



## **Abstract**

Using panel data for five Middle Eastern oil-exporting countries, I have investigated the impact of fluctuations in these countries' oil revenues on their budgetary decisions. My focus is on how revenue fluctuations are correlated with changes in the relative shares of various expenditure categories. The estimations revealed that the budget shares of Defense and Economic Affairs and Services were positively correlated to oil export revenues. Social expenditures, on the other hand, showed a negative correlation. These statistical results could imply that since social expenditures are politically more important, they are shielded against fluctuations in oil revenues. The burden of budget cuts fall more on capital expenditures and defense.

## 1. Introduction

The purpose of this study is to analyze the sensitivity of budgetary decisions in oil exporting countries of the Middle East to their fluctuating oil revenues. More specifically it asks how the composition of the central government's budget changes when oil revenues change. The significance of this subject arises from the fact that oil constitutes a significant portion of the central government revenues in oil exporting countries. Furthermore, historically the price of oil has been highly unstable over the past three decades and as a result policy makers in oil exporting countries have faced a high degree of revenue uncertainty. Kuwait's oil revenues, for example declined from \$14.1 billion in 1996 to \$8.5 billion in 1998. The analysis will also enable us to compare fiscal policies of oil-exporters with other developing nations. Furthermore by tracing the budgetary allocation of these countries over time, we will be able to say whether there has been any significant change in their budgetary priorities as a result of globalization and implementation of economic reform programs.

Dependence of these countries on oil for government finances has meant that during periods of sudden price decline, these governments have had to reduce the size of the total budget and/or endure large budget deficits. They have also been forced to distribute the burden of budget cut among various expenditure categories. In a similar manner during periods of price boost the fiscal resources expand and provide planners with additional resources to allocate among various activities. Several empirical studies such as Hicks and Kubisch (1983) and Hicks (1991) have demonstrated that policy makers, in developing countries, do not distribute the burden of a budget cut equally among all expenditure categories. Instead, they are selective and as a result the budget shares of some categories are better protected than other ones. Several more recent studies, which will be discussed later, have identified some of the socioeconomic and political factors that affect vulnerability (priority) of each expenditure category during periods of fiscal contraction (expansion).

## 2. Argument

Fiscal allocation is, by nature, a political process, which reflects the goals, ideologies and interests of individuals and interest groups that can influence government policy.<sup>1</sup> While all activities of the government are expected to benefit the entire society, not all government-provided goods and services can be defined as public goods. Many of them provide benefits to specific segments of the society. Production subsidies, for example, benefit the manufacturers more than the rest of the society while consumers are the main beneficiaries of price subsidies on consumer goods. Government spending itself is a major source of

demand and revenue for various private industries. Hence, expenditure in each category benefits a particular spending group, which in turn will use its political influence to protect the budget share of that category during periods of fiscal stress.

The ability of interest groups to influence fiscal policy, in turn, depends on the existing political institutions. Both the level of democracy and political stability play a key role in this regard. In a democracy, large numbers of interest groups compete against each other. In a non-democratic or semi-democratic political system a small number of powerful interest groups compete within the ruling political circle. In either case budgetary decisions are influenced by the political structure of the society. Two recent studies, Habibi (1994) and Fardmanesh and Habibi (2000) have used cross-country data to investigate the impact of political institutions on budgetary allocation. These studies have demonstrated that degrees of political stability and political liberty make a difference in how the burden of a budget cut is allocated among various expenditure categories. Social expenditures, for example appear to be less vulnerable in more democratic countries.

Political stability, or the potential for it, also affects the fiscal process. In an environment of political discontent, where the ruling government is concerned about mass protests and street riots and faces internal or external political threats, the public programs that help pacify the population, are expected to enjoy more protection during budget cuts. These often include subsidies on essential goods or public services in major urban cities.<sup>2</sup> In most countries of the Middle East, large amounts of educational resources are misallocated to tertiary education in large urban areas while there is a shortage of primary and secondary education in rural areas. The main reason for this misallocation is that governments are very sensitive to demands of the urban middle class, and college education is very important for this group.<sup>3</sup> Reduction of such college opportunities could lead to urban unrest and politicization of the urban youth.

The third factor that could affect resource allocation in oil exporting countries is the advice of international agencies such as the IMF and the World Bank. While these institutions enjoy very little influence on (relatively) debt-free oil-exporting nations, their economic reform recommendations have become more influential in many of these countries in recent years. These institutions generally advise

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<sup>1</sup> For a detailed review of budgetary process in industrial and developing countries see Wildavsky 1985.

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<sup>2</sup> Hage et al. (1989) has used long term time-series data for four European countries to show that past occurrences of political unrest increases the budget share of social programs.

<sup>3</sup> Excessive investment in university education also results in a large number of college graduates that cannot find adequate employment in the private sector. The government is consequently forced to provide public sector employment for these graduates hence causing more misallocation of public sector resources. See Richards and Waterbury (1996), chapter five, for a detailed discussion of education budget in Middle East.

developing nations to reduce their fiscal deficits and run a tight fiscal policy, which will contribute to overall macroeconomic stability. While IMF is generally concerned with the overall level of deficit, it also advises fiscal planners to switch from general subsidies to programs that target specific population groups. Another IMF recommendation that has an impact on fiscal structure is the privatization of public enterprises. Privatization programs not only reduce the overall fiscal deficit, but they also reduce the share of producer subsidies in the budget, leaving a larger share for other programs.

The fourth group of variables that influence the internal composition of budget are the demographic and economic development factors. In early stages of economic development, government must allocate more resources to infrastructural and development projects such as roads, telecommunication and electricity generation. Accordingly the budget share of these factors is expected to enjoy a higher priority in this stage. Consequently, in case of a sudden drop in government oil revenues, a political elite, that is concerned with long term growth and development of the country, will try to protect the budget share of these capital expenditures, and place a larger burden of the budget cuts on current expenditures.<sup>4</sup> A reverse pattern is expected during budget increases.

The level of per capita income and wealth of a nation will also play a role in how fiscal composition will be affected by a sharp change in a government's oil revenues. Oil exporting countries that have high per capita income and a significant amount of national wealth could easily protect their expenditures against revenue fluctuations. If necessary the government can borrow from domestic or international markets. Saudi Arabia, for example relies on domestic financing to fill its large budget deficits during low oil-revenue periods. Hence we expect significantly less short-term fluctuations in both the total budget and its internal composition for high-income oil exporting nations. The opposite is expected in a relatively lower-income country like Iran.

### **3. Statistical Analysis**

The objective of my statistical analysis is to find out if shares of major categories of government expenditure (in oil exporting countries of the Middle East,) are statistically correlated with their oil revenues. If a country follows a long-term spending plan and smoothes its total budget over time, then the only fiscal variable that will be correlated with oil revenues should be the budget deficit. This pattern is observed for Kuwait before the 1990 Iraqi invasion (See chart 3 in the appendix) where the share of government expenditure in GDP is relatively

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<sup>4</sup> This pattern of behavior has been confirmed in a recent study by De Haan et al. (1996). Using panel data for 22 OECD nations, these authors have shown that, during periods of fiscal contraction, myopic governments tend to cut capital expenditures more than do governments with a longer-term horizon.

stable while the ratio of government surplus to total expenditures shows a high correlation with oil revenues. In this situation short-term revenue fluctuations in either direction are not expected to affect the shares of various expenditure categories.

