1990

Defense Expenditures and Human Capital Development in the Middle East and South Asia

Looney, Robert E.

International
Journal of
Social Economics

CONTENTS

Defence Expenditures and Human Capital Development in the Middle East and South Asia

Robert E. Looney

Naval Postgraduate School, Monterey, California, USA

It is often argued[1] that the post 1973/74 expansion in military expenditures undertaken in the last several decades in the Middle East and South Asian region has pre-empted funds that might have otherwise been allocated to education and the improvement of human capital. As a result, military expenditures have tended to frustrate national development programmes, especially those of the non-oil exporting countries.

Another view, originally presented by Stephanie Neuman[2] in her analysis of the pre-revolutionary Iranian situation, is that some of the skills taught by the military can benefit the civil sector. As she points out, however, a question still remains as to:

> ... how one would distinguish between the military and the civilian costs and benefits. What is the net balance over the long and short term? Furthermore, how are the skill levels related to the kinds of military technology imported? Does more technology demand higher skills and, therefore, indirectly upgrade the educational level of the country? Instead, does it draw away needed skilled manpower from the civilian sector?[2, p. 589]

Clearly, the ability of these countries to adapt to changing and, in most cases, more austere economic environments will depend mainly on how effectively they took advantage of the abundant revenue years to increase the education and skills of their domestic workforces.

While, given the available data, we cannot directly address the issues posed by Neuman, it is still possible to determine whether and to what extent military expenditures have retarded the overall allocation of resources to education and health in the developing world. Specifically, the purpose of this article is to address the question of whether military expenditures in the Third World in general, and the Middle East/South Asia region in particular, have been at the expense of national human resource development. Based on this analysis several implications are drawn as to the development of human capital in the region.

Recent Expenditure Patterns
Human capital accumulation can be stimulated in developing countries 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 (Tables I and II), with the sample countries as a whole increasing their educational expenditures as a percentage of GNP (Table I) from 3.91 (1974) to 5.73 (1986). The corresponding figures for non-Middle East/South Asian countries were 3.44 per cent and 4.04 per cent respectively. The sample countries' educational commitment is also somewhat higher than that of other countries in the region. For these countries, educational expenditures as a share of GNP increased from 3.08 per cent in 1974 to 4.56 per cent by 1986.

These differences are more dramatic when viewed in per capita terms. Here, the sample countries increased their educational expenditures per capita from around $60 in 1974 to over $200 by 1986. The corresponding figures for non-Middle East/South Asian countries were $22.12 and $67.00, respectively.

There is considerably less variation in the pattern of health expenditures. In this expenditure category, the sample countries increased their health expenditures as a percentage of GNP from 1.19 per cent in 1974 to 1.61 by 1986. Corresponding figures for the non-Middle East/South Asian countries were 1.42 and 1.91, respectively. Still on a per capita basis the sample countries did show dramatic increases in their allocations to health. For these countries per capita health expenditures increased from $18.07 in 1974 to 66.93 in 1986, compared with $10.56 and $38.56 for the non-Middle East/South Asian countries.

As might be expected, the sample countries tended to have the heaviest military burden (military expenditures as a percentage of Gross National Product) and per capita military expenditures. In fact, the military burden of this group of countries in 1986 was over three times that of the non-Middle East/South Asian countries.

Interestingly enough, high military burdens were not necessarily reflected in high rates of growth over the 12-year period, 1974-86. In fact, during this interval (Table II) the military burden decreased at an average annual rate of 0.8 per cent. By comparison, those of the other regional Middle East/South Asian countries increased by 4.07 per cent per annum, while those of the non-Middle East/South Asian countries increased by 2.88 per cent per annum. Similar patterns also occurred with regard to per capita military expenditures, with the sample countries' per capita military expenditures increasing at an average annual rate of 5.2 per cent per annum, compared with 8.42 and 11.00 per cent for the non-sample Middle East/South Asian countries and non-Middle East/South Asian countries, respectively.

