

**GLOBAL ARMS AND THIRD WORLD AGGRESSION:
OVERT MILITARY INTERVENTIONS, 1950-1988**

Herbert K. Tillema

David Kinsella

Department of Political Science
University of Missouri-Columbia

Paper presented at the annual meeting of the American Political Science Association, 31 August - 3 September 1995, Chicago. This research was funded in part by a grant from the University of Missouri Research Board. Our thanks to Man Yuan for research assistance.

GLOBAL ARMS AND THIRD WORLD AGGRESSION: OVERT MILITARY INTERVENTIONS, 1950-1988

Abstract

A transfer of arms from one state to another carries contradictory implications for peace and war. Among other considerations, arms may facilitate the use of force by the recipient at the same time that they help to deter the use of force by others. Recently compiled data that identify all arms transfer programs to Third World states and all overt military interventions initiated by Third World states from the 1950s through the 1980s permit systematic analyses of this conundrum. Separate analyses of the impact of arms transfers upon Third World aggression at each of three weakly supervenient levels -- among individual recipient states, among regional security complexes, and for the Third World as a whole -- yield mutually informative but not identical results. Overall, arms transfers to Third World states during the Cold War era apparently exacerbated Third World aggression.

GLOBAL ARMS AND THIRD WORLD AGGRESSION: OVERT MILITARY INTERVENTIONS, 1950-1988

Developed nations supplied hundreds of billions of dollars worth of armaments to the Third World during the half century that followed World War II. The United States and the Soviet Union provided most of this equipment, primarily to members of their respective Cold War blocs. Enduring controversy attends the effect upon world peace. The U.S. Mutual Defense Assistance Act (1949), basis for most subsequent American activity in this domain, claimed "to promote peace and security in furtherance of the purposes of the Charter of the United Nations." Critical observers frequently assert that arms transfers exacerbate frequent and widespread armed conflict in the Third World (Ayoob, 1995; Klare, 1990; Ross, 1990). The issue concerns the symbolic/strategic dimension of military might as much or more than mere physical capabilities to wage war. It also involves suppliers as well as recipients, their relationships, and the structure of global and regional systems.

Disagreement about arms transfers is related to unresolved dispute about the consequence of standing arms generally within world politics. Pacifists frequently emphasize the danger of arms race and war inherent in military acquisitions (Richardson, 1960). "Realists" and "Neo-Realists," on the other hand, frequently emphasize the possibility of peace through armed deterrence (Morgan, 1977; Waltz, 1979: 161-193). The general argument takes further sustenance from remembered events that seem to point in opposite directions (Glynn, 1992: 1-83). World War II is often blamed in part upon disarmament among Western powers which denied them means to deter and undermined their will to counter early evidences of German and other Axis aggression. World War I, on the other hand, is often blamed in part upon prior build-up of armaments among most of the great powers.

Recent systematic research leads to the conclusion that arms transfers are at most contributing factors and not primary causes of either peace or war (Pearson, 1994: 62-68). Beyond this, there is contradictory evidence regarding the direction of arms' effects. Kinsella and Tillema (1995) observe no appreciable impact of superpower arms transfer programs as a whole upon the incidence of military aggression as a whole among the enduring rivals Israel, Syria and Egypt during the Cold War era. The same study reports, however, that aggregate results mask important relationships with individual states whom U.S. and Soviet transfers appear to drive in opposite directions: Soviet transfers to Syria and Egypt appear to contribute to heightened aggression on their part; U.S. transfers to Israel appear to inhibit Israeli aggression. It is suggested that differences between U.S. and Soviet arms transfers is consistent with differences in global roles among the superpowers as status quo and revolutionary powers, respectively. Kinsella's (forthcoming) comparative study of superpower arms transfers within several enduring rivalries finds the Iran-Iraq conflict system resembles that involving Israel and her neighbors but that conflict behavior within the Indian-Pakistani and Somali-Ethiopian rivalries do not appear to respond consistently to either U.S. or Soviet arms transfers.

ARMS TRANSFERS AND THE USE OF FORCE BY STATES

Uncertainty about the effects of arms transfers owes in part to contradictory tactical and strategic implications that arms in general and arms transfers in particular may carry to prudent statesmen. Whether a given transfer of arms enhances peace or foments armed conflict depends upon which of several paths individual states subsequently follow. Their courses presumably depend upon individual foreign policy decisions.

In terms of tactical considerations, including estimated readiness for specific military tasks, new arms often enhance, and seldom if ever diminish confidence and ability to undertake military operations. Arms imports therefore tend to reduce tactical inhibitions and to expand perceived opportunities to employ military force. To the extent that statesmen act upon such considerations, recipients of arms transfers are likely to resort to force more often than would otherwise be the case.

Arms transfers also influence strategic calculations in several ways, including among both recipient states and among others with whom they interact (Schelling, 1966). Recipients may be more likely to resort to force to the extent that they imagine that others will be awed by new arms and be less likely to resist. Recipients who believe suppliers will support their military ventures are especially likely to be belligerent. On the other hand, tending in the opposite direction, new arms usually enhance recipients' confidence in their military capabilities. This may license recipients to postpone military action in response to provocations by other parties, at least temporarily, despite fear that delay risks greater danger to their interests. Supplier caution may contribute further to self-restraint.

At the same time, arms transfers often send mixed messages to other parties with whom recipients interact and so affect the outcome of strategic encounters. On the one hand, enhanced capabilities of the recipient may deter hostile military action by rivals; they may also forestall supporting intervention by friends who believe that the recipient can take care of itself. On the other hand, new arms may trigger preemptive aggression by rivals who fear that the recipient will act at once to exercise its momentary tactical advantage or that the military balance will shift further in recipients' favor in the future.

