# FACTORS AFFECTING HUMAN CAPITAL DEVELOPMENT IN IRAQ: THE ROLE OF MILITARY EXPENDITURES

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## INTRODUCTION

It is often argued[1] that the post 1973/74 expansion in military expenditures in the Persian Gulf States has led to competition between the military and non-military sectors for skilled labor. Furthermore, military expenditures are said to have pre-empted funds that might otherwise have been allocated to education and the improvement of human capital. As a result, military expenditures in the region tended to frustrate development plans even in the more affluent oil exporting countries.

Certainly if this thesis is correct, Iraq, particularly following the outbreak of the Gulf War, should be suffering a major decline in its human capital development. Even in Iraq's case, however, a decline in human capital formation is not inevitable. In fact, previous research has shown that, at least in the Middle East, there tends to be a fairly close association between increases in military participation (number of soldiers per capita) and improvements in the literacy rate. Obviously, whether or not Iraqi educational and military expenditures complement each other or compete for scarce funds will ultimately depend on the government's budgetary priorities.

The purpose of this paper is to address several aspects of the education vs. military expenditures issue as it relates to

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Iraq. Has the country's human capital development suffered during the Gulf War, and if so, in what manner? Does Iraq follow a pattern of military/human capital development typical to the Arab World? How does the country's human resource development during this period compare to that of Iran's? What are the implications of Iraq's human development patterns for the country's reconstruction?

## ECONOMIC CONDITIONS BEFORE THE WAR

In the years following the nationalization of the Iraq Petroleum Company in 1972 and the 1973 oil prices increases, Iraq has made major efforts to develop its infrastructure, its oil sector and its goods producing sectors. Simultaneously, the government also worked to modernize the military. The 1975 Algiers Accords with Iran allowed Iraq to pursue its economic development plans unhindered by the cost of quelling a Kurdish rebellion. By 1979, Iraq had displaced Iran as the second largest OPEC oil producer/exporter after Saudi Arabia.[2]

While the Baath tradition of controlling expenditure to avoid debt and economic overheating was maintained until the end of the 1970s, it was evident by 1979 that Iraq had not escaped the classic structure of an oil rich retainer state. In addition, the government was coming under increased pressure to expand expenditures following the second round of oil price increases in the late 1970s:[3]

The government's stepped up expenditures, particularly after Saddam Hussain's accession to the presidency in 1979, placed severe strains on the economy, and many of the problems currently facing the Iraqi economy began to develop at this time. In particular, shortages of skilled manpower began to appear and bureaucratic inefficiency started to have a serious effect on the development process.

Ironically, the over abundance of non-productive labor in the government service sector was matched by a serious labor shortage in productive sectors. Industrial projects in the 1976-80 Development Plan called for nearly half a million

additional semi-skilled workers, 375,000 craftspersons and 1,500,000 degree holders. The total annual output of graduates was less than 20,000, and the situation in vocational fields was even more inadequate. It is impossible to say how much the labor bottleneck as opposed to other factors contributed to the shortcomings of the Plan, but abundant anecdotal evidence indicates it was a major factor:[4]

> Japanese firms working on Iraqi projects have had to import thousands of Chinese workers from the People's Republic and Yugoslav construction firms have an edge in bidding on Iraqi projects owing to their ability to supply the necessary labor. A recent World Bank study estimates that by 1985 Iraq will depend on non-Iraqis for between 4.3 and 10 percent of its entire labor force. The outlook may be even further complicated if the armed forces draw more heavily on the limited pool of skilled labor.[5]

This last concern was realized with the mobilization of major segments of the labor force as the Gulf War escalated and size of the armed forces increased. During the early years of the war, the armed forces expanded from 140,000 persons in 1978 to 450,000 in 1982, and further to 642,000 in 1984.[6]

The mobilization of the military has several important implications. In 1978, the size of the labor force in Iraq was 2.97 million or 24 percent of the total population of 12.41 million. Applying the same percentage to the 1982 population of 14.11 million yields a labor force of 3.39 million.[7] This means that the proportion of the labor force enlisted in the army increased form 4.7 percent in 1978 to 13.3 percent in 1982. By 1984, however, with a population of 15.25 million (and an implied labor force of 3.66 million), it is likely that around 17.5 percent of the labor force was in the military.

It should be noted that the loss of a major segment of the domestic labor force to the military economy was more





than offset by the rise in the number of women in the labor force and, more importantly, by imported workers, mainly Egyptians. Thus between 1978 and 1982, the size of the labor force increased by 2.7 million (from 2.97 million to 5.67 million), while the population of Iraq increased by only 1.7 million during the same period.

