Routine, Response, or Rational Expectations?: An Analysis of Bilateral Relations in Intranational and International Contexts

J. Sky David
Department of Political Science
Texas A&M University
College Station, Texas 77843-4348
(409) 845-2511
jsdavid@polisci.tamu.edu

Abstract

This paper explores the international and intranational interactions among national and subnational actors in El Salvador and the United States from 1978-1992. Hypotheses derived from three prevalent theories are tested in order to evaluate their utility in the study of interactions between actors under conditions of cooperative and conflictual behavior. Event data were gathered and processed with KEDS. A maximum likelihood technique is used to test hypotheses from each theoretical framework. The findings support the predictions from each model of interaction, although in varying degrees.

Introduction

A recurring theme in the study of international relations concerns the strategic interaction among actors. Interactions among actors, or rivals, can take many forms. Among the many topics that are studied under this rubric are arms races, international conflict, and lately in the study of intranational violence. Theories that explain the strategic behavior between actors are in stark contrast to earlier theories that explained the behavior of actors in terms of national characteristics, and/or a combination of economic factors. This paper explores the international and intranational interactions among national and subnational actors in El Salvador and the United States from 1978-1992. Hypotheses derived from three prevalent theories are tested in order to shed further light on the behavior among these actors under conditions of cooperative and conflictual behavior.

Previous studies that analyzed the interaction between actors can be classified along a number of major dimensions. These dimensions are: 1) the status of the actors (e.g., nation states or international organizations), 2) the substantive behavior analyzed in the interaction, and 3) the process by which information is processed by the actors. This paper fits into the aforementioned dimensions in the following ways. I will explore bilateral interactions between national and subnational actors during the protracted period of civil conflict in El Salvador during the 1970s, 1980s, and 1990s. Specifically, I will investigate the bilateral relations between the government of El Salvador and its guerilla challengers (domestic sphere), as well as between the Salvadoran and United States governments (international sphere). El Salvador provides an opportunity to analyze bilateral relations between actors over time, as well as across a wide spectrum

of behaviors. Finally, I derive hypotheses that are designed to put three prevalent theories (rational expectations, reciprocity, and bureaucratic routine) of behavior to the test. That is, are actors more attuned to the contemporaneous behavior of their rival, (and thus are considered to efficient users of information), or are actors more attuned to the past behavior of their rivals, or does the behavior of a rival actor have any affect on the contemporaneous behavior of the actor in question? I now turn to the theoretical underpinnings that have been offered to explain and predict the interactions among actors.

Routine, Reciprocity and Rational Expectations

There are three prevalent, and often competing, theories of interaction in this body of literature. The first is the rational expectations thesis, the second is the reciprocity (action-reaction) thesis, and the third is the policy inertia (bureaucratic routine) thesis. Although all of the competing theories attempt to explain and predict relations among actors, there are marked differences between the three theories. The rational expectations and reciprocity theories are dynamic in nature, in that they both incorporate the notion of strategic interaction among actors. Collectively, these theories are often characterized as second-generation theories, as the first generation focused exclusively on the attributes of the actors (states) (see discussion by Richardson et. al 1981 and Moore 1995). However, the key difference between the two theories is how they assume that interactions shape behavior. In contrast, the bureaucratic routine model is a static.

The rational expectations theory was originally developed in economics (Muth 1961, In Williams and McGinnis 1988). The rational expectations theory posits that

actors "respond not to the actual behaviors of other powers but to rational expectations of others' future policies or to departures from these expected policies" (Goldstein and Freeman 1991:17). In the rational expectations literature, the information environment is assumed to be quite "rich" (Williams and McGinnis 1988:973). These actors are also assumed to make efficient use of information derived from the other actor. Actors are presumed to have sufficient information about the other actor through past interactions, and are able to discern norms of behavior, or expectations of the other actor's future behavior (Ward 1981:231). In this theoretical framework, "states will be excellent at predicting their rival's behavior and thus will only take note of it when it deviates from the expected pattern" (Moore 1995:135).

In contrast to the rational expectations theory, the information environment is not assumed to be rich in the action-reaction (reciprocity) theoretical framework.   It is theorized that the past actions of a given actor condition the current behavior of its rival (Ward 1982).[1] Actors are presumed to be incapable of forming consistent expectations/forecasts of the other actor's behavior, as the relationship between the two is in constant flux. Therefore in lieu of forming norms of the rival's behavior, actors use the past behavior of their rivals in order shape their behavior towards the other actor.

The bureaucratic routine model is concerned with the policy inertia of a given actor, or its "short term" memory (Ward 1982). Policy inertia is the notion that "countries [(or actors)] tend to keep doing the same things that they themselves have been doing in the recent past" (Goldstein and Freeman 1990:23). According to this model, the behavior of a rival actor has little effect on the behavior of the actor in question.

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[1] Ward has argued that nations "follow what might be called the golden rule of international politics - do unto others what they have recently done unto you" (1981:230).

Instead, the past behavior of the actor in question is theorized to determine its behavior in the present. It should be noted that the rational expectations, reciprocity, and bureaucratic routine models are not all necessarily mutually exclusive.

Under the reciprocity model, policy inertia is often theorized to operate in tandem with the bureaucratic routine model. In addition to responding to the behavior of a rival actor in the previous time period, the past behavior of the actor in question can also shape its behavior toward the other actor. Rational expectations theorists would argue that policy inertia is not an important predictor of an actor's current behavior, i.e., they argue that there should be no relationship between the past behavior of an actor towards its rival, and its subsequent behavior towards its rival in the present. Williams and McGinnis argue that the parameter associated with policy inertia should not significantly influence an actor's current behavior "because past information and previous decisions are presumed to be included in the current information set" (1988:978). According to this logic, if the rational expectations model is correct, then we would expect that the parameter estimates from the past behavior of an actor towards its rival, and the past behavior of its rival to it would all be statistically insignificant.

