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**Socioeconomic development and military policy consequences of
Third World military and civilian regimes, 1965–1985**

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University of North Texas, 1992

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Madani, Hamed, Socioeconomic Development and Military Policy Consequences of Third World Military and Civilian Regimes, 1965-1985. Doctor of Philosophy (Political Science), May, 1992, 115 pp., 12 tables, bibliography, 84 titles.

This study attempts to address the performance of military and civilian regimes in promoting socioeconomic development and providing military policy resources in the Third World.

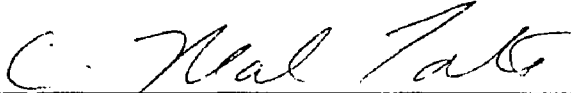
Using pooled cross-sectional time series analysis, three models of socioeconomic and military policy performance are estimated for 66 countries in the Third World for the period 1965-1985. These models include the progressive, corporate self-interest, and conditional.

The results indicate that socioeconomic and military resource policies are not significantly affected by military control. Specifically, neither progressive nor corporate self-interest models are supported by Third World data. In addition, the conditional model is not confirmed by the data. Thus, a simple distinction between military and civilian regimes is not useful in understanding the consequences of military rule.

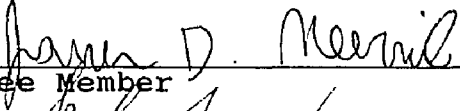
SOCIOECONOMIC DEVELOPMENT AND MILITARY POLICY
CONSEQUENCES OF THIRD WORLD MILITARY
AND CIVILIAN REGIMES, 1965-1985

Hamed Madani, B.A. , M.A.

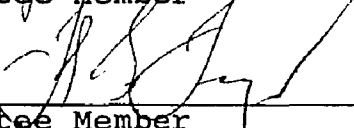
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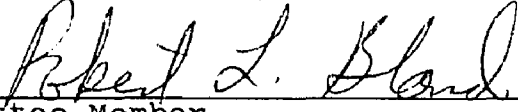
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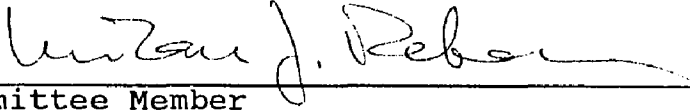
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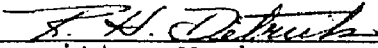
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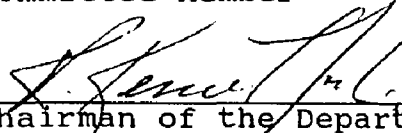
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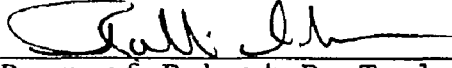
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SOCIOECONOMIC DEVELOPMENT AND MILITARY POLICY
CONSEQUENCES OF THIRD WORLD MILITARY AND
CIVILIAN REGIMES, 1965-1985

DISSERTATION

Presented to the Graduate Council of the
University of North Texas in Partial
Fulfillment of the Requirements

For the Degree of

DOCTOR OF PHILOSOPHY

By

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Denton, Texas

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CHAPTER I

THE DEBATE OVER THE POLICY CONSEQUENCES OF MILITARY AND CIVILIAN REGIMES IN THE THIRD WORLD: AN INTRODUCTION

Introduction

The performance of military and civilian regimes in modernization and socioeconomic development in the Third World nations of Africa, Asia, and Latin America has received much attention in comparative politics in the period since these new nations achieved their independence. A number of scholars (Pauker, 1959; Lieuwen, 1961; Huntington, 1957, 1962, 1968; Daalder, 1962; Finer, 1962; Pye, 1962; Shils, 1962; Halpern, 1963; Janowitz, 1964; Levy, 1966; Bienen, 1971) have reached opposing conclusions about the relationship between military rule and general developmental policy outcomes. One group of scholars argues that military governments tend to promote socioeconomic development, while a second argues just the opposite. A third group suggests that as society changes, so does the role of the military, (details are given in Chapter II).

In the 1950s, scholars generally viewed armed forces as repositories of authoritarian values who lacked organizational competency and capacity (see the discussion in

Bienen, 1983: 34). But by the 1960s, a notable number of scholars presented a favorable view of the military. They pointed to the social class and professional backgrounds of officers and argued that their concern for national defense and prestige, technical proficiency, and middle-class orientations created a tendency for the military actively to support economic development (Paulker, 1959; Daalder, 1962; Johnson, 1962; Shils, 1962; Halpern, 1963; Levy, 1966; Bienen, 1971). These arguments are not entirely persuasive, however. Other scholars argue that civilian governments are more likely to possess the political skills, experience, and resources necessary to check abuses of power, encourage rational planning, and get public support for their modernizing efforts (Lieuwen, 1961; Finer, 1962; Hurewitz, 1969; Needler, 1972). Furthermore, case studies of Third World militaries found that many lack a single corporate identity, suffering from factionalism and a lack of organizational cohesion, which is undermined by a proliferation of patron-client relationships (Finer, 1962; Janowitz, 1964; Huntington, 1968; Luckham, 1971; Price, 1971).

Huntington offers a third view (1968). He argues that in the backward societies of the Third World, military regimes are progressive compared to more advanced societies of the Third World, where the military is retrogressive.

In recent years several attempts to test the conflicting hypotheses derived from this early literature have been made using cross-national aggregate analysis. The findings of these empirical studies have been less than consistent. One group of empiricists argues that military regimes are distinguishable, at least in some ways, by their national public policies (see, for example, Nordlinger, 1970; Schmitter, 1971; Pluta, 1979), while a second group reports the opposite, (see, for example, McKinlay and Cohan 1975; 1976; Jackman, 1976). McKinlay and Cohan's conclusions seem to be representative of the latter group of empiricists:

- (1) military regimes do not in aggregate form a distinctive regime type in terms of performance;
- (2) there is a degree of diversity found within military regimes not dissimilar to the diversity found within civilian regimes; and
- (3) the general degree of similarity or dissimilarity between military and civilian regimes varies from one variable or one category of variables to another (McKinlay and Cohan, 1975: 22-23).

In addition, some scholars maintain that while military regimes might not be different on socioeconomic development, they might participate in politics in order to defend or advance their corporate interests and enhance military spending and size (Needler, 1975; Nordlinger, 1977).

To further reexamine the role of the military and civilian regimes in modernization and development, this current research aims at the following two broad questions: (1) what are the consequences of military and civilian regimes for socioeconomic development? (2) which regime, military or civilian, is more favorable to the armed forces? To answer these two general questions, pooled cross-sectional time-series statistical procedures are applied to an extensive cross-national data set.

Before delineating the framework for analysis, the term "Third World" requires clarification. Third World in this study is based on an economic criterion. It refers to more than 110 less-affluent countries of Latin America, Asia, and Africa that have low-income and middle-income economies (for a detail definition of this term, refer to chapter III).

In the following section, the inadequacies of previous research designs, the advantages of pooled cross-sectional time-series, and consequently, the significance and purpose of this research will be delineated.

Deficiencies in Existing Analysis of the Consequences
of Military and Civilian Regimes and
the Significance of the Study

While there have been various theoretical and empirical studies on the causes and consequences of military intervention, several problems plague the findings of these studies. A primary purpose of this study is to address some of these problems not adequately dealt with in previous works.

First, this study goes beyond previous works by extending analysis to the most recent data. Nordlinger's (1970) study is based on data collected from 1957 to 1963; Schmitter's (1976) is based on data gathered from 1960 to 1970; McKinlay and Cohan's (1975) is based on data obtained from 1951 to 1970; and Jackman's (1976) is based on data collected from 1967 to 1976. The data used here cover 1965-1985, the most recent year for which reliable data can be obtained.

Second, with the exception of Zuk and Thompson (1982), who use pooled cross-sectional time-series methods to examine the relationship between regimes and military expenditures, most other studies use only cross-sectional, cross-national aggregate analysis. This study uses a pooled cross-sectional time-series design.

Problems of Cross-Sectional Analysis

There are several shortcomings with cross-sectional analyses, especially the existing ones in this research area, which argue for the use of a pooled cross-sectional time-series design.

The use of only a cross-sectional design restricts analysis to very general developments without taking into account important differentiations within societies (Umezulike, 1990: 9). Remmer writes, "The erratic growth pattern of Latin American countries also raises questions about the finding of cross-national studies of regime impact. A 'snapshot' approach or examination at a single point in time may provide very misleading evidence" (Remmer, 1978: 46). For example, Remmer shows that in 1969 and 1970 the average per capita increase in GNP was higher for civilian regimes in Latin America than for military ones, whereas in 1971 and 1972 the reverse was true (Remmer, 1978: 46). Given this difficulty, a cross-sectional aggregate design does not allow us to examine the dynamics of year-to-year fluctuations in the socioeconomic patterns of many countries (Zuk and Thompson, 1982: 62).

Furthermore, one can not often place reliance in relationships between variables in existing cross-national aggregate data analyses because the time periods for both dependent and independent variables had often not been

matched (Ravenhill, 1980: 101). For example, in Nordlinger's (1970) study, the data for the dependent variables cover the time period 1950 to 1960, while the independent are measured from 1957 to 1962 (Ravenhill, 1980: 101). This type of assessment undermines the level of confidence in any conclusion regarding the relationship between type of regime and socioeconomic performance.

There has also been a temptation to mismatch the unit of analysis in cross-national designs as the researcher tries to meet the "large enough sample size" requirements. An example of this is Nordlinger's (1970) study which includes in the sample three countries not normally considered part of the Third World, as well as twenty-two countries that had not achieved independence by 1 January 1960 (Ravenhill, 1980: 101).

Advantages of Pooled Cross-Sectional Designs

While not all these problems are endemic to cross-sectional, numerous scholars cite advantages of a pooled cross-sectional time-series analysis (Levenbach and Clearly, 1984; Maddala, 1977; Zuk and Thompson, 1982; Stimson, 1985) that make it possible to avoid these problems.

A pooled model, according to Zuk and Thompson, "contrasts a cross-section of nations on one dimension as well as points of time for each nation on another" (Zuk and Thompson, 1982: 63). With a pooled design, one can

simultaneously examine the relationship between civilian and military regimes and socioeconomic development both across the nations (in space) and historically (in time) (Umezulike, 1990: 8).

Pooling is also considered to be a robust research design for the assessment of causal relationships. According to Stimson (1985) "pooling data gathered across both units and time points can be an extraordinarily robust research design, allowing the study of causal dynamics across multiple cases where the potential cause may even appear at different times in different cases" (Stimson, 1985: 916).

Statistically, "pooling can increase the reliability of the parameter estimates by increasing the degrees of freedom and decreasing the standard errors of the parameter estimates" (Levenbach and Cleary, 1984: 355). In this study, for example, each of the 66 nation models has only 21 time series observations, yielding a pooled total of (1386) observations.

Finally, "since cross sectional variation is normally substantially greater than time series variation, the estimates for a pooled model may be based on a wider range of variation in a potential independent variable than will exist for time series models" (Levenbach and cleary, 1984: 355).

New Dependent Variables

This study also improves on previous analyses of the performance of military and civilian regimes by examining new dependent variables consisting of indices that have more theoretical appeal. Specifically, two indexes are constructed, a socioeconomic performance index and a military performance index (details are presented in chapter III). Previous studies use other, single indicators as dependent variables, including the rate of growth of per capita GNP; gross domestic investment; change in industrialization; change in agricultural productivity; education expenditures; defense expenditures; energy consumption; school enrollment; and physician growth (for a detailed list of the dependent variables used, refer to Table 1). Perhaps one of the reasons for the confusion in the findings of the empirical studies is due to the use of such a variety of indicators. This research uses index variables that specifically focus on crucial developmental measures.

Finally, previous studies suffer from a too narrow focus and the use of less than optimum units of analysis. Most scholars restrict their studies only to Latin America (see, for example, Ames and Goff, 1975; Looney and Frederisken, 1987; Lowenthal, 1974; Neddler, 1969, 1972; Pluta, 1979; Ruhl, 1982; Schmitter, 1971), Africa (see, for

example, Bienen, 1978; Decalo, 1976; Gutteridge, 1975; Luckham, 1971; Ravenhill, 1980) or Asia (see, for example, Hoadley, 1975; Rudner, 1976; King, 1981), and from these area studies made general conclusions about the performance of military and civilian regimes with respect to each region of the Third World. Such a limited scope has its own merit, given the fact that these states share a common history and are characterized by similar ethnic and cultural patterns and problems (Ravenhill, 1980: 105). But, their findings can only be applied to a single area. In this research, the "civil-military performance" thesis is treated as a hypothesis applying to the entire Third World.

To correct both of the area focus of earlier studies, but to retain a manageable analysis, this study adopts the strategy of the "most similar system" design (Przeworski and Teune, 1970: 32-35) for Third World nations. This design is based on the assumption that "common systemic characteristics are conceived of as 'controlled for', whereas intersystemic differences are viewed as explanatory variables" (Przeworski and Teune, 1970: 33). This research seeks to understand the effects of military intervention in politics by controlling for common factors that are shared by Third World nations and using intersystemic factors such as regime types as "explanatory variables." Major common factors include level of economic development and position of the

regimes in the international community. These similarities are implied by the definition of the "Third World."

