Arms Control

The Journal of Arms Control and Disarmament

VOLUME 7
NUMBER 1
MAY 1986

ISSN 0144-0381

FRANK CASS • LONDON

Factors Underlying Venezuelan Defense Expenditures, 1950–83: A Research Note

Robert E. Looney*

Introduction

'A country's military expenditures', the US Arms Control and Disarmament Agency points out, 'are not necessarily representative of military capability.' They do not define a country's efficiency and allocation of expenditures or 'whether the quantity and quality of force supported by them serves national purposes.'[1]

The raw data do enable the measuring of the economic burden, the impact on the average person in the country, and the degree to which a country values military spending over other forms of government outlay. Inevitably, the question that arises from study of the data on military expenditures is why the expenditure and particularly why the trend of military expenditures. Specifically, is there a threat to the security of the particular country; is destabilization by outside forces forcing the expansion of military outlay? Otherwise, why is the burden being assumed?[2] Has the trend of military expenditures simply been affected by the easy income of windfall export earnings such as that experienced by OPEC countries in the 1970s?

In a 1973 study of defense expenditures and military rule in Latin America, Schmitter[3] concluded that the single best explanatory factor for the rise or fall of military budgets in individual countries was the performance of GNP. That finding has been verified by other studies of defense expenditures in Latin America.

Gertrude Heare[4] found in a 1971 study of the six leading military spenders in Latin America (Argentina, Brazil, Chile, Colombia, Peru and Venezuela) that between 1940 and 1970 their outlays fluctuated in the aggregate between 2.5 per cent and 3.0 per cent of GNP. Moreover, absolute expenditures in constant prices tended to rise over these three decades as national economies grew. In brief reviews of the history of military spending in each country, Heare could find no uniform pattern over time. She did point out that expenditures jumped notably with internal conflicts (or with the threat thereof), with periods of economic prosperity or with specific attempts to catch up with lags in construction, pay scales or equipment replacement. She also noted that military

* Naval Postgraduate School, Monterey

budgets declined in times of economic depression or hardship.

The general purpose of this paper is to examine in much more detail[5] than Heare or Schmitter the pattern of military expenditures in a country, Venezuela, having little apparent need to increase allocations for defense over time. The specific purpose of this paper is, given the fact that Venezuela did increase its military expenditures over time throughout this period, to determine the main factors underlying this expansion.

Analysis of Trends in Venezuelan Defense Expenditures

The general observation concerning the stability in Venezuelan military expenditure is borne out by the lack of any particular trend in Venezuelan defense expenditures. In particular, an econometric analysis of the various (Table 1) ratios confirms the overall pattern of stability in Venezuela's defense allocations:

1. Military expenditure as a percent of GDP;
2. Military expenditure as a percent of government consumption;
3. Military expenditure as a percent of government expenditure, and
4. Military expenditure as a percent of government revenue.

The following dummy variables[6] were included in the regression equation on a one-by-one basis to test for structural changes associated with the post-1973 oil price increases. Since it is not apparent whether the 1973–74 oil price increases acted immediately or with a lag or whether the 1978–79 price increases produced a structural shift similar to the 1973–74 period, several dummy specifications were tested:

DUMA	(0) 1950–73
	(1) 1974–83
DUMB	(0) 1950–72
	(1) 1973–83
DUMC	(0) 1950–73
	(1) 1974–78
	(2) 1979–83
DUMD	(0) 1950–73
	(1) 1974–79
	(2) 1980–83

In addition, a dummy variable was included in the regressions to test for possible structural shifts associated with different Venezuelan governments:

DUMP (0) 1950–57 The Dictatorship
(1) 1958–68 AD Democratic Action Party
(2) 1969–73 COPEI Social Christian Party
(3) 1974–78 AD Democratic Action Party
(4) 1979–83 COPEI Social Christian Party

With regard to changes of regime in Venezuela, the two major political parties, the AD and COPEI, are both moderately left of center.[7] The two parties began Venezuela's democratic period as partners in a coalition government in 1958; by the mid-1980s, their platforms differed, however, more in implementation than in substance.

The AD is the oldest and largest party in Venezuela. Substantively, it can be characterized as socialist-populist, similar in general orientation to the Iranian or German Social Democratic parties or the British Labour Party. It is pragmatic in outlook; it argues in favor of a mixed economic system and dedicates itself to the policy of 'sowing the oil' to diversify the economy and develop the nation's infrastructure. It has strong commitments to education and agrarian reform, conducts an active foreign policy and devotes itself to the concept of a representative democracy. The AD enjoys a broad base of support; the peasant (campesino) movement and organized labor, however, stand out as among the staunchest components of its constituency.

The COPEI has held a strong second place to the AD since the mid-1960s when it copied the AD's organizational structure. The COPEI characterizes itself as the 'loyal opposition' to the AD majority and commits itself to the translation of Christian social doctrine into political principles and programs. Specifically, it espouses such causes as agrarian reform, education, social welfare and economic nationalism. Its constituency, which shares many elements of the AD, is generally more conservative and includes a less significant labor element. If anything, therefore, we might expect a structural shift toward proportionately (*ceteris paribus*) greater amounts of public expenditures allocated to defense during COPEI administrations.

The regression results for the ratio of military expenditures to gross domestic product and government consumption were not statistically significant for either the time trend or any of the dummy variables; which means there is no statistical verification of any secular increase or decrease in either the percentage of gross domestic product or government consumption allocated to defense expenditures. Furthermore, the oil price shocks and change in political regimes were not statistically significant in causing structural shifts in the ratio of military expenditure to either gross domestic product or government consumption.

The regression results for military expenditure as a proportion of government revenues and government expenditures also produced (Table 1, 2) no statistically significant time trend. However, both ratios were strongly affected by the oil price dummys, with the political variable also statistically significant and positive for the ratio of military expenditures to government revenues. The dummy variables for the oil price increases were highly significant for the military expenditures ratio, but had consistently lower 't' ratios and 'r-squared' values for the ratio of military expenditures to government expenditures. The negative sign on the oil dummys indicates that the government may have decided to allocate the bulk of the oil windfalls to non-defense activities, while the positive sign on the political variable suggests that COPEI administrations may be more assiduous than AD administrations in allocating funds for the military.

