

**DETERMINANTS OF GOVERNMENT LABOR DEMAND
IN THE GCC STATES**

Ahmad Sulaiman Bin-Obaid
Associate Professor/ Economic Department
Vice Dean of Graduate Studies
King Saud University

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Abstract:

The main objective of this paper is to analyze the determinants of labor demand for the governments sectors of the GCC states. Paucity of data plus efficiency considerations pertaining to the labor markets in the GCC states has entailed the use of pooled cross-section time-series estimation methods. Estimation results show that the GCC states have common factors affecting government labor demand. Thus, similar economic and labor markets features are reflected in the specified labor demand equation. Estimation reveals that governments labor demand responds in opposite directions to government and private employment compensations and to private employment size. Labor demand is inelastic with respect to these variables. In addition, there exist increasing returns to scale in the oil sector of the GCC states with respect to government employment.

I. INTRODUCTION

The Gulf Cooperation Council (GCC) states' economic fortunes evolve around the oil sector. Oil has been the main source of income, foreign exchanges, and governments' revenues. Oil revenues, which accrue directly to the governments, have been spent mostly for consumption and investment purposes to speed up economic development in these states. In particular, the GCC states have spent heavily on building infrastructure, especially when their governments' budgets had run huge surpluses during the 1970s.

Endowed with relatively little national human resources, the GCC states have relied heavily on expatriates to speed up their economic development. However, as governments oil revenue declined and the GCC states population, especially youth, continued to grow at high rates, new entrants to the labor market could not find jobs easily. Although the GCC governments have been the main employer and are considered to be the employer of "the last resort" for the national labor force, they could not continue employing the new entrants to the labor markets at the same rates witnessed in the 1970s and 1980s as governments' employment capacities have become rather limited. The burden of employing national labor, therefore, has shifted from public to private sectors. Thus, it appears that the employment of new entrants will be either through fulfilling newly induced growth jobs and/or through replacing national for non-national workers, working in already existing jobs in the private sectors.

This paper aims at analyzing labor demand determinants for the governments sectors of the GCC states. The paper is set up as follows: the main characteristics of the GCC states' economies are presented in section II. Section III provides a fairly detailed discussion of the labor markets in the GCC states. Section IV discusses data used and the related problems encountered in their use. Section V presents the model and its theoretical underpinnings and explains the estimation procedures. Section VI analyses the empirical results. The paper concludes in section VII with a summary and assessment of the findings.

II. THE ECONOMIES OF THE GCC STATES

To briefly assess the performance of certain economic variables relevant to the subject of this paper, tables 1 and 2 highlight the gross domestic products (GDPs) and the relative importance and growth rates of other basic economic variables in the GCC states during the period of 1991-97.

TABLE (1)
GDP and Relative Importance of Basic Economic Variables in 1992
and 1997 (%)

	Year	UAE	Bahrain	KSA	Oman	Qatar	Kuwait	GCC
GDP (Million \$)	1992	35003.00	4433.30	120942.00	11488.80	7625.20	21583.00	201075.30
	1997	45710.40	5560.40	136122.20	15833.60	8460.40	29332.70	241019.70
Oil Output as % of GDP*	1992	42	17	35	34	36	43	37
	1997	35	16	33	33	32	41	34
Consumption as % of GDP	1992	63	60	75	73	64	77	72
	1997	61	51	70	70	63	76	69
Gov. Consumption as % of total Consumption	1992	28	43	49	54	52	49	46
	1997	26	46	38	31	53	42	36
Capital Formation and change in Inventories as % of GDP	1992	25	35	24	17	21	36	25
	1997	26	30	20	24	24	14	21

Source: Calculated from: The Gulf Cooperation Council SG, [1].

*Only mining.

Figures in table (1) reveal the following: (1) with the exception of Bahrain, oil output constituted over one third of the gross domestic products in the GCC states in 1992 and 1997; (2) consumption shares in the GDPs ranged from 51 percent in Bahrain to 76 percent in Kuwait in 1997, reflecting the fact that the GCC states are consumption-oriented societies;¹ and (3) governments consumption shares have declined for all the GCC states, with the exception of Bahrain and Qatar, during the 1992-1997 period.

Table 2
Annual Growth Rates of Oil and GDP (1991– 1996)

	UAE	Bahrain	KSA	Oman	Qatar	Kuwait
GDP %	3.76	4.65	2.20	6.79	-1.55	14.45
Oil GDP %	-1.02	2.27	1.41	6.75	0.58	2.86
Non Oil GDP %	6.78	5.15	2.63	6.94	-2.34	10.06

Source: Calculated from: The Gulf Cooperation Council SG, [1].

Note: The growth rates were estimated using the following regression equation: $\log Y = c + bt + e$, where, Y = the value of the variable under consideration, c = a constant, b = the exponential rate of growth, t = time, and e = an error term.²

Table (2) shows that the GCC states' GDP growth rates were mainly attributed to growth in the non-oil sectors during the 1991-1996 period. This outcome should not, however, overshadow the fact that economic activities in the GCC states have been relying on direct and indirect government assistance and expenditures. All GCC states, except Qatar, have suffered huge government budget deficits since the start of the oil price downturns in 1982 [3] and [4].