Summary

In this chapter I have asserted that scholars have reached opposing conclusions with respect to the socio-economic and military policy performance of military and civilian regimes in the Third World. I have presented three contrasting views. Furthermore, I have outlined the significance of this research and cited the shortcomings and limitations of research designs adopted by previous students of military and civilian regimes. In addition, I presented the research design and statistical procedure to be used in this work with its advantages.

In the next chapter, I present a literature review that concentrates on the policy consequences of military and civilian regimes. Several hypotheses that can be tested using empirical data are established. Chapter three focuses on the unit of analysis, definition of terms, the data, dependent variables, independent variables, indicators of these variables and operationalizations. It also describes the statistical procedures adopted in this study in appropriate detail. Chapter four delineates the empirical findings deduced from pooled cross-sectional time-series analysis. Specifically, this chapter tests whether each

hypothesis is confirmed or rejected. The last chapter is the conclusion.

CHAPTER II

PERSPECTIVES ON MILITARY POLICY PERFORMANCE: A REVIEW OF THE RELEVANT LITERATURE

This chapter reviews the pertinent literature concerning the policy performance of military and civilian regime and, based on this review, puts forward several hypotheses for empirical tests.

Social scientists have shown great interest in civil-military relations since World War II. This recognition of the political role of the military as a universal phenomenon has produced a number of theoretical studies (see, for example, Bienen, 1968, 1971; Daadler, 1962; Halpern, 1963; Huntington, 1957, 1959, 1962, 1968; Hurewitz, 1969; Janowitz, 1962; Johnson, 1962; Lieuwen, 1961; Pye, 1962; Shils, 1962). Many of these theoretical deliberations center around two topics. They first seek explanations of the causes of military intervention, which is not the subject of this study.

As time progressed, attention shifted to the examination of the consequences of military intervention. Scholars evaluate the accomplishments of military regimes in maintaining stability, creating political institutions, and achieving economic development and national integration (see, for example, Bienen, 1971; Halpern, 1963; Huntington,

1968; Hurewitz, 1969; Lieuwen, 1961; Janowitz, 1960, 1964; Johnson, 1962; Pye, 1962; Shils, 1962).

The Progressive Military

A number of perspectives have been developed in an attempt to study the relationship between military and civilian regimes. The first perspective comes to the support of military governments: it argues that military regimes constitute a modernizing force initiating social change and economic and political modernization in many of the Third World nations (see, for example, Halpern, 1963; Hurewitz, 1968; Levy, 1966; Paulker, 1959; Pye, 1962).

A number of reasons are put forward as to why military regimes are progressive. Scholars argue that the military is the most well-organized institution; that soldiers possess more expertise and organizational skills, stand above ethnicity, and are better educated. Pye argues that

the revolution in military technology has caused the army leaders of the newly emergent countries to be extremely sensitive to the extent to which their countries are economically and technologically backward. Called upon to perform roles basic to advanced societies, the more politically conscious officers could hardly avoid being aware of the need for substantial change in their

own countries (Pye, 1962: 78).

Marion Levy argues that in modernizing societies, the military is typically the organization that is most efficient at "combining maximum rate of modernization with maximum levels of stability and control" (Levy, 1966: 603). J. C. Hurewitz concurs with Levy's assessment by arguing that political parties and civilian politicians in the Middle East have become corrupt and have monopolized social and economic resources, while the economy has stagnated. He further argues that only military rule could correct these inequalities and thereby facilitate economic growth and modernization (Hurewitz, 1968: 117).

In addition, the military is portrayed as a dynamic force that uproots stifling traditions and replaces them with new patterns. In his study of social change in the Middle East and North Africa, Halpern emphasized "the transformation of the army from an instrument of repression in its own interest or that of kings into the vanguard of nationalism and social reform" (Halpern, 1963: 253). He goes on to say, "the more the army was modernized, the more its composition, organization, spirit, capabilities, and purpose constituted a radical criticism of the existing political system" (Halpern, 1963: 258).

With reference to Southeast Asia's militaries, Guy Pauker states that: "they are not the product of social classes with feudal tradition." (Pauker, 1959: 339-340).

Rather, their struggle for national independence and modernization has produced an officer corps that is unlikely to become "the natural allies of feudal or other vested interest. Their natural priorities are progressive" (Pauker, 1959: 339-340).

Similarly, with respect to Latin America, Johnson points to the military's social class and professional background and argues that concern for national defense and prestige, technical proficiency, and middle class orientations create economic development (Johnson, 1962: 121-127).

Nordlinger offers a summary of this perspective on the role of the military in politics:

The likely consequences of military rule are economic growth, the modernization of economic and social structures and a more equitable distribution of scarce economic values and opportunities (Nordlinger, 1970: 1131).

The Conservative/Reactionary Military

Other scholars offer an alternative perspective (see, for example, Finer, 1962; Lieuwen, 1961; Needler, 1972; Shils, 1962). These scholars are skeptical about the willingness and capacity of military regimes to promote modernization and socioeconomic development. With respect to Latin America, Lieuwen depicts the military as a

conservative and even reactionary force, preoccupied mainly with preserving its corporate self-interest and generally lacking the political and administrative resources necessary for the pursuit of a successful developmental effort (Lieuwen, 1961: 147-148).

Similarly, S. E. Finer emphasizes the corporate self-interest of the military as the underlying reason for military intervention.

The military is jealous of its corporate status and privileges, [which] in its most aggressive form, can lead to the military demand to be the ultimate judge on all matters affecting the armed forces. These certainly include foreign policy, and invariably include domestic economic policy and may well include all the factors making for morale, i.e., education and the mass media communication (Finer, 1962: 47).

Thus, these military regimes are likely to increase defense expenditures at the expense of non-defense programs.

Edward Shils views the army as a conservative force that thwarts change and modernization and supplied several reasons for such a stance:

Yet it probably remains a fact that the military have a feeling of sympathy for tradition, not only for their own military

tradition but for the traditional style of society as well. Hierarchic dignity, respect for superiors, solicitude for subordinates, solidarity, and conventionality produce in professional soldiers an attachment to the same phenomena in civilian society. The result is distrust of those who derogate traditional life and rush to overturn it (Shils, 1962: 31).

Needler concurs with Shils and argued that the purpose of coups is increasingly to thwart social and economic development. "It is clear that, if one has to generalize about the role of the Latin American military as a whole, one must consider their role, on balance, still to be a conservative or reactionary one" (Needler, 1972: 45).

The implication of these views is that civilian governments are more likely to possess the political and organizational skills, experience, and resources necessary to check the abuse of power in order to promote socio-economic development, and that military regimes are likely to use their power to promote the well-being of soldiers and the military as an institution.

The Conditional Role of the Military

Other scholars offer a third view of the role of the military in Third World nations. The primary proponent of

this view, Huntington, argues that as society changes, so does the role of the military.

In the world of oligarchy, the soldier is a radical; in the middle-class world he is a participant and arbiter; as the mass society looms on the horizon he becomes the conservative guardian of the existing order. Thus, paradoxically but understandably, the more backward a society is, the more progressive the role of its military, the more advanced a society becomes, the more conservative and reactionary becomes the role of its military (Huntington, 1968: 221).

Empirical Studies of Military Performance

In recent years, political scientists have employed various methodologies and examined a wide range of variables for the purpose of evaluating conflicting hypotheses derived from the literature on the consequences of military intervention. By and large, two dependent variables have drawn the attention of students of civilian and military regimes: socioeconomic performance and military spending variables. My discussion of the empirical studies is thus divided into two major subheadings: socioeconomic performance and military performance.

Socioeconomic Performance as Dependent Variable

Nordlinger (1970: 1131-1148) was one of the early empiricists to study the influence of military regimes upon economic and social change. He uses Adelman and Morris' (1967: 74-76) classification to divide 74 non-Communist countries into three broad groups: countries in which the military was in direct political control during 1957-62; countries in which the military was an important political influence; and countries in which military had little political influence. He uses seven "modernization indicators" as dependent variables. These include growth of per capita GNP, change in the degree of industrialization, degree of improvement in agricultural productivity, rate of improvement in human resources, gross investment rate, change in the effectiveness of tax systems, and leadership commitment to economic development. He measures the rate of growth of per capita GNP in constant prices between 1950/51 and 1963/64. In order to measure the change in the degree of industrialization, Nordlinger relies upon Adelman and Morris' index which is based on the average annual change in industrial output in constant prices, change in the proportion of gross domestic product originating in industry, and the change in the proportion of the total male labor force employed in industry. The degree of improvement in agricultural productivity is measured by the adoption of

extensive use of mechanical power, chemical fertilizers, more modern irrigation systems, better crop rotation, and more scientific breeding. The rate of improvement in human resources is measured by changes in enrollment at the second level of education as a percentage of the age group fifteen to nineteen, and enrollment at the third level of education as a percentage of the appropriate age group. Gross investment rate measures the level of capital formation with respect to the average ratio of gross investment to gross national product. Change in the effectiveness of tax systems has to do with the change in overall success in raising revenue. Nordlinger uses change in the ratio of government domestic revenue to GNP, the average annual rate of increase in real government domestic revenue and the change in the ratio of direct tax to total government revenue, in order to measure this variable. The indicator of leadership commitment to economic development is measured by three types of qualitative judgments: whether the heads of government and semi-official national agencies are involved in direct or indirect guidance of the economy; whether or not this planning includes purposeful attempts to alter institutional arrangements that block the achievement of development goals; and whether or not there is a national planning group charged with full time execution of the plan (Nordlinger, 1970: 1139).

Nordlinger uses correlation coefficients to test the

relationship between military intervention and economic change. He finds only relatively weak correlations between military intervention and socioeconomic indicators. However, "when the stake is thought to be endangered by the acquisition of power by peasants, workers and disadvantaged ethnic groups demanding governmental responsiveness to their economic aspirations, the officers act as conservatives; where this threat from below has not yet gathered strength, the officers allow for economic change" (Nordlinger, 1970: 1144). Nordlinger finds a great overlap between this finding and Huntington's hypothesis outlined above. Thus, he concludes that, subject to small revision, Huntington is essentially correct.

The data...thus tend to bear out the hypothesis that the officers act in accordance with their class interests, either failing to act as modernizing agents or opposing economic and social change where the middle class is relatively wealthy and established--where change is presumably seen to involve the redistribution of economic privileges.... There is only one revision that ought to be made of Huntington's interpretation. Analysis of the Adelman and Morris data indicates that it is only at the very lowest

level of political participation and only in the context of a minuscule middle class that the officers sponsor modernizing policies (Nordlinger, 1970: 1143-1144).

Specifically, he finds that in the tropical African nations, where there exists the smallest middle classes, there are positive correlations between the military's role and the rate of GNP increase, industrial growth, increased agricultural productivity, and education expansion (Nordlinger, 1970: 1147). However, with respect to Latin America, where the middle class is relatively wealthy, military regimes fail to act as modernizing agents and oppose economic and social change. It should be noted that Nordlinger explicitly rules out the claim that civilian regimes are necessarily more successful in carrying out social and economic change.

Nordlinger's conclusions have been reconsidered by Robert W. Jackman (1976). He applies a multiple regression model to Nordlinger's data as well as to a new set of data covering 1960 to 1970. He attempts to analyze the empirical validity of the three contrasting military models, i.e., the progressive military, the conservative/reactionary military, and the conditional role of military. Jackman's first model, the progressive model, assesses the validity of the statement that military regimes constitute a modernizing force which combines "maximum rates of modernization

with maximum levels of stability and control" (Levy, 1966: 603). His second model, the conservative/reactionary model, analyzes the validity of an alternative perspective which postulates that "military governments are most likely to display a concern with maintaining or increasing the prerogatives and status of both military and middle class. Thus, military governments are likely to increase expenditures in the defense sector of the economy and at the same time to reduce the proportion of government expenditures allocated to civilian, nondefense programs" (Jackman, 1976: 1079). His last model, the conditional military, states that the performance of the military vary by level of social and economic development of that country (Jackman, 1976: 1080). The military tends to be progressive in economically undeveloped countries and retrogressive in economically developed nations of the Third World. Jackman's findings contradict those of Nordlinger. Specifically, Jackman states that his research provides little support for Huntington's hypothesis which is confirmed by Nordlinger's research. He states, "Of a total of 21 sets of regression estimates, only three are even partly consistent with his argument, while the remaining 18 contradict" (Jackman, 1976: 1088). Jackman also generated a second set of data with four dependent variables which measure economic and social performance, and an independent variable which measures intervention by the military between

1960-1970. The first of these dependent variables is the average annual percentage change in energy consumption per capita. Average annual percentage changes in school enrollment ratios is his second dependent variable. The third consists of the average annual percentage change in the number of physicians per 1,000 population. The last dependent variable is the number of radios per 1,000 population (Jackman, 1976: 1091-1092).

