{N-2} \\ \cdot & \cdot & \cdot & \cdot & \cdots & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdots & \cdot \\ \rho_{N-1} & \rho_{N-2} & \rho_{N-3} & \rho_{N-4} & \cdots & 1 \end{bmatrix} \quad \text{(A.7)}$$

GLS or Aitken estimator which is still *unbiased* and *best*[5] is obtained by

$$b = (X'\Omega^{-1}X)^{-1}X'\Omega^{-1}y \quad \text{(A.8)}$$

with variance of

$$\text{var}(b) = \sigma^2(X'\Omega^{-1}X)^{-1} \quad \text{(A.9)}$$

Also, unbiased estimate of σ^2 (s^2) is obtained by

$$s^2 = e'\Omega^{-1}e/(N - K) \quad \text{(A.10)}$$

If we replace Ω in equations (A.8) through (A.10) with I, they are identical with equations (A.2) through (A.4) respectively. Therefore OLS is a special case of GLS with $\Omega = I$.

Pseudo-GLS Solution for Serially Correlated Errors

GLS estimation is viable only when we have *a priori* knowledge of the structure of error terms, i.e., Ω, which is unobserved. Also, estimation of ρ's at successive lags from residuals is not viable because over a long lag, we lose lots of observations, and estimate is not stable. Typically, however, serially correlated errors follow a distinct pattern such as first-order *autoregressive process* [AR(1)], first-order *moving average process* [MA(1)], higher orders of AR or MA processes [AR(p), MA(q)], or any combination of AR and MA

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5 GLS estimator is unbiased as far as [Assumption 2] and [Assumption 3] are satisfied and best, i.e., more efficient than, or at least as efficient as OLS estimator.

process [ARMA(p,q)].[6] Since OLS estimator is unbiased, OLS residuals are also unbiased, thus we may infer the time dependent process in errors by analyzing OLS residuals and construct an $\hat{\Omega}$ matrix. Using $\hat{\Omega}$ we can apply GLS method to models with serially correlated errors and because we are using $\hat{\Omega}$ instead of Ω, this method is called *Pseudo-GLS* (Hibbs, 1974).

Analysis of residuals normally begins with conducting a correlogram analysis of *autocorrelation function* as well as *partial autocorrelation function*.[7] That is, since autocorrelations and partial autocorrelations at successive lags yield particular pattern according to the underlying process, we can identify the process by examining the pattern. Table A.1 shows some of the most typical time dependent processes along with the pattern of autocorrelation and partial autocorrelation coefficients.

Once the model of time dependent process is identified through correlogram analysis, coefficients associated with the model can be estimated from residuals. For example, if the process is autoregressive process, unbiased estimates of ϕ_1 and/or ϕ_2 can be obtained by regressing e_t on e_{t-1} and/or e_{t-2}.[8] Using the coefficient estimates and the functional relationship between coefficients and autocorrelation function as seen in Table A.1, we compute "theoretical" autocorrelation coefficients back, and plug them for appropriate off-diagonal elements in Ω matrix. Once the Ω matrix is constructed thereby, (pseudo-) GLS estimation via (A.8) though (A.10) can be applied. The following is a typical example of Ω with AR(1) process.

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[6] Good summary of ARMA models, first developed by Box and Jenkins (1976), is found in Wonnacott and Wonnacott (1979: 234-250) and McCleary and Hay (1980: Chapter 2). See also, Nelson (1973), Hibbs (1974) and Hibbs (1977).

[7] Correlogram here refers to the graphic representation of (partial) autocorrelation coefficients at successive lags. The meaning of autocorrelation coefficient at lag k is analogous to the Pearson correlation coefficient, i.e., correlation between error terms at t and $t-k$. Actually, autocorrelation coefficient or function [ρ_k or ACF(k)] is estimated by

$$\rho_k = \left[\sum_{t=1}^{N-k}(e_t e_{t+k})\right] \div \left[\sum_{t=1}^{N} e_t^2\right]$$

On the other hand, partial autocorrelation coefficient or function (PACF) is analogous to partial correlation coefficient. That is, partial autocorrelation coefficient at lag k is the correlation between e_t and e_{t-k} while controlling for e_{t-1} through e_{t-k+1}. Autocorrelation check through correlogram analysis is preferable to conventional method of Durbin-Watson's d statistics, because correlogram also shows the pattern of autocorrelation as well as autocorrelations at longer lags.

[8] Least squares solution does not work for moving average processes because it involves nonlinear solution. For this case, computer packages are available for non-linear solution.

$$\Omega = \begin{bmatrix} 1 & \phi_1 & \phi_1^2 & \phi_1^3 & \cdots & \phi_1^{N-1} \\ \phi_1 & 1 & \phi_1 & \phi_1^2 & \cdots & \phi_1^{N-2} \\ \cdot & \cdot & \cdot & \cdot & \cdots & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdots & \cdot \\ \phi_1^{N-1} & \phi_1^{N-2} & \phi_1^{N-3} & \phi_1^{N-4} & \cdots & 1 \end{bmatrix}$$

Pseudo-GLS for A Dynamic Model with Serially Correlated Errors

For a dynamic equation, one with lagged dependent variables on the right-hand side of the equation, with serially correlated errors, the above solution does not work, however. Recall that with autocorrelation present, lagged dependent variable is correlated with error terms and OLS estimates of coefficients are biased and inconsistent. Coefficient estimates being biased and inconsistent, so are the residuals, thus we cannot rely on residuals to check the presence and structure of autocorrelation in errors. At least, yet, consistent estimates of coefficient can be obtained by *instrumental variable* (IV) technique which is analogous to 2SLS method to be discussed later. IV method involves two conceptual stages of estimation; (1) finding out an IV for the lagged dependent variable, that is correlated with original variable but not with errors, and (2) getting coefficient estimates with IV substituted for the lagged dependent variable.

