CURRENT RESEARCH ON PEACE AND VIOLENCE

1/1990

TAMPERE PEACE RESEARCH INSTITUTE

Robert E. Looney
Naval Postgraduate School
Monterey,
California 93943 USA

MILITARY EXPENDITURES, MILITARY PARTICIPATION RATES, AND HUMAN CAPITAL DEVELOPMENT IN THE ARAB WORLD

1. Introduction

The question of Middle East military expenditures is probably most frequently raised in an international context, relative to such problems or potential problems as the Arab-Israeli dispute or territorial sovereignty in the Horn of Africa. When and if any attention is given to the domestic significance of military expenditures, it tends to focus on the general concerns for the underdeveloped nature of the economies and social structures of these countries. Since most developing countries suffer from capital shortages that hinder rapid economic growth, high levels of military spending are seen in terms of capital diverted from civilian investment to armaments - from butter to guns. (Cummings et al. 1980, 38).

However, for the oil exporters, particularly the sparsely populated countries in the Arabian peninsula, the oil price increase of 1973 has for the most part erased the problem of capital shortages. But the ready availability of capital has not removed all obstacles to development. Replacing capital shortages are labor shortages, particularly in technologically oriented skill categories, and these new constraints have proven as troublesome as the previous capital problems.

The purpose of this article is to examine the role of military expenditures in human capital formation in the Arab world. Have military expenditure affected human resource development in a positive manner? If so, in what sense? Have patterns of military expenditure/human resource development in the Arab world differed significantly from those in other developing countries, and, if this is the case, have these patterns changed over time?

2. The Importance of Human Resources

The development of human resources or human capital formation is an important policy objective of governments in less developed countries. The main interest shown in the past towards physical capital accumulation leading to high growth rates per se has given way to policies which look at a much wider definition of the capital or wealth of a nation. There are several reasons for this (Deger 1986, 112):

1. It is now generally agreed that physical capital (or its change - investment) is only one of a number of inputs that are required for higher national output. Thus even to achieve sustainable high growth rates one needs human capital as an independent factor of production.
2. There may be cross-productivity effects such that better human capital may also increase the productivity of the physical capital stock.
3. It is increasingly clear that growth and development cannot be automatically equated with each other. The trickledown effect, whereby higher growth rates would automatically and within the medium tern affect the poorer and more deprived sections of society, does not seem to have materialized in many countries.

One of the major ways in which human capital accumulation can be stimulated in developing countries is through public education expenditure as well as government spending on health and other social services. Clearly, governments are by far the most important agencies in this area and can do much more than private enterprises could ever hope to achieve.

Government initiative in this area has expanded in recent years with Arab countries as a whole increasing their educational expenditures as a percent of GNP from 3.87 in 1974 to 5.08 by 1984 (Table 1). The corresponding figures for non-Arab countries were 3.33 percent and 4.01 percent. Health expenditures have not shown such a dramatic increase, however, increasing in the Arab countries from 1.39 percent of GNP in 1974 to 1.59 in 1984. A similar pattern was observed in the non-Arab countries where health

Table 1
Contrasts in Human Resource and Military Expenditures: Arab and non-Arab Countries 1974–1984

(means)

Variable	Arab Countries	Sample Size	non-Arab Countries	Sample Size
Military Expenditures				
(percent of GNP)				
1974	7.87	20	3.01	74
1979	10.54	19	3.37	80
1984	12.39	20	3.72	84
($ per capita)				
1974	139.82	20	32.50	74
1979	559.74	20	58.21	80
1984	539.31	20	75.64	84
Educational Expenditures				
(percent of GNP)				
1974	3.87	20	3.33	80
1979	4.81	19	4.01	84
1984	5.08	20	4.01	85
($ per capita)				
1974	83.98	20	..	80
1979	270.81	18	52.96	84
1984	221.37	18	64.37	85
Health Expenditures				
(percent of GNP)				
1974	1.39	20	1.32	80
1979	1.35	18	1.64	82
1984	1.59	18	1.62	85
($ per capita)				
1974	33.06	20	9.07	80
1979	64.65	18	23.14	82
1984	96.13	18	27.05	85

Source: Sivard, various issues.

expenditures increased from 1.32 to 1.62 percent of GNP over the 1974–84 decade.

On the other hand, the governments of developing countries also have extremely strong commitments to military expenditure to bolster security and counter threats. Aggregate defense expenditure is almost always state-induced and the consumption of scarce resources to support the military as well as reallocation of valuable inputs into armaments productions must generally be provided for in national budgets. In terms of general magnitudes Arab countries expanded their military expenditures as a share of GNP from 7.87 percent in 1974 to 12.39 percent by 1984. Militarization in the non-Arab countries was not nearly as dramatic, with defense expenditures increasing from 3.01 to 3.72 percent of GNP over the corresponding time period.

3. Military Expenditures and Budgetary Trade-offs

In is clear that education and health expenditure to foster human capital and defense spending to assure security are both major publicly provided goods in less developed countries and need state participation to function effectively. On the surface budgetary tradeoffs between defense and allocations to education/

health would seem to be straightforward - for a given budget a $ increase in military expenditure will crowd out an equivalent amount of all other spending, and education and health equivalent amount of all other spending, and education and health will be reduced according to their proportion of the total. Recent research has shown that this view of the budgetary process is simplistic and does not conform with the manner in which governments often chose to prioritize expenditures (Deger 1986, 113).

