

The Impact of Defence Expenditures on Arab Industrial Development

ROBERT E. LOONEY

The purpose of this paper is to examine the role of military expenditures in affecting the pattern of Arab industrial development. In doing so, it attempts to determine whether military expenditures have stimulated increased levels of industrial output, or whether, through diverting resources away from industrial activity, they have depressed the expansion of the region's industrial diversification.

By the use of factor and regression analysis, the main finding of the study is that defence expenditures in the Arab world have been somewhat neutral in impacting on industrial output. In contrast, the study found that non-defence expenditures have tended to retard the region's industrial diversification efforts.

These findings suggest that analysis of the relative skill intensities of civilian and defence expenditures might be a fruitful area for further research into the process of Arab industrialization.

INTRODUCTION

In just over a decade the Arab world in general and the Gulf states in particular have experienced an unprecedented growth in economic output and industrial production. The new regional era began with military and political events – the 1973 Arab–Israeli War and the Arab oil embargo – but resulted in an economic growth that few Third World regions can hope to experience.¹

The benefits of rapid increases in oil revenues were confined not only to the oil-exporting states, but were distributed to neighbouring countries through financial assistance, expanded trade, and jobs for skilled and unskilled workers.

Concurrent with rapid economic growth in the Arab world was an acceleration in regional military spending. Military purchases were partially financed by oil revenues and by military aid and grants from the major arms suppliers.² For the Middle East region as a whole real military expenditures increased from \$60.5 billion in 1975 to \$71.2 billion in 1985.³

Robert E. Looney is Professor of National Security Affairs in the Naval Postgraduate School, Monterey CA 93943, USA.

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During this period, military expenditures averaged around 30 per cent of central government expenditures. This compares with an average of around 20 per cent for developing countries as a whole. Military expenditure per capita averaged around \$500, while the average for developing countries as a whole was around \$50. While the armed forces per 1,000 people averaged around 15 in the Middle East, in the developing countries as a whole the figure was only 5 per 1,000 people.⁴

Ironically, as Lebovic and Ishaq⁵ point out, this increase in military expenditures coincided with rates of rapid growth:

During the 1973–82 period the average annual economic growth rate for individual Middle Eastern states was about 6.0 per cent while military expenditure 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 out-paced economic growth. This indicates a striking trend in the region toward higher military burdens.⁶

To date most of the analysis concerning Middle Eastern military expenditures has focused on strategic issues and the resulting shifts in regional military balance stemming from the recent explosion in defence expenditures. Those studies examining the economic effects from defence expenditures have focused largely on the identification of linkages between defence expenditures and economic growth. While these studies have provided some insight as to the shorter-term economic costs (and occasional benefits) provided by defence expenditures, longer-term factors such as effects on industrial growth and diversification may ultimately determine whether the Middle East military build-up has seriously retarded (or possibly aided) the eventual attainment of viable, self-sustained economic growth of the majority of the region's countries.

The general purpose of the analysis below is to shed more light on the role of military expenditures in affecting economic development in the Arab world. In particular, we are interested in determining the impact, if any, of military expenditures on the industrial development of the region. Have military expenditures stimulated increased levels of industrial output or, perhaps by diverting resources away from industrial activity, have defence expenditures tended to depress the expansion of the region's industrial diversification and development?

MILITARY EXPENDITURES AND ECONOMIC PERFORMANCE

Historically, most analysis of the economic impacts of defence expenditures on Third World development have concentrated on possible growth

effects (either positive or negative) stemming from increased defence burdens. While not dealing with the issue of industrialization directly, these studies do throw light on the types of impact on manufacturing one might expect from increased military burdens.

The classic study of the economic effects of military spending was done in the early 1970s by Emile Benoit for the US Arms Control and Disarmament Agency. His findings are summarized as follows:

There were indications of some favourable growth effects of defence expenditures on a gross basis. Defence manpower training created and strengthened attitudes and skills useful in civilian occupations, and the defence programmes provided dual use infrastructure and other goods and services similar to those provided by the civilian economy. An observed association between high defence burdens, high rates of price increases, and high growth rates . . . also suggested the likelihood that in some countries defence expenditures may have had a 'Keynesian' type of effect in stimulating the use of unemployed or underemployed resources by raising aggregate demand where anti-inflation policies would otherwise have kept it below the level conducive to maximum real growth. Up to a certain level, defence programmes also contributed to the essential security required for economic progress, and under conditions of national danger may even have had energizing and motivational benefits.

He went on to note that:⁸

Devoting resources to high-grade, civilian investment projects rather than to defence 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 defence programmes is civilian consumption with slight growth effects, civilian investment projects with widely varying growth effects, and no use at all – that is a higher rate of unemployment of resources.

Much of the criticism of Benoit is ideological in content. But some valid criticisms of his assumptions, data and methodology can and have been made.⁹ Since Benoit's original work, research on the impact of Third World military expenditures has taken four broad directions:

1. More sophisticated extensions of Benoit direct-impact effects.
 2. Estimates focusing on direct and indirect effects.
 3. Differential impacts of defence expenditures in sub-groupings of
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countries based on relative resource endowments.

4. Eclectic studies focusing on defence/security impacts.

The first set of studies have concentrated on larger sample sizes, and/or improved methodologies:¹⁰

1. Using a slightly different methodology, Lim¹¹ repeated Benoit's analysis on a larger group of developing countries (54) for a later time period (1965–73) and found high military burdens to be detrimental to economic growth.