Jackman's analysis of the three models lends no support to any of them. Thus he concludes, "The empirical analysis just presented lends no support to any of these viewpoints. Instead, both the reexamination of the Adelman and Morris data indicate that military governments have no unique effects on social change, regardless of level of economic development" (Jackman, 1976: 1096).

In a regional analysis, Schmitter (1976) uses both cross-sectional and longitudinal analyses to compare the performance of civilian and military regimes in twenty Latin American countries from 1950 to 1967. He treats military intervention and party competitiveness as independent variables and uses Edwin Lieuwen's classification to divide these countries into three broad groups: countries in which the armed forces dominate politics; countries in which the armed forces are in transition from political to non-political bodies; and in countries which the armed forces are non-political bodies. As an indicator of competitiveness,

he calculates the percentage difference between the winning and second running party in the national presidential election nearest to 1960. Where the two leading contenders are less than 14 percentage points apart, he considers the system highly competitive; where there is a spread of 14 to 40%, he classifies it moderately competitive, and those over 40% differences noncompetitive (Schmitter, 1976: 114).

Schmitter presents a series of "modernization indicators" as dependent variables. As indicators of modernization performance, he uses average annual percentage increases in inflation, exports, imports, industrial production, per capita income, school enrollment, and violence. Schmitter, using a multi-variate cross-sectional analysis, concludes that no regime type is exclusively correlated with developmental success. Military and noncompetitive regimes are slightly more successful in curtailing inflation, increasing foreign exchange earnings, and promoting economic growth; however, environmental factors, particularly dependence on foreign capital, aid, and trade, are more important in understanding performance variations than regime types. Regime type only appear relevant for understanding variations in governmental allocation (referred to as output) as distinct from system performance (referred to as outcome). He finds that military regimes in Latin America tend to spend less on social welfare than civilian governments. In sum, most

correlations between regime type and policy outputs were weak, supporting the view that regime differences are relatively unimportant for understanding modernization and socioeconomic development.

A series of cross-national aggregate data analyses by McKinlay and Cohan (1975 and 1976), based on an original sample of 115 countries, reaches conclusions that are similar to Jackman's. The first study uses cluster analysis and differences of means to compare the performance of military and civilian regimes from 1951 to 1970 across twenty-one performance variables, categorized in five main groupings: political variables; military variables; economic background variables; international trade variables; and short run economic performance variables (1975: 3-4). Their independent variable consists of four types of regimes. The first type of regime consists of a military regime; the second group consists of the periods of civilian rule in countries experiencing a military regime; the third group comprises all other low-income countries which have experienced only civilian rule; the last group included high-income countries. The last group is included for reference purposes.

Like Nordlinger, McKinlay and Cohan find some evidence that the military regimes perform significantly better than civilian regimes in economics performance areas in the poorest countries. According to McKinlay and Cohan, "It

appears, therefore, that, in the low GNP level, military regimes are the most successful type in terms of economic development, while at other levels there is not much differences among regime types" (McKinlay and Cohan, 1975: 21). McKinlay and Cohan conclude "while some military regimes are quite clearly distinct, as indeed are some civilian regimes, a sizable proportion of military and civilian regimes are indistinguishable in terms of performance" (McKinlay and Cohan, 1975: 23.).

The second study by McKinlay and Cohan is restricted to the 1951-1970 period. The major purpose of their second study is to see if the nature of the coup and the political structure of the military regime can explain any of the variance in their economic performance and to examine to what extent the form of termination of military regimes was based on their economic performance (McKinlay and Cohan, 1976: 292). They use thirteen variables to measure economic performance. In addition to these variables, they use three other variables including the nature of the coup, the political structure of the military, and the form of termination of the regime. They find no relationship between the form of the coup or the structure of the military regime and variation in the levels of economic performance. On the other hand, their examination of economic performance and the form of termination of military regimes yields more positive results. "Economic performance

variables... bear a strong relationship with method of termination, but the source levels of the military, i.e., size and expenditure levels, also appear to be significant in influencing the form of the post-transfer government" (McKinlay and Cohan, 1976: 310).

The third study by McKinlay and Cohan is restricted to the 1961-1970 period. The major purpose of this study is to compare the performance of military and civilian regime systems across twenty-five variables which were categorized into five main groupings. They included political activity and political change; military capability; background economic; international economic; and economic performance variables. McKinlay and Cohan also introduce four control variables: GNP; geographic area; duration of the military regime in the military systems; and the number of coups in the military regime systems.

This study is different from their previous studies in at least three different ways: time period; data; and statistical techniques. This study covers the 1961-70 period, uses new data, and cluster analysis. But they arrive at basically the same conclusion as the study conducted in 1975. Specifically, McKinlay and Cohan find evidence that military regimes tend to occupy a weaker international trading position than their civilian counterparts but that their economic performance rates, measured by the rate of growth of per capita GNP, rate of

growth of cost of living, and rate of growth of export, compare favorably with civilian regimes (McKinlay and Cohan, 1976: 863).

In a regional analysis, Ravenhill (1980) uses regression statistics to compare the performance of military and civilian regimes in 33 African countries during the period 1960-1973. He treats regime type as an independent variable and develops four types of regime: civilian regimes in countries which had experienced uninterrupted civilian rule, civilian regimes in countries where a coup d'etat occurred, military regimes, and mixed regimes which consist of the aggregate performance in the years 1960-73 of all regimes in countries subject to military rule.

Ravenhill presents six dependent variables to measure the economic and social performance. They are measured in terms of growth rates in constant GNP, constant gross domestic investment, constant exports, international reserves, rates of growth of primary-school enrollment, and rates of growth of the food-price index.

Ravenhill concludes that "One-way analysis of variance on the performance variables confirms the expectation that there are no significant differences between the aggregate performances of the four regime types on any of the dependent variables" (Ravenhill, 1980: 112). Furthermore, he argues that no evidence is found to confirm the conclusion reached in Jackman's analysis of Nordlinger's

data, and by McKinlay and Cohan, that military regimes tend to have a positive effect on the rate of GNP (Ravenhill, 1980: 112).

In another regional study, King (1981) uses basic economic parameters to compare the performance of democratic (or civilian) and bureaucratic-authoritarian regimes in rural sector in 6 Southeast Asian countries during 1960-75. He treats regime type as an independent variable and develops two types of regime: democratic regimes and bureaucratic-authoritarian regimes.

King presents three broad categories of independent variables: environmental, material welfare, and economic structure, with five, four, and six specific variables, respectively (King, 1981: 482).

King concludes that bureaucratic-authoritarian regimes tend to perpetuate poverty and inequality in rural sector while democratic regimes have just the opposite effect.

Sloan and Tedin (1987) employ multivariate statistical procedures to analyze the relationship between regime type and policy outputs for Latin America, using yearly data for 1960-1980. They identify two independent variables, regime type and regime age, and divide the 20 Latin American countries into five types of regimes and five categories of regime age based on the number of years of regime existence. Sloan and Tedin's regime type include: democratic; bureaucratic-authoritarian; communist; traditional-

authoritarian; and "transitional." The bureaucratic-authoritarian regime is based on a tacit alliance among military, the technocrats, the domestic bourgeoisie, and foreign capital (Sloan and Tedin, 1987: 102). The five regime ages include: 1 year, 1-4 years, 5-9 years, 10-20 years, and 21 plus. They also include in their equation an interaction or covariance term, to test the possibility that the effect of regime type is dependent on regime age (Sloan and Tedin, 1987: 105). They present five "policy output indicators" as dependent variables: domestic economic indicators, measured by Gross Domestic Product per capital and the average yearly change in the consumer price index; military spending as percentage of GNP, agricultural production, external debt, measured by per capita external debt and the ratio of each country's yearly debt service to the value of its yearly export of goods and services; and domestic outputs, measured by school enrollment in elementary, secondary, college, literacy rate, and number of physicians per million population. They conclude that regime is associated with public policy outcomes, but regime age is also a factor (Sloan Tedin, 1987: 121). With respect to regime type, they conclude that bureaucratic-authoritarian regimes achieve the highest level of economic growth, communist regimes show the most success in the field of education and health, traditional authoritarian regimes do better in the field of agriculture than other regimes,

and democratic regimes occupy second place in economic growth, agricultural production, curbing external debt, and promoting health (Sloan and Tedin, 1987: 121). Their overall conclusion is that in comparing regime types, no single regime type shows that it could perform at impressive levels in all of those dependent variables listed above.

Joseph Pluta (1979) attempts to evaluate the performance of ten South American military and civilian governments in terms of military and social indicators between 1961-1970. He distinguishes between policy output and policy outcome. The policy output includes two indicators: central government education and health expenditure. They are measured as government expenditures as proportion of GNP. The policy outcome is comprised of newsprint consumption, newspaper circulation, and infant mortality. The policy outcome variables are measured as follows: average annual percentage changes in newsprint consumption; average annual percentage changes in daily newspaper circulation; and average annual percentage change in infant mortality per 1000 people. Pluta concludes that a pattern revealed by the social indicators suggests that civilian regimes not only allocate more resources to education and health programs but also achieve more effective outcomes in these efforts than military rulers. With respect to infant mortality, there is a substantial reduction under civilian regimes (1979: 476-

478).

Military Performance as Dependent Variable

A number of empirical studies separately or as part of other variables, focus on the military performance of civilian and military regimes.

Thompson (1973) uses defense expenditure as a dependent variable in order to find the relationship between military rule and defense expenditures for the coup years and the post-coup years for 22 successful coups during 1949-1966 (Thompson, 1973: 20-25). He classifies military expenditures into three types including increase, decrease, and no change. Thompson concludes that "It seems surprising that an element that many people would suspect to be of prime importance--the matter of defense allocations--proves to be a very minor factor" (Thompson, 1973: 20).

McKinlay and Cohan (1976: 850-864) use five indicators to measure military performance. They include: mean size of the armed forces per 10,000 population; mean military expenditure as percentage of GNP; the diversification of the armed forces measured in terms of the size of the navy and air force as a percentage of the total size; the rate of growth of the size of the armed forces; and the rate of growth of constant military expenditure.

McKinlay and Cohan reveal that not many significant differences exist between military and civilian regimes in

military dimension. They point out,

The armed forces in military regime systems have expenditure levels which are quite similar to nonmilitary regime systems, and their armed forces are slightly smaller. Further, the armed forces of the military regime system are significantly less diversified than their nonmilitary counterparts. While the rate of growth of size is somewhat higher, the expenditure growth is slightly lower. Once high-income systems are removed, the two types of system become closer in size, growth rate of size, and diversification. The expenditure level is slightly higher in military regime systems, but the growth rate of expenditure is significantly lower. Thus, initially, military and nonmilitary regime systems are very similar in the military dimension (McKinlay and Cohan, 1976: 857).

McKinlay and Cohan also employ controls for GNP in order to test for differences between the military and civilian regimes within GNP levels. Once again, they do not find any major variations. Thus, they conclude that

The consequence of these comparisons is to demonstrate that, as expected, the two

types of system (military and nonmilitary) ...cannot be differentiated from one another by military...performance criteria (McKinlay and Cohan, 1976: 857).

Pluta (1979) uses three indicators to measure military performance: defense expenditure as a proportion of GNP; average annual percentage change in size of armed forces; and average annual percentage change in real dollar value of arms imports. His analysis of defense expenditures and size of armed forces reveals that

the best conclusion appears to be that there is no systematic relationship between regime type and military expenditure. [Nor is there an] apparent relationship between regime type and size of armed forces (Pluta, 1979: 469).

With respect to arms imports, Pluta's analysis reveals that increased arms imports tend to be greater under civilian regimes.

Hill (1979) attempts to test the hypothesis that nations characterized as having more extensive experience of military involvement will commit greater portions of national resources to military activities. She collected data for 101 countries of the First World and Third World for the period 1946-1965.

Hill uses two dependent variables: military spending

as a proportion of gross domestic product and military power per 1,000 working-age population. She also employs two control variables. They include GNP per capita and an index of international and border conflicts.

As a method of analyzing data, Hill uses both multiple regression and the judgmental coding of expert observers, indexed into five-point ordinal scales.

Hill's overall conclusion is that

military influence in civilian politics has an important positive relationship to military policy allocations.

Furthermore, military influence is most important in this regard for poorer and less institutionally developed politics (Hill, 1979: 375).

Ravenhill (1980) also collected data to enable the exploration of the relationship between regime type and expenditure on the armed forces. The dependent variables include: military expenditure, military expenditure as a percentage of GNP as well as per capita of the armed forces, and armed forces per 1,000 population. Data were gathered for the 29 African countries that possessed military forces during the three most recent years for which complete figures were available, namely 1971 to 1973.

Ravenhill concludes that there is not a statistically significant relationship between the mean growth rates in

military expenditure for the four types of regimes (Ravenhill, 1980: 115).

