RECENT TRENDS IN LDC
MILITARY EXPENDITURES

by

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ABSTRACT

Several alarming and largely ignored trends in the size and structure of military expenditure of less developed countries (LDCs) have appeared during the past quarter century. New, fuller, and better data series permit us to discern four of these recent trends sufficiently clearly to call them "stylized facts" of the contemporary development process: (1) LDC defense expenditures have been rising as a fraction of GDP; (2) the capital-cost component of this spending has been rising relative to the operating-cost component; (3) the portion of the LDC population serving in the armed forces has been increasing; and (4) LDC military wages have been rising relative to civilian wages.

RESUME

La taille et la structure des dépenses militaires des pays en développement montrent, pendant les 25 dernières années, plusieurs tendances alarmantes et généralement négligées. Des séries de données nouvelles, plus complètes et de meilleure qualité, nous permettent de constater quatre tendances récentes d'une façon suffisament claire pour les appeller des "faits stylisés" du processus de développement contemporaire: (1) Les dépenses des pays en développement pour la défense sont en augmentation comme fraction du PNB; (2) la composante de cette dépense représentée par le coût d'investissement est en augmentation relativement à la composante des charges de fonctionnement; (3) dans les pays en développement, la partie de la population qui se trouve dans les forces armées est en croissance; (4) les salaires militaires dans les pays en développement sont en augmentation relativement aux salaires civils.

"The cheap defense of nations ... gone."

Edmund Burke

I. INTRODUCTION

In the rush to examine and cross-examine Emile Benoit's (1973, 1978) conjectures about the relationship of military expenditure and real output growth in less developed countries (LDCs), economists have largely ignored several alarming trends in the size and structure of such spending over the past quarter century. New, fuller, and better data series now permit us to discern four of these trends, perhaps sufficiently clearly to call them "stylized facts" of the contemporary development process:

1. LDC defense expenditures have risen as a fraction of GDP in the 1970s. For typical LDCs, such expenditures were less than 3% of GDP in the 1950s and 1960s but rose to 4% by 1980 (Section II).

2. The capital-cost component of LDC military spending, after falling relative to operating costs in the 1960s, rose rapidly in the 1970s. For typical LDCs, equipment costs comprised less than 12% of total costs over the 1950s and 1960s but had reached nearly 20% of total costs by 1980 (Section III).

3. The fraction of the LDC population serving in the armed forces has also risen rapidly in the 1970s. On average, in the 1960s, only one third of one percent of the population was in the military; by 1980, the percentage had reached nearly one half of one percent (Section IV).

4. The LDC military "wage" — more precisely, the operating (i.e. non-capital) costs per warrior relative to civilian income per capita — rose dramatically in the 1970s after falling in the 1960s. Although the evidence differs somewhat for different regions of the Third World, the typical LDC lowered the relative military "wage" by 20% in the 1960s only to raise it back up by that 20% in the 1970s (Section V).

The data used are from Nicole Ball (1983) of the National Defense Research Institute of Stockholm and contain observations from 48 LDCs for various years over the period, 1950-80.[1] The regressions reported here are simply time trends, with the dependent variables being percentage deviations from overall own-country means, to allow for country-specific factors. It cannot be emphasized too strongly that the results tell us nothing about determinants, only about trends. They are subject to all the questions always raised by the use of such cross-country, cross-time data. Nevertheless, the trends are sufficiently manifest to suggest the above four stylized facts. These are derived and discussed, in turn, in Sections II-V, and the relationship between the four is examined, at the end, in Section VI.

II. TOTAL SECURITY EXPENDITURES

The total national defense expenditures of LDCs are not easy to estimate and, once estimated, are not of much interest by themselves. To be compared with those of other years, they must be deflated for price changes, and the usually available consumer, wholesale and national product price indices may provide poor substitutes for the usually unavailable deflator for the military bundle of goods and services. To be compared with those of other countries, they must be converted to a common currency (usually to U.S. dollars), and the problems of using official exchange rates or purchasing-power-parity estimates are legion, well known, and especially serious for LDCs.

A sensible, if partial, way out of these difficulties is to calculate total security expenditures as a fraction of GDP (hereafter called TSE/GDP). This is only a partial escape from difficulties for two reasons. One, interpretation of the ratio as a relative real resource flow is implicitly equivalent to using the same price deflator in both numerator and denominator. And two, comparison of the ratio across countries or across time implicitly assumes an income elasticity of demand for national security of unity as the basis for such comparisons.

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1. In certain of the regressions below, these data are supplemented with information from the World Bank (IBRD, 1983) and from the U.S. Arms Control and Disarmament Agency (ACDA, various years).

The ratio, TSE/GDP, ranges in Ball's sample from barely above zero up to one fourth (for Jordan in the 1970s). It exceeds 10% persistently for only two countries, Jordan in the 1970s and Saudi Arabia from the mid-1960s to the mid-1970s. For the entire sample of 787 observations, the mean value of the ratio, TSE/GDP, is 3.0%.

In an effort to look for trends among countries that vary so greatly in their average propensity to spend on national security, the percentage deviation of TSE/GDP from its own-country mean is calculated for each country in each year for which Ball provides data. These deviations are then regressed on time and time squared, for the entire sample and for each of the four regions separately.[2] The regression statistics are shown in Table 1; and the regression curves are graphed in Figure 1.[3]

For the entire sample of countries, and for countries in the Asian and Latin American sub-samples, the ratio, TSE/GDP, was stable through the 1950s and 1960s, falling slightly in the 1950s and rising slightly in the 1960s. But it rose rapidly in the 1970s, with the trend value of TSE/GDP reaching 30-35% above country means by 1980.[4] For a typical LDC, for which TSE averaged less than 3% of GDP in the 1950s and 1960s, TSE had risen to 4% of GDP by 1980.