2. Faini and associates¹² employed regression estimates for 69 countries over some or all of the period 1952–70 and found that an increase of 10 percentage points in the defence burden leads to a reduction of annual growth by 0.13%.

While Benoit, Lim, and Faini concentrated on the direct impacts of defence expenditures, a second set of studies largely undertaken by Deger¹³ and his associates have focused on their indirect ramifications. Using equation systems that posit, in addition to the direct spin-off effects, related effects through reduced private investment or domestic savings, Deger and Sen¹⁴ and Deger and Smith¹⁵ show that for the 1965–73 period (50 countries) that, although military spending has a small positive effect on growth, the net effect of military spending on growth is negative owing to associated decreases in investment and/or savings.

It is not altogether apparent in any of these studies whether the military burden acts in some way as the statistical proxy for government expenditures. As noted, the size of the government is recognized to have a positive direct effect (Keynesian) and a negative indirect effect (crowding-out of private investment) on economic growth.

The third direction taken by post-Benoit researchers has involved the disaggregating of developing countries into categories, such as resource rich and resource poor or foreign-exchange constrained and unconstrained.¹⁶ In general these studies have found that resource-rich or foreign-exchange abundant countries tend to derive positive impacts on growth from increased military burdens, presumably because they have sufficient resources to pay for both defence and development.

On the other hand, resource-constrained, foreign-exchange poor nations tend to have much lower military expenditures relative to gross domestic product. For these countries, military expenditures tend to have a negative impact on growth. Although during periods of austerity high opportunity costs might indicate that defence cuts could be appropriate, for this group of countries it is usually development projects that are reduced. The reasons are very simple: military expenditures are current outlays (not including arms bought on credit), whereas development

projects are future growths, and there is a natural tendency to try to maintain the status quo. As a result, military budgets in resource-constrained countries are often not significantly reduced during periods of austerity.¹⁷

Finally, the last group of studies tend to focus more on the total impact of defence/security/human capital on economic development. As Charles Wolf notes:¹⁸

. . . 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 spill-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.

In a more recent study, Weede finds considerable empirical support for the proposition that increased military participation rates increase economic growth:¹⁹

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.

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 defence burdens and growth in the Middle East, Lebovic and Ishaq²⁰ found, in general, that the relationship was negative for the non-oil exporting countries, but that no statistically significant pattern existed for the sample (17 countries) as a whole. The negative finding is of course consistent with those obtained by Frederiksen and Looney, who make a distinction between resource-constrained and resource-abundant countries.

Given the small sample size of oil producers in the Middle East, Lebovic and Ishaq were not able to test for any potential positive relationship between defence expenditures and economic growth, a relationship identified by Frederiksen and Looney for larger samples of developing countries. These positive relationships have, however, been identified through time-series analysis for certain individual countries and periods of time.

In his examination of the Saudi Arabian economy, Looney²¹ found that:²²

1. In general, military expenditures have had a net positive impact on the country's overall gross capital formation. That is, after allowing for government expenditures and oil revenues, increases in military expenditures have had a net stimulating effect on investment in the Kingdom. The same also applies to non-oil investment. Here, however, the size of the coefficient (0.30) of defence expenditures is low compared with that of government investment (0.79).
2. Military expenditures do not appear to stimulate either total private-sector expenditures or consumption. Again government investment appears particularly productive in contributing to increased levels of private-sector consumption.
3. Military expenditures do not appear to increase levels of imports nearly as much as do the levels of government expenditures or oil revenues.
4. Interestingly enough, military expenditures appear to induce private-sector investment, whereas government investment seems to crowd out or pre-empt resources that might otherwise flow towards this sector.
5. In the net result, military expenditures appear to contribute more to total demand than does government consumption. The stimulating effect of military expenditures on other types of government expenditure (particularly in the light of the apparently negative effect of government consumption on investment) has tended to reinforce this effect.

In short, military expenditures in the Saudi Arabian context appear to have (in addition to their security value) a number of significant impacts on the private sector, not all of which are negative. In particular, several of the major areas of private-sector activity appear to derive more of a stimulus from government expenditures than from other forms of government allocations. The same also appears to apply to the level of gross capital formation and non-oil investment.

In addition, Looney's results suggest that a careful shifting of government allocations from public-sector consumption to capital formation (providing that profitable areas for investment have not been exhausted), rather than across-the-board reductions in military expenditures, is the most productive policy open to the authorities for contributing to private-sector expansion.

In a slightly different context, it has been suggested that excessive defence expenditures led to the economic instability preceding the Iranian Revolution. While this argument sounds quite plausible, recent cross-section research has reached the counter intuitive conclusion that Iran may have actually derived a number of beneficial economic impacts from allocations to the military. However, cross-sectional analysis looks at only one point in time, and hence its results are always sensitive to the dates chosen for examination.

To determine if time-series analysis provides a different perspective on the impact of the country's military expenditures, another time-series study by Looney²³ attempted to quantify the impacts of military expenditures on the Iranian economy over the 1959-77 period, and, in particular, the consequences associated with the rapid military build-up undertaken by the Shah in the mid-1970s.

In general, Looney's findings indicated that, while a case could be made that the Iranian economy received positive net benefits from defence expenditures in the 1960s, this relationship broke down in the 1970s, with added military expenditures, perhaps through the bottlenecks they created, having a negative impact on a number of sectors and types of capital formation. Interestingly enough, these negative effects were not systematically associated with other types of government expenditures, indicating that defence expenditures were unique in their marginal, negative impact on private-sector output after the 1973-74 revenue boom.