Overall, the record for the each of these theories is mixed, and only a representative sample of past research will be discussed. Ward (1982) found support (from different data sources and multiple time frames) for the reciprocity model. "States tend to be reactive in their foreign policy; they do not tend to exhibit either long- or short-term memory mechanisms" (1982:123).[2]

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[2] Ward (1982) estimated cooperative and non-cooperative behavior separately, and later combined the two. He argued that the model which combined the different types of behavior had less explanatory power than the models that were restricted to cooperative/non-cooperative behaviors exclusively.

Dixon (1983) found support for the reciprocity model is his analyses of interstate "affective expressions" between the U.S. and the Soviet Union. His findings indicated that "the action-reaction model provides a rather powerful explanation of foreign policy affect" (Dixon 1983:847). Moreover, the magnitude of the parameter estimates from the two series in his study were remarkably similar across equations.

Rajmaira and Ward (1990) found a preponderance of support for the reciprocity thesis, as well as some support for the rational expectations model in their analyses of superpower interactions. Central to their argument was the concept of "memory" in superpower interactions. In short-term interactions, their findings indicated that an action-reaction dynamic existed between the U.S., Soviet Union, and China. However, another dynamic was "isolated", and supported, in their cointegration analyses of long-term interaction between the actors. "Superpowers seem to exhibit learned responses that are consistent with well-formed 'rational expectations' about what behavior the rival nation is likely to exhibit in a given period" (Rajmaira and Ward 1990:471). According to their findings, the action-reaction dynamic operates in the short-term, but they argue that rational expectations best characterize long-term interactions.

Goldstein and Freeman (1991) sought to test hypotheses that corresponded to the bureaucratic routine, reciprocity, and rational expectations theories of interactions between the three superpowers. In their analyses of trilateral interaction, they found that a "pure" bureaucratic routine explanation for the interactions between the actors was unsatisfactory. Moreover, they did not find evidence that a "pure" rational expectations explanation best characterized the interactions of the U.S., Soviet Union

and China.[3] Their findings indicated that a mix of bureaucratic routine and reciprocity offered the best explanation for the trilateral interactions of the superpowers (1991:28).

Moore's (1995) analysis of the "Rhodesia Problem" found evidence of reciprocity, rational expectations, as well as policy inertia (bureaucratic routine). Moore found that different actors in a given dyad exhibit complex, and often disparate, interactions that are not uniform for all dyads.   In the domestic sphere, he found that the interaction between the nationalists and the Rhodesian regime were best characterized by an action-reaction relationship (1995:150). Moreover, he found that the underlying data generating processes in this dyad were similar for both actors, as the disturbances between the two equations were correlated. He also found evidence of policy inertia (bureaucratic routine) in the interactions of the nationalists and the Rhodesian government (1995:153). In the international sphere, the most consistent pattern of interaction that he found best explained the behavior of the members in a given dyad was that of an action-reaction relationship.

Williams and McGinnis (1988), and later McGinnis and Williams (1989) offered evidence of a rational expectations in the interactions of the U.S. and Soviet Union. In terms of substantive behavior, they found that the rational expectation theory of strategic interaction was a powerful predictor of military expenditures (1988, 1989), diplomatic hostilities (1989), and finally the gross national product of the U.S. (1989). They argued that "[t]hese strong results imply that any subsequent investigation of the dynamic operation of the system of superpower rivalry should, at the very least, give serious consideration to the possible implications of rational expectations" (1989:1118).

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[3] However, they did find some limited support for the rational expectations model (Goldstein and Freeman 1991:28).

A Brief History of the Civil Conflict in El Salvador

El Salvador has not experienced significant ethnic conflict, and it has enjoyed *relative* independence from the United States (Baloyra 1996).[4] From the early 19th century to the late 20th century, El Salvador has had a past of being ruled by a small elite.[5] This trend continued into mid twentieth century, although the actors have changed from civilian to military.

The military assumed command of the government in 1931, and General Maximiliano Hernandez Martinez was installed as the ruler. One of General Martinez's first actions was to put down a popular uprising in 1932.[6] Later, the Martinez dictatorship was ended by military, and the period of modern day "civilian" rule began. Although there were several attempts to transition from military to civilian rule from 1944-1948, a thirty-year period of institutionalized military rule best characterized the Salvadoran landscape leading up to the civil conflict that ensued from 1979-1992.

The authoritarian Salvadoran regime was not challenged by the United States during this time because of the Cold War. George Kennan once commented that,

> "[W]e should not hesitate before police repression by the local government. This is not shameful since the Communists are essentially traitors…. It is better to have a strong regime in power than a liberal government if it is indulgent and relaxed and penetrated by Communists" (1950, In LaFeber 1984:107).

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[4] Unlike Guatemala, El Salvador does not have a history of foreign-owned plantations (LaFeber 1984:71), and it has not been occupied by U.S. marines like other Latin American countries (Baloyra 1996:439).

[5] The Salvadoran Liberals ruled immediately after independence from Mexico, and later the landed elite (also know as 'the fourteen families') became the dominant component in Salvadoran politics (Booth and Walker 1993:36-37).

[6] Approximately 30,000 peasants were massacred. This event in Salvadoran history is known as "*La Matanza*" (the massacre) (Booth and Walker 1993:37). The ramifications from this repression would be felt decades later, as a new generation of insurgents challenged the rule of the military elite. "The original organizer of these uprisings, a charismatic Marxist intellectual, Augustin Farabundo Marti, was captured before the revolt and both shot and beheaded in its wake" (Booth and Walker 1993:37).

Military assistance, from the United States, was offered to the Salvadoran regime in order to fend off the potential threat of a communist insurgency. From 1953-1976, the United States contributed 2.83 million dollars in military assistance to El Salvador (Booth 1995:191).

Popular mobilization increased markedly during this period. It was during this period that the military and right-wing paramilitary groups began their campaign to repress opponents of the regime (Booth and Walker 1993, LaFeber 1984). Booth and Walker noted that "[l]evels of repression in El Salvador reached such heights in the late 1970s that official mortality statistics began to reflect the curve of terror" (1993:96).