Whether a given arms transfer will instigate or deter violence is therefore problematic. The transfer of arms triggers a complicated dance of behaviors and expectations among all interested parties, including recipients, rivals, allies, suppliers and other interested observers. It follows that all transfers are not necessarily equal whether or not they have similar monetary value. Among other things, the types of weaponry involved, the strategic situation of the recipient, the policy stance of the supplier, and the relationship between supplier and client may each affect the political consequences of arms.

In addition, strategic complexity implies that the effect of arms upon security regions or upon conflict in the world as a whole may appear to be incommensurate with visible effects upon the behavior of recipient states. Assuming that a single arms transfer may simultaneously instigate military action by the recipient and deter military action by other interested parties, it is possible in some instances that arms may incite the recipient state to violence but pacify other interested parties such that the cumulative effect upon the region as a whole appears to be neutral; in extreme cases regions may seem to become more peaceful at the same time that recipients become more warlike. In short, laws

sufficient to account for the foreign policy phenomena associated with arms injected into a state do not appear to be sufficient to account for the international effects of arms injected into a region despite that international effects in general are presumed to be supervenient (dependent) upon foreign policy phenomena.

REDUCTIONIST AND WEAKLY SUPERVENIENT SYSTEMS

Such a conundrum is familiar to students of international relations as the "level-of-analysis" problem (Singer, 1961) concerning apparent disjuncture between information about the international system and information about foreign policies of individual states. "Levels," in this context, represent two or more sets of concepts and related observations that purportedly describe equivalent phenomena in different detail as if viewed at different magnification under microscope or telescope. The level-of-analysis problem in international relations is an instance of a general question in the philosophy of science concerning the unity of scientific knowledge.

A familiar argument synthesized by Oppenheim and Putnam (1958) hypothesizes that branches of science may be ordered hierarchically according to reductive levels for each of which, except the lowest, observations may be decomposed in terms of the next lower level. Were the sciences fully unified it would be possible to reduce knowledge about social groups to knowledge of individual living things, of cells, molecules, atoms and, ultimately, of elementary particles. In the strongest form of this argument, it is hypothesized that all scientific knowledge is determinate in the sense that phenomena associated with complex social entities may be inferred wholly from observations of sub-atomic phenomena and that sub-atomic phenomena may be deduced from observations of complex social entities.

The practical problem with strict reductionism/determinism, over and above moral objections to demeaning human beings and their institutions, is that it has not yet been made to work in anything like all fields of inquiry despite conspicuous successes within some areas of study. Integration among the social sciences has proven to be especially difficult to date. Kenneth Waltz (1979: 60-78) argues in addition that it is unlikely to be found that either one or a few individual states contain within themselves all of the qualities necessary to explain important phenomena we associate with world politics as a whole: international relations, he argues, is inherently more than a foreign policy writ large.

There are alternatives between such extreme positions of strict reductionism/ determinism and presumptive independence among branches of knowledge (Post, 1987: 159-208; Teller, 1987). John Haugeland's (1982) notion of "weak supervenience" is particularly helpful for present purposes. "Supervenience," as the concept is usually employed in contemporary philosophical discourse, represents the notion that elements of one class depend upon elements of another to the extent that identical elements in one (higher-level) class are invariantly associated with identical elements in the second (lower-level) class (Hellman and Thompson, 1974). Supervenient systems may be but are not necessarily reducible. A system of knowledge is reducible if and only if it can be demonstrated that information associated with one (higher level) class may be decomposed in its entirety in terms of definite elements within another (lower-level) class. A system is said to be weakly supervenient if it can

be demonstrated only that (higher-level) information depends upon another (lower-level) class but not necessarily upon definite elements of that class.

Almost all theories of international relations assume supervenience to the extent that, all things being equal, identical foreign policies predict identical international phenomena. Present knowledge generally supports only the proposition that international relations is a weakly supervenient system, however. Within the limits of present knowledge, similar international events often appear to be associated with dissimilar foreign policies (Most and Starr, 1984). In addition, the identification of each foreign policy element that underlies a given international event is frequently beyond the reach of present methods of observation. The reductionist hypothesis that international relations might be reduced entirely to foreign policy terms cannot be invalidated any more than can other speculations regarding future invention. Neither is it a fully satisfactory basis upon which to organize present knowledge.

Arms transfers and international armed conflict evidently represent a weakly supervenient system. We assume that the effects of arms upon international armed conflict within a region or within the Third World as a whole depend upon the policies of all affected parties. Some non-recipients are presumably affected as well as are recipients. We can observe which recipients receives arms and when. We do not know how to recognize the impact of arms upon non-recipients, neither who specifically is affected by a given transfer, nor precisely in what manner.

Weakly supervenient systems, in contrast to fully determinate systems, often do not permit an observer to identify simultaneously and precisely both the locus and the direction of effects within the system. This is roughly analogous to the indeterminacy problem within quantum mechanics which, it may be argued, although Haugeland does not explicitly do so, is also a weakly supervenient system. John von Neumann (1955) suggested that the measurement problem in quantum mechanics may be addressed by means of statistical inference and he and others have subsequently applied this idea to measurement problems in other weakly supervenient systems.

It follows from the assumption of weak supervenience that the observed effects of arms upon the behavior of recipient states and the effects upon specific regions or the Third World as a whole may appear to be inconsistent. The effects of arms upon individual recipients may be interpreted, at least statistically, as deliberate, even sensible responses to new opportunities conferred by receipt of arms. The regional consequences of arms transfers include such diffuse and convoluted effects as sometimes to seem perverse and unintended.