Another pattern of significance involves the relative expansion of educational and health expenditures. In this regard the sample countries experienced average annual increases in education expenditures as a share of GNP of 3.24 per cent per annum over the 1974-86 period. Comparable figures for the non-sample Middle East/South Asian and the non-Middle East/South Asian countries were 3.32 and 1.34 per cent. In other words, the sample countries expanded their human capital development slightly below that of the other regional countries, but considerably faster than other parts of the developing world. With regard to health expenditures as a share of GNP, the sample countries expanded allocations in this area considerably faster than other countries in the region and

Year	Sample Middle East/ South Asian	Non-Sample Middle East/ South Asian	Total Middle East/South Asian	Non-Middle East/South Asian
Military Expenditures (percentage of GNP)				
1974	12.19 (7)	6.10 (22)	7.57 (29)	2.34 (74)
1978	10.72 (7)	6.88 (21)	7.84 (28)	2.80 (80)
1982	10.38 (7)	9.27 (21)	9.55 (28)	3.19 (77)
1986	11.08 (7)	9.85 (20)	10.17 (27)	3.29 (79)
($ per capita)				
1974	237.23 (7)	117.54 (22)	146.43 (29)	16.06 (74)
1978	304.80 (7)	213.57 (22)	235.29 (29)	34.34 (80)
1982	605.86 (7)	431.12 (22)	473.30 (29)	59.04 (77)
1986	435.87 (7)	310.12 (22)	365.71 (29)	56.17 (79)
Educational Expenditures (percentage of GNP)				
1974	3.91 (7)	3.08 (22)	3.28 (29)	3.44 (76)
1978	5.37 (7)	3.82 (21)	4.21 (28)	4.28 (80)
1982	4.88 (7)	3.96 (21)	4.19 (28)	4.34 (80)
1986	5.73 (7)	4.56 (20)	4.86 (27)	4.04 (79)
($ per capita)				
1974	60.36 (7)	68.41 (22)	66.47 (29)	22.12 (74)
1978	145.35 (7)	180.70 (21)	171.86 (28)	44.73 (80)
1982	230.44 (7)	173.72 (22)	187.41 (29)	72.26 (77)
1986	206.32 (7)	169.47 (20)	179.02 (27)	67.90 (79)
Health Expenditures (percentage of GNP)				
1974	1.19 (7)	1.25 (22)	1.23 (29)	1.42 (76)
1978	1.38 (7)	1.37 (21)	1.37 (28)	1.75 (79)
1982	1.93 (7)	1.51 (18)	1.63 (28)	1.90 (78)
1986	1.61 (7)	1.52 (19)	1.54 (27)	1.91 (79)
($ per capita)				
1974	* 18.07 (7)	29.05 (22)	26.40 (29)	10.56 (76)
1978	40.77 (7)	60.25 (21)	55.38 (28)	21.85 (79)
1982	112.02 (7)	73.56 (19)	83.92 (26)	38.23 (78)
1986	66.93 (7)	65.04 (19)	65.55 (26)	38.22 (79)

Values are means with the number of countries in parentheses.

Source: [3].

Table I.
Human Resource and
Military Expenditures
in Developing
Countries 1974-1986:
Means

