Arms Transfer Dependence and Foreign Policy Conflict*

DAVID KINSELLA

School of International Service, American University

There are both military and political dimensions to arms transfers, and their effects on state behavior may not be the same. In this article I examine the degree to which arms transfers and arms transfer dependence interact to affect foreign policy conflict. I hypothesize that, as a transfer of military capability, weapons shipments increase the tendency of the recipient to strike a conflictual posture in its foreign policy, while arms transfer dependence restrains that tendency. An arms recipient faces the possibility that weapons shipments will be curtailed during periods of regional crisis and hostility, and when a state is dependent on one or a few major suppliers for the bulk of its imported weaponry, the costs associated with supply restrictions increases. This should encourage restraint on the part of states otherwise emboldened by arms acquisitions. My analysis treats conflictual behavior as a multiplicative function of arms transfers and arms transfer dependence. Parameter estimates are derived from time series data for nine states engaged in enduring rivalries during the Cold War. For some of these states, there is evidence that arms shipments encouraged more conflictual foreign policies; but there is also evidence that this propensity was tempered by the degree of arms transfer dependence. The model is non-linear, so the precise effects of dependence vary depending on context – i.e. the state's current level of arms importation and dependence – but realistic predictions involve changes in foreign policy conflict equal to 5–25% of their mean levels during the period.

Arms Transfers

Arms transfers are multifaceted phenomena. They represent, obviously, the shipment of military capability from one state to another. Their impact on regional stability may be either positive or negative, depending upon the way this acquired capability is employed (or not employed) and the reaction it provokes on the part of other regional actors. Arms transfers also signal a relationship between supplier and recipient, and such re-

lationships vary immensely in their political significance. Some involve little more than the minimal obligations attending typical international market transactions. Others speak volumes about the national security commitments which extend from supplier to recipient, and may have implications for regional stability which parallel those of arms transfers qua military capability. Lastly, arms transfers, or more properly, the resort to arms importation, suggests some degree of dependence on outsiders for the implements of national defense. This dependence is a function of the extent to which the state must rely on foreign suppliers of military hardware and, where it does so rely, the number of foreign sources available given the current regional and global security constellations.

This article is about this last dimension of

arms transfers. Does arms transfer dependence have an observable and systematic impact on the foreign policy behavior of recipients? And can this impact be disentangled from the impact of the other dimensions of arms transfers – i.e. the transfer of military capability and/or the signaling of security commitment? My answer to both questions is a qualified yes. Arms transfer dependence does exhibit a measurable relationship to foreign policy conflict, for some countries anyway, and that relationship is distinct from the observed relationship between conflict on the one hand and transferred military capability and security commitment on the other. I examine nine countries – Israel, Egypt, Syria, Iran, Iraq, India, Pakistan, Ethiopia and Somalia – from 1951 to 1991. These countries represent belligerents in four enduring rivalries, and each has equipped its armed forces with hardware from a variety of suppliers, not the least being the two superpowers. Previous research indicates that arms transfers to at least some of them have in fact had an effect on regional stability (Kinsella, 1994, 1995; Kinsella & Tillema, 1995). Here I want to examine the effect of arms transfer *dependence*.

Arms Imports and Dependence

The arms trade literature includes numerous studies of arms dependence, and at various levels of analysis. The most sweeping adopt a structural perspective and borrow their conceptual apparatus, or part of it, from the imperialism and dependencia schools. Øberg (1975: 218, 230), for example, identifies arms-transfer patterns of 'feudal dominance' whereby 'peripheral clients are generally dependent on one supplier' – patterns which, moreover, 'grow out of the world structure' and are thus highly resistant to fundamental change. Similar dynamics are identified by Väyrynen (1980: 137), who suggests that arms transfers are 'part of the

structure of the international system' and exhibit a 'cumulative dominance pattern'. Øberg, Väyrynen, and others have also examined the economic and technological dependencies which have emerged as a consequence of the arms trade and the export of military production technology to the Third World (e.g. Kaldor, 1981; Lock & Wulf, 1979; Väyrynen, 1983).[1]

Another dimension of dependence which has been traced partly to arms transfers is the degree to which Third World military force structures have mimicked those of their advanced military-industrial suppliers. Barnett & Wendt (1992: 101) point to imported arms and military technology as one of the systemic sources 'dependent militarization' in which the 'accumulation dynamic is a reflection of external forces rather than self-sustaining'. This dynamic has encouraged the development of capital-intensive militaries in the Third World, a form not altogether appropriate given the distribution of resources (see also Wulf, 1979). The dependent development of Third World militaries goes beyond hardware requirements: military organization, military strategy, even the very definition of national security have been 'imported' along with weapons systems. Indeed, Kaldor (1981) refers to the spread of an entire 'weapons *system*'. For Brzoska & Lock (1988: 393), the result for many Third World militaries is a 'distorted mirror image' of the West: 'efforts to master the operation and maintenance of modern weapons systems as well as to develop military strategies around weapons which reflect the doctrines of warfare among industrial nations . . . and, finally, to duplicate modern weapons manufacture in indigenous fac-

[1] Generic descriptions of the global arms transfer and production system as hierarchical include Neuman (1984), Louscher & Sperling (1994), Ross (1992), and, from a long-term historical perspective, Krause (1992). These portraits of international hierarchy are generally consistent with the studies just mentioned, but with less attention devoted to political economy.

tories bear consequences beyond the military sectors, extending far into the civilian sphere' (see also Wendt & Barnett, 1993).

