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OIL DRIVEN MACROECONOMETRIC MODEL OF KUWAIT

By

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ABSTRACT

Kuwait is a well endowed, small and open economy. In this economy the Government is the owner of the bulk of the wealth. Its wealth comes basically from underground oil and oil-accumulated assets. Since there is virtually no tax, the government influences economic activity through its expenditure and expenditure is determined by returns from its wealth. Moreover, the country depends heavily on imports.

The structure of the model contains these features and the inherent dichotomy of Oil vs. Non-oil, and Kuwaiti vs. Non-Kuwaiti.jf The empirical analysis of the 1970-1986 data confirmed the dominance of the Government in the economy and the characteristics of a small and open economy. More importantly, the simulation exercise emphasizes the leading role of oil prices in overall economic activities and various accounts to the extent that a modest rise in oil prices is likely to turn the budget deficit into huge public savings and foreign accounts into mounting surpluses.

OIL-DRIVEN MACROECONOMETRIC MODEL OF KUWAIT

I. INTRODUCTION

As a typical rich Gulf State, Kuwait's economy is dominated by oil; oil GDP constituted over 50% of its overall GDP in the past two decades. However, Kuwait differs from these rentier economies by its huge wealth. The present value of its financial and non-financial wealth varies between KD 85 billion to KD 155 billion, depending on whether the oil price remains at its low level or grows concomitantly with population.[1] The wealth is also dominated by the underground oil asset whose existing proven reserve is equivalent to 92.5 billion barrels. The government is the

owner of this portfolio of assets. This fact coupled with the following salient features characterized the Kuwaiti economy:

1. The government revenue represents well over 35% of GDP for the period 1970-86. This large revenue is independent of taxation. The share of government revenues in GDP increased steadily from only 4% in the first half of the 1970s to more than 60% in the early 1980s. Similarly, the level of revenues increased during the 1970s through the early 1980s and declined in the last three years. The latter is attributed to the recent decline in oil prices since oil revenue constituted well over 90% of government revenue. These numbers suggest that this huge share of oil revenue (basically owned and run by the government) gives the government a unique position to influence economic activity.

2. If the revenue-constraint hypothesis is valid in this rentier economy, then the avenue through which the government can affect economic activity is through its expenditures since oil prices and production are determined exogenously by world demand and the Organisation of Petroleum Exporting Countries (OPEC) cartel decision.

Government expenditures are varied. They include direct expenditures on public consumption, capital, subsidies, land acquisition and the provision of cheap subsidized loans and other transfer payments to various agents in the economy. Current expenditure is the largest, representing consistently about two-thirds of total government expenditure, whereas government's capital expenditures represent about one-third of total outlays. Land purchases and housing constitute over 50% of the latter; while general public services (education, health and public administration) and defence represent more than 50% of the operating expenditure. The share of total government expenditure in GDP increased steadily from 3% in the early 1970s to

more than 50% in the early 1980s. However, it remains fairly stable in the first half of this decade, as measured by its coefficient of variation at 1.95%.

3. The economy is highly service-oriented, the government is the main producer of these services, i.e. the public sector accounts for more than half of non-oil value-added, and non-oil domestic economic activity is basically determined by government spending.

4. There is a high degree of interdependence with the rest of the world. That is, Kuwait is a small and open economy with a value of merchandise exports (basically oil) and imports of 70% and more than 30% of GDP, respectively, in the 1980s. The country not only depends heavily on imports for nearly all consumer, intermediate and investment goods, it imports more than 80% of its labor. Although foreign labor remitted approximately 10% of GDP outside Kuwait, the overall balance of payments has been in continuous surplus throughout the past two decades; i.e. the country is also exporting capital.

A standard Keynesian framework is adopted to incorporate the stylized fact of this economy.

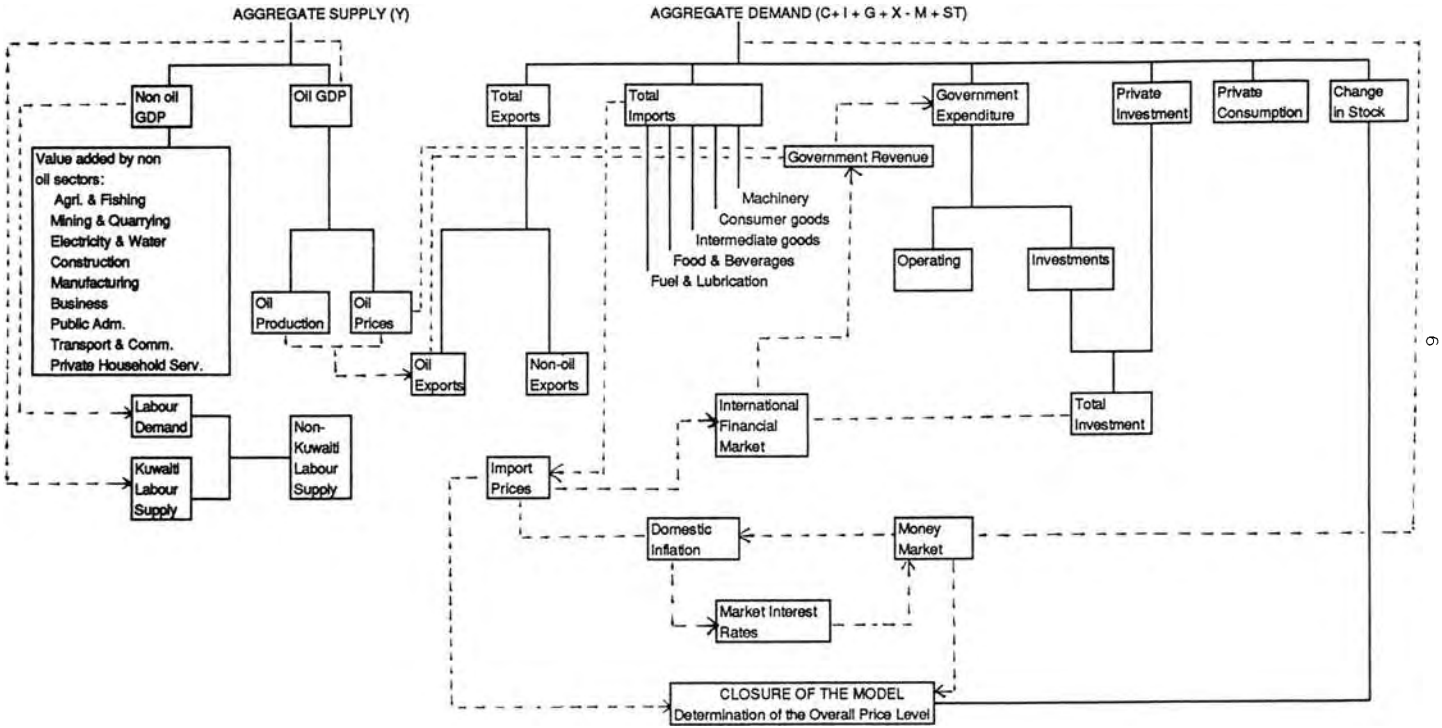
II. THE STRUCTURE OF THE MODEL.

The layout of the positted model is sketched in Figure 1. As indicated in the stylized facts of the Kuwaiti economy, the model emphasized the dominance of oil in the economy. Consequently, its GDP is divided into oil and non-oil GDP.

At the specification stage of the macroeconomic model, world oil demand (the main determinant of oil prices) and OPEC quota restrictions are exogenous to the domestic economy. Consequently, oil GDP is considered exogenous, whereas, the

Figure 1

Layout of the Econometric Model for Kuwait



components of the value-added of the non-oil sector are endogenous. Value-added in non-oil sectors is added to that in the oil sector to determine the value of aggregate supply of the economy.

II.1 Aggregate Supply

Table 1 reveals that oil GDP constituted 71% of GDP during the last two decades. Oil share in GDP has been declining though the years from 85% in the early 1970s to 54% in the second half of the 1980s. This decline started in 1981 and continued to the present. The decline of oil share in GDP is attributed to the reduction in Kuwait's production quota allotted by OPEC (output) and the fall in the world oil prices. Consequently, the share of non-oil GDP increased in the 1980s to 46% of the total. Changes in government revenue (basically oil revenue) affected other sectors indirectly. Previous studies interpreted this decline in domestic activities as direct effect of changes in government spending.

The table also summarizes the structure of non-oil GDP, and reveals that the Kuwaiti economy is highly service-oriented; the three leading service sectors (public and community, business and finance, and transport and communications services) alone represented 55% of non-oil GDP for 1970-86. If personal and household services were added to the three leading service sectors, the share would reach 60% of non-oil GDP. If the contribution of the wholesale and retail trade were included, then this share would jump to 80% of non-oil GDP. The construction sector constituted, on average, 8.5% of non-oil GDP annually in 1970-86. The manufacturing sector of the economy represented 12% of non-oil GDP. The agricultural and fisheries sector constituted only 8% of non-oil GDP, and non-oil mining and quarrying represented only 0.2% of non-oil GDP for the same period (1970-86), the contribution of electricity and water to non-oil GDP was negative; i.e. -4.2%; since this public utility

Table 1

Share of Non Oil Sectors in Non Oil GDP

OBS	Year	Gross Domestic Product	Percentage of Oil GDP	Percentage Non Oil GDP	Non Oil GDP	Percentage Public Admin. & Community	Percentage Wholesale and Retail	Percentage Finance, Real Est. & Bus.	Percentage Manuf. of Non Oil
1	1970	10,029.4	87.7271	12.2736	1,230.97	31.7489	16.9492	19.9680	3.66459
2	1971	10,730.6	87.6930	12.3069	1,320.59	32.6468	16.4851	19.6791	4.25492
3	1972	11,139.4	87.0238	12.9760	1,445.44	35.4079	17.2404	17.9129	4.49137
4	1973	10,420.7	85.3529	14.6472	1,526.35	35.9537	15.5548	17.8806	4.58479
5	1974	9,082.8	82.5419	17.4585	1,585.72	32.9314	16.4884	18.2630	3.94080
6	1975	7,961.4	77.0854	22.9150	1,824.36	30.1744	20.2350	17.1189	5.41341
7	1976	8,486.1	74.6479	25.3750	2,153.35	27.8919	22.3689	16.4409	6.16017
8	1977	8,018.5	71.6443	28.3319	2,271.79	29.2703	23.4881	15.5512	6.85451
9	1978	8,608.4	72.2190	27.7588	2,389.59	28.8778	23.0353	16.3241	7.85072
10	1979	9,805.6	74.3422	25.6399	2,514.15	29.2516	22.3002	16.5277	6.97293
11	1980	7,686.5	63.1978	36.7612	2,825.65	23.9396	25.2859	16.3212	6.48559
12	1981	6,306.3	52.1637	47.7687	3,012.44	25.8963	24.7328	17.3673	6.23017
13	1982	5,583.7	43.0145	57.2955	3,199.21	26.5159	25.3403	17.3502	6.22810
14	1983	6,066.5	51.3129	48.5832	2,947.30	30.6599	18.8111	19.0120	6.56058
15	1984	6,381.1	53.2353	46.7103	2,980.63	31.1958	19.2409	19.7072	6.09938
16	1985	5,984.4	51.7830	49.2865	2,949.50	35.3348	18.5252	19.9152	6.26547
17	1986	6,513.1	57.8327	41.9313	2,731.03	34.4229	18.5571	21.2484	6.45544

OBS	Percentage Refined Product	Percentage Manuf. of Oil Product	Percentage Construction	Percentage Transport, Storage & Communic.	Percentage of Household & Other Serv.	Percentage Forecast of Agri. & Fishery	Percentage of Mining	Percentage of Elect. & Water
1	9.74354	0.61415	5.5948	67.80	5.99771	1.01059	0.120230	2.3104
2	9.23072	0.66183	5.8459	69.63	5.87010	1.01091	0.197639	2.5292
3	7.54372	1.10762	6.0016	73.25	5.88125	0.74925	0.150819	2.8386
4	7.22573	2.08602	6.0189	80.67	6.06414	0.66040	0.307924	2.9960
5	6.21547	4.45602	7.1450	84.98	5.97710	0.66720	0.271801	3.2118
6	4.71179	4.51665	6.8758	97.26	5.90180	0.66654	0.207744	3.1781
7	4.98386	1.55107	9.2888	115.57	5.74361	0.54427	0.298140	3.0260
8	2.74101	1.91919	10.4895	112.09	4.91683	0.46571	0.356547	3.4915
9	2.65025	2.05475	10.3461	124.62	4.46520	0.53273	0.347340	3.8546
10	2.91073	1.97283	11.4257	150.61	4.23205	0.46179	0.163077	4.4440
11	2.11350	1.80136	12.0648	225.07	5.21048	0.46467	0.122096	4.1279
12	1.66144	1.59339	9.9763	250.16	5.08558	0.70740	0.179589	4.2839
13	2.32714	1.14216	8.6859	310.41	4.25418	0.74987	0.066892	4.6952
14	2.84362	1.04977	9.4103	277.43	4.29885	0.93950	0.056323	5.4742
15	2.87322	1.10715	9.1323	264.80	4.30446	1.17324	0.097295	5.9756
16	3.40058	0.99339	6.6181	235.90	4.14308	1.37311	0.037294	6.6588
17	3.81175	1.36945	5.5767	232.50	4.40859	1.47673	0.043939	7.8615

Source: Calculated from Table A1 in the appendix.

sector is a net receiver of government subsidy. The government subsidies for electricity and water averaged KD 360 million annually in 1970-86.

The service sector in GDP was relatively more stable than the production sectors of the economy for 1970-86; the estimated coefficient of variation was less than 20%.[2] There was a continuous steady increase in value-added of these service sectors in 1970-82 in line with the increase in the overall share of non-oil sectors in total GDP. The factors that might explain the variations in value-added on non-oil sectors are presented in Table 2.

II.2. Empirical Analysis of the Supply Side

Annual data on sectoral value-added, output prices, capital stocks, input prices, development expenditures and lagged value-added for 1970-86 were used to statistically validate the positted value-added model of the producing sectors. These derived value-added equations are implicit functions of their production functions. The value-added function is basically driven by its own price. In some non-oil sectors, the function is driven by non-factor input prices. Time-series data on those variables are tabulated in Appendix A1. With the exception of the non-oil mining and quarrying (MQ) and refined oil products (RFP) sectors, the ordinary least squares (OLS) method of estimation is applied to the value-added equation in a linear form for all non-oil producing sectors of the economy, however, in the MQ and RFP sectors, the two-stage least squares (2SLS) method of estimation is used to correct the inherent simultaneity bias in both quantities produced and their prices.

All signs of the estimated coefficients confirmed the theoretical restrictions of the value-added model. In general, the predetermined output prices are the main determinants of the value-added of the non-oil sectors of the economy, except the heavily subsidized electricity and water industry. In some cases, value-added was also

statistically responsive to either factor or non-factor input prices and in some instances, to government policy actions. In addition, there was a significant adjustment cost in most of these sectors as measured by the lagged value-added, i.e. effect due to inertia is positive and significant.

II.2.i. Public Administration and Community Services Sector

Value-added by this sector was stable around a mean of slightly over 30% of non-oil GDP during 1970-86. The contribution of the public administration and community services sector to non-oil GDP declined from 33% in the first half of the 1970s to 29% in the second half of the 1970s and further to 26% in the early 1980s, however, its contribution in the last four years increased to 33%.

Nearly 90% of the variations in the value-added by the public administration and community services was explained by the enormous inertia from past value-added as measured by the coefficient of determination (R^2) in Table 2; current value-added in the sector adjusts almost instantaneously to recent lagged value-added since the estimated one-year lagged coefficient is approximately 0.93%. This behaviour is explained by the fact that value-added in the public administration and community services sector is basically the wage bill. Therefore, the first difference between current and lagged value-added measures the rate of growth of the wage bill. This is simply the estimated intercept of the model.[3] This high growth rate is consistent with the government employment policy since labor contracts usually last for long periods.