On the other hand when revenue constraint is a major concern in fiscal decisions and government is reluctant to run large budget deficits, spending will have to be adjusted according to the fluctuations in the oil market. During periods of price decline, the budget must be reduced and the burden of budget cut must be allocated among various categories. Since, based on the factors that were discussed earlier, some categories enjoy a higher priority, we expect the relative budget shares to be affected by changes in oil revenues. This is best demonstrated by the allocation of budget in Iran, which is shown in chart group 2 of the Appendix.

#### ***3.1 Dependent Variables***

I have selected three major categories from the IMF functional classification of central government budget, which are reported in table B of Government Finance Statistics. These categories are, a) Economic Affairs and Services, b) Social Expenditures (education, health and social security) and c) Defense. From the economic classification of government expenditure (table C in GFS country tables), the following four categories were selected: a) Capital Expenditure, b) Expenditure on Goods and Salaries, c) Wages and Salaries and d) Subsidies and Other Current Transfers. The shares of these categories in total government expenditures are used as dependent variables in our regression analyses. In addition to these spending categories, the share of government in GDP and budget deficit as a ratio of total budget, are also included in the analysis.

#### ***3.2 Country Coverage***

The countries included in the analysis are Bahrain, Iran, Kuwait, Oman and the United Arab Emirates (UAE). For these five countries long-term annual data on composition of government budget were obtained from the IMF publication: Government Finance Statistics Yearbook (GFS). The annual data in most cases covers more than 20 years up to 1999. Unfortunately, for several other oil exporters such as Algeria, Iraq, Libya, Saudi Arabia and Qatar, adequate long-term fiscal data of comparable type, was not available and hence they were excluded. Only three of the countries in our sample are members of OPEC: Iran, Kuwait and the UAE. For these countries the oil revenue data was obtained from the OPEC Annual Statistical Bulletin. For Bahrain and Oman the total value of merchandise exports was used as a proxy for oil revenues. In both countries oil and related products (including natural gas) are the main export item. The share of oil in merchandise exports of Bahrain and Oman is 60 percent and 80 percent

respectively. Tables 1 and 2 offer summary information about the five countries in the sample.

Our data set consists of a non-homogeneous panel of five countries and at least 20 years of annual observation for most variables. This time period is long enough to cover several episodes of sharp price change in the oil market (Chart 1).

The only country that had less than 20 years of data for most variables was UAE. Transforming the data set into a homogeneous panel based on availability of data for UAE would have resulted in loss of too many observations for other countries.

The data set has been used to generate two types of regressions. First, I use the entire pool in a cross-section time-series regression model to detect any statistical correlation that is common to all five countries. In the second section, separate time-series regressions are generated for each country and the country differences in fiscal response to oil revenues will be discussed. In addition to regression analysis I have also used simple tabulation of expenditure elasticity to compare the response of each budget share during periods of sharp oil price rise and decline.

#### **4. Statistical Results**

##### ***4.1 Panel Data Regressions***

For each expenditure category, I have used the data from all five countries in a panel regression model, which includes an oil revenue variable in the right hand side. Furthermore since the economies of the four small Arab kingdoms (Bahrain, Kuwait, UAE and Oman) are significantly different from Iran, we have repeated all regressions for a smaller sample consisting of these four countries. Initial tests revealed strong serial autocorrelation in the dependent variables. Cross-section Heteroskedasticity was also detected in most cases. As a remedy for these problems all regressions include a first degree autocorrelation term: AR(1) and they have all been estimated with the feasible GLS technique, which assumes the presence of cross-section heteroskedasticity in the data set. In addition to the oil revenue variable only two other variables were used in each equation. Since 1990-91 Gulf war has had a significant political and economic impact in the economies of the four Arab countries in our sample I have used a dummy variable that assumes a value of 0 for years before 1991 and 1 for 1991-99. As a proxy for the level of economic development I have used the ratio of urban to total population. The per capital GDP would have been a better candidate except for the fact that it was highly correlated with the oil revenue variable and led to multicollinearity. The problem was most severe in the four Arab nations where GDP and Oil revenues are highly correlated.

The results of Panel data regressions for seven expenditure categories are reported in table 3. It also includes equations for Budget surplus and the ratio of total budget to GDP.

For each dependent variable, four regression models are reported. Two regressions use the entire data set of five countries while the other two include only the four Arab Kingdoms. The two regressions for each data set have the same set of explanatory variables but instead of the contemporaneous values of the oil revenue variable, its lagged value is used. The justification for this experiment is that oil revenues could have a lagged effect on fiscal policy. An unexpected change in oil revenues could affect the internal composition of budget in both, the current and the next year.

Since there are too many equations in table 3, a summary of the significant results of the four equations for each expenditure category appears in table 4 above. We observe that among the functional categories the budget shares of Defense and Economic Affairs and Services are positively correlated with the share of oil revenues in GDP while the correlation for Social Expenditures is negative. This result does not mean that social expenditures diminish when the oil revenues increase. An increase in oil revenues allows the government to expand all expenditure categories. However, the addition to the budgets of defense and development projects is larger than social programs and hence the relative share of social expenditures declines. Notice that this result is only significant for the panel of Arab kingdoms, which are endowed with large financial resources. One interpretation of this finding is that, in these countries, the basic social expenditures on health, education and welfare are shielded against fluctuations in oil revenues. Consequently, in periods of revenue decline, their shares of the budget cuts are smaller than other categories<sup>5</sup> The reason that this result is not significant in the larger sample that includes Iran, is that the scarcity of fiscal resources in Iran imposes a constraint on the government's social expenditures. Consequently, these expenditures absorb a large share of any increases in the government's oil revenues and hence a positive correlation between social expenditures and oil revenues is expected in that country.

The results for the economic classification of the budget lead to similar conclusions. As reported in Table 4, the share of capital expenditures shows a positive correlation with the share of oil revenues in GDP while an opposite

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<sup>5</sup> This result is compatible with several other empirical studies on vulnerability of social expenditures during expenditure cuts. Hicks and Kubisch(1983) and Sahn and Bernier(1995) have found that regardless of political institutions social expenditures in developing countries are generally less volatile than other expenditures. One explanation for this observation is that recurring wages and salaries are a large component of social expenditures. Another cause is the government's concern with political instability.

result is observed for the budget share of subsidies and the budget share of Wages & salaries.

### 5. Individual Country Estimations

In order to test the robustness of the results that were obtained from the panel data regressions, I have conducted a set of time-series regressions for each country. The models are similar to the ones used in the panel-data regressions. The right hand side variables in each regression include an oil-revenue variable, a dummy variable for the 1991-99 period and the ratio of urban population, which is used as a proxy for economic development. For each dependent variable I have run four regressions that vary only in their oil revenue variables. The first two regressions include the current and lagged values of the ratio of oil revenues to GDP respectively. The third and fourth regressions use the current and lagged values of the country's oil revenues in millions of US dollars. The reason we are repeating the estimations with dollar values instead of the share of oil in GDP is that since oil production is a major component of GDP an increase in oil revenues, increases GDP as well. Consequently, for countries where oil constitutes a significant portion of GDP, the oil/GDP ratio might remain stable during periods of sharp revenue fluctuation. In this case the regression models that use the Oil/GDP ratio might wrongly reject the presence of correlation between a budget share and oil revenues. I have added the third and fourth regression models for each country to avoid such a situation and make sure the results are robust. The individual country models are reported in table 5.