The effect of the oil price increases is also apparent in an analysis of the time trend in real military expenditures. Total real military expenditures display a strong time trend in Venezuela with slightly over 75 per cent (Table 3) of the fluctuations in military expenditures explained by time alone. Several of the measures of structural shift associated with the oil price-revenue changes are also statistically significant with the highest (Equation 8, Table 3) correlation coefficient-squared (0.938) being associated with the trend in oil price increases beginning in 1973.

Clearly, the results imply a strong time trend and, therefore, stability in defense expenditures. The time trend pattern has, however, been broken sharply and shifted upward by the sudden affluence associated with the oil price increases experienced in the 1970s. Overlapping the structural shifts associated with the oil price phenomenon is another set of shifts associated with the difference in priorities vis à vis the defense sector associated with the two main political parties, with the COPEI more inclined to allocate funds for this purpose.

These patterns are more apparent when an analysis of residuals from the regression equation is made. The residuals around the time trend regression equations (1st four columns, Table 4) show that military expenditures have experienced several cyclical patterns with abnormally low allocations occurring in the early 1950s (1952–53), then rather high allocations up to 1960, followed by a period of lower than predicted defense expenditures all through the 1960s (1960–1970). The 1970s, in turn, were generally a period of abnormally high allocations occurring in the defense industry, with only 1970, 1973, 1976 and 1979 expenditures falling below the trend line. When dummy variables were added to the regression equation to account for the structural shift associated with the petroleum boom in the 1970s, a somewhat different picture emerged:

1. Not only is the regression equation significantly improved (from an r-squared of 0.752 for time to 0.938 for time plus DUMB) but several years in the 1960s are no longer seen as times of abnormally low expenditures;
2. In addition, given the correction for the 1973–74 oil price increases, several years in the 1970s, despite rapid increases in oil revenues, are now below their historical trend (1978 and 1981 with DUMA);
3. A regression of real military expenditure on real government revenues plus structural shifts associated with petroleum and political developments improves the correlation coefficient to 0.961, indicating that the secular increase in petroleum revenues adjusted for structural shifts has played a more important role in explaining military expenditures than simply a gradual increase in military expenditures associated with an expanding economy;
4. The analysis of residuals on the regression of military expenditures on revenues plus structural changes (Col. 9, Table 4) indicates that, contrary to the residuals around the time regression, the later 1960s were actually a period of relatively high allocations to military activities, while the 1970s, if anything, were a period of relatively low allocations (1970, 1971, 1974, 1976, 1977, and 1978 all lying below the regression line).

In general, therefore, the introduction of dummy variables to the trend analysis confirms the tentative conclusions obtained earlier that while the increase in oil revenues has greatly facilitated the increase in the allocations to the defense sector, during the 1970s that sector received relatively small allocations in light of the amount of funds suddenly placed at the disposal of the government. Again, defense expenditures in the country appear to be quite stable, neither reduced in line with other government programs during periods of austerity, nor increased dramatically during periods of affluence.

Historical Defense-Macroeconomic Patterns

The previous section identified government revenue patterns as a major element associated with movements in defense expenditures. Clearly, a large percentage of the Venezuelan government's revenues are made up of oil revenues. Furthermore, higher oil revenues permit not only greater expenditure outlays but, in addition, have exerted considerable political pressure on the country's respective ministries to increase allocations in all areas. Thus, the magnitude of oil revenues appears to be of critical importance in determining the volume of public expenditures in Venezuela. To show the historical relationship of

government revenues to military expenditures in Venezuela, regressions were performed using various macroeconomic variables and fiscal indices as regressors. The independent variables included the levels of real government expenditure (GEP), real gross domestic product (GDPNP), the real government debt (GDP), real government consumption (GCNP), the real government current deficit (GDEFP), real government revenues (GRP), the financial system's real credit to the government (MSGCP), and the public sector's real foreign borrowing (GFSP). In addition, the five dummy variables described above were included to test for structural shifts in the specified equations.

To test for stability in the relationships, the 1950–82 time period was broken down (arbitrarily) into two sub-periods of more or less equal intervals, 1950–65 and 1966–82. The results (Table 5), obtained by regressing each variable on defense expenditure, indicate that for the period as a whole (1950–82) defense expenditures were (based on the correlation coefficient) most closely related to real gross domestic product (GDPNP), followed by real government consumption (GCNP), real government expenditures (GEP), and real government revenues (GRP). Interestingly, government credit from the financial system (MSGCP), government foreign borrowing (GFBP), and real government debt had negative signs. In general, a number of dummy variables were also significant. The results (Tables 6, 7) for the sub-periods indicate that the linkage between defense expenditures and these variables was more stable in the 1950–65 period (Table 6), weakening somewhat in the 1966–82 period (Table 7). The size of the coefficients for all of the independent variables is also considerably lower for the 1966–82 period, confirming the conclusion reached in the previous section that a weakening over time occurred between these major macroeconomic aggregates and defense spending.

Note for the period as a whole (Table 8), the significant increase in the elasticity (see below) of defense expenditures (from 0.33 to 0.94) when a dummy variable (DUMA) was added to the regression equation to capture the structural shift associated with the 1973–74 oil price increase. Clearly, the negative sign on the dummy and the rise in elasticity indicate that military expenditures have not kept pace directly with the post-1973/74 increase in oil revenues.

To gain some idea of the responsiveness of defense expenditures to movements in the macro-fiscal variables, regressions were performed on the variables in their logarithmic form. In this specification, the coefficients of the regression equations are interpreted as elasticities, i.e., a 1 per cent change in the independent variable produces an x per cent change in real defense expenditures. The results (Tables 8–10) are consistent with those presented in the previous analysis (Tables 5–7). In

general, the strength of the independent variables in affecting real defense expenditures has declined somewhat over time. For example, during the 1950–65 period (Table 9) a 1 per cent change in real government revenue was associated with a 0.99 per cent change in real defense expenditures. By 1966–82, the same 1 per cent change in government expenditures was associated with (Table 10) only a 0.48 per cent increase in defense spending. The major exception to this pattern is government consumption. During the 1950–65 period, real government consumption was weakly related (and not statistically significant) to defense expenditure – a 1 per cent increase in real consumption associated with a 0.55 per cent increase in real defense expenditures. By 1966–82, not only was real government debt highly significant statistically when regressed on defense, but its elasticity had increased to 0.63 (Table 10). Taking into account the structural shift associated with the post-1973 increase in petroleum prices, however, it appears that the overall (1950–82) elasticity of military expenditure with respect to government revenues is around 1.00, the same as in the 1950–65 sub-period.