Partially as a result of labor and infrastructural bottlenecks, inflation rose, imports piled up as ports in the Gulf began to clog and recourse had to be made to expensive overland routes from Turkey and Jordan. Despite these adverse signs, political imperative combined with the doubling of oil revenues meant that the overall national growth rate in 1979 was set at 16.8 percent, compared with average annual real growth of 10.5 percent in 1973. In fact, nominal growth in 1979 was 27 percent and real growth about half that. When the war broke out in September 1980, the Iraqi economy was already seriously off balance, with accelerating inflation and virtually complete dependence on oil for export revenues.[8]

## COSTS OF THE WAR

There is no doubt that the war has profoundly distorted Iraq's economy, quite apart from its incalculable human cost which includes more than a million dead and injured and between 1 and 2 million displaced persons. The fact that Iraq has not published detailed national statistics since 1977 means that any attempt to estimate the cost of the war is extremely difficult. The difficulty is compounded because various estimates each select different components or cost and thus is not comparable with the others. Furthermore, the estimates refer to different time periods.[9]

As Joffe and McLachlan[10] note, annual costings of the war show similar variations. Most observers have assumed that in recent years Iraq has spent $4-5 billion on arms purchases, with some estimates ranging as high as $6.25 billion. Iraq's economic losses have been estimated at around 16 billion a year.

## PATTERNS OF HUMAN RESOURCE DEVELOPMENT AND MILITARY EXPENDITURES

The consequences for human capital development of increased military expenditures in Iraq can be best assessed within the context of comparative developments taking place simultaneously in neighboring Arab countries. In fact, 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. 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 from 1.39 percent of GNP in 1974 for the Arab countries to 1.59 in 1984.

A similar pattern was observed in the non-Arab countries, where health expenditure increased form 1.32 to 1.62 percent of GNP over the 1974-84 decade. Whereas Arab countries had a higher average annual rate of education/GNP growth (2.8 vs. 1.9) for the decade 1974/84, non-Arab countries had higher rates of expansion of per capita education expenditures (12.1 vs. 10.2).

In general, the Arab countries have experienced higher rates of growth of military expenditures per capita relative to education or health expenditures (14.5% vs. 10.2% and 11.3%) over the 1974/84 period. Non-Arab countries, on the other hand, had higher rates of per-capita growth of education and health expenditures relative to military expenditures (12.1% and 11.5% vs. 8.8%) over the same time period.

In short, concurrent with rapid economic growth in the Arab world, there has been an acceleration in military spending. For the region as a whole, military purchases have been partially financed by oil revenues and by military aid and grants from the major industrial country arms suppliers. According to Lebovic and Ishaq:[11]

> 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%, while military expenditures grew by approximately 13.0 percent 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 Gross Domestic Product).[12]





As might be expected, comparable figures during this period for Iraq show that the country had a considerably higher increase in military expenditures than those of Arab countries as a whole; whereas Iraq's per capita military expenditures were below Arab countries in 1974, $112.42 vs. $139.82, Iraq's per capita military expenditures increased at an average annual rate of 23.37% over the 1974/84 period (vs. 14.5% for Arab countries).

Interestingly enough, Iran's military expenditures increased fairly modestly during the period under consideration. While increasing at an annual average rate of 14.6 during the 1979-84 period, they still averaged only 2.80 for the 1974/84 period as a whole. In contrast, Iran's educational expenditures were considerably above those of Iraq; by 1984 the country had a per-capita educational expenditure about twice that of Iraq's.

In terms of other measures of socio-economic/military development, for the Arab countries:

1. Government expenditures (as a percentage of GNP) on education, health and defense were about twice those non-Arab countries (19.1 vs. 3.2 in 1984). The rate of growth of the share of these expenditures in GNP

was also about twice as fast as those of non-Arab countries (3.8% vs. 1.9%) over the 1974/84 period.

2. The Arab countries also have higher teacher per capita ratios than their non-Arab counterparts in the Third World together with higher rates of growth of this ratio (3.0% vs. 1.9%) over the 1974/84 period.

3. Despite having a higher ratio of teachers per capita, the Arab countries have experienced, relative to non-Arab countries, slower rates of expansion in the proportion of the school age population attending school. As a result, the Arab countries while having a higher proportion of their population in school in 1974 (42.5% vs. 41.9%) ended the decade with a lower ratio of their school age population actually in school.