IV is usually found by regressing the lagged dependent variable on the current and lagged values (Hibbs, 1974: 297)[9] of other independent variables and taking the predicted value. That is, for a model

$$y_t = \lambda y_{t-1} + \sum_k \beta_k x_{kt} + \varepsilon_t \qquad \text{(A.11)}$$

IV for y_{t-1} ($\hat{y}_{t-1}$) is obtained by

$$\hat{y}_{t-1} = \sum_k \hat{\lambda}_k x_{kt} + \sum_k \hat{\delta}_k x_{kt} \qquad \text{(A.12)}$$

Systematic component will remain in the predicted value but stochastic component will be purged out. Consistent estimates of coefficients are obtained at second stage regression, with IV substitution for the lagged dependent variable such that

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9 Current value of other independent variables alone can not be used to generate IV because, at second stage, there will be multicollinearity between set of independent variables and IV, a linear combination of the independent variables. As far as the number of observation allows, one may use further lagged values of independent variables to improve the explanatory power of IV (Johnston, 1972: 318).

$$y_t = \lambda^* y_{t-1} + \sum_k \beta_k^* x_{kt} + \varepsilon_t^* \tag{A.13}$$

where λ^* and β_k^* are IV estimators.

Two problems remain with this method. First, there may still be auto-correlation in errors, hence the solution may yield biased estimates of coefficient variances. Second, IV substitution yields less efficient coefficient estimates, if consistent, depending on how well IV represents the original variable, i.e., the correlation between two.[10]

A method called IV-GLS is one of the proposed solutions. First, use residuals derived from (A.14) below to conduct correlogram analysis of ACF and/or PACF to infer the time-dependent process in error terms and estimate associated coefficients. It is viable because consistent IV estimators are used.

$$e_t = y_t - \left(\lambda^* y_{t-1} + \sum_k b_k^* x_{kt} \right) \tag{A.14}$$

Given the model of time dependent process and estimates of the model coefficients, ϕ's or θ's via the procedure described earlier, we can now have consistent and more efficient pseudo-GLS estimates using equations (A.8) through (A.10) and original values of lagged dependent variable, not IV substitute (Hibbs, 1974: 298). That is, pseudo-GLS estimates of coefficients and their variances are obtained by

$$\hat{B} = (X'\hat{\Omega}^{-1}X)^{-1}X'\hat{\Omega}^{-1}y \tag{A.8'}$$

$$\text{var}(\hat{B}) = s^2(X'\hat{\Omega}^{-1}X)^{-1} \tag{A.9'}$$

$$s^2 = e'\hat{\Omega}^{-1}e/(N-K-1) \tag{A.10'}$$

where $X = [y_{t-1} \quad x_1 \quad \ldots \quad x_k]$ and $\hat{B} = [\hat{\lambda} \quad \hat{\beta}_1 \quad \ldots \quad \hat{\beta}_k]$.

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10 See below the discussion on 2SLS method for this point.

Table A.1. Distrubance Time-Dependent Processes: Some Representative Examples[a]

Processes	Equational Form[b]	*Autocorrelation Function* Estimating Equation	*Autocorrelation Function* Correlogram Pattern	*Partial Autocorrelation Function* Correlogram Pattern
		Autoregressive (AR) *Processes*		
AR(p)	$u_t = \sum_{i=1}^{p} \phi_i u_{t-1} + v_t$	$\rho_k = \sum_{i=1}^{p} \phi_i \rho_{k-1}$	Non-zero over successive lags.	$\psi \neq 0$, for $k \leq p$ $\psi = 0$, for $k > p$
AR(1)	$u_t = \phi_1 u_{t-1} + v_t$, $-1<\phi_1<1$	$\rho_k = \phi_1^k$	Exponential decay.	$\psi_1 = \rho_1 \neq 0$ $\psi_k = 0$, for $k>1$
AR(2)	$u_t = \phi_1 u_{t-1} + \phi_2 u_{t-2} + v_t$ $-1<\phi_2<1$,$(\phi_1+\phi_2)<1$, and $(\phi_2-\phi_1)<1$	$\rho_k = \phi_1 \rho_{k-1} + \phi_2 \rho_{k-2}$ $\rho_1 = \phi_1/(1-\phi_2)$ $\rho_2 = [\phi_1^2/(1-\phi_2)] + \phi_2$	Non-zero over successive lags, mixture of exponentials or dampled sine wave.	$\psi_k \neq 0$, for $k \leq 2$ $\psi_k = 0$, for $k > 1$
		Moving Average (MA) *Processes*		
MA(q)	$u_t = v_t - \sum_{i=1}^{q} \theta_i v_{t-i}$	$\rho_k = \left(-\theta_k + \sum_{i=1}^{q-k} \theta_i \theta_{k+1}\right) \div \left(\sum_{i=0}^{q} \theta_i^2\right)$	$\psi_k \neq 0$, for $1 \leq k \leq q$ $\psi_k = 0$, for $k>q$	Non-zero but tails off over successive lags.
MA(1)	$u_t = v_t - \theta_1 v_{t-1}$ $-1<\phi_1<1$	$\rho_1 = -\theta_1/(1+\theta_1^2)$ $\rho_k = 0$, for $k>1$	Single spike at lag 1 and zero thereafter.	Non-zero but tails off over successive lags.
MA(2)	$u_t = v_t - \theta_1 v_{t-1} - \theta_2 v_{t-2}$ $-1<\theta_2<1$, $(\theta_1+\theta_2)<1$, and $(\theta_1-\theta_2)<1$	$\rho_1 = (-\theta_1+\theta_1\theta_2)/(1+\theta_1^2+\theta_2^2)$ $\rho_2 = (-\theta_2)/(1+\theta_1^2+\theta_2^2)$ $\rho_k = 0$, for $k>2$	Two spikes at lags 1 and 2 and zero thereafter.	Non-zero but tails off over successive lags.
		Mixed *Autoregressive-Moving Average* (ARMA) *Process*		
ARMA(1,1)	$u_t = \phi_1 u_{t-1} + v_t - \theta_1 v_{t-1}$ $-1<\phi_1<1$, $-1<\phi_1<1$	$\rho_1 = (1-\phi_1\theta_1)(\phi_1-\theta_1)/(1+\theta_1^2-2\phi_1\theta_1)$ $\rho_k = \phi_1 \rho_{k-1}$, for $k > 1$	Decays exponentially after lag 1	$\psi_1 = \rho_1$ affected by AR component then tails offs following MA pattern

Notes: [a] ρ_k (ψ_k) refers to (partial) autocorrelation function at lag k respectively. Note that $\rho_0 = 1$, $\rho_k = -\rho_k$ and $\phi_1 = -\psi_1$.