The Salvadoran regime was then faced with a seemingly "Catch 22" situation. In 1977, U.S. military assistance was temporarily suspended to El Salvador because of human rights abuses by the regime. However, the Nicaraguan national revolt that began in 1979 changed U.S. policy towards El Salvador. Therefore, the Salvadoran regime was faced with the two (and often competing) tasks of simultaneously improving human rights conditions, while putting down a growing insurgency. In order to avoid having "another Nicaragua" on its hands, the Carter administration began to provide military assistance (approximately 5 million dollars) to El Salvador in 1979 (Booth 1995:194). The Salvadoran regime ultimately used these funds to suppress popular mobilization and protest against the government. The end result of this military aid is that repression increased and popular mobilization increased in response.[7] Rebel groups united to form the Farabundo Marti National Liberation Front (FMLN) in 1980.[8]

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[7] It was a commonly held view in the Carter administration that "[r]ight-wing dictatorships bent on preserving anachronistic social orders were regarded as bad security risks; the more they relied upon

Throughout the conflict in El Salvador, U.S. policy was disparate. The only similarity between the Carter and Reagan administrations was the shared belief that the Marxist rebels should not come to power (LeoGrande et. al 1986). Carter viewed monetary aid as a means to remedy the social problems in El Salvador, i.e., a political solution to the growing crisis. In contrast, Reagan viewed aid in military terms, i.e., a strong military was the only way to suppress the FMLN insurgency (Diskin and Sharpe 1986). Diskin and Sharpe argued that "[f]rom 1979-1984 United States policy helped undermine the power of moderates, strengthen repressive and often savage right wing forces, and encourage armed insurgency" (1986:50). This process resembled a negative feedback loop, in that increased government repression was answered by increased revolutionary activity. A total of 6 billion dollars in U.S. aid was sent to El Salvador during the 1980-1992 civil conflict (Booth and Walker 1993:101).

August 7, 1987 was marked a turning point in the Salvadoran civil war. The Central American Peace Accords, signed by the Salvadoran government, signaled the regime's willingness to negotiate with the guerrillas. However, the signing of this peace accord did not abate hostilities between the regime and the rebels. The conflict finally reached a peaceful end on January 16th, 1992 with the help of U.N. intervention (Baloyra 1996:451).

Propositions and Hypotheses

In essence, three general hypothesized relationships, derived from the reciprocity, rational expectations, and policy inertia propositions, will be tested across a

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force to sustain themselves, the more rapidly they mobilized and radicalized their opponents" (LeoGrande et. al 1986:297).

[8] This group took its name from the slain organizer of the 1932 demonstrations that ended in "*La Matanza*." The Farabundo Marti National Liberation Front was composed of the Revolutionary Army of

number of dyads through time during the Salvadoran conflict from 1978-1992. I have

gathered data on four dyads in the Salvadoran conflict: 1) Rebel - Salvadoran

Government, 2) Salvadoran Government - Rebels, 3) Salvadoran Government - U.S.

Government, and 4) U.S. Government - Salvadoran Government. The propositions for

this analysis are then given as:

> P1: The past behavior of a given actor towards the other actor in the dyad ($Dyad_{(Actor_B -> Actor_A)_{t-1...t-k}}$) is positively related to the contemporaneous behavior of the other actor in that dyad ($Dyad_{(Actor_A -> Actor_B)_t}$).

> P2: The past behavior of a given actor towards the other actor in the dyad ($Dyad_{(Actor_B -> Actor_A)_{t-1...t-k}}$) is not related to the contemporaneous behavior of the other actor in that dyad ($Dyad_{(Actor_A -> Actor_B)_t}$).

> P2a: The contemporaneous correlation of the disturbances between equations will be positively related.

> P3: The past behavior of a given actor towards the other actor in the dyad ($Dyad_{(Actor_A -> Actor_B)_{t-1}}$) will be positively related to its contemporaneous behavior towards that other actor in the dyad ($Dyad_{(Actor_A -> Actor_B)_t}$).

Proposition 1 corresponds to the action-reaction (reciprocity) model.

Propositions 2 and 2a (collectively) were derived from the rational expectations model.

Finally, proposition 3 was drawn from the bureaucratic routine model.

In this analysis, I will adopt Moore's (1995) definition of reciprocity. "[R]eciprocity

is defined as symmetric (i.e., contingent and roughly equivalent) interaction among two

or more parties where each party's action is responsive to the action of the other(s)"

(1995:134). If hypotheses derived from the reciprocity proposition (P1) are borne out,

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the People, the Popular Forces of Liberation, the Armed Forces of National Resistance, the Revolutionary
Party of Central American Workers, and the Armed Forces of Liberation (Booth and Walker 1993:183).

then we would expect to see that the past behavior by one actor would yield a similar increase/decrease in the behavior by the other actor in the dyad, and vice-versa. Moreover, if hypotheses derived from the bureaucratic routine proposition (P3) are not rejected, then we would expect to find a significant parameter estimate for that actor's behavior in the previous time period.

If reciprocal relationships are not borne out by the data, then the findings would seem to lend initial support the rational expectations thesis. Williams and McGinnis argue that if the null hypothesis is not rejected, i.e., that the coefficients (which correspond to the other actor's behavior in the dyad) in a given equation are not significantly different than zero, then that is tentative evidence (a necessary condition) for the rational expectations thesis (1988:979, also see Moore 1995:137). Moreover, Williams and McGinnis argue that there should be a positive contemporaneous correlation in the error terms *between* equations ($Cor(e_{equationA}, e_{equationB}) \neq 0$) if the rational expectations hypothesis is to be supported (also see McGinnis and Williams 1989). Therefore, a relationship between actors that would be congruent with the rational expectations model would be one where the parameter estimates are not significantly different than zero, <u>and</u> that a positive contemporaneous correlation among the disturbances between the equations must exist (P2 & P2a).

In contrast to the rational expectations model, the error terms between equations in a reciprocity model are not theorized to be necessary conditions. Moore (1995) argues that "the [(reciprocity)] argument does not comment on whether there should be a relationship among the error terms, although one would anticipate that actors

engaged in an action-reaction relationship would also take note of deviations, suggesting that the errors would be correlated" (1995:136-137).