Econometric results reported by Deger (1981) show that there exist a large number of simultaneous channels by which these effects and counter effects operate and the final causality is not clear cut. Along somewhat different lines, a recent examination of budgetary tradeoffs between third world arms producers and those without an indigenous arms industry (Looney, 1988, 601-623) found that when increasing the share of the budget allocated for defense, arms producers tended to increase the share of education, health, roads and other activities likely to increase the overall rate of economic growth. Non-arms producers, however, tended to cut a disproportionate number of growth enhancing allocations to accommodate expansions in the military budget. The net impact for these countries was lower overall growth.

A related issue, and one of significant relevance for the Gulf States in the post 1982 era of fiscal austerity, is the manner in which austerity driven budgetary cuts are allocated. Anecdotal evidence suggests that officials follow rather ad hoc rules for making large contractions in a short period of time - cutting new rather than on going projects, new rather than present employment, materials and travel expenses rather than personnel, and favoring ministries that are politically powerful or reducing those that expanded most rapidly in the past (Caiden and Wildavsky 1974).

Along these lines some sectors are often thought to be more vulnerable than others to reductions; social sectors, in particular are usually considered more and defense sectors less susceptible.

In general, (Goode 1984) programs once enlarged seem difficult to reduce, particularly if they generate large employment benefits. As to the choice of which sector to cut back, it is often felt that some sectors are more "vulnerable" than others to reductions. The defense sector, in particular, is usually considered difficult to reduce, while other sectors, particularly the social sectors such as health, education and rural development, are considered vulnerable. The alleged vulnerability of the social sectors is clearly evident in the publications of the World Bank:

> In the difficult past few years, budgetary crises have often meant that social services were cut back in the process of unravelling carefully designed programs (The World Bank, IDA 1983, 52).
>
> Since many human development programs are publicly funded, they are especially vulnerable when growth is threatened and budgets are under pressure... The recurrent costs of social programs, expecially salary costs tended to make them a permanent and, therefore, vulnerable part of government budgets (The World Bank 1981, 97-98).
>
> Quick fix relief through disproportionate cutbacks - in for example education or rural development - may have negative consequences for the entire economy (World Bank, Focus, 1983).
>
> Many member countries have had to reduce and reorient investment programs to curtail recurrent expenditures and to delay the completion of high priority development projects. Programs in health, education and other social sectors have been particularly vulnerable (World Bank, Program 1984, 1).
>
> In the crisis situations confronting African governments, education, training and health programs are continuously in danger of becoming the residula legatees of both resources and of attention by policymakers (World Bank, Sub-Saharan 1983).

Despite these rather strongly held views and such extensive circumstantial evidence, little empirical investigation has been made on the vulnerability of different sectors to reductions in public expenditures. One study (Hicks and Kubisch 1984, 37-39) that did focus on this problem examined 37 cases of budgetary reductions (countries where real expenditures declined in one or more years). Here vulnerability was loosely defined as:

1. A sector was well-protected if expenditures on it were reduced by less than the percent of reduction in total expenditures.
2. A sector was vulnerable if its percentage of reduction exceeded the average.

In brief, a simple ratio of percentage changes in sectoral expenditures to those in total spending served as the measure of vulnerability. When the ratio had a greater value than one, it indicated that the sector was highly vulnerable, while a value between zero and one indicated low vulnerability with less than proportional reductions in the relevant rate. A negative value indicated that despite overall expenditure reductions, the sector was allowed to expand.

The main findings of this study showed an average decline of 13% in real government expenditures,

while the decline for the social sectors was only 5%, producing a vulnerability index of 0.4. By contrast, the index is 0.6 for administrative/defense sectors and over 1.0 for production and infrastructure. In short, social sectors were less vulnerable to cuts than defense and administration, which in turn were considerably less vulnerable than production and infrastructure – a finding quite contrary to the generally accepted view.

The fact that social sectors and defense were both relatively protected suggests that there were high political costs associated with reducing them. On the other hand, countries appeared to have been more willing to cut spending on infrastructure and production which, of course, are likely to have adverse implications for longer term growth prospects, but few early, direct and immediate costs.

This picture has been recently confirmed by McKinlay (1989) who found that there was no evidence that third world military expenditures are responsive to government financial constrains of a short or long term variety.

> In this respect, then, we infer that military expenditure has a life largely independent of central financial constrains, indicative therefore on its part of a substantial degree of autonomy (McKinlay 1989, 35).

With regard to budgetary priorities, McKinlay found that while a substantial commitment was made by Third World countries to the growth and expansion of education and health expenditure, that commitment was not nearly as high as in the area of military expenditure. In this respect, military expenditure was generally taken to be a higher priority.

Finally, McKinlay found that Third World countries as a whole move their education and health expenditures in a much narrower band than their military expenditure. From this, he again concluded that military expenditure had a greater independence or autonomy of movement. The greater harmony or synchronization between budget size and education/health expenditures could not be explained in terms of the size of education/health as opposed to military expenditure. From this he concluded (McKinlay 1989, 37):

> We are inclined to that argument that the lower level of synchronization of military expenditure with budget is a reflection again of the greater independence of military expenditure. Third World governments are more inclined to move education and health expenditures in line with overall budget expansions and contractions. This leads us to infer that education-health expenditure is a rather more stable component of general government expenditure than military expenditure, which though of course ultimately entirely constrained by budget expenditure does show greater freedom or latitude in its movement... Although military expenditures does seem to attract some special priority and enjoy a greater degree of autonomy, our conclusion suggests that military expenditure is not detrimental to education or health expenditure.

As noted at the beginning of this section, simple zero sum models of budgetary shares are not the appropriate measure of determining the impact that military expenditures have on human capital development in developing countries. Ultimately this impact will depend not just on budgetary priorities, but perhaps more importantly on the degree of simultaneous expansion in the overall size of the economy and the government budget itself.