Year	Sample Middle East/ South Asian	Non-Sample Middle East/ South Asian	Total Middle East/South Asian	Non-Middle East/South Asian
Military Expenditures (percentage of GNP)				
1974/78	− 3.6 (7)	3.05 (22)	0.88 (29)	4.59 (74)
1978/82	− 0.80 (7)	7.74 (21)	5.06 (28)	3.31 (80)
1982/86	1.64 (7)	1.53 (21)	1.59 (28)	0.77 (77)
1974/86	− 0.80 (7)	4.07 (20)	2.49 (27)	2.88 (79)
($ per capita)				
1974/78	6.47 (7)	16.10 (22)	12.58 (29)	20.92 (74)
1978/82	18.73 (7)	19.20 (22)	19.09 (29)	14.51 (80)
1982/86	− 7.90 (7)	− 7.91 (22)	− 7.91 (29)	− 1.24 (77)
1974/86	5.20 (7)	8.42 (22)	7.92 (29)	11.00 (79)
Educational Expenditures (percentage of GNP)				
1974/78	8.25 (7)	5.53 (22)	6.44 (29)	5.61 (76)
1978/82	− 2.36 (7)	0.90 (21)	− 0.12 (28)	0.35 (80)
1982/86	4.19 (7)	3.59 (21)	3.78 (28)	− 1.77 (80)
1974/86	3.24 (7)	3.32 (20)	3.33 (27)	1.34 (79)
($ per capita)				
1974/78	24.57 (7)	27.49 (22)	26.80 (29)	19.25 (74)
1978/82	12.21 (7)	− 0.98 (21)	2.19 (28)	12.74 (80)
1982/86	− 2.75 (7)	− 0.61 (22)	− 1.14 (29)	− 1.54 (77)
1974/86	10.78 (7)	7.85 (20)	8.61 (27)	9.80 (79)
Health Expenditures (percentage of GNP)				
1974/78	3.77 (7)	2.32 (22)	2.73 (29)	5.36 (76)
1978/82	8.74 (7)	2.46 (21)	4.44 (28)	2.08 (79)
1982/86	− 4.43 (7)	0.17 (18)	− 1.41 (28)	0.13 (78)
1974/86	2.55 (7)	1.64 (19)	1.89 (27)	2.50 (79)
($ per capita)				
1974/78	22.56 (7)	20.01 (22)	20.34 (29)	19.94 (76)
1978/82	28.75 (7)	5.12 (21)	10.95 (28)	15.01 (79)
1982/86	−12.08 (7)	− 3.03 (19)	− 5.99 (26)	− 0.01 (78)
1974/86	11.52 (7)	6.95 (19)	7.89 (26)	11.31 (79)

Values are average annual rates of growth with number of countries in parentheses.

Source: [3].

Table II.
Human Resource and Military Expenditures in Developing Countries 1974-1986: Average Annual Rates of Growth

slightly above that achieved by the non-Middle East/South Asian nations. The same was also true of per capita health expenditures.

In short, concurrent with rapid economic growth in the sample countries, there has been an acceleration in military spending, but at a slightly lower rate than the overall expansion of the economy. Still, the absolute levels of military expenditure dwarf other parts of the world. Generally, defence expenditures have been financed by oil revenues and by military aid and grants from the major industrial country arms suppliers. Lebovic and Ishac have noted that while absolute regional military spending has been phenomenal, the military also controlled a greater percentage of the central government budget in the Middle East and twice as much of the national output as in other developing countries or in the world as a whole:

> Middle Eastern defense accounted for one-third of the military spending of developing countries and almost one-half of world arms imports. During the 1973-1982 period, the average annual economic growth rate for individual Middle Eastern states was about 6.0 per cent, while military expenditures grew by approximately 13.0 per cent per year. Although military expenditure levels vary greatly across countries, in a great majority of the countries the growth rate of military spending outpaced economic growth. This indicates a striking trend in the region toward higher military burdens (military expenditures as a ratio of GDP)[4, p. 107].

While these trends seem to have slackened in the post-1982 period, the fact still remains that military expenditures may represent a considerable burden in terms of foregone allocations to other types of activities. For example, despite the relative affluence of a number of the sample countries, the rate of expansion (1974-86) of educational expenditures on a per capita basis was only slightly above the average of the non-Middle East/South Asian countries, and below that of the other regional economies.

Looking at the impact of military expenditures from a different perspective, that of labour scarcity, Cummings et al.[1] note that labour shortages in the Gulf States created by expanded military expenditures may be a far greater long-term impediment to growth in the region than any effects associated with the diversion of capital or foreign exchange to military activities. In a somewhat similar manner, Mousad[5] found that a 10 per cent reduction in the military spending ratio (percentage of GNP) or a decrease of around of $12.9 billion would increase education expenditure by around $8.1 billion per year.