In the bureaucratic routine framework, policy inertia is expected to play a significant role in the contemporaneous behavior of a given actor. If the policy inertia hypothesis is not rejected, then we would expect to find a significant coefficient for the same actor's behavior in a previous time period. In contrast, the prediction from the rational expectations framework is that policy inertia will not be a significant predictor of the behavior of a given actor. Table 1 presents a summary of the expected statistical relationships in the action-reaction, rational expectations, and bureaucratic routine models.

[insert Table 1 about here]

The following hypotheses will be tested in the intranational component of this analysis. I hypothesize that the interactions in the Salvadoran regime → rebel dyad, as well as in the rebel → Salvadoran regime dyad, will correspond to the action-reaction model. The main assumption of the rational expectations model is that actors have a history of regular interaction, and are thus able to develop norms of behavior that shape predictions about the future behavior of their rival. I do not assume that there was a rich information environment in the rebel → Salvadoran and Salvadoran → rebel dyads. Additionally, I hypothesize that the past behavior of a given actor will be positively related to its contemporaneous behavior. In sum, I am hypothesizing that the reciprocity and bureaucratic routine models will work in tandem to explain the interactions between the Salvadoran regime and its rebel challengers.

Finally, I would expect that the underlying data generating process between the contemporaneous behavior of the rebels and the Salvadoran regime will be positively related, i.e., each actor will also be cognizant of the deviations from the past behavior of its rival. Therefore, I would expect that the disturbances in these equations would be positively related.

In order to test these hypotheses, I will use the following specifications.

$$Dyad_{\text{Re}bels->ES_t} = a_1 + b_1 Dyad_{\text{Re}bels->ES_{t-1}} + b_2 Dyad_{ES->\text{Re}bels_{t-1}} + b_3 Dyad_{ES->\text{Re}bels_{t-2}} + e_1 \quad [1]$$

$$Dyad_{ES->\text{Re}bels_t} = a_2 + b_1 Dyad_{ES->\text{Re}bels_{t-1}} + b_2 Dyad_{\text{Re}bels->ES_{t-1}} + b_3 Dyad_{\text{Re}bels->ES_{t-2}} + e_2 \quad [2]$$

If parameters b_1, b_2, and b_3 in equations 1 and 2 are positively signed and significant, then that would indicate support my hypotheses for the intranational component of this analysis. Moreover, a finding of $(Cor(e_{equation.1}, e_{equation.2}) > 0)$ would lend support to my contention that the processes that are driving the interaction between the actors in these dyads are related.

I assume that the information environment in the international dyads (Salvadoran regime → U.S. and U.S. → Salvadoran regime) was rich enough so that norms of behavior could be developed between these actors, and that these norms shape predictions of the other actors' behavior. This is a reasonable assumption, as the U.S. has a history of granting economic and military aid to El Salvador. Therefore, I expect that the interaction between the Salvadoran and United States government will correspond to the rational expectations model. Therefore, I would expect that the past behavior of the United States towards the Salvadoran government would not be related

to the contemporaneous behavior of the El Salvador towards the United States (and vice-versa). Rather, I would expect that each of these actors would be more predisposed to take notice of deviations from the "norm" as the rational expectations model suggests. Moreover, I do not expect that policy inertia will not play a significant role in the interactions between El Salvador and the United States, given the predictions made by the rational expectations model. The following specifications will be used to test the hypotheses from the international component.

$$Dyad_{ES->US_t} = a_1 + b_1 Dyad_{ES->US_{t-1}} + b_2 Dyad_{US->ES_{t-1}} + b_3 Dyad_{US->ES_{t-2}} + e_3 \qquad [3]$$

$$Dyad_{US->ES_t} = a_2 + b_1 Dyad_{US->ES_{t-1}} + b_2 Dyad_{ES->US_{t-1}} + b_3 Dyad_{ES->US_{t-2}} + e_4 \qquad [4]$$

In contrast to the predictions from the intranational component of the analysis, if parameters b_1, b_2, and b_3 in equations 3 and 4 are not significantly different than zero, then that would indicate initial support my hypotheses for the international component of this analysis. Moreover, a finding of ($Cor(e_{equation3}, e_{equation4}) > 0$), in addition to the expected findings just mentioned, would indicate that the rational expectations model of behavior explains the interaction between El Salvador and the United States.

It is important to note that I am not including contemporaneous values on the right-hand side of the equations (e.g., Moore 1995, Ward 1981, Ward 1982, Dixon 1983, Dixon 1986, Ward and Rajmaira 1992). Goldstein argues that the inclusion of a contemporaneous parameter in the specification "generally produces a significant reciprocity coefficient and reduces the significance of the autoregressive (inertia)

coefficient" (1991:198-199). Moreover, the inclusion of contemporaneous parameters

may introduce simultaneity in the model and confound inference.[9]

In addition, I am employing a two month lag structure in all of the specifications.

Early work by Ward (1982) indicated that long-term memory did not operate in the

action-reaction relationships that he analyzed. I include an extra lag to test this

contention. Unlike other authors who have used empirical methods to ascertain the lag

structure of the terms in their respective models (e.g., in VAR models), I restrict the

current specification to two lags.[10] I felt that a longer lag specification was not justified

on substantive grounds in this case, as circumstances can change *markedly* within one

quarter of a year, and that a quarter lag could obfuscate a true relationship if one

existed.

Data

Event data will be used to test the hypothesized relationships in this analysis.