Another relevant factor involves the manner in which military expenditures are spent – the composition between military hardware and personnel development. In fact, the earliest theorists (for example, Janowitz 1964, 17 and Levy, Jr. 1966, 605) of the role of the armed forces in the development process argued that one of the most important ways in which the military establishment can contribute to economic progress was to relieve the commonly found shortages of technical and administrative manpower.[1]

Here, the acquisition of modern weapons was said to bring with it certain benefits in terms of technology transfer and technical training. It was argued by the theorists that the possession of such weapons made military personnel both more aware of the technological gap between industrialized and developing countries and more likely to act on this awareness than other social groups. The training received by soldiers to anable them to use modern weapons and support equipment was said to provide them with those technical skills that are of particular value for economic development.

It is quite possible in regions such as the Middle East, where educational programs have lagged, that the military also performs a more fundamental task: developing basic skills in literacy. Based on the considerations summarized above the following section attempts to determine the extent to which military expenditures have affected educational/health expenditures and ultimately the development of human capital in the Arab world.

4. Method of Analysis

In order to determine the relative impact of military expenditures on various facets of socio-economic per-

formance and in particular on human capital development in the Arab World,[2] a factor analysis was undertaken of the change in sixteen measures of social and economic development over the 1974–84 period.

The variables included:

1. *Military.* (a) armed forces per capita, (b) military expenditure per soldier, (c) share of military expenditures in the central government budget[3] and (d) total military expenditures.
2. *Social Expenditures.* (a) educational expenditures, (b) health expenditures, (c) share of educational expenditures in the central government budget, and (d) share of health expenditures in the central government budget.
3. *Growth Expenditures.* (a) physicians per capita, (b) teachers per capita, (c) school age population per teacher, (d) literacy rate, (d) percentage of school age population in school.

The analysis consisted of extracting the main dimensions (factors) from the data[4]. An oblique rotation was used for this purpose.[5] Comparisons between the Arab world and third world were made by:

1. Analyzing the total sample of countries and then comparing the results with those obtained for the Arab countries as a group and the non-Arab countries as a group.

Table 2
Patterns of Government Expenditures and Socio-Economic Progress: Developing Countries, 1974–84

(standardized regression coefficients)

Variable	Factor 1 Growth	Factor 2 Human Capital	Factor 3 Military Exp	Factor 4 Budgetary Trade-off	Factor 5 Health Exp
Population	0.98*	-0.05	-0.06	-0.09	-0.04
GNP	0.97*	-0.11	-0.36	0.05	-0.09
Physicians/capita	0.73*	-0.18	0.18	-0.09	0.07
Percent of schoolage pop. in school	-0.21	0.88*	0.16	-0.03	-0.21
Teachers/capita	0.37	0.76*	-0.20	-0.02	-0.16
Educational exp	0.13	0.61*	0.41	-0.16	0.09
School age pop. per teacher	0.35	-0.82*	0.07	-0.13	0.02
Military exp per soldier	-0.21	0.01	0.96*	-0.13	-0.08
Military exp	0.46	0.05	0.51*	0.36	-0.09
Government exp	0.39	0.41	0.46	0.13	0.11
Armed Forces/capita	-0.07	0.27	-0.40	0.91*	0.12
Share of Military exp in gov budget	0.02	-0.22	0.42	0.54*	-0.29
Share of educational exp in gov budget	0.06	0.37	-0.19	-0.62	-0.09
Share of health exp in gov budget	-0.06	-0.12	-0.13	-0.06	0.84
Health exp	0.19	0.29	0.28	0.00	0.68
Literacy rate	0.09	0.28	0.07	-0.16	-0.66
EIGENVALUES	*4.47*	*2.89*	*1.85*	*1.66*	*1.13*
Factor Scores					
Bahrain	3.45	-1.32	2.21	1.09	0.32
Iran	-0.37	0.95	-1.22	0.14	-0.10
Iraq	0.10	0.33	0.05	-0.79	-0.33
Kuwait	0.29	-0.20	-0.27	-0.43	0.28
Oman	0.85	3.05	-0.81	-1.89	-0.28
Saudi Arabia	1.69	1.97	1.63	0.37	2.18
UAE	6.99	0.32	0.23	1.97	-0.09

Notes: Based on obliquely rotated factor analysis. All variables are in terms of their rate of growth over the 1974–84 period. Data from: Sivard, various issues.

2. Examining for changes over time by performing (1) above for the 1974-84 period as a whole, and (2) using separate tests for the five year periods: (a) 1974-79, and (b) 1979-84.

The analysis produced several interesting patterns. For growth over the period as a whole (Table 2):

1. Overall growth (consisting largely of the growth in income (GNP) and population) was the dominant trend (Factor 1) in the data.
2. Human capital development was a clearly defined factor, comprised largely of increases in: (a) the percent of school age population in school, (b) teachers per capita, (c) educational expenditures, and (d) school age population per teacher (with the expected negative sign, given the fact that higher values would indicate a lower level of progress toward expanding educational opportunities during this period). Interestingly enough, expanded literacy was not correlated particularly highly (a standardized regression coefficient of only 0.40) with the factor depicting improvements in human capital.
3. The major budgetary trade-offs involving defense, education and health were largely confined to the negative relationshop between educational and defense expenditures. This relationship was fairly weak, however, with educational expenditure's share in the budget having a standardized regression coefficient of only -0.62 on the budgetary trade off dimension (Factor 4) and -0.19 on the military expenditure dimension (Factor 3).
4. In terms of absolute increases in educational expenditures, there was no trade-off with allocations to defense (as evidenced by the standardized regression coefficient of 0.41 for educational expenditures on Factor 3). In general, however, the three categories of government expenditures examined here (defense, education and health) expanded at somewhat different rates, with little correlation between their patterns of growth over this period.
5. Relative to non-Arab countries, the Gulf states' factor scores[6] (except for Iran) achieved high levels of overall growth. However, Bahrain, Iraq and Kuwait were not able to effectively extend their growth successes to improvements in human capital. The greatest improvements in human capital were achieved by Saudi Arabia and Oman, followed by Iran. However, except for Iran and Iraq, the Gulf states were able to achieve above average increases in health expenditures.