This pattern is not followed by the other two regional samples. The Middle East sample contains only two countries (Jordan and Saudi Arabia), for only one of which are there data for the late 1970s (Jordan); the shape of the Middle East regression in the 1970s thus reflects the idiosyncrasies of that one country.

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2. The regional groupings are those selected by Ball.

3. The horizontal axis of all of the graphs shown here is (Year-1980), the same time variable that appears in the regressions. The graphs are only shown for the years in which there is at least one observation in the relevant sample.

4. The definition of the independent variables makes the constant term of each regression the estimated 1980 value of the dependent variable.

Table 1

Regression Trends of TSE/GDP

Regression[1,2]	Entire Sample	Regional Samples			
		Africa	Asia	Latin America	Middle East
Constant	0.286 (0.277)	0.0925 (0.311)	0.294 (0.256)	0.359 (0.258)	-0.379** (9.122)
Year	0.0357** (0.00485)	-0.00968 (0.0137)	0.0392** (0.00832)	0.0469** (0.00703)	-0.130** (0.0188)
Year Squared	0.000759** (0.000166)	-0.00133* (0.000582)	0.000917** (0.000285)	0.00112** (0.000230)	-0.00715** (0.000859)
N	787	235	223	305	24
R^2	0.152	0.140	0.182	0.212	0.813
D of F	737	216	207	288	20

Notes:
1. The dependent variable is the percentage deviation of TSE/GDP from its sample own-country mean.

2. "Year" is calendar year minus 1980 (and "year squared" the square of calendar-year-minus-1980). Standard errors are in parentheses. * indicates significance at 95%, ** at 99%.

The African regression is more noteworthy, since there are 17 countries in that sample. In Africa, the rapid rise in TSE/GDP occurred in the 1960s, and the ratio stabilized in the 1970s. Cross-country regressions like these are not the place to locate motivations and income elasticities, but one might want to note that sub-Saharan Africa not only experienced low growth rates in the 1970s but also lower growth rates then than the 1960s.

III.   MILITARY CAPITAL COSTS

The disaggregation of military expenditure into its current and capital components is not always feasible, and the Ball sample falls from nearly 800 to 700 observations on this account. Not only is the breakdown, in Ball's words, "perhaps not entirely accurate" (Ball, 1983, p. 37), but the totals of the two categories do not always add to the figure for total security expenditure

(TSE). The reasons are two: 1) some military expenditures are classified by Ball as "R&D", an infrequent and always small category in LDCs; and 2) expenditures that "could not be disaggregated" (ibid.) are included in the totals but not in the components. This latter problem is neither infrequent nor small, but its effect on the regressions turns out to be slight.[5]

Data problems notwithstanding, Ball's work in dividing military expenditures into "operating costs" (O) and "capital costs" (C) is especially suggestive for the analysis of LDC security costs. Much of the Benoit controversy over the impact of military expenditure on growth rates hinged on the question whether military expenditure deflected resources from investment or enhanced private capital formation by productively utilizing relatively low-cost resources. While hardly a perfect measure of this, the Ball division of expenditures gets at this distinction. Military capital costs are likely to require scarce foreign exchange or skilled labor, while operating costs are more likely to reflect the direct use of unskilled labor or the acquisition of domestic goods produced with relatively less skilled labor.

The trends examined here are those in the ratio of capital costs to the total of operating and capital costs (C/(O+C)). The importance of country-specific factors in this ratio is great — the overall sample average of C/(O+C) is 12%, but for Iran in the mid-1970s it rose above 70%, and for many other countries it was consistently close to zero.[6] Because such country-specific factors are important, the percentage deviation of this ratio from the country's own mean ratio is calculated for each country and for each year for which data are available. This percentage deviation is regressed on time and time squared.

The trend regressions are shown in Table 2, and the regression curves pictured in Figure 2. For the entire sample and for each of the regions, a U-shaped curve appears. C/(O+C) is above the country average in the 1950s, below in the 1960s, and again above in the 1970s.[7] LDC

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5. This is discussed in Section VI.

6. For nearly one fifth of the observations, the ratio was less than 2%.

7. For each of the regressions, R^2 is low but the year and year-squared coefficients are almost all highly significant (the exception is again Africa).

militaries were becoming much more capital-intensive in the 1970s. The typical LDC, which averaged spending barely 12% of its military budget on equipment over the 1950s and 1960s, was spending nearly 20% by 1980.

Table 2

Regression Trends of C/(O+C)

| Regression[1] | Entire Sample[3] | Regional Samples[2] | | |
		Africa	Asia	Latin America
Constant	0.475 (0.723)	0.220 (0.664)	0.354 (0.648)	0.574 (0.817)
Year	0.0839** (0.0134)	0.0201** (0.00746)	0.0736** (0.0223)	0.0963** (0.0242)
Year Squared[4]	0.00271** (0.000468)	--	0.00256** (0.000746)	0.00298** (0.000818)
N	700	227	200	263
R^2	0.0538	0.0410	0.0565	0.0589
D of F	652	209	185	246

Notes:
1. The dependent variable is the percentage deviation of C/(O+C) from its sample own-country mean.