Previous scholars have enumerated some of the potential pitfalls associated with event

data. Doran et. al (1973, In Gerner et. al 1994) and Brockett (1992) have argued that

local sources (in their case Latin America) report more instances of domestic instability

than does the *New York Times* (Muller and Seligson 1987, also see the resulting

controversy in Muller and Seligson 1989, Fu and Midlarsky 1989). Brockett found fault

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[9] The Hausman test is an accepted, albeit general method, of testing for simultaneity in a given specification (Hausman 1978, Greene 2000). The accepted method of overcoming the simultaneity problem is to create an "instrument" for the offending variable(s). In time-series applications, the convention is to create an instrument for the current value of the offending variable(s) based on its own lagged values. However, in action-reaction and rational expectations models, the other exogenous variables in the equation are the predetermined counterparts of that variable. The result is that a high degree of multicollinearity is introduced into the model, as the instrument is the predicted value of the offending variable with its own lagged values as regressors. In effect, the "cure" is worse than the "disease" in this context.

with the *World Handbook of Political and Social Indicators* (Taylor and Jodice 1983),

which used the *New York Times* index as the primary source for the data collection

enterprise, primarily for its underreporting of deaths due to political violence. While it

may be true that the *World Handbook of Political and Social Indicators* may have

underreported deaths in Latin America[11], accurate "body counts" from militarized

interstate disputes, and even wars, are difficult to determine to the *exact number* of

casualties. Gerner et. al argue that newspapers may underreport some events due to

seasonal effects, the newspaper editor's prerogative, and/or the possibility that less

detail will be provided in a local source (1994:105). Therefore, they argue for the use of

a news *agency* such as Reuters.[12]

While researchers should be cognizant of the maladies enumerated by Gerner

et. al and Brockett, I argue that they do not confound the data in this analysis. First, I

am not employing fatality statistics in this analysis. This comes as no surprise as the

theoretical foundations of previous research (who used the *World Handbook* data) were

those based on national characteristics. This paper analyzes the strategic interaction

between the Salvadoran regime, its rebel challengers, and the United States, and thus

the type of data criticized by Brockett would not be appropriate. A more fundamental

reason that mitigates Gerner et. al's criticisms, in this analysis, is the salience of the

conflict. In my case, the situation in El Salvador from 1978-1992 garnered a great deal

of attention from the Carter, Reagan, and Bush administrations. This is not surprising,

due to the national revolt, and subsequent counterinsurgencies, that occurred in

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[10] The series in this analysis did not approximate normality (to be discussed in a later section), and as a result, lag selection based on Granger tests are invalid.
[11] Brockett has made a sweeping statement that this malady may extend to the entire Third World.

neighboring Nicaragua during that same time period, as well as the large amounts of aid that were provided to El Salvador from the United States. By extension, one would suspect that this would translate into consistent media coverage by national sources.

Goldstein (1991) has addressed many of the criticisms that have been leveled at researchers who employ event data. While the potential of bias in the media is always possible, it is not fatal for analyses of the interactions between actors.

> [D]ata series that *consistently* under- or over- estimate a country's military spending or the level of cooperation and hostility in its actions will nonetheless produce efficient and unbiased reciprocity coefficients in a correctly specified equation system. Likewise, an undercount of total events (in an event data set that missed many "unreported" events) would not generally bias the reciprocity coefficient even if the undercount were nonrandom (Goldstein 1991:197).

In effect, any potential biases that may be present in a given news source will tend to produce "conservative" and consistent estimates (1991:201).

While cognizant of the potential pitfalls associated with event data, I find the arguments defending the use of event data by Goldstein more compelling. Therefore, I used the *New York Times* via the *LEXIS-NEXIS* (2000) news service to construct an event data set for the February 1978 to December 1992 time period. A boon of this source is that I was able to access full-text news stories, instead of being limited to abstracts only, as is the case in the bound *New York Times* index. There were a total of 4885 documents that were downloaded from the *LEXIS-NEXIS* news service.[13]

In order to process the enormous amount of text that was generated from the on-line searches, I used the Kansas Event Data System (KEDS) (Schrodt et. al 1994, Schrodt 1998). KEDS is a program that has the ability to assist the researcher in the

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[12] While the Reuters news service was the desired source for the data in this paper, resource limitations precluded my use of this source.

coding of events. It also has the ability to perform automated coding on vast amounts of data using pattern recognition. KEDS is superior to human coding in a number of ways. "First, it is free of non-reproducible coding biases" (Schrodt 1998:4). A second reason is that it saves the individual researcher material resources, as event data sets have typically been assembled by teams of graduate students (Gerner et. al 1994). Moreover, "coder fatigue" and interrater agreement difficulties are avoided when using a machine coding system. Finally, KEDS allows researchers to change the coding rules consistently for the entire data set without a great loss of time or resources (Schrodt 1994, 1998:4).

I employed the modified conflict-cooperation scale for the WEIS (McClelland 1978) data set in order to code the raw data (Goldstein 1992).[14] Like Goldstein and Pevehouse (1997), I converted the weighted WEIS codes to interval data. Using KEDS to code the raw event data, according to the modified WEIS scheme, yielded a total of 10,317 coded events. Previous scholars (e.g., Goldstein 1991, Goldstein and Freeman 1990, Moore 1995) have used the "month" as the unit of analysis, and I will follow their lead. It has been argued that the "year" as the unit of analysis is too long in which to measure dynamic behavior (Moore 1995), and that time units shorter than a month tend to obfuscate true relationships due to "noisy" data (Freeman 1990). The cooperation-conflict scale (which will form both the endogenous and exogenous variables) was operationalized as the monthly mean of the weighted WEIS "net cooperation" score for all actions by a given actor towards a given target in a dyad. This "net cooperation"

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[13] This yielded approximately 7,750 pages of raw text.
[14] I would like to thank Philip A. Schrodt for generously supplying verb and actor dictionaries. These dictionaries were used as templates.

score reflects the typical behavior for actors in a dyad in a given month.[15] Accordingly, the final data set had 179 monthly observations.

Methodology

Previous authors have tested hypotheses derived from the action reaction and rational expectations theories using a number of different statistical techniques. The techniques ranged from rank-order correlations (Van Wyk and Radloff 1993a), ordinary least squares (OLS) (Tanter 1972, Richardson et. al 1981, Ward 1981, Ward 1982, Dixon 1983, Van Wyk and Radloff 1993b, Goldstein and Pevehouse 1997), two stage least squares (2SLS) (Azar et. al 1974), three stage least squares (3SLS) (Dixon 1986), full information 3SLS with error correction mechanisms (Rajmaira and Ward 1990), vector autoregression (VAR) (Williams and McGinnis 1988, Goldstein and Freeman 1990, Goldstein 1991, Goldstein and Freeman 1991, McGinnis and Williams 1989), near-vector autoregressions (Moore 1995), and seemingly unrelated regression techniques (Majeski 1985).