A different strand of inquiry into the consequences of arms transfer dependence is evident in numerous studies of supplier leverage (or, as appears more often to be the case, non-leverage). Here the approach is more explicitly behavioral. The degree of influence exercised by superpowers over their client states has received the greatest attention, since the United States and Soviet Union have been identified as 'hegemonic suppliers' in a position to employ arms supplies as a means 'to induce, or try to prevent, particular actions' (SIPRI, 1971: 17). Most agree with Pierre (1982: 14) that 'a major political rationale for arms transfers has been the influence the supplier gains in dealings with the recipient nation'. The question which continues to drive empirical research in this area is whether this influence translates into observable changes in recipient behavior and, if so, under what conditions. The evidence is mixed, but the most common conclusion is that the case for arms-as-leverage is probably overstated (e.g. Bercovitch, 1991; Chubin, 1982; Laurence, 1983; Menon, 1986; Nachmias, 1988; Pajak, 1981; Pollock, 1982; Snider, 1978; Sylvan, 1978; Wheelock, 1978). But where researchers do observe effective leverage, recipients' arms transfer dependence is often identified as a necessary condition (e.g. Betts, 1980; Sislin, 1994).[2]

The Logic of Arms Transfer Dependence

Catrina (1988) provides an extraordinarily thorough analysis of the theoretical and empirical issues surrounding arms transfers and dependence. His conception of dependence is framed in terms of costs and benefits. The arms recipient derives direct benefits from its relationship with its supplier in that its perceived need for weaponry is fulfilled. The supplier derives no direct benefits, only costs (equal, let us say, to the level at which that weaponry is subsidized). Dependence, then, is the 'currency' which settles these accounts: 'Those parties that have more benefits than costs in a given relationship pay for the surplus of benefits by being dependent. And those parties that have more costs than benefits in a given relationship are recompensed by being dominant' (Catrina, 1988: 149).

A similar logic has been developed in the rational-choice literature on alliance behavior. A state's decision to enter into an alliance is said to reflect a calculation of the trade-off between the increase in security and the decrease in autonomy which accompanies alliance membership. In alliances between major and minor powers – which Morrow (1991) calls 'asymmetric' because different benefits accrue to each – it is the minor power that purchases additional security at the cost of its autonomy. The major power enters into the opposite exchange, and can afford to do so since it possesses a security 'surplus'.[3] This notion supplements Catrina's (1988). Although arms transfer relationships are not alliances per se, they do represent varying degrees of alignment. Closer relationships involve not

[2] Fashioning a conceptual framework from the debate about the many faces of power in contemporary political theory, Krause (1991) cautions that it may be too much to expect that the influence deriving from arms transfer relationships will be manifest in the actual behavior of recipients. Even where this sort of 'bargaining power' appears to be absent, the possibility exists that 'structural power' or 'hegemonic power' serves the interests of the arms supplier, and at the expense of the recipient (see also Moon, 1985). Nuanced conceptions of influence can also be found in the literature on patron-client relations in international relations (see Carney, 1989; Handel, 1981: ch. 3; Ifestos, 1992; Shoemaker & Spanier, 1984).

[3] Morrow (1991) further suggests that asymmetric alliances have been rather durable historically, even in the face of increases in minor powers' capabilities, because the bulk of their security continues to be provided by their major power allies. Alliances do weaken under these circumstances, however, as the relative costs rise in comparison to the security benefits received (on this point, see also Sorokin, 1994).

only the shipment of armaments, but also a more generally perceived security commitment on the part of the supplier. They also entail higher levels of recipient dependence – i.e. are paid for with some measure of recipient autonomy.

The rational calculus which we can reasonably assume drives Third World arms imports is well captured in McGinnis's (1990) model of regional rivalry. A state's perceived sense of security (S in his SCAD model) is a function of both its own and its rival's military capabilities. The state's own military capability is, in turn, a function the arms it imports from its major power patron. Yet the security benefits of alignment are discounted by both the political costs of alignment (A) and the costs of dependence on external sources of weaponry (D).[4] The political costs of alignment are analogous to those highlighted in alliance theory – e.g. the surrender of autonomy involved in granting basing rights to external powers, along with the erosion of domestic political support that may follow. The costs of dependence on external sources of weaponry reside in the possibility that weapons flows will be interrupted in the context of regional crises and warfare, when threats to national security are most acute.

Empirical indicators of arms dependence are fairly straightforward. The two most frequently identified determinants are (1) low levels of domestic arms production capacity and (2) a concentration of external sources of weaponry. The inability to produce weapons domestically renders the state dependent on foreign suppliers overall, while reliance on one or a few external sources accentuates dependence on those suppliers in particular. States wanting to minimize arms dependence, therefore, have two alternatives. The first, obviously, is to increase the state's

self-sufficiency in arms production. But this has proven difficult even for the most advanced arms producers in the Third World, who must continue to rely upon external sources for their most advanced weaponry (Anthony, 1993). However, for any given level of self-sufficiency, arms recipients may enhance their autonomy by diversifying their supplier portfolio. For as Catrina (1988: 169) points out: 'The likelihood that a country's arms suppliers will be able to coordinate their policies is smaller, the larger their number is. Moreover, the impact of any supplier's manipulation of the supply also is smaller the more suppliers a recipient has, and the more evenly the supply is spread among them.'