[b] u_t represents disturbance at time t and v_t represents random "white noise" at time t distributed normally and independently. Since $E(u_t) = 0$ by [Assumption 3], constant term does not appear in the equations. The range of coefficients is restricted for *stationarity* of *AR* processes or *invertibility* of *MA* processes.

A System of Structural Equations

An Overview

A system of equations with M endogenous variables and Q exogenous or pre-determined variables can be written as

$$\begin{aligned}
y_1 &= \gamma_{21}y_2 + \ldots + \gamma_{m1}y_m + \beta_{11}x_1 + \ldots + b_{q1}x_q + u_1 = 0 \\
y_2 &= \gamma_{12}y_1 + \ldots + \gamma_{m2}y_m + \beta_{12}x_1 + \ldots + b_{q2}x_q + u_2 = 0 \\
&\ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \\
y_m &= \gamma_{1m}y_1 + \gamma_{2m}y_2 + \ldots + \beta_{1m}x_1 + \ldots + b_{qm}x_q + u_m = 0
\end{aligned} \tag{A.15a}$$

or

$$\begin{aligned}
&\gamma_{11}y_1 + \gamma_{21}y_2 + \ldots + \gamma_{m1}y_m + \beta_{11}x_1 + \ldots + \beta_{q1}x_q + u_1 = 0 \\
&\gamma_{12}y_1 + \gamma_{22}y_2 + \ldots + \gamma_{m2}y_m + \beta_{12}x_1 + \ldots + \beta_{q2}x_q + u_2 = 0 \\
&\ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \\
&\gamma_{1m}y_1 + \gamma_{2m}y_2 + \ldots + \gamma_{mm}y_m + \beta_{1m}x_1 + \ldots + \beta_{qm}x_q + u_m = 0
\end{aligned} \tag{A.15b}$$

where $\gamma_{ii} = -1$. This system of equations can be expressed in matrix form as follows.

$$Y\Gamma + XB + U = 0 \tag{A.16}$$

where Y is $(N \times M)$ data matrix for M endogenous variables, Γ is $(M \times M)$ matrix of structural coefficients among M endogenous variables, X is $(N \times Q)$ data matrix for Q exogenous variables, B is $(Q \times M)$ matrix of structural parameters between M endogenous variables and Q exogenous variables, and U is $(N \times M)$ matrix of errors. By successive substitutions, we can express all equations in reduced form, i.e., in terms of exogenous variables if the system is mathematically complete. That is,

$$Y\Gamma = -XB - U \tag{A.17}$$

If Γ is invertible, i.e., non-singular,[11]

$$Y = -XB\Gamma^{-1} - UX^{-1} = X\Pi + V \tag{A.18}$$

where Π is $(Q \times M)$ matrix of reduced form coefficients and V is vector of newly defined error terms such that

$$\Pi = -B\Gamma^{-1} \text{ or } -\Pi\Gamma = B \tag{A.19}$$

and

$$V = -U\Gamma^{-1}.$$

BLOCK-RECURSIVE STRUCTURE RECONSIDERED

For a recursive system, the coefficient matrix Γ is *triangular* as shown in (A.16) indicating unilateral causality.

$$\Gamma = \begin{bmatrix} -1 & \gamma_{12} & \gamma_{13} & \gamma_{14} & \gamma_{15} & \cdot\ \cdot & \gamma_{1m} \\ 0 & -1 & \gamma_{23} & \gamma_{24} & \gamma_{25} & \cdot\ \cdot & \gamma_{2m} \\ 0 & 0 & -1 & \gamma_{34} & \gamma_{35} & \cdot\ \cdot & \gamma_{3m} \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot\ \cdot & \cdot \\ 0 & 0 & 0 & 0 & 0 & \cdot\ \cdot & -1 \end{bmatrix} \tag{A.20}$$

Analogously, in a block-recursive system, elements in (A.20) may be treated as blocks of elements such that (1) elements in submatrices along the main diagonal may not be zero,[12] (2) elements in above diagonal submatrices may or may not be zero, and (3) below diagonal submatrices must be zero matrices (Fisher, 1963). This structure means that (1) within each block noted by main diagonal submatrices, the system is non-recursive with reciprocal causal effects, (2) endogenous variables from lower level blocks can causally influence endogenous variables in higher level blocks but are treated as pre-determined, and (3) variables in higher level blocks do not appear in lower level blocks.

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[11] Γ is singular when the system is mathematically incomplete in that either there are more endogenous variables than equations or some equations are linearly dependent. Thus, this is another way to state the requirement of mathematical completeness.

[12] Main diagonal elements of these submatrices are of course –1.

Identification

In a non-recursive system, OLS estimation of structural equations does not yield coefficient estimates with desirable properties, rather biased and inconsistent estimates because error terms and included endogenous variables are correlated, as noted earlier. Yet, since exogenous variables will be uncorrelated with error terms by definition, OLS estimates of reduced form coefficients will be unbiased. Thus, we can possibly get estimates of structural coefficients (Γ and B) using unbiased estimates of reduced form coefficients (Π) and the relationship in equation (A.19). Notice however that since we have only one equation for two unknowns (Γ and B), we cannot solve for unique solutions of structural coefficients unless there are some a priori or theoretical knowledge on the structure of Γ and B.. That is to say, when we specify equations in the system by including some variables and excluding the others, we restrict some elements of Γ and B to be zero. The question of identification of an equation is then whether zero-restrictions of structural coefficients provide enough information to yield unique solutions for structural coefficients.