In short, government revenues have apparently played a dominant role in the 1950–82 period in influencing defense expenditures, while the link between total government expenditures and defense expenditures is not nearly as strong in the later (1966–82) period as in the earlier (1950–65) period. The level of real government consumption also appears much more influential in explaining defense expenditures in the later period, with a correlation coefficient of 0.740 compared to 0.222 in the 1950–65 period (Tables 9, 10). The links between both real gross domestic product and defense appear to have declined over time (judged by the elasticity), although when corrected for the post–1973 oil price increases, the elasticity of 0.97 (1950–82) is slightly lower than the 1.23 for the 1950–65 period.

Impact of Military Expenditures in Other Latin American Countries

One possible factor affecting Venezuelan military expenditures could be the perceived need on the part of the Venezuelan authorities to emulate military expenditures in neighboring states. This need could reflect either an imagined threat to Venezuelan security or simply emulation of the acquisitions of new weapons systems by regional neighbors.

To test the importance of this emulation effect, real military expenditures were regressed on real military expenditures in several neighboring countries. The results (Table 11) indicate that except for Ecuador, no statistically significant relationships were found. The lagged values of military expenditures in the sample of neighboring countries

were also regressed on Venezuelan real military expenditures and again, except for Ecuador, no statistically significant relationships existed.

It should be noted that the relationship with Ecuadoran military expenditures is barely significant (2.39 t value, Table 11) and, perhaps more importantly, the relationship is probably spurious: Ecuador is also an OPEC oil producer and most likely expanded its military expenditures after the 1973 oil price increases in a manner similar to Venezuela.

The correlation pattern of Venezuelan and Ecuadoran military expenditures can also be corrected for in part by the strong time trend in the regression of real military expenditure over time. For the 1955–83 period, time alone accounts for 66.4 per cent of the fluctuations in Venezuelan military expenditure (Table 12) and 56.1 per cent of the fluctuations in Ecuadoran military expenditures.

Introducing the effect of the 1973–74 oil price increases in the regression equations (Equations 2 and 9, Table 12) increases the r-squared correlation coefficient to 88 per cent for Venezuela and 90.7 per cent for Ecuador. The oil price structural change was positive for both countries (each of which is a member of OPEC) and highly significant, indicating a break in the historical pattern of military expenditures for each country, wherein additional revenues accrued to both governments after 1973.

Note, also, the strong time trends in military expenditures for Colombia, Peru and Mexico. Of the major oil *importers* examined, Colombia and Brazil experienced reductions in military expenditures following the 1973–74 oil price increases, while Peru's pattern of real military expenditures was not affected by these external shocks (Table 12). Mexico and Argentina, both domestic producers of oil, did not experience alterations in their pattern of military expenditures following the oil price shocks. Of course, Argentina's pattern of military expenditure was greatly affected by the Falklands War. A dummy variable (DUMW) for this period (Values: 0=1955–81, 1=1982–83) was highly significant when regressed (Table 12) on that country's real military expenditures.

In short, one can conclude that Venezuelan military expenditures have been determined largely by developments internal to that country (oil revenues and increased gross domestic product), with military expenditure patterns of regional countries affecting allocations for Venezuelan defense marginally, if at all.

Determinants of the Deviation from Trends in Real Military Expenditures

As noted above, once correcting for the structural change associated

with the post-1973 oil price increases, one finds great stability in the patterns of Venezuelan military expenditures. The linkage between government revenues and military expenditures is undoubtedly more complicated than outlined above, however. It is unlikely that there is a pure one-to-one relationship between government revenue and military expenditures in each time period. To throw more light on the matter, this subsection examines in detail the linkages over time between changes in government (largely oil) revenues and the subsequent allocations for military expenditures.

Because of the strength of the time trend in both military expenditure and its major determinants – government revenues (GRP), government expenditures (GEP), gross domestic product (GDPNP), and government consumption (GCNP) – the empirical relationships may be somewhat spurious. Military expenditures and government expenditures might, for example, be correlated with some other variable which, in turn, had a strong time trend. The high correlation between military expenditure and, for example, gross national product would have been only apparent and not indicative of any particular casual relationship.

To determine whether or not spurious correlation accounted for the high correlations of military expenditure and the independent variables examined above, all variables were regressed on time and the dummy variables associated with oil prices and political change. The deviations from the trend for each of the variables were then regressed on the deviations from the trend in real military expenditure (MEPDT), i.e., the deviations from the regression equation of real military expenditures regressed on time.

The various measures of deviations from the trend in real government revenues were computed from the deviations from the regression equation or real government revenues on:

1. Time (GRPDT),
2. Time, DUMC, DUMP (GRPDCP),
3. Time, DUMC (GRPDTC);
4. Time, DUMP (GRPDTP),
5. Time, DUMD (GRPDTD).

The deviations from the trend in government revenues lagged one year were:

1. Time, DUMC (GRPDTCL);
2. Time (GRPDTL).

Similarly, deviations from the trend were computed for the macro-variables assumed to affect real military expenditures. These deviations were computed from:

1. For government expenditure, the regression of real government expenditure on time (GEPDT);
2. For gross national product, the regression of real gross national product on:
   (a) Time (GDPNPDT);
   (b) Time, DUMP (GDPNPDT);
3. For government consumption, the regression of real government consumption on time (GCNPDT);
4. For gross national product lagged one year, the regression of gross national product lagged one year on:
   (a) Time (GDNPNDTL);
   (b) Time, DUMA (GDPNPDTAL);
   (c) Time, DUMP (GDPNPDTPL).

The results (Table 13) show that even after extracting the trend from military expenditure and the major independent variables selected for the analysis, the strong statistical significance of the regression equations persists. In terms of government revenues, a number of alternative specifications of the deviation from the trend were statistically significant when regressed on military expenditures with the deviations from the trend of government revenues regressed on time and DUMD (GRPDTD), accounting for over 40 per cent (Table 14) of the deviations from the trend in military expenditures regressed on time (MEPDT). Interestingly, lagged values of the deviations from the trend (GRPDTCL, GRPDTL) in government revenues (Table 13) were also statistically significant in accounting for deviations from the trend in real military expenditures.