Again these findings are consistent with cross-section analysis, which indicates that resource-constrained countries generally experience negative impacts from military expenditures, while those not constrained by foreign exchange and/or domestic savings are capable of experiencing positive impacts from increased allocations to defence.

IMPACT OF GOVERNMENT EXPENDITURES ON INDUSTRIAL DIVERSIFICATION

While the studies described above provide a number of insights as to the ways in which military expenditures affect economic performance in the Arab world, they are somewhat silent as to the manner in which these

effects occur. In particular, it is not always apparent whether in these studies the military burden simply acts in some way as the statistical proxy for government expenditures. As noted, the size of these is likely to have a positive direct effect (Keynesian) and a negative indirect effect (crowding-out) on private-sector activity. Are the net impacts of these effects similar or opposite for defence and non-defence governmental expenditures?

In terms of their impact, defence expenditures in particular and/or government expenditures in general may retard industrial development because of their potential to cause:²⁴ (a) a decrease in private consumption because fewer resources (including foreign-exchange) are available to the civilian sector; (b) a decrease in civilian imports, and even balance of payments difficulties owing to increased military imports; (c) an increase in inflation owing to increased government budget deficits; (d) a distortion of the pricing system because generally military procurements are not made in open, competitive markets; (e) shortages of managerial skills and skilled workers in a labour-constrained civilian sector leading to reduced productivity and growth; (f) a distribution of income in favour of the military and against the civilian sector; and (g) an increase in the political power of the military leading it to control, and pre-empt if necessary, the civilian sector of the economy.

Many of these effects combine in the oil-exporting countries to produce the so-called 'Dutch disease' effect whereby a booming oil sector impacts in such a way as to create an expanding non-traded goods (and services) sector, and a declining or stagnating non-oil (externally) traded goods sector.

In the developed countries (in particular Holland) where this phenomenon was first observed, it has been associated with 'de-industrialization', while in the less-developed countries and especially among OPEC members it has been associated with a fall in domestic production of traded agricultural and industrial goods (except of course where the product enjoys high tariff barriers and/or import restrictions) and a boost to construction and services (both of which are mostly non-traded in terms of the final product).

The Dutch disease model is based upon a three-factor, two-commodity full employment model of production and trade.²⁵ Specifically the economy is assumed to produce two commodities: one traded internationally (either exported or imported or both), the other traded only domestically, since either transported costs or import restrictions prevent the commodity from being internationally traded. The two sectors producing traded and non-traded goods are assumed to have capital in a fixed amount that is given and non-shiftable in the short run.

The labour force is fixed in the aggregate, but mobile between the two sectors.

To sum up, the model assumes two specific factors, one mobile factor and two commodities, one internationally traded and the other not. Based on these assumptions, significantly increased oil-financed, public-sector expenditures produce a change in relative sectoral prices. The resultant price/wage movements determine factor incomes and sectoral output.²⁶

Based on the above assumptions, petroleum-financed expenditures impact in a predictable manner: imports expand and there is a decline in the relative price of traded goods. This is a direct result of the fact that the initial excess in demand increases the price of non-traded goods (which are realistically assumed to be in limited supply in the short run). Higher disposable income, the relative price advantage of traded goods after the boom, plus lower production of traded goods at home (owing to their lower relative price and resulting fall in profitability), increase the demand for imports, thus causing the trade balance to deteriorate. However, the country's ability to maintain a fixed exchange rate supported by dollar-dominated oil revenues, together with rising prices for non-tradeables result in an appreciation of the real exchange rate.

Given the fixed capital stock and perfectly competitive markets, the demand for labour in each sector depends on the wage/price relationship in that sector. The demand for labour depends negatively on the sectoral real product wage (ratio of the wage to sectoral output price). This means that a rise in the relative price of one sector by more than the wage would increase employment and thereby output in that sector.

Increased output would involve higher cost per unit, since it would come about through an increase in the sector's use of labour per unit of capital, implying a falling sectoral marginal physical product of labour, because the capital stock is fixed. The mobility of labour and the immobility of capital means that a change in the relative price of traded to non-traded goods would have an uneven impact on factor incomes. Labour mobility allows labour to shift out of the traded sector, and thereby maintain or raise its real income, while capital immobility means that the returns to capital fall sharply in the sector with a lower relative price, and returns to capital rise sharply in the sector with a higher relative price.

It is clear that the traditional Dutch disease-oriented approach to the analysis of oil booms stresses the factors associated with the appreciation of the real exchange rate, driven by a rise in the relative price of non-traded goods. The relative price shift causes a reallocation of labour towards the non-traded sector, a rise in the output of non-traded goods

and a fall in the output of traded goods. Returns to capital in non-traded activities rise, while returns in traded activities fall.