The terms of arms supply also bear on the relationship of dependence. Weapons provided on a grant basis foster a higher degree of recipient dependence than do outright sales, since the former betray the recipient's reliance on the supplier's financial resources as well. Somewhere in between these two extremes fall arms packages provided under favorable credit terms (Catrina, 1988: 212–216; Brzoska, 1995). Licensed and co-production arrangements are harder to place on such a continuum since they involve the transfer of weapons production technology and knowledge as opposed to finished systems. Yet the proliferation of these sorts of collaborative efforts is transforming the nature of global arms production, and accompanying them are a unique set of issues relating to arms dependence and interdependence (Bitzinger, 1994; Schwarz, 1987).

The issue of arms dependence has little bearing on the military dimension of arms transfers. It reflects instead the *political context* in which military capability is transferred. Military capability is the same whether it derives from one or a multitude of sources, whether it constitutes a large or a small portion of the recipient's military strength overall, and whether it comes at a

[4] They are also discounted by economic opportunity costs (C) of indigenous defense efforts, but these are peripheral to the present analysis.

substantial discount or at market price. This is not to say that these elements have no military implications. A diversification of suppliers, for example, may have adverse military consequences if nonstandardization of weapons systems precludes the formation of well-integrated and efficient force structures. But given any particular weapon system or package, the military capability it represents is independent of its cost, the availability of third-party substitutes, and the indigenous arms production capacity of the recipient.

A Simple Empirical Model

My interest is in assessing the impact of arms transfer dependence on the degree of hostility in state's foreign policy behavior. My argument will be that, although the impact of arms transfer dependence interacts with the impact of the acquired weaponry itself, the effects are distinct and measurable. I do restrict my analysis to arms transfers and dependence, and therefore make no attempt to provide anything like a general model of foreign policy conflict. At the same time, I expect that the obvious factors left out of my simple empirical model – ethnic, religious, and territorial disputes, for example – are not highly correlated with arms transfer dependence, so the effects I do observe are not likely to be spurious, even if they operate at the margins of the conflict process.[5]

Similar to research on the effectiveness of arms-as-leverage, research on the impact of

arms flows on regional stability has yielded mixed results, whether the focus has been the initiation of hostile diplomatic or military behavior (cf. Baugh & Squires, 1983; Kiefer, 1988; Kinsella, 1994, 1995; Kinsella & Tillema, 1995; Schrodt, 1983; Sherwin, 1983) or the course of military hostilities once begun (Brzoska & Pearson, 1994; Harkavy, 1985; Neuman, 1986). This is not the place to review the host of possible explanations for this literature's divergent findings, beyond pointing to the suspicion which underlies the present analysis. That is, it could be that the military and political dimensions of arms transfers have countervailing effects on foreign policy conflict, and observation of arms flows, however measured, is probably not a particularly good indicator of the latter dimension (e.g. arms transfer dependence).[6] Until we attempt to disentangle these dimensions – admittedly, an exercise which has proven easier in qualitative research than in quantitative research, even if less systematic – our empirical results will fail to capture the complexities of the underlying process.

I begin with the hypothesis that arms imports, representing the transfer of military capability, increase the propensity of recipients to engage in diplomatic or military conflict. The reasoning is straightforward: assuming that a state has some grievance with another state, an increase in military capability diminishes the risks of pursuing a forceful sol-

[5] A more general model would include any number of additional factors, perhaps the most important being some measure of grievance, like outstanding territorial disputes (Vasquez, 1993) and ongoing armament in the region, including arms shipments to potential rivals (Kinsella & Tillema, 1995). But since my aim here is to examine how arms transfers and dependence interact at the margin, a partial model will suffice. Note also that since I examine the conflict behavior of each state over time, many of those idiosyncratic factors which must be taken into account in a more general model of conflict are in effect held constant. This is especially the case where such disputes form the basis of enduring rivalries with neighboring states.

[6] In previous analyses, I have argued that some indicators of arms flows may be better than others for purposes of tapping the political dimension of arms transfers (Kinsella, 1995; Kinsella & Tillema, 1995). Specifically, I have suggested that arms-transfer program counts are superior to dollar values in this respect, since the latter factor in weapon performance characteristics (speed, firepower, etc.) to better approximate market value when actual costs are unknown (see Brzoska & Ohlson, 1987, appendix 8). Program counts simply attempt to measure the general level of arms-transfer activity between two states (see also Schrodt, 1983). Of course, this argument should not be pushed too far, since it is clear that closer political relations surely entail a willingness by suppliers to provide higher-performance military hardware.

ution even if that pursuit threatens to erupt into a more severe military conflict.