The above average factor scores of the Gulf States as a group on the expenditure and growth dimensions suggest that they, and perhaps the Arab world as a whole, have differed somewhat from the rest of the world in terms of the nature of the major interrelationshops between growth, education/human capital formation and military expenditures. A separate factor analysis confined to the Arab World countries as a group (Table 3) confirmed this suspicion:

1. In contrast to the situation characterizing developing countries as a whole, the Arab countries expanded each major area of government expenditure at a somewhat similar rate. Government expenditures were in fact the dominant trend in the Arab country data. Interestingly enough, expansion of the public sector was not closely related to overall growth the economy (GNP).
2. Despite this fact, educational expenditures (as a share of the government budget) appear to have a fairly strong negative (as evidenced by a standardized regression coefficient of -0.72 on the dimension containing the share of military expenditures in the government budget). Furthermore, the share of defense expenditures in the government's budget appears to have expanded at the expense of some types of socio-economic advancement.
3. However, no negative tradeoffs between military expenditures and the overall change in socio-economic progress are apparent. In absolute terms, increases in military expenditures were positively correlated with increased: (a) educational expenditures, (b) teachers per capita, and (c) physicians per capita.
4. The Arab countries do not appear to have developed their human capital in as consistent a manner as developing countries as a whole, i.e., there is no one dimension of the data on Arab countries that can be called an increase in human capital formation. Instead, the percent of school age population in school is largely associated with the expansion in public sector expenditure, and teachers per capita with overall growth and military expenditure.
5. As with developing countries as a whole, expanded rates of literacy were not highly associated with increased levels of funding or teacher/student ratios. In contrast to the developing world as a whole, however, improvements in literacy in the Arab world were fairly closely associated with increases in the military participation rate (the level of military personnel per capita).

Table 3
Patterns of Government Expenditures and Socio-Economic Progress: Arab Countries, 1974-84

(standardized regression coefficients)

Variable	Factor 1	Factor 2	Factor 3	Factor 4
	Growth in govt expenditures	Growth	Budget Trade-offs	Military Particip Literacy
Military expenditures per soldier	0.93*	-0.43	0.19	-0.09
Educational expenditures	0.90*	-0.02	-0.17	-0.06
Government expenditures	0.87*	0.28	0.14	0.07
Health expenditures	0.75*	0.27	-0.09	-0.29
% School age population in school	0.73*	-0.17	-0.48	0.21
Military Expenditures	0.61*	0.47*	0.50*	0.11
GNP	-0.04	0.94*	0.08	0.01
Population	-0.19	0.94*	0.08	0.10
Teachers/capita	0.45	0.59*	-0.47	0.14
Share of Military expenditures in gov budget	0.06	0.03	0.80*	0.17
School age population per teacher	-0.51*	0.29	0.55*	-0.06
Physicians/capita	0.22	0.42	0.52*	-0.28
Share of educational expenditures in gov budget	0.08	0.03	-0.72*	-0.20
Armed Forces/capita	-0.03	0.14	0.26	0.76*
Literacy rate	-0.05	0.24	-0.23	0.73*
Share of health expenditures in gov budget	0.01	0.26	-0.38	-0.73*
EIGENVALUES	*5.11*	*4.24*	*1.83*	*1.56*
Factor Scores				
Bahrain	0.20	0.72	2.59	-0.82
Iraq	-0.17	-0.36	0.54	1.84
Kuwait	-0.57	-0.17	-0.17	-1.03
Oman	0.25	0.49	-2.30	0.40
Saudi Arabia	1.03	0.73	-0.49	-1.16
UAE	-0.24	3.39	1.12	0.70

Notes: As in Table 2.

As might be imagined because of their numbers, non-Arab countries had more in common with developing countries as a whole than their Arab counterparts. However, several interesting contrasts with Arab countries are apparent (Table 4):

1. In contrast to their Arab counterparts, non-Arab countries have achieved a fairly uniform expansion in human capital (Factor 3). Put differently, these countries have been able to have fairly uniform expansions in: (a) the percent of school age population actually in school, (b) the numbers of teachers per capita, and (c) the literacy rate.
2. While government expenditures were not closely related to increases in economic activity in the Arab world, non-Arab countries experienced a fairly close relationship between the growth in: (a) educational expenditures, (b) total government allocations and (c) GNP.
3. While both Arab and non-Arab countries experienced stronger budgetary trade-offs between defense and education than defense and health, the non-Arab countries do not appear to have had improved levels of literacy associated with increased military participation rates. Instead, as

Table 4
Patterns of Government Expenditures and Socio-Economic Progress: Non-Arab Countries, 1974–84

(standardized regression coefficients)