To grasp the meaning of identification, suppose we want to identify the first equation whose structural coefficients appear in the first columns of Γ and B. Also, we arrange the system such that coefficients of variables excluded from the first equation appear first. Then, we have coefficient matrices with following structures. Let m_1 be number of endogenous variables excluded from the equation, m_2 be number of endogenous variables included in the equation ($m_1 + m_2 = M$), q_1 be number of excluded exogenous variables and q_2 be number of included exogenous variables ($q_1 + q_2 = Q$). Then, the matrices Γ and B can be divided into submatrices as seen below such that Γ_{11} and B_{11}.are vectors of zeros with order of ($m_1 \times 1$) and ($q_1 \times 1$) by specification, Γ_{21} and B_{21} are vectors of structural coefficients we want to know for the equation with order of ($m_2 \times 1$) and ($q_2 \times 1$) respectively.

$$\Gamma = \begin{array}{c} \\ m_1\{ \\ m_2\{ \end{array} \begin{array}{c} \overset{1}{} \quad \overset{M-1}{} \\ \left[\begin{array}{c|c} \Gamma_{11} & \Gamma_{12} \\ \hline \Gamma_{21} & \Gamma_{22} \end{array}\right] \end{array} \qquad B = \begin{array}{c} \\ q_1\{ \\ q_2\{ \end{array} \begin{array}{c} \overset{1}{} \quad \overset{M-1}{} \\ \left[\begin{array}{c|c} B_{11} & B_{12} \\ \hline B_{21} & B_{22} \end{array}\right] \end{array}$$

Correspondingly, by (A.19), we can define Π such that Π_{11} is the matrix of reduced form coefficients of q1 excluded exogenous variables for m1 excluded endogenous

variables, Π_{12} is the matrix of reduced form coefficients of q_1 excluded exogenous variables for m_2 included endogenous variables, and so on, as follows.

$$\Pi = \begin{array}{c} \\ q_1\{ \\ q_2\{ \end{array} \begin{array}{c} \begin{array}{cc} m_1 & m_2 \end{array} \\ \left[\begin{array}{c|c} \Pi_{11} & \Pi_{12} \\ \hline \Pi_{21} & \Pi_{22} \end{array}\right] \end{array}$$

We now equate (A.19) for the first column only (because we are interested in the first equation only), and with a priori knowledge that Γ_{11} is zero, we obtain

$$-\Pi_{12}\Gamma_{21} = B_{11} = 0 \tag{A.21}$$

$$-\Pi_{22}\Gamma_{21} = B_{21} \tag{A.22}$$

Now, we have two equations for two unknowns, and if we can get unique solutions for Γ_{21} from (A.21), we can also get unique solutions for B_{21} by (A.22). Because we already know one element in Γ_{21} is -1 (for dependent variable itself), the condition that (A.21) yield unique solution is

$$\text{Rank of } \Pi_{12} = m_2 - 1 \tag{A.23}$$

which is referred to as the *rank condition* for identification which is necessary and sufficient.[13]

Especially notice that the point is not the invertibility of Π_{12} such that $-\Gamma_{21} = B_{11}\Pi_{12}^{-1} = 0\Pi_{12}^{-1} = 0$ which is useless. Rather, the question of identification is whether, given that one element in Γ_{21} is known to be -1, (A.21) is collapsed into $(m_2 - 1)$ independent equations to solve for $(m_2 - 1)$ unknowns in Γ_{21}. A simple example should help clarifying the point here as well as the discussion to follow about estimation.

Consider a nonrecursive system of equations with three endogenous and four exogenous variables such that

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[13] Since Π_{12} has m_2 columns, a necessary, if not sufficient, condition that rank condition is satisfied is that the number of rows of Π_{12}, which is q_2 is at least m_2-1, i.e., number of excluded exogenous variables must be equal to or greater than the number of included endogenous variables minus one. This is called the order condition for identification, which is necessary, but not sufficient.

$$y_1 = \gamma_{21}y_2 + \gamma_{31}y_3 + \beta_{11}x_1 + \beta_{21}x_2 + \beta_{31}x_3 + u_1 \quad \text{(A.24a)}$$

$$y_2 = \gamma_{12}y_1 + \gamma_{32}y_3 + \beta_{22}x_2 + \beta_{42}x_4 + u_2 \quad \text{(A.25a)}$$

$$y_3 = \gamma_{23}y_2 + \beta_{13}x_1 + \beta_{43}x_4 + u_3 \quad \text{(A.26a)}$$

or

$$-y_1 + \gamma_{21}y_2 + \gamma_{31}y_3 + \beta_{11}x_1 + \beta_{21}x_2 + \beta_{31}x_3 + u_1 = 0 \quad \text{(A.24b)}$$

$$\gamma_{12}y_1 - y_2 + \gamma_{32}y_3 + \beta_{22}x_2 + \beta_{42}x_4 + u_2 = 0 \quad \text{(A.25b)}$$

$$\gamma_{23}y_2 - y_3 + \beta_{13}x_1 + \beta_{43}x_4 + u_3 = 0 \quad \text{(A.26b)}$$

This system of equations can be expressed in matrix form as (A.16), i.e., $Y\Gamma + XB + U = 0$ or $Y = -XB\Gamma^{-1} - U\Gamma^{-1} = X\Pi + V$ where

$$\Gamma = \begin{bmatrix} -1 & \gamma_{12} & 0 \\ \gamma_{21} & -1 & \gamma_{23} \\ \gamma_{31} & \gamma_{32} & -1 \end{bmatrix}, B = \begin{bmatrix} \beta_{11} & 0 & \beta_{13} \\ \beta_{21} & \beta_{22} & 0 \\ \beta_{31} & 0 & 0 \\ 0 & \beta_{42} & \beta_{43} \end{bmatrix}, \text{and } \Pi = \begin{bmatrix} \pi_{11} & \pi_{12} & \pi_{13} \\ \pi_{21} & \pi_{22} & \pi_{23} \\ \pi_{31} & \pi_{32} & \pi_{33} \\ \pi_{41} & \pi_{42} & \pi_{43} \end{bmatrix}$$

Take the first equation for which (A.21) is

$$\begin{bmatrix} \pi_{41} & \pi_{42} & \pi_{43} \end{bmatrix} \begin{bmatrix} -1 \\ \gamma_{21} \\ \gamma_{31} \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix} \quad \text{(A.27)}$$

yielding

$$\pi_{42}\gamma_{21} + \pi_{43}\gamma_{31} = \pi_{41} \quad \text{(A.28)}$$

Notice that the matrix of π's in (A.27) has only one row, hence rank of 1 and does not meet both rank and order conditions that require the rank be (q_2-1), i.e., 2, thus the first equation is under or unidentified. The result is that, as shown in (A.28), there is only one equation for two unknowns, γ_{21} and γ_{31}, thus, we can not get unique solutions for them.