Next, I hypothesize that arms transfer dependence decreases the likelihood that recipients will strike a conflictual posture in their foreign policies. There is a two-fold logic here. First, although the increased military capability accompanying arms imports enhances the state's chances of prevailing in a military conflict, should one eventuate, increased dependence carries with it the possibility that the state's military capability will be undermined by embargoes or other restrictions on the transfer of armament just when perceived threats to national security are most acute. Therefore, whatever boldness is encouraged by arms imports should be tempered somewhat when the state is in fact dependent on them. The second and closely related reason to expect an inverse relationship between arms dependence and foreign policy conflict has to do with what SIPRI (1971: 17) termed the 'restrictive' pattern of supply: 'The characteristic feature of this pattern is that arms are not supplied to countries where this may, directly or indirectly, involve the supplier in a local or international conflict.' SIPRI argued that although certain suppliers adopt arms transfer policies in which 'restrictive' considerations predominant – with others driven by 'hegemonic' or 'industrial' considerations, the two other patterns identified – all suppliers display a mix of motivations. This has been confirmed by Sanjian's (1991) fuzzy set analysis of arms-transfer decision making.

This second point is relevant when we consider that the countries examined in this study, when they were most dependent, were usually dependent upon one of the superpowers. Since SIPRI (1971: 18) has suggested that '[t]he policies of the United States and the Soviet Union represent a hegemonic pattern of supply', we may not expect that they were overly concerned about their policies' implications for regional stab-

ility. But this is an oversimplification. Golan (1991: 129), for instance, in surveying the history of US-Soviet cooperation in the Middle East, concludes that the major factor behind both tacit and explicit collaboration was 'a mutual interest in preventing escalation of the [Arab-Israeli] conflict to the point of superpower confrontation'. Likewise, Weinbaum (1991: 320) found that '[m]utual constraint in highly conflictual circumstances is the most familiar form of regulated competition' between the superpowers in the Persian Gulf; while Zartman (1991: 162) identified '*ad hoc* rule-respecting so as to avoid direct confrontations, incidents and accidents' in the Horn of Africa. In short, the superpowers really did not promote proxy *wars* in the Third World, at least not intentionally, even though they may have encouraged lesser forms of competition.

Where arms transfer dependence does give suppliers, even hegemonic suppliers like the United States and Soviet Union, some measure of influence over recipients, it is more likely to be used to pull them back from the brink of overt military conflict. Whether recipients are actually restrained by their suppliers or choose themselves to avoid conflict for fear of a subsequent interruption in arms flows is not an issue I want to pursue here. Either way, the observed relationship between arms transfer dependence and foreign policy conflict should be an inverse one.[7] Therefore, we can model foreign policy conflict, C, as a function of arms transfers, T, and arms transfer dependence, D, as follows:

$$C = \alpha T^{\beta} D^{\gamma} \mu \qquad (1)$$

where α represents some constant or base

[7] If arms transfer dependence signals a close relationship with a superpower patron, as was the case for some of the countries examined here, aggressive behavior on the part of rival states may be deterred, thereby permitting a less conflictual stance on the part of the dependent recipient. Again, we would observe an inverse relationship between dependence and foreign policy conflict, but here the impact is indirect – i.e. via the deterrence of potential adversaries.

level of conflict and μ is a random error component. The effects of arms transfers and dependence are expected to interact, so the functional form of the model is multiplicative.[8] Exponents on the T and D terms represent these effects. I have hypothesized that the effect of arms transfers on foreign policy conflict, β, is positive while the effect of dependence, γ, is negative. That is, arms transfer dependence serves to discount the positive impact of the arms themselves on the propensity of recipients to engage in conflictual behavior. Since the effects of arms transfers and dependence are exponents in the model (and assuming a positive estimate of α), the predicted level of conflict is never negative, which would be meaningless theoretically.

Research Design

Estimates of the unknown parameters α, β, and γ in model (1) are obtained from time series data for Israel, Egypt, and Syria, Iran and Iraq, India and Pakistan, Ethiopia and Somalia. Although model (1) is nonlinear, its parameters may be estimated using linear regression once the time series are log transformed.[9] Analyses are conducted for each of the nine countries separately.

I focus on these states for three reasons. First, they were belligerents in enduring regional rivalries during the Cold War (and most still are) while at the same time receiving large amounts of weaponry from external sources, especially the superpowers. As Third World rivals armed at high levels

by opposing superpowers, they represent a coherent set of cases; and, setting aside North and South Korea – a unique case given the permanent stationing of American forces – perhaps even an exhaustive set. Second, other dimensions of the relationship between arms transfers and conflict have been examined for these countries (e.g. Kinsella, 1995), making them good candidates for further exploration. Third, as a practical matter, the most appropriate data for testing my hypotheses have been made available only for these arms recipients (see below).

Data and Measurement
Foreign policy conflict (C), the dependent variable, is constructed from conflictual events registered in the Conflict and Peace Databank (COPDAB) and the World Event/Interaction Survey (WEIS), the latter as updated by Tomlinson (1993). All conflictual actions undertaken by each of the nine countries, and directed toward any other country, are weighted according to severity and summed for each year covered by the database: 1948–78 for COPDAB, 1966–91 for updated WEIS. For each country, the COPDAB time series is extended from 1979 to 1991 using forecasts based on the WEIS series.[10]

Arms transfer data used to construct the independent variables come from SIPRI. As

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[8] The model bears some resemblance to the Cobb–Douglas production function familiar to economists, which expresses output as a multiplicative function of labor and capital inputs. The main difference is that the effects of labor and capital reinforce one another in the production function, while I have hypothesized that dependence diminishes the impact of arms shipments.
[9] In using natural logarithms, the estimated base level of conflict, $\hat{\alpha}$, is $\exp(\hat{\alpha}^*)$, where $\hat{\alpha}^*$ is the intercept from the linear regression.