4. The relative expansion of teachers in the Arab world resulted from this group of countries experiencing a relatively rapid decline in the ratio of school age population per teacher.

5. Despite the relatively slow increase in the percentage of school age population in school, Arab countries were able to achieve considerably greater improvement in literacy than their non-Arab counterparts.

6. Consistent with their relatively high level of military expenditures, Arab countries had much higher military participation ratios (armed forces per 1.000 population) than their non-Arab counterparts. In 1974 Arab countries had 11.7% soldiers per 1,000 population, while at the same time non-Arab countries had 4.5%. By 1984 the respective rates were 14.4% and 5.6%.

Again, Iraq, while beginning the period as a relatively typical Arab country, tended to magnify several of the ten year





patterns experienced by this group of states:

1. While Iraq's expenditures on education, health and defense were nearly the same as the mean for the Arab group in 1974, by 1984 the country was spending over half (54.2%) of its GNP on these items, compared to only 22.4% for Arab countries as a group.

2. Similarly, Iraq began the period with a military participation rate slightly below (10.5% vs. 11.7%) that of Arab countries, and ended it with a rate considerably higher (42.1% vs. 14.4%).

3. Iraq's literacy rate was slightly below that of Arab countries (26.0% vs. 27.5%) in 1975. By 1984, however, Iraq's literacy rate had increased to 58% compared to 48.0% for the Arab group of countries.

4. The relative improvement in Iraq's literacy rate occurred despite the fact that the country experienced the same increase in school age population in school (2.1% 1974/84) and school age population per teacher (4.9%) as the other Arab countries.

5. In part, the improvement in literacy must have stemmed from Iraq's rapid increase in teachers per capita (8.4%) compared to other Arab countries (3.0%) over the 1974/84 period.

6. During this period, Iran tended to have more stable albeit lower expansions in most of the key ratios described above. The one exception was school age population in school, where Iran's increase was 3.4% per annum over the 1974/84 compared to 2.1% for Iraq.

Despite Iraq's heavy commitment to the military during this period, it is not obvious that the country suffered any particularly severe retardation in human capital development. As

Lebovic and Ishaq point[13] out, besides the simple guns-versus-butter trade-off, economic theory does not unambiguously indicate whether a higher military burden retards or promotes economic growth in general and human capital development in particular. Empirical evidence on the subject is the focus of controversy. The classic study of the economic effects of military spending was done in the early 1970s by Emile Benoit for the U.S. Arms Control and Disarmament Agency. His findings showed that:

> There were indications of some favorable growth effects of defense expenditures on a gross basis. Defense manpower training created and strengthened attitudes and skills useful in civilian occupations, and the defense programs provided dual use intrastructure and other goods and services similar to those provided by the civilian economy.[14]

He went on to note that:

> Devoting resources to high grade civilian investment projects rather than to defense might, of course, have produced even more growth. However, even here the practically relevant consideration is not the optimum alternative use of the resources but the probable actual alternative use. The probable actual alternative use of the resources absorbed by defense programs is civilian consumption with slight growth effects, civilian investment projects with widely varying growth effects, and non use at all—that is a higher rate of unemployment of resources.[15]

As Charles Wolf notes:

> ...and paramilitary forces can contribute to economic development by their contributions to





> internal and external stability. Moreover, the real economic costs imposed by the military on developing countries can be reduced to the extent these forces provide training, construction, technological and industrial spills-overs that contribute to economic growth. Evidence in support of both of these propositions is provided by the experience of several of the successfully modernizing countries during the past decade.[16]

In a more recent study, Erich Weede finds considerable empirical support for the proposition that increased military participation rates increase overall economic growth:

> In my view, the positive effect of military service on economic performance should be explained as follows: the military teaches discipline and creates a useful habit of obeying orders. Where the military participation ratios are high, the military is more likely to be disciplined and effective than elsewhere, since there is a perceived need to be on the alert against foreign enemies. Moreover, the higher the military participation ratio, the more young men acquire discipline and obedience. That is why I regard the military participation ratio as a discipline related indicator of human capital formation, why I suggest to broaden the notion of human capital formation so as to include abilities and discipline.[17]

Clearly, the Arab World, given its relatively low levels of human capital formation, should be one of the areas most receptive to this link between military expenditure, military participation, human capital formation and economic growth.