Initial tests reveal the presence of both heteroskedasticity and serial autocorrelation in most of the equations. Furthermore, the source of heteroskedasticity varies from one equation to the other. Since a common model specification for all equations is desired, the Newey-West (1987) method of efficient estimation was chosen instead of weighted least squares. This method (also known as the Newey-West Heteroskedasticity, Autocorrelation Correction (HAC) model), assumes that the source of heteroskedasticity is unknown and generates a heteroskedasticity and autocorrelation consistent covariance matrix, which results in efficient estimates for the right hand side variables.

Table 5 reveals that for most of the expenditure categories the correlation between that category's share of budget and the oil revenue variable is highly similar across the five countries. The strongest similarities are observed in the areas of capital expenditures, social expenditures, economic affairs and services, and finally wages and salaries. We observe that the budget share of capital expenditures in all five countries are positively correlated with the share of oil revenues in GDP. Furthermore this relation is significant in all countries other than Kuwait. Another category that is positively correlated with oil revenues in all five countries is economic affairs and services. This category, which includes expenditures on infrastructure and development projects has a significant

coefficient in Bahrain, UAE and Kuwait. These countries have the highest per capita income in our sample. In Iran and Oman, which have lower per capita incomes, the coefficient is still positive but it is not significant.

For defense expenditures we observe a significant positive correlation with oil revenues in Bahrain, Iran and Oman. In Kuwait the relation is significant but the coefficient is negative. One explanation is that defense expenditures enjoy the highest priority in Kuwait and are funded according to a long-term defense program, which is not sensitive to oil revenues. Consequently any increase in oil revenues is used in other categories with more flexible budgets. Hence during periods of oil revenue expansion the budget of non-defense expenditures rises faster than the defense budget. This results in the negative correlation between the budget share of defense and oil revenue that has been observed.

The negative correlation between the budget share of social expenditures and oil revenues, which was observed in the panel data regressions is also visible in the individual country estimations. However, it is to be noted that it is only significant in Oman and Iran, the lowest per capita income countries in our sample. One possible explanation is that because of social and political concerns, the budget of social programs is protected against fluctuations in oil revenues. Hence any unexpected additional revenues flow to other programs (e.g. defense and development projects) in the short run.

With regard to economic classification of the budget, we observe a negative correlation with oil/GDP variable for subsidies as well as wages & salaries. The share of subsidies did not have a significant coefficient in any country other than Bahrain and hence the result cannot be generalized. The share of wages and salaries, on the other hand, had a significant coefficient in every country other than Kuwait, which appears to have a unique fiscal behavior in comparison to other Arab oil-exporting kingdoms for most expenditure categories. The share of capital expenditures, which is mostly determined by infrastructure and developmental spending, has a positive and significant coefficient as expected, with the exception of Kuwait.

### 6. Elasticity of Budget Shares in Periods of Sharp Revenue Fluctuation

The regression analysis in the last two sections dealt only with the question of how the budget shares are correlated with oil export revenues. In this section I ask whether the direction of revenue change affects the sign and magnitude of the fiscal response. In other words I like to find out if the impact of a 20 percent oil revenue increase on the fiscal share of each category and the impact of a 20 percent revenue decline on the fiscal share of the same category are similar in magnitude but are of opposite signs. In order to address this question I have identified four two-year intervals during which the oil market experienced sharp fluctuations in one direction or the other. During 1985-86 and 1997-98 intervals, the price of oil declined by 48 percent and 39 percent respectively. During 1989-

90 and 1995-96 intervals, on the other hand, the price rose by 55 percent and 30 percent respectively. For each interval I have calculated the two-year elasticity of budget shares as the ratio of percentage change in budget share to percentage change in oil export revenues. The results are reported in Table 6 below.

When the elasticity is positive during both periods of increasing and declining oil revenues, it implies that the budget share moves in the same direction as the oil revenue. This could represent a category that is of secondary priority. It receives additional funding in good times and loses budget in bad times. Capital expenditures during the 1985-86 and 1989-90 intervals showed this attribute in all five countries of our sample. In the case of Iran and Kuwait this attribute is also observed for the budget share of subsidies and transfers.

Another pattern that is observed in several cases in Table 6 is a negative elasticity for both intervals of rising and declining oil revenues. This implies that the category under consideration is protected against revenue fluctuations. One possible cause for such a fiscal outcome is that politically, it is not feasible for the government to cut this category's budget below a fixed level and at the same time it does not feel any pressure to increase the category's budget significantly above that level either. This pattern is observed for the budget share of wages and salaries in Bahrain, Iran and Kuwait during 1985-86 and 1989-90 intervals. We also observe this pattern with respect to capital expenditures in Bahrain, Kuwait, UAE and Oman during the 1995-96 and 1997-98 intervals.

Table 6 also reveals a significant difference in the direction of fiscal response before and after 1990. For example the elasticity of capital expenditures in Bahrain, UAE, Kuwait and Oman was positive during the 1985-86 revenue decline, but became negative during the 1997-98 decline. While many developing countries initiated market oriented economic reforms in the 1980s and early 1990s, the oil-exporting countries took serious steps towards such reforms only in the mid-1990s. Major attempts towards fiscal efficiency and the promotion of the private sector began after 1992 and was accelerated after the severe oil price decline of 1998, which led to fiscal stress in many countries.<sup>6</sup>

Consequently the attitude of policy makers towards various expenditure categories has changed. As explained in Richards and Waterbury(1996), up until very recently, The Middle Eastern countries, particularly the oil exporters, followed a state-led growth strategy, which saw the government as the engine of economic growth and development. This strategy led to the rapid expansion of the public sector and budget deficits that were not sustainable. The internal contradictions of this strategy and its failure to generate sustainable growth have

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<sup>6</sup> The Kuwait Investment Authority, for example, has sold more than 653 million KD of its stock holdings in various firms since 1994. (Source: Kuwait Country Profile: [www.ifc.org/camena/kuwait.htm](http://www.ifc.org/camena/kuwait.htm).)

finally convinced many oil exporters to initiate market oriented reforms.<sup>7</sup> This is best demonstrated by the fiscal reforms and the promotion of private sector that have been adopted by almost all oil exporting countries, such as Iran, Algeria and Libya, in recent years. There is now an effort underway in Kuwait, Bahrain and other countries to reduce the share of consumer subsidies on utilities, healthcare and education. This offers an explanation for the change in elasticity of social expenditures in Bahrain and UAE from negative in 1985-86 to positive in 1997-98 intervals of revenue decline. The positive sign in the latter period indicates that social expenditures were no longer protected against an oil revenue decline. On the other hand, we observe that the budget share elasticity of economic affairs and services, in Bahrain, UAE, Kuwait, and Oman, has changed from positive in 1985-86 to negative in the 1997-98 interval. The interpretation is that during the latter interval of revenue decline the budget shares of infrastructure and development projects, (which constitute the economic affairs & services category) enjoyed a higher protection in comparison to the earlier interval. This is another clear sign of shifting fiscal priorities in recent years.

## 7. Summary and Conclusion

In this article I have analyzed the impact of oil revenue fluctuations on the internal allocation of budget in oil-exporting countries. In these countries, the central governments rely on oil exports as a significant source of fiscal revenues. I have used time series data for five countries; Bahrain, Iran, Kuwait, Oman and UAE in my statistical analysis. Three types of analysis were conducted.