[10] The weighting index for COPDAB is from Azar & Sloan (1976); for WEIS, I use Goldstein's (1992) index. Forecasting parameters were obtained from bivariate regressions of COPDAB on WEIS for the overlapping years 1966–78. During that period, correlations between the two conflict series are as follows: Israel, 0.81; Egypt, 0.66; Syria, 0.67; Iran, 0.90; Iraq, 0.62; India, 0.99; Pakistan, 0.99; Ethiopia, 0.95; Somalia, 0.94. Overall, WEIS is a reasonably good predictor of COPDAB (and vice versa) for these countries, despite the different event coding schemes used to construct the two databases. I have followed this procedure in previous analyses of arms transfers and interstate conflict (e.g. Kinsella, 1994, 1995). Reuveny & Kang (1996) have undertaken a more rigorous demonstration of the soundness of 'splicing' COPDAB and WEIS data in this way.

Table I.   Summary Measures of Arms Transfer Dependence

| | Dollar Values | | Number of Programs | | |
	Mean	Standard Deviation	Mean	Standard Deviation	Correlation
Israel	0.76	0.26	0.61	0.27	0.77
Egypt	0.69	0.27	0.58	0.26	0.87
Syria	0.82	0.29	0.73	0.22	0.24
Iran	0.73	0.28	0.51	0.29	0.54
Iraq	0.67	0.30	0.55	0.28	0.47
India	0.60	0.17	0.44	0.16	0.39
Pakistan	0.64	0.25	0.50	0.24	0.72
Ethiopia	0.80	0.24	0.58	0.26	0.50
Somalia	0.69	0.37	0.55	0.35	0.33

Dollar value measures computed for 1950–88 (Somalia, 1960-88); program measures computed for 1950–91 (Somalia, 1960–91).

an indicator of arms transfers (T), I employ two alternative measures: (1) the total dollar amount imported per year, and (2) the total number of transfer programs in effect per year. Import dollar values are reported in Brzoska & Ohlson (1987) and subsequent issues of the *SIPRI Yearbook* and represent estimated market value (and thus military-use value); they are not the amounts actually paid by recipients to suppliers. Transfer program counts are based on SIPRI's arms trade registers, which appear in SIPRI (1975), Brzoska & Ohlson (1987), and the yearbooks. Each entry in the register represents a single program, regardless of the type or number of weapons involved in the transfer, and is counted for each year that the program was underway, from the year of order until the year of final delivery.

I have adopted Catrina's (1988: 199) indicator of arms transfer dependence (D):

$$\left(\frac{t_1}{T}\right)^2 + \left(\frac{t_2}{T}\right)^2 + \ldots + \left(\frac{t_n}{T}\right)^2$$

where t is the amount of arms imported

from supplier $i = (1,2,\ldots n)$ and T is the total amount imported from all n suppliers. Each ratio is squared and summed so that the index ranges between zero and one, with numbers closer to one indicating higher levels of source concentration and thus greater degrees of arms dependence.[11] When

[11] Catrina (1988: 181–184) has also suggested a different, if tentative, measure of dependence, along the lines discussed above – i.e. the degree to which the state is not self-sufficient in arms production. Specifically, taking the figure of 30% as a reasonable approximation of the share of military spending which is devoted to domestic arms production, Catrina proposes as a measure of self-sufficiency the ratio of that figure to that figure plus the value of arms imports. The result can be subtracted from one to obtain an alternative measure of dependence. In addition to the blanket assumption regarding the share of military spending devoted to arms production – a figure which seems high even for the most self-sufficient of Third World states – the index is also problematic because military spending figures (SIPRI's and others) indicate actual amounts spent on the military while arms import values represent international market values. Values determined by domestic markets for military goods are likely to be different from values determined by the international market. Both may be good individually as trend indicators, but it seems risky to combine them. Quantitative analyses of self-sufficiency along these lines should probably await the availability of comparably priced arms production and arms import data. There are some data, also from SIPRI, which seem to fit the bill, but the time series are not especially long (see Anthony, 1993: Table 17.1)

Table II. Log-linear Regression Estimates of Effects on Foreign Policy Conflict: Arms Transfers Measured as Dollar Values

	Constant $\hat{\alpha}^*$	Transfers $\hat{\beta}$	Dependence $\hat{\gamma}$	R^2	D-W
Israel	6.812**	0.247*	0.126	0.20	0.87†
	(0.824)	(0.130)	(0.539)		
Egypt	6.826**	0.128**	−0.228**	0.13	1.45
	(0.251)	(0.037)	(0.071)		
Syria	6.204**	0.199**	−0.285**	0.25	1.38†
	(0.327)	(0.051)	(0.074)		
Iran	4.428**	0.299*	−0.660*	0.21	0.53†
	(0.800)	(0.125)	(0.290)		
Iraq	4.665**	0.389**	−0.450**	0.59	1.74
	(0.334)	(0.056)	(0.092)		
India	6.299**	0.003	−0.865**	0.08	1.30†
	(1.066)	(0.163)	(0.354)		
Pakistan	5.907**	0.057	−0.032	0.01	0.94†
	(0.962)	(0.200)	(0.710)		
Ethiopia	0.313	1.000*	0.047	0.24	0.43†
	(2.825)	(0.485)	(0.749)		
Somalia	5.477**	−0.033	0.121	0.06	1.64
	(0.446)	(0.093)	(0.139)		