If this pattern of labor contracts continues through the 1990s, the contribution of the public administration and community services sector to non-oil GDP will stay constant or decline slightly from 33% in 1986 to 29% in the late 1990s. Rather, the trends in the structure of the non-oil GDP predict that the wholesale and retail trade

Table 2

OLS and 2SLS Results of Real Value-Added Equations in Non-Oil Sectors (1970-1986)

Independent Variable (Sect. Value-Added)	Intercept	Output Price	Lagged Output Price	Input Price	Sectoral Capital Stock	Sectoral Govt. Expen-diture	Lagged Dependent 1 Year Lagged	Lagged Dependent 2 Year Lagged	Lagged Private Con-sumption	R^2	F-Ratio	D.W.
Public Adm. and Community	78.1550 (1.07)						0.9334 (9.36)***			0.88	87.67	2.26
Wholesale and Retail	-10.6065 (-0.19)***	15.1418 (6.17)***		-0.1936 (-2.92)**						0.87	38.07	1.60
Finance, Real Est. and Bus. Services	152.8437 (7.79)***	1.0703 1.32(c)							0.0885 (2.79)***	0.95	99.63	1.53
Manufacture of Non-Oil Products	-20.9229 (-0.73)	1.2702 (2.07)*			0.0284 (2.78)**					0.93	61.04	AR(1)
Refined Products	941.9266 (0.59)	16.4084 (2.94)***			2.6140 (0.83)					...	4.66	AR(1)
Manufacture of Chemical Products	-56.1802 (-2.13)**	1.1790 (4.06)***				-77.1916 (-3.49)***				0.66	9.57	1.83
Construction	102.1991 (3.37)***			-0.0283 (-2.92)**	0.0988 (3.72)***		0.9982 (8.28)***			0.93	34.47	2.02
Transportation, Storage & Communic.	-106.1627 (-1.99)*	3.8605 (5.26)***					-0.1593 (-0.87)			0.87	35.89	AR(2)

Private Households & Services	22.4111 (1.22)(c)	0.7322 (1.99)*			0.5768 (2.00)*	-0.3374 (-1.45)(b)				
Agriculture and Fisheries	-3.4073 (-2.31)**	0.0380 (1.60)(a)			1.2301 (11.65)***			0.96	170.88	2.50
Mining and Quarrying	3.7801 (1.99)*	0.0689 (1.28)(c)		-0.0978 (-1.87)*	0.5449 (2.78)**			...	5.25	1.80
Electricity and Water	-4.7692 (-1.47)(b)	0.0310 (0.83)	-0.0311 (-0.73)		1.0729 (28.37)***			0.99	859.23	2.32

*** indicates significance at 0.01 level
** indicates significance at 0.05 level
* indicates significance at 0.10 level
(a) indicates significance at 0.15 level
(b) indicates significance at 0.20 level
(c) indicates significance at 0.25 level

No asterisk nor letter means insignificance even at 0.25 level.

t-values between parentheses. AR(q) means the errors are q-order autoregressive process. These equations are corrected for autocorrelation. R^2 is not reported in 2SLS results since R^2 is meaningless in this case.

and the financial and real estate business sectors are likely to gain relative importance since their share of non-oil GDP will increase in the 1990s.

II.2.ii. Wholesale and Retail Trade

The value-added by the wholesale and retail trade sector was stable around a mean of 20% of non-oil GDP during 1970-86. The stability is measured by the coefficient of variation at 9.2% for 1970-86. The contribution of this sector grew steadily from 16.5 in 1971 to 25.3% in 1982 and has declined since then. This decline was primarily attributed to the recent decline in re-exports of goods and services to neighbouring Iraq and Iran due to the Iran-Iraq war.

Significant factors that explain 87% of the variations in value-added of the wholesale and retail trade are the changes in both output price and wage rates, (Table 2). The estimated input and output price elasticities are -1.22 and 2.33, respectively; a 10% rise in wholesale and retail prices, *ceteris paribus*, will result in a 23.3% increase in value-added in this sector, whereas a 10% decline in wage rate, *ceteris paribus*, will increase value-added in wholesale and retail trade by 12.2% since this sector is mainly labor-intensive. Wholesale and retail trade shops are numerous and are privately-owned. This privately-owned and competitive activity is price-elastic. Therefore, with the improved confidence of the business community after the cease-fire in the Iran-Iraq war, re-exports to these countries are expected to gain momentum and , consequently, the potential demand is likely to produce a modest rise in prices. This modest rise in prices coupled with a slight decline in real wages as witnessed in the last three years are likely to result in an increase in the contribution of the value-added of the trade sector to non-oil GDP from 18.5% in 1986 to 21% in the late 1990s. Although the activities of the wholesale and retail trade in the domestic economy is predicted to increase over the next decade, its relative importance (as a proportion of non-oil GDP) is likely to be challenged by business services since

recent favourable developments in the economy after the cease-fire in the Gulf war are likely to benefit financial, real estate and business services more.

II.2.iii. Financial, Real Estate and Business Services

The value-added by the business services sector was stable around a mean of 18% of non-oil GDP during 1970-86. The share of value-added by real estate was 60% of the value-added in the sector for the same period; however, the trends in the GDP of the business services sector reflect structural change within the sector. The share of real estate in GDP of business services fell from more than 70% in the early 1970s to 60% in the late 1970s and has declined further to 45% in the early 1980s (CMT,1988). In turn, the contribution of the banking and insurance sector to non-oil GDP grew steadily from 5% in the 1970s to 10% in the early 1980s. The contribution of the financial sector declined as a result of the Gulf war and the after-effects of the stock market (Souk-Al-Manakh) crash. The Gulf war slowed economic activity in general. The recent Difficult credit Facilities Settlement Program implemented by the government to protect the solvency of the banks and the debtors with long-term repayment schedules gained confidence in the financial sector. Moreover, the services and products offered by the financial sector improved considerably during the 1980s. Finally, in this volatile economy, one would expect an increasing role and growing importance of the financial sector as a facilitator of investment, especially after the cease-fire of the Iran-Iraq war. Consequently, the contribution to non-oil GDP of the business sector is forecast to reach 22.5% by the year 2000, thus replacing wholesale and retail trade as the second largest sector in the non-oil sectors of the economy. The parameters used in the forecast are obtained from the results of the estimated value-added model in Table 2.

Ninety-five per cent of the variations in value-added by business services are explained by movements in real rates of interest and lagged private consumption. The

latter is taken as proxy for psychological confidence of the public in an adaptive fashion. Lagged private consumption is more significant and has a greater effect on value-added than the interest rate, its estimated elasticity is 4.33, calculated at the means of the sample data (1970-86). A one percent rise in lagged private consumption, *ceteris paribus*, produces more than a 4% increase in value-added by business services. The estimated coefficient of the interest rate is not significant at the 0.10 level, however, it is significant at the 0.25 level and the corresponding elasticity is 0.18, indicating that value-added in business services is relatively interest-inelastic in a sense that a 10% rise in real rate of interest, *ceteris paribus*, will hardly increase value-added of business services by 2%.

Three leading service sectors (public administration, trade and business services) are projected to dominate non-oil activities in the 1990s with their contribution to non-oil GDP exceeding 70% in 2000. Unlike the service sectors, the share of manufacturing fell in the 1980s relative to the 1970s and is forecast to decline further in the 1990s.

II.2.iv. Manufacturing Sector

In the last two decades, the government of Kuwait has pursued the objective of diversifying its economy to reduce its dependence on oil so that the manufacturing sector will play a leading role. Consequently, in the last 15 years, there has been a huge build-up in oil-dependent petroleum refining and chemical industries. The share of manufacturing in non-oil GDP fell from 14% in the early 1970s to less that 10% in the early 1980s. Although there was an increase in the share of manufacturing value-added in the last three years, its contribution to non-oil GDP is still lower than the average of 12.1% for 1970-86. This recent increase in the manufacturing value-added is largely attributable to the growth in value-added of refined oil products. However,

the share of non-oil manufacturing products remains and is predicted to dominate manufacturing activities through the turn of the century.

a Non-Oil Manufacturing Industries

The share of value-added in non-oil manufacturing industries out of non-oil GDP increased gradually from 4% in the early 1970s to 7% in the late 1970s and stayed at 6.4% in the 1980s. Although the contribution of non-oil manufacturing industries declined in the 1980s to 6.4 %, its share in the last two years has been increasing slightly. The increase in the contribution of the non-oil manufacturing sector to non-oil GDP comes basically from the growth in fabricated metal, publishing, non-metallic, food and textile industries. Although the value-added of the wood industry to non-oil manufacturing is high, its relative growth was modest for the period.

More than 90% of the variations in the value-added of non-oil manufacturing industries in 1970-86 are explained by the changes in their prices and the capital stock in the sector (Table 2). The computed own-price elasticity is 0.73, at the means of the data. Thus, a 10% rise in the composite price index of non-oil manufactured products will, *ceteris paribus*, increase value-added by the sector by slightly more than 7%, whereas, a 10% increase in the capital stock in the sector is likely to boost value-added of the non-oil manufacturing industries by 4-5 % assuming that other things remain unchanged. Table 2 also confirms that value-added in refined oil products is affected by the same factors (price and capital stocks), however, value-added in refined products is relatively more price-elastic than all other sectors.

b Refined-Oil Products

Although the largest expansion in the manufacturing sector has been in oil-dependent refining and chemical industries, the contribution of refined oil products to

non-oil GDP considerably declined from more than 9% in the early 1970s to less than 2% in the early 1980s and has been increasing since then reaching nearly 4% in the last two years.

The level of economic activity in refined oil products industries is closely connected to world oil demand. When the world demand for oil falls, it creates a pressure on oil prices to fall, as witnessed in the 1980s. This interdependence and the close demand-supply linkage will result in a simultaneous equation bias in using the OLS method to estimate the value-added equation of refined products. To respond to the problem of simultaneous equation bias, one would consider the system of equations that determines the equilibrium refined oil price and quantity. Supply of refined prices in each year equals exports and domestic consumption. Since exports of refined products are determined exogenously, lagged exports or refined oil products are considered one of the instrumental variables (I.V.) in the first stage of the two-stage least squares (2SLS) method of estimating value-added in refined products. The remaining instruments consist of all predetermined variables of both the domestic consumption and value-added functions. These are real GDP, lagged value-added, number of cars,, capital stock in the sector and capacity utilization in refineries. Refined oil price and value-added are the endogenous variables of the system of equations. The stage two results are summarized in Table 2, where value-added of refined oil-products are highly price-elastic. The estimated own-price elasticity indicates that a 1% rise in refined oil prices will, *ceteris paribus*, increase value-added in the sector by 10.5%. The sign of the estimated coefficient of sectoral capital stock is positive; however, the magnitude of its effect on value-added is insignificant as far as the 1970-86 data are concerned. Capital expenditure has a significant effect on value-added of manufactured chemical products.

c Manufactured Chemical Products

Value-added in manufactured chemical products increased steadily in the first half of the 1970s. The contribution of chemical product to non-oil GDP jumped from 0.6% in the early 1970s to 4.5% in the mid-1970s, and declined to 2% in the second half of the 1970s, and to less than 1.5% in the 1980s. The stagnation and decline in the value-added of the sector is attributed to the weakness of this government industry to market its products regionally or internationally. This is reflected in the changes in prices of these products and government development expenditure in the oil sector as the determinant factors of value-added to manufactured products. The sign of the estimated coefficient in development expenditure is unexpectedly negative. The likely explanation is that government development expenditure in the oil sector basically serves the refined products sector. The latter are owned by the government. Therefore, chemical industries (including private paints, rubber and other chemical industries) compete with refining industries for development expenditure in the sector. In the absence of huge development expenditure in the oil sector, chemical industries would have benefited from the fund to improve their marketing strategy, thus explaining the opposite relationship between value-added and development expenditure. The weakness of the marketing strategy of the sector is partly explained by the effect of output price in value-added. The estimated own-price elasticity is 0.5, indicating that a 10% rise in prices of chemical products is likely to increase value-added by 5%. This interpretation supports CMT (1988) recommendations favouring government subsidies to improve marketing and the highly productive activities in the manufacturing sector.

II.2.v. Construction

Value-added in construction increased steadily in the 1970s from 5.6% of non-oil GDP in 1970 to a peak of 12.1% in 1980 (Table 1); however, the relative role of

construction has been declining during the last five years. The decline has been sharp, from over 12% of total non-oil GDP in 1980 to only 5.5% in 1986. The steady decline was attributed to the steady decline in investment demand. Consequently, one year lagged value-added represents investment demand as one of the determinants of construction in the value-added equation.[4] The results of the OLS confirm that a 10% increase in investment will, *ceteris paribus*, increase value-added in the sector by more than 35%, as revealed by the estimated elasticity around the mean of the data. This finding partially explains the recent decline in value-added of construction. Investment demand in 1984-86 was only KD 990 million, and more than half of this sum was financed by the state. The decline in investment is explained by the fact that most of the major infrastructure projects in Kuwait such as public buildings, airports and ports have been completed. Consequently, the share of construction in GDP will decline further in future years as predicted by the model. It can be expected, however, that less new construction will be offset to a large extent by an increase in demand for maintenance of this huge infrastructure. Similarly, there is a drop in private sector investments reflected in the oversupply of housing and offices. This has been triggered by the speculative investments in the early 1980s in the Souk-Al-Manakh.

Another non-factor cost component that might explain the movements in value-added of construction is the cost of borrowing. The estimated interest-elasticity is -0.89, measured at the means of the data. For every 1% rise in real cost of borrowing (or credit allotted to construction), the value-added in the construction sector is likely to drop by nearly 1%. About 93% of the variations in the value-added in this sector are explained by the variations in investment demand and cost of borrowing (Table 2).

II.2.vi. Transport, Storage and Communication

The transport and communications sector continued growing in relative importance as a share of non-oil GDP since the late 1970s. It increased from a stable 5.3% in the 1970s to 9.7% in 1982, but stagnated during the last three years at around 8.5% (Table 1).

The OLS results (Table 2) indicate that more than 90% of the variations in the value-added of the sector are explained by the movements in the prices of these services and an adjustment factor from past inertia; however, the latter is statistically insignificant.

Value-added in transport and communication is price-elastic. The estimated elasticity indicates that for 10% rise in prices, value-added in this service sector is likely to increase by slightly more than 17%. With the expected growth in innovations in telecommunications the increase in demand for telecommunications and decline in importance of public transport services, the share of value-added is predicted to stagnate around 8.2% of non-oil GDP throughout the 1990s.

II.2.vii. Private Household and Personal Services

Table 1 reveals that the private household service sector witnessed a gradual reduction in relative importance as a share of non-oil GDP. Its contribution to non-oil GDP has declined from 6.0% in the early 1970s to 5.0% in the late 1970s, stagnated around 4.5% in the 1980s and is predicted to stagnate around 4.2% in the 1990s.

More than 70% of the variations in the value-added of the sector are explained by changes in the variables of the combined adaptive expectation with partial adjustment model (Table 2). The results of the estimated parameters of the model reveal that for every additional KD in the price of household services, *ceteris paribus*, value-added

by sector will increase immediately by 700 fils.[5] There was also a cumulative fast decaying effect of this price rise in the past.

II.2.viii. Agriculture and Fisheries

The agriculture and fisheries sector contributes slightly less than 1% to non-oil GDP and is forecast to increase its share in the 1990s. With the exception of fishing, its role has been limited by unsuitable climatic conditions, limited natural resource base and high cost of production. Nevertheless, the relative importance of the sector has been growing slowly but steadily from 0.5% of non-oil GDP in 1979 to nearly 2% in 1986.

More than 95% of the variations in value-added of the agriculture and fisheries sector are explained by the changes in supply prices and the lagged value-added, (Table 2). The latter is affected by inertia. The estimated coefficients indicate that the current value-added over-adjusts adaptively to the immediate lagged value-added in the sector with estimated elasticity of 1.09.[6] Price elasticity of supply of agricultural and fishery commodities is usually low in most empirical studies. Although the estimated coefficient is not significant at the 10% level, it is significant at 0.15%. The corresponding computed price-elasticity is 0.09, indicating that a 10% rise in agriculture and fishing prices will, *ceteris paribus*, hardly produce a 1% increase in value-added by this sector. As confirmed by the model, it seems that for the period 1970-84, the activities in the sector adapt instantaneously to inherited past activities as a common characteristic of agriculture and fishery activity elsewhere. This slow pattern of growth is expected to prevail in future.

These trends in the structure of GDP show that one of the sectors that is expected to gain in relative importance during the 1990s is non-oil mining and quarrying.

II.2.ix. Non-Oil Mining and Quarrying

The non-oil mining and quarrying sector represents only 0.05% of total non-oil GDP. The relative importance of the sector dwindled from 0.36% of non-oil GDP in 1977 to 0.04% in 1986. The level of economic activity in the quarrying sector appears closely connected to the level of economic activity in the construction sector. When construction activity is depressed, the non-oil mining and quarrying activity also tends to be depressed. This dependence on construction activities and close demand-supply linkage with investment demand suggest simultaneity bias in using the OLS method to estimate the value-added equation in quarrying. Consequently, an I.V. technique is adopted to cater for the simultaneity bias. The instruments used in the first stage of estimation are Kuwaiti population, government housing expenditure, lagged value-added in quarrying and lagged price index of transportation. The latter is also used to capture the relevant non-factor cost to the sector.

The stage two results are summarized in Table 2. The input price, output price and lagged value-added are the main determinants of the value-added in the mining and quarrying sector. Value-added is more elastic to factor price than the output price; a 1% rise in the unit-cost of transporting output of non-oil mining and quarrying will, *ceteris paribus*, depress value-added of the sector by almost 2% whereas, a 10% rise in output prices is likely to increase value-added by 1%. The response of value-added to price changes dies-off geometrically in Koyck scheme, and the rate of adjustment is slower than in other sectors. An immediate reaction to inertia is mostly felt in the electricity and water sector.