Lagged deviations from the trend for real gross national product (Table 13) were also highly significant in explaining deviations from the trend in real military expenditures. In fact, lagged values for real gross national product were much more highly correlated with deviations from the trend in real military expenditure than current period values for GDP.

Conclusions

The statistically significant results obtained using lagged values, together with the stability of real defense expenditures as a share in gross domestic product, suggest that long-run forces may interact to maintain stability in the level of defense allocations. Revenue or expenditure changes clearly affect defense expenditures over more than a one year time interval.

In brief, our analysis of the data for the 1970s and early 1980s indicates that the trends perceived by Heare and Schmitter have persisted but are not as strong as those found in the 1950s and 1960s. Presumably, the

Venezuelan government wishes to maintain some overall proportion of GNP in defense expenditures, thus delineating the optimal level of defense expenditures. The difference between the actual level of defense expenditures at any point in time and this optimal level affects the amount of funds allocated for defense in any single year. Apparently, because of uncertainty concerning the optimal level of defense expenditures caused by oil shocks in the 1970s and early 1980s, the government has had an increasingly difficult time in delineating the speed with which actual levels of defense expenditures are to be adjusted to the optimal level.

Given the country's limited need for defense expenditures, it will be interesting to observe how the government scales down the optimal level of defense expenditures in response to declining oil revenues and how significant an impact this declining optimal level will have on year-to-year cutbacks in defense expenditures.

NOTES

1. From C. Brown, 'Latin America Arms: For War? The Experience of the Period 1971–80', *Inter-American Economic Affairs* (Summer 1983), p. 61.
2. Ibid.
3. P. Schmitter, 'Foreign Military Spending and Military Rule in Latin America' in P. Schmitter, ed., *Military Rule in Latin America: Function, Consequences and Perspectus* (Beverly Hills, CA: Sage Publications, 1973).
4. Gertrude E. Heare, *Trends in Latin American Military Expenditures* (Washington, D.C.: Department of State, 1971).
5. For a detailed non-quantitative analysis of an earlier period cf. E. Baloyra, 'Oil Policies and Budgets in Venezuela, 1938–68', *Latin American Research Review* (Summer 1974), pp. 28–72.
6. A general description of the use and interpretation of dummy variables can be found in P. Rao and R. Miller, *Applied Econometrics* (Belmont, CA: Wadsworth Publishing Co., 1971), pp. 88–93.
7. Cf. Cecilian M. Valentine, *The Political, Economic and Labor Climate in Venezuela* (Philadelphia: The Wharton School, 1979), pp. 88–93.

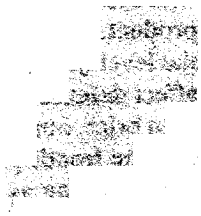

TABLE 1

VENEZUELA: TIME SERIES ANALYSIS OF DEFENSE EXPENDITURES AS A % OF CURRENT REVENUES 1980-1982

Equation	Independent Variables							Statistics		
	Duma	Dumb	Dumc	Dumd	Dump	Time	RHO	r^2	F	DW
(1) Military Expenditures as % Government Revenues =	-4.15 (-8.44)						0.25 (1.51)	0.704	71.36	1.87
(2)		-3.93 (-8.59)					0.120 (0.697	0.711	73.92	1.94
(3)			-2.34 (-5.16)				0.46 (2.95)	0.471	26.67	1.85
(4)				-2.47 (-5.30)			0.42 (2.69)	0.484	28.09	1.93
(5)					1.68 (2.64)		0.91 (13.12)	0.188	6.98	2.19
(6)	-3.95 (-5.12)					-0.013 (-0.32)	0.25 (1.50)	0.705	33.52	1.87
(7)		3.71 (-4.75)				-0.013 (-0.34)	0.13 (0.78)	0.704	33.44	1.94
(8)			-1.95 (-2.95)			-0.046 (-0.81)	0.43 (2.76)	0.501	14.09	1.85
(9)				-2.00 (-2.97)		-0.052 (-0.96)	0.40 (2.51)	0.515	14.89	1.92
(10)					1.95 (3.35)	-0.29 (-5.45)	0.49 (3.18)	0.507	14.42	1.92
(11)						0.14 (1.05)	0.95 (17.45)	0.034	1.11	2.25

NOTES: Estimations made using Cochrane-Orcutt two stage iteration process for serial correlation; see text for definition of symbols

( ) = t statistic
F = F statistic
DW = Durbin-Watson statistic
L = Variable lagged one year

TABLE 2

Venezuela: Trend Analyses of Military Expenditures as % Government Expenditures 1950-1982

Equation	Independent Variables						RHO	r^2	F	DW
	DUMA	DUMB	DUMC	DUMD	DUMP	TIME				
(1) Military Expenditure as % Government Expenditures	-2.57 (-4.06)						0.58 (4.08)	0.354	16.51	1.63
(2)		-1.26 (-1.51)					0.79 (7.40)	0.071	2.29	1.78
(3)			-1.57 (-3.91)				0.54 (3.71)	0.338	15.34	1.63
(4)				-1.67 (-3.93)			0.58 (4.03)	0.340	15.47	1.70
(5)					-0.24 (-0.52)		0.89 (11.56)	0.008	0.27	1.82
(6)	-1.32 (-1.53)					-0.11 (-1.86)	0.66 (4.98)	0.350	7.54	1.75
(7)		-0.44 (-0.49)				-0.16 (-2.23)	0.72 (6.03)	0.254	4.77	1.84
(8)			-0.22 (-0.35)			-0.16 (-2.18)	0.72 (5.89)	0.257	4.84	1.81
(9)				-0.71 (-1.19)		-0.12 (-1.88)	0.66 (5.03)	0.327	6.82	1.78
(10)					-0.02 (-0.44)	-0.19 (-2.69)	0.75 (6.42)	0.231	4.21	1.85
(11)						0.056 (0.50)	0.98 (25.80)	0.008	0.24	1.91

NOTES: See text for definition of symbols
Estimations made using Cochrane-Orcutt two stage iteration procedure for serial correlation correction

( )= t statistic; F= F Statistic; r2= correlation coefficient; DW= Durbin Watson Statistic