Time period of analysis is 1951–89, except for Somalia which is 1961–89. Independent variables are lagged one year. Standard errors of the estimates appear in parentheses.
** Significant at the 0.01 level. * Significant at the 0.05 level. † Durbin–Watson test suggests the presence of first-order autocorrelation (or test is indecisive). Reported standard errors are robust: the estimated covariance matrix allows for serial correlation of moving average order one.

arms transfers are operationalized as import values for purposes of estimating model (1), the dependence indicator is also constructed using value data; when programs are used to measure transfers, they are also used for dependence. SIPRI publications do not include annual import values for recipients broken down by supplier, which are necessary to compute annual levels of arms transfer dependence. Here I must rely on unpublished data obtained directly from the institute.[12] Entries in SIPRI's arms trade registers

[12] My thanks to Ian Anthony of SIPRI's Arms Production and Arms Transfer Project for supplying data for the nine countries examined here. The US Arms Control and Disarmament Agency (ACDA), the other main source for data on the arms trade, also does not publish annual figures broken down by supplier. Both SIPRI and ACDA release figures on bilateral transfers in five-year aggregates, but these data do not permit the construction of time series long enough to estimate the parameters in model (1). The required degrees of freedom could be obtained by pooling time series of five-year intervals, in which case results based on SIPRI data might be compared to those from ACDA data, but I will not conduct such an exercise here.

Table III.   Log-linear Regression Estimates of Effects on Foreign Policy Conflict: Arms Transfers Measured as Numbers of Programs

	Constant $\hat{\alpha}^*$	Transfers $\hat{\beta}$	Dependence $\hat{\gamma}$	R^2	D-W
Israel	7.951**	0.212	0.656	0.18	0.84[†]
	(1.420)	(0.466)	(0.417)		
Egypt	7.023**	0.166	−0.188	0.07	1.39[†]
	(0.234)	(0.094)	(0.296)		
Syria	5.933**	0.489**	−0.209	0.30	1.42
	(0.365)	(0.139)	(0.265)		
Iran	4.998**	−0.005	−1.557	0.32	0.63[†]
	(0.996)	(0.399)	(0.673)		
Iraq	4.486**	0.654**	-0.784**	0.65	2.05
	(0.296)	(0.120)	(0.203)		
India	6.883**	-0.406	−1.344**	0.15	1.45
	(0.748)	(0.296)	(0.482)		
Pakistan	5.625**	0.274	0.201	0.04	0.92[†]
	(0.698)	(0.257)	(0.443)		
Ethiopia	1.597	1.192	0.031	0.17	0.25[†]
	(2.461)	(0.783)	(1.012)		
Somalia	6.283**	−0.396	0.560*	0.13	1.79
	(0.630)	(0.214)	(0.259)		

Time period of analysis is 1951–91, except for Somalia which is 1961–91. Independent variables are lagged one year. Standard errors of the estimates appear in parentheses.
** Significant at the 0.01 level. * Significant at the 0.05 level. [†] Durbin–Watson test suggests the presence of first-order autocorrelation (or test is indecisive). Reported standard errors are robust: the estimated covariance matrix allows for serial correlation of moving average order one.

do represent bilateral transfers, so measures of dependence based on program counts are possible to construct from published sources.

Table I shows means and standard deviations for both indicators of arms transfer dependence, as well as their correlation. That the means of the value indicators are somewhat higher than the program indicators suggests that those suppliers responsible for larger numbers of programs also tended to provide weaponry of higher-than-average market value. The correlation between the

two indicators of dependence shows a good bit of variation, from a high of 0.87 for Egypt to a low of 0.24 for Syria. We might therefore anticipate that analyses conducted using different indicators will in some cases yield different results.[13]

In the analyses which generated the re-

[13] Correlations between alternative indicators of total arms imports are much higher, suggesting that the two may be more closely substitutable. For the nine countries, the average correlation between imports measured in dollars and imports measured in programs is 0.74, with a high of 0.92 for India and a low of 0.52 for Somalia.

Table IV. Estimated Effects of Arms Transfer Dependence on Foreign Policy Conflict

	Conflict		Effect of Change in Dependence			
	Mean	*SD*	*0.10–0.35*	*0.65–0.90*	*Mean + SD*	*Mean – SD*
Egypt	2587	1825	−889	−168	−166	+272
Syria	1874	1423	−1028	−178	−102[†]	+243
Iran	1891	3097	−1395	−143	−131[†]	+261
Iraq	2065	2535	−1623	−226	−251	+497
India	1506	2184	−2958	−206	−175	+304

Effects computed as changes in $\exp(\hat{\alpha}^*) \, T^{\hat{\beta}} D^{\hat{\gamma}}$ using estimates reported in Table II and mean levels of arms transfers.
[†] Mean plus one standard deviation exceeds 1.0 (see Table I). Estimated effect is for a change from the mean level of dependence to 1.0.

sults that follow, the independent variables were lagged one year. Because the relationship between arms transfers and dependence on one hand and foreign policy conflict on the other is a dynamic one, attention to temporal order is the only way to insure that model (1) approximates the implied causal order. This is not foolproof, of course, especially since the process being modeled involves both time lags (e.g. between weapons deliveries and their readiness for battle) and time leads (e.g. anticipation of threatened arms embargoes), but where systematic criteria are needed to infer causality, the temporal order of observed events is the best available.[14]

Statistical Results

Parameter estimates for the empirical model are reported in Table II. These are derived from dollar-value indicators of arms transfers and arms transfer dependence. The intercept,

[14] A different kind of research would be required to guard against being led astray by the temporal order of events. If a state anticipated engaging in military conflict at some future time and therefore acquired weaponry in preparation, then it is not quite correct to say that arms transfers 'caused' the conflict, even though the transfers came first chronologically. Explaining current behavior as a consequence such anticipation probably requires the sort of direct evidence that quantitative analysis cannot supply – e.g. from interviews, memoirs, government papers, etc.