Along these lines, Deger[6] estimated that a 15 per cent reduction in the share of military spending ratio, i.e. from 6.3 to 5.4 per cent of GDP (approximately $13 billion in absolute terms) would increase the education expenditure ratio to 2.93 per cent of national output. In absolute terms, this would amount to about $4.5 billion a year. These estimates were made for developing countries as a whole, with no distinction made between countries that were resource abundant or resource constrained, labour abundant or labour scarce, and so on.

The purpose of the analysis below is to extend several strands of the analysis surveyed above. Specifically, we are interested in determining whether and to what extent military expenditures have affected human capital development in the sample countries and the region as a whole. Finally, are the linkages

between military expenditures, human capital development and allocations to health in the region fundamentally different from those in other parts of the world and, if so, in what manner?

Framework for Analysis

The main measurable variables pertain to allocations to defence, government expenditures and the public education that may generate human capital. The latter is proxied by the ratio of public education expenditure as a proportion of GDP. Following Deger[7] we assume that public education spending as a proportion of the national product is a crucial determinant of human capital formation (MEY). In other words, if this ratio falls, the rate of growth of human capital may, in all probability, also fall.

As Lebovic and Ishaq have noted[4, p. 110], one of the main difficulties with previous studies was their lack of clarity as to whether the military burden acted in some way as a statistical proxy for government expenditures. To avoid this problem, total government expenditures were included in the analysis as a control variable, with the share of military expenditures lagged. Specifically, because government expenditures usually go up across the board, including military expenditures in the current year would capture this spurious budgetary element. To eliminate this effect, lagged military expenditures ($MEYo$) were included in the regression equation. The share of military expenditures in GNP in 1986 was then lagged on the residuals of the estimated education equation (Equation 1) to determine whether and to what extent military expenditures retarded the potential allocations to human capital.

There is considerable continuity in the provision of health and educational expenditures, with the proportion of national resources allocated to each changing only gradually over time. To control for this factor, the percentage of human resources allocated to education at an earlier period was introduced into the regression equation. 1982 was selected for this purpose since this date represents the beginning of the current phase of relatively slack oil markets and international debt problems, both of which have resulted in austerity in many parts of the developing world.

The literature is unclear as to whether health and educational expenditures are substitutes or complements. Certainly, a logical case could be made for either position. In addition, in many developing countries, the military is intimately involved in the provision of education and health services, particularly in rural areas, so that these three expenditure categories may be correlated. To avoid this problem government expenditures were specified as being a function of their level in a base period (again, 1982), together with total government expenditures.

Preliminary regressions indicated that the share of government expenditures in GNP were highly correlated with military expenditure per soldier. As one might imagine expenditures per soldier tend to be closely correlated with per capita income.

Finally, several regional variables were introduced to determine whether the sample countries and or the Middle East/South Asian region[8] as a whole

varied significantly from developing countries in general in the provision of health and educational services.

In sum, the model with expected signs used for examining the impact of military expenditures on human resource development was of the form[9]:

$$EDY = f(\overset{+}{GEY}, \overset{?}{MEYo}, \overset{+}{EDYo}) \tag{1}$$

$$GEY = f(\overset{+}{GEYo}, \overset{+}{MEAF}) \tag{2}$$

$$MEAF = f(\overset{+}{YP}, \overset{+}{MEAFo}) \tag{3}$$

where:

EDY = the percentage of Gross National Product (GNP) allocated to education (1986);

MEYo = the percentage of GNP allocated to defence (1982);

EDYo = the percentage of GNP allocated to education (1982);

GEY = the percentage of GNP allocated to government expenditures (1986);

GEYo = the percentage of GNP allocated to government expenditures (1982);

MEAF = military expenditures per soldier (1986);

MEAFo = military expenditures per soldier (1982);

YP = per capita income (1986).

Results

The estimated model[10] produced several interesting patterns[11] (see Tables III and IV):

(1) For the total country sample[12], lagged military expenditures had a negative impact on the proportion of national resources allocated to education (Table III, Equation 1).