2. For the definition of "year" and "year squared", see Table 1, note 2. Standard errors are in parentheses. * indicates significance at 95%, ** at 99%.

3. The Middle East sample contains only one country (with 10 years of observations) and is omitted here as a region but included in the entire sample.

4. Omitted (—) if not significant at 95% when included.

The purpose here is to expose stylized facts, not to explain them, but two observations are irresistible.

One, the upturn in the ratio, C/(O+C), occurred at about the same time that the arms transfer procedures of advanced countries changed. Grants for equipment purchase, which do

not show up in the LDC capital-cost figures, gave way to sales.[8] Moreover, the transfer of old, used, or obsolete equipment gave way to the sale of more expensive equipment embodying new technology. Both of these changes may well have contributed to the rise of $C/(O+C)$ in LDCs in the 1970s, quite independently of any shift in LDC preferences toward a more capital-intensive military establishment.[9]

And two, much of the history of the Benoit-inspired controversy about the relation of military expenditures and growth rates in LDCs may be capable of interpretation through this U-shaped trend of $C/(O+C)$ (Benoit, 1973 and 1978). Benoit's data were largely drawn from the mid-1950s to the mid-1960s, a period when LDCs were increasingly incurring operating costs rather than capital costs in their military spending. If such expenditure did not augment growth, it may at least have minimized the adverse effects of such spending on growth by drawing on low-opportunity-cost resources. By the 1980s, when the challenges to Benoit's hypothesis were springing up widely, the data were coming from the 1970s — when LDC military expenditures were increasingly capital-intensive.[10]

IV.   MILITARY PERSONNEL

The importance of national security in a country's labor force allocation is most easily measured by the ratio of armed forces personnel to total population. Even in this straightforward measure, however, there are difficulties. Neither the very young nor the very old are eligible for military duty — nor, in many countries, are women — so total population is not the proper denominator for such a ratio. This we ignore for simplicity. The other difficulty is that the armed forces are only part of the total labor allocated to national security. Unfortunately, it will have to do since estimates, comparable across countries and across time, are not yet collected for the numbers of police and other paramilitary personnel.

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8. Often on soft-interest and deferred-payment bases, which also reduce the LDC figures but not by so much.

9. For history and discussion of the move from grants to sales and from old to new, see Mosley (1985) pp. 140 ff, Nincic (1982) pp. 144 ff, Graves and Hildreth (1985) Chapter 1, Labrie et al. (1982), and Klare (1984) pp. 40 ff.

10. For a review of the testing of Benoit's hypothesis, see Grobar and Porter (1987).

The ratio of armed forces personnel to population, Pers/Pop, is again calculated as a percentage deviation of each available observation from its own-country mean. The regressions on time and time squared are shown in Table 3, and the regression curves are pictured in Figure 3. For all except the Middle East — with but two countries and 21 observations — the trend is significantly upward. For Asia, there is little change in the ratio for the 1960s, but there is an accelerated upward movement in the 1970s.

Table 3

Regression Trends of Pers/Pop

Regression[1]	Regional Samples				
	Entire Sample	Africa	Asia	Latin America	Middle East
Constant	0.224 (0.385)	0.364 (0.484)	0.543 (0.369)	0.0779 (0.263)	-0.299** (0.0797)
Year[2]	0.0232** (0.00296)	0.0367** (0.00644)	0.108** (0.0226)	0.00792* (0.00326)	-0.0983** (0.0154)
Year Squared[2,3]	--	--	0.00406** (0.00114)	--	-0.00581** (0.000821)
N	616	212	158	225	21
R^2	0.0905	0.134	0.212	0.0257	0.747
D of F	568	195	143	209	17

Notes:
1. The dependent variable is the percentage deviation of the ratio, (military) Personnel divided by (total) Population, from the sample own-country mean.

2. See Table 1, note 2.

3. Omitted (—) if not significant at 95% when included.

The average ratio of armed forces personnel to population for the entire sample is less than 0.40% (the ratio reaches as high as 3%, for Jordan in the early 1970s). Thus, for a typical country, the regression for the entire sample suggests that the ratio has risen from 0.30% in 1960 to 0.47% in 1980 — a rise in the ratio of more than one half over the past two decades.

V.   THE RELATIVE MILITARY "WAGE"

The military wage rate in LDCs, relative to the average civilian wage rate, is not widely collected information and so to discuss it requires first a search for a reasonable proxy.[11] The proxy used here, called the relative military "wage" — in quotation marks throughout to remind us of its inadequacies — is the ratio of military operating costs per warrior to the nation's GDP per capita. For (sort of) short, this is written (Op C/Pers)/(GDP/Pop).

This proxy ratio — technically (Op C/Pers)/(GDP/Pop) but called the military "wage" — will be proportional to the true average military wage rate if three conditions are fulfilled within each of the LDCs considered in the sample: 1) the civilian wage share of total national output is constant over time; 2) the labor force is a constant fraction of the population; and 3) military wage payments are a constant fraction of total military operating costs.[12] A few words on each are appropriate:

1. Studies of the functional distribution of income indicate that the wage share of national output changes slowly in most countries. For the less than one third of a century examined here, constancy is not an unreasonable assumption. But the wage share does rise over longer periods of development and may have risen over 1950-80 as the LDCs in this sample have grown. To that extent, movements of the measured military "wage" will provide an upwardly biased estimate of the true average military wage.