However, in their study of the relationship between defense burdens and growth in the Middle East, Lebovic and Ishaq[18] found in general the relationship was negative for the

non-oil exporting countries, but that no statistically significant pattern existed for the total sample (seventeen countries).

Looking at the impact of military expenditures from a different perspective, that of labor scarcity, Cummings, Askari and Skinner,[19] note that labor 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, Mohamed Raief Mousad[20] found that a ten percent reduction in the military spending ratio (percent of GNP) or a decrease of around $12.9 billion would increase education expenditure by around $8.1 billion per year.

Along these lines, Saadet Deger[21] estimated that a 15 percent reduction in the share of military spending ratio i.e., from 6.3% of GDP to 5.4% (approximately 13 billion dollars in absolute terms), would increase education expenditure ratio to 2.93% 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 as being resource abundant or resource constrained, labor abundant or labor scarce and so on.

The purpose of the analysis below is to extend several strands of previous studies. As noted above, with several exceptions, previous studies have tended to concentrate on developing countries as a whole. Here, we are primarily interested in examining the Arab states, a set of countries characterized as generally having by Third World standards very high military burdens (military expenditures as a percentage of GNP), together with lower than average levels of human capital. In addition, we are interested in determining whether and to what extent military expenditures act independently of total government expenditures in affecting human capital development in the region. Finally, are the linkages between military expenditures and human capital development in the Arab world fundamentally different from those experienced in other parts of the world, and if so why?





## FRAMEWORK FOR ANALYSIS

The main quantifiable variables pertain to allocations to defense, 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,[22] we assume that public education spending as a proportion of the national product is a crucial determinant of human capital formation (HC). In other words, if this ratio falls, then the rate of growth of human capital may, in all probability, fall too.

As Lebovic and Ishaq have noted,[23] 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 in addition to military expenditures, with each defined in terms of a different ratio. Specifically, government expenditures (GEY) were treated in terms of their share of GNP.

To avoid spurious correlations with government expenditures, allocations to defense were defined in ways other than the traditional military burden (military expenditures share of GNP). Since the literature is unclear as to the most appropriate definition of the defense burdens, three alternative measures were used: (a) military expenditures per soldier (MEAF); (b) the defense share of the central government budget (MEGE); and (c) the military participation rate—the number of soldiers per 1000 population (AFP).

Increase in human capital formation over any time period are likely to be affected by the level of human capital formation at the beginning of the period, i.e., countries with a relatively low level of human capital development at the beginning of the period are more likely to experience pressures to increase their allocations to education. This process is similar to the normal capital stock adjustment mechanism found to explain patterns of investment in physical assets i.e., invest-

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ment is likely to be higher the greater the difference between the actual and optimal stock of capital assets.[24] To control for this factor, the rate of human capital development (HCo) at the beginning of the period (i.e., 74 for the 1974-84 interval) was introduced into the regression equation.

Finally, rapid increases in per capita income may reduce the ratio of educational expenditures to Gross Domestic Product, particularly in the oil exporting countries where, due to absorptive capacity problems, oil revenues often outrun the government's capability to expand productive expenditures.[25] To achieve unbiased estimates this factor should also be controlled for the share of the government budget at higher levels of per capita income. To control for this factor, the increase in per capita income (YP) with the expected negative sign was also introduced into the regression equations.

In sum, the model with expected signs used for examining the impact of military expenditures on human development was of the form:[26]

$$HC = [\underset{(+)}{GEY}, \underset{(?)}{MEAF}, \underset{(?)}{MEGE}, \underset{(?)}{AFP}, \underset{(-)}{YP}, \underset{(-)}{HCo}]$$

Where:

HC = educational expenditures/GNP
GEY = total government expenditures/GNP
MEAF = military expenditures per soldier
MEGE = the share of defense in the central government budget
AFP = the number of soldiers per 1000 population
YP = per capita income (GNP/population)
HCo = educational expenditures/GNP in the base year

All variables except HCo were defined in terms of their rate of growth over the specified time interval. To get an idea of the robustness of the results, step-wise regressions were undertaken for the entire time interval 1974-84,[27] together with its two five-year sub-periods, 1974-79 and 1979-84.





## RESULTS

The results for the period as a whole (1974-84) produced several interesting findings: (Table 1)

1. For developing countries, in general, increases in the share of government expenditures in GNP explain approximately 60% of the changes in human capital formation. The coefficient for the government expenditure term (GEY) is very stable, not changing appreciably with varying model specification.