First I combined the data for all five countries into a (time-series cross-section) panel data model to identify the statistical relations that are valid for all countries in the sample. The pooled data estimations revealed that the budget shares of Defense and Economic Affairs and Services were positively correlated to oil export revenues. The social expenditures, on the other hand, showed a negative correlation. These statistical results could imply that since social expenditures are politically more important, they are shielded against fluctuations in oil revenues. The burden of budget cuts during periods of revenue decline fall more on capital expenditures and defense.

To further test the robustness of these results a second set of regressions were estimated separately for each country. Individual country regressions confirmed the results of the pooled data estimations. We observed a positive correlation between the budget share of capital expenditures, economic affairs and services and defense; and oil revenues for all countries with the exception of Kuwait. A strong negative correlation between social expenditures and oil revenues was

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<sup>7</sup> See chapter 8 of Richards and Waterbury (1996) for a detailed coverage of this issue.

observed in the cases of Iran and Oman, which have smaller per capita incomes than Bahrain, Kuwait and UAE.

Finally, I calculated the elasticity of budget shares to oil revenues for four time intervals of sharp oil revenue fluctuation. In each of these two-year intervals the international price of oil rose or declined by more than 30 percent and caused a significant change in the fiscal revenues of oil-exporting nations. The results of this analysis were also consistent with the results of pooled data and individual country regression estimations. The elasticity of capital expenditures with respect to oil revenues had a positive sign for all countries while an opposite result was observed for social expenditures.

Furthermore, it was observed that the direction of fiscal response to sharp oil price decline of 1997-98 was different from the response to the price decline of 1985-86. During the earlier interval, the elasticity of capital expenditures was positive but became negative during the latter interval. This indicates that the budget share of capital expenditures has become more stable over time. We observe an opposite result for social expenditures, indicating that these categories are no longer automatically protected during periods of oil revenue decline. These changes can be partially explained by the fact that, in recent years, majority of oil exporting nations have embraced market oriented economic reforms, which promote fiscal discipline and a more efficient allocation of budget for social and welfare programs.

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**Chart 1: Average Price of the OPEC Basket of Crude Oil**



**Table 1: Basic Information for the Selected Countries**

	Population (Million) 1998	Oil Export Revenues \$US Million 1998	Gov. Expenditures as % of GDP 1988	GDP 1998 \$US billion
Bahrain	0.643	2060	28	5.35
Kuwait	1.86	8472	40	25.33
Iran	61.9	10048	21	112.77
Oman	2.3	4085	34	14.96
UAE	2.7	11131	12	47.23

**Table 2: Oil Export Revenues and Share of Government Expenditures in GDP**

	Bahrain	UAE	Iran	Kuwait	Oman	Bahrain	UAE	Iran	Kuwait	Oman
	Oil Exp.	Oil Exp.	Oil Exp.	Oil Exp.	Oil Exp.	G/GDP %	G/GDP %	G/GDP %	G/GDP %	G/GDP %
1974	NA	6948	20904	10568	1212	NA	NA	NA	18.16	69.71
1975	NA	6762	19634	8594	1416	29	NA	NA	28.35	71.74
1976	NA	8383	22923	9090	1590	37.56	NA	NA	25.6	72.95
1977	NA	9258	23599	8918	1612	34.8	NA	NA	36.16	61.58
1978	NA	8661	21684	9557	1593	33.55	NA	45.82	43.21	63.27
1979	2159.6	12862	19186	17294	2277	27.72	NA	34.92	31.52	47.86
1980	3552.8	19390	11693	18935	3745	32.61	NA	36.66	33.95	40.78
1981	3386	18761	11491	14229	4693	32.66	NA	37.41	37.21	43.54
1982	2945.6	15956	20168	9066	4421	38.09	NA	33.75	36.38	46.53
1983	2585	13016	21250	10699	4253	40.73	NA	31.36	49.44	46.54
1984	2824	12037	16726	10996	4421	36.8	NA	25.51	45.72	45.3
1985	2553.4	10896	13710	9451	4913.24	38.43	NA	23.18	45.14	48.27
1986	1828	6865	6255	6378	2843.2	44.59	NA	20.54	52.26	49.41
1987	2012	7900	10755	7523	3766.38	42.04	15.18	19.21	40.2	39.99
1988	1830	7627	9673	6840	3215.93	25.08	15.14	20.95	40.82	42.45
1989	2129	10215	12031	10432	4049.93	38.33	13.36	17.42	38.83	40.79
1990	2939	14846	17906	6385	5535.55	37.61	11.69	19.87	56.87	36.25
1991	2725	14356	15767	874	4747.19	33.29	12.25	16.43	103.83	36.68
1992	2604	14251	16802	6224	4977.94	34.57	11.98	16.23	49.88	40.87
1993	2439	12118	14251	9708	4630.97	28.92	12.05	21.72	45.06	52.47
1994	2055	11683	14801	10482	4560.16	27.33	11.77	20.94	50.19	37.75
1995	2502	12822	14944	12054	5277.35	31.41	12.35	21.95	45.67	37.8
1996	3059	14980	17960	14099	6424.04	30.04	12.91	24.34	29.57	31.54
1997	2759	15269	17662	13468	6162.66	33.73	13.3	22.2	33.24	30.34
1998	2060	11131	10048	8472	4085.45	28.85	12.27	20.96	38.8	32.49
1999	2532	15021	16098	10998	5908.44	33.13	12.95	22.69	36.81	30.45

Source: Oil Export Revenues (Millions of \$): OPEC annual Statistical Bulletin  
Share of Government GDP: International Financial Statistics, IMF

**Table 3: Panel Data Regression Estimations for Components of Government Expenditure in Oil Exporting Countries**

Variable Name	Oil Revenue as % GDP	Oil %GDP 1 year lag	Time Dummy <sup>@</sup>	Urban Pop. % of Total	Pop. Under 14 (% of Total)	Number of Obs.*	Estimation Method
Economic Affairs and Services ( % of Total Budget)		0.094 (2.26, 0.02)	-0.05 (-4.79, 0.00)			(5, 113,U) Oil-5	WLS
Economic Affairs and Services (%)	0.1 (2.39, 0.018)		-0.05 (-4.12, 0.00)			(5, 117, U) Oil-5	WLS
Economic Affairs and Services (%)		0.108 (2.58, 0.011)	-0.06 (-4.8, 0.00)			(4, 89, u) Arab-4	WLS
Economic Affairs and Services (%)	0.1 (2.28, 0.02)		-0.05 (-3.74, 0.00)			(4,92,u) Arab-4	WLS
Capital Expenditures % of Total	0.139 (3.31, 0.001)		-0.057 (-4.12,0.00)	-0.001 (-0.56, 0.57)		(5, 114,u) Oil-5	WLS
Capital Expenditures % of Total		0.07 (1.63, 0.105)	-0.05 (-3.7, 0.00)			(5, 113, u) Oil-5	WLS
Capital Expenditures % of Total	0.08 (1.84, 0.069)		-0.02 (-1.43, 0.15)	-0.02 (-0.57, 0.56)		(4,90,u) Arab-4	WLS
Capital Expenditures % of Total		0.009 (0.20, 0.84)	-0.016 ((-0.81, 0.41)	-0.03 ((-0.70, 0.48)		(4, 89, u) Arab-4	WLS
Expenditure on Goods and Services as % of Total	-0.04 (-0.9, 0.36)		0.04 (2.89, 0.003)	0.0017 (1.09, 0.27)		(5,108,u) Oil-5	WLS
Expenditure on Goods and Services as % of Total		-0.04 (-0.9, 0.36)	0.03 (2.89, 0.004)	0.006 (1.02, 03)		(5,107, u) Oil-5	WLS
Expenditure on Goods and Services as % of Total	-0.024 (-0.46, 0.64)		0.02 (1.32, 0.18)	0.007 (0.29, 0.76)		(4, 84, u) Arab-4	WLS
Expenditure on Goods and Services as % of Total		-0.047 (-0.96, 0.33)	0.02 (1.29, 0.2)	0.005 (0.21, 0.82)		(4, 83,u) Arab-4	WLS
Wages and Salaries %of Total Exp.	0.033 (0.87, 0.38)			0.19 (2.58, 0.01)	-0.32 (-1.41, 0.16)	(4,79, U) Arab4	WLS
Wages and Salaries % of Total Exp.		-0.06 (-1.7, 0.09)		0.07 (5.39, 0.00)		(4, 78) Arab_4	WLS