TABLE 3

VENEZUELA DEFENSE EXPENDITURES, TREND-STRUCTURAL ANALYSIS, 1950-1983

Equation	Independent Variables							Statistics		
	TIME	DUMA	DUMB	DUMC	DUMD	DUMP	RHO	r^2	F	DW
(1)	114.25 (9.69)						0.56 (3.94)	0.752	94.07	1.87
(2)		978.57 (3.55)					0.91 (12.32)	0.289	12.63	2.63
(3)			91.42 (0.28)				0.94 (16.16)	0.002	0.079	2.25
(4)				486.47 (2.34)			0.91 (12.70)	0.150	5.50	2.43
(5)					618.06 (3.15)		0.98 (12.10)	0.242	9.93	2.42
(6)						-263.32 (-1.67)	0.95 (18.01)	0.083	2.80	2.30
(7)	82.23 (7.20)	805.56 (3.73)					0.408 (2.57)	0.892	124.27	1.99
(8)	84.91 (9.08)		737.06 (3.95)				0.11 (0.64)	0.938	229.75	1.90
(9)	94.09 (5.65)			291.10 (1.62)			0.54 (3.72)	0.784	56.60	1.93
(10)	88.53 (5.13)				381.95 (2.05)		0.58 (4.15)	0.761	48.01	1.94
(11)	135.02 (11.00)					-342.03 (-2.40)	0.44 (2.87)	0.853	87.36	1.89
(12)	108.40 (6.27)		489.65 (2.07)			-226.44 (-1.54)	0.21 (1.28)	0.927	114.79	1.89

NOTES: Estimations made using Cochrane-Orcutt two stage iteration process for serial correlation; see text for definition of symbols

( ) = t statistic
( )$_F$ = F statistic
DW = Durbin-Watson statistic
$_L$ = Variable lagged one year

TABLE 4

VENEZUELAN REAL DEFENSE EXPENDITURE: TREND ANALYSIS, RESIDUALS (ACTUAL - ESTIMATED)

	TREND VARIABLE											
	TIME	TIME DUMA	TIME DUMB	TIME DUMP	TIME DUMB DOMP	GEP	GEP DUMC	GRP	GRP DUMD DUMP	GDPNP	GCNP	GCNP DUMA
1951	43.2	-73.0	-59.7	34.8	-24.1	-170.0	-157.0	-133.0	-230.0	-194.0	-212.0	-200.0
1952	-12.5	-120.0	-118.0	-39.6	-97.3	-175.0	-165.0	-146.0	-221.0	-205.0	-215.0	-210.0
1953	-71.2	-173.0	-192.0	-120.0	-183.0	-195.0	-185.0	-166.0	-237.0	-241.0	-246.0	-233.0
1954	40.4	-59.6	-104.0	-32.4	-104.0	-42.1	-28.9	-2.2	-85.8	-122.0	-118.0	-87.7
1955	88.6	15.1	-7.2	10.0	-34.4	-11.9	7.2	25.1	75.5	-40.8	-26.2	-16.6
1956	42.1	-1.0	6.5	-39.4	-50.3	-57.9	-38.6	-91.0	-27.7	-82.7	-11.8	-37.0
1957	277.0	25.2	265.0	183.0	187.0	118.0	155.0	160.0	223.0	94.4	184.0	180.0
1958	246.0	27.5	365.0	509.0	467.0	-15.2	36.6	156.0	197.0	247.0	20.3	46.8
1959	17.4	80.6	207.0	127.0	228.0	-103.0	-83.6	-165.0	74.5	93.6	123.0	6.9
1960	-218.0	-163.0	-80.2	-140.0	62.7	-231.0	-222.0	-278.0	-80.0	-73.0	-255.0	-288.0
1961	-127.0	-103.0	-112.0	-97.0	-80.	-115.0	-86.8	-130.0	-185.0	-47.2	-60.8	-70.1
1962	-242.0	-213.0	-244.0	-234.0	-223.0	-95.0	-87.3	-169.0	-265.0	-177.0	-104.0	-125.0
1963	-13.3	9.0	-64.3	-35.9	-47.4	89.3	122.0	107.0	-95.1	50.8	34.0	84.3
1964	-146.0	-84.6	-111.0	-165.0	-130.0	-37.9	-10.0	-54.7	-64.9	-62.6	22.8	9.9
1965	-32.6	39.1	3.2	-69.4	-31.1	86.8	120.0	104.0	131.0	91.7	97.5	115.0
1966	-127.0	-24.2	-28.7	-166.0	-93.9	-3.6	28.9	24.4	175.0	63.5	17.6	25.0
1967	31.3	146.0	134.0	-24.9	52.9	149.0	190.0	142.0	337.0	220.0	201.0	216.0
1968	-16.0	-6.9	27.4	-213.0	-89.0	-34.8	2.0	-61.1	335.0	41.0	82.9	51.6
1969	-323.0	-169.0	-163.0	-58.8	-61.5	-149.0	-112.0	-153.0	-124.0	-37.6	-63.0	-77.5
1970	-304.0	-166.0	-221.0	-230.0	-166.0	-36.7	-2.4	-107.0	-292.0	-136.0	-154.0	-72.3
1971	63.8	204.0	125.0	114.0	170.0	331.0	376.0	279.0	-77.4	240.0	233.0	345.0
1972	93.4	299.0	318.0	167.0	308.0	258.0	313.0	268.0	229.0	342.0	279.0	345.0
1973	-29.6	226.0	-426.0	54.0	-231.0	110.0	164.0	-27.3	52.2	65.0	118.0	179.0
1974	807.0	274.0	515.0	537.0	488.0	550.0	291.0	61.5	-541.0	168.0	652.0	64.4
1975	726.0	667.0	833.7	691.0	145.0	527.0	544.0	689.0	398.0	193.0	554.0	464.0
1976	-732.0	-714.0	-427.0	-735.0	-578.0	-1060.0	-1030.0	-910.0	-219.0	-803.0	-1090.0	-1130.0
1977	314.0	163.0	87.7	160.0	48.6	106.0	185.0	439.0	186.0	22.2	22.2	211.0
1978	41.5	-37.7	-1.9	-85.1	-100.0	0.1	25.6	127.0	465.0	-98.1	-5.31	36.1
1979	-44.8	-117.0	-96.5	151.1	18.6	335.0	-134.0	-55.3	-62.7	-428.0	-167.0	-82.4
1980	170.0	97.0	86.0	186.0	144.0	253.0	196.0	189.0	248.0	-51.3	11.3	146.0
1981	5.2	-27.0	11.4	26.0	32.6	-452.0	-390.0	-251.0	-491.0	1.6	-189.0	-47.9