The majority of the studies in this area use ordinary least squares (or generalized least squares) in order to test hypotheses in their statistical models. Implicit in the use of these techniques is the assumption of normally distributed disturbances. This assumption is necessary for inference of the model parameters, as well as the variance. Judge et. al argue that when this assumption is violated, the "estimators **b** and $\hat{s}^2$ are no longer efficient or asymptotically efficient" (1985:824). Moreover, it has been demonstrated that the "respective distributions of **b** and $(T\text{-}K)\ \hat{s}^2/s^2$ are no longer

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[15] Other researchers (e.g., Goldstein and Freeman 1990, Goldstein 1991, Goldstein and Pevehouse 1997) have used the monthly summed WEIS "net cooperation" scores. However, the summation of

normal and c^2 and [sic], consequently, the *F* and *t* tests on b are not necessarily valid

in finite samples" (Judge et. al 1985:824).

The data in this analysis manifested certain characteristics that prohibited the

implementation of more conventional analytical techniques. It follows that if the series

in a given equation are themselves normally distributed, then the resulting disturbances

will approximate normality. Table 2 presents the results of a Shapiro-Wilk (1965) and

Shapiro-Francia (1972) normality tests on the series in the analysis.[16]

[insert Table 2 about here]

As the tests indicate in table 2, none of the series are even "approximately" normally

distributed. Based on these results, the use of a given estimation technique that

assumes normality would be inappropriate. Therefore, I will adopt a different estimation

technique from previous authors in order to address the special nature of my time-series

data.[17]

One possible alternative would be employ robust estimation techniques such

as quantile regression, minimum absolute deviation (MAD), trimmed least squares, or

Huber's M-estimation technique (see Judge et. al 1988, Huber 1964, 1996). However,

due to the excessive negative skew and leptokurtic nature of the series, earlier analyses

using robust estimation techniques still yielded disturbances that were not normally

distributed.

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events tends to build in extreme values of cooperation and conflict, and thus one is unable to distinguish what is "typical behavior" between the actors in a given dyad.
[16] The test statistics of the Shapiro-Wilk (1965) and Shapiro-Francia (1972) tests are based on new approximations by Royston (1982, 1983, 1991a, 1991b, 1992, 1993) of the original tests.
[17] Dickey-Fuller and Augmented Dickey-Fuller unit root tests were performed on each series. The null hypothesis, i.e., that the series in question is integrated, was rejected in all cases using the 1% critical values (Dickey and Fuller 1979, 1981, In Enders 1995).

My solution is to employ a statistical technique which is not restricted to the normality assumption, which is able to model negatively skewed data, and which still retains the desirable properties of asymptotic consistency, efficiency, and unbiasedness. A full information maximum likelihood log gamma regression will be the estimation technique used in my analyses[18]. The log likelihood for a log gamma regression is given as:

$$\left[\frac{1}{e^{\ln(f)}}\right]\times\left[(y\times(\frac{-1}{e^{\Theta}})\right]-\Theta+\left[\left(\frac{1}{e^{\ln(f)}}\right)\times\left(\ln(\frac{y}{e^{\ln(f)}})-\ln(y)-\ln[\Gamma(\frac{1}{e^{\ln(f)}})]\right)\right] \qquad (5)$$

$$\text{where:} \quad \Theta = x_t \boldsymbol{b}$$

Findings

The initial discussion will be centered on the intranational component of this analysis, i.e., equations 1 and 2. The first model to be tested was the rebel - Salvadoran government dyad (equation 1).[19] The full information maximum likelihood log gamma regression for the rebel - Salvadoran government dyad is presented in table 3.

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[18] The gamma distribution which underlies the gamma generalized linear model (GLM) is appropriate for continuous data, and it is able to model excessive skew in the data. A characteristic of a gamma GLM is that the response variable cannot take on negative values. Its full information maximum likelihood log-link counterpart cannot take on negative values or values of zero. Accordingly, the data derived from the modified WEIS scale from Goldstein (1992) were rescaled so that it ranges from 1 to 21 where a score of "1" is indicative of extreme conflict and a score of "21" is indicative of extreme cooperation. Stata v. 6 (StataCorp 1999) was the statistical package used for all analyses. The ado *-lgamma-* was used to estimate the equations (Hilbe 2000).

[19] Preliminary diagnostics revealed that there were a number of outliers in the data. The *dfits* procedure in tandem with the Belsley et. al (1980, In Judge et. al 1988) size-adjusted cutoff criterion

$[|dfits| > 2\left(\frac{K}{T}\right)^{\frac{1}{2}}]$ were employed in this endeavor (see Judge et. al 1988 for a discussion). Since the

continuous time component is paramount in analyses of the type in this paper, I found that simply dropping outliers was unacceptable. Therefore, I included a number of variance dummies in each of the specifications in this analysis. This ensures that the overall variance of the model will not be monopolized (or "driven") by outlying observations. Diagnostics performed on each model in this analysis indicated that first-order autocorrelation did not adversely affect any given model. I performed a modified version of

[insert Table 3 about here]

The first finding from this model is that the parameter for policy inertia variable of the rebels toward the Salvadoran government ($Dyad_{\mathrm{Re}bels->ES_{t-1}}$) was not a significant predictor of the cooperative and conflictual behavior between the actors in this dyad. This finding was not expected, as I had originally hypothesized that bureaucratic routine and reciprocity would both characterize the interactions between these actors. The findings for the single lagged Salvadoran government - rebel cooperation-conflict variable ($Dyad_{ES->\mathrm{Re}bels_{t-1}}$) was significant at conventional levels.   Therefore we can conclude that the behavior of the Salvadoran government towards the rebels in the previous time period is a significant predictor of the contemporaneous behavior of the rebels towards the Salvadoran government. We find a similar finding with its lagged counterpart ($Dyad_{ES->\mathrm{Re}bels_{t-2}}$). These latter results suggest that the rebels are much more attuned to the behavior of the Salvadoran government towards them in the previous two time periods (months) than they are to their own past behavior in the previous time period as the reciprocity model predicts. Therefore, the results from the first equation provide support for the action-reaction model of interaction, but do not support the bureaucratic routine model for this dyad.