**Table 3: Cont.**

Variable Name	Oil Revenue as % GDP	Oil %GDP 1 year lag	Time Dummy <sup>@</sup>	Urban Pop. % of Total	Pop. Under 14 (% of Total)	Number of Obs. *	Estimation Method
Wages and Salaries % of Total Exp.	0.03 (0.90, 0.37)		-0.0009 (-0.08, 0.93)			(5, 104, u) Oil-5	WLS
Wages and Salaries % of Total Exp.		-0.105 (-2.37, 0.02)		-0.0004 (-0.12, 0.90)		(5, 82, u) Oil-5	WLS (1975-95)
Subsidies & Other Current Transfers (% of Total Exp.)	-0.082 (-2.22, 0.02)		0.01 (1.65, 0.1)	-0.017 (-1.15, 0.25)		(4, 60, b) Arab-4	WLS 1980, 95
Subsidies & Other Current Transfers (% of Total Exp.)		-0.048 (-1.98, 0.05)	0.02 (2.18, 0.03)	-0.08 (-0.7, 0.48)		(4, 83, u) Arab-4	WLS
Subsidies & Other Current Transfers (% of Total Exp.)	-0.05 (-2.22, 0.02)		0.015 (2.17, 0.03)	-0.0005 (-0.51, 0.60)		(5, 108, u) Oil-5	WLS
Subsidies & Other Current Transfers (% of Total Exp)		-0.045 (-1.94, 0.054)	0.015 (-2.65, 0.009)	-0.0006 (-0.57, 0.56)		(5, 107, u) Oil-5	WLS
Social Expenditures as % of Total	-0.02 (-1.005, 0.31)		-0.002 (-0.30, 0.76)	0.12 (9.25, 0.00)		(4, 80, b) Arab-4	WLS 1980-99
Social Expenditures as % of Total		-0.05 (-2.17, 0.03)	0.003 (0.48, 0.63)	0.109 (9.26, 0.00)		(4, 76, B) Arab-4	WLS 1980-99
Social Expenditures as % of Total	0.01 (0.42, 0.66)		-0.01 (-1.81, 0.07)	-0.01 (-0.56, 0.57)		(5, 100, b) Oil-5	WLS 1980-99
Social Expenditures as % of Total		0.02 (0.95, 0.34)	-0.02 (-2.32, 0.02)	-0.002 (-0.11, 0.9)		(5, 100, b) Oil-5	WLS 1980-99
Defense Exp. As % of Total Exp.	-0.01 (-0.37, 0.70)		-0.012 (-0.96, 0.33)	-0.0006 (-0.35, 0.72)		(5, 100, b) Oil-5	WLS 1979-99
Defense Exp. As % of Total Exp.		0.026 (5.60, 0.00)	-0.05 (-5.06, 0.0)	0.0008 (0.88, 0.37)		(5, 110, b) Oil-5	WLS 1977-99
Defense Exp. As % of Total Exp.	-0.01 (-0.25, 0.8)		0.025 (1.54, 0.12)	-0.13 (-5.11, 0.00)		(4, 90, u) Arab-4	WLS
Defense Exp. As % of Total Exp.		0.03 (0.85, 0.39)	0.02 (1.55, 0.12)	-0.122 (-4.71, 0.00)		(4, 89, u) Arab-4	WLS

**Table 3: Cont.**

Variable Name	Oil Revenue as % GDP	Oil %GDP 1 year lag	Time Dummy <sup>@</sup>	Urban Pop. % of Total	Pop. Under 14 % of Total	Number of Obs. *	Estimation Method
Defense Exp. As % of Total Exp.		0.23 (3.47, 0.0009)	-0.04 (-2.58, 0.011)	-0.0002 (-0.16, 0.86)		(3, 72, b) UAE, Ir,Om	WLS 1975-99
Budget Surplus as % of Total Exp.	12.07 (3.69, 0.0004)			0.31 (3.18, 0.002)		(5, 101, u) Oil-5	WLS
Budget Surplus as % of Total Exp.		6.75 (1.91, 0.05)	0.31 (0.46, 0.64)	0.33 (3.05, 0.003)		(5, 100,u) Oil-5	WLS
Budget Surplus as % of Total Exp.	10.33 (2.4, 0.01)		0.46 (0.58, 0.56)	0.35 (3.05, 0.003)		(4,80,b) Arab-4	WLS 1979-99
Budget Surplus as % of Total Exp.		6.44 (1.71, 0.09)	0.56 (0.46, 0.64)			(4, 79, u) Arab-4	WLS
Government Expenditures \$US	0.095*(Oil Rev) (3.15, 0.0021)		0.03 (0.20, 0.88)			(5, 103,u) Oil-5	WLS
Government Expenditures \$US		0.016*(Oil Rev.) (0.30, 0.75)	0.21 (1.105, 0.27)			(5, 100, b) Oil-5	WLS 1980-99
Government Expenditures \$US	0.093*(Oil Rev.) (3.08, 0.002)		0.027 (0.14, 0.88)			(4, 82, u) Arab-4	WLS
Government Expenditures \$US		0.007*(Oil Rev.) (0.21, 0.82)	0.2 (1.04, 0.29)			(4,79, u) Arab-4	WLS

Notes: The t-statistic and its critical probability are reported in Parentheses under each coefficient.

@: This dummy variable equals zero for 1975-90 and equals one for 1991-99 period.

\* Abbreviations: u=Unbalanced Panel, b= Balanced Panel, WLS= Weighted Least Sqr.

Oil-5= Bahrain, Iran, Kuwait, Oman and UAE, Arab-4= Bahrain, Oman, Kuwait, UAE

All regressions have been modified for serial autocorrelation with AR(1)

**Table 4: Summary of the Panel Data Estimations: Correlation of Oil Revenues and the Budget Shares of Various Expenditure Categories.**

	<b>Oil Revenue as % of GDP in Year t</b>	<b>Oil Revenues as % of GDP in Year t-1</b>
Positive Correlation	Government Expenditures in \$US (A4, O5)*	Share of Capital Exp. (O5)
	Share of Capital Exp. (A4, O5)	Share of Defense Exp. (O5)
	Share of Exp. On Econ. Affairs & Services (A4, O5)	Share of Exp. On Econ. Affairs & Services (A4, O5)
	Budget Surplus as % of Total Exp. (A4, O5)	Budget Surplus as % of Total Exp. (A4, O5)
Negative Correlation	Share of Subsidies & other Current Trans. (A4,O5)	Share of Subsidies & other Current Trans. (A4,O5) Share of Social Expenditures (A4)

Note: The budget shares (dependent variables) in both columns are for year t.