As indicated earlier, given the relatively little human resource endowments and the high shares of private consumption, the GCC states have become more dependent on expatriates to undertake many social and economic projects. However, the size of the government foreign labor force in three GCC states, Saudi Arabia, Oman, and to a certain degree, Bahrain, has declined over the period of 1991-1997 (see table 3). This is attributed to the fact that these states have been active in replacing nationals for non-nationals in their labor force, especially in the public sector, and also to the declining economic growth witnessed during mid 1990s.

III. LABOR MARKETS IN THE GCC STATES

The population size of the GCC states was 27.6 million inhabitants in 1997, with an annual growth rate of approximately 3.5 percent, and the majority of the population were under 20 years of age. [1]

The size of the labor force in the GCC states was approximately 7.44 million in 1995; 67% of which were in Saudi Arabia and the rest was unevenly distributed among the remaining states, where Bahrain contained the lowest percentage, 3%, and the UAE the highest percentage, 11.5%. The size of the labor force has more than doubled in Saudi Arabia, Oman, and Kuwait, and more than tripled in the other three states, the UAE, Bahrain, and Qatar over the period of 1975-1995. This was due to accelerating economic growth in the GCC states during the late 1970s and early 1980s. [3]

Foreign labor has constituted the majority of the labor force in the GCC states since early 1970s. Shaban *et. al.* [5] stated that foreign labor in the total labor force was a few hundreds of thousands during the 1960s. However, because of the sharp rise in oil prices and the resulting accelerated economic growth in the region during the 1970s, the size of foreign labor has reached 2.04 and 5.36 millions workers, or 59% and 73% of the total labor force in the GCC states in 1990 and 1995, respectively. At state level, foreign labor in 1990 amounted to 90% in the UAE, 87% in Kuwait, 77% in Qatar, 69% in Saudi Arabia, 68% in Oman, and 45% in Bahrain. [3]

National labor force in the GCC states has been mainly employed in the governments sectors. This sector has been considered by national workers as the employer of "the first resort." It provides lifetime employment, relatively high wages, lucrative fringe benefits, fewer daily-working hours, and generous retirement schemes [3] and [4]. In 1991, there were 822.8 thousand employees (71% of them were national employees) in the GCC governments sectors, which accounted for 14% of the total labor force [6].

Table (3) shows the growth rates for different employment variables for the GCC states over the period of 1991-1997.

Table (3)
Annual Growth Rates of Disaggregated Employment (1991–1997)

	UAE	Bahrain	KSA	Oman	Qatar	Kuwait
Total Employment	3.4	3.7	4.1	2.4	4.9	12.9
Private Sector Employment	3.4	4.0	4.2	2.4	4.8	14.1
Government Employment	3.1	1.4	3.7	1.7	5.5	7.6
National	5.3	2.8	6.3	2.9	6.1	6.1
Foreign	1.7	-7.2	-6.7	-0.7	4.2	12.2
Private Sector Employment Compensation	4.81	0.12	1.72	2.68	1.74	-7.68
Government Employment Compensation	1.72	4.4	-0.42	4.69	-2.96	5.69

Source: Private and government employment from: The GCC SG, [6]; and The GCC SG, [1]. Private and government employment compensations were calculated from: UN. ESCWA, [7] and [8]; Saudi Arabia, Ministry of Planning, [9] and [10]; Qatar, General Statistical Organization, [1] and [12]; and IMF, Government Financial Statistics, [13].

The figures yield relatively high positive total employment growth rates for all GCC states but the state of Oman. These trends were mainly affected by private employment growth rates. National government figures show growth for national employees at a rate faster than that of foreign labor. The decline in the size of foreign labor in the government sectors in Bahrain, Saudi Arabia, and Oman is due to the implementation of the so called "labor substitution (or replacement) of national for foreign labor policy," that has been adopted in the wake of the second Gulf War.

Compared with the foreign population, national population participation rates are very low in the GCC states. In 1985, for example, the participation rates of the national population were 25% in Bahrain, 24.6% in Oman, 21.4% in Saudi Arabia, 19.0% in Qatar, 18.0% in Kuwait, and 16.5% in the UAE [3]. These low national participation rates are attributed to demographic and economic factors. Among these factors are the high percentage of youth population (under 20-years of age), increasing tendency towards pursuing higher education instead of seeking employment, and the relatively high non-labor income. Social factors also play a role in this respect, e.g., strong family ties and generous family financial support prompt a person not to actively seek a job, while customs and traditions may cause low female participation rate.³

IV. DATA

To specify and estimate the determinants of government labor demand for each GCC state, lengthy time-series data on relevant variables are needed. However, given paucity of labor market data in the GCC states, especially those pertaining to government labor markets, panel time-series cross-section data for the six Gulf states were utilized. Six observations on each variable and for each GCC state were collected as they were available or, alternatively, calculated. The time series obtained are of an annual basis and covered the period of 1991-1996.