The second model to be tested was the Salvadoran government - rebel dyad (equation 2). The results are presented in table 4.

[insert Table 4 about here]

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the *M*-test (Ostrom 1990) using the residuals from the log gamma regression fit to test for this threat to inference.

Unlike the first model, the parameter for the policy inertia variable

($Dyad_{ES->\mathrm{Re}bels_{t-1}}$) was significant, and in the hypothesized direction. Unlike the first

model (equation 1), policy inertia does seem to be operating in the behavior of the

Salvadoran government towards the rebels. The momentum to continue to maintain

policies in the previous time period into the current time period is pronounced. Stronger

findings were associated with the previous behavior of the rebels ($Dyad_{\mathrm{Re}bels->ES_{t-1}}$ and

$Dyad_{\mathrm{Re}bels->ES_{t-2}}$) towards the Salvadoran government.   In terms of the lagged

behavior of the rebels, the findings indicate that the past behavior of the rebels towards

the regime are quite salient in guiding the regime's behavior in the current time period,

just as the action-reaction theoretical framework suggests. Therefore, the hypotheses

associated with the reciprocity and bureaucratic routine models were supported for this

dyad.

A related question emerges from the results of the first and second domestic

models (equations 1 and 2), i.e., are the underlying data generating processes of each

model systematically related? On the surface, it appears that the same data generating

processes holds for both models. If this conjecture is so, then we would also expect

that the disturbances from the two equations would be correlated[20]. A correlation of the

contemporaneous disturbances across equations indicated that the underlying data

generating processes were indeed similar (r = .43, p > .00). Taken together, the results

of the first and second equations support the predictions of the action-reaction model,

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[20] Moore (1995) adopts a benchmark p-value of .20 when analyzing the disturbances. I will adopt this benchmark in this analysis.

and offer limited support for the notion that a mix reciprocity and bureaucratic routine explain the interaction between the actors in these dyads.

The next step of the analysis was to concentrate on the international facet of the conflict in El Salvador from 1978 to 1992. The two principal actors in this step of the analysis are the Salvadoran and United States governments. The first model to be discussed will be that of the behavior of the Salvadoran government towards the United States (equation 3). The estimates for this model are presented in table 5.

[insert Table 5 about here]

The parameter estimates for b_2 and b_3 (the lagged behavior of the United States towards El Salvador) are not significantly different from zero. These initial findings for the El Salvador → United States dyad suggest that the interactions between these actors may approximate the relationship predicted by the rational expectations model. The parameter estimate for the policy inertia term (b_1), is also not significantly different from zero. This supports my contention that the past behavior of the Salvadoran regime does not influence its contemporaneous behavior with the United States.

The next step in the analysis was to estimate equation 4, i.e., the United States → Salvadoran government dyad. The results are presented in table 6.

[insert Table 6 about here]

An unanticipated finding was revealed in the parameter estimate for the policy inertia ($Dyad_{US->ES_{t-1}}$) term, as I had originally hypothesized that the bureaucratic routine relationship would not operate in this dyad. In addition to the unexpected significance of this term, the coefficient is signed in the negative direction. Therefore, the policy inertia

of the United States is negatively related to its contemporaneous behavior towards El Salvador.[21]

The findings indicate that the parameters (b_2 and b_3) for the past behavior of the Salvadoran regime towards the United States (equation 4) are not significantly different from zero. As mentioned earlier in the discussion of the findings for equation 3, this tentatively suggests that a rational expectations relationship may be operating in the interactions between the actors in this dyad, as I had originally hypothesized.

If the rational expectations hypothesis for the two dyads in equations 3 and 4 is correct, then in addition to the insignificant parameter estimates for b_2 and b_3 in equations 3 and 4, there should be a positive relationship between the disturbances of the two equations. If these conditions are found, then that would indicate that the actors in these dyads are "hyper-responsive" and make efficient use of information in an information-rich environment. It would also mean that these actors would be cognizant of deviations from "normal" relations between the two actors. The contemporaneous correlation among the disturbances in equations 3 and 4 is modestly significant at the predetermined level for the disturbances ($r = .11$, p > .15).

The findings associated with equations 3 and 4 support the majority of my earlier hypotheses of the interaction between El Salvador and the United States. There is evidence that the interaction between both of these actors is best characterized as one of rational expectations. The results indicate that a norm of behavior between the United States and El Salvador has developed, and that this norm of behavior between the actors guides their contemporaneous relations.

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[21] This unanticipated finding will be discussed in greater detail in the concluding section.

Conclusion

      The results from in this analysis have shed some light on the interactions between national and subnational actors in the international and intranational arenas. The results suggest that the interaction dynamic in a given dyad is largely a function of the actors involved. The hypotheses for an action-reaction relationship between the Salvadoran regime and its rebel challengers were supported through time and across a wide range of behavior. Conversely, the findings suggested that nation states with a history of interaction develop norms of behavior, and that these norms of behavior shape contemporaneous interaction as the rational expectations model would suggest.