SYSTEMS, STATES, AND SECURITY COMPLEXES

The number and identify of meaningful "levels" within a weakly supervenient system is often indefinite; not so within a fully determinate system for which all knowledge reduces to one level. Indeterminacy implies that various classes of observation may capture information that cannot be known at other levels. In general, any class of observations is likely to be uniquely informative if it represents differences that cannot be deduced from more highly aggregated observations and if it reveals distinctive qualities, including interaction effects, that cannot be inferred from disaggregated observations.

Certain levels of analysis are stipulated by convention within international relations. Observa-

tions about individual states and their foreign policies are customarily assumed to represent unique information that cannot be reduced entirely to consequences of individual human beings, much less to biological, chemical or physical phenomena. Observations about the characteristics of the international system are also customarily assumed to include unique information that cannot be inferred simply from knowledge of individual states.

Between the level of the individual state and that of today's presumptively global international system are various postulated aggregations that each purportedly captures unique information about some aspect of international relations. One such is the distinction between the Third World, including most societies of Africa, Asia, Latin America and the Middle East, and the Developed World (or Worlds) of Europe and North America. It must be borne in mind, however, that the original form of this idea introduced by Alfred Sauvy (1969: 204) in the early 1950s conceived of the *tiers monde* primarily as a cultural entity distinct from European and Europeanized society. With respect to security affairs, the "Third World" represents merely an agglomeration of disparate local and regional rivalries and ententes that gain common identity primarily through parallel involvements among the world's great powers. As such, the Third World is less a cohesive security unit in its own right than it is a compartmented repository of global security concerns that are best understood in terms of the international system as a whole.

Various other efforts have been made to define meaningful aggregations of states below the level of the international system. These include notions of "subordinate systems" (Brecher, 1963) and of international or regional "subsystems" (Haas, 1970; Thompson, 1973; see also Russett, 1967; Cantori and Spiegel, 1970). The domain of interstate relations encompassed by these conceptualizations is fairly broad, which naturally has led to disagreements over subsystem or regional boundaries. More recent efforts, often by analysts of Third World security, have tended to focus more narrowly on political and military relations, and have in the process achieved some measure of consensus.

Barry Buzan's (1991: chapter 5) framework for analyzing Third World security is built around his notion of "security complexes." A regional security complex is defined as a geographically proximate group of states with closely linked security concerns, and usually entails "a high threat/fear which is felt mutually among two or more major states" (193-194). These complexes typically include an array of minor states, although their impact on regional security dynamics is secondary. Following Waltz (1979), Buzan conceives of security complexes as subsystems -- "miniature anarchies" with identifiable patterns of interaction (mostly enmity) and distributions of power (209). Political and military interaction is more intense among the states comprising the complex than between members and nonmembers. Geographical boundaries are thus delineated by the "relative indifference" shown to outside developments (193).

Others have adopted analytical frameworks similar to Buzan's for purposes of Third World security analysis (e.g., Ayoob, 1995; Wriggins, et. al., 1992). These studies have sought to emphasize, among other things, the role of extraregional powers, which highlights the distinction between higher and lower level security complexes. Lower level (i.e., regional) complexes consist of states with relatively limited power-projection capabilities, and therefore have relatively little impact on security relations beyond the region. Higher level complexes involve the great powers, and are not perforce

geographically bounded. The dynamics of higher level security complexes reverberate throughout the international system, penetrating or impinging upon regional complexes. This may take many forms, but most analysts agree that arms transfers have been "the characteristic tool of intervening great powers in almost every Third World security complex" (Buzan, 1991: 213; see also Ayoob, 1995: 100-102).

EFFECTS OF ARMS TRANSFERS WITHIN A WEAKLY SUPERVENIENT SYSTEM

On average, although not necessarily in every case, foreign arms transfers are likely to incite increased military activity by recipients if only because new arms almost always increase recipient's tactical capabilities (hence, opportunities) for military action. Soviet and American arms are presumably similar in this regard, across the Third World as a whole, despite that the United States was not so openly committed to forceful change around the world as was the Soviet Union.

The systemic effects of arms transfers are associated with the character of given security complexes and not merely with the effects upon particular recipients. Within a stable security complex, generally speaking, the net effect of arms transfers is likely to be negligible because arms deter military action by non-recipients as often or as much as they incite military action by recipients. In unstable security complexes, arms fail to deter non-recipients and may even incite preemptive action among them to the extent that arms contribute to increased armed conflict in the region as a whole. In case of pacified complexes, presumably including where arms are supplied only or almost exclusively to a regional hegemon, arms transfers may be associated with reduced conflict within the region because all except the recipient are deterred from undertaking military action.

Abundant anecdotal evidence exists to suggest that imported arms are contributing factors in at least some of the numerous instances of international armed conflict that have racked the Third World during the Cold War era. It is plausible to suppose that the Third World as a whole inclines toward instability with respect to arms transfers. Most of the globe has been peaceful at any given moment since World War II, but few regions outside the Developed World of Europe and North America have been reliably pacified. At any given moment there are usually some Third World "hotspots" somewhere within which arms fail to deter and seem primarily to incite violence. Such hotspots often represent regions where most neighbors gain new arms. The United States may have contributed more to Third World violence overall than it intended and as much or more than the Soviet Union, primarily because the United States provided more arms among more recipients than the Soviet Union.