TABLE 4 (Con't)

VENEZUELAN REAL DEFENSE EXPENDITURE: TREND ANALYSIS, RESIDUALS (ACTUAL - ESTIMATED)

	TREND VARIABLE											
	TIME	TIME DUMA	TIME DUMB	TIME DUMP	TIME DUMB DOMP	GEP	GEP DUMC	GRP	GRP DUMD DUMP	GDPNP	GCNP	GCNP DUMA
1982	-213.0	-239.0	-219.0	-214.0	-210.0	69.0	-26.4	182.0	117.0	37.1	56.7	20.7
1983	-209.0	-257.0	-308.0	-251.0	-293.0	-	-	-	-	229.0	219.0	132.0
r^2	0.752	0.892	0.938	0.853	0.927	0.360	0.443	0.322	0.961	0.858	0.729	0.566
F	94.07	124.27	229.7	87.36	114.79	16.87	11.15	14.24	221.86	188.50	83.48	19.54
DW	1.87	1.99	1.91	1.89	1.89	2.11	2.32	2.80	2.00	2.13	1.94	2.35

NOTES: Estimations made using Cochrane-Orcutt two stage iteration process for serial correlation; see text for definition of symbols.

( ) = t statistic
F = F statistic
DW = Durbin-Watson statistic
L = Variable lagged one year

TABLE 5

Determinants of Venezuelan Military Expenditures, 1950-82

Equation	Independent Variables									RHO	Statistics		
	GRP	GEP	GDPNP	GCNP	DUMA	DUMB	DUMC	DUMD	DUMP		r^2	F	DW
(1) MEP =	0.018 (3.77)									0.91 (12.78)	0.321	14.24	2.80
(2)		0.035 (4.10)								0.81 (7.95)	0.360	16.87	2.11
(3)			0.015 (13.28)							0.44 (2.79)	0.854	176.49	2.17
(4)				0.096 (8.71)						0.585 (4.08)	0.716	75.84	1.98
(5)	0.037 (14.64)								389.83 (4.41)	0.17 (0.98)	0.928	181.72	2.07
(6)		0.027 (3.04)					408.82 (2.97)			0.81 (7.96)	0.443	11.15	2.32
(7)		0.021 (2.01)						455.56 (2.05)		0.84 (8.96)	0.390	8.96	2.27
(8)			0.018 (10.19)				-364.58 (-2.05)			0.25 (1.47)	0.921	163.00	1.96
(9)				0.056 (2.62)	767.56 (2.22)					0.73 (6.11)	0.576	19.05	2.34
(10)				0.059 (2.59)				428.01 (1.80)		0.75 (6.51)	0.516	14.94	2.21

TABLE 5 (con't)

Determinants of Venezuelan Military Expenditures, 1950-82

Equation	Independent Variables								RHO	Statistics		
	MSGCP	GFBP	GDP	DUMA	DUMB	DUMC	DUMD	DUMP		r^2	F	DW
(1) MEP =	-0.027 (-3.39)								0.95 (17.90)	0.276	11.49	2.49
(2)		-0.029 (-2.24)							0.95 (17.92)	0.143	5.03	2.19
(3)			-0.018 (-1.71)	957.67 (3.47)					0.94 (16.79)	0.325	6.76	2.73
(4)			-0.022 (-1.86)					-317.50 (-1.86)	0.96 (21.35)	0.185	3.17	2.38
(5)	-0.021 (-2.35)						390.17 (1.87)		0.92 (13.53)	0.348	7.48	2.61
(6)		-0.028 (-2.54)		939.03 (3.62)					0.93 (14.43)	0.403	9.44	2.71
(7)		-0.037 (-3.32)					713.59 (3.98)		0.92 (13.72)	0.437	10.87	2.08
(8)		-0.038 (-3.22)						-404.88 (-2.79)	0.961 (19.92)	0.328	6.89	2.35

NOTES: Estimations made using Cochrane-Orcutt two state process for serial correlation correction; see text for definition of symbols:

( ) = t statistic
F = F statistic
DW = Durbin-Watson statistic

TABLE 6

DETERMINANTS OF VENEZUELAN MILITARY EXPENDITURES, 1950-1965

Equation	Independent Variables							RHO	Statistics		
	GRP	GEP	GDPNP	GCNP	GDP	MSGCP	DUMP		r^2	F	DW
(1) MEP =	0.084 (5.40)							0.43 (1.85)	0.691	29.16	1.74
(2)		0.084 (6.82)						0.75 (4.48)	0.781	46.61	1.64
(3)			0.021 (4.58)					0.68 (3.72)	0.617	21.01	1.61
(4)				0.096 (2.50)				0.83 (5.80)	0.325	6.28	1.80
(5)					0.056 (-2.31)			0.92 (9.77)	0.293	5.36	2.23
(6)						-0.11 (-5.40)	758.82 (9.56)	0.21 (0.81)	0.891	49.50	1.89
(7)	0.061 (3.38)						338.71 (3.04)	0.63 (3.20)	0.688	13.23	1.53
(8) •		0.10 (7.47)					-257.54 (-2.87)	0.85 (6.46)	0.840	31.60	1.87
(9)			0.019 (3.89)				211.35 (1.91)	0.76 (4.47)	0.636	10.52	1.73

NOTES: Estimations made using Cochrane-Orcutt two stage iteration procedure for serial correlation:

( ) = t statistic
F = F statistic;
r^2 = correlation coefficient;
DW = Durbin Watson statistic;
L = variable lagged one year.