On the surface, there is considerable evidence that most of the patterns predicted by the model outlined above have characterized development in two of the leading Gulf states, Saudi Arabia and Kuwait. For example, in a recent study Al-Sabah found that:²⁷

1. The real share of the tradeable sector in non-oil GDP increased from 9.97 per cent in 1966 to more than 14.5 per cent in 1974, but then declined to only 12.4 per cent in 1978. In contrast the private non-tradeable sector behaved in the opposite manner: its share continued to decline in the 1960s and early 1970s (it reached 44.7 per cent of non-oil GDP in 1974), but after 1974 it recovered strongly to contribute more than half of the non-oil real GDP in 1978. The public non-tradeable sector, on the other hand, behaved in a fluctuating manner, with a downward trend.
2. Not only did the real growth rate of the private non-tradeable sector surpass those of the tradeable and the public non-tradeable sector, but it also emerged in the 1978–80 period as the fastest employer. Employment in the private non-tradeable sector increased from 24.46 per cent of the total labour force in 1975 to more than 32 per cent in 1980.
3. Even though the tradeable and the public non-tradeable sector managed to increase their absolute numbers of labour employment (owing to the large influx of foreign labour), they were not able to increase their relative shares in total employment.
4. Government expenditure on wages and salaries, which represents more than 80 per cent of current expenditure, increased by about 130 per cent during the period 1972–78, although the increase in the size of government employment was no more than 48 per cent in the same period, reflecting the fact that nominal wages in the government sector increased by more than 80 per cent during the six-year period.
5. Government expenditures increased by more than 250 per cent during the 1973/74 to 1977/78 period. Given the scarcity of indigenous labour, the huge increase in government expenditure resulted in a large increase in the cost of labour, and also in intense real estate speculation, which made real estate transactions more profitable than building new housing. As a result, a severe housing shortage developed, which was reflected by the more than 80 per cent increase in the rental index of housing during 1975–78.
6. In terms of relative rates of inflation, the price index for the

tradeable goods sector relative to the GDP deflator was continually decreasing throughout the 1974–78 period. In other words, price inflation in the tradeable sector was decreasing relative to general, domestic price inflation, whereas price inflation in private non-tradeable outpaced domestic inflation. Price responses of the public non-tradeable sector, on the other hand, were less regular – possibly because of their largely administered prices and the dominance of the government sector.

7. The appreciation of the real exchange rate, (defined by Al-Sabah as the GDP deflator for tradeable goods relative to the GDP deflator for private non-tradeable goods), was a clear signal for private resources to be reallocated towards non-tradeable activities (like real estate speculation), while profitability in the tradeable sector tended to be squeezed between rising domestic costs and import competition.

8. During this period the importance of trade to the Kuwaiti economy increased considerably. The trade balance was only about 11.5 per cent of the GDP in 1970, but after the oil price increase of 1973–74, it increased tremendously with a value of more than half the 1974 GDP.

9. The movements of the nominal exchange rate, however, in the period 1974–78 appear to have had a weak linkage with particular components of the balance of payments. The Kuwaiti dinar's exchange rate was not very sensitive to changes in the current or capital account, perhaps because it was heavily influenced by the authorities' desire to curtail imported inflation.

10. There is a remarkable association between the real exchange rate, share of tradeable goods in non-oil GDP, and non-oil trade deficits relative to GDP. Up to 1974, the real exchange rate was depreciating, with inflation in the tradeable sector far exceeding inflation in non-tradeables. The rise in the relative price of tradeable goods had presumably reduced the growth rate and demand for tradeables relative to non-tradeables. This factor may go a long way in explaining the 28 per cent reduction in the ratio of the non-oil trade deficit in GDP during the 1971–74 period. On the other hand, real depreciation, among other things had apparently stimulated growth in the tradeable sector and led to more than a ten per cent increase in the share of tradeables in non-oil real GDP.

11. The picture for 1974–78 is very consistent with the Dutch disease model, in that in the case of the real appreciation of the exchange rate, one would expect the growth in domestic demand for tradeables to increase relative to non-tradeables, which leads to an

increase in the trade deficit and hence a squeeze in profitability of the tradeable sector relative to non-tradeables. In fact, real appreciation was associated with a substantial increase in the non-oil trade deficit, and a noticeable reduction in the share of the tradeable sector in non-oil real GDP. Interestingly enough, the private non-tradeable sector, which was a major loser during the period of real depreciation, made a remarkable recovery after the price shock of 1973–74.

In sum, Al-Sabah presents a convincing case for the existence of the Dutch disease in Kuwait, at least through the 1970s. These results were also confirmed for the expanded time period, 1970–85, by Looney²⁸ in a recent study which found that:

1. Primary activities: agriculture, fishing, and mining exhibit mixed results from real exchange-rate appreciation, with agriculture and mining experiencing weak Dutch disease effects (the rather low level of statistical significance of the Dutch disease term) with fishing obtaining a positive stimulus from this effect.
2. Manufacturing activities exhibit a fairly consistent pattern of Dutch disease effects. As expected, this sector largely comprised products that are tradeable and experienced generally negative impacts from both an appreciating exchange rate and an increase in relative prices.
3. As expected, services consisting largely of non-tradeables generally experienced positive Dutch disease effects.

Finally, in his study of Saudi Arabian industrialization Looney²⁹ found that, in general, in the case of tradeables:

1. Government expenditures and credit have played a major role in stimulating production.
2. The problems associated with an appreciating exchange rate, the Dutch disease, have tended to reduce output. This applies to both long- and short-run movements in the case of agriculture, mining and refining, and shorter-run movements in the case of non-oil manufacturing.

From this, Looney concluded that, in the case of Saudi Arabia, oil revenues have tended to work at somewhat cross purposes for the general class of tradeables. On the expenditure side, oil revenues have been converted into both effective demand and available credit that would obviously not have been present otherwise. On the other hand, the competitive effects associated with exchange rate appreciation have

apparently tended to offset any cost-reducing effects stemming from lower cost imports of capital, intermediate goods and labour. Here, however, non-oil manufacturing presents an interesting exception, in that the longer-run effects associated with the Dutch disease have tended to net out, leaving only shorter-run negative impacts stemming from appreciation in the real exchange rate.