This does not necessarily imply that arms served identical functions within every region all of the time. Some regional security complexes were persistently unstable, including the Middle East where the superpowers competed nakedly and consistently through arms from the 1950s onward. Other regions became unstable from time to time. Nor did the United States and the Soviet Union perform similar roles everywhere. Within some localities -- notably within some corners of the Middle East -- previous research (Kinsella and Tillema, 1995; Kinsella, forthcoming) suggests that arms imports from the Soviet Union induced more violence than did those from the United States. Elsewhere, at various times, the superpowers reversed roles depending in part upon which was most closely associated with the local status quo.

DATA ANALYSIS

Measurement and Estimation

Following are a few simple tests of the impact of arms transfer programs upon the incidence of Third World overt military intervention at several levels of analysis.¹ Different levels are investigated by means of supervenient measures that reflect different aggregations of arms transfers and interventions. Recently compiled data permits systematic investigation of all arms transfer programs to Third World states and all overt military interventions by Third World states between 1950 and 1988. This period encompasses nearly the entirety of the Cold War era.

Kinsella (forthcoming; Kinsella and Tillema, 1995) enumerates all arms transfers to Third World states from all foreign suppliers according to weapons transfer programs to individual states recorded in the arms trade registers of the Stockholm International Peace Research Institute (SIPRI, 1975, 1988-1991; Brzoska and Ohlson, 1987).² We assume that an arms transfer program constitutes a political stimulus that may affect tactical and strategic calculations of the recipient and of other interested parties.

Tillema's (forthcoming, 1991) enumeration of overt military interventions since World War II includes 382 such interventions initiated by Third World states between 1950 and 1988. An overt military intervention represents combat-ready military operations openly undertaken by a state's regular military forces within a foreign territory.³ As such, overt military intervention is the defining characteristic of modern international armed conflict, including all generally recognized international wars and other immediately war-threatening military engagements. We assume that any initiation of overt military intervention, without regard to the target, initial magnitude or ostensible purpose, represents a quintessential aggressive act that may be affected by an arms transfer to the intervenor or to another related state.

These arms transfer data and overt military intervention data are nominally complete records of their respective phenomena. Therefore, numbers of arms transfer programs and numbers of interventions may be summed in order to measure rates appropriate to each of several levels of analysis. The number of ongoing arms transfer programs to a state and the number of overt military interventions initiated by that state permit analysis of the effects of arms upon aggression at the level of the state. The number of arms transfer programs within a regional security complex and the number of interventions initiated by members -- no matter by which members -- of that region permit regional level analysis. Similarly, the total number of arms transfers to, and the total number of interventions by Third World states permit analysis at the level of the Third World sub-system.

Estimation procedures follow those reported in an earlier study (Kinsella and Tillema, 1995) which focused exclusively upon the Middle East. We construct annual time series for the number of military interventions and arms transfer programs that occur during each year between 1950 and 1988. We have made separate tallies for total arms transfers, transfers from the United States, and transfers from the Soviet Union. Figure 1 shows time series for the Third World taken as a whole (although this represents only one of our aggregations).⁴ It is reasonable to assume, if there is a relationship between

arms transfers and military intervention, that it is a dynamic one. Since we are interested primarily in the impact of the former upon the latter, we restrict our analysis to the association between *ongoing* arms transfer programs and newly *initiated* interventions.⁵

[Figure 1 about here]

Application of linear regression to analyze event counts, such as ours, yields inefficient parameter estimates. Therefore we use a Poisson regression model in which maximum-likelihood estimates are based on a probability distribution more appropriate to event-count data (King, 1989). Two very simple models are estimated:

$$E(I_I) / \theta = \exp(\beta_0 + \beta_1 I_O + \beta_2 T_T) \quad (1)$$

$$E(I_I) / \theta = \exp(\beta_0 + \beta_1 I_O + \beta_2 T_A + \beta_3 T_S) \quad (2)$$

In the first model, initiated interventions, I_I -- observable events generated by the underlying process of state hostility, θ -- are expressed as an exponential function of ongoing interventions, I_O , and total arms-transfer programs, T_T . The second model treats initiated interventions as a function of ongoing interventions, American programs, T_A , and Soviet programs, T_S . While we do not attempt to account for the various grievances which give rise to armed conflict, both models do control for ongoing interventions and thereby make some allowance for recently high levels of interstate hostility, whatever the cause.

Results for the Third World

Table 1 lists parameter estimates for the effects of arms transfers on military intervention. Estimates for the effect of transfer programs from all sources (β_2 from model 1) appear in the first column; estimates for the effects of American and Soviet programs (β_2 and β_3 from model 2) appear in the second and third columns.⁶ Here our focus is on all Third World states. We have hypothesized that arms transfers, regardless of their source, increase the propensity of recipients to engage in overt military activity. The pooled time-series analysis (first row) is designed to test that proposition: the unit of analysis is the recipient-year, and the dependent variable is the number of military interventions in which the recipient was the initiator. The results are unambiguous. Ongoing arms-transfer programs to Third World states, from all sources combined and from the superpowers individually, were associated with an increase in the initiation of military intervention by recipients from 1950 to 1988.

[Table 1 about here]

Ascending from the individual level of analysis makes hypothesizing considerably more difficult. Although many observers treat as self-evident the conclusion that arms transfers have had an exacerbating effect on the incidence of conflict in the Third World as a whole, this remains an empirical question in the absence of theory which integrates the complex and countervailing dynamics identified in

the previous discussion. Nevertheless, the conventional wisdom does receive support from the results in Table 1. The estimates in the second row of the table are derived using aggregate time series for all Third World states taken together.⁷ Arms transfer programs from all sources have exacerbated the incidence of military conflict in the Third World, as have programs from the United States specifically. Arms transfers from the Soviet Union have not had this same effect on the aggregate level of conflict.