For the second equation, (A.21) is

$$\begin{bmatrix} \pi_{11} & \pi_{12} & \pi_{13} \\ \pi_{31} & \pi_{32} & \pi_{33} \end{bmatrix} \begin{bmatrix} \gamma_{12} \\ -1 \\ \gamma_{32} \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix} \quad \text{(A.29)}$$

yielding

$$\pi_{11}\gamma_{12} + \pi_{13}\gamma_{32} = \pi_{12} \tag{A.30}$$

$$\pi_{31}\gamma_{32} + \pi_{33}\gamma_{32} = \pi_{32} \tag{A.31}$$

or

$$\begin{bmatrix} \pi_{11} & \pi_{13} \\ \pi_{31} & \pi_{33} \end{bmatrix}\begin{bmatrix} \gamma_{12} \\ \gamma_{32} \end{bmatrix}=\begin{bmatrix} \pi_{12} \\ \pi_{32} \end{bmatrix} \tag{A.32}$$

If (A.30) and (A.31) are linearly independent or the matrix of π's in the left hand side of equation (A.32) is in full rank,[14] then we can solve two equations for two unknowns, yielding unique solutions as (A.33) and (A.34). Because we have just enough information to solve for unique solutions, the equation is *exactly* or *just identified.*

$$\gamma_{12} = \frac{\pi_{12}\pi_{31} - \pi_{12}\pi_{33}}{\pi_{12}\pi_{31} - \pi_{12}\pi_{33}} \tag{A.33}$$

$$\gamma_{32} = \frac{\pi_{12}\pi_{31} - \pi_{11}\pi_{32}}{\pi_{13}\pi_{31} - \pi_{11}\pi_{33}} \tag{A.34}$$

Finally, consider the last equation for which (A.21) is

$$\begin{bmatrix} \pi_{22} & \pi_{23} \\ \pi_{32} & \pi_{33} \end{bmatrix}\begin{bmatrix} \gamma_{23} \\ -1 \end{bmatrix}=\begin{bmatrix} 0 \\ 0 \end{bmatrix} \tag{A.35}$$

yielding

$$\pi_{22}\gamma_{23} = \pi_{23} \tag{A.36}$$

$$\pi_{32}\gamma_{23} = \pi_{33} \tag{A.37}$$

Now, we have two equations for one unknown (γ_{23}) such that $\gamma_{23} = \pi_{23}/\pi_{22}$ or $\gamma_{23} = \pi_{33}/\pi_{32}$. These two solutions, which are identical conceptually or in population, usually

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[14] Thus, rank condition requires that the matrix of π's in the left hand side of equation (A.32) collapsed from (A.21) be in full rank, not Π_{12} in (A.21).

differ from each other in sample estimation. We have redundant information and the equation is overidentified.

Estimating Structural Equations: Two Stage Least Squares (2SLS) Solution

The method getting structural coefficients as for the second equation is called *indirect least squares* (ILS) because we usually estimate the reduced form coefficient by OLS. Notice by the example of the third equation, however, that ILS yields multiple solutions for structural coefficients in the case of an overidentified equation. Because we have no theoretical reason to take one solution over the other(s), the problem is how to utilize the information in a most appropriate way. 2SLS is the most prevalently used method to estimate overidentified structural equations.

Consider an equation in a nonrecursive system

$$y = Y_1\gamma + X_1\beta + u \tag{A.38}$$

where y is $(N \times 1)$ data vector for the dependent variable, Y_1 is $(N \times g)$ data matrix for g endogenous variables included in the equation as regressors, X_1 is $(N \times h)$ data matrix for h exogenous variables included in the equation, γ is $(g \times 1)$ coefficient vector for endogenous variables and β is $(h \times 1)$ coefficient vector for exogenous variables. (A.38) can also be expressed as (A.39).

$$y = \begin{bmatrix} Y_1 & X_1 \end{bmatrix} \begin{bmatrix} \gamma \\ \beta \end{bmatrix} + u \tag{A.39}$$

Let Z be $\begin{bmatrix} Y_1 & X_1 \end{bmatrix}$ and δ be $\begin{bmatrix} \gamma \\ \beta \end{bmatrix}$, then (A.39) can be expressed as

$$y = Z\delta + u \tag{A.40}$$

which is analogous to (A.1). And, likewise analogously by (A.2), structural coefficients may be obtained by

$$\delta = \begin{bmatrix} \gamma \\ \beta \end{bmatrix} = (Z'Z)^{-1}Z'y = \begin{bmatrix} Y_1'Y_1 & Y_1'X_1 \\ X_1'Y_1 & X_1'X_1 \end{bmatrix}^{-1} \begin{bmatrix} Y_1'y \\ X_1'y \end{bmatrix} \tag{A.41}$$