Source: Table 3. (Only the equations with a significant coefficient for the oil revenue variable are considered)

\*: A4= the sample includes Bahrain, Kuwait, Oman and UAE.

O5= The sample includes Bahrain, Iran, Kuwait, Oman and UAE.

**Table 5: Individual Country Regression Results**

Dependent Variables	Oil Revenue as % of GDP	Oil Revenue as % of GDP (Lagged)	Oil Export Rev. (US\$ million)	Oil Export Rev. (US\$ million) (Lagged)
<b>(I) Bahrain</b>				
Capital Expenditures	0.22	0.22	6.20E-05	4.90E-05
%	0.0009	0.0007	0.012	0.019
Budget Surplus	12.2	13.4	0.0036	0.003
	0.02	0.004	0.02	0.01
Defense Expenditures	0.09	0.09	2.40E-05	1.80E-05
	0.02	0.07	0.06	0.26
Economic Services	0.08	0.15	2.30E-05	5.10E-05
	0.21	0.05	0.21	0.009
Goods and Services	-0.14	-0.13	-3.90E-05	-2.20E-05
	0.0017	0.005	0.06	0.17
Total Expenditures as % of GDP	-1.15	-0.48	0.0004	0.0002
	0.89	0.93	0.86	0.86
Social Expenditures	-0.03	-0.036	-0.00000964	-1.19E-05
	0.29	0.34	0.27	0.37
Subsidies	-0.04	-0.049	-1.40E-05	-0.0000148
	0.28	0.16	0.18	0.03
Wages and Salaries	-0.24	-0.27	-6.22E-05	-5.64E-05
	0.0025	0.0001	0.059	0.024
<b>(II) United Arab Emirates</b>				
Capital Expenditures	0.44	0.42	-3.48E-01	-3.74E-01
%	0.026	0.0002	0.59	0.58
Budget Surplus	6.42	4.06	1.40E-04	-6.10E-05
	0.068	0.15	0.2	0.45
Defense Expenditures	-0.33	-0.43	9.10E-06	6.43E-01
	0.32	0.06	0.26	0.45
Economic Services	0.25	0.22	-3.40E-06	-3.87E-06
	0.05	0.0028	0.32	0.33
Goods and Services	-0.4	-0.34	3.01E-07	4.10E-06
	0.02	0.0012	0.95	0.58
Total Expenditures as % of GDP	-4.85	-4.96	3.49E-05	4.82E-05
	0.059	0.0013	0.85	0.56
Social Expenditures	0.11	0.11	-7.20E-06	-8.20E-06
	0.32	0.27	0.014	0.0008
Subsidies	-0.05	-0.04	3.40E-06	1.85E-06
	0.39	0.24	0.003	0.325
Wages and Salaries	-0.23	-0.23	-3.44E-06	-4.40E-06
	0.08	0.08	0.45	0.3

**Table 5: Contd.**

Dependent Variables	Oil Revenue as % of GDP	Oil Revenue as % of GDP (Lagged)	Oil Export Rev. (US\$ million)	Oil Export Rev. (US\$ million) (Lagged)
<b>(III) Iran</b>				
Capital Expenditures	0.46	0.36	1.01E-05	7.20E-06
%	0.0004	0.0016	0	0.009
Budget Surplus	7.22	-9.57	2.10E-04	-3.80E-05
	0.52	0.18	0.1	0.68
Defense Expenditures	0.55	0.48	5.87E-06	6.05E-06
	0	0	0.09	0.027
Economic Services	0.37	0.34	7.66E-06	7.60E-06
	0.0006	0.0002	0.0004	0.0004
Goods and Services	-0.47	-0.38	-1.03E-05	-7.10E-06
	0	0	0	0.002
Total Expenditures as % of GDP	79.2	64.35	9.40E-04	7.90E-04
	0.0007	0.001	0.019	0.057
Social Expenditures	-0.75	-61	-1.30E-05	-9.30E-06
	0	0	0.0002	0.019
Subsidies	-0.03	-0.024	-4.09E-07	-7.30E-07
	0.59	0.66	0.79	0.57
Wages and Salaries	-0.86	-0.68	-1.49E-05	-1.07E-05
	0	0	0.0002	0.01
<b>(IV) Kuwait</b>				
Capital Expenditures	0.12	0.108	4.56E-06	5.84E-06
%	0.16	0.13	0.034	0.005
Budget Surplus	98.8	101.04	0.0001	0.0007
	0.01	0.0002	0.49	0.32
Defense Expenditures	-0.37	-0.19	-1.48E-05	-1.33E-05
	0.03	0.1	0.14	0.04
Economic Services	0.08	0.06	1.37E-05	2.45E-06
	0.31	0.45	0.59	0.36
Goods and Services	0.27	0.007	1.29E-05	6.39E-06
	0.41	0.96	0.23	0.44
Total Expenditures as % of GDP	-59.46	-26.5	-0.002	-0.001
	0.037	0.61	0.45	0.05
Social Expenditures	-0.015	-0.16	3.17E-06	3.90E-07
	0.94	0.19	0.69	0.94
Subsidies	-0.45	-0.131	-1.96E-05	-1.33E-05
	0.29	0.4	0.161	0.149
Wages and Salaries	0.03	-0.07	3.84E-06	1.99E-06
	0.85	0.49	0.53	0.7

**Table 5: Contd.**

Dependent Variables	Oil Revenue as % of GDP	Oil Revenue as % of GDP (Lagged)	Oil Export Rev. (US\$ million)	Oil Export Rev. (US\$ million) (Lagged)
<b>(V) Oman</b>				
Capital Expenditures	0.21	0.25	-1.60E-05	-9.70E-06
%	0.07	0.009	0.16	0.38
Budget Surplus	15.6	6.28	0.001	-0.0009
	0.32	0.58	0.17	0.5
Defense Expenditures	0.28	0.28	-7.40E-06	-1.32E-05
	0.0006	0.0001	0.34	0.09
Economic Services	0.12	0.14	-3.40E-06	-2.00E-06
	0.09	0.04	0.59	0.72
Goods and Services	-0.11	-0.12	1.39E-05	8.14E-06
	0.19	0.06	0.08	0.33
Total Expenditures as % of GDP	55.4	52.4	-0.006	-0.004
	0.017	0.006	0.0005	0.025
Social Expenditures	-0.31	-0.3	1.62E-05	1.89E-05
	0	0	0.02	0.002
Subsidies	-0.02	-0.03	8.40E-07	-2.60E-07
	0.41	0.11	0.75	0.93
Wages and Salaries	-0.26	-0.28	1.45E-05	1.20E-05
	0.001	0	0.08	0.104

Note: The critical probability of T-statistics is reported below each coefficient.

All regressions include additional independent variables that have not been reported.