Table 2 provides an interpretation of the parameter estimates reported in Table 1. The Poisson regression model is nonlinear, so the predicted impact of a change in arms transfers depends on the existing levels of military intervention. In a "typical" year, the "typical" Third World state initiated 0.13 military interventions (i.e., the mean for the pooled time series). An increase of 7.47 arms-transfer programs in this context (i.e., a standard deviation) yields a predicted increase of 0.03 interventions -- a 23 percent change.⁸ Standard deviation increases in American and Soviet programs yield predicted increases of 0.01 and 0.02 interventions, respectively. In a typical year, roughly ten military interventions were initiated by all Third World states. An increase of 161.1 transfer programs is associated with just over three additional interventions, or a 32 percent increase. Although a standard deviation increase in American programs is much less (35.5), the net impact is about the same -- an increase of about three military interventions. Again, the impact of changes in Soviet programs is statistically insignificant at this level of aggregation.

[Table 2 about here]

Since these models are extremely parsimonious, and since there is also a stochastic element in the process leading to overt military conflict, we have not explained a great deal of the variance in initiated interventions. Indeed, at the individual level of analysis, both models explain only about 1 percent of that variance. At the aggregate level, they fare considerably better: model 1 explains 19 percent of the variance in initiated interventions; model 2, 26 percent.⁹ Figure 2 plots predicted values from the two models against the actual (aggregate) data. Both models seem to capture the general trend in the initiation of Third World military conflict, but also miss much, especially the large variation in the number of interventions initiated during the 1960s.

[Figure 2 about here]

Results for Regional Security Complexes

Buzan (1991), Ayoob (1995), and other students of Third World security have argued that the intensity and relative autonomy of state interaction within certain regions of the Third World qualifies them as subsystems or security complexes. These, they suggest, may serve as useful units of analysis. Such interaction patterns do not apply to all geographic regions composing the Third World, but Buzan has identified five which together do in fact encompass most states: South America, the Middle East, Southern Africa, South Asia, and Southeast Asia (see Figure 3).

[Figure 3 about here]

We adopt this framework as a guide for our regional analysis. Unfortunately, however, aside from cataloguing the membership of these five security complexes, Buzan is not terribly specific as to the likely impact of outside intervention in these complexes. Although he identifies arms transfers as the

most common means by which lower level complexes are penetrated by higher level ones, he is ambivalent about the net effect. His most precise statement is the following:

Where penetration from higher to lower levels is unipolar, ... the consequence is suppression of local conflicts.... Bipolar penetration suppresses local conflict if it takes the form of overlay, as in Europe; but if it is just alignment, as in much of the Third World, then it amplifies them.... Multipolar penetration... may be messy, but it is less intense, and gives states greater latitude in their political relations with outside powers. (Buzan, 1991: 208)

There are two issues to consider here. The first is the *intensity* of outside penetration, which is what Buzan alludes to in contrasting "overlay" (i.e., the direct presence of an external power) and "alignment." The second is the *polarity* of outside penetration, or the number of external powers competing for regional influence.¹⁰

We have made a rather preliminary effort to distinguish the five Third World security complexes on these two dimensions of outside penetration, based upon patterns of arms-transfer activity. For each security complex in each year, a good indicator of outside penetration, P_O , is simply the number of arms-transfer programs underway (newly initiated or ongoing from previous years), rescaled so that the complex-year experiencing the lowest activity receives a score of zero and the complex-year with the highest activity receives a score of one. This captures the intensity dimension. We also want to assess polarity, but we are specifically interested in the bipolarity of superpower penetration, not just any bipolarity. Therefore, to distinguish superpower penetration, P_S , from outside penetration generally, we discount P_O by an indicator of the importance of superpower transfers in the total, also rescaled. That is,

$$P_S = P_O \left[\frac{(T_A \% T_S)}{T_T} \right]_0^1$$

Finally, to distinguish bipolar superpower penetration, P_B , we discount P_S by an indicator of the balance in American and Soviet transfer activity, again rescaled:

$$P_B = P_S \left[1 - \frac{*T_A \% T_S*}{T_A \% T_S} \right]_0^1$$

This last discount factor takes on higher values when superpower arms transfers to the region are at high levels and roughly equal.

For each of the five security complexes, Table 3 reports summary measures (period means and standard deviations) for outside penetration, P_O , and bipolar penetration, P_B . It is clear that the Middle East was the most penetrated of the five regions, by outsiders in general and by the superpower competition more specifically. South America, South Asia, and Southeast Asia also experienced outside interference, although penetration by the Soviet-American rivalry itself is much less apparent in these regions than in the Middle East. In the case of South America, the sharp contrast between P_O

and P_B is due to the fact that the relatively high level of outside penetration was most closely unipolar. Based on these summary indicators, then, and following Buzan (1991), we hypothesize (1) that arms transfers to the Middle East were most likely to be associated with an increase in the incidence of military intervention, and (2) that transfers to South America were least likely to be associated with intervention. As regards the other three regions, we are agnostic: Buzan has less to say about the impact of multipolar penetration, and our indicators are not especially well-suited to distinguish degrees of multipolarity. Nor do we have any particular *a priori* expectations about the effects of American versus Soviet arms-transfer programs.¹¹ We consciously proceed in a partly inductive fashion.