II.2.x. Electricity and Water

Electricity and water are produced by the Ministry of Electricity and Water (MEW) in Kuwait. The price of electricity was set at two fils per Kwh during the

1960s and has not been changed since. Similarly, water is priced at 500 fils/1,000 gal. These prices are far below the true cost of producing electricity and water two decades ago and inflation has been increasing this wedge considerably. As a result, the government incurred a financial burden to maintain the low subsidized prices of electricity and water for the last two decades at average cost of KD 360 million yearly. Consequently, the contribution of the sector to total non-oil GDP has been negative and its absolute share to non-oil GDP increased from less than 2.5% in 1970 to 7.8% in 1986.

The low fixed nominal prices (declining real prices) of electricity and water resulted in steadily increasing consumption at rate of 12.1% per annum in the past two decades. moreover, fixing the prices at an extremely low level for a long time partially explains the insignificance of the estimated coefficient in Table 2. Electricity and water are price-inelastic and the fact that prices have been fixed for a long time confirms the significance of the coefficient of lagged value-added. Value-added in the sector adapts instantaneously to the one year lagged value added with a corresponding elasticity of 1.07%. The latter is not statistically different from unity, at least at the 5% significance level. In turn, the rate at which the sector is shrinking is -4.8 (measured by the estimated intercept). Ninety-nine percent of the variations in value-added in the electricity and water sector are explained by the variations in the lagged value-added and the real price changes (Table 2).

MEW uses light fuel and natural gas to produce electricity and water. The ministry pays world prices for oil, however, most oil produced domestically is exported. Oil has accounted for over 90% of merchandise exports in the recent past.

Therefore, the responsiveness of non-oil value-added in these sectors to output prices is indicated. The oil portion is also driven by oil prices, especially oil exports.

II.2.xi. Oil Exports

In the last two decades, crude and refined oil has been the largest earner of foreign exchange in Kuwait. Consequently, exchange rate ($/KD), abbreviated as Π, is considered an exogenous variable in the exports of oil function (EO). Kuwait is a member of the OPEC cartel, which determines its oil production quota exogenously. To the extent that the quota is revised according to the more recent volume of exports, one year lagged exports are introduced in the model to capture this adjustment process. The results of the estimated oil exports equation using the OLS method are:

$$EO_t = -3582.84 + 1157.76\,\Pi_t + 0.95\,EO_{t-1} \qquad (2)$$
$$(-0.36) \qquad (0.38) \qquad (4.31)^{***}$$

$R^2 = 0.83$, F-ratio = 30.98 and D.W. = 2.14
*** indicates significance at 0.01 level.
Otherwise insignificance even at 0.10 level

More than 80% of the variations in oil exports are explained by the movements in the exchange rate and past inertia, as indicated by the coefficient of determination R^2. Although the sign of the estimated exchange rate coefficient confirmed the theoretical restriction that an appreciation in the value of the US dollar creates an incentive for Kuwait to export more oil since oil exports are denominated in $, the estimated coefficient is not statistically different from zero as far as the 1970-86 data are concerned. However, Eq. 2 confirms the a priori belief that the OPEC quota is the determinant factor of oil exports, and Kuwait is a founding member of OPEC and is likely to adhere to the quota restriction.[7] The estimated elasticity is 0.98, indicating that current oil exports adjust immediately to the most recent level of oil exports.

The structure of the Kuwaiti economy has been dominated by oil production (Figure 1). Oil represented well over 85% of GDP in the first half of the 1970s. It stagnated at 74% in the second half of the 1970s. As a result of the 1982 OPEC cut in output-quota of Kuwait and a sharp decline in oil prices, the share of oil-GDP

decreased to 43% and jumped to 52% in 1983-85. In 1986, the share increased to 58% and jumped to 52% in 1983-85. In 1986, the share increased to 58% of GDP. Oil production is determined by OPEC and world oil prices. These facts are determined exogenously, thus making oil GDP exogenous.

II.3. Aggregate Demand

Kuwait is a high-saving country. Van Wincoop (1987) showed that the current overall consumption level is at least a billion dinars below what is warranted on the basis of total financial and non-financial wealth. Salih (1989) confirmed this finding by estimating the marginal propensity to save from permanent revenue at 0.40 and transitory revenue is mostly saved for the public sector. The average propensity to consume in Kuwait is higher than similar developing economies (e.g. Saudi Arabia) by nearly 25%[8]. Private consumption in Kuwait represented 28.3% of GDP, on average, for 1970-86 (Table 3).

II.3.i.Private Consumption

Private consumption (C) has been increasing steadily both in 1984 prices and relative to GDP. Measured in 1984 prices, private consumption increased steadily from less than a billion KD in 1970 to KD 3.5 billion in 1982. However, in 1983-86, private consumption declined gradually from KD 3.0 billion in 1983 to KD 2.5 billion in 1986[9]. Translated in percentage out of GDP, the share of private consumption (average propensity to consume) increased steadily from less than 10% in the early 1970s to 36% in 1980, peaked at 63% in 1982, and has been declining since then to 46% in 1983 and to only 39% in 1986. Although GDP has been declining in the period 1980-85, average private consumption increased in general in the period and is higher than the average for the whole period. This is partly explained by the increase in non-human wealth of Kuwait, measured by both the Future Generation Fund and

Table 3

Share of Aggregate Demand Components

OBS	Year	Aggregate Demand	Percentage Real Private Consumption	Percentage Gross Fixed Formation	Percentage Government Expenditure	Percentage of Export	Percentage of Import
1	1970	9,995.0	9.7074	3.1843	3.0822	89.8228	5.7447
2	1971	10,555.5	9.2256	2.9110	3.3022	89.8614	5.3618
3	1972	10,965.3	8.7863	2.9333	3.6262	90.3854	5.9020
4	1973	10,219.7	8.8567	3.0409	5.2683	89.9639	7.2480
5	1974	9,477.7	10.7126	4.0928	11.1704	81.7465	8.3256
6	1975	8,309.8	15.4981	7.9144	12.4413	78.1875	14.4926
7	1976	9,282.4	18.0426	9.3906	14.6192	74.5329	17.6319
8	1977	9,245.5	22.1736	12.2969	17.8174	68.5624	22.6306
9	1978	9,577.6	21.6745	10.6970	17.2111	70.9941	21.5028
10	1979	11,605.7	20.1023	7.9781	19.1420	70.6559	19.3629
11	1980	9,540.2	30.6823	10.8573	28.0858	59.4037	30.2209
12	1981	8,827.9	34.4833	12.1076	35.5754	47.2566	30.4493
13	1982	8,342.7	42.1105	16.4073	39.2208	35.5775	34.8827
14	1983	8,052.2	35.1432	18.3660	39.9550	43.6543	36.8921
15	1984	8,263.5	34.8369	15.8081	39.1995	46.7357	36.7520
16	1985	7,597.3	34.6387	17.0587	41.0487	46.4666	38.7270
17	1986	7,510.9	33.6045	12.2063	32.1333	52.6342	29.8872

Source: Calculated from Table A2 in the Appendix.

transitory revenue of the public sector. Consequently, return from financial wealth is added to government budgetary revenue to define total adjusted revenue as a relevant explanatory variable instead of GDP. This adjusted revenue was separated into permanent and transitory components to capture the permanent and transitory effect in the Koyck geometrically declining consumption function. This distinction is important in the government expenditure model since budgetary revenue alone does not reflect the behaviour nor the practice of the public expenditure policy. A significant portion of government revenue is transferred to citizens in forms of housing, free health services, free education, contribution to social security, and other transfer payments. The government pays its citizens higher wages and salaries than the private sector. Thus, it is appropriate to use the government constraining variable (revenue) as a resource variable in the consumption function (private and public). Following Ball and Drake (1964) and Bridge (1971), the OLS results of the postulated model, corrected for second order auto-correlation, for 1970-86 is:

$$C_t = 126.6835 + 0.3085\ TRP_t + 0.1122\ TRT_t + 0.5923\ C_{t-1} \qquad (3)$$
$$(2.99)^{**} \quad (10.05)^{***} \quad (4.62)^{***} \quad (16.93)^{***}$$

$R^2 = 0.99$, F-ratio = 72.62
t-values between parentheses.
*** indicates significance at 0.01 level and ** indicates significance at 0.05 level.

TRP is the permanent component of total revenue, TRT is the transitory (random) component of revenue and C_{t-1} is one year lagged private consumption. The permanent effect is nearly three times the transitory effect as shown in Eq.3, thus confirming Freidman's (1957) restriction that consumption is basically determined by the permanent resource variable. The estimated marginal propensity to consume permanently is 0.31. The regression results in Eq. 3 satisfy Brown (1952) conditions that $\hat{a}_1 = 0.31$ is strictly positive and $\hat{a}_2 = 0.59 < 1$. Although the estimated permanent propensity is low, it represents short-run propensity, the estimated marginal propensity to consume from Eq.3 is 0.76. Marginal propensity to consume out of

transitory revenue is low, i.e., 0.12, indicating that transitory revenue is basically saved, thus reconfirming Van Wincoop's (1987) finding that Kuwait is a high-saving society. Similarly, government consumption expenditure is basically determined by permanent revenue. One advantage of defining private consumption as a function of revenue is to examine the consistency of the consumption function is by adding government expenditure to private consumption to get total consumption (TC) to compare the results of the total with the sum of the two components (private and Public). The OLS results of TC, corrected for second-order auto-correlation, are summarized in Eq. 4.

$$TC_t = 313.9772 + 0.4035\ TRP_t + 0.1170\ TRT_t + 0.6844\ TC_{t-1} \qquad (4)$$
$$(5.28)^{***} \quad (7.78)^{***} \quad (3.65)^{***} \quad (20.02)^{***}$$

$R^2 = 0.99$, F-ratio = 91.26
t-values between parentheses.
*** indicates significance at 0.01 level.

The permanent marginal propensity to consume is statistically different from zero and is equal to 0.41, thus indicating that for every additional KD earned by the government, 410 fils are consumed. About 310 fils are consumed privately and the rest is consumed by the public sector, however, transitory revenue is basically saved and the small consumed portion of the transitory revenue goes to private consumption and public investment since the marginal propensity to expend from transitory revenue is not significantly different from zero in the government consumption expenditure model. Nevertheless, it is significant in development expenditure.

II.3.ii Government Expenditure

The share of government expenditure in GDP is higher for Kuwait than Saudi Arabia. For example, in 1980, the share was 35% for Kuwait and 23% for Saudi Arabia, whereas the share of government expenditures in the USA was only 20% of GDP in 1980.

The dominance of the public sector in the economy has also been increasing over the years, whether measured by the share of government revenue or expenditure in GDP. The share of government revenues and expenditures in GDP increased steadily from 4 and 3%, respectively, in the early 1970s to more than 50% in 1982-84, (Table 3). similarly, the level of revenues and expenditures increased during the 1970s through early 1980s and declined in the last three years. Salih (1989) confirmed that the level and structure of revenue Granger-cause government expenditures, but the reverse is not true.

Total government expenditure has been increasing at an average rate of growth of nearly 14% annually in the last two decades. Although this rate of growth levelled off in the 1980s to 1.5% annually, government revenue has been declining by almost 15% annually in the 1980s. Current expenditure (salaries and wages, purchase of goods and services and transfer payments) represents 70% of total expenditures, (Table 3). By 1986/87, current expenditure alone exceeded total budgetary revenue. This is basically attributable to the increase in salaries and wages. Salaries and wages claim one third of total expenditures. When current expenditure is broken down by aim, general public services and defence dominate ranging from 34 to 60% in the last decade. The functional classification of the budget revealed that housing expenditure is the largest component of expenditure programs. During the 1970s, education ran second, but, in this decade, it has been challenged by fuel and energy expenditures (basically electricity subsidy) that have phenomenally risen because prices have remained fixed nominally while both demand and costs have increased. Health expenditure has risen steadily in the last decade to move into fourth spot, followed by public order/safety, social security, food subsidies and welfare transfer programs.

Development expenditure represented 23% of total expenditures, whereas land purchase constitutes slightly less than 8% of total expenditures (Table 3). Although development expenditure was reduced considerably in 1980/81 in response to a

decline in oil revenue, the government continued its development program. As a result, there has been huge capital accumulation approaching KD 14 billion at present.

The country also accumulated other forms of non-oil assets. Financial assets exceed KD 30 billion at present. Financial assets consist of KD 10 billion in the General Reserve Fund (GRF), KD 16.7 billion in the Fund for Future Generations (FFG) and KD 4.8 billion in international downstream acquisition of the Kuwait Petroleum Corporation (KPC). The returns from these financial and physical capital assets are not counted in the state's annual budget. Only revenue from underground oil wealth appeared in the budget as return from the nation's wealth. Leonard (1988) and Salih (1989) argued that one way of interpreting the 1981/82 - 1986/87 accounting budget deficit is the exclusion of returns from other non-oil assets from the budget.

Historically, the state annual budget was consistently in surplus before 1981/82, however, by 1981/82 expenditures exceeded total government revenues and as a result, the budget deficit for the period 1981/82 to 1986/87 was covered by the General Reserve Fund; the government deployed part of its financial assets to meet its expenditure requirements.

Consequently, investment income from financial assets is added to the budgetary oil and non-oil revenue to represent the true government revenue (TRF) at the disposal of the public sector. This adjusted revenue is taken as an independent variable to examine the revenue-constraint hypothesis in Kuwait. Salih (1989) demonstrated that government revenues Granger-cause its expenditures and the reverse is not true as far as 1970-86 data are concerned- This result supports other empirical findings in most developing countries. Hence, the explanatory variable of the government expenditure model is the adjusted revenue. The latter is divided into permanent and transitory components of actual revenue to isolate the regular from the random effects of the public sector resources on its expenditure behaviour. The OLS

results of regressing total expenditure on permanent and transitory revenues for 1970-86 are:

$$G_t = 473.9984 + 0.3952\ TRP_t + 0.1579\ TRT_t \qquad (5)$$
$$(0.97) \quad (3.30)^{***} \quad (1.79)^{*}$$

$R^2 = 0.89$, F-STAT = 16.40
The model is corrected for second-order auto-correlation.
t-values between parenthesis.
*** and * indicate significance at 0.01 and 0.10 level, resp. No asterisk indicates insignificance even at 0.10 level.

Nearly 90% of the variations in government expenditure are explained by the variations in its permanent and transitory revenues, as indicated by the coefficient of determination R^2. Eq. 5 reveals that government expenditure is positively and statistically driven by these revenues. The effect of the permanent component of revenue on expenditure is more than double the transitory effect, measured by the marginal propensities to expend. The estimated permanent marginal propensity to expend is approximately 0.4, thus indicating that for every additional KD earned by the public sector, the government is likely to spend, on average, 400 fils in total outlays plus an additional 160 fils from transitory gains. In turn, the marginal propensity to save permanently is 0.6 and government windfall gains are mostly saved, indicating that Kuwait is a high-saving country. This result is consistent with Van Wincoop's (1987) finding that at current Kuwait's overall level of consumption, spending is at least a billion dinars below what is warranted on the basis of total financial and non-financial wealth. Similarly, current (CG) and development (DG) expenditures are Granger-caused by revenue. The OLS results, corrected for autocorrelations are:

$$CG_t = 421.6721 + 0.2353\ TRP_t + 0.0798\ TRT_t \qquad (6)$$
$$(1.13) \quad (2.59)^{**} \quad (1.36)$$

$$DG_t = 49.2174 + 0.1170\ TRP_t + 0.0570\ TRT_t \qquad (7)$$

(0.38) (3.59)*** (2.19)**

$R^2 = 0.88$, F-STAT = 12.72
t-values between parentheses.
*** and * indicate significance at 0.01 and 0.10 level, resp.
No asterisk indicates insignificance even at 0.10 level.

These equations indicate that out of the average 400 fils spent on public outlays from each additional KD return from public wealth, two-thirds go to operating expenditures (mainly salaries and wages) and the remaining one-third to physical capital. More important is the fact that the significant portion of the transitory component is spent on investment (instead of consumption) and development programs, i.e., future consumption (saving), as revealed in Eqs. 6 and 7. The equations also reveal that the corresponding estimated propensities nearly add to the estimated total propensity to expend in Eq. 5.

The one-year lagged dependent variable is included in Eqs. 5,6, and 7 to measure the short and long-run effects of permanent revenue. Salih (1989) showed that the long-run effect is five times the short-run effect of permanent revenue on total operating and development expenditures[10]. These results suggest that Kuwait's available resources, especially permanent revenues proved to be the restraining variable on government expenditures (whether observed or permanent component). These expenditure equations suggest that there is enormous inertia in public expenditures in terms of long-term labor contracts, investment projects, etc. These findings are also applicable to both operating and development expenditures. The only difference between these equations is that the significant portion of the transitory revenue is spent in development programs and not consumed as operating expenditure, but it is persistent in both private and total investment models.