In the case of non-tradeables a much different pattern has developed:

1. With the exception of construction, direct government expenditures have played a minor role in stimulating production. With the exception of wholesale and retail trade, the same applies to credit.
2. On the other hand, again with the possible exception of wholesale and retail trade, in the short run all these sectors have received considerable stimulus through their higher domestic prices and reduced import costs associated with an appreciating exchange rate.

Looney found that, in spite of apparent Dutch disease symptoms in Saudi Arabia, long-run disincentives did not appear to be preventing expansion in the manufacturing sector as a whole. In part this finding may result from the fact that the manufacturing sector in Saudi Arabia is extremely non-homogeneous, with a modern export sector superimposed on a local more traditional, non-traded set of activities, largely producing for ARAMCO and the construction sector (non-tradeables). There is likely to be imperfect substitution between many of the local manufactured goods and imported products. Given the fact that the manufacturing sector is comprised of both tradeables and non-tradeables, any long-term trends in the exchange rate are likely to be neutral for the sector as a whole.

On the other hand, Looney concluded that, given likely developments in the oil sector and the resulting inability to import massive amounts of labour and capital, the government, burdened with an overvalued real exchange rate, will find it increasingly difficult to attain its highest priority: diversification through expansion of the traded goods sector.

THE RELATIVE IMPACT OF DEFENCE AND GENERAL GOVERNMENT EXPENDITURE

In sum, while differing somewhat on specific details, empirical studies on the ramifications of increased government expenditures tend to pessimism: studies focusing on the impact of defence expenditures tend to stress the retarding effect of these allocations on general growth; studies stressing general or total governmental expenditures, especially in oil-

rich countries, tend to indicate that the side effects associated with these expenditures often depress industrial investment and development.

Obviously, for policy purposes it is important to determine the manner in which government expenditures influence industrial development:

1. Are these effects largely direct, i.e., the diversion of labour, capital and foreign exchange from the industrial sector, or are they of the indirect type associated with the Dutch disease?
2. Are there additional consequences, such as accelerated growth stemming from government expenditures, strong enough to neutralize or even offset any possible disincentives to industrial investment and expansion associated with public sector expenditures?
3. Are military expenditures more likely than non-military allocations to affect industrial development and diversification?

To examine these issues an analysis was made of the patterns of government expenditures and manufacturing output in a sample of the 20 Arab countries for which the Arab Monetary Fund publishes data on a continuing basis.³⁰

In estimating the impact of government expenditures on industrial growth and diversification, it is assumed that the sectoral share of manufacturing output at some point in time [MANUF(t)] is a function of manufacturing output in a base year [MANUF(o)], the share of government expenditures in economic activity [GE(t)], the appreciation of the real foreign exchange rate [DUTCH], and real per capita economic growth [DYP], with the expected signs:

$$\text{MANUF}(t) = [\text{GE}(t), \text{DUTCH}, \text{DYP}, \text{MANUF}(o)]$$

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1. The expected sign of government expenditure can be either positive or negative, depending on the net effect of crowding out vs Keynesian demand linkages. Government expenditures were broken down into three main categories: (a) total government, (GE); (b) defence expenditures (MILX), and (c) non-defence expenditures (GEC).
 2. Since the Dutch disease variable is defined as the nominal exchange rate in terms of dollars (deflated by the ratio of import to domestic prices), higher values would therefore indicate depreciation of the currency, and its expected sign is therefore negative. For estimation purposes the term DUTCH represents the change in the real exchange rate from its 1974 base.
 3. The growth of domestic demand, DYP, is defined as the change in real per capita income from the base year of 1974.
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4. Two terms were used to represent the extent of industrialization in some base year: MANNO, the share of manufacturing output to non-oil GDP and MANTDS, the ratio of manufacturing value added to that of distribution. These two terms were chosen because they show significant differences between oil and non-oil Arab countries.

The received literature is of somewhat limited value in providing insights as to the appropriate operational definition of several of the key variables. For instance, is the relative degree of industrial development and/or diversification best represented by the share of manufacturing in GDP, or the share of manufacturing in total expenditures? The same applies to the relative extent of public sector expenditures. Is the relative burden of military expenditures best depicted as the share of governmental expenditures in GDP, its share relative to private sector expenditures, or its share of total expenditures?

It is quite clear that any definition of either the relative degree of industrialization or governmental expenditures will be arbitrary. To avoid as much as possible the use of arbitrary definitions of key variables, a factor analysis was used to create indexes of both industrial activity and the government's relative control of resources. Since total government expenditures and non-defence public-sector expenditures were highly correlated, a separate factor analysis was performed for each. Other variables included in each factor analysis were those representing defence expenditures, manufacturing and oil.

A typical factor analysis, together with individual country scores on each factor, is given in Table 1.

1. The factor depicting total government expenditures was comprised largely of government expenditures as a percentage of non-oil GDP, GDP and domestic absorption. The same applied to non-defence public-sector expenditures.
2. The factor depicting the relative degree of industrialization consisted largely of manufacturing as a share of non-oil GDP, and manufacturing as a share of domestic absorption.
3. The oil variable was composed largely of variables representing the ratio of oil to non-oil GDP and domestic absorption.
4. Military expenditures were represented by a factor depicting the influence of military expenditures as a share in total government expenditures, and military expenditures as a share of non-oil GDP and total Gross National Product.