$\hat{\alpha}^*$, for each of the nine countries is positive, and for all but Ethiopia the estimates are statistically significant. The base level of conflict is given as $\hat{\alpha} = \exp(\hat{\alpha}^*)$, which is always a positive number (appropriately, since negative conflict is undefined). The estimated effects of arms transfers on conflict behavior, $\hat{\beta}$, is positive and statistically significant for six of the nine countries: Israel, Egypt, Syria, Iran, Iraq and Ethiopia. For each of these countries, then, there is support for the hypothesis that arms transfers increase the likelihood that the recipient will pursue a more conflictual foreign policy. For five of the nine countries – Egypt, Syria, Iran, Iraq and India – the estimated effects of arms transfer dependence, $\hat{\gamma}$, is negative and statistically significant, as predicted by my second hypothesis. In short, arms transfers have increased the propensity of some states to engage in foreign policy conflict, but that increased propensity is attenuated by arms transfer dependence.

The proportion of variance in foreign policy conflict explained by the model is in most cases not terribly high, but this is not intended as a general model of the conflict process. Nonetheless, the R^2 for some countries is rather substantial for a two-variable model (e.g. Syria, Iran, Ethiopia), and for Iraq it is indeed surprising that this simple

empirical model explains a full 59 percent of the variance in conflict.[15]

The results shown in Table III, derived from program-count measures of arms transfers and dependence, are not quite as supportive of the hypotheses. Again, the estimated intercept is positive as we expect, and for all but Ethiopia statistically significant. But only two countries – Syria and Iraq – show evidence of striking a more conflictual foreign policy posture subsequent to increased arms imports. For three countries – Iraq, along with Iran and India – estimates of the effect of arms transfer dependence is negative, as expected. So here too there is empirical support for the hypothesized effects of arms transfers and dependence, but the use of this indicator has yielded somewhat less support than do the analyses of import values.[16]

The divergent results obtained using alternative indicators could be anticipated in light of the correlations reported in Table I. It is not obvious whether one is superior for testing my hypotheses, although the dollar-value measures certainly 'perform' better. I will offer these tentative observations, however. Program counts are a cruder indicator of transferred military capability, and in fact are favored by some analysts who are more interested in arms shipments as a measure of political alignment (Kinsella, 1995; Kinsella & Tillema, 1995; Schrodt, 1983). Arms transfers expressed as dollar values take into account the performance characteristics of the weaponry as well as the volume received, and therefore represent a better summary measure of imported military capability. A military calculus provides the basis for my first hypothe-

sis: conflictual behavior accompanies increased military capability. It also provides a basis, at least in part, for the second hypothesis: conflictual behavior is discouraged by vulnerability to interruptions in the supply of military capability. If program counts are a less precise measure of shipped military capability, and construct a cruder indicator of military dependence, it may be that measurement error is responsible for the weaker results.

Because my primary theoretical and empirical concern has been with the effects of arms transfer dependence on foreign policy conflict, Table IV offers some interpretations of the those effects based on the estimates reported in Table II. The first two columns of the table list the mean and standard deviation of the level of foreign policy conflict for each of the five countries for which the hypothesized impact of arms transfer dependence is supported by the data. These figures may serve as a benchmark in order to judge the relative importance of the predicted effects of changes in arms transfer dependence. The remaining four columns list those predicted effects, i.e. changes in foreign policy conflict, $\exp(\hat{\alpha}^*) T^{\hat{\beta}} D^{\hat{\gamma}}$, accompanying changes in dependence, D, assuming that arms transfers, T, remain constant at mean levels. Because the model is nonlinear, the predicted effects on conflict depend upon the context in which the change in dependence occurs. Columns 3 and 4 show the effects of a 0.25 increase in arms transfer dependence when dependence is currently low (0.10) and when dependence is rather high (0.65). Columns 5 and 6 start at the mean level of arms dependence for each country and show the effects of a standard deviation increase in dependence and a standard deviation decrease.[17]

In the context of low arms transfer de-

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[15] Where Durbin–Watson tests fail to reject the null hypothesis of non-autocorrelated residuals (of first order), or where the tests prove inconclusive, the standard errors of the parameters come from a consistent estimate of the covariance matrix, allowing for autocorrelation in the form of a first-order moving average. The standard errors reported in Tables II and III are therefore robust.

[16] The impact of dependence appears to have been positive in the case of Somalia, which is opposite to that hypothesized.