II.3 iii. Investment Function

Government investment in Kuwait is partly intended to support and encourage private investment. Government investment policies include providing free infrastructure, free services, issuing favourable laws to promote private investment, production subsidies (cheap water, electricity, fuel, land, loans and tax-exemption of imported input) and protection and preferential treatment of local firms. Despite these generous cost-saving devices to encourage investment, the share of total government and private investment in GDP averaged only 12.5% yearly in 1970-86 (Table 3). For example, the share of investment in GDP in 1980 was slightly less than 13.5% for Kuwait, whereas the share of investment in GDP was 25% for Saudi Arabia, however, total investment increased steadily both in absolute and relative terms from 3% of GDP in 1970 to 24.5% of GDP in 1982 and had been declining since then to only 14.1% of GDP in 1986. This policy resulted in accumulating a stock of physical public capital estimated by Salih and Khalaf (1988) at KD 14.0 billion at present.

The few studies of the investment pattern in Kuwait concentrated on industrial investments. Girgis (1979) outlined prospects for industrial expansion and diversification of the Kuwait economy arising from oil. Al-Saman (1984) and Girgis (1984) registered observatory notes on industrial development in Kuwait for 1973-81. Al-Tony (1985) examined behaviour of firm's investment spending in the industrial sector. Girgis (1986) and Amsden (1988) suggested the Korean model to correct the path of the manufacturing sector in Kuwait. Salih and Khalaf (1989) reviewed investment policies and examined aggregate and private investment functions for Kuwait for 1970-84. This study updates the previous posited model to 1986. The OLS results are:

$$I_t = -283.3139 + 0.3647\ Y_t - 24.9637\ r_t + 0.5028\ I_{t-1} \quad (8)$$

$$(-1.32) \quad (2.30)^{**} \quad (-1.06) \quad (1.69)^{a}$$

R^2=0.88, F-ratio = 26.75 and D.W. = 1.25
t-values between parentheses.
** indicates significance at 0.05 level and a indicates significance at 0.15. level. No asterisk or letter indicates insignificance even at 0.15 level.

Equation 8 reveals that about 88% of the variations in gross fixed capital formation (I_t) are explained by the variations in non-oil GDP (Y_t), real interest rate (r_t) and one-year lagged total investment (I_{t-1}) for 1970-86. In support of standard empirical findings, all the signs confirmed the theoretical restrictions and, more importantly, investment is relatively income-elastic and interest-inelastic. The estimated income-elasticity for the period in 0.97, indicating that a 10% increase in non-oil GDP will, *ceteris paribus*, boost investment by 9.7%. Although the sign of the coefficient of real interest rate is correct, its magnitude is not statistically different from zero at the specified level of significance. Similar to public investment, total investment in the economy adjusts to recent inertia; however, it adjusts at a lower rate than that of government investment expenditures. Public investment (DG) is not only affected by recent inertia, it is statistically responsive to changes in GDP with a relatively slower rate of adjustment than private investment. The OLS results are:

$$DG_t = -129.5441 + 0.1096\ Y_t + 8.5099\ r_t + 0.7036\ DG_{t-1} \quad (9)$$

$$(-1.74)^{a} \quad (2.46)^{**} \quad (1.41) \quad (6.85)^{***}$$

R^2 = 0.98, F-STAT = 212.47 and D.W. = 1.55.
t-values between parentheses.
*** and ** indicate significance at 0.01 and 0.05 level, resp. No asterisk indicates insignificance even at 0.10 level.

About 98% of the variations in public investment are explained by the changes in non-oil GDP, real interest rate and inertia, measured by the coefficient of determination R^2. All theoretical signs are correct except the real interest rate; however, the estimated magnitude of the latter is not statistically different from zero. Since government did not borrow to invest in 1970-86, real interest rate does not have

a significant impact on government's investment decision. It seems that real interest rate is more relevant to private investment than to public investment. Its estimated coefficient is significant at least at the 15% level as shown in Eq. 10.

$$PI_t = -123.7221 + 0.2350\ Y_t - 53.5484\ r_t + 0.9704\ PI_{t-1} \qquad (10)$$

$$(-0.63) \quad (1.64)^a \quad (-1.79)^a \quad (3.23)^{**}$$

$R^2 = 0.75$, F-STAT = 5.89 and D.W. = 2.15.
t-values between parentheses.
** indicate significance at 0.05 level.
a indicates significance at 0.15 level.
Otherwise, estimated coefficient is insignificant even at 0.10 level.

The estimated coefficients in Eqs. 9 and 10 nearly add up to the corresponding ones in Eq. 8. Private investment adjusts faster than public investment and is more income-responsive than public and total investment. The estimated income elasticity is 1.08 calculated at the means of the 1970-86 observations, hence, indicating that a 10% increase in non-oil GDP (domestic economic activities) will, *ceteris paribus*, increase private investment by almost 11%. This partly explains the fact that private investment grew at times of boom in domestic activities and declined at bust periods as read from the time-series data in appendix A. For example, the share of private investment in GDP rose steadily from 1.5% in the early 1970s to 18.3% in 1983 and declined to 7.6% in 1986. Private investment also adjusts almost instantaneously to inertia as suggested by the coefficient of one year lagged investment. The latter is approximately approaching unity (0.91). Furthermore, the estimated interest-elasticity is 0.43, which is more than three times that of total investment, thus indicating that a 19% decline in real interest rate is likely to encourage private investment by 4-5%. The growth and increase in private and government expenditures created demand for imported goods since the foreign exchange earned from exported goods is more than enough to pay for these commodities.

II.3.vi. Foreign Sector

Value of merchandise real exports increased steadily from only KD 660 million (6% of GDP) in 1970 to more than KD 5.4 billion (70% of GDP) in 1980 (Table 4). This is explained by the steady growth in oil exports from KD 565 million (5.6%) in 1970 to slightly over KD 5.1 billion (66% of GDP) in 1980. Both shares of total and oil exports from GDP in 1980 exceeded that of Saudi Arabia (about 68%) in 1980. the share of total exports to GDP peaked in 1981 to 72.2% and declined since then to about 50% in 1982-85 and plunged further to only 32.4% in 1986. The increase in 1981 is basically attributed to the tremendous increase of the non-oil exports from less than 1% in the early 1970s to 9.3 and 9.8% in 1981 and 1982, respectively. Industrial fertilizer is the largest component of Kuwait's domestically produced non-oil exports and consists mainly of ammonia and urea. For 1983-86, these exports declined to 7.2, 5.8, 5.1 and 3.9% of GDP, respectively, because of depressed international prices and demand. Other exports of local origin are metal pipes, cement, shrimp and various chemical. Unlike the oil exports discussed in Eq. 2, non-oil exports (ENO) are determined by non-oil GDP (domestic economic activities) as summarized in the OLS results of Eq. 11 corrected for second-order auto-correlation.

$$ENO = -326.0002 + 0.2257\ Y + 27.8172\ \Pi \qquad (11)$$

$$(-0.88) \quad (5.77)^{***} \quad (0.19)$$

$R^2 = 0.94$, F-STAT = 37.73

*** indicates significance at 0.01 level, whereas no asterisk means insignificance even at 0.10 level.

Eq. 11 represents a typical small economy equation. The variable Y represents domestic supply of output. Therefore, a rise in output, *ceteris paribus*, increases exports. Non-oil export is income-elastic, with estimated elasticity of 1.8 calculated at the means of the data. Although the effect of exchange rate (as a relevant price) on supply of non-oil exports is theoretically correct with respect to sign, its magnitude is

Table 4

Share of the Trade Balance Components

OBS	Year	Real Exports	Percentage of Oil Export over Total Export	Percentage of Non Oil Export overTotal-Export	Real Import
1	1970	8,977.78	99.7059	0.2941	574.18
2	1971	9,485.31	99.6373	0.3627	565.96
3	1972	9,911.06	99.4995	0.5005	647.17
4	1973	9,194.01	99.2408	0.7592	740.72
5	1974	7,747.66	98.4873	1.5127	789.07
6	1975	6,497.23	97.3773	2.6227	1,204.31
7	1976	6,918.43	96.8851	3.1149	1,636.66
8	1977	6,338.96	96.3007	3.6993	2,092.32
9	1978	6,799.52	96.5380	3.4620	2,059.45
10	1979	8,200.12	96.2513	3.7487	2,247.20
11	1980	5,667.25	92.7990	7.2010	2,883.14
12	1981	4,171.75	90.0354	9.9646	2,688.02
13	1982	2,968.11	80.3141	19.6859	2,910.15
14	1983	3,515.12	84.4956	15.5044	2,970.62
15	1984	3,862.00	88.7260	11.2740	3,037.00
16	1985	3,530.20	89.3632	10.6368	2,942.20
17	1986	3,953.30	92.3052	7.6948	2,244.80

OBS	Year	% Imported Food & Beverage	% Imported Industrial Goods	% Imported Fuel & Lubricants	% Imported Consumer Goods
1	1970	12.6474	16.5414	0.62658	20.4364
2	1971	12.7090	16.8620	0.71923	20.0400
3	1972	10.9620	16.5886	0.70821	19.8054
4	1973	11.4641	15.3436	0.73521	18.5424
5	1974	15.6448	23.6239	1.12112	22.6802
6	1975	13.9831	15.7775	0.47417	18.2157
7	1976	10.4153	19.2620	0.48046	19.7762
8	1977	9.7497	20.8602	0.58241	21.6765
9	1978	10.3952	19.7178	0.39503	32.5655
10	1979	10.6315	21.1425	0.54828	32.5889
11	1980	9.1251	18.2275	0.53808	30.0215
12	1981	10.0043	19.3855	0.43404	29.0482
13	1982	10.0618	20.3699	0.48876	30.2019
14	1983	9.1684	14.4362	0.40272	27.6662
15	1984	10.5843	14.5687	0.38107	25.8775
16	1985	10.1082	12.8481	0.32156	24.6136
17	1986	12.0903	13.8973	0.32619	29.3007

OBS	% Imported Equipments	% Imported Other Goods & Services	Trade Balance	Percentage of Trade Balance over GDP
1	23.4064	26.3420	8,403.60	83.7894
2	21.0755	28.5944	8,919.35	83.1212
3	17.9916	33.9442	9,263.89	83.1635
4	19.9563	33.9584	8,453.29	81.1199
5	26.6436	10.2864	6,958.59	76.6130
6	31.5535	19.9961	5,292.92	66.4820
7	30.3830	19.6830	5,281.77	62.2402
8	36.3932	10.7378	4,246.64	52.9605
9	27.8694	9.0571	4,740.07	55.0633
10	24.6595	10.4293	5,952.92	60.7094
11	25.3224	16.7655	2,784.11	36.2208
12	31.2901	9.8377	1,483.73	23.5277
13	35.7095	3.1681	57.96	1.0380
14	32.5448	15.7816	544.50	8.9755
15	26.0468	22.5417	825.00	12.9288
16	24.2114	27.8970	588.00	9.8255
17	28.0419	16.3437	1,708.50	26.2317

Source: C.B.K. 1987, 'Quarterly Statistical Bulletin,' Central Bank of Kuwait.

not statistically different from zero. Crude and refined oil exports have been and are still accounting for over 90% of merchandise exports.

Most non-oil exports during 1975-81 were re-exports of mainly machinery and transportation goods to neighbouring Iraq, however, due to the Iran-Iraq war, the value and share of re-exports in GDP have been declining in recent years to less than KD 250 million (3.5%). Non-oil GDP or its share of total GDP reflects the common characteristic of a typical GCC country where oil dominates GDP. In the absence of data on trade between these countries, the share of non-oil GDP in total GDP is likely to be a reasonable proxy for internal trade within the region. Similar to the non-oil exports analyzed in Eq. 11, re-exports are trade-elastic as shown in the following OLS results:

$$RE = -182.8694 + 0.2652\ Y - 2.6558\ UVIM \qquad (12)$$
$$(-2.71)^{**}\quad (4.75)^{***}\quad (-1.28)$$

$R^2 = 0.90$, F-STAT = 44.55 and D.W. = 1.29
t-values between parentheses.
*** and ** indicate significance at 0.01 and 0.05 levels, respectively.
No asterisk indicates insignificance even at 0.1 level.

It is apparent from Eq. 12 that 90% of the variations in re-exports are explained by the variations in potential regional trade proxy and the unit-value of imports. The latter represents the per unit cost of importing machinery and equipment. Although the sign of the estimated cost coefficient is theoretically correct, it is insignificant at the 0.10 level (however, its magnitude is significant at 0.20 level). Re-exports are income-elastic with an estimated elasticity of 2.67 calculated at the means of the data.

II.3.v. Imports Function

Like the rest of the Gulf States, Kuwait depends heavily on imports for nearly all consumer, intermediate and investment goods. The country also relies on imports to

satisfy demand for food. Real value of imports has been increasing steadily from KD 250 million in the early 1970s to KD 2.4 billion in the early 1980s (Table 4). It declined since then to KD 1.5 billion in 1986; however, it jumped to KD 2.4 billion in 1987. The share of imports in GDP increased steadily from only 2.5% in the early 1970s to more than 30% in the early 1980s and averaged at 25% in the last three years. This share is more than double that of the US, however, in 1980, the share of imports in GDP for Saudi Arabia was 35%, whereas the share for Kuwait was approximately 25%.

There seems to be a close relationship between non-oil GDP and imports. This association is verified is the OLS results of the imports function for 1970-86.

$$IM_t = -1053.6168 + 1.3445\ Y_t - 147.0534\ \Pi_t + 0.1962\ IM_{t-1} \qquad (13)$$

(-0.58) (3.28)*** (-0.24) (0.79)

$R^2 = 0.96$, F-STAT = 1.73, D.W. = 1.73
t-values between parenthesis.
*** indicates significance at 0.01 level.
Otherwise, insignificant even at 0.10 level.

Over 95% of the variations in real imports have been explained by the variations in non-oil GDP (domestic activities), exchange rate and one-year lagged imports as indicated by the coefficient of determination, R^2, in Eq. 13. All the expected theoretical signs are correct in the equation, thus satisfying a small open economy case, however, only the estimated coefficient of non-oil GDP is statistically different from zero. The estimated income-elasticity of imports is 1.58 calculated at the means of the series, thus indicating that the imports function is income-elastic so that for a 10% rise in non-oil GDP, *ceteris paribus*, demand for imports is likely to increase by 16%. This result is confirmed in Eqs. 14-18 for functions of the main five import groups.

As shown in Table 4, imports of machinery and equipments (IMK) represent about 30% of total imports. The OLS results of machinery and equipment import demand function are corrected for second-order auto-correlation and summarized in Eq. 14.

$$IMK = 2601.7443 + 0.5569\ Y + 652.6143\ \Pi - 9.6171\ PK + 1.1134\ CAPACITY \quad (14)$$

$$(-2.29)^{**} \quad (2.29)^{**} \quad (1.63) \qquad (-0.95) \qquad (1.45)$$

$R^2 = 0.94$ and F-STAT = 36.22.
t-values between parenthesis.
** indicates significance at 0.05 level and no asterisk indicates insignificance even at 10% level.

Where PK abbreviates the composite price index of machinery and equipments (capital goods), CAPACITY stands for the capacity utilization in the manufacturing sector and the rest of the variables as defined before. All the signs, except exchange rate, of the estimated coefficients confirmed the theoretical restrictions. The exchange rate is defined in terms of US$/KD, since most of the capital goods are imported from Europe and Japan (not only from the USA), the $/KD rate misrepresents the appropriate prices in the machinery-exporting countries (UK, W. Germany, Italy, France and Japan) and, more importantly, there is no statistical evidence to reject the hypothesis that the magnitude of estimated exchange rate coefficient equals zero at least at the 10% level of significance. Consequently, the composite price index of machinery and equipment represents the relevant price of the imported capital goods. Although the sign of the price-coefficient corroborates the demand relationship, its magnitude is insignificant, thus suggesting that demand for imported capital goods is price-inelastic. One would argue that this finding is sensible for the following logic. These goods are essential for the country's ambitious development plans and their prices are insignificant relative to income therefore, the effect of the price on the demand of these goods is negligible. By the same reasoning, the flourishing domestic activities (as measured by non-oil GDP) are likely to increase demand for these goods as confirmed by the sign and magnitude of the estimated coefficient. The estimated

output-elasticity is 2.36, indicating that imported capital goods are income-elastic. Similarly, increased capacity-utilization of the capital-intensive sector of the economy is likely to increase demand for machinery and equipment. The sign of the estimated coefficient confirmed this relationship but the magnitude of the effect is insignificant at the 0.10 level, however, it is significant at the 0.20 level.

Imports of consumer goods constitute, on average, 25% of total imports yearly for 1970-86 (Table 4). In recent years, consumer goods have made up the largest single category of imports. Similar to the total imports in Eq. 13, imported consumer goods (IMC) represent a small open economy model with all the theoretical restrictions satisfied in Eq.15.

$$IMC_t = 606.1664 + 0.2075\ TC_t\ \ 291.8198\ \Pi_t + 0.2975\ IMC_{t-1} \qquad (15)$$

$$(1.18) \qquad (3.38)^{***}\ \ (-2.33)^{**} \qquad (1.63)^{a}$$

$R^2 = 0.97$, F-STAT = 124.19 and D.W. = 1.40
t-values between parentheses.
*** indicates significance at 0.01 level.
* indicates significance at 0.10 level.
a indicates significance at 0.15 level.
No asterisk indicates insignificance even at 0.15 level.