Sloan and Tedin (1987) use military spending as a percentage of GNP to measure military performance. They argue that both regime type and regime age are predictors of military expenditures. They reveal that the regime which spent the largest on military was the communist regime, then came the "transitional" regime type, followed by bureaucratic-authoritarian, democratic, and traditional authoritarian regimes. With respect to regime age, the longer a regime was in power, the less it spent on military (Sloan and Tedin, 1987: 110).

Sloan and Tedin conclude,

...in comparing regime types, no single regime type demonstrated that it could perform at impressive levels in [military performance] (Sloan and Tedin, 1987: 121).

Finally, in the most sophisticated analysis, Zuk and Thompson (1982) employs pooled cross-sectional time-series analysis to analyze the effect of military intervention on military spending in 66 less-developed countries for the period 1967 to 1976. They identify two dependent variables: defense spending as a portion of the state budget, and comparative rates of growth in military spending. Their independent variables included regime type, coup occurrences, level of conflict, economic development, arms

imports, and previous military spending.

With respect to regime type and military spending, Zuk and Thompson find a positive and statistically significant relationship between military and mixed regimes, and the proportional size of defense budgets, domestic or interstate conflict and arms imports per capita. On the other hand, no relationship is detected between wealth (GNP per capita) and the size of previous defense budgets. However, these four variables account for only 11 percent of the variance in defense budgets. Thus, "even though the evidence supports the ideal that regime type makes a difference in defense-allocation decisions, it clearly does not make an overwhelming difference" (Zuk and Thompson, 1982: 66).

Zuk and Thompson also study states that experienced successful coups during the 1967-1976. They argue that there is a positive relationship between successful coups and military spending, but total variance explained is fairly low. Moreover, most of the explained variance is due to the influence of the size of the previous year's budget (Zuk and Thompson, 1982: 68).

Zuk and Thompson conclude:

...the resulting empirical mosaic suggests that military rules do not increase the size of military budgets either in general or comparison with their civilian counterparts. Although it is clear that military

and mixed regimes devoted more of their budget to defense purposes than do civilian regimes, the average proportional size of military budget is decreasing for all three. Interestingly, the fastest rate of decline is found within the military regimes (Zuk and Thompson, 1982: 71).

In sum, during the past three decades, a number of empirical studies have been conducted to ascertain the political, economic, and social consequences of military and civilian regimes in the Third World. Despite this prolonged interest, there is not general agreement on the consequences of military and civilian regimes.

Hypotheses

This research seeks to study the performance of military and civilian regimes in non-Western countries during 1965-1985, by means of empirical analysis. It specifically focuses on socioeconomic performance and military policy of military and civilian regimes. The three perspectives suggested above, are used to generate hypotheses for empirical tests. The first perspective is based on the notion that the military in the Third World constitute a unified group dedicated to modernization and national developmental goals. Furthermore, the military alone, in the absence of party competition, possess the

requisite internal discipline and organizational coherence to establish policies aimed at concentrating and investing political resources while containing sectarian, regional and class conflict (see, for example, Halpern, 1963; Hurewitz, 1968; Levy, 1966; Pauker, 1959; Pye, 1962). A pertinent hypothesis is:

H1: increased military control improves socioeconomic performance.

The second perspective, contrary to the first hypothesis, is based on the argument that military governments are not dedicated to modernization and national development goals in the Third World. Thus, a pertinent hypothesis is:

H2: increased military control does not improve socioeconomic performance.

The third perspective is predicated on the argument that a military regime preserves and protects its corporate interest. An appropriate hypothesis is:

H3: increased military control increases military expenditures and the size of the military.

The fourth view suggests that the more backward a society, the more progressive the role of its military; the more advanced a society becomes, the more conservative and reactionary becomes the role of its military. Two plausible hypotheses are:

- H4:** increased military control will increase socioeconomic performances if a society has a low level of economic development;
- H5:** increased military control will decrease socioeconomic performances if a society has a high level of economic development.

Summary

In this chapter, I presented a survey of pertinent literature with respect to the consequences of military and civilian regimes. The first part of the chapter dealt with descriptive and theoretical study of the relationship between the performance of military and civilian regimes. I presented several contradictory perspectives, with one group of scholars arguing that military regimes constituted a modernizing force; a second group portraying them as a conservative and reactionary force; and still another group of scholars offering a third alternative by arguing that as society advances toward modernization and economic development, the less progressive becomes the role of military in that society and vice versa.

The second part of this chapter examined the empirical research in two categories of dependent variables: socioeconomic performance and military performance. The

last part of this chapter outlined several testable hypotheses concerning the possible relationship between the military and civilian regimes and socioeconomic performance and military spending.

In the next chapter, I summarize my research design and data analysis, and I discuss the unit of analysis, definition of terms, the data, dependent and independent variables, indicators of these variables, and their operationalization, and the statistical procedure to be used for hypothesis testing.

TABLE 1
SUMMARY OF FINDINGS ON THE CONSEQUENCES
OF MILITARY REGIME

STUDY	NUMBER	YEAR	DEPENDENT VARIABLES	OUTCOME	DESIGN
1. Nordlinger (1970)	74	1957-62	SEPV	Positive Re- lationship if Small Middle Class	CS
2. Jackman (1976)	77	1960-70	SEPV	Opposite of Nordlinger's	CS
3. Schmitter (1976)	16	1950-67	SEPV	No Relation- ship	CS
4. McKinlay and Cohan (1975)	115	1951-70	SEPV	Similar to Nordlinger's	CS
5. McKinlay and Cohan (1976)	115	1951-70	SEPV	No Relation- ship	CS
6. McKinlay and Cohan	115	1961-70	SEPV/MPV	No Relation- ship	CA

(1976)

7. Ravenhill (1980)	33	1960-73	SEPV	No Significant Differences	AV
8. King (1981)	6	1960-75	SEPV	Positive	BEP
9. Sloan and Tedin (1987)	20	1960-80	SEPV	No Overall differences	MA
10. Pluta (1979)	10	1961-70	SEPV/MPV	Mixed	CS
11. Thompson (1973)	22	1949-66	MPV	None	CS
12. McKinlay and Cohan (1976)	115	1961-70	MPV	None	CA
13. Hill (1979)	101	1945-65	MPV	Positive	CS
14. Ravenhill (1980)	33	1960-73	MPV	None	AV
15. Zuk and Thompson (1982)	66	1967-76	MPV	None	CT

CC	=Correlation Coefficient
CS	=Cross-Sectional Analysis
L	=Longitudinal Analysis
CA	=Cluster Analysis
AV	=Analysis of Variance
MA	=Multivariate Analysis
MR	=Multiple Regression
SEPV	=Socioeconomic Performance Variables
MPV	=Military Performance Variables
BEP	=Basic Economic Parameters

CHAPTER III

RESEARCH DESIGN AND METHOD OF ANALYSIS

An important aspect of conducting empirical research in social sciences is making sure that concepts are operationalized, proper units of analysis are utilized, and an appropriate research design is selected. In this chapter, I discuss five crucial topics: unit of analysis, research design, missing observations, definitions of key terms and the measurements of dependent and independent variables for testing each hypothesis and indexes and their computations.

The Unit of Analysis

Adam Przeworski and Henry Teune (1970) suggest two types of research designs for comparative study (for detailed elaboration of these designs, refer to Chapter I). These two research designs are the "most similar systems" and "most different systems" designs. This study uses the most similar system design in order to understand the policy consequences of military and civilian regimes in the Third World. As elaborated in chapter one, the most similar systems design is used in this study because this research seeks to understand the effect of military intervention in

politics over socioeconomic and military performances by controlling for common factors shared by Third World nations, such as level of economic and social developments, and using intersystemic factors, i.e., regime types as explanatory variables.

The unit of analysis is a nation/year. A nation is selected as a unit of analysis because the focus of this study is on the socioeconomic and military performance of national governments. Necessarily, each nation comprises a unit of analysis. Furthermore, "year" is used as a unit of analysis because nations make data available on annual bases. In addition, nation/year as a unit of analysis helps determine performance changes overtime when different types of regimes, military or civilian, are in power in a nation. Finally, nation/year as a unit of analysis opens up the pooled cross-sectional research design and that is a valuable addition.

Every Third World nation that had a population of one million or more at the beginning of the time-series (1965) is included. I decided to include only nations with a population of one million or more because more data are available for countries with large populations. The starting point of the analysis is 1965 and the cut-off point is 1985. The year 1965 is used as the beginning period for two major reasons: first, almost all countries (except Bangladesh) in this study gained their independence before

1965; second, more data are available for the Third World nations since 1965. The end year (1985) is chosen because it represents the last year for which complete data are available.

Since the meaning of the term "Third World" is not clear cut, the question "what decision rule will be used to include or exclude a nation?" has to be answered.

By and large, "Third World" comprises the developing nations of Africa, Asia, and Latin America. "First World" comprises the societies of North American and Western Europe that adopted democratic political institutions and industrial or post-industrial economies. "Second World" refers to the industrial Eastern European nations and the Soviet Union that had communism as their form of government (Plato and Olton, 1982: 21) during 1965-1985. In other words, "Third World" nations are neither Western industrialized democracies nor authoritarian Marxist regimes.

This definition, using political systems, has come under criticism. Some scholars argue that the political definition of "Third World" is too broad. For example, Bertsch and Clark exclude countries such as North Korea, Vietnam, Cambodia, Laos, and Cuba from their definition of "Third World". These are eliminated because they belong to the communist world. Similarly, Japan and Israel are not considered members of the Third World and they are assigned to the camp of industrialized democracies. Still others

may consider Greece, Portugal and South Africa as First World while others may classify them as belonging to the Third World nations (for classifications of developing countries by international agencies, see the World Bank, 1989: 250-51).

In order to resolve this controversy, I use economic system as defined by the World Bank as an important indicator in classifying nations. The World Bank classifies economies according to their per capita Gross National Product (World Bank, 1989: 159-160). For operationalization purposes, only nations that belong to its first two per capita Gross National Product groups are included. These two groups are low-income and middle-income economies. Low-income economies are those with per capita GNP of \$480 or less, while middle-income economies are those with a per capita Gross National Product of more than \$480 but less than \$6,000 (World Bank, 1989: 159). However, I made a slight modification to the World Bank's data. The 1989 World Bank report gives per capita Gross National Product in 1987 dollars. To standardize my analysis for the entire 1965-1985 time period, my classification of the economies is based on constant per capita Gross National Product in 1980 dollars. A nation had to have per capita Gross National Product of less than 6,000 1980 dollars at the end of the time-series (1985) in order to be included in the analysis. Table 2 lists the nations included in this study.

TABLE 2
LIST OF NATIONS INCLUDED
IN THE STUDY

Argentina	Haiti	Peru
Bangladesh	India	Philippines
Benin	Indonesia	Rawanda
Bolivia	Israel	Senegal
Brazil	Jamaica	Sierra Leone
Burma	Jordan*	Singapore*
Burundi	Kenya	South Africa*
Cameroon	Republic of	Sri Lanka
Central African	Korea (South)*	Sudan
Republic	Liberia	Syria*
Chile*	Madagascar	Tanzania
Colombia	Malawi	Thailand*
Congo*	Malaysia*	Togo
Costa Rica	Mali	Tunisia*
Cote d'Ivoire	Mauritania	Turkey
Dominican Republic	Mexico	Uganda
Ecuador*	Morocco	Uruguay
Egypt	Nicaragua	Venezuela
El Salvador*	Niger	North Yemen
Ethiopia	Nigeria	Zaire
Ghana	Pakistan	Zambia
Greece*	Panama*	Zimbabwe
Guatemala	Paraguay	

Note: The following countries are part of the World Bank's low-income and middle-income economies but are excluded from analysis due to paucity of data: Afghanistan, Algeria, Botswana, Burkina Faso, Chad, China, Gabon, Guinea, Iran, Iraq, Kampuchea, Lebanon, Lesotho, Mauritius, Mozambique, Oman, Nepal, Papua New Guinea, Somalia, and South Yemen. In addition, Second World nations are not included in this study.

*Nations with per capita GNP of more than \$480 but less than \$6,000 in 1985.

Originally, 98 countries were included in the analysis. Some of the countries had to be excluded due to too many missing observations. I considered ten consecutive years of missing data on any one variable as too many. As a result

of elimination, 66 countries were used in this study. This yields a large number of cases because the total number of units of analysis is the number of countries (66) multiplied by the number of years (21) = 1,386.

Missing Observations

Empirical work is often faced with the problem of missing values for one or more variables. There is not one basic rule of thumb for dealing with missing observations. According to Pindyck and Rubinfeld, "The choice of method of dealing with missing observations depends upon the nature of each particular regression model and the related data" (Pindyck and Rubinfeld, 1967: 194).

Pindyck and Rubinfeld suggest that if several consecutive values for a given variable in a given country are missing either at the beginning or at the end of the time-series, the appropriate strategy is to compute the missing values by regressing "the known values of the variable, x , on time and replacing the missing observation by the fitted values of the regress" (Pindyck and Rubinfeld, 1976: 197). In other words, the regression, $Y = a + bX$ would be run for all available X observations and $\hat{Y} = \hat{a} + bX$ would be calculated, where values of (x) are chosen to correspond to the time period of the missing observations (Pindyck and Rubinfeld, 1976: 197).