Variable	Factor 1 Growth	Factor 2 Budget Trade-offs	Factor 3 Human Capital	Factor 4 Health Exp
Educational exp	0.91*	-0.33	0.02	-0.03
Government exp	0.85*	0.26	0.04	0.01
GNP	0.81*	-0.05	-0.03	0.06
Physicians/capita	0.33	0.10	0.01	0.05
Military expenditures per soldier	0.15	0.73*	0.03	0.22
Share of Military expenditures in gov budget	0.10	0.73*	-0.03	-0.35
Military expenditures	0.54*	0.64*	-0.02	-0.21
Population	0.36	-0.40	0.05	-0.38
Share of educational expenditures in gov budget	0.24	-0.80*	-0.04	-0.08
% School age population in school	-0.04	0.08	0.85*	-0.03
Teachers per capita	0.11	-0.18	0.78*	0.00
Literacy rate	-0.04	0.12	0.54*	-0.29
School age population per teacher	0.02	-0.02	-0.73*	-0.18
Share of Health expenditures in gov budget	-0.03	-0.02	-0.06	0.86*
Health expenditures	0.43	0.09	0.00	0.84*
Armed Forces/capita	0.25	-0.02	-0.14	-0.31
EIGENVALUES	*3.48*	*2.72*	*2.14*	*1.54*
Factor Scores				
Iran	-0.23	-1.62	1.08	-0.15

Notes: As in Table 2.

noted above, literacy in the non-Arab countries is fairly closely associated with other measures of human capital attainment.

To sum up, one of the major indicators of human capital formation in developing countries, improvement in literacy, occurred through fairly conventional means in the non-Arab world. For these countries, increased expenditures on education have manifested themselves in more teachers per student and so on, with the ultimate effect of improvements in the overall rate of literacy. The Arab countries have apparently relied more on instruction within the military service to eradicate illiteracy. A corollary to this is that the non-Arab school systems appear to have been relatively more adept at contributing to human capital formation than their counterparts in the Arab world.

In addition to the period as a whole, several distinct patterns associated with each of the two five years subperiods are of interest. In terms of growth over the 1974–79 period:

1. For the sample as a whole (Table 5) the dominant factor was, as was the case for the entire period (1974–84), growth. This factor was largely defined in terms of increased income and population.
2. Similarly, human capital formation was again the second major trend in the data. This factor was largely comprised of (a) increases the percentage of school age population in school, (b) the expansion in central government allocations to education, (c) the increase in teachers per capita.
3. An apparent outcome of increased resources in the educational area was an improvement in the overall rate of literacy, although the standardized regression coefficient of literacy on human capital development was not particularly high (0.41). This relationship was, however, considerably stronger than for the period as a whole (Table 2).
4. During this period, expansion in the government's allocations to education was fairly closely correlated with the overall expansion of the public sector budget.

Table 5
Patterns of Government Expenditures and Socio-Economic Progress: Developing Coutnries, 1974–79

(standardized regression coefficients)

Variable	Factor 1 Growth	Factor 2 Human Capital	Factor 3 Budgetary Trade-offs	Factor 4 Health Exp
Population	0.93*	-0.21	-0.08	-0.19
GNP	0.89*	0.02	0.08	0.22
Physicians/capita	0.71*	0.08	0.01	0.12
Government expenditures	0.49	0.49*	0.39	0.03
% School age population in school	-0.18	0.90*	0.07	-0.16
Educational expend	0.15	0.81*	-0.07	-0.11
Teachers per capita	0.35	0.65*	-0.25	-0.02
Literacy rate	-0.16	0.41*	0.07	-0.37
School age population per teacher	0.06	-0.70*	0.31	-0.04
Share of Military expenditures in gov budget	-0.02	-0.18	0.86*	-0.30
Military Expenditures	0.38	0.09	0.77*	-0.13
Military expenditures per soldier	-0.34	0.25	0.60*	0.35
Share of educational expenditures in gov budget	-0.03	0.34	-0.75*	-0.14
Share of Health expenditures in gov budget	-0.10	-0.15	-0.10	0.93*
Health expenditures	0.21	0.04	0.08	0.90*
Armed Forces/capita	0.05	0.24	0.05	-0.35
EIGENVALUES	*4.02*	*2.82*	*2.16*	*1.83*
Factor Scores				
Bahrain	1.51	-0.58	3.62	-0.15
Iran	-0.29	0.31	-1.98	-0.65
Iraq	0.12	0.22	-0.49	-0.05
Kuwait	0.57	-0.03	-0.45	0.13
Oman	0.45	1.35	-1.84	-0.01
Saudi Arabia	1.67	1.38	1.42	-0.67
UAE	7.53	0.30	1.87	0.53

Notes: As in Table 2.

5. As was the case for the period as a whole, the main budgetary trade-offs were between military and educational expenditures. In contrast, health expenditures (as a share of the government budget) were not affected to any great extent by movements in the other two major areas of public sector allocation. (standardized regression coefficient of 0.24).
6. The military participation rate was not correlated with any of the main trends in the data. Increases in the number of soldiers per capita, however, was weakly correlated.

In general, therefore, the pattern that emerges for the 1974–79 period for developing countries was fairly similar to their experience over the entire 1974–84 period.

For the Arab countries during the 1974–79 period (Table 6):

1. Government expenditures were more closely associated with the overall expansion of the economy than was the case for the period as a whole. In particulr, health expenditures (but not allocations to education) were closely associated with both the expansion in GNP and the population.