2. The ratio of the labor force to population also moves slowly for most countries. Its movement depends on the labor-force participation preferences of working-age persons and on the dependency ratio (i.e. the ratio of the numbers of the very young and the very old to the total population). Examination of these trends indicates that, for most LDCs, the ratio of labor force to population has declined over the past 30 years, largely due to the rapid population growth and the

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11. This entire section refers to the average military wage rate. A change in the hierarchical structure of the military will change this even with no change in any military pay rates.

12. The first and second of these three conditions could be avoided by using some average (say, industrial) wage rate as the denominator (in place of GDP/Pop). While it is easy to find such series for most LDCs, it is not easy to be sure that they are comparably calculated across countries.

resulting growth in the fraction of children in the population. This also will mean that movements of the military "wage" will provide an upwardly biased estimate of the true average military wage.

3. The "operating cost" data collected by Ball (1983) include not only wage payments but also other non-capital expenditures. To the extent that these latter are non-wage income "perks" — such as food, housing, clothing, and off-duty transport — we want them counted into the true military wage. But to the extent that they involve non-consumption operating costs — such as on-duty transport and ammunition — we should exclude them. If military wage payments, broadly construed, are a rising fraction of total operating costs, then movements of the measured military "wage" will provide a downwardly biased estimate of the true military wage; if military wages are a falling fraction of total operating costs, the "wage" will provide an upwardly biased estimate. I suspect the latter tendency but on the basis of little real evidence.

Movements in the relative military "wage" — i.e. (Op C/Pers)/(GDP/Pop) — probably overstate the true movements of average military wage rates relative to civilian wage rates. But we will proceed on the assumption that the bias is small enough to be ignored. Only the quotation marks around the word, wage, will remain to remind us.

The trends of the military "wage" are reported in Table 4 and displayed in Figure 4, for the entire sample and for each of the regions. The shapes of these trends across the different regions are quite different — for the first time in these pages. The relative "wage" has fallen steadily in Africa, risen steadily in Latin America, and exhibited a steep U-shape in Asia.[13] The entire sample shows a milder U-shape. The trends in each of the regions are consistent with the conjecture that, for the first 20 years or so after independence, LDCs reduce the military wage to move it from the previous colonial structure toward greater consistency with their own post-independence wage structures. Then the relative military wage begins once again to rise.

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13. The Middle East consists in this sample of but one country and is omitted as a separate region.

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Such a rise in the relative military wage may simply reflect increased risk or increased need for loyalty. But it does not necessarily mean that the same structure of warriors is increasingly well-paid relative to civilians. At least two other explanations leap forth as possibilities. One, the LDC militaries are becoming increasingly hierarchical. An ever higher ratio of chiefs to braves will raise the average wage with no change in particular wage rates. And two, the increased capital intensity of the LDC militaries has demanded a more highly skilled personnel to operate and maintain it. The higher average military wage may simply reflect the replacement of low-wage unskilled workers with high-wage skilled workers.

Table 4

Regressions Trends of Military "Wage"

Regression[1,2]	Entire Sample	Regional Samples[3]		
		Africa	Asia	Latin America
Constant	0.141 (0.401)	-0.169 (0.342)	0.158 (0.525)	0.216 (0.319)
Year	0.0465** (0.0135)	-0.0168** (0.00495)	0.0942** (0.0345)	0.0217** (0.00420)
Year Squared[4]	0.00255** (0.000688)	--	0.00625** (0.00173)	--
N	532	185	129	208
R^2	0.0288	0.0595	0.150	0.115
D of F	486	168	115	192

Notes:
   1. The dependent variable is the percentage deviation from its own-country mean of (Op C/Pers)/(GDP/Pop).

   2. See Table 1, note 2.

   3. The Middle East sample contains only one country (with 10 years observations) and is omitted here.

   4. Omitted (—) if not significant at 95% when included.

VI. INTERRELATIONS OF THE TRENDS

In each of the previous four sections, some way of looking at military expenditure in LDCs has been examined for trends. In each, evidence of a disturbing trend has been uncovered. The exposure of these possible stylized facts has been the main purpose of this paper.

Here, we will go a bit further, comparing the trend regressions of the different sections to assess the relative quantitative importance of these different aspects of the growing militaries of LDCs. To do this, compare the percentage growth rate in 1980 implied by each of the regressions of each of the previous four sections. To calculate the 1980 percentage growth rate of any variable (X), consider the basic trend regression (without error term):

$$\frac{X_{it} - \bar{X}_i}{\bar{X}_i} = \hat{a}_0 + \hat{a}_1(t-1980) + \hat{a}_2(t-1980)^2, \tag{1}$$

where i represents country and t time. (For some regressions, $\hat{a}_2$ is insignificant and omitted.) Then,

$$\frac{dX_{it}}{dt} \quad (\text{for } t = 1980) = \hat{a}_1\bar{X}_i \quad \text{and} \tag{2}$$

$$X_{it} \quad (\text{for } t = 1980) = (1 + \hat{a}_0)\bar{X}_i \quad ; \tag{3}$$

and hence the estimated 1980 growth rate of X_i is

$$\hat{a}_1/(1 + \hat{a}_0).$$

These growth rates are shown in Table 5.