On the other hand, if missing value(s) appear in the middle of time-series, the following formula is used for computing the missing observation for year t (X_t): missing observation = two previous years plus two subsequent years, divided by four (see Appendix A for the formula).

In this study, I use both methods in order to calculate replacement scores for missing data. If data are missing at the beginning or at the end of the time-series, the former method is used. The latter method is applied if missing values appeared in the middle of time-series.

I use regression on time method to estimate missing data because one does not know what the series was like either before or after the missing observations. Therefore, the best guess that one can make is that the missing data is like it would have been if it were progression against time either beforehand or afterwards. On the other hand, when missing data occur in the middle of time series, one knows what the series was like before and after the missing data. Thus, it is a reasonable tactic to say that if the missing data are in the middle of time series, the missing data is the average of the preceding and following data.

Research Design

Since the principal goal of this research is to analyze the relationship between regimes (military and civilian) and socioeconomic and military performance between nations and over time, simple cross-sectional analysis is deficient (Hall, 1988: 8). Furthermore, a longitudinal analysis of each country does not facilitate comparisons of cross-sectional patterns that are important for evaluating the consequences of military and civilian regimes on socioeconomic and military affairs (Hall, 1988: 8). Therefore, a pooled cross-sectional time-series statistical design is used. Most quantitative research in comparative politics has used either a cross-sectional or a time-series design. With respect to the former, data are collected across space, within a single time period, as shown below:

$$Y_i \quad X_i$$

$$Y_j \quad X_j$$

$$Y_k \quad X_k$$

where Y and X represent the dependent and independent variables, respectively, and i , j , and k represent different cross-sectional units (Holbrook, 1991: 93).

On the other hand, in time-series observations are obtained over time, from within a single cross-sectional unit:

$$Y_{it} \quad X_{it}$$

$$Y_{it-1} \quad X_{it-1}$$

$$Y_{it-2} \quad X_{it-2}$$

where X , Y , and i are the same as in cross-sectional design, and t is the time period (Holbrook, 1991: 94).

An alternative to the above designs is the pooled cross-sectional design. In this design, several cross-sections are pooled together, producing a data set with observations collected across both space and time. The form of the pooled data set is as follows:

$$Y_{it} \quad X_{it}$$

$$Y_{it-1} \quad X_{it-1}$$

$$Y_{it-2} \quad X_{it-2}$$

$$Y_{jt} \quad X_{jt}$$

$$Y_{jt-1} \quad X_{jt-1}$$

$$Y_{jt-2} \quad X_{jt-2}$$

$$Y_{kt} \quad X_{kt}$$

$$Y_{kt-1} \quad X_{kt-1}$$

$$Y_{kt-2} \quad X_{kt-2}$$

In the above matrix, the data are not restricted to N observations, as in the case of cross-sectional analysis, nor T observation, as in the case of time-series analysis; the data set has $N \times T$ observations (Holbrook, 1991: 94). The advantages of this design over other designs have already been discussed in Chapter I. According to Levenbach and Clearly, "A pooled model includes observations for N

cross sections over T time periods" (Levenbach and Clearly, 1984: 354).

When one deals with cross-sectional and time-series data, one should combine the assumptions that are usually associated with cross-sectional (homoscedasticity) with those associated with a time-series (serially uncorrelated terms) analysis (Umezulike, 1990: 88). Homoscedasticity (or similar scatter) refers to a situation where "the dispersion of the values of the dependent variable should be similar for different values of the independent variable" (Renner, 1988: 155). If the dispersion of values are different or "the variances of the error term are not equal for each observation", the result is heteroscedasticity (Renner, 1988: 155).

As for time-series data, it is usually suspected that the error terms are serially correlated (autocorrelation) since the order of the observation has a meaning. This implies that the error term from a particular time period depends in some systematic way on error terms from earlier time periods (Umezulike, 1990: 88). The error terms refer to "the proportion of the variance in the dependent variable that [cannot be explained] knowing the independent variable" (Renner, 1988: 155).

"With cross-sectional observations like a nation-state, it is frequently true that the errors are mutually independent, but heteroscedasticity violates the classical

regression assumption that their error terms are drawn from a distribution that has a constant variance (homoscedasticity)" (Umezulike, 1990: 88-89).

If autocorrelation and heteroscedasticity exist in the data, they must be corrected before carrying out the analysis, or else our inferences will be weak.

The method used to build a pooled model depends on assumptions, and these assumptions are based on the characteristics of the data under investigation. Generally, there are three methods, namely: a) Ordinary Least Squares (OLS); b) Ordinary Least Squares with dummy variables (OLSD); and c) Generalized Least Squares (GLS) (Maddala, 1977). OLS should be used if it can be established that there is a constant coefficient and intercepts for all the nations involved (Maddala, 1977, 362). The OLS model with dummy variables can be used if the intercepts are different, since it is less restrictive than the OLS (Maddala, 1977, 363). If the coefficients and the intercepts are random, the best technique is GLS. This is because the random coefficients and random intercepts assume that an additional error term is required to account for a random variation that is specific to a given cross-section (Maddala, 1977, 358). Chapter IV closely examines these alternative models in order to decide which model(s) are appropriate to analyze the data.

Definitions and Measurements

As mentioned in the early part of this chapter, "Third World" in this study is based on an economic criterion (for a full definition of this term, refer to the early pages of this chapter).

Other important terms in this study are "coup d'etat" and "military regime." A "coup d'etat" is defined as a swift, decisive, and successful seizure of government power by a small group of military officers where the incumbent regime must leave office unwillingly, against established procedures (Plano, 1973: 98).

Political scientists employ various types of regimes in order to evaluate their performance (for a detailed discussion, see Hanneman, 1985). Nordlinger (1970) adopts three categories of regimes, according to the political strength of the military. The first category of countries were those in which the military was in direct political control during some part of the period under study; the second group include countries in which military is an important political influence but was not in direct control of government during most of the period; and the last group contains those countries in which the military had little or no political influence during the period under the study (Nordlinger, 1970: 1138).

Schmitter (1976) also develops a tripartite classification scheme, including countries in which the armed forces dominate politics; countries in which the armed forces are in transition from political to non-political entities; and countries in which the armed forces are non-political (Schmitter, 1976: 114). But Schmitter's findings is applicable only to Latin America.

McKinlay and Cohan (1975) define four population of regimes. The first group consists of military regimes; the second group consists of the periods of civilian rule in countries that experience a military regime; the third group consists of all other low-income countries that experience only civilian rule; and the last group includes high-income countries, included for reference purposes (McKinlay and Cohan, 1975: 1-2).

In her analysis of the consequences of military involvement in politics, Hill creates, without operationalizing them, a five-point ordinal scale for the period 1946-65. The scale distinguishes the following categories of nations: No direct military involvement in civilian politics; some coup occurred but the military did not assume direct rule; the influence of the military is rated as "important in civilian politics; the nation experienced a period of joint civilian-military rule; and a

nation experienced a period of direct military rule (Hill, 1979: 372).

Ravenhill identifies four categories of regimes: civilian regimes in countries that experience uninterrupted civilian rule; civilian regimes in countries where a coup d'etat occurred; military regimes in countries with a military head of state where power was seized by force; and "mixed" regimes (Ravenhill, 1980: 106).

Finally, Zuk and Thompson (1980) code a state as having a military regime only if the same or different military regime installed after a military coup was in power throughout the time period under study; if no successful coups occurred either or before or during the period, then the state is coded as having a civilian regime; and their third category is called mixed regime, applied to those states that experience intermittent phases of post-coup rule that were preceded or followed by phases of civilian regimes (Zuk and Thompson, 1982: 64).

In order to systematically compare the performance of civilian and military regimes, this study uses Zuk and Thompson's typology with some modification. Originally three population of regimes are introduced. The first population consists of military regimes. For each country/year military regime is defined as any regime which

came to power as a consequence of a successful coup d'etat, led by the army, navy or air force, that remained in power, with a military person as the chief executive, for at least six months in that year (McKinlay and Cohan, 1975: 1). If an election took place and the incumbent military officer, as chief executive who initially came to power via a coup won the election, such elections are not counted as interruptions in the military rule (Jackman, 1976: 1091). The second population of regimes consists of civilian regimes where a civilian was the chief executive officer and stayed in power for at least six months of a year. Finally, the third population includes regimes with either a civilian as the chief executive and several military persons in the cabinet or a military head of government who nominates a civilian as the head of government and himself work behind the scene.

All data used for classifying regimes in the Third World are taken from The Europa Year Book (1966-1990). I used both O'Kane (1987) and Sivard's (1989) data to cross-check for accuracy the different types of regimes. O'Kane's data report successful coups d'etat from 1950 to 1985. On the other hand, Sivard reports data both on world military expenditures and military control and repression in the Third World from 1945 to 1988.

The independent variable in this analysis is regime type. As mentioned above, three categories of regime are established, including civilian, military, and mixed regimes. Originally the regime type was coded as follows: 0 = Civilian; 1 = Military; and 2 = Mixed. Because there were only 16 cases of mixed regimes, I decided to merge these with the military regime population. Since the independent variable is nominal, I treat them as dummy variable in the equation where $M1 = 1$ for military regime, 0 if not.

Countries included in the analysis gained their independence before or in 1965. The only country which did not secure her independence in 1965 but was included in the analysis is Bangladesh. Since she was part of Pakistan until 1971, I assigned Pakistan's code from 1965-1971.

Political scientists examine a wide range of dependent variables for the purpose of evaluating the performance of military and civilian governments (see Chapter I). The dependent variables in this analysis are classified into two groups: socioeconomic and military performance.

Socioeconomic development is mainly measured by gross national product (GNP) per capita. For example, McKinlay and Cohan use several variations of gross national product per capita in order to develop their socioeconomic variable

(McKinlay and Cohan, 1976: 851). However, this conventionally used variable has come under fire. Critics consider it a crude measure of economic development that does not provide all of the information that is required to make inferences about socioeconomic performance. In criticizing Tanter's work, for example, Zartman and Entelis argue that

gross national product is a very crude measure of mass material satisfaction. ...A new oil well or iron mine may greatly enhance the GNP, with almost nothing reaching the men in the street (Zartman and Entelis, 1971: 298)

According to Bill and Springborg,

The United Arab Emirates, for example, have a per capita GNP that is considerably larger than that of the United States... Yet in all these societies the benefits of this wealth are very unevenly distributed (Bill and Springborg, 1990: 15).

According to another scholar,

There is no automatic policy relationship between any particular level or

rate of growth of GNP and improvement in such indicators as life expectancy, death rates, infant mortality, literacy, etc. (Sewell, et al, 1977: 147; cited by Bill and Springborg, 1990: 16).

In answer to these difficulties, an alternative measure of socioeconomic development, the Physical Quality of Life Index (PQLI), is advanced by Morris, Sewell and their colleagues at the Overseas Development Council (for the usefulness of this and other indexes, refer to Chapter I). The PQLI is a composite of three indicators: life expectancy, infant mortality, and literacy rate. According to Sewell,

these three indicators do reflect distributional characteristics within countries, for countries cannot achieve high national averages of literacy, life expectancy, and infant mortality unless majorities of their populations are receiving the benefits of progress in each of these areas (Sewell, et al, 1977: 147).

This research used a version of the PQLI composite index in order to operationalize socioeconomic development

with some modification. Due to the paucity of data on literacy rate in many Third World countries, the annual literacy rate is supplanted by savings per capita. A justification for replacing the literacy rate with savings per capita is that "just as the literacy variable indexes opportunity for an individual, so does saving per capita" (Liu, 1976: 55).

Data on these three indicators, infant mortality (number of infants per thousand, in a given year, who die before reaching one year of age); life expectancy at birth (number of years a newborn infant would live if prevailing patterns of mortality for all people at the time of his or her birth were to stay the same throughout his or her life); and savings per capita, are taken from the computer data files reported in the World Table (World Bank, 1989). The World Table has data from a variety sources including, the United Nations, the International Monetary Fund, and World Bank. The data on domestic savings reported in local currencies, are converted to per capita constant 1980 dollars, before the analysis.

Gross Domestic Savings per capita for year t (constant 1980 \$US) = Gross Domestic Savings per capita for year t (current local currency) / Population for year t / Gross Domestic Product for year t (see Appendix A).

Deflation to the 1980 dollar value is derived by dividing current price estimates of Gross Domestic Product at purchaser values by the constant price deflator estimates and the currency conversion factor for year t (World Tables, 1989: 8).

The military performance of regimes is measured by two indicators: military expenditures and size of the armed forces. Data on these two variables are taken from the computer data files reported in World Military Expenditures and Arms Transfers (US Arms Control and Disarmament Agency, 1985). Since the computer data files report data only until 1983, I coded data for 1984 and 1985 from the printed 1987 addition of World Military Expenditures and Arms Transfers (US Arms Control and Disarmament Agency, 1987: 43-84) and added these to the previous data files. The military expenditure was originally reported in current U.S. dollars. In order to change them to constant U.S. dollars, the following formula is used: Constant military expenditure for year t = military expenditure for year t / Gross Domestic Product deflator for year (see Appendix A for the formula and examples).