Table 6
Patterns of Government Expenditures and Socio-Economic Progress: Arab Countries, 1974–79

(standardized regression coefficients)

Variable	Factor 1 Growth	Factor 2 Budget Trade-offs	Factor 3 Human Capital	Factor 4 Literacy Military Particip
Physicians/capita	0.94*	-0.14	0.08	0.01
Population	0.94*	0.11	-0.35	0.11
GNP	0.91*	0.20	-0.07	-0.06
Health expenditures	0.85*	0.22	0.17	-0.02
Teachers/capita	0.67*	-0.43	0.34	-0.12
Share of Military expenditures in gov budget	-0.02	0.87*	-0.12	0.05
Military Expenditures	0.39	0.81*	0.15	0.05
Share of health expenditures in gov budget	0.36	-0.53*	-0.47	0.15
Share of educational expenditures in gov budget	-0.20	-0.77*	0.22	0.14
Educational expenditures	0.07	-0.04	0.90*	0.05
Percent of school age population in school	-0.01	-0.12	0.90*	0.24
Government expenditures	0.52*	0.51*	0.55*	0.04
Military expenditures per soldier	-0.35	0.49*	0.49*	-0.41
School age population per teacher	-0.17	0.43	-0.62	0.21
Literacy rate	-0.07	-0.25	0.31	0.84*
Armed Forces/capita	0.01	0.34	-0.08	0.82*
EIGENVALUES	*5.14*	*3.31*	*2.96*	*1.62*
Factor Scores				
Bahrain	-0.14	2.44	-0.40	-0.16
Iraq	-0.02	-0.74	-0.48	0.07
Kuwait	0.04	-0.63	-0.37	-0.56
Oman	-0.02	-1.71	0.45	1.18
Saudi-Arabia	0.59	0.55	0.66	-0.96
UAE	3.62	0.96	-0.50	-0.16

Notes: As in Table 2.

2. Whereas the three major types of government expenditures, health, education and military, were fairly synchronized over the 1974–84 period, each followed a somewhat independent path during the 174–79 period. In particular, during 1974–79 there was little similarity in rates of expansion of educational and military expenditures.
3. In terms of budgetary trade-offs, military expenditures expanded at the expense of both health and education. At this time, however, expanded educational expenditures were fairly highly correlated with military expenditures per soldier.
4. As with the period as a whole, improvements in literacy were largely associated with increases in the military participation rate (as opposed to expenditures on education). In addition, the standardized regression coefficient of both terms on a common factor was also somewhat higher than over the 1974–84 period.

As was the case for the period as a whole, several marked contrasts existed during 1974–79 between the Arab and non-Arab countries with regard to the expenditure patterns and socio-economic development (Table 7).

Table 7
Patterns of Government Expenditures and Socio-Economic Progress: Non-Arab Countries, 1974–79

(standardized regression coefficients)

Variable	Factor 1 Health Exp	Factor 2 Budget Trade-offs	Factor 3 Growth	Factor 4 Human Capital	Factor 5 Physicians Armed Forces
Health expenditures	0.93*	-0.04	0.31	-0.08	-0.10
Share of Health exp in gov budget	0.92*	-0.14	0.05	-0.12	-0.07
Military exp per soldier	0.58*	0.40	-0.20	0.20	0.29
Population	-0.78*	-0.06	0.34	-0.17	-0.01
Share of Military exp in gov budget	-0.18	0.91*	-0.07	-0.02	0.03
Military exp	-0.09	0.87*	0.37	0.01	-0.03
Share of educ exp in gov budget	-0.23	-0.77*	0.18	0.10	0.01
Government exp	0.08	0.26	0.89*	0.08	-0.11
Educational exp	-0.09	-0.30	0.85*	0.15	-0.06
GNP	0.09	0.00	0.80*	-0.13	0.33
Teachers per capita	0.00	-0.13	0.02	0.88*	0.05
% School age pop. in school	0.04	0.12	0.03	0.77*	-0.12
Literacy rate	-0.21	0.22	0.02	0.47*	-0.08
School age pop. per teacher	-0.09	0.23	0.00	-0.82*	0.05
Physicians/capita	-0.15	0.04	0.11	0.09	0.80*
Armed Forces/capita	-0.07	0.12	0.02	0.25	-0.63*
EIGENVALUES	*3.32*	*2.99*	*2.62*	*1.86*	*1.08*
Factor Scores					
Iran	-0.31	-2.11	-0.37	0.74	0.31

Notes: As in Table 2.

1. In contrast to the Arab countries, military expenditure per soldier was associated with health expenditures (as opposed to educational expenditures).
2. The relationship between educational expenditures and the overall expansion of government expenditures was much closer than was the case for the Arab countries.
3. Literacy was again more highly correlated with conventional inputs such as teachers, whereas in the Arab countries improvements in literacy were much more closely associated with increases in the military participation rate.
4. In contrast to the period as a whole, however, increased educational expenditures were not associated with educational performance (measured in terms of literacy, teachers per student and the percent of school age students in school).

With regard to the 1979–85 sub-interval:

1. The entire sample of developing countries experienced (Table 8) expenditure/socio-economic development patterns very similar to those experienced during the previous five year interval (Table 5). For developing countries as a group, it appears that military participation rates are not associated with any aspect of socio-economic progress.
2. One important difference concerns the manner in which educational expenditures impact on human capital. In the earlier period, educational expenditures were highly associated with such performance indices as the percent of school age population in school, teachers per capita and (to a lesser extent) improvements in the rate of literacy. In the latter period, educational expenditures were more

Table 8
Patterns of Government Expenditures and Socio-Economic Progress: Developing Countries, 1979–84

(standardized regression coefficients)