Where TC represents total consumption in Kuwait. All signs of the estimated coefficient are theoretically correct. Imported consumer goods are elastic with respect to total domestic consumption as indicated by the estimated elasticity of 1.55 calculated at the mean of the 1970-86 data. Imported consumer goods are statistically responsive to changes in exchange rate, at least at the 5% significance level. The corresponding estimated coefficient indicates that for every additional penny rise in the exchange rate ($/KD); imported consumer goods are likely to decrease by almost 3 fils. Similar to Eq. 13 imported consumer goods adjust at a lower rate than total consumption to past inertia (Eq. 4).

Intermediate goods represent 20% of total imports in 1970-86; however, in recent years, imported intermediate goods were second to consumer goods. Imported intermediate good (IMI) are usually demanded by the industrial sector in Kuwait. Consequently, the rate of capacity-utilization and domestic economic activities (measured by non-oil GDP) coupled with the demand prices of these commodities (PI) are the main determinants of the demand for intermediate goods. This is confirmed empirically in the OLS results of Eq. 16.

$$IMI = -477.5624 + 0.4057\ Y + 0.6822\ CAPACITY - 6.9427\ PI \qquad (16)$$
$$(-3.79)^{***}\ (4.86)^{***}\ (2.03)^{*}\qquad\qquad (-2.58)^{**}$$

$R^2 = 0.95$, F-STAT = 74.38 and D.W. = 1.68.
t-values between parentheses.
***, **, * indicate significance
at 0.01, 0.05 and 0.10 levels,
respectively

Similar to the machinery import function, imported intermediate goods are income-elastic with estimated elasticity of 2.82 measured at the mean of the data. Estimated capacity elasticity is 1.14, indicating that a 10% increase in capacity utilization of the manufacturing sector will, *ceteris paribus*, increase demand for imported industrial input by over 11%. The distinguishing feature of this equation from the preceding ones is that import demand for intermediate goods is price-elastic. The estimated own-price elasticity is -1.44 calculated at the means of the 1970-86 data. Imported food and beverages is also price-elastic (Eq. 17).

Foods and beverages constituted nearly 12% of total imports. Both values of imported and domestically produced food and beverage have been more than tripled between 1970 and 1986. This suggests that imported food and beverages complement (not substitute) domestically produced food and beverages. This claim is confirmed empirically by the sign and magnitude of the estimated coefficient of the domestic food and beverage price sub-index (PFB) in the imported demand of food and beverage (IMFB) equation (Eq. 17).

$$IMFB = -96.9156 + 2.9139\ PFP + 0.0340\ Y - 1.9139\ \Pi \qquad (17)$$
$$(-7.58)^{***}\quad (3.78)^{***}\quad (1.36)\qquad (-2.48)^{**}$$

$R^2 = 0.98$, F-STAT = 271.78 and D.W. = 1.69.
*** indicates significance at 0.01 level
** indicates significance at 0.05 level.
No asterisk indicates insignificance even at 0.10 level.

The US$/KD rate ($\Pi$), as a proxy for per unit cost of imported food and beverages, is significant and its estimated elasticity is -.03, confirming the common belief and empirics that food is price-inelastic. Furthermore, food is a necessity that is likely to be less income-elastic than the other categories of imported goods. This is confirmed by the estimated income-elasticity of 0.39, measured at the means of the data. Like the remaining non-food imported categories, fuel and lubricants are likely to be income-elastic. This claim is verified in the OLS results of the imported fuel and lubricant (IMFL) equation, corrected for second-order autocorrelation.

$$IMFL = 15.7013 + 0.0063\ Y - 7.0761\ \Pi + 0.0028\ PFL \qquad (18)$$
$$(2.11)^{*}\quad (3.63)^{***}\quad (-2.48)^{**}\quad (0.05)$$

$R^2 = 0.94$, F-STAT = 18.73
***, ** and * indicate significance at 0.01, 0.05 and 0.10 levels, respectively.
Otherwise insignificant.

Fuel and lubricants constitute less than 1% of total imports. Imported fuel and lubricants contain items that complement domestically produced fuel as confirmed by the sign of the estimated coefficient of the price index of domestically produced fuel. However, its magnitude is not statistically different from zero. Imported fuel and lubricants are elastic with respect to income and own-price. The latter is measured by the exchange rate and is estimated at -2.30, whereas the former equals 1.60.

The country not only imports nearly all consumer, intermediate and capital goods, it imports more than 80% of its labor. One implication of the dependence on

imported labor is the outflow of workers' remittances. Although workers' remittances were relatively small during the 1970s (accounting for only 7% of non-oil GDP), they increased to 12% in the last few years. The overall balance of payments in Kuwait has been in continuous surplus throughout the past two decades, reflecting high levels of petroleum exports and income from foreign investments. Despite decline in exports due to reduced export volume and prices in the last few years, Kuwait's balance of trade is still registering a surplus of more than a billion dinars.

III. LABOR MARKET

III.1. Labor Demand

The rapid expansion of the Kuwaiti economy, as in other oil-exporting countries, has necessitated a large inflow of foreign labor. Foreign labor has more than tripled from less than 175 000 in 1970 to more than 600 000 in 1986 (Table 5). The latter constitutes 85% of the total labor force in Kuwait. The labor demand in terms of number of workers tripled from less than 235 000 in 1970 to more than 710 000 in 1986 (Table 5). That is an average rate of growth of 7.2% annually for 1970-86. Factors that might have explained the tremendous increase in labor demand (LD) are analyzed in Eq. 19. The predetermined variables of the model include the growth in non-oil GDP (Y) to represent the growth in domestic economic activities, real wage rate (W) measured by overall average wage in the economy and one-year lagged labor demand (LD_{t-1}) to pick up effect of past inertia. The 1970-86 OLS results, corrected for second-order autocorrelation, are:

Table 5

Labour Market

OBS	Year	Labour Supply	Kuwaiti Labour Supply	Non-Kuwaiti Labour Supply	Percentage of Kuwaiti Labour	Percentage of Non-Kuwaiti Labour
1	1970	234,354	59,634	174,720	25.4461	74.5539
2	1971	245,800	64,285	181,515	26.1534	73.8466
3	1972	257,857	69,299	188,558	26.8750	73.1250
4	1973	270,579	74,705	195,874	27.6093	72.3907
5	1974	284,006	80,532	203,474	28.3557	71.6443
6	1975	298,415	86,971	211,444	29.1443	70.8557
7	1976	328,993	90,780	238,213	27.5933	72.4067
8	1977	363,117	94,747	268,370	26.0927	73.9073
9	1978	401,233	98,887	302,346	24.6458	75.3542
10	1979	443,832	103,209	340,623	23.2541	76.7459
11	1980	491,468	107,719	383,749	21.9178	78.0822
12	1981	522,739	111,255	411,484	21.2831	78.7169
13	1982	556,053	114,860	441,193	20.6563	79.3437
14	1983	591,628	118,581	473,047	20.0432	79.9568
15	1984	629,625	122,423	507,202	19.4438	80.5562
16	1985	670,212	126,390	543,822	18.8582	81.1418
17	1986	713,570	130,485	583,085	18.2862	81.7138

OBS	Population in Million Persons	Kuwaiti Population	Non-Kuwait Population	Percentage of Kuwaiti	Percentage of Non-Kuwaiti
1	739,000	347,396	391,604	52.9911	47.0089
2	784,000	369,372	414,628	52.8862	47.1138
3	832,000	392,739	439,261	52.7958	47.2042
4	883,000	417,584	465,416	52.7085	47.2915
5	937,000	444,000	493,000	52.6147	47.3853
6	995,000	472,088	522,912	52.5540	47.4460
7	1,058,000	489,466	568,534	53.7367	46.2633
8	1,125,000	507,483	617,517	54.8904	45.1096
9	1,197,000	526,164	670,836	56.0431	43.9569
10	1,275,000	545,532	729,468	57.2132	42.7868
11	1,370,000	565,613	804,387	58.7144	41.2856
12	1,432,000	587,059	844,941	59.0043	40.9957
13	1,497,000	609,318	887,682	59.2974	40.7026
14	1,564,000	637,015	926,985	59.2701	40.7299
15	1,636,000	661,168	974,832	59.5863	40.4137
16	1,710,000	686,237	1,023,763	59.8692	40.1308
17	1,788,000	712,257	1,075,743	60.1646	39.8354

Source: C.S.O. 'Annual Statistical Abstract,' Central Statistical Office, Ministry of Planning, Kuwait.

$$LD_t = 26097.91 - 18167.18\ W_t + 34173.16\ Y_t + 1.03\ LD_{t-1} \quad (19)$$
$$(1.63)^{*} \quad (-2.07)^{*} \quad (1.54) \quad (65.96)^{***}$$

$R^2 = 0.99$, F-STAT = 2275.67
*** and * indicate significance at 0.01, and 0.10 level, respectively. No asterisk indicates insignificance even at 0.10 level.

About 99% of the variations in labor demand are explained by the variations in real wages, growth in non-oil GDP and lagged labor demand, as revealed by the coefficient of determination R^2. All the theoretical restrictions are confirmed by the signs of the estimated coefficient in Eq. 19. Real wages have increased gradually from less than KD 2.0/h in 1973 to KD 2.3/h in 1986 at an average rate of growth of 0.8% annually. Its estimated elasticity was -0.16, indicating that labor demand in Kuwait is wage-inelastic. Although the estimated coefficient of the growth in non-oil GDP is insignificant at the 0.10 level, it is statistically different from zero at the 0.20 significance level. At this level of significance, every 1% growth in domestic economic activities, *ceteris paribus*, is likely to trigger an increase in demand for about 3 400 laborers of which 80% are likely to be non-Kuwaitis. Other things remaining the same, labor demand also adjusts significantly to the recent development in the labor market as measured by the estimated coefficient of the one year lagged labor demand. The estimated elasticity is not statistically different from unity, thus suggesting that current demand for labor adapts immediately to recent demand conditions. One implication of this instantaneous adjustment of labor demand is the worsening of the population balance in Kuwait. As discussed in CMT (1988) the foreign population in Kuwait has more than doubled between the 1970 and 1985 censuses, and more serious is the increase of non-Kuwaiti population from 53% in 1970 to nearly 60% in 1985. Although the Kuwaiti population grew at 4.5% annually for 1970-86, supply of Kuwaiti labor declined steadily from 7.8% in the early 1970s to 3.2% in the 1980s.

III.2. Labor Supply

Labor supply of Kuwaitis doubled from 60 000 in 1970 to slightly less than 130 000 in 1985 (Table 5). This increase is not enough to match the tripled demand for labor in Kuwait over the same period. CMT (1988) argued that the decline in growth rate of Kuwaiti labor supply in the 1980s (3.2%), which is half that of the total labor demand in the 1980s (6.4%) is due to the extremely low labor participation rate of its citizens (18.5%), high level of non-wage benefits received by Kuwaitis and declining productivity. In the absence of value-added per Kuwaiti labor or any reasonable non-wage wealth proxy, it is reasonable to take oil GDP as a proxy for the return from the highest component of non-human wealth (oil) in Kuwait. This non-human wealth variable with average wage are the two relevant explanatory variables in the labor supply (LS) model. The OLS results of the Kuwaiti labor supply (LSK), corrected for first-order autocorrelation, are presented in Eq. 20.

$$LSK = 145677.85 - 5862.16\ W - 6.6120\ WEALTH \qquad (20)$$
$$(7.69)^{***} \quad (-0.52) \quad (-5.68)^{***}$$

$R^2 = 0.89$ and F-STAT = 59.73
t-values between parentheses.
*** indicate significance at 0.01.
No asterisk indicates insignificance even at 0.10 level.

The variations in real wages and non-human wealth proxy explained about 90% of the variations in the Kuwaiti labor supply in Eq. 20. Although the sign of the estimated coefficient of the wage rate is negative, its magnitude is not statistically different from zero at any specified level of significance; only the non-wage benefits received by Kuwaitis is the significant variable in the model, at least at the 0.01 level. As indicated by the estimated coefficient, for any additional KD benefit received by Kuwaitis, more than six Kuwaitis are likely to be discouraged in supplying their services. Therefore, government benefits to Kuwaitis create a disincentive effect as

far as employment of Kuwaitis is concerned, thus confirming the CMT (1988) argument that non-wage benefits to Kuwaitis discourage supply of Kuwaiti labor. Therefore, government policies that tie non-wage benefits with efforts or encouraging Kuwaitis to stay long years in the jobs are desirable to correct for this disincentive effect. The non-Kuwaiti labor supply is considered a residual to close the gap between total labor demand and the Kuwaiti labor supply (Figure 1), therefore, it is not analyzed here.

Another phenomenon of the Kuwaiti labor supply is the heavy withdrawal of men over 40 years of age from the labor force, mainly due to the prevailing social security retirement program. This feature may partly explain the rapid increase of foreign labor even during the recent recessionary period. If retirement and current immigration policies continue, the extrapolation of total labor demand forecasts that labor demand is likely to reach 1.150 million by the year 2000 and Kuwaiti labor will represent about 10% of the labor force. This will worsen the population balance and make it difficult to achieve the main objective of the plan to balance population by the year 2000.

Another implication of the increasing dependence of foreign labor and imports of other commodities is the openness of the economy. Kuwait is a small open economy that is subjected to world volatility. To insulate the economy from such volatilities, the government subsidizes most imported goods and services to stabilize domestic prices.

IV. DETERMINATION OF THE PRICE LEVEL AND CLOSURE OF THE MODEL

The consumer price index (CPI) in Kuwait covers a wide range of food, housing, clothing and transport services, especially after 1978, whereas the wholesale price index (WPI) covers less commodities and the index favours manufactured goods. However, the inclusion of the subsidized commodities in the CPI calculation may bias the index downwards and, consequently, the variations in the overall index may reflect modest changes in prices.

Figure 2 shows that the CPI, WPI and the import price index (measured by the unit value of imports, UVIM) exhibit a modest increasing pattern for the 1970s through the 1980s; however, they differ in the rates of change. Most of the previous studies of price determination take CPI to represent the overall price level. CPI grew gradually from 36.6 in 1970 to 102.4 in 1986, with an average rate of growth of 6.1% annually over the period (Figure 2). The growth rate is lower than that of Saudi Arabia (7.1%) by 1% for the same period.

Moosa (1986) examined the effect of money on prices and output using quarterly data for 1977.1-1982.4. His findings suggested that government expenditure is the main determinant of domestic prices with an estimated elasticity of 0.48, followed by import prices with an elasticity of 0.29 and, finally, money supply with a modest elasticity of 0.05. Salih et al. (1989) supports Moosa's (1986) findings by analyzing the determinants of the price level using annual data for 1972-84.

This study updated 1970-86 data and posited a simple Keynesian price adjustment model. The OLS results of the price model, corrected for second-order autocorrelation is:

$$CPI_t = 7.0226 + 0.9584\ CPI_{t-1} \qquad (21)$$
$$(3.81)^{***} \quad (39.13)^{***}$$

R^2-0.99 and F-STAT = 1943.10
t-values between parentheses.
*** indicates significance at 0.01 level.

More than 99% of the variations in the price level are explained by the recent inertia; ie. the current consumer price index adjusts almost instantaneously to last year's price. This price-setting behaviour is consistent with the supply prices in Table 6. Producers in all sectors of the economy set current prices at last year prices (Table 6). Most important is the striking similarity between the rate of price adjustment of the overall domestic activities (measured by the non-oil GDP deflator) and the overall price level (measured by the CPI in Eq. 21). These results not only explain the importance of inertia in the price movements, but they also close this macromodel. Sirageldin et al. (1985) closed the model by adopting a stock equation; however, that equation included GDP and two dummy variables as exogenous variables. The introduction of two dummy variables created more serious econometric problems than solving the closure of the model. To avoid such problems and to guarantee equality of aggregate demand with the aggregate supply in the 1978 through 2000 forecast, these price equations are also utilized in the simulation stage.

Eq. 21 asserted the importance of inertia in setting current prices adaptively. This behaviour enabled us to examine the effect of world prices and monetary stimulus in domestic inflation rate.