TABLE 7

DETERMINANTS OF VENEZUELA MILITARY EXPENDITURES, 1966-1982

Equation	Independent Variables					RHO	Statistics		
	GRP	GEP	GDPNP	GCNP	DUMB		r^2	F	DW
(1) MEP =	0.033 (16.06)					-0.36 (-1.57)	0.948	258.03	2.11
(2)		0.033 (3.90)				0.44 (2.00)	0.521	15.26	1.88
(3)			0.012 (7.58)			0.13 (0.57)	0.804	57.54	1.98
(4)				0.076 (4.90)		0.32 (1.37)	0.632	24.02	1.88
(5)	0.025 (4.20)				413.41 (1.49)	-0.36 (-1.61)	0.955	130.12	2.27
(6)		0.014 (1.80)			1018.26 (3.41)	-0.17 (-0.69)	0.887	47.51	2.19
(7)			0.007 (2.41)		692.04 (1.95)	-0.17 (-0.72)	0.905	56.97	2.14
(8)				0.031 (1.82)	985.13 (3.14)	-0.21 (-0.89)	0.897	52.38	2.24

NOTES: Estimations made using Cochrane-Orcutt two stage iteration procedure for serial correlation:

( ) = t statistic
F = F statistic;
r^2 = correlation coefficient;
DW = Durbin Watson statistic;
L = variable lagged one year.

TABLE 7 (cont'd)

DETERMINANTS OF VENEZUELAN MILITARY EXPENDITURES, 1966-1982

Equation	Independnet Variables							RHO	Statistics		
	MSGCP	GFBP	GDP	GDEFP	DUMC	DUMD	DUMP		r^2	F	DW
(1) MEP =	-0.026 (-2.37)							0.83 (6.08)	0.287	5.63	2.50
(2)		-0.028 (-1.59)						0.85 (6.51)	0.154	2.55	2.28
(3)			-0.024 (1.50)				-481.08 (-2.07)	0.91 (9.27)	0.300	2.57	2.73
(4)	-0.022 (-2.85)				627.56 (4.73)			0.18 (0.75)	9.785	21.97	2.10
(5)				0.032 (1.89)			-561.55 (-2.41)	0.87 (7.35)	0.356	3.32	3.09
(6)		-0.035 (-2.27)				706.86 (3.24)		0.72 (4.18)	0.502	6.06	2.08
(7)		-0.045 (-3.01)					-624.47 (-3.09)	0.87 (7.39)	0.517	6.42	3.00

NOTES: Estimations made using Cochrane-Orcutt two stage iteration procedure for serial correlation:

( ) = t statistic
F = F statistic;
r^2 = correlation coefficient;
DW = Durbin Watson statistic;
L = variable lagged one year.

TABLE 8

VENEZUELAN MILITARY EXPENDITURE ELASTICITIES, 1950-1982

Equation	Independent Variables						RHO	Statistics		
	GRP	GEP	GDPNP	GCNP	GDP	DUMA		r^2	F	DW
(1)	0.33 (3.54)						0.89 (11.08)	0.295	12.56	2.24
(2)		0.64 (7.36)					0.78 (7.10)	0.643	54.24	1.95
(3)			0.87 (9.15)				0.69 (5.46)	0.736	83.84	2.11
(4)				0.71 (6.13)			0.76 (6.69)	0.556	37.59	2.06
(5)					-0.056 (-2.80)		0.92 (14.16)	0.208	7.88	2.23
(6)	0.94 (14.63)					-0.47 (-4.30)	0.17 (1.44)	0.944	236.24	1.92
(7)		0.59 (4.90)				0.05 (0.38)	0.80 (7.48)	0.615	22.44	1.97
(8)			0.97 (7.81)			-0.11 (-0.83)	2.62 (4.49)	0.818	63.15	2.04
(9)				0.47 (2.69)		0.19 (1.56)	0.83 (8.63)	0.404	9.51	2.06
(10)					-0.058 (-3.22)	0.30 (3.10)	0.91 (12.26)	0.394	9.11	2.50

NOTES: Estimations made using Cochrane-Orcutt two stage iteration procedure for serial correlation:

( ) = t statistic
F = F statistic;
r^2 = correlation coefficient;
DW = Durbin Watson statistic;
L = variable lagged one year.

TABLE 9

VENEZUELAN MILITARY EXPENDITURES ELASTICITIES, 1950-1965

Equation	Independent Variables						RHO	Statistics		
	GRP	GEP	GDPNP	GCNP	GDP	DUMP		r^2	F	DW
(1)	0.99 (8.12)						0.28 (1.13)	0.835	65.94	1.78
(2)		0.86 (5.95)					0.756 (4.46)	0.731	35.43	1.63
(3)			1.23 (4.67)				0.70 (3.91)	0.626	21.77	1.60
(4)				0.55 (1.93)			0.85 (6.34)	0.222	3.73	1.68
(5)					-0.056 (-3.05)		0.89 (7.71)	0.417	9.30	2.12
(6)	0.63 (3.56)					0.25 (2.50)	0.65 (3.35)	0.630	10.24	1.73
(7)		1.26 (9.16)				-0.22 (-2.51)	0.48 (2.15)	0.928	77.42	1.78
(8)•			1.18 (3.86)			0.14 (1.57)	0.76 (4.61)	0.604	9.15	1.67
(9)				0.66 (1.71)		-0.07 (-0.48)	0.86 (6.57)	0.230	1.79	1.65
(10)					-0.054 (-2.88)	0.053 (0.53)	0.887 (2.47)	0.427	4.48	2.13

NOTES: Estimations made using Cochrane-Orcutt two stage iteration procedure for serial correlation:

( ) = t statistic
F = F statistic;
r^2 = correlation coefficient;
DW = Durbin Watson statistic;
L = variable lagged one year.

TABLE 10

VENEZUELAN MILITARY EXPENDITURE ELASTICITIES, 1966-1982

Equation	Independent Variables								Statistics		
	GRP	GEP	GDPNP	GCNP	GDP	DUMB	DUMP	RHO	r^2	F	DW
(1)	0.48 (18.97)							-0.27 (-1.15)	0.962	359.9	2.13
(2)		0.56 (5.41)						0.42 (1.86)	0.676	29.27	1.82
(3)			0.72 (9.32)					0.12 (0.52)	0.861	86.97	1.92
(4)				0.63 (6.31)				0.30 (1.30)	0.740	139.92	1.81
(5)					-0.05 (-0.63)			0.87 (7.08)	0.027	0.40	2.17
(6)		0.33 (2.70)				0.20 (1.75)		0.08 (0.34)	0.859	36.83	1.94
(7)				0.35 (2.48)		0.25 (2.25)		-0.11 (-0.42)	0.903	56.12	2.09
(8)					0.036 (0.92)	0.46 (5.86)		-0.17 (-0.69)	0.881	44.45	2.26

NOTES: Estimations made using Cochrane-Orcutt two stage iteration procedure for serial correlation:

( ) = t statistic
F = F statistic;
r^2 = correlation coefficient;
DW = Durbin Watson statistic;
L = variable lagged one year.