The interesting aspect of the factor analysis was the finding of little correlation between total government expenditures and those allocated to defence. The same result was also obtained in a factor analysis

containing both non-defence and defence expenditures. In addition, and somewhat contrary to popular belief, it appears that military expenditures in the Arab world are determined by factors other than general budgetary considerations and/or the ability to finance expenditures out of sources such as oil revenues.

TABLE 1
FACTOR ANALYSIS OF ARAB WORLD ECONOMIC STRUCTURES, 1983
(standard regression coefficients)

Variable	Factor 1 Gov Exp	Factor 2 Oil	Factor 3 Military	Factor 4 Manuf
gov exp/GDP	1.10*	-0.33	0.02	0.04
gov exp/absorption	0.83*	0.33	-0.07	0.05
gov exp/non-oil GDP	0.80*	0.34	-0.07	-0.07
oil/absorption	-0.08	1.02*	0.04	0.06
oil/non-oil GDP	-0.01	0.99*	0.02	-0.03
military exp/gov exp	-0.21	-0.04	1.09*	0.04
military exp/absorption	0.31	0.11	0.74*	-0.01
military exp/non-oil GDP	0.34	0.15	0.66*	-0.08
manufacturing/non-oil GDP	0.12	0.03	0.00	1.01*
manufacturing/absorption	-0.09	0.00	0.00	0.96*
Factor Scores	Factor 1	Factor 2	Factor 3	Factor 4
<i>Oil Producers</i>				
UAE	-1.36	1.12	0.63	1.35
Bahrain	-0.62	-0.14	-0.97	0.99
Arabia	1.26	1.43	1.12	-0.30
Oman	0.82	1.62	2.43	-1.49
Kuwait	0.96	1.44	-0.89	-0.13
Libya	0.46	1.17	0.82	-1.14
<i>Other</i>				
Jordan	-0.16	-0.88	0.37	0.25
PDR Yemen	1.25	-1.00	-0.10	0.01
Yemen Arab Rep.	-0.31	-0.92	0.53	-0.87
Egypt	0.70	-0.32	0.68	1.08
Algeria	0.32	0.16	-1.16	0.53
Tunisia	-0.44	-0.50	-0.92	0.54
Sudan	-1.24	-0.86	-0.97	-0.71
Somalia	-0.60	-0.87	-0.22	-1.04
Morocco	-0.90	-0.73	-0.73	1.86
Mauritania	-1.03	-0.72	-0.63	-0.93

Notes: Factor analysis based on orthogonal rotation. Manufacturing and oil data from: Arab Monetary Fund, *National Accounts of Arab Countries, 1974-1985*. Government and military expenditure data from: United States Arms Control and Disarmament Agency, *World Military Expenditures and Arms Transfers, 1985*.

Finally, several country patterns stand out:

1. The oil countries, with the exception of the UAE, have generally relatively high levels of governmental expenditures. With the exception of Bahrain and Kuwait, the same also applies to military expenditures.

2. Again with the exception of the UAE and Bahrain, the oil countries are at a somewhat lower stage of industrial development and diversification.
3. In general, there is little association between total government expenditures and defence expenditures in the Arab world. Notable exceptions are Bahrain, Libya, Egypt, Sudan and Morocco.

The next step in the analysis was to test for the relative importance of government expenditures in affecting the pattern of industrial development and diversification. For this purpose estimates were made of the equation given above for three points in time: 1985, 1983, and 1977. Here, 1985 was selected since it represented the last year for which complete data were available.

Both 1983 and 1977 were selected because they represented the conditions after the effects of the first (1973/74) and the second (1978/79) oil price shock had worked themselves out.

TABLE 2
RELATIVE IMPACT OF GOVERNMENT EXPENDITURES ON
ARAB WORLD INDUSTRIAL DEVELOPMENT, 1985

(standard regression coefficients)					
MANUF = -	0.41 GET	+ 0.51 DUTCH	+ 0.45 DYP	+ 0.44 MANTDS77	- 0.21 MANNO77
	(-3.01)	(2.70)	(1.75)	(2.10)	(-0.56)
r ² = 0.890; F = 11.39 df = 12					
MANUF = -	0.44 GEC	+ 0.48 DUTCH	+ 0.42 DYP	+ 0.77 MANTDS77	- 0.07 MANNO77
	(-2.88)	(3.06)	(2.82)	(1.97)	(-0.19)
r ² = 0.881; F = 10.33 df = 12					
MANUF = -	0.25 MILX	+ 0.55 DUTCH	+ 0.48 DYP	+ 0.55 MANTDS77	- 0.23 MANNO77
	(-0.98)	(2.39)	(2.16)	(1.06)	(-0.37)
r ² = 0.779; F = 4.95 df = 12					
MANUF = -	0.27 OIL	+ 0.53 DUTCH	+ 0.52 DYP	+ 0.37 MANTDS77	+ 0.05 MANNO77
	(-1.41)	(2.56)	(2.44)	(0.79)	(0.10)
r ² = 0.804; F = 5.76 df = 12					

Notes: Manufacturing (MANUF); total government expenditures (GET); non-military government expenditures (GEC); military expenditures (MILX); and oil (OIL) are factor scores derived from a four-factor oblique rotation comprised of: oil, manufacturing, military and government expenditure variables. The manufacturing factor consists of manufacturing/non-oil GDP, and manufacturing/absorption. The oil variable consists of mineral sector output as a share of non-oil GDP and absorption. The military factor consists of: military expenditures/total government expenditures, military expenditures, non-oil GDP, and military expenditures/absorption. The government expenditure factors consist of government expenditure as a share of: absorption, non-oil GDP and GDP. DUTCH is the Dutch disease effect and represents the appreciation of the real exchange rate over the 1974-85 period, i.e., a positive sign indicates depreciation of the real exchange rate. DYPNO = growth in non-oil per capita income over the 1974-85 period; MANNO77 = the share of manufacturing output in non-oil GDP, 1977; and MANTDS77 = manufacturing value added/distribution/value added, 1977.