Indexes

In order to operationalize theoretical concepts or

variables, indicators are used. Indexes consist of several variables that make good indicators because they better measure the whole concept (Kanchanasuwon, 1988: 77).

In this study two indexes are adopted: the socio-economic development, (PQLI) index, and the military performance index. Each index is constructed by the "standardized additive method." This method consists of "the transformation of the data on separate variables into standardized scores, called Z-scores, which are in turn added to give the index" (Umezulike, 1990: 86). The following formulas describe the procedures for converting the three socioeconomic variables into standardized scores:

(1) Standardized Constant Gross Domestic Savings Per Capita = $\frac{\text{gross domestic savings} - \text{mean of gross domestic savings}}{\text{standard deviation of gross domestic savings}}$ (see Appendix A for the formula).

(2) Standardized Infant Mortality Rate Per 1,000 Infants = $\frac{\text{infant mortality rate} - \text{mean of infant mortality}}{\text{standard deviation of infant mortality rate}}$ (see Appendix A for the formula).

(3) Standardized Life Expectancy at Birth = $\frac{\text{life expectancy rate at birth} - \text{mean of life expectancy rate at birth}}{\text{standard deviation of life expectancy rate at birth}}$ (see Appendix A for the formula).

Physical Quality of Life Index = Standardized Constant Per Capita Gross Domestic Savings - Standardized Infant Mortality rate Per 1,000 Infants + Standardized Life Expectancy at Birth (see Appendix A for the formula).

Similar formulas were applied in order to compute standardized military expenditure in constant US dollars and standardized number of soldiers.

Standardized Military Expenditure in Constant US Dollars = Military Expenditure in Constant US Dollars - Mean of Military Expenditure in Constant US Dollars / Standard Deviation of Military Expenditure in Constant US Dollars (see Appendix A for the formula).

Standardized Number of Soldiers (1000s) = Number of Soldiers (1,000s) - Mean of Number of Soldiers (1,000s) / Standardized Deviation of Number of Soldiers (1,000s) (see Appendix A for the formula).

Finally, an index of military performance was derived by using the following formula:
Standardized Military Expenditure in Constant US Dollars + Standardized Number of Soldiers (1,000s)
(see Appendix A for the formula).

Summary

The first part of this chapter deals with the unit of analysis and missing observations. The unit of analysis is a nation/year.

The second part of the chapter deals with missing observations. Two different strategies were presented in order to estimate the values of missing data.

The third part of the chapter focuses on research design. Several methods are presented in order to build pooled models. It is argued that building a model depends on the assumptions and characteristics of data.

In the fourth part of this chapter, I present the definition of key terms, identify the independent and dependent variables, and show how they are operationalized and measured. Specifically, the independent variable consists of military and civilian variables while the dependent variable comprises per capita savings, life expectancy, infant mortality, military expenditure, and number of soldiers. Furthermore, specific formulas are presented in order to convert local currencies into U. S. dollars and nominal dollars into real dollars.

The last part of this chapter focuses on development of indexes. Two indexes are developed, the socioeconomic

development and military performance. Specific formulas are presented to compute those indexes.

The next chapter delineates the empirical findings deduced from pooled cross-sectional time-series analysis. Specifically, it tests whether each hypothesis presented in Chapter II is confirmed or rejected.

CHAPTER IV

DATA ANALYSIS

The major purpose of this chapter is to evaluate empirically the performance of military and civilian regimes in socioeconomic development and military policy.

A pooled cross-sectional time-series analysis is used to test the relationship between regime type and policy performance across a twenty-one year period (1965-85) in 66 countries (details are given in Chapter III). The sample size is the product of years and countries, or 1386.

Specifically, the analysis seeks to test five hypotheses (refer to Chapter II for a list of these hypotheses). These five hypotheses yield three models: "the progressive/regressive model," "the corporate self-interest model" and "the conditional model."

The first model, the progressive/regressive model, assesses the validity of two opposing hypotheses. The first asserts that military regimes constitute modernizing forces that initiate socioeconomic development while the second, its opposite, postulates that military intervention in politics is likely to be a regressive force that retards socioeconomic development and modernization in the Third World. The second model, corporate self-interest, states that military governments tend to display a concern for the

corporate self-interest of the armed forces, i.e., that they increase military resources, regardless of their impact on socioeconomic development. The last model, the conditional model, argues that the performance of the military is based upon the economic conditions of society: the military tends to be progressive in less economically undeveloped countries of the Third World and retrogressive in more economically developed nations of the Third World.

The rationale for developing these disparate models is to ascertain which model is better specified and consequently to test which is more useful in the analysis of civil-military relations. In what follows, I explain the reason for including a single independent variable in the models.

The Relevant Independent Variable

Socioeconomic development performance and military performance are complex dependent variables. It is possible that they are affected by many political and societal traits other than military control. However, for the purpose of clarity and hypothesis-testing, this research focuses only on military control and, indeed, the equations that are estimated in this chapter use military control as the only or primary independent variable.

This is justifiable in large part because most of the pertinent independent variables that might have an impact on

the physical quality of life or military performance are themselves economic development related. And in fact physical quality of life and military performance are closely correlated with economic development. Therefore, if one were to include additional independent variables to measure economic development in either equation, one would simply be using a close correlate of the dependent variables to explain the dependent variable. Obviously, this will not take us very far.

In addition, other potential independent variables that might explain the dependent variables can not be clearly derived from the literature. Therefore, in testing the hypotheses, I have chosen not to include independent variables other than military control or, in the case of the conditional model, the interaction of military control and economic development.

Before reporting the results of pooled regression analysis, I delineate how the models are specified and comment on the pooled regression models to be used to analyze the data.

The Progressive/Regressive Model

In order to test the validity of the first hypothesis, the following model is estimated:

$$PQLI_{it} = A + B_1MILCTRL_{it} + U_{it} \quad (4.1)$$

where $PQLI_{it}$ is the physical quality of life index in country i in time t , (i.e., the sum of the Z score versions of saving per capita, life expectancy at age one, and infant mortality rate times -1); A is the regression constant or intercept, B_1 is the slope for the regression on military control, $MILCTRL_{it}$ is military control in country i at time t ; and U_{it} is the random error term associated with the model.

The above model simply states that socioeconomic development is a function of military control. The coefficient of military control (B_1) in the equation explains whether performance differs specifically in nations where there is military rule compared to nations where there is civilian rule.

Testing this model requires a two-tailed test because it tests contrary predictions of the progressive and regressive models. A positive coefficient for military control indicates an increase in the socioeconomic performance during military rule; that military regimes perform better than civilian governments, as the progressive model predicts. A negative coefficient for military control indicates increases in the socioeconomic performance during civilian regimes; thus, military regimes perform worse than civilian regimes, as the regressive model predicts.

The Corporate Self-Interest Model

In order to test the validity of the second model, the following equation is estimated:

$$\text{MILINDEX}_{it} = A + B_1 \text{MILCTRL}_{it} + U_{it} \quad (4.2)$$

where MILINDEX is the military index in country i at time t , A is the regression constant, B_1 is the slope for the regression of MILINDEX on military control, MILCTRL $_{it}$ is military control in country i at time t , and U_{it} is the random error term associated with the model in country i at time t .

The reader will recall that the military index, MILINDEX, is constructed from the Z scores of military expenditures in constant 1980 dollars and per capita size of the armed forces (number of soldiers per 1,000 population).

The coefficient of military control (B_1) in the equation explains whether military policy performance differs where there is military, rather than civilian, rule. A positive regression coefficient for military control indicates an increase in military policy performance during military rule, while a negative coefficient for military control indicates an increase in military policy performance during civilian regimes.

The corporate-interest hypothesis predicts that increased military control increases military policy performance and by expanding military resources.

The Conditional Model

The validity of the conditional model is tested in two ways. In the first approach to testing this model, I subdivided the total group of countries into high-income and low-income groups. The advantage of this approach is that one can deal independently and separately with countries that fall into the relevant income categories. The disadvantage is that each of the income groups has a smaller number of cases than the total group. This can affect the statistical significance of coefficients in the equation. Furthermore, one is unable to draw a single conclusion about the effect of military control. Instead, one has to draw conclusions concerning military control's impact within each group.

To create the two groups, high-income countries, those with a Gross National Product per capita of more than \$480 at the end of the time-series (1985), were coded 1. Low-income countries, coded 0, are those countries with a Gross National Product per capita equal to or less than \$480 at the end of the time-series data. The model takes the following form:

$$PQLI_{i0} = A_0 + B_{10}MILCTRL_{i0} + U_{i0} \quad (4.3)$$

for low-income countries and

$$PQLI_{i1} = A_1 - B_{11}MILCTRL_{i1} + U_{i1} \quad (4.4)$$

for high-income countries where all terms have the same meaning as in equation (4.1).

The fourth hypothesis predicts that increased military control increases socioeconomic performance if a society has a low level of economic development. A positive coefficient of B_{10} , in equation (4.3), the low income countries model, indicating a progressive role for the military governments in countries of low economic development, will confirm the validity of the fourth hypothesis. A negative coefficient of B_{11} , in the high income countries, (equation 4.4), will confirm the validity of the fifth hypothesis. The fifth hypothesis predicts that increased military control will decrease socioeconomic performance if a society has a high level of economic development.

The second approach to testing the conditional hypotheses is to define a single independent variable that would measure the interaction of income and military control. The advantage of this approach is that it allows us to develop a single measure of the impact of military control that operationalizes the conditional model and retains the entire number of cases for analysis. To do that, I construct a new variable to measure the interaction of income and military control which is at the heart of the conditional hypothesis. High-income countries (Gross National Product per capita of more than \$480 in any given

year from 1965-1985) which had military regimes are coded -1. Low-income countries (Gross National Product per capita of equal to or less than \$480 in any year from 1965-1985) with military regimes, are coded +1. All other countries those countries that did not experience military rule, are coded 0. The model takes the following form:

$$PQLI_{it} = C + d_1NEOCTRL_{it} + V_{it} \quad (4.5)$$

where $PQLI_{it}$ is the physical quality of life index, C is the regression constant, d_1 is the slope for the regression of socioeconomic performance on NEOCTRL, NEOCTRL is the constructed variable measuring the interaction of income and military control, and V_{it} is the random error term associated with country i at time t . A positive relationship would indicate that the conditional model is correct.

Pooled Regression Procedures

When one deals with any regression analysis, concern focuses on the structure of the error terms. In cross-sectional data, it is usually assumed that the disturbance terms are independent but heteroscedastic. In time-series analysis, it is usually suspected that error terms are serially correlated though not necessarily heteroscedastic. In pooling data, one has to be concerned with regard to likely disturbance terms related to both time-series and cross-section. As mentioned in Chapter III, there are four

alternative schemes by which the pooled data might be analyzed. These methods consist of Ordinary Least Squares (OLS), the covariance model, which combines OLS with dummy variables representing the cross sections (LSDV), the error components model, and the autoregressive method (Stimson, 1985). To use any of these methods depends on the assumptions that are based on the characteristics of the data under investigation.

The first model, OLS, also known as the constant coefficients model, is considered best when one assumes that all the classical error term assumptions hold, i.e., that intercepts are fixed and equal for all cross-section units, and there is no autocorrelation and no heteroscedasticity across the residuals of the cross-section units (Pindyck and Rubinfeld, 1976: 203). But these assumptions "represent rather restrictive set of assumptions that will generally not be satisfied" (Leuenbach and Clearly, 1984: 356). Therefore, in this analysis, I use OLS only as a referent.

The second model, the covariance model, assumes that each cross-sectional unit has its own peculiar intercept. It uses dummy variables. They are intended to capture the unique intercepts of each unit (Holbrook, 1991: 101). However, Pindyck and Rubinfeld state, "the dummy variable technique uses up a substantial number of degrees of freedom [one per cross section]. The loss of degrees of freedom may substantially decrease the statistical power of the model"

(Pindyck and Rubinfeld, 1976: 205). Furthermore, the covariance model does not deal with situations in which the regression lines for variables shift over time and over cross sections. (Pindyck and Rubinfeld, 1976: 205). Hence, it is not used here.

The third model is called the "error or variance components or random coefficients" model. In this model, the intercepts are treated as random and independent of the residuals and mutually independent (Umezulike, 1990: 104). This model also assumes "that error terms have a zero mean, common variance and are serially independent and independent across cross-section" (Umezulike, 1990: 104). Its use depends on the nature of data. If data reveal the presence of autocorrelation and heteroscedasticity, which is the case with the data I analyze, then this model is not appropriate.