Figure 2

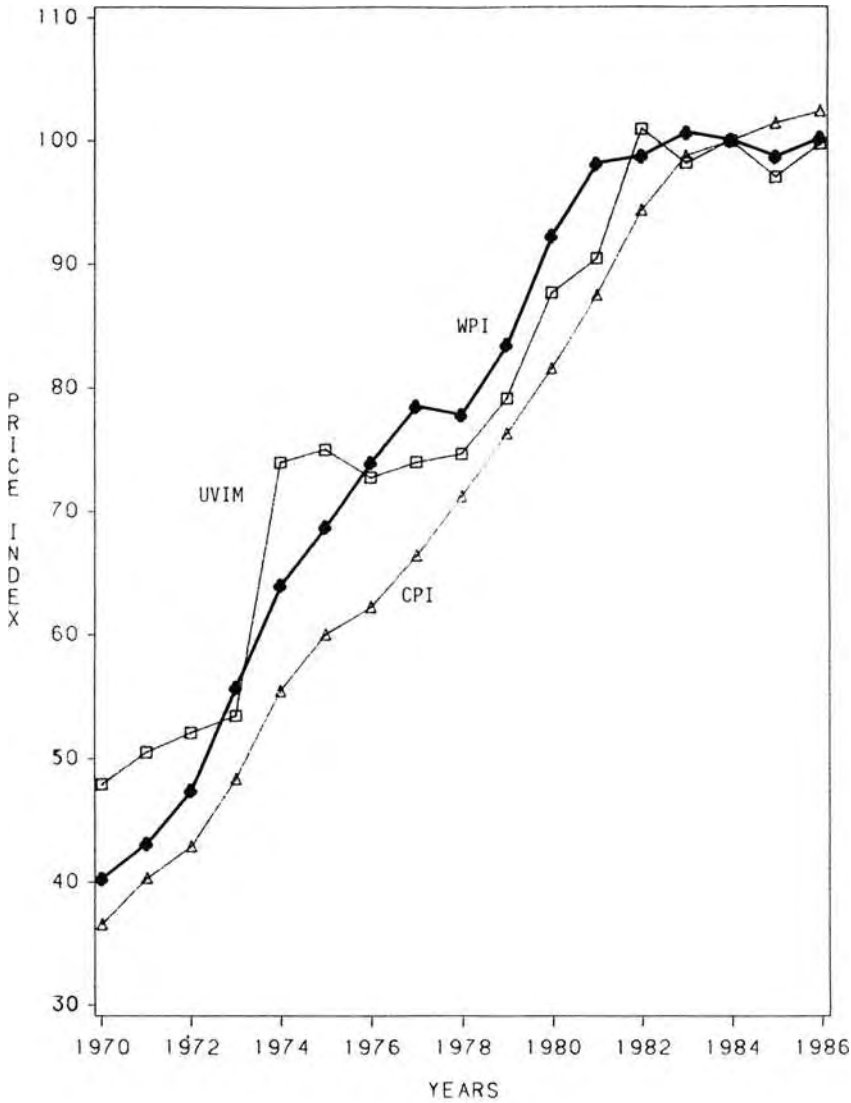

110
100
90
80
70
60
50
40
30
PRICE INDEX
WPI
UVIM
CPI
1970
1972
1974
1976
1978
1980
1982
1984
1986
YEARS
CONSUMER PRICE INDEX
WHOLE SALE PRICE INDEX
UNIT VALUE OF IMPORTS

Table 6

OLS Results of Supply Prices Models

Dependent Variable (Supply Price of)	Intercept	One-Year Lagged Dependent Variable	F-Statistics	R^2	D.W.
Agriculture and Fishing	12.0424 (2.55) **	0.8987 (15.17) ***	230.22	0.94	1.52
Construction	4.9372 (2.40) **	0.9847 (35.37) ***	1,251.00	0.99	1.57
Wholesale and Retail	5.8900 (2.40) **	0.9708 (35.37) ***	863.16	0.98	1.96
Manufactured Chemicals	8.4375 (1.36)	0.9322 (10.88) ***	118.36	0.89	1.87
Non-Oil Manufactured Products	8.8368 (1.53)	0.9244 (12.04) ***	144.96	0.91	1.82
Refined Oil Products	73.5849 (1.71) *	0.6716 (3.38) ***	11.48	0.45	1.76
Financial, Real Estate and Business Services	21.3717 (1.57)	0.7662 (5.00) ***	24.97	0.64	2.05
Public Administration	4.6829 (0.92)	1.0110 (13.03) ***	169.92	0.92	2.06
Transport, Communications and Storage	3.3988 (1.11)	1.0089 (24.47) ***	598.60	0.98	2.43
Private Household Services	2.3799 (1.08)	1.0468 (30.23) ***	913.79	0.99	1.60
Electricity and Water	8.3174 (0.70)	0.7957 (4.76) ***	50.48	0.90	AR(2)
Non-Oil, Mining and Quarrying	9.4646 (1.66) *	0.9174 (9.78) ***	95.74	0.87	2.34
Non-Oil GDP	9.0376 (1.40)	0.9457 (11.24) ***	126.40	0.90	2.26
World Oil	13.7740 (1.89) *	0.8693 (8.98) ***	80.73	0.85	1.69
GDP	11.2946 (1.87) *	0.8828 (10.41) ***	108.27	0.89	1.23

*** indicates significance at 0.01 level.
** indicates significance at 0.05 level.
* indicates significance at 0.10 level.
No asterisk indicates insignificance even at 0.10 level.
AR(2) means the model is corrected for second-order autocorrelation.
t-values between parentheses. Coefficients of one-year lagged price of public administration, transport and private household services are not significantly different from unity.

V INFLATION EQUATION, INTEREST RATE AND MONEY MARKET EQUILIBRIUM

V.1. Inflation in Kuwait

In the last two decades, inflation in Kuwait has been moderate relative to the rest of the world. Measured by any of the three commonly used price indices - the CPI, WPI and the GDP deflator - the average rate of inflation has been 6.1% per annum. Measured by the rate of growth of CPI, the inflation rate declined from 8.6% in the 1970s to 5.6% in the first half of the 1980s and was only 1.2% in the last three years.

With this low inflation rate in recent years, policy-makers have never been preoccupied with inflation in Kuwait; however, with the recent introduction of deficit financing in Kuwait, there has been a growing role and a resurgence of interest in monetary policy and its effect on inflation. On the other hand, academic economists have examined the effect of monetary stimulus on inflation in Kuwait. Al-Sabah (1987) examined the relationship between money and inflation in Kuwait from June 1973 to August 1977 and found that the effect of money on inflation is basically generated between the fifth and seventh lagged months. This lag length effect is implicitly assumed in Moosa's (1986) inflation equation by lagging the proxy of the money supply by two quarters. His findings suggested that import prices are the main determinant of domestic prices, followed by monetary stimulus and the least effect comes from government stimulus. Similarly, El-Mallkh's and Atta's (1981) inflation equation is explained in terms of money supply and import prices excluding government expenditure. Their empirical finding suggested that imported inflation is the supply side determinant of domestic inflation, whereas the demand-pull side is generated and fuelled by monetary stimulus. Salih et al. (1989) confirmed that world inflation was the main determinant of domestic inflation followed by the growth rate of money supply in 1972-84.

This study updated the series for 1970-1986 and modified the inflation equation in relation to the adaptive price-setting behaviour verified in Eq. 21. Thus, the Koyck geometrically declining function is appropriate in this case. In conjunction with previous studies and in line with the layout of the model (Figure I), imported inflation and growth rate in money supply are added to the lagged dependent variable in inflation (Eq. 22). The symbol (^) above the economic variables in Eq. 22 indicates the rate of growth of these variables. The OLS results of the inflation equation are:

$$\hat{CPI}_t = 0.0109 + 0.2058\ \hat{UVIM}_t + 0.0868\ \hat{M2}_t + 0.3494\ \hat{CPI}_{t-1} \qquad (22)$$

$$(1.13) \quad (3.96)^{***} \quad (1.93)^{*} \quad (6.01)^{***}$$

$R^2 = 0.86$, F-STAT = 17.98 and D.W. = 2.14.
t-values between parentheses.
*** and * indicate significance at 0.01 and 0.10 levels resp.
No asterisk indicates insignificance even at 0.10 level.

Eighty six percent of the variations in inflation in Kuwait are explained by the changes in growth rates of lagged domestic inflation, money supply and imported inflation. A doubling of world inflation will, *ceteris paribus*, result in a 21% increase in domestic inflation in the short-run and nearly 30% in the long-run at least at the 0.01 level of significance. The latter confirmed the empirical results in previous studies. A 100% increase in the growth of money supply broadly defined (to capture effect of quasi-money) will, *ceteris paribus*, result in an almost 9% increase in domestic inflation in the short-run and 12% in the long-run, at least at the 0.10 significance level. The long-run effect is equivalent to the empirical findings in Salih et al. (1989)[11]

It is evident from Eqs. 22 and 23 that money supply is a significant factor affecting both domestic prices and inflation. Therefore, its role has been increasing over time. The recent resurgence in monetary policy and the new development in the bond markets in 1987, basically issuance of debt-financing instruments, are other factors supporting the growing role of the monetary sector in the economy. However,

the preceding remarks fall short of advocating the argument of neoclassical dichotomy in Kuwait economy. Rather, our empirical findings indicate that money supply is only one of the determinants of domestic prices.

V.2. Money Market Equilibrium

If money supply is determined by the Central Bank (CBK) authorities with money market equilibrium assumption in place, a 2SLS method of estimation is used to describe the demand for money (MD) as a function of the opportunity cost of holding real cash balances (market interest rates, i) and income (non-oil GDP, Y).

The instruments used in the first stage to estimate the nominal interest rate are lagged, non-oil GDP and one year lagged non-oil GDP deflator. The stage-two results are summarized on the following page.

$$MD = -168.71 - 2564.37\, i + 0.49\, Y \qquad (24)$$

$$(-0.47) \quad (-0.78) \quad (8.82)^{***}$$

F-STAT = 43.36 and D.W. = 1.76
t-values between parentheses.
*** indicates significance at 0.01 level. Otherwise insignificant even at 0.10 level.

Interest rate has been fixed by monetary authorities. Therefore, it is legitimate to assume that i is exogenous in the demand for money equation (Eq. 24), however, Eq. 24 reveals that the demand for money is income-elastic and interest-inelastic. Although the sign of the estimated coefficient of the nominal interest rate confirmed the theory, its magnitude is not statistically different from zero. Only the estimated coefficient of income is significant at least at the 1% level. The estimated income-elasticity is 1.53, calculated at the means of the data. This model explains historical behaviour of the money market, however, recent developments in the financial sector may not be represented by the model. The reason is two fold.

First, the equality between money demand and supply determines interest rate. Second, Kuwait is an open capital market. Consequently, domestic interest rates are influenced by factors that might affect capital mobility. Figure 3 shows the close relationship between domestic and international market interest rates, thus giving the following arbitrage condition:

$$i = i^* + E\pi + \rho \tag{25}$$

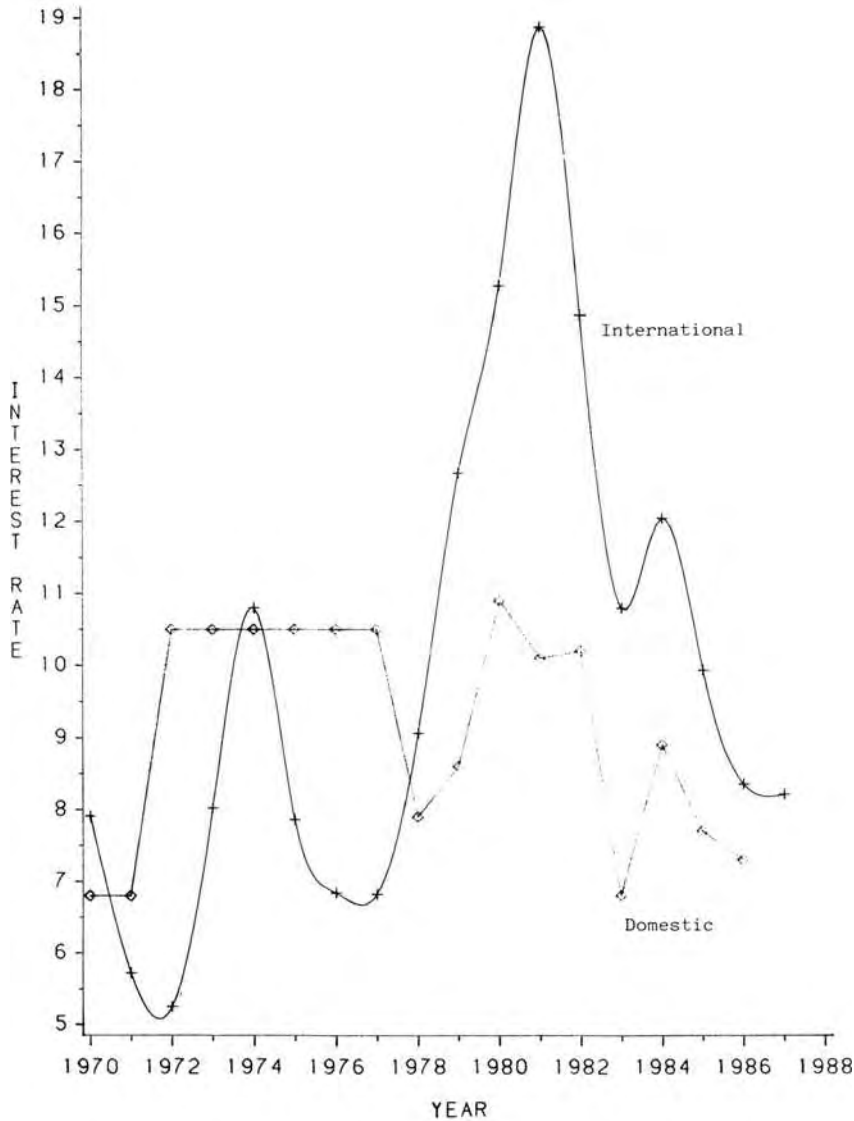
Where domestic interest rate (i) is determined by international interest rate (measured by U.S. rate) i^*, expected rate of change of nominal exchange rate ($E\pi$) and a risk premium on KD(ρ). Eq. 25 then gives the domestic interest rate that is consistent with stable foreign exchange reserves. Assuming no capital flight, then equilibrium in the money market (money demand equals money supply) gives the money stock that is consistent with the domestic interest rate. It is legitimate to assume for 1970-86 that there was no risk premium in KD. Then the estimated OLS results of Eq. 25 for 1970-86 are:

$$i = -9.3730 + 0.9896\, i^* + 0.0512\, E\pi \tag{26}$$
$$(-7.72)^{***} \quad (9.08)^{***} \quad (0.34)$$

$R^2 = 0.88$, F-STAT = 41.48 and D.W. = 1.16.
t-values between parentheses.
*** indicates significance at 0.01 level.
No asterisk means insignificance even at 0.10 level.

Eighty eight percent of the variations in domestic market interest rates are explained by the variations in international market interest rates and movement in nominal exchange rate as measured by the coefficient of determination R^2. Eq. 26 reveals that international interest rate is the main determinant of domestic interest rate. The 1970-86 data indicate that the average effective domestic interest rate (9.12%) was close to the international rate (9.96%) to the extent that every percent rise in international interest rate is likely to be transmitted in full percentage point domestically. The only difference between these rates is that domestic market rates are relatively less volatile than the international rates. Their volatilities are measured by the coefficients of variation at 17.3 and 36.4%, respectively. Results in Eq. 26 are

Figure 3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8
7
6
5
INTEREST RATE
International
Domestic
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
YEAR
NOMINAL
INTEREST RATE

used in forecasting money supply in 1987-2000. The velocity of circulation in the forecast period is relatively reasonable.

VI. SIMULATION AND FORECASTING

The ability of the model to replicate the past was tested by the forecast error, measured by the root mean square simulation errors (RMSE). In general, the RMSE did not exceed 20% for the majority of the endogenous variables of the model. Small RMSE are indicative of satisfactory performance of the model, but this does not guarantee accurate or reliable prediction; indeed, small RMSE enhances the degree of confidence in the model and helps explaining the behaviour and structure of the economic system.

The main empirical finding of the model corroborates the fact that Kuwait is foremost an oil economy, and economic activity has in the past been dependent on oil production and its international price. Oil price (or oil revenue) represents the main external driving force of the model (Figure 1). Consequently, developments in the oil market define the three alternative scenarios in the simulation. These are:

1. Base-run scenario that assumes that the values of the exogenous variables in the 1980s (1980-86) will continue in future (1987-2000).

2. Future oil prices are expected to follow the pattern and growth rate in real world oil prices in the 1980-85 (annual growth rate of 1.02%).

3. The expected future oil revenue will remain at the lowest 1986 level. This is equivalent to assuming a decline in real oil prices (by the rate of inflation).

The base-run case represents the worse-case scenario, whereas the second case forecasts an optimistic future of an annual growth rate of 1.02% of oil prices. The maintenance of the lowest 1986 oil income is between the two scenarios. It is assumed in these scenarios that government revenue includes resturns from Kuwait's portfolio of assets and indeed oil is one of these assets. These scenarios provide a wide range of options that may aid policy-makers and planners to evaluate the course and design of appropriate policy tools to achieve the plan's objectives.