2. While increased military expenditures per soldier (MEAF) did not detract from human capital development, increases in the defense share of the public sector budget as well as increases in military expenditures per soldier tended to reduce the expansion of human capital development relative to GDP during this period. The same was also the case for increase in the military participation rate (AFP).

3. In terms of Iraq, it appears that the country spent considerably less than predicted by the model, with the student residual for that country varying (depending on model specification) between -4.60 and -5.06. In other words, even after controlling for military expenditures and military participation rates, Iraq was unable, relative to most other Third World countries, to increase its commitment to human capital formation during this period.

4. In sharp contrast, Iran's commitment to human capital formation was considerably above that anticipated by the model.

**TABLE 1**
**Factors Affecting Human Capital Formation In The Third World, 1974-1984**
(Standardized regression coefficients)

(1) HC = 0.77 GEY
(11.23) r2 = 0.589; F = 126.01; df = 89
**Student Residual Iraq = -4.60 Student Residual Iran = 1.56**

(2) HC = 0.78 GEY - 0.03 MEAF
(10.05) (-0.36)
r2 = 0.590; F = 61.17; df = 87
**Student Residual Iraq = -4.74 Student Residual Iran = 1.52**

(3) HC = 0.77 GEY + 0.06 MEAF - 0.28 MEGE
(10.86) (0.77) (-4.24)
r2 = 0.662; F = 54.92; df = 87
**Student Residual Iraq = -5.05 Student Residual Iran = 1.38**

(4) HC = 0.74 GEY + 0.05 MEAF - 0.26 MEGE - 0.09 HCo
(10.00) (0.65) (-3.77) (-1.34)
r2 = 0.670; F = 42.04; df = 87
**Student Residual Iraq = -4.96 Student Residual Iran = 1.37**

(5) HC = 0.75 GEY + 0.01 MEAF - 0.25 MEGE - 0.09 HCo
( 9.84) (0.17) (-3.58) (-1.37)

+ 0.06 YP
(0.77)
r2 = 0.671; F = 33.58; df = 87
**Student Residual Iraq = -5.03 Student Residual Iran = 1.40**

(6) HC = 0.84 GEY + 0.11 MEAF - 0.17 MEGE - 0.13 HCo
( 9.84) (-1.16) (-2.31) (-1.89)
+ 0.10 YP - 0.20 AFP
(1.37) (-2.62)
r2 = 0.697; F = 31.12; df = 87
**Student Residual Iraq = -5.06 Student Residual Iran = 1.56**

**Notes:** HC = education expenditures/GNP; GEY = government expenditures/GNP; MEAF = military expenditures per soldier; MEGE = share of military expenditures in central government budget; YP = per capita income; AFP = the military participation rate (armed forces per capita). HCo = education expenditure/GNP for 1974. All variables except HCo are rates of growth.





Looking at countries in terms of Arab/non-Arab groupings (Tables 2 and 3), however, produces a picture considerably different than that obtained above for the Third World countries as a whole over the 1974/84 period:

1. While by itself the growth in the share of government expenditures in GNP accounts for well over 65% of the observed fluctuations in the share of human capital formation in GDP for the Arab countries, this relationship breaks down with more complete model specification (Table 2, equations 5, 6 and 7).

2. Perhaps more importantly, several of the military expenditure terms are now statistically significant. Both expanded rates military expenditures per soldier (MEAF) and the military participation rate (AFP) tended to increase human capital development during this time period. However, as with the total sample of Third World countries, increases in the defense share of the budget (MEGE) tended to reduce the growth in human capital formation.

3. Iraq's pattern of human capital is much better accounted for in the context of Arab world development patterns than it was when the total sample of countries was used. While Iraq's human capital expenditures still expanded somewhat below the rate anticipated by the Arab world equations, this difference was much less than that predicted in the total sample case. In addition, Iraq's pattern of human capital development tended to converge toward the Arab world norm, once military expenditures were introduced explicitly into the model.

4. For the non-Arab countries (Table 3) much the reverse was true. In addition to increased levels in defense expenditures in the central government budget, these countries as a group experienced negative impacts on human capital formation stemming from expanded military expenditures per soldier and increased military participation rates.