TABLE 3
RELATIVE IMPACT OF GOVERNMENT EXPENDITURES ON
ARAB WORLD INDUSTRIAL DEVELOPMENT, 1983

(standard regression coefficients)

$$\text{MANUF} = -0.38 \text{GET} + 0.43 \text{DUTCH} + 0.43 \text{DYP} + 0.56 \text{MANTDS77} + 0.10 \text{MANNO77}$$

(-3.19) (2.58) (3.16) (1.74) (0.28)

$$r^2 = 0.868; F = 13.17 \text{ df} = 15$$

$$\text{MANUF} = -0.47 \text{GEC} + 0.36 \text{DUTCH} + 0.40 \text{DYP} + 0.47 \text{MANTDS77} + 0.10 \text{MANNO77}$$

(-3.79) (2.39) (3.18) (1.59) (1.07)

$$r^2 = 0.890; F = 16.11 \text{ df} = 15$$

$$\text{MANUF} = -0.21 \text{MILX} + 0.47 \text{DUTCH} + 0.51 \text{DYP} + 0.61 \text{MANTDS77} - 0.16 \text{MANNO77}$$

(-0.95) (1.82) (2.65) (1.30) (-0.28)

$$r^2 = 0.755; F = 6.19 \text{ df} = 15$$

$$\text{MANUF} = -0.38 \text{OIL} + 0.54 \text{DUTCH} + 0.64 \text{DYP} + 0.64 \text{MANTDS77} - 0.17 \text{MANNO77}$$

(-2.48) (2.71) (3.81) (1.75) (-0.41)

$$r^2 = 0.835; F = 10.15 \text{ df} = 15$$

Notes: See notes to Table 2; in this table DUTCH and DYPNO relate to the period 1974-83.

TABLE 4
RELATIVE IMPACT OF GOVERNMENT EXPENDITURES ON
ARAB WORLD INDUSTRIAL DEVELOPMENT, 1977

(standard regression coefficients)

$$\text{MANUF} = -0.39 \text{GET} + 0.14 \text{DUTCH} - 0.21 \text{DYP} - 0.38 \text{MANTDS74} + 1.28 \text{MANNO74}$$

(-3.10) (1.19) (-0.84) (-1.41) (4.52)

$$r^2 = 0.878; F = 14.44 \text{ df} = 15$$

$$\text{MANUF} = -0.46 \text{GEC} + 0.14 \text{DUTCH} - 0.24 \text{DYP} - 0.40 \text{MANTDS74} + 1.45 \text{MANNO74}$$

(-3.42) (1.32) (-2.29) (-1.64) (5.16)

$$r^2 = 0.897; F = 17.39 \text{ df} = 15$$

$$\text{MANUF} = -0.17 \text{MILX} + 0.11 \text{DUTCH} - 0.13 \text{DYP} - 0.16 \text{MANTDS74} + 0.90 \text{MANNO74}$$

(-1.01) (0.73) (-0.84) (-0.47) (2.65)

$$r^2 = 0.783; F = 7.25 \text{ df} = 15$$

$$\text{MANUF} = -0.29 \text{OIL} + 0.14 \text{DUTCH} - 0.01 \text{DYP} - 0.29 \text{MANTDS74} + 1.11 \text{MANNO74}$$

(-1.81) (0.99) (-0.01) (-0.47) (3.36)

$$r^2 = 0.821; F = 9.16 \text{ df} = 15$$

Notes: See notes to Table 2; in this table DUTCH and DYPNO relate to the period 1974-77; MANNO74 and MANTDS74 relate to 1974.

In general, the results (Tables 2–4) indicate that:

1. Dutch disease factors were relatively important in the latter periods in affecting the development of the manufacturing. Based on the size of the standardized regression coefficients, Dutch disease effects were slightly more important than real per capita growth in affecting manufacturing by 1985.
2. By 1983, however, real per capita growth had a slightly stronger effect on the region's industrial development.
3. By 1977, however, neither real per capita growth nor the Dutch disease effects had made much of an impact on the region's industrial development.
4. In general, higher levels of total government expenditures and governmental non-defence expenditures have been associated with depressed development of the industrial sector.
5. This pattern is not simply a spurious correlation, in that it does not reflect the fact that high levels of government expenditure are found in countries with dominant oil sectors. Except for a weak association in 1983, development of the oil sector does not appear to be statistically significant in explaining the pattern of relative industrial development in the Arab world.
6. In contrast to total governmental expenditures and those for non-defence activities, military expenditures do not appear to have affected Arab world industrial development over the 1974–85 period. While this term had a negative sign in each of the years examined, it was not statistically significant in any instance.