Variable	Factor 1 Growth	Factor 2 Budget Trade-offs	Factor 3 Human Capital	Factor 4 Health	Factor 5 Armed Forces
Educational exp	0.95*	-0.19	-0.02	-0.06	0.07
GNP	0.83*	0.08	0.07	0.00	-0.25
Government exp	0.68*	0.41	-0.05	-0.02	0.28
Share of military exp in gov budget	-0.03	0.85*	0.05	-0.19	-0.08
Military exp	0.39	0.79*	0.01	-0.13	0.14
Military exp per soldier	0.16	0.70*	0.03	0.17	-0.59*
Share of educational exp in gov budget	0.39	-0.76*	0.13	-0.09	-0.12
Percent of school age pop. in school	0.17	-0.08	0.78*	0.02	-0.16
Teachers/capita	0.17	-0.25	0.60*	0.13	0.19
Literacy rate	-0.33	0.18	0.43*	0.16	0.10
School age pop. per teacher	0.15	-0.09	-0.72*	0.19	-0.09
Share of health exp in gov budget	-0.12	-0.27	-0.04	0.86*	-0.05
Health expenditures	0.55*	0.06	-0.07	0.69*	0.17
Physicians/capita	0.18	-0.11	-0.03	0.24	-0.19
Population	0.35	-0.30	-0.15	-0.47	0.02
Armed forces/capita	0.00	-0.01	0.09	0.01	0.88*
EIGENVALUES	*3.42*	*3.01*	*1.64*	*1.42*	*1.25*
Factor Scores					
Bahrain	1.18	-1.13	0.55	1.81	-1.40
Iran	-0.23	0.35	0.33	-0.85	1.19
Iraq	-0.38	2.31	-0.48	-1.06	2.19
Kuwait	-0.15	-0.20	-0.75	0.18	0.11
Oman	2.88	-0.12	1.33	0.93	-0.20
Saudi Arabia	0.39	-0.48	1.16	4.34	0.36
UAE	0.27	-0.53	0.54	-0.69	0.25

Notes: As in Table 2.

closely related to the simple expansion in government expenditures and GNP. At this time, there was little association between expanded government allocations to education and improvements in human capital.

With regard to differences in expenditure and socio-economic performance in the Arab and non-Arab countries (Tables 9 and 10):

1. For the Arab countries (Table 9) military expenditures were the dominant dimension in the data. Within this dimension, total government and military expenditures were highly correlated. In contrast, total government expenditures expanded (Table 10) with income (GNP) and educational expenditures in the non-Arab States.
2. Although literacy was still associated with the military participation rate in Arab countries, this relationship did not appear as strong as in the earlier period. For the non-Arab countries there was actually a fairly strong negative relationship between literacy and the military participation rate (Factor 5, Table 10).
3. Human capital formation was, as in the earlier period, a separate dimension in the case of non-Arab countries. However, human capital was no

Table 9
Patterns of Government Expenditures and Socio-Economic Progress: Arab Countries, 1979–84

(standardized regression coefficients)

Variable	Factor 1 Military Exp	Factor 2 Health Exp	Factor 3 Literacy	Factor 4 Schools	Factor 5 Growth
Military exp	0.97*	-0.01	0.08	-0.02	-0.02
Government exp	0.92*	0.07	0.00	0.14	0.23
Military exp per soldier	0.89*	0.01	-0.32	-0.14	0.01
Share of military exp in gov budget	0.78*	-0.08	0.11	-0.08	-0.19
Armed forces/capita	0.53*	-0.04	0.50*	0.00	-0.03
Share of educational exp in gov budget	-0.62*	-0.01	-0.44	-0.07	0.28
Share of health exp in gov budget	-0.20	0.99*	0.20	-0.17	-0.06
Health expenditures	0.19	0.92*	0.02	0.01	0.17
Teachers/capita	-0.03	0.60*	-0.45	0.07	-0.23
Literacy rate	0.03	0.13	0.92*	0.23	0.12
School age pop per teacher	0.06	0.18	-0.40	0.80*	-0.10
Population	-0.06	-0.12	0.42	0.75*	0.16
Percent of school age population in school	0.05	0.13	-0.21	-0.83*	0.27
GNP	0.03	-0.12	-0.04	-0.17	0.91*
Physicians/capita	0.11	0.08	0.50*	-0.01	0.70*
Educational exp	0.06	0.10	-0.52*	0.16	0.61*
EIGENVALUES	*5.23*	*3.04*	*2.04*	*1.49*	*1.29*
Factor Scores					
Bahrain	-0.73	0.03	0.81	-0.35	2.20
Iraq	1.94	-1.11	1.22	0.15	-1.09
Kuwait	-0.27	-0.23	-0.15	0.24	-0.58
Oman	0.74	1.11	-1.20	-0.57	2.19
Saudi Arabia	-0.48	2.54	0.72	-0.79	-0.20
UAE	-0.38	-0.43	0.74	0.83	0.45

Notes: As in Table 2.

longer an identifiable factor in the Arab world. More specifically, there was little or no relationship in the Arab countries between educational expenditures, teachers, school age participation rates and literacy. In fact, there was a fairly strong negative relationship between improvements in literacy and expanded allocations to education.

5. *Conclusions*

The findings presented above indicate that an important aspect of human capital development, improvements in literacy, has proceeded in a somewhat unique manner in the Arab world. For these countries, improvements in literacy have been much more closely associated with the military participation rate than is the case in other parts of the world. While this relationship appears to be weakening somewhat, it is still a dominant factor for these countries.

Having said this, the reason for this pattern is not completely clear. Are the observed improvements in literacy associated with military participation due to some particular success of Arab world militaries in training recruits, or do they simply reflect deficiencies in the civilian educational systems? Would comparable allocations to conventional schools have produced better attainment towards national literacy and skill improvement? While the results obtained above

Table 10
Patterns of Government Expenditures and Socio-Economic Progress: non-Arab Countries, 1979–84

(standardized regression coefficients)