However, since Y_1 are correlated with errors, OLS estimator by (A.41) is biased and inconsistent. 2SLS involves finding instrumental variables (IV) to replace Y_1 ($\hat{Y}_1$) by performing OLS regression on reduced form equation for Y_1, i.e., regressing Y_1 on all exogenous variables, X, then performing an OLS regression of y on $\hat{Y}_1$ and X_1. That is,

$$\hat{Y}_1 = X(X'X)^{-1}X'Y_1 \tag{A.42}$$

where $X = \begin{bmatrix} X_1 & X_2 \end{bmatrix}$ and, of course, X_2 is $[N \times (Q - h)]$ data matrix for $(Q - h)$ exogenous variables excluded from the equation. Now let W be $\begin{bmatrix} \hat{Y}_1 & X_2 \end{bmatrix}$ and replace Z in (A.4) and (A.41) by W, and 2SLS estimation for

$$y = Wd + e \tag{A.43}$$

can be obtained by

$$d = \begin{bmatrix} c \\ b \end{bmatrix} = (W'W)^{-1}W'y = \begin{bmatrix} \hat{Y}_1'\hat{Y}_1 & \hat{Y}_1'X_1 \\ X_1\hat{Y}_1 & X_1'X_1 \end{bmatrix}^{-1} \begin{bmatrix} \hat{Y}_1'y \\ X_1'y \end{bmatrix}$$

$$= \begin{bmatrix} Y_1X(X'X)^{-1}X'Y_1 & Y_1'X_1 \\ X_1'Y_1 & X_1'X_1 \end{bmatrix}^{-1} \begin{bmatrix} X(X'X)^{-1}X'y \\ X_1'y \end{bmatrix} \tag{A.44}[15]$$

It can further be shown that the variance-covariance matrix of 2SLS estimator can be estimated by

$$s^2 \begin{bmatrix} Y_1X(X'X)^{-1}X'Y_1 & Y_1'X_1 \\ X_1'Y_1 & X_1'X_1 \end{bmatrix}^{-1} \tag{A.45}$$

where

$$s^2 = e'e/(N-g-h) = (y - Y_1b - X_1c)'(y - Y_1 - X_1c)/(N - g - h) \tag{A.46}[16]$$

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15 This derivation is obtained by the facts that $\hat{Y}_1 = Y_1 - V_1$ (V_1 is residuals from OLS estimation of reduced form equations) and least squares residuals are uncorrelated with predicted value and regressors, i.e., $Y_1'V_1 = 0$ and $X'V_1 = 0 = X_1'V_1$.

16 Reconsidering earlier discussion of identification via examples, several points are to be noted. First of all, for an unidentified equation, 2SLS procedure just collapses because of multicollinearity problem. Consider the first equation in above example. After IV substitution, the estimation equation at second stage is

A few points can be noted from the discussion so far. First, from (A.44), 2SLS does not actually involve computing $\hat{Y}_1$ to replace Y_1. Rather, it actually estimate structural coefficients at a single step. Second, from (A.35), 2SLS performed by two separate runs of OLS does not provide accurate estimate of coefficient variances because, at second stage, it uses $\hat{Y}_1$ instead of Y_1 to calculate residuals and residual sum of squares, hence s2 in (A.46). Normally, it overestimate residual variance, hence standard errors of estimates.

Second, more importantly, main diagonal elements of inverse matrix in (A.45) are least when $\hat{Y}_1 = Y_1$, i.e., instrumental variables are perfectly correlated with original variables, hence original variables themselves, and roughly speaking, the higher the correlation between $\hat{Y}_1$ and Y_1 is, the less the main diagonal elements, i.e., variances of coefficient estimates (Johnston, 1972: 281; Hanushek and Jackson, 1977: 244).[17] Thus,

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$$y_1 = c_{21}y_2 + c_{31}y_3 + b_{11}x_1 + b_{21}x_2 + b_{31}x_3 + e_2$$

where

$$y_2 = \pi_{12}x_1 + \pi_{22}x_2 + \pi_{32}x_3 + \pi_{42}x_4$$

$$y_3 = \pi_{13}x_1 + \pi_{23}x_2 + \pi_{33}x_3 + \pi_{43}x_4$$

From this, it is obvious that one of the IVs can be expressed as a linear combination of the other IV and three exogenous variables, x_1, x_2, and x_3, hence perfect multicollinearity. Second, for an exactly identified equation, 2SLS yields identical results with ILS. To demonstrate this,

$$\begin{aligned} y_2 &= c_{12}y_1 + c_{32}y_3 + b_{22}x_2 + b_{42}x_4 + e_2 \\ &= c_{12}(\pi_{11}x_1 + \pi_{21}x_2 + \pi_{31}x_3 + \pi_{41}x_4) \\ &\quad + c_{32}(\pi_{13}x_1 + \pi_{23}x_2 + \pi_{33}x_3 + \pi_{43}x_4) + b_{22}x_2 + b_{42}x_4 + e_2 \\ &= (c_{12}\pi_{11} + c_{32}\pi_{13})x_1 + (c_{12}\pi_{21} + c_{32}\pi_{23} + b_{22})x_2 \\ &\quad + (c_{12}\pi_{31} + c_{32}\pi_{33})x_2 + (c_{12}\pi_{41} + c_{32}\pi_{43} + b_{42})x_4 + e_2 \\ &= \pi_{12}x_1 + \pi_{22}x_2 + \pi_{32}x_3 + \pi_{42}x_4 + e_2 \end{aligned}$$

From this, it is obvious

$$\gamma_{12} = \frac{\pi_{12}\pi_{31} - \pi_{12}\pi_{33}}{\pi_{12}\pi_{31} - \pi_{11}\pi_{33}} \qquad \text{(by A.33)}$$

$$\gamma_{32} = \frac{\pi_{12}\pi_{31} - \pi_{11}\pi_{32}}{\pi_{13}\pi_{31} - \pi_{11}\pi_{33}} \qquad \text{(by A.34)}$$

Finally, for an overidentified equation, it is shown that 2SLS estimator can be seen as a weighted average of the multiple estimates obtained from reduced form coefficients in case of overidentified equations, e.g., π_{23}/π_{22} and π_{33}/π_{32} in earlier example (Goldberger, 1973).

[17] It intuitively makes sense when we note that main diagonal elements of $(X'X)$, for example, are the sums of squares of each variables, hence their variances when measure through their means, and the sum of

2SLS estimator is less efficient than OLS estimator in small samples. Furthermore, as to be noted shortly, 2SLS estimator is still biased, if consistent, and consistency is large sample property. Thus, when the sample size is relatively small and $\hat{Y}_1$ is poorly correlated with Y_1, we pay too high price for consistency, the big loss in efficiency.