CONCLUSIONS

While it might seem intuitively obvious that shifting public allocations from military toward more productive activities would result in a net positive stimulus to industrial development, the results presented above indicate that there is little evidence that this is the case in the Arab world. In fact, other types of governmental expenditure have tended to have a relatively strong depressing effect on the region's industrial diversification efforts.

The finding that defence expenditures are rather neutral in regards to industrial growth is consistent with other studies with time series analysis for individual countries. Apparently allocations to defence can have a net negative impact on industrial development; but this is most likely to occur only during periods of particularly rapid acceleration in expenditures.

Perhaps the novel finding of this study was the generally negative impact on industrial development produced by non-defence expen-

ditures. At this point, one can only speculate as to the source of these problems. Because Dutch disease and growth effects were controlled for, one might suspect crowding-out effects to be the chief mechanism through which government expenditures affect industrial development. It is not at all clear, however, why these should be any greater than a similar pre-emption of resources associated with military expenditures.

In estimating the impact of defence expenditures on the Gulf states, Cummings, Askari and Skinner,³¹ note that labour shortages created by expanded military expenditures may be a far greater long-term impediment to growth in the region than any affects associated with the diversion of capital or foreign exchange to military activities. In a somewhat similar manner, Mousad³² found that a ten per cent reduction in the military spending ratio (per cent of GNP) or a decrease of around \$12.9 billion would increase education expenditure by around \$8.1 billion per year.

The results presented here suggest that additional estimates should be made of the impact on economic activity of other types of government expenditure – especially those going to administration and services. It may well turn out that these expenditures have even higher opportunity costs in terms of labour shortages and/or reduced levels of educational attainment.

NOTES

1. James H. Lebovic and Ashfaq Ishaq, 'Military Burden, Security Needs, and Economic Growth in the Middle East', *Journal of Conflict Resolution* (March 1987), p.106.
2. Ibid., p.107.
3. US Arms Control and Disarmament Agency, *World Military Expenditures and Arms Transfers, 1987* (Washington, DC: ACDA, 1987); figures are in constant 1984 dollars.
4. Ibid.
5. Ref.1, p.107.
6. Ibid.
7. Emile Benoit, 'Growth and Change in Developing Countries', *Economic Development and Cultural Change* (1978), p.273.
8. Ibid., p.244.
9. For an excellent review of this literature, see Steve Chan, 'Military Expenditures and Economic Performance', US Arms Control and Disarmament Agency, *World Military Expenditures and Arms Transfers, 1986* (Washington, DC: ACDA, 1987), pp.29–38.
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11. David Lim, 'Another Look at Growth and Defense in Less Developed Countries', *Economic Development and Cultural Change* (1983), pp.377–84.
12. R. Fain, P. Arnez and L. Taylor, 'Defense Spending, Economic Structure and Growth: Evidence Among Countries and Over Time', *Economic Development and Cultural Change* (1984), pp.487–98.
13. For a summary and discussion of this work see Saadet Deger, *Military Expenditure in Third World Countries: The Economic Effects* (London: Routledge & Kegan Paul,

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16. See, for example, P. C. Frederiksen and Robert E. Looney, 'Defense Expenditures and Economic Growth in Developing Countries: Some Further Empirical Evidence', *Journal of Economic Development* (July 1982), pp.113-25; P. C. Frederiksen and Robert E. Looney, 'Defense Expenditures and Economic Growth in Developing Countries', *Armed Forces and Society* (Summer 1983), pp.633-46 and Robert E. Looney and P. C. Frederiksen, 'Defense Expenditures, External Public Debt and Growth in Developing Countries', *Journal of Peace Research* (December 1986), pp.329-37.
17. Cf. Robert E. Looney, 'Socio-Economic Environments and the Budgetary Allocation Process in Developing Countries: The Case of Defense Expenditures', *Socio-Economic Planning Sciences* (1988), pp.57-70.
18. Charles Wolf, 'Economic Success, Stability and the Old International Order', *International Security* (1981), p.89.
19. 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.
20. Ref.1, pp.106-38.
21. Robert E. Looney, 'The Impact of Defense Expenditures on the Saudi Arabian Economy', *Journal of Arab Affairs* (Fall 1987), pp.198-229.
22. Ibid., pp.225-6.
23. Robert E. Looney, 'The Role of Military Expenditures in Pre-Revolutionary Iran's Economic Decline', *Iranian Studies* (1989).
24. Ref.1, pp.110-11.
25. Corden reference.
26. The analysis here draws extensively on Ahead Gauzier, 'Prices and Output in Two Oil-Based Economies: The Dutch Disease in Iran and Nigeria', *ID Bulletin* (October 1986), pp.14-20.
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29. Robert E. Looney, 'Oil Revenues and the Dutch Disease in Saudi Arabia: Differential Impacts on Sectoral Growth', Working Paper, Department of National Security Affairs, Naval Postgraduate School (1988).
30. Economic data are from the Arab Monetary Fund, *National Accounts of Arab Countries, 1974-1985* (Abu Dhabi, United Arab Emirates, 1987). Military expenditures and total government expenditures are taken from the US Arms Control and Disarmament Agency *World Military Expenditures and Arms Transfers, 1987 and 1986* (Washington, DC: ACDA, 1987 and 1986). Because of missing observations, Syria, Lebanon, Iraq and Qatar were not included in several of the regressions.
31. John Thomas Cummings, Hossin G. Askari and Michael Skinner, 'Military Expenditures and Manpower Requirements in the Arabian Peninsula', *Arab Studies Quarterly* (Winter 1980), pp.38-49.
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