Table 5

1980 Growth Rates of Military Ratios Implied by the Regressions

Ratio Variable[1]	(Section Discussed)	Entire Sample	Regional Samples[2]		
			Africa	Asia	Latin America
Total Security Expenditure	(II)	2.78%	-0.89%	3.03%	3.45%
Military Capital Costs	(III)	5.69%	1.65%	5.44%	6.12%
Military Personnel	(IV)	1.90%	2.69%	7.00%	0.73%
Military "Wage"	(V)	4.08%	-2.02%	8.13%	1.78%

Notes:
1. The definitions of the ratios (by section discussed):

II.   TSE/GDP;
III.   C/(O + C);
IV.   Pers/Pop; and
V.   (Op C/Pers)/(GDP/Pop).

2. Middle East omitted throughout this table.

Source: Regressions of Tables 1-4.

For the entire sample, and for the two regions except Africa, the ratio of capital to total military expenditures was rising at a rate above 5% per annum in 1980. In Asia, the ratio of military personnel to population and the ratio of the average military "wage" to the overall average wage were both rising at rates of 7-8% in 1980. Only in Africa was the ratio of total security expenditures to GDP falling; elsewhere, this ratio was rising at a rate above 3% in 1980. Almost throughout the less developed world, these indicators of relative allocations to defense were rising at rates of 2% to 8% per annum by 1980.

The numbers are high, and alarming, but they are only estimates; and the magnitudes of the standard errors of the constant terms in the regressions mean that they are only very rough estimates. One consistency check can be utilized to make this warning clear. The four ratios

examined separately in Sections II-V are — as alert readers may have noticed — not independent of each other. Algebraic manipulation shows that

$$
\left[\frac{TSE}{GDP} \right] = \frac{\left[\dfrac{Op\ C/Pers}{GDP/Pop} \right] \cdot \left[\dfrac{Pers}{Pop} \right]}{1 - \left[\dfrac{C}{O + C} \right]} , \qquad (4)
$$

provided that (O + C) = TSE, as in principle it should.[14] In fact, (O + C) is often smaller than TSE because expenditures that Ball was unable to allocate were included in TSE but neither in O nor in C. Ignoring this, differentiating (4), and evaluating it at 1980 estimated values, one reaches a 1980 growth rate identity:

$$
G\left(\frac{TSE}{GDP}\right) = G\left(\frac{Pers}{Pop}\right) + G\left(\frac{Op\ C/Pers}{GDP/Pop}\right) + \frac{\left(\frac{C}{O+C}\right)}{1 - \left(\frac{C}{O+C}\right)} \cdot G\left(\frac{C}{O+C}\right) \qquad (5)
$$

where G(.) means estimated 1980 percentage growth rate of the parenthetical ratio. The estimates of the two sides of equation (5) are shown in Table 6. The right-hand side is higher in every sample except that for Latin America, where the estimates are nearly identical.[15] This second estimate in Table 6 of the same variable — the growth rate in 1980 of TSE/GDP – reemphasizes the roughness of these trend calculations but offers no suggestion that the earlier estimates were too high.

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14. Almost — remember, R&D expenditures are excluded from (O + C) but not from TSE; but such R&D is small in LDCs. See Ball (1983) passim.

15. A part of the difference, but not as much as one percentage point in any of the four samples, can be attributed to the failure of (O + C) to equal TSE. Ironically, despite ever improving LDC data services, Ball experienced increasing rather than decreasing difficulty over 1950-80 allocating TSE between O and C.

Table 6

Consistency Checks on Regression Trends

Sample	Side of Equation (5)	
	Left-Hand	Right-Hand
Entire	2.78%	6.75%
Africa	−0.89%	0.89%
Asia	3.03%	15.88%
Latin America	3.45%	3.35%

Note:
> The weight on the final term of equation (5) is .1364,
> the overall sample average of the value, for each of
> the four samples.

Source: Table 5.

APPENDIX: DATA

The principal source of the data is Ball (1983). The data sources and problems are described fully there and hence need only brief discussion here. The data cover 48 less developed countries (LDCs) and various years over the period 1950-80. These were the countries for which "it was possible to obtain data ... which covered much of that period" (Ball, 1983, p. 34). In principle, this provides 1,488 observations on national security expenditures; in fact, Ball presents quantitative information for total security expenditure in only 769 cases.[16]

There are two advances made by this data effort — beyond the sheer number of LDCs and years covered:

1. Security expenditures are disaggregated. The principal disaggregation is between operating (i.e. current) and capital (i.e. equipment) costs. (This distinction is utilized in Sections III and V.) The exact distinction is inevitably fuzzy, especially where rapidly depreciating or obsolescing military equipment is involved.

2. The security expenditure data are checked against the other usual sources and as a result presumably represent the best, qualitatively as well as quantitatively, that are available to us in the mid-1980s.[17]

No doubt there is bias in this expenditure data. One, since many LDCs are reluctant to broadcast the structure and extent of their military forces, there is direct under-reporting, with many expenditures being hidden, reported as non-military, or paid for by off-budget agencies. And two, military gifts from abroad and military purchases with payments deferred are rarely

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16. "The only criterion used in choosing the data presented ... [was] availability" (Ball, 1983, p. 35).

17. The usual sources are three: i) the U.S. Arms Control and Disarmament Agency (ACDA); ii) the International Institute of Strategic Studies (IISS); and iii) the Stockholm International Peace Research Institute (SIPRI). Security expenditure data are available from these three sources for comparison purposes since 1961, 1972, and 1952, respectively.

included in LDC budget statements.[18] Thus, the Ball figures for security expenditures must be recognized as lower-bound, at best.