(2) The model predicted education expenditures in the sample countries fairly well. As might have been anticipated Israel, Saudi Arabia and Algeria's commitment to education was somewhat higher than the norm, with Syria and Pakistan slightly below the norm.

(3) Regressing the current share of GNP allocated to defence, along with several regional variables[13] on the residual (from Equation 1), it appears (Table III, Equation 1') that the Middle East/South Asia region in general and the sample countries in particular had better rates of educational attainment than that experienced in other parts of the world.

(4) More importantly, military expenditures significantly reduce the difference between the actual level of educational expenditures, and that predicted by the model. That is, increased military expenditures apparently have a retarding effect on budgetary allocations to human capital, offsetting

Total Sample

$$EDY = 0.86\ GEY + 0.38\ EDYo - 0.42\ MEYo \qquad (1)$$
$$(4.66) \qquad (4.71) \qquad (-2.93)$$

$R^2 = 0.652;\ F = 56.21:\ df = 90$

Residuals	Actual	Predicted	Error
Egypt	4.8	4.7	0.1
Israel	7.3	6.7	0.6
Saudi Arabia	10.6	9.6	1.0
Syria	5.7	6.1	-0.4
India	3.4	3.3	0.1
Pakistan	2.2	2.6	-0.4
Algeria	6.1	4.7	1.4

$$Error = -0.43\ MEY + 0.29\ SREGIONX \qquad (1')$$
$$(-3.95) \qquad (2.66)$$

$R^2 = 0.140;\ F = 8.07;\ df = 99$

Middle East/South Asian Countries

$$EDY = 1.40\ GEY + 0.28\ EDYo - 0.89\ MEYo \qquad (2)$$
$$(3.54) \qquad (1.57) \qquad (-2.47)$$

$R^2 = 0.615;\ F = 10.67:\ df = 20$

Residuals	Actual	Predicted	Error
Egypt	4.8	5.0	0.2
Israel	7.3	5.8	1.5
Saudi Arabia	10.6	10.8	-0.2
Syria	5.7	6.0	-0.3
India	3.4	3.4	0.0
Pakistan	2.2	2.5	-0.3
Algeria	6.1	5.1	1.0

$$Error = -0.42\ MEY \qquad (2')$$
$$(-2.25)$$

$R^2 = 0.175;\ F = 5.08;\ df = 24$

Non-Middle East/South Asian Countries

$$EDY = 0.46\ GEY + 0.53\ EDYo - 0.10\ MEYo \qquad (3)$$
$$(2.62) \qquad (5.11) \qquad (-0.88)$$

$R^2 = 0.689;\ F = 48.73:\ df = 66$

$$Error = -0.24\ MEY \qquad (3')$$
$$(-2.32)$$

$R^2 = 0.068;\ F = 5.41;\ df = 74$

High Military Expenditure Countries (ME > 5.04% GNP)

$$EDY = 0.94\ GEY + 0.33\ EDYo - 0.42\ MEYo \qquad (4)$$
$$(3.26) \qquad (2.43) \qquad (-2.00)$$

$R^2 = 0.607;\ F = 13.93:\ df = 27$

Residuals	Actual	Predicted
Egypt	4.8	4.4
Israel	7.3	6.6
Saudi Arabia	10.6	9.6
Syria	5.7	5.8
Pakistan	2.2	2.3

$$Error = -0.52\ MEY + 0.33\ SAMPLE \qquad (4')$$
$$(-3.23) \qquad (2.05)$$

$R^2 = 0.282;\ F = 5.89;\ df = 30$

Low Military Expenditure Countries (ME < 5.04% GNP)

$$EDY = 0.34\ GEY + 0.49\ EDYo + 0.08\ MEYo \qquad (5)$$
$$(2.43) \qquad (4.59) \qquad (0.83)$$

$R^2 = 0.675;\ F = 51.67;\ df = 59$

Residuals	Actual	Predicted	Error
India	3.4	3.5	-0.1
Algeria	6.1	4.5	1.5

Note: Estimated with a two-stage least squares estimation procedure. See text for a definition of the variables. Values are standardised regression coefficients.