**TABLE 2**
**Factors Affecting Human Capital Formation In The Arab World, 1974-1984**
(Standardized regression coefficients)

(1) HC = 0.82 GEY
(5.56) r2 = 0.659; F = 30.90; df = 17
**Student Residual Iraq = -3.01**
(2) HC = 0.54 GEY - 0.40 MEAF
(3.07) (2.27)
r2 = 0.746; F = 22.02; df = 17
**Student Residual Iraq = -2.52**
(3) HC = 0.48 GEY + 0.44 MEAF - 0.25 MEGE
(2.96) (2.75) (-2.10)
r2 = 0.807; F = 19.51; df = 17
**Student Residual Iraq = -2.50**
(4) HC = 0.32 GEY + 0.47 MEAF - 0.21 MEGE - 0.25 HCo
(1.99) (3.20) (-1.95) (-2.01)
r2 = 0.852; F = 30.90; df = 17
**Student Residual Iraq = -2.36**
(5) HC = 0.01 GEY + 0.91 MEAF - 0.28 MEGE - 0.27 HCo
(0.02) (5.03) (-3.19) (-2.76)
- 0.41 YP
(-3.13)
r2 = 0.919; F = 27.16; df = 17
**Student Residual Iraq = -1.22**
(6) HC = 0.26 GEY + 1.74 MEAF - 0.49 MEGE - 0.26 HCo
(0.02) (5.03) (-3.19) (-2.76)
- 0.90 YP - 0.42 AFP
(-3.13) (2.15)
r2 = 0.942; F = 30.21; df = 17
**Student Residual Iraq = -1.29**
(7) HC = 0.91 MEAF - 0.28 MEGE - 0.27 HCo - 0.41 YP
(8.84) (-3.41) (-3.13) (-4.22)
r2 = 0.918; F = 36.78; df = 17
**Student Residual Iraq = -0.65**

**Notes:** HC = education expenditures/GNP; GEY = government expenditures/GNP; MEAF = military expenditures per soldier; MEGE = share of military expenditures in central government budget; YP = per capita income; AFP = the military participation rate (armed forces per capita). HCo = education expenditure/GNP for 1974. All variables except HCo are rates of growth.





**TABLE 3**

**Factors Affecting Human Capital Formation In The Non-Arab World, 1974-1984**

(Standardized regression coefficients)

(1) HC = 0.67 GEY
(7.56) r2 = 0.449; F = 57.12; df = 71
**Student Residual Iran = 2.47**
(2) HC = 0.68 GEY - 0.27 MEAF
(43.76) (-3.19)
r2 = 0.525; F = 37.06; df = 69
**Student Residual Iran = 2.40**
(3) HC = 0.81 GEY - 0.18 MEAF - 0.33 MEGE
(10.00) (-2.19) (-4.10)
r2 = 0.662; F = 36.14; df = 69
**Student Residual Iran = 2.40**
(4) HC = 0.76 GEY - 0.20 MEAF - 0.29 MEGE - 0.14 HCo
(8.80) (-2.41) (-3.42) (-1.63)
r2 = 0.637; F = 28.45; df = 69
**Student Residual Iran = 2.43**
(5) HC = 0.77 GEY - 0.21 MEAF - 0.29 MEGE - 0.13 HCo
(8.25) (-2.26) (-3.37) (-1.56)

+ 0.03 YP
(0.30)
r2 = 0.637; F = 22.46; df = 69
**Student Residual Iran = 2.42**
(6) HC = 0.87 GEY - 0.34 MEAF - 0.21 MEGE - 0.17 HCo
(8.89) (-3.27) (-2.41) (-2.01)

+ 0.06 YP - 0.23 AFP
(0.69) (-2.52)
r2 = 0.670; F = 21.35; df = 69
**Student Residual Iran = 2.42**

**Notes:** HC = education expenditures/GNP; GEY = government expenditures/GNP; MEAF = military expenditures per soldier; MEGE = share of military expenditures in central government budget; YP = per capita income; AFP = the military participation rate (armed forces per capita). HCo = education expenditure/GNP for 1974. All variables except HCo are rates of growth.

In addition to the distinctive differences observed between Arab and non-Arab counties, several interesting contrasts were found between the two five year intervals:[28]

1. Other than the negative effect on human capital associated with increased shares of the government budget being allocated to defense, military expenditures in the developing world as a whole do not appear to have diverted resources away from education during the 1974/79 period.[29]

2. During the 1974/79 period, Iraq closely followed the pattern predicted by the model. In this sense, its efforts at human capital formation were "typical" of those of taking place in the Third World.

3. Iran, on the other hand, experienced rates of capital formation considerably above that predicted by increases in government expenditures, the share of the budget allocated to defense and the initial (1974) share of educational expenditures in Gross Domestic Product.