[17] Refer to Table I for means and standard deviations of arms dependence. In the case of Syria and Iran, the mean plus one standard deviation exceeds 1.0, which is undefined. Therefore, the reported effects are for change from the mean level of dependence to 1.0.

pendence, the predicted effects of increased dependence are fairly large decreases in foreign policy conflict (column 3). When dependence is high, further increases yield much smaller decreases in foreign policy conflict (column 4). It should be acknowledged that this nonlinearity reflects the construction of the model: the negative exponential assumes that conflict is convex, decreasing with dependence. This is a plausible assumption, since we might expect that initial losses of military autonomy are more consequential – i.e. cause greater pause for states contemplating military action – than subsequent losses of autonomy. Still, this notion of diminishing marginal costs of dependence is not the hypothesis that I have tested here and deserves further attention in empirical research.

Starting with the mean level of arms dependence, which is rather high for these states, the effects of changes in arms dependence are smaller than changes in the context of low dependence. Standard deviation increases in dependence, of course, lead to decreases in foreign policy conflict, while standard deviation decreases in dependence lead to increases in conflict. These changes in the level of arms transfer dependence, and their consequences for conflict behavior, are of the magnitudes we might most expect to observe in the real world. For these countries, a 'typical' increase in dependence is associated with foreign policy conflict 5–15% lower than their mean levels for the Cold War period. Typical decreases in dependence are accompanied by 10–25% higher levels of conflict.

Conclusion

What has motivated this analysis is the proposition that arms transfers are multifaceted international phenomena, with both military and political dimensions, and a suspicion that the effects of these two dimensions

of arms transfers on state behavior may be distinct. Arms transfer dependence is the political dimension which has concerned me here. I have hypothesized that while arms imports themselves, representing an acquisition of military capability, increase the propensity of recipients to engage in conflictual foreign policy behavior, arms transfer dependence serves to restrain that impulse. Dependence raises the possibility that arms shipments will be curtailed by disapproving suppliers just when they are most needed, during regional crises – a possibility with some basis in experience, given that even 'hegemonic' suppliers like the United States and Soviet Union have sought to restrain their clients during periods of regional instability.

Since the two effects are hypothesized to interact, foreign policy conflict has been modeled as a multiplicative function of arms transfers and arms transfer dependence. The estimated exponents on the interactive terms provide empirical support for the predicted effects on conflict behavior. For six of the nine countries examined here, arms transfers appear to have encouraged more conflictual foreign policies. For four of these, plus another, arms transfer dependence tempered this propensity. The precise effects of arms dependence vary with existing levels of arms imports and dependence, but the most realistic predictions involve changes equivalent to 5–25% of these states' mean level of conflict during the Cold War period.

There are at least two issues that should be addressed in subsequent empirical work. The first is the question of generalizability. The empirical domain for the present study is a rather select group: the states I examine are positioned toward the high end of the spectrum for both arms importation and involvement in regional hostility. The hypothesized dynamics do not seem to have operated uniformly among even this group, so we should not be surprised if empirical

support is spotty elsewhere.[18] That does not, of course, undermine the validity of the country-specific findings, which derive from the analysis of time series data, but it might prompt a search for the conditions under which these dynamics do operate. A more general model of foreign policy conflict will be helpful in this regard. Second, my study has focused on one facet of arms transfer dependence – i.e. the degree to which a state's arms import portfolio is concentrated or diversified. The impact of this sort of dependence is itself enhanced or diminished by the extent to which the state can rely of domestic production of armaments.[19] Operationalizing self sufficiency for purposes of empirical analysis is difficult, given the scarcity of data on domestic arms production (see note 11), but it is a worthwhile effort in light of the findings reported here.

With the end of the Cold War, and diminishing competition for influence in the once contested regions of the Third World, we are likely to witness reduced dependence on the United States and Russia as sources of military hardware. This trend is reinforced by higher levels competition in the international arms market as all producers seek export outlets for overproduction (Anthony, 1994; Brzoska & Pearson, 1994). For arms importers, the result is likely to be increased diversification of arms suppliers, and thus decreased dependence on any one or few of them. My analysis would predict, all other things being equal, an increase in the level of regional instability. But hopefully all other things will not be equal, since the end of the Cold War may be opening up new avenues for the resolution of long standing regional rivalries.

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[18] I have conducted some preliminary analyses for other Third World countries, but am forced to rely solely on program counts as a measure of arms imports and as a means of constructing the index of dependence. Given data availability and degrees-of-freedom considerations, time series analyses are possible for 45 additional Third World countries. Of these, 11 regressions generated negative and statistically significant parameter estimates for arms transfer dependence, as predicted: Bolivia, Brazil, Chile, Gabon, Kuwait, Lybia, Peru, South Africa, El Salvador, Saudi Arabia and Senegal. All but Kuwait and Senegal also had positive and statistically significant parameter estimates for total arms imports, as predicted. In short, the dynamics hypothesized here are not widespread, but neither are they isolated. These results are available upon request.

[19] For instance, Israel's high degree of self-sufficiency (relative to other Third World states) may partly account for the finding that the level of arms transfer dependence did not diminish the positive impact of arms imports on conflict behavior, as it did in the other cases (see Table II).

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DAVID KINSELLA, b. 1961, PhD in Political Science (Yale University, 1993); Assistant Professor in the School of International Service, American University. Recent articles have appeared in *International Interactions, Journal of Conflict Resolution, International Studies Quarterly*, and *American Journal of Political Science*; current main interests: arms transfers and arms production in the Third World.