Whether the downward bias has increased or decreased over time is unclear. Military gifts have become less common over the period, 1950-80, but low-interest deferred payments more common. The trends of "hidden expenditures" are quite unknown. The text implicitly assumes that the extent of the bias has not changed (or has increased, in which case the trends uncovered in the text are even more alarming).

Ball collected the data for each LDC from the country's own sources. Thus, neither the concepts nor the practices of data collection are comparable across countries. There is also incomparability across years within countries, but to a much smaller degree. Thus, all the calculations of the text deal with each variable's percentage deviation from its own-country mean (across all the years available for that country for that variable). This all but eliminates the risk that the estimated trends arise through coincidental appearance and disappearance of particular countries in the sample.

The regressions of the text utilize three data series from sources other than Ball:

1. GDP, from IMF (1981).[19]

2. Military personnel, from ACDA (various years). These data are for armed forces personnel only and do not include police or other para-military personnel. The data are not available before the 1960s.

3. Population, from IBRD (1983).[20]

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18. Such gifts and purchases are in principle, counted as expenditures by the donor (or lending) country. From one viewpoint, this treatment is quite correct — it avoids global double-counting. But even gifts impose burdens, and the result here is under-reporting of military resource allocation.

19. Some of the GDP data are taken from other sources. Exact source for each country and year is reported in Ball (1983).

20. Data for Guyana from IMF (1981). Intra-quinquennial figures are interpolated log-linearly.

In each section of the text, all observations are utilized for which all the needed data are available in these sources. Data absences account for the different number of observations in the regressions of the different sections.