4. The patterns observed for developing countries during 1974/79 period were quite stable (in terms of the size of the regression coefficients); they did not carry over into the 1979-84 period. Specifically, the overall coefficient of determination (r2) was much lower in the latter interval as was the strength of the expansion in government expenditures to increase the importance of education in economic activity.

5. In addition, the military participation rate which was slightly significant (and negative) for the period as a whole was not statistically significant in either of the two five year sub-periods.

6. During the 1979/84 period, Iraq's human capital





development was considerably below that anticipated by the model. In fact, the short-fall in capital formation from that predicted increased as the share of defense expenditures in the government's budget was added to the regression equation.

7. On the other hand, over the 1974/79 sub-period, Iran was a "typical" Third World country, following very closely the increase in human capital development predicted by the model.

For Arab countries as a group:

1. The model with government expenditures (GEY) and the share of defense in the government budget (MEGE) accounted for around 65% of the fluctuations in human capital formation during the 1974/79 period.

2. In contrast to the 1974/84 period, however, increased rates of military expenditures per soldier were no longer associated with expanded levels of human capital formation.

3. In addition, increased levels of military participation were associated with reductions in human capital formation.

4. During the first five year interval, Iraq closely followed the pattern of human capital development predicted by the Arab world equations. In addition, the predicted value for Iraq's human capital development improved once the increase in military participation rate had been controlled for.

5. A much different pattern emerged in the second (1979/84) time interval. As with the case for the 1974/85 interval, both military expenditures per soldier and the military participation rate were positively associated with increases in human capital development.

6. In Iraq's case, introducing increased levels of military participation tended to increase considerably the level of human capital development predicted for that country by the model.

Finally, in terms of the patterns of human capital development in the non-Arab world:

1. In contrast to the period as a whole, military expenditures per soldier (MEAF) during the 1974-79 interval were not statistically significant in retarding the expansion of human capital development.

2. Again, at this time, expanding the share of defense in the government budget apparently came (at least partially) at the expense of educational expenditures.

3. Again Iran's performance with regard to human capital development, was superior to most developing countries. The country's positive student residual of 2.12 to 2.22 was one of the highest in the non-Arab world during this period.

4. These patterns changed in the latter five year interval. During this period, military expenditures per soldier were now associated with reduced rates of growth in human capital development (the military participation rate was statistically insignificant).

5. For this period Iran's human capital formation was slightly below that for the non-Arab countries as a whole and its position vis a vis these countries did not change considerably upon controlling for military expenditures.





## SUMMARY

To sum up, the process of human capital development in the Third World appears to be affected to a certain extent by the pattern of military expenditures simultaneously undertaken by these states. The patterns vary considerably by subgrouping—Arab vs. non-Arab and by time period—the late 1970s vs. the early 1980s. In general, these patterns have become more extreme with time.

A major finding of the analysis above was that Arab countries have tended (particularly in the more recent times) to experience positive associations between military expenditures per soldier (and to a certain extent increased military participation rates) and human capital development. On the other hand, increased military expenditures per soldier (and to a lesser extent the military participation rate) appear to have come at the expense of human capital development in the non-Arab world.

During the earlier time period, Iraq appears to have followed pretty closely the patterns experienced by most Third World countries, and certainly those of the Arab world. This situation deteriorated somewhat in the second time period, however, with Iraq missing many of the apparent linkages between expanded military expenditures per soldier and allocations to education which existed in many other Arab states. On the other hand, there is some evidence that increased military participation during the 1979/84 period stimulated increased rates of human capital development in Iraq.

As a basis comparison, Iran appears to have done relatively well with regard to its human capital development, particularly during the earlier period.

## CONCLUSIONS

While it might seem intuitively obvious that shifting public allocations toward military expenditures would retard human capital development and hence decrease a country's

long run growth prospects (and presumably increase its dependence on foreign workers), the results presented above indicate that this view is too simplistic. Admittedly, this possibility may hold some validity for many developing countries, but it does not appear to be an accurate description of the process by which resources are allocated in the Arab world. Certainly in recent years, increases in military expenditure per soldier (and perhaps also the military participation rate) appear to complement the normal allocations to education provided by most states.

Based on the results presented above, one can only speculate as to the mechanisms linking military expenditures and human capital formation in the Arab world. Given shortages of skilled labor in Iraq,[30] the government may have assigned a very high priority to attracting available skilled labor to the military services.[31]

More likely, the Iraqi government has opted to subsidize education for 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 country without requiring drastic increases in the numbers of foreign military advisors.