[Table 3 about here]

Table 4 follows the same format as Table 1. Note from the first column that the Middle East was the only security complex in which arms transfers had an exacerbating impact on the initiation of military conflict, a finding consistent with our hypothesis. Soviet programs in particular had that effect, although American programs did not (columns 3 and 2, respectively). Note also that the incidence of military intervention in South America was unaffected by arms transfers (row 1). Although this result is not necessarily at odds with our hypothesis that South America is least likely to have experienced instability deriving from arms transfers, it does not support Buzan's notion that unipolar penetration of that security complex (by the United States) led to a suppression of local conflicts -- in which case we would expect a negative parameter estimate. The remaining findings do not lend themselves to a straightforward interpretation. Soviet arms transfers to Southern Africa and Southeast Asia were associated with an increase in the incidence of military intervention, as were American transfers to South Asia. But American transfers were also associated with a decrease in the initiation of military intervention in Southern Africa, the only negative relationship we observe at an aggregate level of analysis.

[Table 4 about here]

CONCLUSION

We have examined the impact of arms transfers upon the bellicosity of Third World states at several supervenient levels of analysis for the period 1950-1988. The relationship is examined at the level of the individual recipient, in terms of the Third World as a whole, and at the intermediate level of regional security complexes. Such familiar levels of analysis as well as other potentially informative intermediate aggregations, are considered to be components of a weakly supervenient (non-deterministic) system. We know enough about arms transfers to individual states and about military interventions by individual states confidently to summarize each at any level up to the that of the Third World as a whole. We do not know how to know enough to reduce all manifestations of their relationship to demonstrable effects upon and visible actions by individual states. We do not even know whether it is possible to know enough.

Poisson regression models applied to pooled time series representing numbers of all arms transfer programs and numbers of overt military interventions demonstrate that arms transfers enhance the likelihood that a recipient state will resort to force abroad. At the same time, time series cumulated

across the Third World as a whole demonstrate that increased frequency of arms transfer programs to the Third World predict increased frequency of overt military intervention by Third World states.

Observations of the effects of U.S. and Soviet arms transfers, taken at different levels, yield superficially puzzling results. American and Soviet programs each contribute to the likelihood that individual recipients will engage in overt military intervention. American programs also contribute to the likelihood of increased aggression within the Third World as a whole. Soviet arms transfer programs do not. To conclude that American arms contribute to a more warlike world but that Soviet arms do not is dubious given that both apparently exacerbate aggressive tendencies among their recipients. Some apparent contradictions between systemic-level and individual-level phenomena may be expected within weakly supervenient systems such as international relations. Systemic effects of arms transfers, seen at any level above that of the individual state, result from complex interactions affecting the calculations of recipients and also an indeterminate number of related but not individually observed non-recipients. In particular, we forecast that, under certain conditions, the instigating effect of arms upon recipients may be balanced, or more than balanced, by deterrent effects upon some related non-recipients.

Some of these interaction effects may leave traces that can be discerned at intermediate levels of analysis, including among regional security complexes in which member states interact persistently with one another. We surmised that the net effect of arms transfers will be negligible within many regional security complexes because instigation of recipients is balanced by deterrence among non-recipients. Within unstable regions, however, arms may provoke military action by non-recipients as well as recipients.

Among the hallmarks of expected regional instability during the Cold War era were indications of competitive penetration by outsiders and especially by the superpowers, including competitive supply of arms to rival clients. Neither the superpowers nor other arms suppliers competed on similar terms everywhere. They competed most directly and most extensively within perceptibly unstable regions where new arms were generally expected to make a difference. Five regional security complexes identified by Buzan (1991) have been compared. The Middle East is distinctive among these for the extent to which it is persistently penetrated by imported arms. The Middle East is also the only one of the five regions for which arms programs overall predict heightened aggression. Soviet programs are more consistent culprits than American in this case. Different patterns emerge within other regions. American arms are associated with increased aggression in South Asia and with lessened violence in Southern Africa. Soviet Arms appear to exacerbate aggression within Southern Africa and Southeast Asia as well as the Middle East.

These preliminary analyses of broadly defined and temporally extensive regional security complexes do not purport to display the full effects of arms upon aggression. They do help to confirm a few essential suppositions. 1) Arms generally, including Soviet as well as American programs, may contribute to the totality of aggression among some interacting states. 2) Neither American nor Soviet arms exert consistent effects everywhere. 3) Most importantly, consistent with the view that arms transfers and the use of force by states constitute a weakly supervenient system, various aggregations representing different levels of analysis each reveal important parts of the total picture. On balance, these results appear to provide more confirmation to those who fear that the spread of arms spreads

international violence than to those who hope that arms transfers may contribute to world peace. This is not the only effect, however. Arms evidently also deter at some times and places. Moreover, other research suggests that arms transfers may occasionally help to restrain a recipient (Kinsella and Tillema, 1995).

More detailed understanding of the contingent effects of arms transfers may benefit from further investigation of intermediate levels of analysis between the individual state and the international system and its major subsystems. Exploration of other conceptions of regional security complexes may be informative, including as these relate to various local rivalries and ententes. In addition, it may be useful to examine regions and localities during different periods in acknowledgement that the boundaries and the dynamics of a security community may alter over time.