Variable	Factor 1 Growth	Factor 2 Budget Trade-offs	Factor 3 Human Capital	Factor 4 Health Exp	Factor 5 Armed Forces Literacy
Educational exp	0.91*	-0.23	0.08	-0.22	0.04
Government exp	0.90*	0.21	-0.03	0.01	0.06
GNP	0.81*	-0.01	0.00	-0.19	-0.26
Health exp	0.80*	-0.03	-0.03	0.59*	-0.02
Share of military exp in gov budget	-0.01	0.87*	0.04	-0.20	0.06
Military exp	0.59*	0.67*	-0.02	-0.10	0.07
Military exp per soldier	0.15	0.58*	-0.01	0.01	-0.53
Share of educational exp in gov budget	0.15	-0.73*	0.20	-0.28	-0.01
Teachers/capita	0.04	-0.08	0.86*	0.08	0.04
Percentage of school age pop. in school	0.03	-0.04	0.76*	-0.07	-0.24
School age pop. per teacher	0.04	-0.01	-0.76*	0.02	-0.18
Share of health exp in gov budget	-0.06	-0.32	-0.09	0.79*	-0.14
Population	0.23	-0.36	-0.13	-0.51*	0.08
Physicians/capita	-0.19	0.07	0.06	-0.20	0.58*
Armed forces/capita	0.29	0.03	0.12	0.32	0.56*
Literacy Rate	-0.10	0.13	0.36	0.25	-0.45*
EIGENVALUES	*3.83*	*2.96*	*1.63*	*1.50*	*1.17*
Factor Scores					
Iran	-0.11	0.66	0.88	-0.27	1.08

Notes: As in Table 2.

are suggestive, definitive answers to questions of this sort will have to wait until detailed analysis of the region's military and educational budgets can be undertaken.

In an earlier study, Erich Weede (1983, 11–20) found that in the sixties and seventies, nations with higher skill levels, as indicated by school enrollment ratios, grew faster than others. While these patterns were not found in the analysis above, it appears that one important aspect of military participation in the Arab world is its potential to contribute to future growth and development. Put differently, while the conventional analysis that tends to view military and educational expenditures as competing for resources may be correct, in fact, it may be somewhat beside the point at least as far as the Arab world is concerned. In the longer term, the skills learned and the levels of improved literacy gained in military service may pay high dividends in terms of enabling the labor force to play a more direct role than in the past in contributing to national economic growth.

NOTES

1. This discussionis based on Ball, 1985, 1.
2. 1984 was the latest date for which complete and comprehensive data was available. National income account data is from: Arab Monetary Fund, National Accounts of Arab Countries, 1974–85 (Abu Dhabi/ Arab Monetary Fund, 1987). Social data was from: Ruth Sivard, various issues. Here Arab countries included: Jordan, UAE, Bahrain, Tunisia, Algeria, Saudi Arabia, Sudan, Syria, Somalia, Iraq, Oman, Qatar, Kuwait, Lebanon, Libya, Egypt, Morocco, Mauritania, Yemen Arab Republic, PDR Yemen. For comparison, the results for Iran are presented in the factor scores.

3. Here defined to include health, education and military expenditures.
4. Those factors having an eigenvalue greater than one.
5. The rationale for this method is given in Rummel, 1979.
6. Factor scores provide an index of the relative ranking of each country in terms of its attainment of each of the major dimensions in the data. Scores above zero indicate greater than average attainment, while negative scores indicate less than average values for that factor.

REFERENCES

Arab Monetary Fund 1987. *National Accounts of Arab Countries, 1974-85.* Abu Dhabi: Arab Monetary Fund.

Ball, Nicole 1985. "The Contribution of Military Training to Human Capital Formation in the Third World", paper presented at the Biennial Conference of the Inter-University Seminar on Armed Forces and Society, 18-20 Oct. 1985, Chicago.

Caiden, N. and Wildavsky A. 1974. *Planning and Budgeting in Poor Countries.* New York: John Wiley.

Clummings, John Thomas, Askari, Hossein G. and Skinner, Michael 1980. "Military Expenditures and Manpower Requirements in the Arabian Peninsula", *Arab Studies Quarterly,* Winter.

Deger, Saadat 1981. "Human Resources, Education and Military Expenditures in Developing Countries", paper presented at the 2nd World Congress of Social Economics, Jerusalem, August 1981.

Deger, Saadat 1986. *Military Expenditure in Third World Countries: The Economic Effects.* London: Routledge & Kegan Paul.

Goode, R. 1984. *Government Finance in Developing Countries.* Washington: Brookings Institution.

Hicks, N. and Kubisch, A. 1984. "Cutting Government Expenditures in LDCs", *Finance and Development,* Sept. 1984.

Janowitz, Morris 1964. *The Military in the Political Development of New Nations.* Chicago: Phoenix Books.

Levy Jr, Marion J. 1966. *Modernization and the Structure of Societies: A Setting for International Affairs.* Princeton, N.J.: Princeton University Press.

Looney, Robert E. 1988. "Budgetary Impacts of Third World Arms Production", *International Journal of Public Administration.*

McKinlay, Robert 1989. *Third World Military Expenditure: Determinants and Implications.* London: Frances Pinter.

Rummel, R.J. 1979. *Applied Factor Analysis.* Evanston, Illinois: Northewestern University Press.

Sivard, Ruth Leger. *World Military and Social Expenditures.* Washington: World Priorities. Various issues.

Weede, Erich 1983. "Military Participation Ratios, Human Capital Formation, and Economic Growth: A Cross-National Analysis", *Journal of Political and Military Sociology,* Spring 1983.

World Bank 1983. *Focus on Poverty, 1983.* Washington: International Bank for Reconstruction and Development.

World Bank 1983. *IDA in Retrospect.* Washington: International Bank for Reconstruction and Development.

World Bank 1984. *World Bank Program on Special Assistance to Member Countries.* Washington: International Bank for Reconstruction and Development.

World Bank 1981. *World Bank Development Report, 1981.* New York: Oxford University Press.

World Bank 1983. *Sub-Saharan Africa: Progress Report of Developmment Prospects and Programs.* Washington: International Bank for Reconstruction and Development.