This interpretation is consistent with the results obtained above. Given the fairly high correlation between military expenditures and government revenues in the region,[32] allocations to both defense 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 population, 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 programs both within and outside of the military.

The results presented here suggest that additional estimates should be made of the impact on economic activity of other types of government expenditures—especially those



going to administration and services. It may well turn out that these expenditures have even higher opportunity costs in terms of labor shortages and/or reduced levels of educational attainment.

## NOTES

1. Best articulated in John Thomas Cummings, Hossein Askari and Michael Skinner, "Military Expenditures and Manpower Requirements in the Arabian Peninsula," *Arab Studies Quarterly* (Winter 1980), pp. 38-49.
2. Abbas Alnasrawi, "Economic Consequence of the Iraq-Iran War," *Third World Quarterly* (July 1986), p. 872.
3. George Joffe and Keith McLachlan, *Iran and Iraq: The Next Five Years* (London: Economist Intelligence Unit, 1987), p. 19.
5. Joe Stork, "Iraq: The War and the Gulf," *MERIP Reports* (June 1981), pp. 16-17.
6. Ruth Leger Sivard, *World Military and Social Expenditures* (Washington: World Priorities), various issues.
7. Abbas Alnasrawi, "The Economic Consequences of the Iraq-Iran War," pp. 875-76.
8. George Joffe and Keith McLachlan, *Iran and Iraq*, p. 19.
9. *Ibid.*, p. 23.
10. *Ibid.*,, pp. 23-24.
11. James Lebovic and Ashafaq Ishaq, "Military Burden, Security Needs, and Economic Growth in the Middle East," *Journal of Conflict Resolution* (March 1987), p. 107.
12. *Ibid.*
13. *Ibid.*
14. Emile Benoit, "Growth and Change in Developing Countries," *Economic Development and Cultural Change* (1978), p. 273.
15. *Ibid.*, p. 244.
16. Charles Wolf Jr., "Economic Success, Stability and the

Old International Order," *International Security* (1981), p. 89.

17. Erich Weede, "Military Participation Ratios, Human Capital Formation, and Economic Growth: A Cross-National Analysis," *Journal of Political and Military Sociology* (Spring 1983), p. 17.
18. James Lebovic and Ashafaq Ishaq, "Military Burden, Security Needs, and Economic Growth in the Middle East," pp. 106-138.
19. John Thomas Cummings, Hossın G. Askari and Michael Skinner, "Military Expenditures and Manpower Requirements in the Arabian Peninsula," pp. 38-49.
20. Mohamed Raief Mousad, "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* (Number 11, 1984), pp. 35-55.
21. Saadet Deger, "Human Resources, Government Education Expenditure, and the Military Burden in Less Developed Countries," *Journal of Developing Areas* (October 1984), pp. 37-48.
22. *Ibid.*, pp. 42-43.
23. James Lebovic and Oshafaq Ishaq, "Military Burden, Security Needs and Economic Growth in the Middle East", p. 110.
24. Cf. Michael K. Evans, *Macroeconomic Activity: Theory, Forecasting and Control* (New York: Harper & Row, 1969), Chapter 4.
25. For an excellent description and application of the concept of Absorptive capacity see Ragaei El Mallakh and Jabov K. Atta, *The Absorptive Capacity of Iraq* (Lexington, MA: Lexington Books, 1981).
26. Data was taken from Ruth Leger Sivard, *World Military and Social Expenditures* (Washington: World Priorities) various issues. 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 twenty 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 Peoples Democratic Republic of Yemen. Because of missing observations, Lebanon, Qatar and Mauritania were absent from most of the regressions.

27. As of May 1989, 1984 was the latest year covered by the Sivard data.
28. Because of their length these results are only summarized here. A complete set of tables with the detailed findings are available from the author upon request.
29. For lack of space, statistically insignificant results are not reported here. They are obtainable from the author upon request.
30. Documented in Abbas Salih Mehdi and Olive Robinson, "Economic Development and the Labor Market in Iraq," *International Journal of Manpower* (1983), pp. 3-39.
31. A possibility noted by Cummings, Askari and Skinner, "Military Expenditures and the Military Burden in Less Developed Countries, p. 42.
32. Cf. Robert E. Looney, "The Impact of Defense Expenditures on the Saudi Arabian Private Sector," *Journal of Arab Affairs* (Fall 1987), pp. 198-229.