ENDNOTES

1. We do not examine the impact of arms transfers on the course of military conflict once it has begun. For systematic historical analyses of the effects of arms resupply during wartime, see Pearson, Baumann, and Bardos (1989) and Pearson, Brzoska and Crantz (1994).
2. An arms-transfer program represents an agreement to transfer some number of a particular weapon system over some number of years. Therefore, a single program, which appears as a single entry in SIPRI's registers, almost always involves the shipment of multiple weapons. We assume that the *political* impact of an arms-transfer program commences as soon as supplier and recipient enter into a transfer agreement -- i.e., even before the first shipment of weapons has arrived -- so programs are considered to be in effect from the order date through the date of final delivery.
3. An overt military intervention is defined to include all and only combat-ready military operations openly undertaken by the regular military forces of a state within a foreign state or non-self-governing territory. It includes operations by conventional ground combat units, commando and other small unit raids, aerial attacks, ground-based artillery and rocket attacks, and naval bombardment. Operations undertaken with consent of the target government are included as well as are blatant armed attacks. All such operations undertaken by a state within one target state or territory are considered to constitute one overt military intervention.
4. As an aside, compare our program-count measure of arms transfers to SIPRI's "market value" indicator (the latter are obtained from Brzoska and Ohlson, 1987: appendix 4B; SIPRI, 1991: Table 7A.2). Correlations for each pair of time series are as follows: total transfers, $r = .90$; American transfers, $r = .80$; Soviet transfers, $r = .42$.
5. SIPRI does not attempt to date arms-transfer programs more precisely than the year in which they were initiated. In order to exclude from our counts those programs which were initiated *after* the onset of military intervention, we must exclude *all* programs initiated during the year of onset. If we were somehow able to include those programs initiated during that year, but before the outbreak of conflict, observed positive relationships between arms and aggression would be more pronounced.
6. To conserve space, we only report estimates for the arms-transfer variables. The full set of regression results, including parameter estimates and log-likelihood ratios, are available upon request.
7. Military interventions conducted in the Third World by non-Third World states are not included in the tallies.
8. The derivative of I_t with respect to T_t is $I_t\$$. Starting from the mean number of interventions and assuming a standard deviation increase in arms transfer programs, the computation is therefore $0.13 \times 0.031 \times 7.47 = 0.03$.

9. In order to determine the proportion of the variance explained in initiated interventions, we used the Poisson regression estimates to generate predicted values and computed (and squared) the correlation between this series and the actual one.

10. The use of the term "penetration" is not altogether satisfactory since it implies too great a degree of passivity on the part of regional states. While regional states often find themselves in positions of dependence vis-à-vis outside providers of security, dependence is surely not one-sided (see, for example, Bercovitch, 1991; Windsor, 1991). The term may also be somewhat offensive to one's feminist sensitivities. But then again, so too is the process to which the term is applied -- reason enough, perhaps, to stay with it.

11. Our previous work does in fact suggest that American and Soviet transfers have had different effects on regional conflict -- the latter being more likely to exacerbate it -- but that research was conducted at the individual level of analysis where recipients' (and their rivals') relative satisfaction with the status quo provided a context within which the impact of arms transfers could be hypothesized. See Kinsella (1994, forthcoming) and Kinsella and Tillema (1995).

REFERENCES

- Ayoob, Mohammed (1995). *The Third World Security Predicament: State Making, Regional Conflict and the International System*. Boulder, CO: Lynne Rienner.
- Bercovitch, Jacob (1991) "Superpowers and Client States: Analysing Relations and Patterns of Influence." In *Superpowers and Client States in the Middle East: The Imbalance of Influence*, edited by Moshe Efrat and Jacob Bercovitch. London: Routledge and Kegan Paul. Pp. 9-32.
- Brecher, Michael (1963). "International Relations and Asian Studies: The Subordinate State System of Southern Asia." *World Politics* 15: 213-235.
- Brzoska, Michael, and Thomas Ohlson (1987). *Arms Transfers to the Third World 1971-85*. New York: Oxford University Press.
- Buzan, Barry (1991). *People, States, and Fear: An Agenda for International Security Studies in the Post-Cold War Era*, second edition. Boulder, CO: Lynne Rienner.
- Cantori, Louis J., and Steven L. Spiegel (1970). *The International Politics of Regions: A Comparative Approach*. Englewood Cliffs, NJ: Prentice Hall.
- Glynn, Patrick (1992). *Closing Pandora's Box: Arms Races, Arms Control, and the History of the Cold War*. New York: Basic Books.
- Haas, Michael (1970). "International Subsystems: Stability and Polarity." *American Political Science Review* 64: 99- 123.
- Haugeland, John (1982) "Weak Supervenience." *American Philosophical Quarterly* 19 (January): 93-103.
- Hellman, Geoffrey, and Frank Thompson (1975). "Physicalism: Ontology, Determination, and Reduction." *The Journal of Philosophy* 72: 551-564.
- King, Gary (1989). *Unifying Political Methodology: The Likelihood Theory of Statistical Inference*. New York: Cambridge University Press.
- Kinsella, David (forthcoming 1995). "Nested Rivalries: Superpower Competition, Arms Transfers, and Regional Conflict, 1950-1990." *International Interactions* 21: 109-125.
- Kinsella, David (1994). "Conflict in Context: Arms Transfers and Third World Rivalry During the Cold War." *American Journal of Political Science* 38 (August): 557-581.
- Kinsella, David, and Herbert K. Tillema (1995). "Arms and Aggression in the Middle East: Overt Military Interventions, 1948-1989." *Journal of Conflict Resolution* 39 (June): 306-329.
- Klare, Michael T. (1990). "Wars in the 1990s: Growing Firepower in the Third World." *Bulletin of the Atomic Scientists* 46: 9-13.
- Morgan, Patrick M. (1977). *Deterrence: A Conceptual Analysis*. Beverly Hills, CA: Sage.
- Most, Benjamin A. and Harvey Starr (1984). "International Relations Theory, Foreign Policy Substitutability, and 'Nice' Laws." *World Politics* 36 (April): 383-406.
- Oppenheim, Paul, and Hilary Putnam (1958). "Unity of Science as a Working Hypothesis." In *Minnesota Studies in the Philosophy of Science*, Volume II, edited by Herbert Feigl, Michael Scriven, and Grover Maxwell. Minneapolis: University of Minnesota Press. Pp. 3-36.
- Pearson, Frederic S. (1994). *The Global Spread of Arms: Political Economy of International Security*. Boulder, CO: Westview.