Table III.
Defence Expenditures
and Allocations to
Education, 1986

Total Country Sample

$$HEY = \quad 0.50\ GEY + \quad\quad 0.72\ HEYo - \quad\quad 0.43\ MEYo \quad\quad (1)$$
$$(4.85) \quad\quad\quad (8.82) \quad\quad\quad (-4.09)$$

$R^2 = 0.602;\ F = 45.34;\ df = 90$

Residuals	Actual	Predicted
Egypt	1.0	3.2
Israel	2.1	1.8
Saudi Arabia	4.0	4.4
Syria	0.8	0.6
India	0.9	1.0
Pakistan	0.2	0.1
Algeria	2.2	1.5

Middle East/South Asian Countries

$$HEY = \quad 1.06\ GEY + \quad\quad 0.95\ HEYo - \quad\quad 1.07\ MEYo \quad\quad (2)$$
$$(3.06) \quad\quad\quad (2.33) \quad\quad\quad (-2.55)$$

$R^2 = 0.492;\ F = 6.47;\ df = 20$

Residuals	Actual	Predicted
Egypt	1.0	4.0
Israel	2.1	1.6
Saudi Arabia	4.0	4.6
Syria	0.8	0.2
India	0.9	0.9
Pakistan	0.2	0.0
Algeria	2.2	1.5

Non-Middle East/South Asian Countries

$$HEY = \quad 0.31\ GEY + \quad\quad 0.70\ HEYo - \quad\quad 0.14\ MEYo \quad\quad (3)$$
$$(5.54) \quad\quad\quad (9.47) \quad\quad\quad (-1.35)$$

$R^2 = 0.772;\ F = 74.75;\ df = 66$

$$Error = \quad -0.24\ MEY \quad\quad\quad\quad (3')$$
$$(-2.32)$$

$R^2 = 0.068;\ F = 5.41;\ df = 74$

High Military Expenditure Countries (ME > 5.04% GNP)

$$HEY = \quad 0.67\ GEY + \quad\quad 0.52\ HEYo - \quad\quad 0.52\ MEYo \quad\quad (4)$$
$$(4.97) \quad\quad\quad (1.45) \quad\quad\quad (-2.60)$$

$R^2 = 0.567;\ F = 11.80;\ df = 27$

Residuals	Actual	Predicted
Egypt	1.0	3.3
Israel	2.1	1.9
Saudi Arabia	4.0	4.5
Syria	0.8	0.9
Pakistan	0.2	0.2

$$Error = -0.56\ MEY + 0.37\ SAMPLE \quad\quad\quad (4')$$
$$(-3.31) \quad\quad\quad (2.17)$$

$R^2 = 0.291;\ F = 5.95;\ df = 29$

Low Military Expenditure Countries (ME < 5.04% GNP)

$$HEY = \quad 0.14\ GEY + \quad\quad 0.92\ HEYo - \quad\quad 0.22\ MEYo \quad\quad (5)$$
$$(0.83) \quad\quad\quad (6.44) \quad\quad\quad (-2.24)$$

$R^2 = 0.800;\ F = 78.78;\ df = 59$

Residuals	Actual	Predicted	Error
India	0.9	0.9	
Algeria	2.2	1.7	1.5

$R^2 = 0.05;\ F = 4.16;\ df = 67$

Table IV.
Defence Expenditures
and Allocations to
Health, 1986

Note: Estimated with a two-stage least squares estimation procedure. See text for a definition of the variables. Values are standardised regression coefficients.

to a certain degree the inclination of the sample countries to fund education at levels above the developing country norm.

Because the Middle East/South Asian countries appear *ceteris paribus* more willing than other parts of the developing world to fund educational expenditures, this group of countries was examined in a separate set of regressions. In general:

(1) Countries in this region do not have as much continuity in their educational allocations as other parts of the world as shown by the lack of statistical significance on the lagged share of education in GNP (Equation 2, Table III).