VI.1. Status Quo Scenario

The 1970s witnessed two large oil-price hikes (1974 and late 1970s) that subjected the economy to world volatility. Although, the 1980s represented an era of a downturn in oil-prices and, consequently, a recession in domestic economy, the situation in the 1980s is likely to persist in the few years ahead as most forecasters agree that high oil prices will not be repeated in normal circumstances. Therefore, it is reasonable to assume that the rate of growth in all exogenous variables of the model in the 1980s will continue in 1987-2000, thus representing the declining era or worse-case scenario. If the situation in the 1980s continues through the end of the 1990s, GDP will grow at a slow pace of only 0.6% yearly in 1987-2000 (Table 7). More importantly is the expected change in the structure of the economy. The base year 1986 showed that oil represented nearly 58% of GDP. The importance and dominance of oil in the economy has been deteriorating steadily in the forecast period to less than 40% (i.e., 36%) at the turn of the century, i.e., a 2.5% rate of decline in oil GDP annually in 1987-2000. In turn, domestic economic activity makes up for this decline and, therefore, maintains modest growth in the overall GDP over the forecast period. The average annual growth rate of non-oil GDP is 2.8% for 1987-2000.

Similarly, the share of oil revenue in GDP and total government revenue has been declining in the 1990s. Oil revenue in the forecast period will not be enough to

Table 7

Forecast of Main Indicators in Case One Scenario (KD Million)
(Assuming Situation in 1980s Continues)

Sector	1986	1987	1990	1995	2000
Gross Domestic Product	6,513.10	7,153.50	7,250.84	7,442.40	7,647.69
Oil Gross Domestic Product	3,766.70 57.82%	3,783.20 52.89%	3,549.90 48.96%	3,161.00 42.47%	2,772.10 36.25%
Non-Oil Gross Domestic Product	2,746.40 42.17%	3,370.30 47.11%	3,700.94 51.04%	4,281.43 57.53%	4,875.59 63.75%
Oil Revenue	1,483.80 22.78%	2,511.70 35.11%	2,270.40 31.31%	1,868.20 25.10%	1,466.10 19.17%
Total Revenue	1,728.50	2,363.56	2,508.69	1,998.75	1,720.49
Private Consumption	2,524.00 38.75%	2,450.00 34.25%	2,240.93 30.91%	1,931.32 25.95%	1,664.48 21.76%
Government Expenditure	2,413.50 37.06%	2,745.33 38.38%	2,819.80 38.89%	2,114.46 28.41%	1,800.27 23.54%
Investment	916.80 14.08%	894.69 12.51%	829.26 11.44%	717.16 9.64%	631.89 8.26%
Imports	2,244.80 34.47%	2,825.00 39.49%	2,809.00 38.74%	2,782.00 37.38%	2,755.78 36.03%
Exports	3,953.30 60.70%	4,377.66 61.20%	4,091.10 56.42%	3,613.50 48.55%	3,135.91 41.00%
Oil Exports	3,649.10 92.31%	3,433.45 78.43%	2,859.96 69.91%	2,109.01 58.36%	1,555.23 49.59%
Balance of Trade	1,708.50 26.23%	1,552.66 21.70%	1,282.10 17.68%	831.50 11.17%	380.13 4.97%
Government Budget	-685.00	-381.77	-311.11	-115.71	-79.78
Population (millions)	1.788	1.835	2.033	2.368	2.703
Kuwaiti Population (millions)	0.712 39.84%	0.728 39.65%	0.794 39.04%	0.904 38.19%	1.015 37.55%
Non-Kuwaiti Population (millions)	1.075 60.12%	1.107 60.33%	1.239 60.94%	1.463 61.78%	1.688 62.45%
Labour Demand (workers)	713,570	729,670	823,566	986,054	1,150,416
Kuwaiti Labour Supply (workers)	130,485 18.29%	145,020 19.87%	163,716 19.88%	194,086 19.68%	224,040 19.47%
Non-Kuwaiti Labour Supply (workers)	583,822 81.82%	584,650 80.13%	659,845 80.12%	791,986 80.32%	926,376 80.53%
Consumer Price Index (of 1984 = 100)	102.41	92.132	101.704	117.66	133.637
Inflation Rate (% annually)	1.00	-10.04	3.42	3.14	2.71

cover the government expenditure. Although total revenue in 1987 is forecast to exceed government expenditure, revenues fall short of expenditure in 1988-2000. Consequently, a deficit of KD 311 million will appear in the state's general budget in 1988 and continue through the 1990s; however, it will decline to reach only KD 80 million in the year 2000. Although government expenditure has increased in the 1980s, it will decline in the 1990s.

The decline in oil income was evidenced by the country's ability to earn foreign exchange. Both the value and share of exports in GDP are forecast to decline from KD 4.0 billion (60% of GDP) in 1986 to less than KD 3.0 billion (40% of the GDP) in year 2000, basically due to the decline in oil exports from KD 3.7 billion in 1986 to slightly less than KD 1.6 billion in 2000. Although the share of oil exports in total exports will gradually decline from 90% in 1986 to 50% in 2000, oil will still represent an important source of the country's exports. Consequently, imports has declined by 3.8% annually in the forecast period, whereas exports declined by 5.2% yearly. The overall surplus on the external current account will continue, but in a declining pattern in the forecast period from KD 1.7 billion (26% of GDP) in 1987 to only KD 380 million (5% of GDP) in year 2000.

Similar to government expenditure, private consumption and investments are forecast to decline, respectively, by 2.8% and 5.8% annually over 1987-2000. Thus, the overall growth in aggregate demand is lower than the growth in GDP. Consequently, inflation rate will increase from less than 1% in 1986 to 3.1% yearly in the 1990s.

Despite the modest growth in domestic economic activities, labor demand is expected to grow by 4.3% annually in 1987-2000. Although Kuwaiti labor supply is forecast to grow by slightly higher rate of 4.5%, foreign labor will represent more

than 80% of the labor force. Consequently, the population balance will worsen so that the proportion of non-nationals will exceed 62% of total population by the year 2000.

The structural change in the economy is reflected in the declining importance of oil due to the growth in non-oil sectors of the economy. The base-run case also predicts a shift in the importance within the non-oil sectors of the economy, and service activities will continue to dominate economic activities. Table 8 reveals that the contribution of the service sectors to non-oil GDP will exceed 80% (about 45% of GDP) in 1987-2000. Public services will still have the lion's share of these services but in a gradual increasing rate: from 14.5% of GDP in 1986 to nearly 19% in 2000. The latter constitutes about 30% of non-oil GDP. Although finance and business services challenged wholesale and retail trade in the second spot in 1986, wholesale and retail share in GDP is forecast to exceed 15% in the year 2000, whereas contribution of finance and business services is forecast to reach 10% in the year 2000. This growth corroborates the expectation that trade and finance sectors will play an important role after the cease-fire in the Gulf war. The optimism after the cease-fire is also reflected in the construction sector. The sector is expected to grow steadily from 2.3% of GDP (5.5% of non-oil GDP) to more than 6.3% of GDP (almost 10% of non-oil GDP). This increase in construction activities will bring with it an increase in demand for building materials. Consequently, value-added in non-oil manufacturing will increase from KD 176 million in 1986 to KD 345 million in 2000. Similarly, the share of non-oil manufacturing in GDP will almost double from 2.7 to 4.5% in 2000; however, the contribution of the refined oil products sector to total GDP is forecast to decline from 1.6% in 1986 to only 0.7% in 2000.

Transport and communications and agriculture and fisheries are expected to gain importance in future. The contribution of transport and communications in GDP is forecast to increase steadily from 3.6% in 1986 to 6.6% in 2000 (Table 8). Although the contribution of agriculture and fisheries in GDP declined slightly in 1987 relative to the base year 1986, its contribution has improved since then to surpass 1% in the

Table 8

Forecast of Sectoral Value-Added (Case One Scenario)
(Assuming Situation in 1980s Continues)

Sector	1986	1987	1990	1995	2000
Gross Domestic Product (Million KD)	6,513.10	7,153.50	7,250.84	7,442.40	7,647.69
Public Administration (% of GDP)	14.43%	13.96%	15.18%	17.08%	18.85%
Wholesale & Retail Trade (% of GDP)	7.81%	10.60%	11.75%	13.54%	15.21%
Finance & Business Services (% of GDP)	8.91%	7.70%	8.24%	9.06%	9.82%
Non-Oil Manufacturing (% of GDP)	2.71%	3.09%	3.49%	4.03%	4.51%
Refined Oil Products (% of GDP)	1.60%	1.04%	0.96%	0.83%	0.71%
Chemical products (% of GDP)	0.57%	0.68%	0.72%	0.78%	0.83%
Construction (% of GDP)	2.34%	4.39%	4.86%	5.61%	6.31%
Transport & Communication (% of GDP)	3.57%	4.23%	4.81%	5.72%	6.58%
Personal Services (% of GDP)	1.85%	1.99%	2.07%	2.21%	2.35%
Agriculture & Fishing (% of GDP)	0.70%	0.63%	0.73%	0.88%	1.02%
Non-Oil Mining & Quarrying (% of GDP)	0.02%	0.04%	0.03%	0.02%	0.01%
Electricity & Water (% of GDP)	3.30%	2.17%	2.72%	3.13%	3.31%

year 2000. This forecast confirmed the support of the government to the sector in the last three years and its commitment to improve the productivity of the sector. The remaining sectors are expected to stagnate.

VI.2. Optimistic Scenario

Oil prices grew by 1.02% annually in 1980-85. If this situation continues through the end of the decade, total GDP will grow by 4.1% yearly in 1987-2000; GDP will increase steadily from KD 6.5 billion in 1986 to nearly KD 11 billion by the turn of the century. This is attributable to the growth rate in both oil and non-oil GDP in 1987-2000. Table 9 reveals that oil GDP will rise steadily from KD 3.8 billion in 1986 to KD 5.0 billion in the year 2000. Although oil GDP is forecast to grow through the years, its growth rate is lower than the overall annual growth rate of GDP. Consequently, oil GDP share in total GDP has been declining gradually from 54% in 1986 to 46% of GDP even with a modest rise in oil prices. However, non-oil GDP is forecast to grow by 6.2% annually through the years and its share in GDP will exceed 54% in 2000. Similar to the case one scenario, the service sectors in non-oil GDP will continue to dominate domestic activities (Table 10).

The modest increase in oil price is mainly evidenced in oil exports. Although the share of oil exports in total exports represented slightly less than 80% in 1987, it grew steadily at a 2.8% annual growth rate through the years to gain its historical peak years in the late 1990s to 2000, i.e., oil exports are forecast to reach 95% of total exports (Table 9). Consequently, trade balance is forecast to register an increasing surplus of more than 27% of GDP. Another important impact of the modest increase in oil prices is the state's annual budget. Unlike the case one scenario, the 1986 deficit is forecast to be reduced to less than KD 8 million in 1987, and more important is the continuing growth in public saving (budget surplus) of KD 140 million in 1988 to over half a billion KD in 2000.

Table 9

Forecast of Main Indicators in Case Two (KD Million)
(Assuming Growth Rate of World Oil Prices in 1980s)

Sector	1986	1987	1990	1995	2000
Gross Domestic Product	6,513.10	7,123.00	8,316.97	9,338.72	10,905.96
Oil Gross Domestic Product	3,766.00 57.82%	3,841.50 53.93%	4,076.60 49.02%	4,500.90 48.20%	4,969.40 45.57%
Non-Oil Gross Domestic Product	2,746.40 42.17%	3,281.50 46.07%	4,240.37 50.98%	4,837.82 51.80%	5,936.56 54.43%
Oil Revenue	1,483.38 22.78%	1,522.90 21.38%	1,646.80 19.80%	1,875.96 20.00%	2,137.00 19.59%
Total Revenue	1,717.40	1,757.20	1,886.66	2,125.22	2,691.49
Private Consumption	2,524.00 38.75%	2,361.20 33.15%	2,480.90 29.83%	2,488.71 26.65%	2,725.45 24.99%
Government Expenditure	2,413.00 37.05%	1,765.00 24.78%	1,747.89 21.02%	1,935.90 20.73%	2,170.26 19.90%
Investment	916.80 14.08%	1,264.50 17.75%	1,568.40 18.86%	2,220.70 23.78%	3,121.70 28.62%
Imports	2,244.80 34.47%	2,825.00 39.66%	2,809.00 33.77%	2,782.00 29.79%	2,755.78 25.27%
Exports	3,953.30 60.70%	4,666.11 65.51%	4,885.00 58.74%	5,158.46 55.24%	5,498.54 50.42%
Oil Exports	3,649.10 92.31%	3,721.90 79.76%	4,024.40 82.38%	4,584.56 88.87%	5,222.53 94.98%
Balance of Trade	1,708.50 26.23%	1,841.11 25.85%	2,076.00 24.96%	2,376.46 25.45%	2,742.76 25.15%
Government Budget	-695.60	-7.80	138.77	189.32	521.23
Consumer Price Index (of 1984 = 100)	102.41	106.37	119.20	144.43	169.91
Inflation Rate (% annually)	0.99	3.87	4.02	4.23	3.53

Table 10

Forecast of Sectoral Value-Added in Case Two
(Assuming Growth Rate of World Oil Prices in 1980s)

Sector	1986	1987	1990	1995	2000
Gross Domestic Product (Million KD)	6,513.10	7,123.00	8,316.97	9,338.72	10,905.96
Public Administration (% of GDP)	14.43%	13.85%	14.16%	14.48%	14.64%
Wholesale & Retail (% of GDP)	7.81%	10.51%	10.95%	11.47%	11.82%
Finance & Business Services (% of GDP)	8.91%	7.64%	7.68%	7.68%	7.63%
Non-Oil Manufacturing (% of GDP)	2.71%	3.06%	3.25%	3.41%	3.50%
Refined Oil Products (% of GDP)	1.60%	1.03%	0.90%	0.71%	0.55%
Chemical Products (% of GDP)	0.57%	0.68%	0.67%	0.66%	0.65%
Construction (% of GDP)	2.34%	4.35%	4.54%	4.75%	4.90%
Transport & Communication (% of GDP)	3.57%	4.20%	4.49%	4.85%	5.11%
Personal Services (% of GDP)	1.85%	1.97%	1.93%	1.87%	1.82%
Agriculture & Fishing (% of GDP)	0.70%	0.63%	0.68%	0.74%	0.79%
Non-Oil Mining & Quarrying (% of GDP)	0.02%	0.04%	0.03%	0.02%	0.01%
Electricity & Water (% of GDP)	3.30%	2.15%	2.54%	2.65%	2.57%

Although total revenue is forecast to grow by 5.3% annually, government expenditure and private consumption are likely to grow by 2.4% and 1.2% per annum, respectively, in 1987-2000. This is consistent with the behaviour of the government (Kuwait is a high-saving country). Similarly, investment is expected to grow and exceed private consumption in 2000. The increase in oil prices also has an impact on domestic inflation; overall price level is expected to grow by nearly 4.0% annually.

VI.3. Intermediate Scenario

This case assumes that oil income stays at its 1986 level. As a result, oil GDP stays at its 1986 level and the share of oil GDP in total GDP will decline through the years from 57.8% in 1986 to only 41.4% in year 2000 (Table 11). The latter is still higher than that in the first case scenario. Although oil GDP stays at its 1986 level, GDP is forecast to grow at a rate of 2.3% annually. This is basically attributable to the growth in non-oil GDP (4.9% per annum), especially the service sectors (public administration, wholesale and retail, business, transport and finance), construction activities and other producing sectors (non-oil manufacturing and agriculture and fisheries), shown in Table 12.