      Mixed support for was found for the bureaucratic routine model. In the intranational context, the policy inertia hypothesis was only supported in one of the two equations. In the international context, the bureaucratic routine hypothesis was supported in one of two equations, even though it was originally hypothesized that it would not be a factor in shaping the behavior between the two actors. Although these findings are at odds with some of my original hypotheses, I will attempt to explain them. This unanticipated finding for the policy inertia term in equation 4 could suggest that current behavior of the United States towards El Salvador, with respect to its past behavior towards El Salvador, is characteristic of an equilibrium-seeking rapport with the Salvadoran government. Recall that the U.S. conditioned foreign aid to El Salvador on two grounds. On the one hand, foreign aid was withdrawn by the Carter administration because of human rights abuses. However, after the national revolt in Nicaragua and emergence of the Reagan administration, an emphasis was placed on ensuring domestic stability by putting down a growing insurgency. The condition that

human rights practices in El Salvador should improve was never suspended. Therefore, the foreign policy of the United States could be characterized as finding a balance between improving human rights conditions and putting down an insurgency by force. That is, the long-term picture of the behavior of the United States towards the Salvadoran regime might be characterized as one of equilibrium.

In terms of the findings for the policy inertia hypothesis in the domestic arena, it appears that a more complex relationship exists than was originally hypothesized. One factor that may influence whether the past behavior of a given actor accords with the bureaucratic routine model, although not addressed here (but will be in future research), concerns the status quo. One would expect that actors who are engaged in conflict will value the status quo in different ways. The Salvadoran regime, although never truly dominant throughout the conflict, remained in power during the entire insurgency. Therefore, the regime had a stake in the status quo and continued previous policies that kept it in power. On the other hand, the rebels were never able to gain an absolute advantage over the regime and displace it from power. At the present, one could speculate that the rebels never exhibited behavior that conformed to the policy inertia model because of the past policies of this group were never able to displace the regime.

In retrospect, this is an area that is ripe for future research in intranational conflict. This would entail formulating a formal model about how satisfaction with the status quo influences future policy. However, these are questions that will be addressed in a subsequent project.

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Table 1: Expected Statistical Relationships of the Rational Expectations, Action-Reaction, and Bureaucratic Routine Models.

Model	H0	Reject H0?	Is it necessary for $Cor(e_1, e_2) \neq 0$?
Rational Expectations	$b_2 ..., b_k = 0$	No	Yes
Action-Reaction	$b_2 ..., b_k = 0$	Yes	No
Bureaucratic Routine	$Corr(b_t, b_{t-1}) = 0$	Yes	NA

Table 2: Normality Tests for Individual Series 1978-1992

Shaprio - Wilk Test*

Series	Obs.	W	V	z	P > |z|
Rebel - Government Dyad $_{(t)}$	179	.95629	5.922	4.069	.00002
Government - Rebel Dyad $_{(t)}$	179	.95534	6.051	4.119	.00002
Salvadoran - U.S. Dyad $_{(t)}$	179	.88149	16.056	6.351	.00000
U.S. - Salvadoran Dyad $_{(t)}$	179	.91671	11.285	5.545	.00000

*   H0: Normality

Shaprio - Francia Test*

Series	Obs.	W'	V'	z	P > |z|
Rebel - Government Dyad $_{(t)}$	179	.95713	6.282	3.750	.00009
Government - Rebel Dyad $_{(t)}$	179	.95244	6.969	3.953	.00004
Salvadoran - U.S. Dyad $_{(t)}$	179	.87916	17.708	5.734	.00001
U.S. - Salvadoran Dyad $_{(t)}$	179	.91280	12.778	5.119	.00001

*   H0: Normality

Table 3: Gamma Regression of the Rebel - Salvadoran Government Dyad 1978-1992

Variable*	Coef.	Std. Err.**	z	P > | z |
Rebel - Government Dyad $_{(t-1)}$	.011	.008	1.375	.169
Government - Rebel Dyad $_{(t-1)}$	.028	.011	2.449	.014
Government - Rebel Dyad $_{(t-2)}$	.017	.009	1.912	.056
constant	1.65	.148	11.15	.000
ln(phi)	-2.521	.145	-17.37	.000

N = 179
log likelihood = -388.73
AIC = 853.456
SC = 974.15

Dependent variable: Rebel - Salvadoran Government Dyad
* Note: results of 33 dummy variables omitted
** Note: robust standard errors

Table 4: Gamma Regression of the Salvadoran Government - Rebel Dyad 1978-1992

Variable*	Coef.	Std. Err.**	z	P > | z |
Government - Rebel Dyad $_{(t-1)}$	.011	.006	1.861	.063
Rebel - Government Dyad $_{(t-1)}$	.010	.005	1.984	.047
Rebel - Government Dyad $_{(t-2)}$	.009	.004	2.325	.020
constant	1.987	.066	30.253	.000
ln(phi)	-3.484	.122	-28.562	.000

N = 179
log likelihood = -330.08
AIC = 722.16
SC = 820.62

Dependent variable: Salvadoran Government - Rebel Dyad
*   Note: results of 26 dummy variables omitted
** Note: robust standard errors

Table 5: Gamma Regression of the Salvadoran Government - U.S. Dyad 1978-1992

Variable*	Coef.	Std. Err.**	z	P > | z |
Government - U.S. Dyad $_{(t-1)}$	-.003	.003	-1.028	.304
U.S. - Government Dyad $_{(t-1)}$	.006	.005	1.306	.192
U.S. - Government Dyad $_{(t-2)}$	.001	.005	.220	.826
constant	2.413	.081	29.701	.000
ln(phi)	-4.334	.158	-27.484	.000

N = 179
log likelihood = -295.53
AIC = 657.06
SC = 761.87

Dependent variable: Salvadoran Government - U.S. Dyad
*   Note: results of 28 dummy variables omitted
** Note: robust standard errors

Table 6: Gamma Regression of the U.S. - Salvadoran Government Dyad 1978-1992

Variable*	Coef.	Std. Err.**	z	P > | z |
U.S. - Government Dyad $_{(t-1)}$	-.009	.004	-2.017	.044
Government - U.S. Dyad $_{(t-1)}$	.002	.004	.453	.651
Government - U.S. Dyad $_{(t-2)}$	.002	.004	.400	.689
constant	2.542	.101	25.224	.000
ln(phi)	-4.068	.138	-29.587	.000

N = 179
log likelihood = -323.44
AIC = 702.88
SC = 791.81

Dependent variable: U.S. - Salvadoran Government Dyad
*   Note: results of 23 dummy variables omitted
** Note: robust standard errors