(2) For these countries, military expenditures have a strong and negative impact on the proportion of funds allocated to human capital development (the size of the standardised coefficient of the lagged military expenditure term is approximately twice that for the developing world as a whole).

(3) As evidenced by the analysis of residuals, military expenditures also appear to depress the *ceteris paribus* propensity of the Middle East/South Asian countries to allocate funds to education (the negative sign on MEY, Equation 2', Table III).

(4) As a basis of comparison, education in the non-Middle East/South Asian countries as a group did not experience adverse effects stemming from increased commitments to defence (the lack of statistical significance of the military expenditure term, $MEYo$, Equation 3, Table III). In addition, military expenditures were not significant (not shown here) in explaining the difference between the actual and expected level of education for this group of countries.

An obvious question at this point is whether or not there is something unusual about the countries in the Middle East/South Asia region *per se* with regard to their budgetary patterns. Given the fact that this region as a whole allocates a proportionately high amount of GNP to defence, the negative impact observed may simply reflect the fact that for all countries there may be a threshold past which military expenditures come at the expense of social expenditures. That is, defence and education/health may not compete for funds as long as defence expenditures remain relatively low — the tax base being large enough to support both. Once a certain level of defence expenditures are reached however, the government may be unable to fund a wide spectrum of non-defence allocations. Under these circumstances defence may simply have a higher priority, and receives funding at the expense of other programmes.

To test this hypothesis, the sample countries were split into two groups, those with a military burden higher than the norm (5.04 per cent of GNP in 1986) and those lower than the norm. Estimating the model produced results similar in many respects to those found for the regional sub-groups:

(1) Education suffers in countries with high military burdens. For these countries, this effect operates directly with a lag (Equation 4, Table III) and also, indirectly through reducing the propensity for funding human capital development (Equation 4', Table III).

(2) The sample countries (in this case Egypt, Israel, Saudi Arabia, Syria and Pakistan) were somewhat unique in that their inclination to fund education was greater than that of other highly militarised countries (Equation 4', Table III).

(3) As with the non-Middle East/South Asian countries, defence expenditures did not come at the expense of allocations to education in the group of countries with low defence burdens.

While suggestive, the above results are not conclusive in pinpointing the underlying cause — regional or budgetary constraint of the negative trade-off between defence and education. However it does appear (for whatever reason) that the Middle East/South Asia region in general, and the sample countries in particular, are more willing to fund education (given a level of military expenditures) than countries outside the region. This propensity offsets somewhat the generally negative impacts of defence on education in these countries.

Health expenditures (Table IV) present a similar picture, with several notable exceptions:

(1) In general there is more continuity over time in health expenditures in the Middle East/South Asia countries, with health expenditures in 1982 significant in predicting 1986 values.

(2) While military expenditures have a negative impact on allocations to health in the Middle East, this effect is only direct (Equation 2, Table IV) with the differences between actual and anticipated levels of health expenditures not affected by the current military burden.

(3) Although not affecting educational expenditures directly, non-Middle East countries with high levels of defence tended to suppress their commitments to health programmes (Equation 3', Table IV).

(4) As with the case of education, the sample countries (given their levels of military expenditures) were more inclined to increase health expenditures (Equation 4', Table IV).

Again the general pattern is one whereby excessive military burdens appear funded in part by cutbacks to non-defence programmes.

Conclusions

While it might seem intuitively obvious that reducing military expenditures would accelerate human capital development and hence increase a country's long-run growth prospects, the results presented above indicate that this view is too simplistic. Admittedly, this possibility undoubtedly holds validity for countries with especially high military burdens, and/or those in the Middle East/South Asia region, but it does not appear to be an accurate description of the process by which resources are allocated in the Third World in general.