FIGURE 1
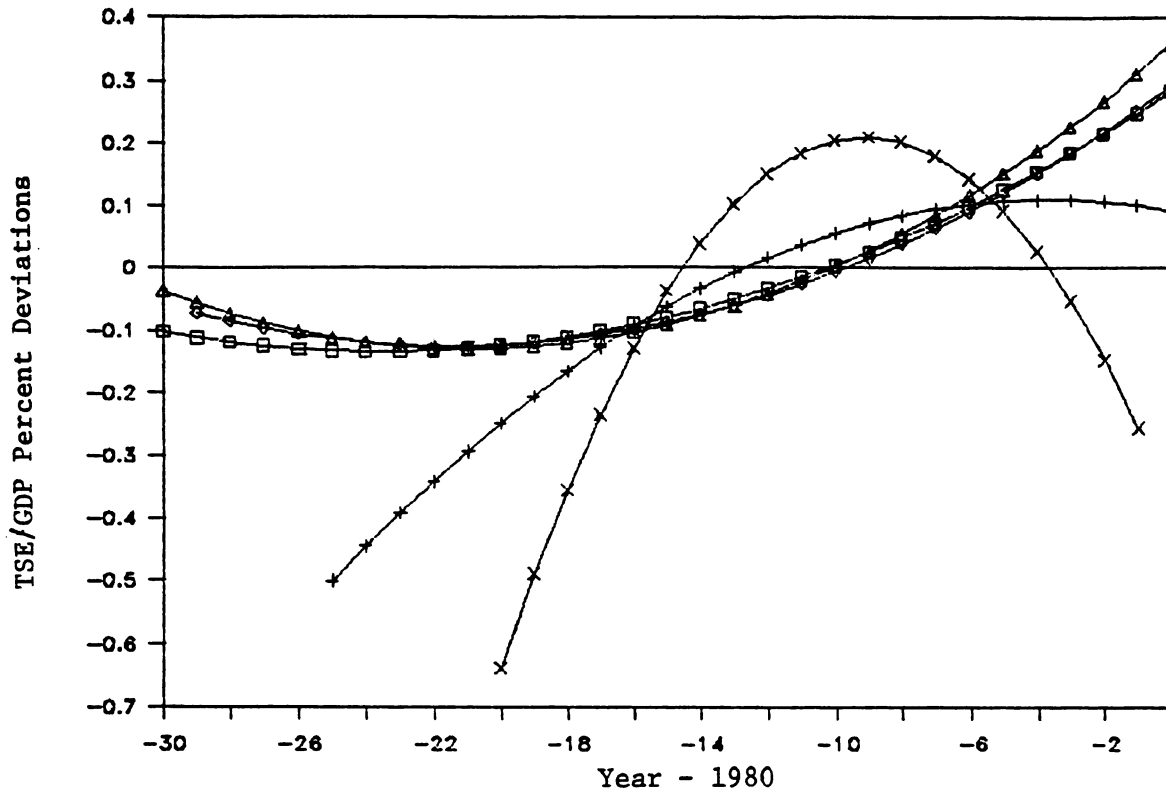
TSE/GDP Percent Deviations

Year - 1980

□ Entire Sample
+ Africa
◇ Asia
△ Latin America
x Middle East

FIGURE 2

Year - 1980

□ Entire Sample
+ Africa
◊ Asia
△ Latin America

FIGURE 3

Year - 1980

□ Entire Sample
+ Africa
◊ Asia