Further, while it has been shown that 2SLS procedure breaks down for an underidentified equation due to multicollinearity, high degree of multicollinearity is still a problem even for an identified equation. This is especially the case if the equation includes more than one endogenous variables as IVs for endogenous variables are linear combinations of same set of variables, and one IV, together with the exogenous variables in the equation that are components of IVs can be very highly, if not perfectly, correlated with another.

Indeed, the loss of efficiency and high degree of multicollinearity is two of the most pervasive problems associated with 2SLS method. One solution might be to invoke Three Stage Least Squares (3SLS), which is one of full information system estimation technique. If 2SLS estimates one equation at a time,[18] 3SLS estimates all equations in the system simultaneously by taking account of variance-covariance among error terms across equations, i.e., structural disturbances, and yields in general more efficient estimates than 2SLS.[19] However, there are two major disadvantages for 3SLS. First of all, because

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squares is greater than the product of the variable and any predicted value generated by regression. Taking inverse, the elements are smallest when original elements are greatest.

[18] Thus, 2SLS is called limited information single equation estimation technique.

[19] 3SLS estimation can be seen as application of GLS to 2SLS. Generalizing (A.41) for all equations in the system, a system of M equations at second stage of 2SLS can be seen as

$$y_1 = Wd_1 + e_1$$
$$y_2 = Wd_2 + e_2$$
$$\vdots$$
$$y_m = Wd_m + e_m$$

where $W_g = \begin{bmatrix} \hat{Y}_g & X_g \end{bmatrix}$ and $d_g = \begin{bmatrix} c_g \\ b_g \end{bmatrix}$ or more generally, $Y = Wd + e$. Application of Aitken estimator by (A.8) leads to 3SLS estimator such that $d = (W'\Omega^{-1}W)^{-1}W'\Omega^{-1}y$. As usual, Ω is defined as $E(ee')$ and estimated such that

$$\Omega = \begin{bmatrix} \sigma_{11}I & \sigma_{12}I & \cdots & \sigma_{1M}I \\ \sigma_{21}I & \sigma_{22}I & \cdots & \sigma_{2M}I \\ \vdots & \vdots & \cdots & \vdots \\ \sigma_{G1}I & \sigma_{G2}I & \cdots & \sigma_{GM}I \end{bmatrix}$$

3SLS considers overall structure of the system simultaneously, in case that there is any misspecified equation in the system, the effect spreads out over the all equations. More importantly, however, because 3SLS estimates all coefficients in the system simultaneously, 3SLS estimation of a large system is often not viable because of the shortage of degrees of freedom (Wonnacott and Wonnacott, 1979: 511). Precisely because of this reason, 2SLS is chosen in this research.

It can be proven that 2SLS estimator is asymptotically consistent (Johnston, 1972: 383-4), though small sample property, especially biasedness is not clear. Monte Carlo studies suggests, however, that when multicollinearity among X's are not present, 2SLS generally outperforms OLS (Johnston, 1972: 408ff). Again, 2SLS is at least consistent and computationally convenient, thus the most widely used.

2SLS, Lagged Endogenous Variables and Autocorrelation in Errors: IV-GLS Solution Applied to Each Stages of 2SLS

If technical solution to problems in 2SLS is not viable, solution is to be found in specification. A rule of thumb might be, hopefully, to find some exogenous variables (1) with major explanatory power so as to improve efficiency of $\hat{Y}$'s and (2) as unique for each endogenous variable as possible to avoid collinearity. In time series observations, such variables are often found in terms of *lagged endogenous variables*. Unfortunately however, the inclusion of lagged endogenous variables in the list of predetermined instruments complicates the estimation procedure a lot more.

As discussed before, when there is any lagged endogenous variable among regressors and error terms are serially correlated, the lagged endogenous variable is correlated with error terms, hence, it can no longer be treated as *pre-determined.* Even at the first stage of 2SLS, lagged endogenous variables and autocorrelation in error terms will produce biased and inconsistent coefficient estimates, hence inconsistent instrumental variables, and consequently the same results in second stage. Furthermore, upon presence of autocorrelation, least square estimator is biased and residuals do not provide information on the error terms. A conservative rule of thumb, especially for time series model, might be treating them strictly endogenous variables (Berry, 1984: 82-84).

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where $\sigma_{ij} = (e^*_i{}' e^*_i)/N$ designating covariance between errors in ith and jth equations, and e^*_i is residual from second stage estimation of ith equation. For relatively detailed discussion of 3SLS, see Wonnacott and Wonnacott (1979: 502-511) and Kmenta (1971: 573-578).

There are some difficulties with this conservative rule, however. First, by treating lagged endogenous variables in the system strictly endogenous, it is very likely that some of equations become unidentified. Second, by deleting lagged endogenous variables from first stage estimation, we are very likely to end up poor replacements for included endogenous variables as just discussed. The costs are especially costly when there is actually no autocorrelation.

Instead, this study employs a estimation method which might be seen as 2SLS with IV-GLS treatment at each stages. Since autocorrelation in disturbances poses problems even in the absence of lagged endogenous variables, i.e, biased estimates of coefficient variances by (A.45) as in the case of single equation, pseudo-GLS procedure via (A.8) through (A.10) is be applied to the second stage estimation of each equation via (A.44) through (A.46) such that

$$d = (W'\Omega^{-1}W)^{-1}W'\Omega^{-1}y \tag{A.47}$$

and variance-covariance matrix for d is

$$\text{var}(d) = s^2(W'\Omega^{-1}W)^{-1} \tag{A.48}$$

where s^2 is obtained by

$$s^2 = \frac{e'\Omega^{-1}e}{N-g-k} = \frac{(y - Y_1b - X_1c)'\Omega^{-1}(y - Y_1b - X_1c)}{\text{N-g-k}} \tag{A.49}$$

Also an $\hat{\Omega}$ for Ω can be obtained by analyzing residuals from least squares estimation of (A.43) through the procedure discussed earlier.