The fourth model is called the autoregressive model. It is a variant of the generalized least squares method developed by Parks (1974). This model controls for the potential consequence of heteroscedasticity and autocorrelation and provides the most conservative estimates of the relationship under consideration (Hall, 1988: 8). Since this last model, autoregressive, accounts for heteroscedasticity and autocorrelation, the preferred analysis method is generalized least squares (GLS). The GLS model assumes that, "over time, disturbances are

autoregressively related, heteroscedastic over cross-section units, and mutually correlated" (Umezulike, 1990: 116).

Two alternative models are used here--OLS and autoregressive. I use the OLS model as a baseline. Its estimates reveal what the relationships between military control and my dependent variables would be if they did not suffer from autocorrelation and heteroscedasticity. But I shall show that OLS is not appropriate because the data surely suffer from autocorrelation and heteroscedasticity. In order to account for the fact that the data suffer from autocorrelation and heteroscedasticity, the autoregressive model was used to provide the principal description of the relationships of interest.

Autocorrelation occurs when "the value of a time series at time t is often indicative of its value at time $(t + 1)$. That is, the value of a time series at time t is correlated with its value at time $(t + 1)$ (Mendenhall, 1981: 270). If this happens it violates one of the assumptions basic to the least squares inferential procedures and one can not apply the OLS model and have confidence in the validity of this model" (Mendenhall, 1981: 270).

The presence of autocorrelation in this research is determined by looking at the value of Durbin-Watson. Durbin-Watson D . If the residuals are completely uncorrelated, the value of D is 2. On the other hand, if residual correlation is very strong and positive, the value

of D approaches zero (0) (Mendenhall, 1981: 172). As tables 3 through 7 indicate, the values of D are quite close to zero (0). Therefore, the data suffer from autocorrelation and the OLS model is not appropriate except as a baseline to be compared with the more appropriate autoregressive model.

In addition, heteroscedasticity is expected in our data since we deal with 66 nations that differ markedly in geographic size and population. Thus, in using such indicators of socioeconomic performance and military policies, one is likely to face "different magnitudes of errors" (Umazulike, 1990: 112). For example, the absolute magnitudes of the error in measuring GNP per capita, savings per capita, life expectancy, infant mortality and the like will be less for small than for large countries. Heteroscedasticity will be prevalent in this analysis.

Due to the presence of autocorrelation and heteroscedasticity, the preferred analysis method becomes a generalized least square (GLS) procedure based on a cross-sectionally correlated and time-wise autoregressive model of the error structure. The progressive/regressive, corporate self-interest, and conditional OLS models are reestimated using this variant of the GLS procedure. The GLS pooled time-series equations were calculated using the Micro-Crunch program which implements the Parks' method.

Results of Pooled Regression Analysis

The Progressive/Regressive Model

The first two hypotheses, combined as the progressive/regressive model, state that increased military control improves or worsens, socioeconomic performance. The estimated coefficients for this model and their standard errors are displayed in Table 3. The standard errors are given in parentheses beneath the estimated coefficients. A positive coefficient for military control would support the

TABLE 3

PROGRESSIVE/REGRESSIVE MODEL: EFFECT OF THE
MILITARY AND CIVILIAN REGIMES ON
SOCIOECONOMIC DEVELOPMENT (PQLI)
1965-1985 (N=1,386)

ORDINARY LEAST SQUARES ESTIMATES (OLS)

Independent Variable	Coefficient
Constant (Intercept)	24926.4375 (7043.0522)*
Military Control (MILCTRL)	-18911.11 (10530.44)+

R²= .002

Durbin-Watson D 0.04

Main table entries are the regression estimates and the numbers below them in parentheses are their standard errors.
*t=3.54, significant at the 0.001 level.
+t=-1.80, significant at the 0.10 level, two-tailed.

progressive, while a negative coefficient would support the regressive model. Since this model involves contrary predictions, a two-tailed test of significant is used.

The results do not support the progressive hypothesis because the value of the regression coefficient is negative. Military rule has a borderline statistically significant negative effect on the physical Quality of life index (PQLI). The value of its regression coefficient is -18911.11. Its standard error of 10530.44 indicates that the negative impact of military control is statistically significant at the point 0.10 level with $t = -1.80$. The data support the validity of the regressive model which postulates that military intervention in politics is likely to be a regressive force that will retard socioeconomic

TABLE 4

PROGRESSIVE/REGRESSIVE MODEL: EFFECT OF
THE MILITARY AND CIVILIAN REGIMES
ON SOCIOECONOMIC DEVELOPMENT
(PQLI) 1965-1985 (N=1,386)

GENERALIZED LEAST SQUARES ESTIMATES (GLS)

Independent Variables	Coefficient
Constant	672.39 (718.75)*
Military Control (MILCTRL)	-417.08 (771.86)*

$R^2 = 0.000$

Note: See notes to Table 3.

*Significant beyond the 0.5 level, two-tailed.

development in the Third World.

However, as can be detected from Table 3, the statistical fit of the equation (4.1) is not very

impressive: $R^2 = 0.002$. The R^2 of 0.002 is very small, despite the fact that the relationship is statistically significant.

Despite the positive results displayed for the regressive model in the OLS equation of Table 3, the OLS results are generally suspect. The Durbin-Watson D value, 0.04, shows that the data most likely are plagued by serial correlation. As a result, the GLS model is applied to the data.

The results for the progressive/regressive model estimated using the autoregressive procedures are presented in Table 4. The table indicates that military rule does not have a statistically significant effect on socioeconomic performance. The value of its regression coefficient is -417.08 which is not statistically significant. Similarly, R squared for the equation is 0.000, indicating that knowledge of military control does not help one improve one's prediction of socioeconomic performance. Therefore, neither the progressive nor the regressive model is confirmed by the GLS/Autoregressive model.

Despite the reestimation of the progressive/regressive model using the more appropriate GLS/autoregressive procedure, the results do not support either the progressive or the regressive model. These findings are consistent, in general, with the best of the empirical literature, and specifically with Jackman's findings that "the civilian-

military government distinction appears to be of little use in the explanation of social change" (Jackman, 1976: 1097).

The Corporate Self-Interest Model

Table 5 reports the OLS estimates for the corporate self-interest model. A positive coefficient for military control would indicate that it increases military resources. However, the results indicate that Hypothesis 3, military rule increases military resources, is not confirmed. The regression coefficient for military control is not positive

TABLE 5

CORPORATE SELF-INTEREST MODEL: EFFECT OF THE
MILITARY AND CIVILIAN REGIMES ON MILITARY
EXPENDITURES AND THE SIZE OF THE
MILITARY 1965-1985 (N=1,386)
ORDINARY LEAST SQUARES ESTIMATES (OLS)

Independent Variable	Coefficients
Constant (Intercept)	25469.63 (6938.45)*
Military Control (MILCTRL)	-11071.02 (10374.05)+
R ² = 0.001	
Durbin-Watson D	0.05

Main table entries are the regression estimates and the numbers below them in parentheses are their standard errors.
*Significant at the 0.0005 level.

+Significant at the 0.15 level, one-tailed.

but negative, -1107.02. Thus the OLS analysis confirms that military regimes do not promote the expansion of military resources to a greater degree than civilian governments.

The negative results, displayed for the corporate self-interest in Table 4, are still suspect. The Durbin-Watson D of 0.05 shows that the data suffer from autocorrelation. Therefore, the GLS/autoregressive model was next applied to the data.

Table 6 gives the GLS estimates for the effect of military control on military resources. Not surprisingly the regression coefficient and fit of the GLS model indicate that there is no statistically significant impact of military control on military resources. The coefficient for

TABLE 6

CORPORATE SELF-INTEREST MODEL: EFFECT OF THE
MILITARY AND CIVILIAN REGIMES ON MILITARY
EXPENDITURES AND THE SIZE OF THE
MILITARY 1965-1985 (N=1,386)

GENERALIZED LEAST SQUARES ESTIMATES (GLS)

Independent Variable	Coefficient
Constant (Intercept)	2375.60 (841.52)*
Military Control (MILCTRL)	-647.6106 (990.53)+

R² = 0.000

Note: See notes to Table 5.

*Significant at the 0.005 level, one-tailed.

+Significant beyond the 0.25 level.

military control is -647.61 which is considerable less than its standard error of 990.63. Also, R squared for this equation, once again, indicates that there is no predictive utility knowledge of military control. The data confirm

that military regimes do not differ to a statistically significant degree from civilian governments in their tendencies to increase the resources of their militaries.

These results are consistent with the findings of McKinlay and Cohan (1976) and Zuk and Thompson (1982). McKinlay and Cohan find that military control had no impact on the rate of increase of military spending. The Zuk and Thompson study produce similar results. Zuk and Thompson use two separate military resources as dependent variables: defense spending as a proportion of the state budget, and rates of growth in military spending.

These results do not support Hill's findings (1979) that the higher the level of military intervention, the greater the level of military spending as a proportion of gross domestic product. According to Hill, "Across the entire nation set, our analysis shows slight positive associations between military influence and the two military policy indicators [military spending as a proportion of gross domestic product and military manpower per 1,000 working-age population]" (Hill, 1979: 373-374).

The Conditional Model: Separate Sample Analysis

To test H4, increased military rule improves socioeconomic performance if a society has a low level of economic development, and H5, increased military rule decreases socioeconomic performance if a society has a high

level of economic development, I look first at the results from separate analyses of low-income and high-income nations. Table 7 reports the OLS estimates for low-income nations. The parameter estimate for the impact of military control, 4825.40, is 1.6 times its standard error, which signifies that the impact of military control on socioeconomic development in the low-income nations is statistically significant at the 0.1 level, one-tailed.

TABLE 7

CONDITIONAL MODEL: EFFECT OF THE MILITARY AND
CIVILIAN REGIMES IN LOW-INCOME NATIONS
ON PQLI 1965-1985 (N=1,095)
ORDINARY LEAST SQUARES ESTIMATES (OLS)

Independent Variable	Coefficient
Constant (Intercept)	2492.55 (2012.37)*
Military Control (MILCTRL)	4825.40 (2968.02)+
R ² = 0.002	
Durbin-Watson D	0.05

Main table entries are the regression estimates and the numbers below them in parentheses are their standard errors.

*Significant at the 0.15 level.

+Significant at the 0.1 level, one-tailed.

Therefore, the data do offer weak support for the argument that countries with military control and low economic development have high socioeconomic performance. However, the R squared is very low.

Furthermore, the Durbin-Watson D of 0.05 suggests that residuals are strongly correlated. Thus, the GLS model is next used to reestimate equation (4.3).

Table 8 reports the results of generalized least squares analysis for low-income countries. The results indicate that the coefficient for military control, -13.08, is not statistically significant. In summary then, the results reported in both Tables 7 and 8 do not confirm the validity of the hypothesis which states that military regimes tend to be progressive in countries at a low level of economic development.

Table 8

CONDITIONAL MODEL: EFFECT OF MILITARY AND
CIVILIAN REGIMES IN LOW-INCOME NATIONS
ON PQLI 1965-1985 (N=1,092)

GENERALIZED LEAST SQUARES ESTIMATES (GLS)

Independent Variable	Coefficient
Constant (Intercept)	235.36 (134.39)*
Military Control (MILCTRL)	-13.08 (304.47)+

R² = 0.000

Note: See notes to Table 7.

*Significant at the 0.05 level, one-tailed.

+Significant beyond the 0.25 level.

Table 9 presents the analysis of data for high-income countries. The coefficient for military control in Table 9 is -99659.34, which is more than twice its standard error. This appears to confirm the regressive role of the military in the Third World countries at high levels of economic development. However, the R squared of 0.014 does not

suggest a very strong overall relationship between military control and socioeconomic performance in Third World countries at high levels of economic development. Since the Durbin-Watson D is approximately zero, suggesting the presence of autocorrelation, equation (4.4) was reestimated using the GLS pooled regression model. Table 10 contains the generalized least square analysis for the

TABLE 9

CONDITIONAL MODEL: EFFECT OF THE MILITARY AND
CIVILIAN REGIMES IN HIGH-INCOME NATIONS
ON PQLI 1965-1985 (N=294)

ORDINARY LEAST SQUARES ESTIMATES (OLS)

Independent Variable	Coefficient
Constant (Intercept)	100130.95 (30779.21)*
Military Control (MILCTRL)	-99657.34 (48583.65)+
R ² = 0.014	
Durbin-Watson D	0.04

Main table entries are the regression estimates and the numbers below them in parentheses are their standard errors.
*Significant at the 0.0005 level.
+Significant at the 0.025 level, one-tailed.

high-income category of the Third World nations. The value of the regression coefficient in the GLS/autoregressive analysis is -388.00. This value is far less than its standard error, indicating that there is no impact of military control on socioeconomic performance in the high-income nations when the more appropriate GLS model is

used. Thus, although the OLS model shows such an impact, one must conclude that the regressive role of the military in Third World countries at higher level of economic development is not confirmed.