△ Latin America
x Middle East

FIGURE 4

Year - 1980
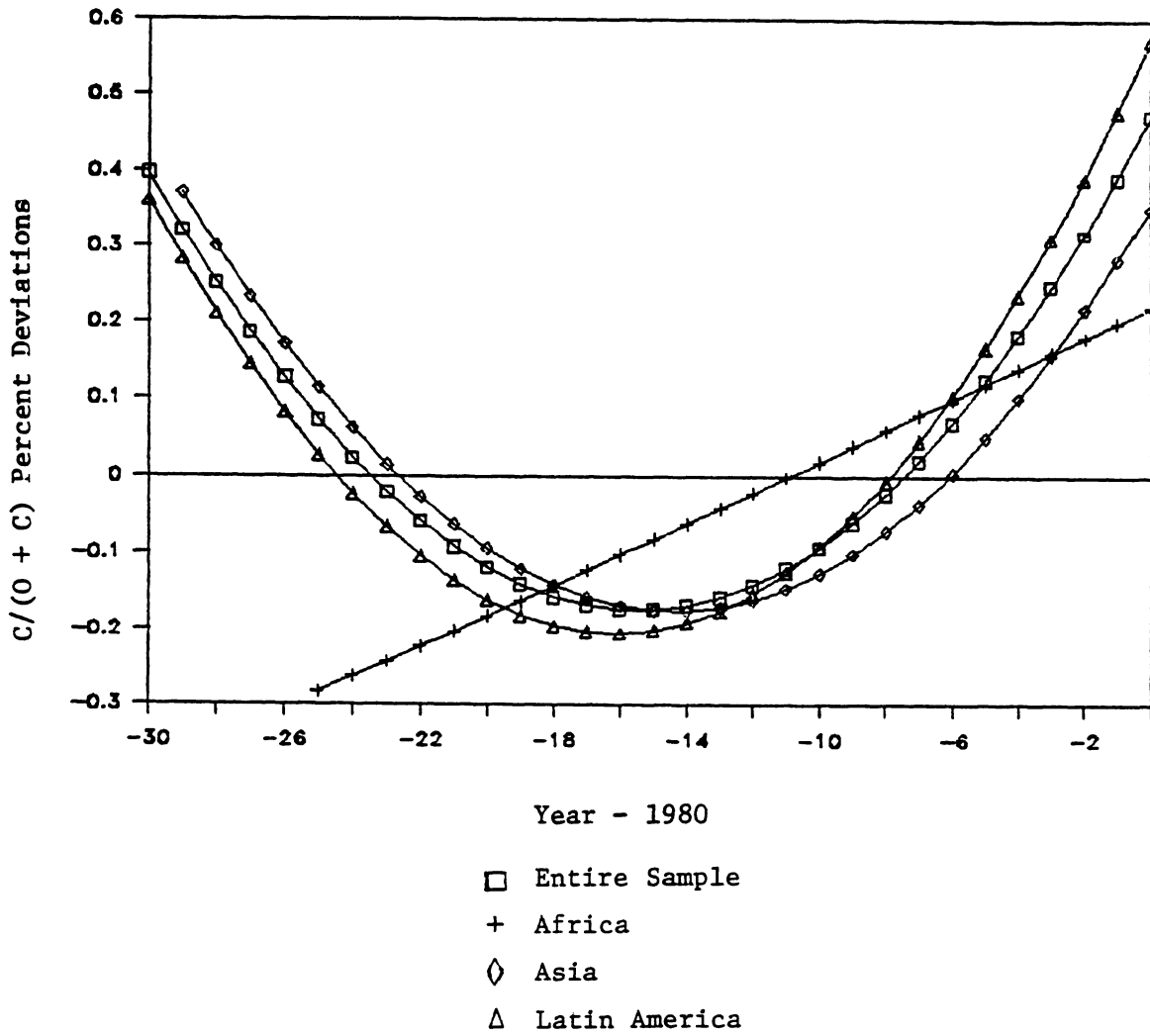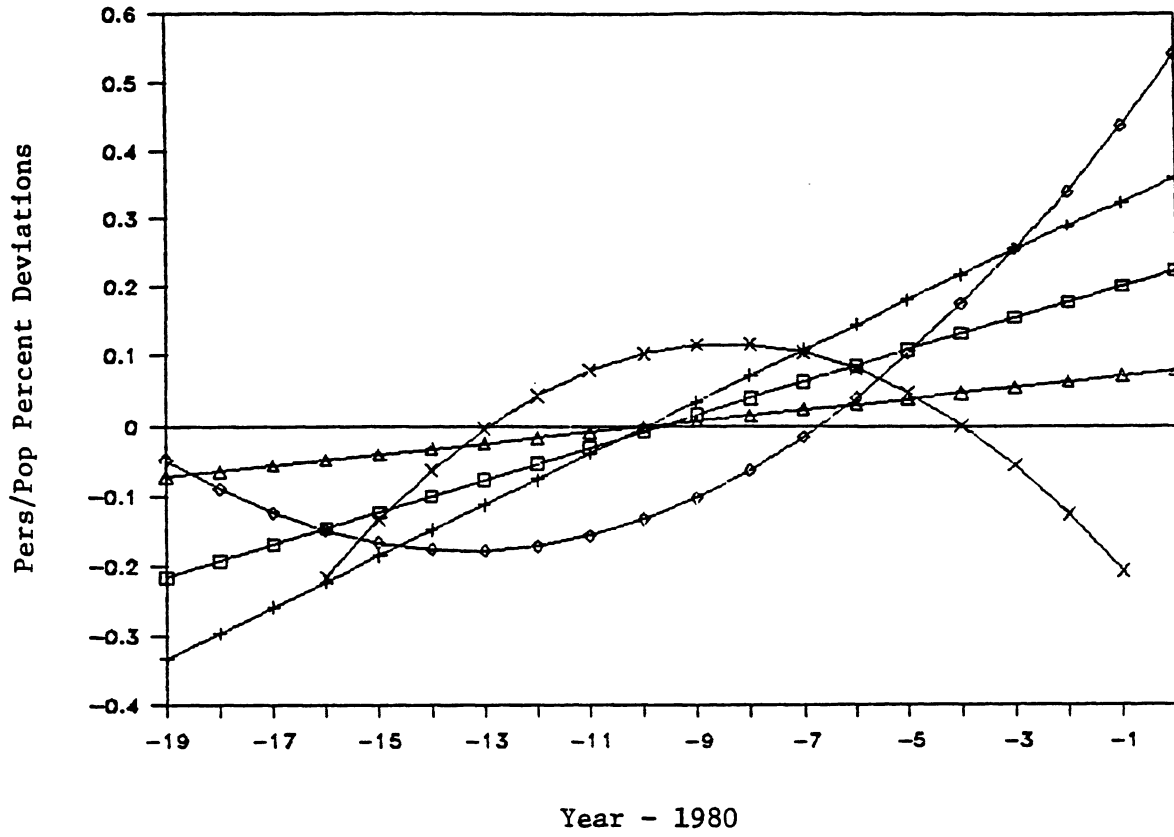
☐ Entire Sample
+ Africa
◊ Asia
△ Latin America
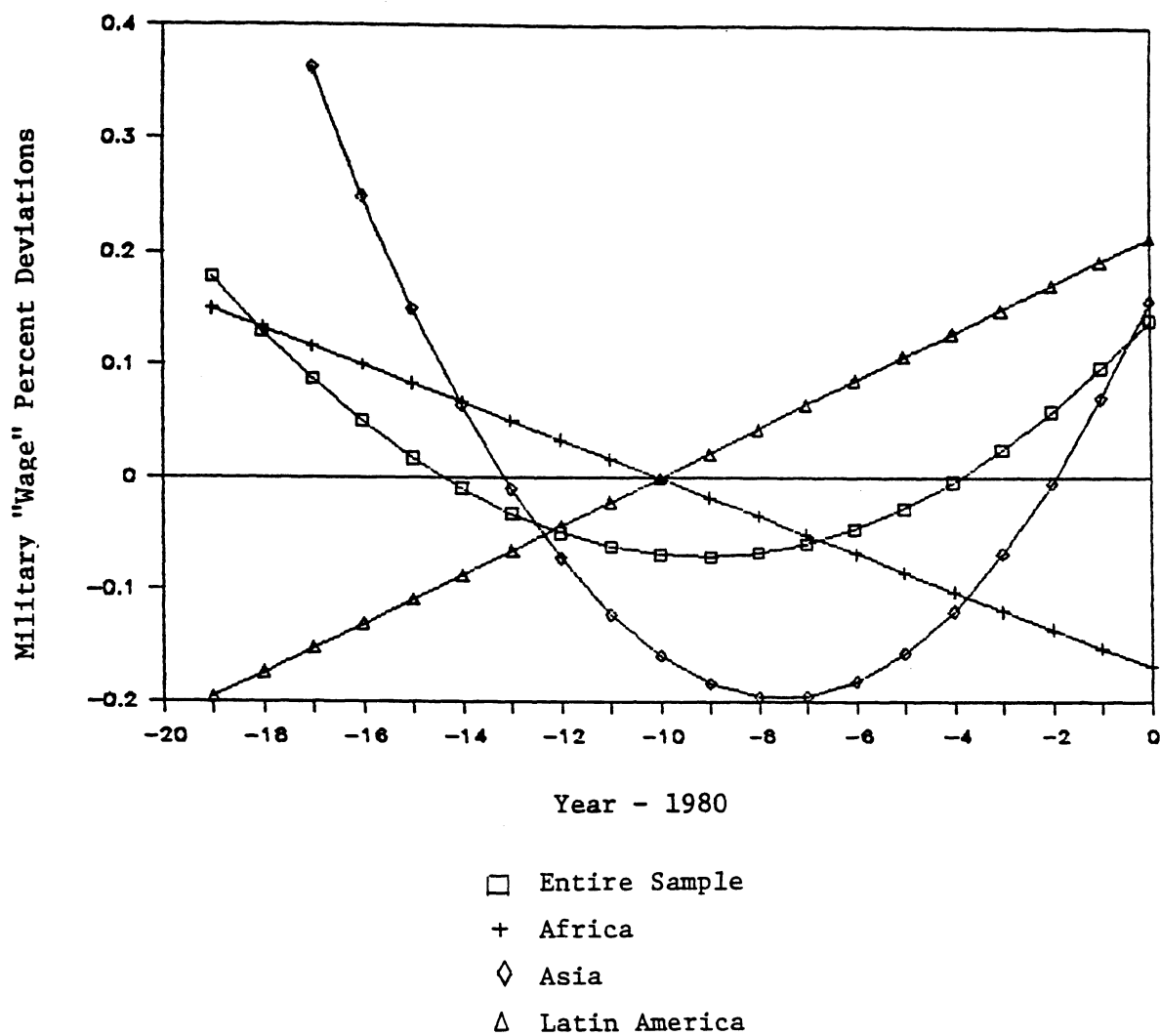
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