In the oil scene, this scenario is a mirror-image of the second scenario, especially concerning oil revenue. Since oil revenue stays at its 1986 level, total revenue hardly grows in 1987-2000. The latter grows by only 0.07% yearly in the forecast period. Government commitments to labor contracts and other long-term development programs are likely to increase total expenditure slightly from KD 2.4 billion in 1986 to KD 2.8 billion in 2000. In turn, the government deficit is expected to increase from KD 120 million in 1987 to KD 1.1 billion in 2000. This situation is worse than the predicted declining deficit in the first scenario; however, this scenario produces a better trade balance than the first case scenario. Oil exports at the 1986 level are

Table 11

Forecast of Main Indicators in Case Three (KD Million)
(Assuming oil income stays at its 1986 level)

Sector	1986	1987	1990	1995	2000
Gross Domestic Product	6,513.10	7,031.05	7,466.46	8,247.62	9,100.17
Oil Gross Domestic Product	3,766.70 57.82%	3,766.70 53.57%	3,766.70 50.45%	3,766.70 45.39%	3,766.70 41.39%
Non-Oil Gross Domestic Product	2,746.40 42.17%	3,264.35 46.43%	3,699.76 49.55%	4,530.92 54.61%	5,333.47 58.61%
Oil Revenue	1,483.80 22.78%	1,483.80 21.10%	1,483.80 19.87%	1,483.80 17.88%	1,483.80 16.31%
Total Revenue	1,717.40	1,718.10	1,723.66	1,730.06	1,738.29
Private Consumption	2,524.00 38.75%	2,344.45 33.34%	2,240.45 30.01%	2,181.54 26.29%	2,150.11 23.63%
Government Expenditure	2,413.50 37.06%	1,837.36 26.13%	1,908.39 25.56%	2,428.11 29.26%	2,827.51 31.07%
Investment	916.80 14.08%	894.69 12.72%	829.26 11.11%	717.16 8.64%	631.89 6.94%
Imports	2,244.80 34.47%	2,825.00 40.18%	2,809.00 37.62%	2,782.00 33.53%	2,755.78 30.28%
Exports	3,953.30 60.70%	4,593.31 65.33%	4,509.70 60.40%	4,223.00 50.89%	3,925.11 43.13%
Oil Exports	3,649.10 92.31%	3,649.10 79.44%	3,649.10 80.92%	3,649.10 86.41%	3,649.10 92.97%
Balance of Trade	1,708.50 26.23%	1,768.31 25.15%	1,700.70 22.78%	1,441.00 17.37%	1,169.33 12.85%
Government Budget	-696.10	-119.26	-184.73	-698.05	-1,089.22
Consumer Price Index (of 1984 = 100)	102.41	92.12	94.46	98.57	102.67
Inflation Rate (% annually)	0.99	-10.05	0.85	0.87	0.83

Table 12

Forecast of Sectoral Value-Added in Case Three Scenario
(Assuming oil income stays at its 1986 level)

Sector	1986	1987	1990	1995	2000
Gross Domestic Product (Million KD)	6,513.10	7,031.05	7,466.46	8,297.62	9,100.17
Public Administration (% of GDP)	14.43%	14.00%	14.74%	15.80%	16.68%
Wholesale & Retail Trade (% of GDP)	7.81%	10.62%	11.41%	12.52%	13.46%
Finance & Business Services (% of GDP)	8.91%	7.72%	8.00%	8.38%	8.69%
Non-Oil Manufacturing (% of GDP)	2.71%	3.09%	3.39%	3.73%	3.99%
Refined Oil Products (% of GDP)	1.60%	1.05%	0.94%	0.77%	0.63%
Chemical products (% of GDP)	0.57%	0.69%	0.70%	0.72%	0.74%
Construction (% of GDP)	2.34%	4.40%	4.72%	5.19%	5.58%
Transport & Communication (% of GDP)	3.57%	4.24%	4.67%	5.29%	5.83%
Personal Services (% of GDP)	1.85%	1.99%	2.01%	2.04%	2.08%
Agriculture & Fishing (% of GDP)	0.70%	0.63%	0.71%	0.81%	0.91%
Non-Oil Mining & Quarrying (% of GDP)	0.02%	0.04%	0.03%	0.02%	0.01%
Electricity & Water (% of GDP)	3.30%	2.17%	2.64%	2.89%	2.93%

higher than those predicted in case one. The latter are declining sharply through the years. Consequently, oil exports in this scenario dominate total exports.

The decline in other components of aggregate demand produces a modest inflation rate of less than 1% in 1987-2000.

VII. CONCLUSION

The structure of the macromodel contains the salient features and characteristics of the Kuwaiti economy: dichotomy of oil vs. non-oil, Kuwaiti vs. non-Kuwaiti, dominance of the government in the economy and its being a small and open economy. It then describes and analyzes the supply side and studies the aggregate demand of the economy in a standard Keynesian framework using 1970-86 time-series data.

The country's economy is dominated by oil. Consequently, its GDP is divided into oil and non-oil GDP. Non-oil GDP is generated from the standard national accounts' nine sectors with the manufacturing sector disaggregated further to three subsectors: non-oil, oil-refining and chemical manufacturing subsector. The non-oil GDP is dominated by the service-oriented sectors (public administration, wholesale and retail, finance and business, transport and communications and private household services). Followed by the construction sector and related non-oil manufacturing industries. It is predicted that domestic activities will be dominated by these service-oriented sectors through the end of the century. Thus, non-oil domestic activities gain importance to the extent that its share in GDP exceeds oil share by the turn of the century. This structural change in the economy will persist whether oil prices fall or rise gradually.

The financial and non-financial resources generated by the economy result in demand for goods and services domestically. This basically comes from private consumption, investment and government expenditure. The government is owner of the bulk of the wealth in the country, thus the government is the prime mover of domestic activities. It is empirically verified that returns from the total financial and non-financial wealth determine government expenditure; however, the state saves more than it spends. To satisfy public and private consumption, the country imports most of its needs. The empirics corroborate the fact that the country is a small open economy. Its financial sector is partly influenced by rates of borrowing and lending money. In turn, its domestic inflation is determined by world inflation and growth in its money stock. The country also imports more than 80% of its labor force and this situation is predicted to continue through the turn of the century.

Although, terms of trade are not spelled out in the model, the price setting behaviour of the producers and the historical pattern of the overall price level confirmed the instantaneous price adjustment mechanism. This simple Keynesian price model is used in the model simulation so that aggregate supply equates aggregate demand with the insignificant discrepancy representing less than the historical average change in the stocks. The condition guarantees the closure of the model.

Finally the study offers three alternative scenarios to aid policy makers in future projections of the main indicators of the economy. These scenarios emphasize the importance of oil prices in overall economic activities and various accounts to the extent that a modest rise in oil prices is likely to turn the budget deficit into huge public savings and the foreign accounts into mounting surpluses.

These scenarios assumed implicitly that the government action to balance the economy is achieved through its budget. The debt-financing instrument is introduced

in 1987 (after base year of our forecast) to balance the budget. Although the government borrowing is not considered in our forecast, the size of the deficit is estimated in 1987-2000. It is clear from two scenarios that there is a need to mobilize additional resources to finance the deficit when oil prices fall, despite the fact that government uses returns from financial assets to augment its revenue. Conversely, the forecast indicates that there is no need to borrow when oil prices and/or returns from other assets rise. Therefore, a more interesting future extension of this report is to examine borrowing government policy to sterilize the deficit when oil prices fall.

NOTES

1 KD is the Kuwaiti currency: Kuwaiti Dinar (KD) equals 1000 fils. 1 KD equals approximately US$3.50. For further discussion on the estimation of Kuwaits wealth, interested readers may consult Leonard (1988), Weitzman (1988) and Salih (1989).

2 The coefficient of variations for business and finance, public and community, personal and household services and the wholesale and retail sector are 9.5, 12.1, 14.8 and 16.0%, respectively. Although the coefficient of variation in the transport and communications sector is 26.2%, it is significantly lower than that of electricity and water, agriculture and fisheries, manufactured refined products, non-oil mining and quarrying and manufacturing chemical sectors; their coefficients of variations are 37.4, 47.9, 56.4, 59.8 and 63.7% respectively, for 1970-86.

3 When value-added was expressed as a function of the output price, the estimated coefficient (4.8) was highly significant and its elasticity was 0.44, measured at the means of the data. It is obvious that the output price index basically measures the wage rate.

4 Alternatively, lagged value-added reflects the immediate response of current value-added to the recent past. Please note that there is difficulty in obtaining a good and reliable construction price index as a proxy for output price.

5 More specific for the model

$$VA_t = \alpha + \beta\gamma\lambda P_t + \{(1-\gamma) + (1-\lambda)\} VA_{t-1} - (1-\gamma)(1-\lambda) VA_{t-2} + \varepsilon_t \quad (1)$$

where VA_t is value-added at time t,

VA_{t-1} and VA_{t-2} are one and two periods lagged value-added

P_t is the price at time t and ε_t is a random error. γ indicates the rate of adjustment for $0<\gamma<1$ and λ estimates the speed of adjustment; the closer γ to zero, the longer the adjustment takes in this process. In this model, the estimated coefficients of one-year lagged and two-year lagged value-added are less than unity. The coefficient of current value is unity. Therefore, the model gives damped (not oscillating) cycles.

6 When the model was tested for negative serial autocorrelation and/or a lagged dependent variable, there was no statistical evidence to support the existence of either. Consequently, one would interpret over-adjustment as a biological property of the fish. Recently, there have been tremendous efforts in aquaculture whereby fish over-multipied exponentially, hence giving rise to the explosive nature of the model.

7 SAMA (1983) and Johany et al. (1986) calculated the fraction of oil production to allotted quota to OPEC members. At times of increased chiselling in 1982-83, the fraction of production to allotted quota for Kuwait was only 1.03 and 1.06, respectively

8 The average propensity to consume in Saudi Arabia was 0.25 in 1980 reported in Johany et al. (1986), whereas the average propensity to consume in Kuwait for the same year was slightly higher than 0.30 and it was 0.65 for the USA in 1980.

9 Private consumption in the national accounts of Kuwait is taken as a residual between GDP and the sum of government expenditure, investment, trade balance and change in stocks; private consumption includes observed private consumption and a random factor, hence consumption data is likely to represent an error-in-variable and, consequently, there arises the possibility of over-estimating propensities using residual data by the OLS method.

10 Salih's (1989) empirical findings reject the claim that permanent expenditure is a random walk since the estimated propensity is significantly lower than unity; however, the estimated coefficient is stable around 0.34.

11 These results are consistent with those obtained in the modified Koyck geometrically declining price model:

$$CPI_t = 4.3000 + 0.2652\ UVIM_t + 0.0020\ M2_t + 0.6265\ CPI_{t-1} \qquad (23)$$

(1.30) (3.83)*** (1.97)* (6.66)***

$R^2 = 0.99$, F-STAT = 1385.82
and D.W. = 1.54.
t-values between parentheses.
*** and * indicate significance at
0.01 and 0.10 levels, respectively.
Otherwise insignificant even at 0.10 level.

APPENDICES

Table A1

Value Added by Sectors

OBS	Year	Non-Oil GDP	Public Adminst & Comm	Whole-Sale & Retail	Finance, Real-estate & Buss	Manuf of Non-Oil	Refined Product	Manuf of Oil Product
1	1970	1230.97	390.82	208.64	245.8	45.11	119.94	7.56
2	1971	1320.59	431.13	217.7	259.88	56.19	121.9	8.74
3	1972	1445.44	511.8	249.2	258.92	64.92	109.04	16.01
4	1973	1526.35	548.78	237.42	272.92	69.98	110.29	31.84
5	1974	1585.72	522.2	261.46	289.6	62.49	98.56	70.66
6	1975	1824.36	550.49	369.16	312.31	98.76	85.96	82.40
7	1976	2153.35	600.61	481.68	354.03	132.65	107.32	33.40
8	1977	2271.79	664.96	533.6	353.29	155.72	62.27	43.60
9	1978	2389.59	690.06	550.45	390.08	187.6	63.33	49.10
10	1979	2514.15	735.43	560.66	415.53	175.31	73.18	49.60
11	1980	2825.65	676.45	714.49	461.18	183.26	59.72	50.90
12	1981	3012.44	780.11	745.06	523.18	187.68	50.05	48.00
13	1982	3199.21	848.3	810.69	555.07	199.25	74.45	36.54
14	1983	2947.3	903.64	554.42	560.34	193.36	83.81	30.94
15	1984	2980.63	929.83	573.5	587.4	181.8	85.64	33.00
16	1985	2949.5	1042.2	546.4	587.4	184.8	100.3	29.30
17	1986	2731.03	940.1	506.8	580.3	176.3	104.1	37.40

OBS	Const	Transpt & Storage	House-hold & Service	Agricult & Fishery	Mining & Quarring	Elect & Water
1	68.87	67.80	73.83	12.44	1.48	-28.44
2	77.20	69.63	77.52	13.35	2.61	-33.40
3	86.75	73.25	85.01	10.83	2.18	-41.03
4	91.87	80.67	92.56	10.08	4.70	-45.73
5	113.30	84.98	94.78	10.58	4.31	-50.93
6	125.44	97.26	107.67	12.16	3.79	-57.98
7	200.02	115.57	123.68	11.72	6.42	-65.16
8	238.30	112.09	111.70	10.58	8.10	-79.32
9	247.23	124.62	106.70	12.73	8.30	-92.11
10	287.26	150.61	106.40	11.61	4.10	-111.74
11	340.91	225.07	147.23	13.13	3.45	-116.64
12	300.53	250.16	153.20	21.31	5.41	-129.05
13	277.88	310.41	136.10	23.99	2.14	-150.21
14	277.35	277.43	126.70	27.69	1.66	-161.34
15	272.20	264.80	128.30	34.97	2.90	-178.11
16	195.20	235.90	122.20	40.50	1.10	-196.40
17	152.30	232.50	120.40	40.33	1.20	-214.70

Sources: (1) C.S.O. 1986, National Accounts Statistics, Central Statistical Office, Ministry of Planning.

(2) C.S.O. 1987, Annual Statistical Abstract, Central Statistical Office, Ministry of Planning.

Table A2

Aggregate Demand Components

OBS	Year	Aggre-gate Demand	Real Private Consu-mption	Gross Fix Capital Forma-tion	Gov't Expen-diture	Real-EXP	Real-IMP	Increase In stock
1	1970	9995	970.25	318.27	308.07	8977.78	574.18	-5.20
2	1971	10555.5	978.81	307.27	348.56	9485.31	565.96	6.50
3	1972	10965.3	963.45	321.65	397.63	9911.06	647.17	18.71
4	1973	10219.7	905.18	310.77	538.40	9194.01	740.72	12.08
5	1974	9477.7	1015.30	387.90	1058.69	7747.66	789.07	57.18
6	1975	8309.8	1287.86	657.67	1033.85	6497.23	1204.31	37.51
7	1976	9282.4	1674.78	871.67	1357.01	6918.43	1636.66	97.16
8	1977	9245.5	2050.07	1136.91	1647.31	6338.96	2092.32	164.60
9	1978	9577.6	2075.89	1024.51	1648.41	6799.52	2059.45	88.70
10	1979	11605.7	2888.01	925.91	2221.57	8200.12	2247.20	172.30
11	1980	9540.2	2927.16	1035.81	2679.45	5667.25	2883.14	113.70
12	1981	8827.9	3044.14	1068.84	3140.55	4171.75	2688.02	90.60
13	1982	8342.7	3513.14	1368.81	3272.06	2968.11	2910.15	130.70
14	1983	8052.2	2829.79	1478.86	3217.25	3515.12	2970.62	-18.22
15	1984	8263.5	2878.74	1306.30	3239.25	3862.00	3037.00	14.20
16	1985	7597.3	2631.60	1296.00	3118.59	3530.20	2942.20	-36.90
17	1986	7510.9	2524.00	916.80	2413.50	3953.30	2244.80	-51.90

Sources: (1) C.S.O. 1987, Annual Statistical Abstract, Central Statistical Office, Ministry of Planning.

Table A3

Price Indices

OBS	Year	Price of Public Administ & Comm	Price of Wholesale & Retail	Price of Finance, Realestate & Buss	Price of Manf of Non Oil	Price of Refined Product	Price of Manf of Oil Product
1	1970	27,317	40,759	31,672	44,735	17,050	39,021
2	1971	30,448	43,169	32,865	45,649	20,459	41,190
3	1972	30,313	44,274	36,587	46,888	25,862	42,349
4	1973	30,209	49,372	38,312	55,016	23,030	42,651
5	1974	34,418	56,227	40,294	63,994	93,446	51,769
6	1975	43,796	59,876	47,892	70,251	87,599	61,129
7	1976	44,789	62,984	58,656	73,901	102,311	66,048
8	1977	51,597	69,445	70,166	67,403	174,691	63,188
9	1978	53,171	72,250	72,788	64,488	198,074	63,462
10	1979	68,814	77,480	103,066	71,074	550,492	77,157
11	1980	82,793	88,075	109,385	86,877	399,665	74,971
12	1981	87,584	89,080	110,524	87,122	272,587	76,708
13	1982	94,244	94,680	184,074	96,447	216,038	95,868
14	1983	97,905	98,584	131,402	94,658	180,157	110,213
15	1984	100,000	100,000	100,000	100,000	100,000	100,000
16	1985	88,531	100,426	84,011	98,680	164,506	99,386
17	1986	112,889	101,537	80,918	97,930	332,046	99,144

OBS	Price of Const	Price of Transp	Price of House-hold Services	Price of Agricult & Fishery	Price of Mining & Quarring	Price of Elect & Water
1	40,802	44,211	27,320	20,016	5,862	25,387
2	43,109	47,033	30,534	22,322	8,043	27,934
3	44,300	48,489	32,149	29,363	7,862	26,249
4	48,351	50,649	31,850	36,111	9,328	25,738
5	55,410	58,168	34,786	44,329	33,621	24,818
6	58,729	60,492	39,073	53,207	34,259	22,663
7	61,299	60,560	39,004	61,007	33,198	28,791
8	66,471	65,550	48,523	72,684	35,690	26,525
9	71,229	68,353	55,445	78,397	33,647	26,479
10	76,279	73,616	63,064	101,464	58,155	23,761
11	84,659	78,059	67,921	107,159	86,207	63,383
12	87,512	83,390	72,258	112,482	71,733	129,275
13	94,357	92,823	84,938	118,925	93,388	151,468
14	98,792	98,838	96,290	101,878	100,000	137,291
15	100,000	100,000	100,000	100,000	100,000	100,000
16	101,527	101,982	105,155	97,778	95,259	76,604
17	102,429	106,630	108,887	95,478	91,379	43,847

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