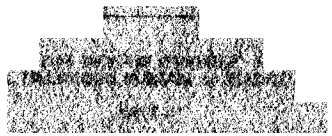

TABLE 11

VENEZUELAN DEFENSE EXPENDITURE RESPONSE TO DEFENSE EXPENDITURES IN SELECTED LATIN AMERICAN COUNTRIES, 1955-1982

Equation	Peru Defense Expenditure (PMEP)	Mexico Defense Expenditure (GMEP)	Colombia Defense Expenditure (CMEP)	Ecuador Defense Expenditure (BMBP)	Brazil Defense Expenditure (BMEP)	Venezuelan Defense Expenditure Lagged (VMEPL)	Ecuador Defense Expenditure (EMEP)	RHO	Statistics r^2	F	DW
Venezuelan Military Expenditure (VMEP) =	0.003 (1.73)							0.86 (8.81)	0.111	3.02	1.85
		-0.08 (-1.83)						0.95 (15.86)	0.112	3.35	2.02
			-0.01 (-0.41)					0.92 (12.57)	0.007	0.17	2.22
				0.22 (2.39)				0.87 (9.04)	0.193	0.159	5.75
					-0.003 (-0.50)			0.93 (13.14)	0.011	0.257	2.17
						0.42 (13.68)	0.08 (2.21)		0.916	0.916	1.46

NOTES: Estimations made using Cochrane-Orcutt two stage iteration procedure for serial correlation:

( ) = t statistic
F = F statistic;
r^2 = correlation coefficient;
DW = Durbin Watson statistic;
L = variable lagged one year.

TABLE 12

Determinants of Military Expenditures, Selected Latin American Countries, 1955-1983,
Trend Analysis

Equation		Trend Variables TIME	DUMA	DUMB	DUMC	DUMD	RHO	Statistics r^2	F	DW
Venezuela										
(1)	MEP =	120.01					0.52			
		(6.89)					(3.19)	0.664	47.58	1.81
(2)		71.97	913.82				0.30			
		(4.45)	(3.86)				(1.60)	0.880	81.11	1.93
(3)		70.27		963.51			-0.09			
		(5.56)		(4.91)			(-0.51)	0.939	172.22	2.01
(4)		87.96			357.07		0.50			
		(3.48)			(1.64)		(2.91)	0.723	28.72	1.89
(5)		80.81				454.25	0.53			
		(3.21)				(2.06)	(3.18)	0.712	27.21	1.89
Columbia										
(6)		384.87					0.66			
		(1.74)					(4.59)	0.110	3.05	1.70
(7)		972.38		-11623.0			-0.13			
		(9.46)		(-7.26)			(-0.67)	0.799	43.79	2.10
Ecuador										
(8)		190.56					0.52			
		(5.54)					(3.18)	0.561	30.79	2.24
(9)		92.93	1873.34				-0.07			
		(3.87)	(4.92)				(-0.37)	0.907	107.45	1.93
(10)		113.71		1395.62			0.19			
		(3.25)		(2.65)			(0.96)	0.816	48.89	2.00

TABLE 12 (con't)

Determinants of Military Expenditures, Selected Latin American Countries, 1955-83
Trend Analysis

Equation	Trend Variables						RHO	Statistics		
	TIME	DUMA	DUMB	DUMC	DUMD	DUMW		r^2	F	DW
Peru										
(11)	13491.6 (5.71)						0.64 (4.26)	0.576	32.62	1.82
(12)	11173.6 (4.12)	31200.3 (0.88)					0.54 (3.30)	0.673	22.67	1.72
Brazil										
(13)	1717.0 (1.35)						0.69 (4.63)	0.077	1.84	2.23
(14)	3942.5 (3.22)			-17816.5 (1.85)			0.45 (2.53)	0.363	5.71	2.13
(15)	3904.0 (3.15)				-18792.4 (-1.89)		0.50 (2.83)	0.339	5.14	2.13
Mexico										
(16)	685.93 (13.07)						0.37 (2.06)	0.876	171.06	1.63
(17)	865.71 (7.64)	-2479.6 (-1.86)					0.62 (4.10)	0.770	36.86	1.84
(18)	665.04 (7.45)		390.89 (0.31)				0.38 (2.11)	0.874	76.73	1.63
Argentina										
(19)	575.66 (2.77)					8050.54 (8.39)	0.88 (10.02)	0.815	53.04	1.32
(20)						8358.8 (8.55)	0.97 (22.30)	0.745	73.14	1.24

NOTES: Estimations made using Cochrane-Orcutt two state process for serial correlation correction; see text for definition of symbols:

( ) = t statistic
F = F statistic
DW = Durbin-Watson statistic

TABLE 13

VENEZUELA: GOVERNMENT REVENUE DETERMINANTS OF THE DEVIATIONS FROM THE HISTORICAL TREND IN DEFENSE EXPENDITURE, 1950-1982

Equation	Measures of the Deviation of Revenues from the Historical Trend in Government Revenues							RHO	Statistics		
	GRPDT	GRPDTCP	GRPDTC	GRPDTP	GRPDTCD	GRPDTCL	GRPDTL		r^2	F	DW
(1) MEPDT =	0.04 (3.02)							0.017 (0.095)	0.240	9.16	1.99
(2)		0.02 (2.52)						-0.039 (-0.22)	0.180	6.36	1.99
(3)			0.03 (5.37)					-0.40 (-2.44)	0.499	28.90	2.04
(4)				0.02 (3.51)				-0.20 (-1.12)	0.299	12.36	2.03
(5)					0.03 (4.65)			-0.39 (-2.40)	0.427	21.66	2.02
(6)						0.02 (2.98)		-0.08 (-0.50)	0.241	8.93	1.93
(7)							0.02 (2.86)	-0.13 (-0.73)	0.227	8.20	1.99

NOTES: Estimations made using Cochrane-Orcutt two stage iteration process for serial correlation; see text for definition of symbols

( ) = t statistic
F = F statistic
DW = Durbin-Watson statistic
L = Variable lagged one year