Based on the results presented above, one can only speculate as to the mechanisms linking military expenditures and human capital formation in the

Middle East/South Asian countries. While military expenditures do appear to retard human capital development in the region, the fact remains that levels of educational expenditures in the region are still high by Third World standards (Table I). In addition, these countries also appear more inclined, *ceteris paribus*, to fund educational programmes.

What may be happening is that governments in the region are subsidising education of increased numbers of civilians during periods of stepped-up military expenditures with the understanding that upon completion of training those individuals will serve some time in the military. This strategy would allow the military to absorb the large volume of sophisticated weapons flowing into the region while at the same time not requiring drastic increases in the numbers of foreign military advisers.

This interpretation is consistent with the results obtained above. Given the fairly high correlation between military expenditures and government revenues in the region[14], allocations to both defence and education could increase fairly rapidly without either category experiencing significant changes in its share of the budget. Because of the low skill levels of the local populations in these countries, it is unlikely that rapid increases in military expenditures per soldier and in the number of soldiers per capita could be absorbed without accelerated training programmes both within and outside the military.

Notes and References

1. Best articulated in Cummings, J., Askari, H. and Skinner, M., "Military Expenditures and Manpower Requirements in the Arabian Peninsula", *Arab Studies Quarterly*, Winter 1980, pp. 38-49.

2. Neuman, S., "Security, Military Expenditures and Socioeconomic Development: Reflections on Iran", *Orbis*, Fall 1978.

3. Sivard, R.L., *World Military and Social Expenditures*, World Priorities, Washington, various issues.

4. Lebovic, J. and Ishaq, A., "Military Burden, Security Needs, and Economic Growth in the Middle East", *Journal of Conflict Resolution*, March 1987.

5. Mousad, M.R., "Human Resources, Government Education Expenditure and the Military Burden in Less Developed Countries: With Special Reference to Arab Countries", *Bulletin of Arab Research and Studies*, No. 11, 1984, pp. 35-55.

6. Deger, S., "Human Resources, Government Education Expenditure, and the Military Burden in Less Developed Countries", *Journal of Developing Areas*, October 1984, pp. 37-48.

7. Deger, S., "Human Resources, Government Education Expenditure, and the Military Burden in Less Developed Countries", *Journal of Developing Areas*, October 1985, pp. 42-3.

8. The Middle East/South Asian region was comprised of: Turkey, Bahrain, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, UAE, Yemen Arab Republic, People's Democratic Republic of Yemen, Afghanistan, Bangladesh, India, Nepal, Pakistan, Sri Lanka, Burma, Algeria, Libya, Morocco, Somalia, Sudan, Tunisia.

9. Data were taken from Sivard, R.L.[3]. The original sample of developing countries consisted of 109 nations. Because of milling observations on several countries the usual sample size was around 90 countries. The Arab countries consisted of the 20 members of the Arab Monetary Fund and consisted of: Jordan, UAE, Bahrain, Tunisia, Algeria, Saudi Arabia,

Sudan, Syria, Somalia, Iraq, Oman, Qatar, Kuwait, Lebanon, Libya, Egypt, Morocco Mauritania, Yemen Arab Republic and the People's Democratic Republic of Yemen. Because of missing observations, Lebanon, Qatar and Mauritania were absent from most of the regressions.

10. For brevity only the results for equation (1) are presented here. The full model and results are available from the author upon request.

11. Data were taken from Sivard, R.L., *World Military and Social Expenditures*, World Priorities, Washington, 1989; and Sivard, R.L., *World Military and Social Expenditures*, World Priorities, Washington, 1985.

12. The original sample consisted of 110 developing countries. Because of missing observations only 93 of these were used in the analysis.

13. The regional dummy variables used were (a) SAMPLE with values of two for the seven countries under consideration and one for all other developing countries; and SAMPLERG with values of three for the sample countries, two for other countries in the Middle East/South Asia Region and one for all others.

14. *Cf.* Looney, R.E., "The Impact of Defense Expenditures on the Saudi Arabian Private Sector", *Journal of Arab Affairs*, Fall 1987, pp. 198-229.