All regressions have been estimated with the Newey-West HAC method to adjust the standard errors for heteroskedasticity and serial autocorrelation

**Table 6: Elasticity of Expenditure Shares to Oil Revenues During Periods of Large Oil Revenue Volatility**

	Bahrain	UAE	Iran	Kuwait	Oman
<b>Capital Expenditures</b>					
(D)1986	0.77	1.37	0.23	0.03	0.18
(I)1990	0	0.19	0.8	4.05	-0.4
(I)1996	-0.49	-1.3	0.07	-0.36	-0.56
(D)1998	-0.35	-2.95	0.73	-0.42	-0.34
<b>Defense Exp.</b>					
(D)1986	-0.52	0.08	-0.62	0.17	0.38
(I)1990	0.03	-0.09	-0.12	-8.65	0.109
(I)1996	0.43	-0.2	-1.03	0.7	-0.11
(D)1998	0.22	0.33	-0.33	0.85	0.18
<b>Economic Affr. &amp; Services</b>					
(D)1986	0.33	0	0.59	0.36	0.21
(I)1990	-0.18	0.33	0.46	4.48	-0.35
(I)1996	-0.42	-1	-0.74	0.47	-0.3
(D)1998	-0.42	-1.94	0.24	-0.35	-0.1
<b>Goods and Services</b>					
(D)1986	-0.47	na	-0.23	-0.18	0.14
(I)1990	0	-0.03	-0.2	-2.84	0.09
(I)1996	0.3	-0.057	-0.08	0.25	0.08
(D)1998	0.11	0.17	-0.46	-0.08	-0.01
<b>Social Expenditures</b>					
(D)1986	-0.17	-0.31	-0.24	-0.4	-0.75
(I)1990	0.15	0.008	0.122	0.21	0
(I)1996	0.18	0.206	0.077	-0.03	0.42
(D)1998	0.12	0.05	-0.39	-0.42	-0.2
<b>Subsidies and Transfers</b>					
(D)1986	-0.25	NA	0.45	0.25	-4.71
(I)1990	-0.22	0.37	0.05	1.95	0.03
(I)1996	-0.72	1.27	0.18	0.27	0
(D)1998	-0.17	-0.54	0.16	0.23	0.5
<b>Wages and Salaries</b>					
(D)1986	-0.68	NA	-0.4	-0.4	-0.59
(I)1990	-0.07	-0.009	-0.21	-0.39	0.13
(I)1996	0.54	0.14	0.14	0.159	0.39
(D)1998	-0.02	0.12	-0.41	-0.59	-0.122

Note: (D) and (U) refer to periods of sharp decrease and increase in price of oil respectively.

\* All elasticity numbers reported here represent % change of the budget share variable over a two-year interval ending in the stated year, divided by the % change in the oil revenues over the same interval.

# Appendix

## Bahrain: Shares of Various Expenditure Categories in Total Budget

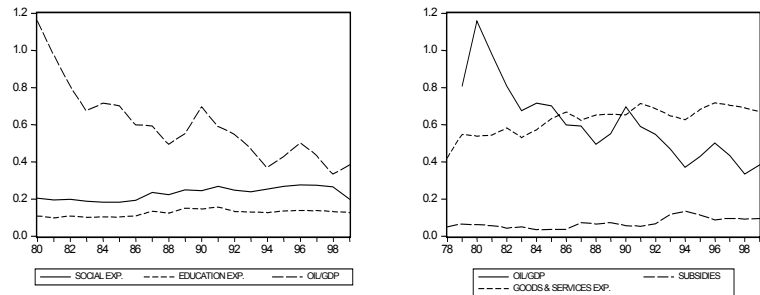
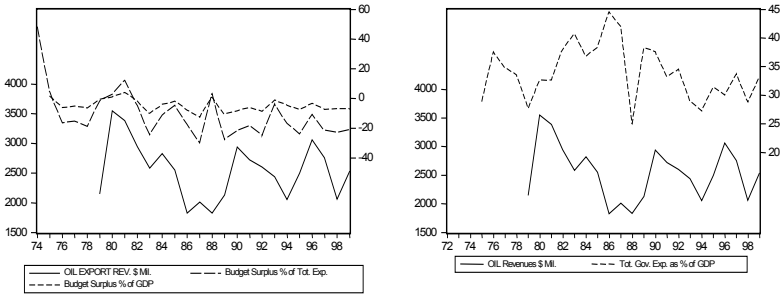
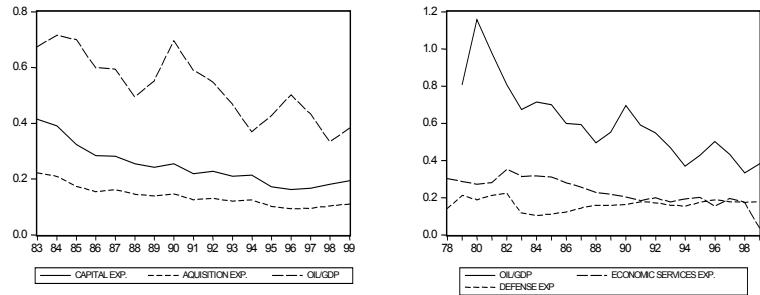


Diagram Group 1

## Iran: Shares of Various Expenditure Categories in Total Budget

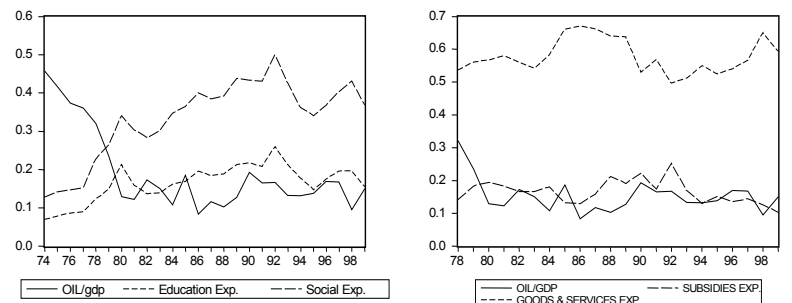
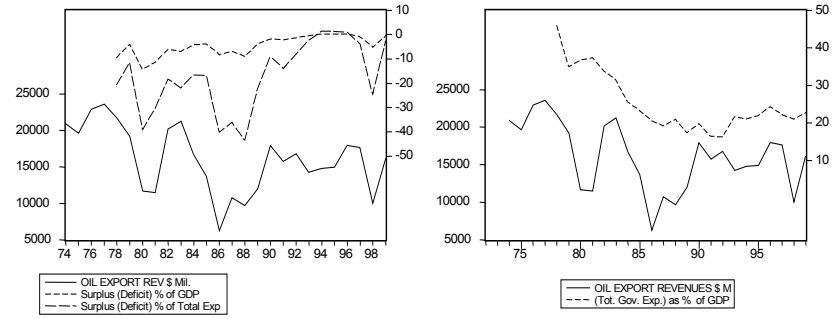
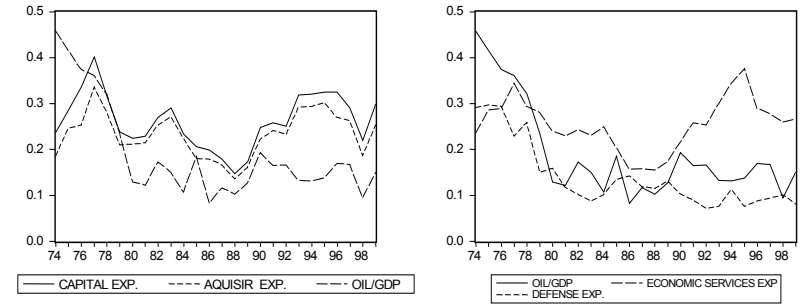
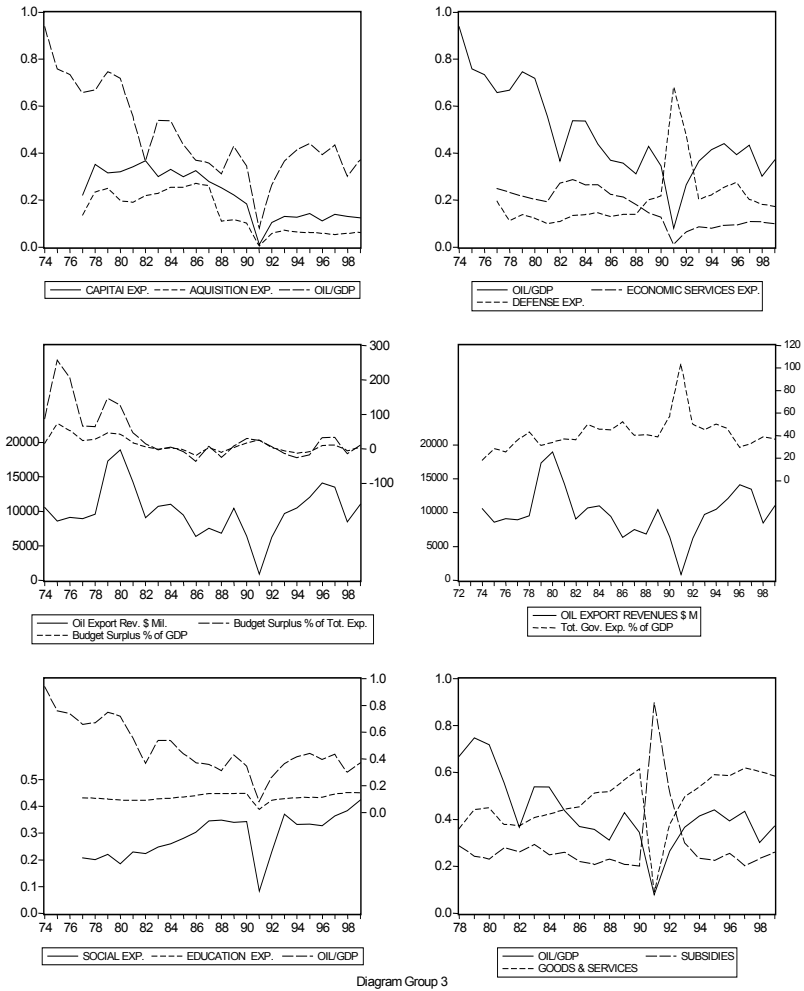