TABLE 10

CONDITIONAL MODEL: EFFECT OF MILITARY AND
CIVILIAN REGIMES IN HIGH-INCOME NATIONS
ON PQLI 1965-1985 (N=294)

GENERALIZED LEAST SQUARES ESTIMATES (GLS)

Independent Variable	Coefficient
Constant (Intercept)	698.00 (6978.90)*
Military Control (MILCTRL)	-388.00 (6978.97)*

R² = 0.000

Note: See notes to Table 9.

*Significant beyond the 0.25 level.

In order to test for the validity of the conditional model thoroughly, I reestimate the equation for all 66 countries using the interaction between regime type and economic well-being as the independent variable. Table 11 reports the OLS estimates for the conditional model in combined analysis. Its results indicate that the conditional model is not confirmed. The coefficient for the interaction of military control and economic development is -3823.40. This figure is substantially less than its standard error of 7870.89. Thus, one must conclude, on the basis of the OLS results, that the conditional model is not

confirmed. Once again, the Durbin-Watson coefficient indicates the necessity of proceeding to a GLS analysis. That analysis is reported in Table 12.

TABLE 11

CONDITIONAL MODEL: EFFECT OF THE MILITARY
CIVILIAN REGIMES IN LOW-INCOME AND HIGH-
INCOME NATIONS ON PQLI 1965-1985
(N=1,386)

ORDINARY LEAST SQUARES ESTIMATES (OLS)

Independent Variable	Coefficient
Constant (Intercept)	16229.68 (5264.27)*
New Control (NEOCTRL)	-3823.40 (7870.89)+

R² = 0.000

Durbin-Watson D 0.04

Main table entries are the regression estimates and the numbers below them in parentheses are their standard errors.
*Significant at the 0.005 level.
+Significant at the 0.5 level.

The data in Table 11 show that the results are not very impressive. The value of the regression coefficient for the interaction of military control and economic development is -194.97. Its standard error of 633.59 indicates that the impact of this interaction is not statistically significant. Thus, neither the OLS results nor the GLS results, reported in Table 12, supports the conditional model.

In summary, this model, once again, supports Jackman's findings (1976) that military governments in the Third World

TABLE 12

CONDITIONAL MODEL: EFFECT OF THE MILITARY
AND CIVILIAN REGIMES IN LOW-INCOME AND
HIGH-INCOME NATIONS ON PQLI
1965-1985 (N=1,386)

GENERALIZED LEAST SQUARES ESTIMATES (GLS)

Independent Variable	Coefficient
Constant (Intercept)	384.92 (510.20)*
New Control (NEOCTRL)	-194.97 (633.59)+

$R^2 = 0.000$

Note: See notes to Table 11.

*Significant at the 0.2 level, one-tailed.

+Significant beyond the 0.25 level.

are neither progressive or regressive, nor do they fit the conditional model of socioeconomic development suggested by Huntington (1968).

The results show that socioeconomic performance and military resource policies are not significantly affected by military control. Specifically, neither progressive nor corporate self-interest models are supported by Third World data during 1965-1985 periods. In addition, the conditional model or Huntington's assumption is not confirmed by the data. Thus, a simple distinction between military and civilian governments is not useful in understanding the consequences of military rule.

Summary

This chapter looks at the statistical relationship between the military control and the socioeconomic and military resource performance of the Third World nations in the period 1965-1985. The relationship is examined through pooled regression analysis.

Specifically, a pooled cross-sectional time-series analysis applied to the data tests the validity of the five hypotheses derived from the theoretical literature.

This chapter also discusses the operationalization of the independent variables and the reason for concentrating on the impact of a single independent variable, military control. The empirical investigation of the models, resulting from the five hypotheses, leads to the conclusion that a simple distinction between military and civilian regimes is not useful in understanding the consequences of military rule in the Third World.

The results show that socioeconomic performance and military resource policies are not statistically significantly affected by military control nor the interaction of the level of economic development and military control.

Thus, neither the progressive, regressive, corporate self-interest or conditional model is supported by the analysis of these data for Third World nations in 1965-1985.

CHAPTER V

CONCLUSIONS

The armed forces have been a major political participant in a number of Third World nations. In recent years, "there has been a renaissance of interest in issues relevant to military involvement in politics" (Kennedy and Louscher, 1991: 1). A number of empirical studies have been conducted to ascertain the political, economic, and social consequences of the military and civilian regimes in the Third World over the past three decades.

These findings are disconcerting. They are disconcerting because there is no general agreement on basic straight-forward questions. For example, when the military dominates the decision making of a government, does it improve socioeconomic development more than the civilian regimes? Also, does the military favor the military organization in regime resource policies?

The pertinent literature, reviewed in Chapter II, suggests three opposing views. One view posits that military regimes are progressive forces that foster social change and economic development. The second view perceives military governments as antithetical to development. Alternatively, ruling soldiers are seen as devoted to promoting the corporate interests of the military. Finally,

a more complex view argues that the accomplishments of the military depend upon the level of economic development of the respective Third World states. In poor countries, military regimes tend to be reformist and progressive, while in more wealthy Third World countries, they tend to be regressive.

Dissatisfaction with this lack of empirical consensus led me to a close scrutiny of several inadequacies of existing empirical research and to an identification of several problems that might have affected the findings of existing empirical studies.

One obvious problem singled out in Chapter I relates to the way in which the data had been previously manipulated. The widely used cross-sectional analysis is an inadequate technique given the dynamic nature of the research questions. On the other hand, more appropriate longitudinal designs had not been used for a sufficiently large number of the Third World countries. A second possible problem concerns the possibility that previous studies did not use variables that specifically focus on crucial developmental measures.

Based on these observations, I examine the 1965-1985 socioeconomic performance and military resource patterns of 66 countries in the Third World in the context of a design that combines the advantages of cross-sectional and time-series analysis without many of their limitations.

The independent variable in this analysis is regime type. Two categories of regimes are established: military and civilian. The dependent variables were socioeconomic and military resource policy performance. The former is measured by a Physical Quality of Life Index (PQLI). It is the sum of the Z score versions of savings per capita, life expectancy at age one, and infant mortality rate times -1. The latter is operationalized by a resource index. It is constructed from the Z scores of military expenditures in constant 1980 dollars and per capita size of the armed forces (number of soldiers per 1,000 population).

After investigating the first question, the following general conclusions may be drawn. Little apparent relationship seems to exist between regime type and socioeconomic policy performance. Specifically, military governments do not differ significantly from civilian governments in their socioeconomic performance. Both progressive and regressive hypotheses, drawn from the literature, must be rejected.

In addition, when the interaction of economic development and military control is considered, the results are the same: when the military dominates the decision making of the Third World's political systems, it has no effect on socioeconomic change, regardless of the level of economic development.

After investigating the second question, empirical analysis lends no support to the argument that the military seeks primarily to defend and advance corporate interests by increasing military resources (expenditures and size). There exists little relationship between regime type and level of military expenditures and size of armed forces. Thus, the second hypothesis is rejected, too.

The findings of this research reinforce the findings of several students of the military and civilian politics who empirically demonstrate that statements depicting military regimes in the Third World as either progressive or regressive are without empirical foundation (McKinlay and Cohan, 1975 and 1976; Jackman, 1976; and Zuk and Thompson, 1982). In addition, we can also conclude that "military regimes do not assume different mantles as countries in the Third World become wealthier" (Jackman, 1976: 1097). Furthermore, this research also corroborates Thompson's (1973) findings that the relationship between military regimes and military resources is not significant.

On the other hand, the findings of this empirical research do not support results of Nordlinger (1970), Schmitter (1971), and Hill (1979). With respect to the relationship between military control and socioeconomic performance, Nordlinger finds that the relationship is very

weak. But, he finds a positive correlation between military regime and socioeconomic performance in countries with small middle classes. Schmitter reports that military regimes tends to spend less of their resources on social welfare than civilian regimes. Hill shows that the higher the level of military intervention, the greater the level of military resources.

Implications

Regime type defined as a simple military/civilian dichotomy may not be a useful way to assess the socioeconomic and military policy impact of the military regimes because this division may obscure possible overlaps between civilian and military governments. All military regimes may not form a homogeneous group. According to Grindle, the military may have extensive influence in many types of regimes and military influence in politics may usually have substantial civilian support (Grindle, 1987: 257). Therefore, in order to help students of comparative politics better understand the relationship between civilian/military regimes, future empirical research should decide what is the best way to arrive at a typology of regimes that is relevant for the explanation of policy consequences.

Furthermore, military and civilian regimes may share common characteristics and attributes. Regimes, whether military or civilian, may be cohesive or not, may foster modernization and socioeconomic development, or they may not, and some regimes mobilize the population, while others do not.

Another implication of this research is that regime type just does not matter. One reason may be that military regimes, after seizing power, realize that the art of governing is not easy. They realize that civilian regimes are not as venal, corrupt and incompetent as they thought. Rather, the problems they deal with are extremely difficult and hard to solve. They are as much subjected to pressures, demands, and constraints as the civilian regimes if not more. Thus, it does not make much difference who is going to succeed, i.e., civilian or military.

With regard to military resource policies, there is always the option that civilian regimes may react defensively. Or it may be that military resources are affected by such things as either external threats or internal civil strife or both. They are not built into this research because of the limitations of the scope of this study.

Recommendations For Further Research

In order to help students of military and comparative politics understand military control and socioeconomic and military policy performance better, I present the following recommendations.

Future research can move beyond bivariate model and adopt multivariate model of analysis by incorporating additional variables that could have important effect on the relationship between military control, socioeconomic development, and military resource policy. For instance, specific countries may be involved in either internal or external conflict which, regardless of whether regime is military or civilian, may retard socioeconomic development and contribute to increase in military resource policy funding.

Another reason for there being little apparent relationship between military control and socioeconomic development might be that military regimes devote more attention to maintaining order at the expense of socioeconomic development. In order to account for these possibilities, new control variables are recommended.

In conclusion, this study found no support for any of theses relating civilian-military rule to policy performance. However, the results of this research may not

be conclusive. Future research may consider the suggestions presented here. It is only in this fashion that a more complete understanding of the relation between military control and socioeconomic policy performance can be accomplished.

**APPENDIX
FORMULAS**

APPENDIX

FORMULAS

The following formulas are used to: convert local currencies to per capita constant dollars; compute the the military expenditure to constant U. S. dollars for year t; convert the three socioeconomic variables into standardized scores; construct an index of PQLI; and construct an index of military performance, respectively.

$$\text{VAR}_{20t} = (\text{VAR}_{20t}/\text{VAR}_{1t}) / (\text{VAR}_{41t}/100) / (\text{VAR}_{98t})$$

where

VAR_{20t} =current price Gross Domestic Savings in local currency for year t.

VAR_{1t} =population for year t.

VAR_{41t} =Gross Domestic Product deflator for year t
(this variable was divided by 100 to get the data in proportion).

VAR_{98t} =conversion factor for year t.

$$\text{MILEX}_t = (\text{MILEX}_t) / (\text{VAR}_{41t}/100)$$

where

MILEX_t =military expenditure for year t. VAR_{41t}
=conversion factor for year t (this variable is divided by 100 in order to get the data in proportion).

$$ZVAR_{20} = (VAR_{20} - VAR_{20mean}) / (VAR_{20sd})$$

where

$ZVAR_{20}$ = standardized constant per capita Gross Domestic Savings.

VAR_{20} = current price Gross Domestic Savings in local currencies.

VAR_{20mean} = mean of VAR_{20} .

VAR_{20sd} = standard deviation of VAR_{20} .

$$ZVAR_{111} = (VAR_{111} - VAR_{111mean}) / (VAR_{111sd})$$

where

$ZVAR_{111}$ = standardized infant mortality rate per 1,000 infants.

VAR_{111} = infant mortality rate per 1,000 infants.

$VAR_{111mean}$ = mean of VAR_{111} .

VAR_{111sd} = standard deviation of VAR_{111} .

$$ZVAR_{112} = (VAR_{112} - VAR_{112mean}) / (VAR_{112sd})$$

where

$ZVAR_{112}$ = standardized life expectancy at birth.

VAR_{112} = life expectancy at birth.

$VAR_{112mean}$ = mean of VAR_{112} .

VAR_{112sd} = standard deviation of VAR_{112} .

$$PQLI = ZVAR_{20} - ZVAR_{111} + ZVAR_{112}$$

$$ZMILEXCON = (MILEXCON - MILECON_{mean}) / (MILEXCON_{sd})$$

where

ZMILEXCON =standardized military expenditure in
constant U. S. dollars.

MILEXCON =military expenditure in constant U. S.
dollars.

$MILEXCON_{mean}$ =mean of MILEXCON.

$MILEXCON_{sd}$ =standard deviation of MILEXCON.

$ZARMFORCE = (ARMFORCE - ARMFORCE_{mean}) / (ARMFORCE_{sd})$

where

ZARMFORCE =standardized number of soldiers (1,000s).

ARMFORCE =number of soldiers (1,000s).

$ARMFORCE_{mean}$ =mean of ARMFORCE.

$ARMFORCE_{sd}$ =standard deviation of ARMFORCE.

$INMILPER = ZMILEXCON + ZARMFORCE$

where

INMILPER =index of military performance.

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