- Pearson, Frederic S., Robert A. Baumann, and Gordon N. Bardos (1989). "Arms Transfers: Effects on African Interstate Wars and Interventions." *Conflict Quarterly* 9: 36-62.
- Pearson, Frederic S., Michael Brzoska, and Christer Crantz (1992). "The Effects of Arms Transfers on Wars and Peace Negotiations." In *SIPRI Yearbook 1992: World Armaments and Disarmament*. Oxford: Oxford University Press.
- Post, John F. (1987). *The Faces of Existence: An Essay in Nonreductive Metaphysics*. Ithaca, NY: Cornell University Press.
- Ross, Andrew L. (1990). "Do-It-Yourself Weaponry." *Bulletin of the Atomic Scientists* 46: 20-22.
- Russett, Bruce M. (1967). *International Regions and the International System*. Chicago: Rand McNally.
- Sauvy, Alfred (1969). *General Theory of Population*, trans. Christophe Campos. New York: Basic Books.
- Schelling, Thomas C. (1966). *Arms and Influence*. New Haven: Yale University Press.
- Stockholm International Peace Research Institute (1971). *The Arms Trade with the Third World*. Stockholm: Almqvist and Wiksell.
- Stockholm International Peace Research Institute (1988-1991). *SIPRI Yearbook: World Armaments and Disarmament*. Oxford: Oxford University Press.
- Teller, Paul (1987). "A Poor Man's Guide to Supervenience and Determination." *Southern Journal of Philosophy* 22 (Supplement): 137-162.
- Thompson, William R. (1973). "The Regional Subsystem: A Conceptual Explication and a Propositional Inventory." *International Studies Quarterly* 17: 89-117.
- Tillema, Herbert K. (1991). *International Armed Conflict Since 1945: A Bibliographic Handbook of Wars and Military Interventions*. Boulder, CO: Westview Press.
- Tillema, Herbert K. (forthcoming). *Overt Military Intervention in the Cold War Era*. Columbia, SC: University of South Carolina Press.
- U.S. Mutual Defense Assistance Act (1949). *United States Statutes at Large* 63: I, 714-721.
- von Neumann, John (1955). *Mathematical Foundations of Quantum Mechanics*, translated by Robert T. Beyer. Princeton: Princeton University Press.
- Waltz, Kenneth N. (1979). *Theory of International Politics*. Reading, MA: Addison-Wesley.
- Windsor, Philip (1991). "Superpowers and Client States: Perceptions and Interactions." In *Superpowers and Client States in the Middle East: The Imbalance of Influence*, edited by Moshe Efrat and Jacob Bercovitch. London: Routledge and Kegan Paul. Pp. 33-52.
- Wriggins, H. Howard, ed., with F. Gregory Grause, Terrance P. Lyons, and Evelyn Colbert (1992). *Dynamics of Regional Politics: Four Systems on the Indian Ocean Rim*. New York: Columbia University Press.

Table 1 Poisson Regression Estimates of Effects of Arms-Transfer Programs on Military Intervention in the Third World, 1950-1988

	Total Programs	American Programs	Soviet Programs
Pooled time series (N = 2964)	0.031** (0.004)	0.026** (0.012)	0.047** (0.001)
Aggregate time series (N = 39)	0.002** (0.001)	0.009** (0.003)	0.001 (0.003)

Note: Cell entries are parameter estimates from Poisson regressions, with standard errors in parentheses. All models included a constant term and controlled for ongoing military interventions. Estimates in columns 2 and 3 are from the same model, and so control for transfer programs from the other superpower.

** .05 significance

* .10 significance

Table 3 Penetration of Regional Security Complexes, 1950-1988

	Outside	Bipolar
South America	.20 (.10)	.01 (.02)
Middle East	.51 (.27)	.25 (.15)
Southern Africa	.04 (.01)	.00 (.00)
South Asia	.12 (.06)	.05 (.04)
Southeast Asia	.19 (.06)	.06 (.06)

Note: Cell entries are means for the 1950-1988 period, with standard deviations in parentheses.

Table 4 Poisson Regression Estimates of Effects of Arms-Transfer Programs on Military Intervention in Regional Security Complexes, 1950-1988

	Total Programs	American Programs	Soviet Programs
South America	-0.003 (0.005)	0.005 (0.025)	-0.017 (0.134)
Middle East	0.002* (0.002)	0.003 (0.005)	0.015** (0.006)
Southern Africa	0.030 (0.054)	-0.604** (0.220)	0.690** (0.138)
South Asia	-0.149 (0.177)	0.055* (0.036)	0.005 (0.019)
Southeast Asia	-0.002 (0.014)	-0.031 (0.030)	0.039* (0.024)

Note: Cell entries are parameter estimates from Poisson regressions, with standard errors in parentheses. All models included a constant term and controlled for ongoing military interventions. Estimates in columns 2 and 3 are from the same model, and so control for transfer programs from the other superpower.

** .05 significance * .10 significance

Figure 3 Security Complexes in the Third World

Source: Buzan (1991), p. 210