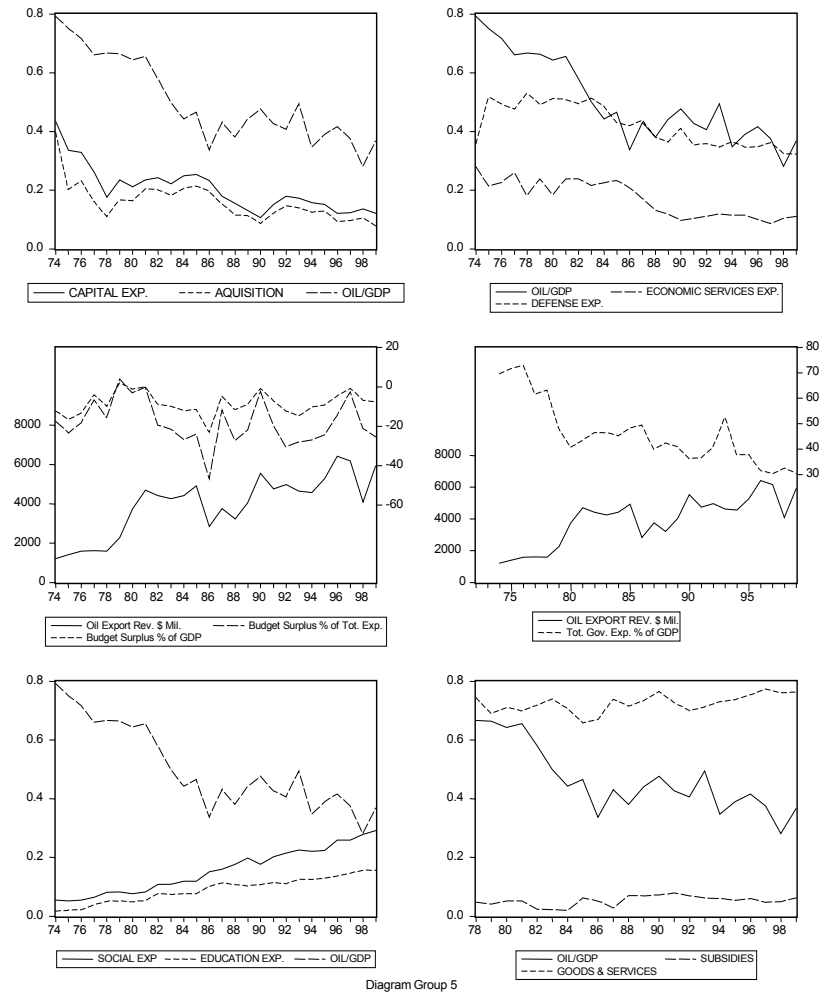
Diagram Group 2



## Kuwait: Shares of Various Expenditure Categories in Total Budget



## Oman: Shares of Various Expenditure Categories in Total Budget



# United Arab Emirates: Share of Various Expenditure Categories in Total Budget

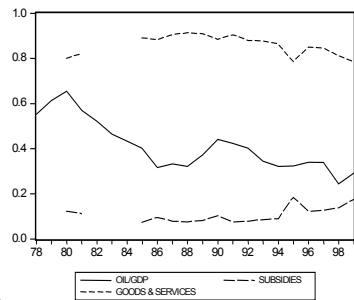
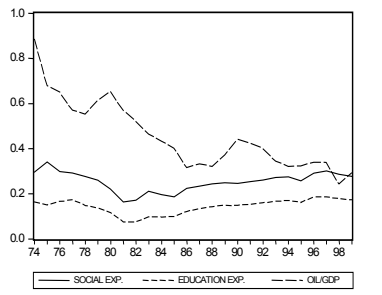
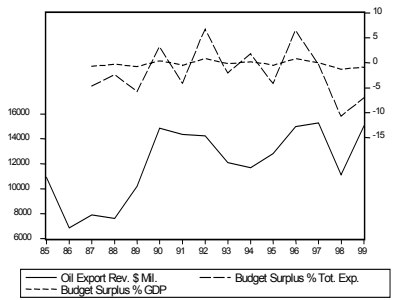
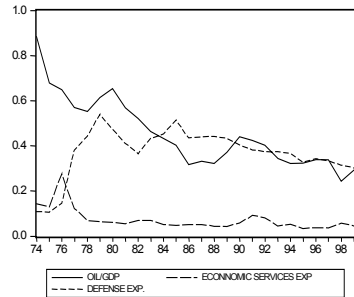
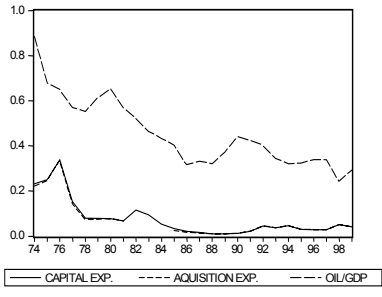


Diagram Group 5