Likewise, IV-GLS analogy can also applied to 2SLS estimation of dynamic models, at both stages of 2SLS. That is, at first stage, we can create instrumental variables for the lagged endogenous variables by regressing current and successive lagged values of all exogenous variables.[20] IVs are then substituted for the corresponding lagged endogenous variables and residuals from estimation of reduced form equation for each endogenous variables are checked for the presence and structure autocorrelation in disturbances. If autocorrelation is present, pseudo IV-GLS method is used to create IVs

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[20] It is important to make sure that the number of lags must equal or exceed the number of lagged endogenous variables divided by the number of exogenous variables. This is because of a problem analogous to identification problem; one of the IVs for the lagged endogenous variables can be expressed by linear combination of other IVs and all exogenous variables, hence perfect multicollinearity. See above *fn.* 9.

for endogenous variables at the first stage and if not, OLS solution will be good for the IVs.[21]

At the second stage, IV-GLS solution again will be invoked if the equation in question is of dynamic formulation. That is, IVs created at the first stage are substituted for corresponding lagged endogenous variables included in the equation and residuals from OLS estimation of the second stage equation are checked for the presence and structure of autocorrelation in disturbances. If autocorrelation is present, GLS solution via (A.47) through (A.49) is to be sought and, if not, simple least squares solution via (A.44) through (A.46) will be the final estimation results. Figure A.1 summarizes the estimation steps at a glance.

Unfortunately, computer softwares that precisely satisfy the steps discussed above are not readily avaible. Thus, I wrote a program utilizing matrix operation in SAS PROC MATRIX. Also, PROC ARIMA in SAS is used to identify and estimate time dependent process in disturbances. Hard copies of the program as well as data used in this research shall be avaible upon request.

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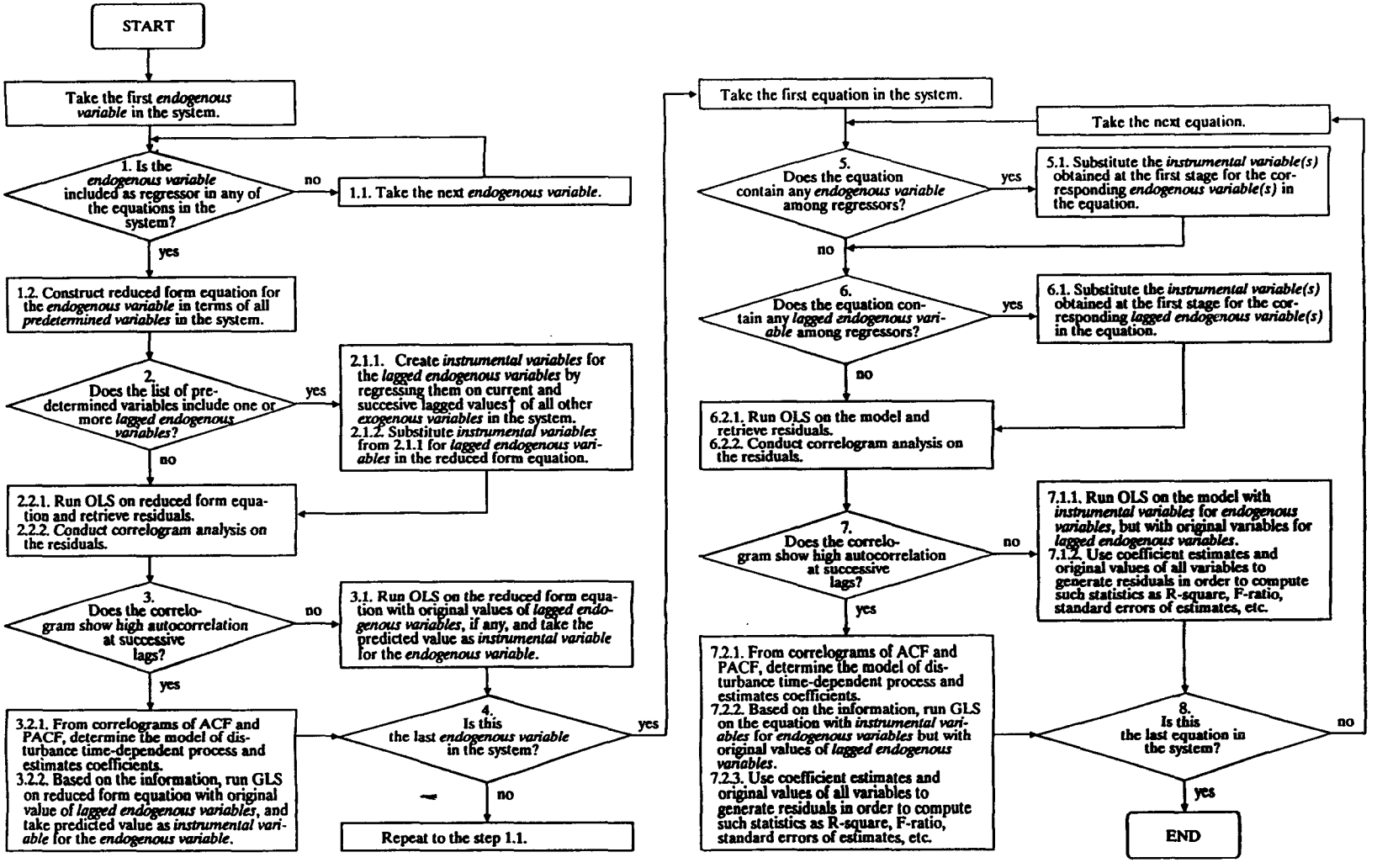
[21] If IV substitution alone generates $\hat{Y}$ that is good enough, the GLS step can practically be skipped.



Notes: Left part of the diagram describes the first stage, and right part of the diagram describes the second stage of 2SLS regression.
† Number of lags ≥ (number of lagged endogenous variables + number of exogenous variables)

Figure A.1. Estimation Steps: A Flow Diagram

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