The variables used for estimation are government total employment (GTE), private total employment (PTE), government employment compensation (GEC), private employment compensation (PEC), Gross nominal domestic product (GDP), and the lending interest rates (LIR). Data for GTE and GDP were obtained from: The GCC SG, [6], and The GCC SG, [1], respectively. Data for PTE were calculated by subtracting GTE figures from total employment (TE) statistics for each state; which were obtained from: The GCC SG, [1]. Data for LIR were collected from International Financial Statistic (IFS) [15], for Bahrain and Kuwait, from International Financial Statistic (IFS) [16], for Oman, and from Saudi Monetary Agency (SAMA), [17], for Saudi Arabia. The average of these LIR data were utilized in the case of Qatar and the UAE.

The data pertaining to GEC and PEC were estimates. Government wages and salaries bills were divided by GTE figures to get the GEC values. Government wages and salaries bills were obtained from: IMF, Government Financial Statistics [13], for Bahrain, Kuwait, Oman, and the UAE; and from: Saudi Arabia, Ministry of Planning, [9] and [10] for Saudi Arabia; and from: Qatar, General Statistical Organization, [11] and [12].

Total private employment compensation figures were divided by those for PTE to get the PEC values. Total private employment compensation figures were calculated by subtracting government wage and salaries bills from total employment compensation. The source of total employment compensation was: UN, ESCWA, [7] and [8], for all states.

V. THE MODEL AND ESTIMATION PROCEDURES

A. *The Model*

The major methodological differences among previous studies that estimated labor demand elasticity and elasticities of substitution between capital and labor are restricted to variations in functional form and sample choices [18]. There are two functional form choices; one using a cost function and the other using a dual production function. While the cost function includes factor prices as exogenous variables, the production function form contains the levels of the factors of production as its exogenous variables. The choice between the two forms is mainly dictated by the relative accuracy with which factor prices and quantity data can be measured and by the appropriateness of assuming that price and quantity variables are exogenous, i.e., whether or not the choice is of more interest for analyzing the effects of different policies.

In addition to the choice of cost or production functions basis, the question of functional form is equivalently important. Most studies employ one of the following forms: a Cobb-Douglas (CD), a constant elasticity of substitution (CES), or a transcendental logarithmic formulation.⁴

With regards to the question of sample choice, studies conducted reveal that cross-section, time-series, or pooled cross-section time series samples were used. Hamermesh and Grant [19] stated that the cross-section studies reviewed used industries, states, Standard Metropolitan Statistical Areas (SMSAs), or pooled combinations of industries and states. They also indicated that time-series studies have advantage over the cross-sectional ones since they avoid the problem of "scale effects."⁵ However, the choice between these sample choices is largely dependent on data availability.

In this paper, the estimation of government labor demand was based on the Cobb-Douglas production function where limited availability of data for the GCC states dictated this choice. Our interest, however, is in obtaining factor demand and output elasticities.

Derivation of a labor demand function using the Cobb-Douglas functional form yields the following function:

$$E = f(r_1, r_2, Q) \quad (1)$$

where E is employment, r_1 and r_2 are factor prices, and Q is output. An equation to be estimated for labor demand could assume the following linear form:

$$E = \alpha + \beta r_1 + \gamma r_2 + \delta Q + e,$$

(2)

where, α , β , γ , and δ are slope parameters and e is the error term. An alternative formulation that directly yields elasticities with regard to the concerned variables is the following log-linear form:

$$\ln E = \alpha + \beta \ln r_1 + \gamma \ln r_2 + \delta \ln Q + e,$$

(3)

where α , β , γ , and δ are the elasticity coefficients.

Empirically, the government labor demand equation for the GCC states was specified and put in a linear first difference form as follows:

$$\Delta GTE_{jt} = \alpha_{0j} + \alpha_j \Delta GEC_{jt} + \beta_j \Delta PEC_{jt} + \gamma_j \Delta LIR_{jt} + \delta_j \Delta GDP_{jt} + e_{jt}, \quad (4)$$

where $j = 1, 2, \dots, 6$ are the GCC states, $t = 1, 2, \dots, 6$ are time periods, α_j , β_j , γ_j , and δ_j are coefficients, Δ is the first difference operator, GTE is government total employment, GEC is government employment compensation, PEC is private employment compensation, LIR is the lending interest rate, and GDP is gross domestic product at cost prices. The choice of the first difference form was intended to cater for non-stationarity and autocorrelation issues.⁶

Given the increasing national unemployment rates in the GCC states and the governments' intention towards reducing such rates, e.g., through replacing national for foreign workers, an additional variable was added to the equation in order to quantify

governments responses to private sectors employment policies. This variable is private total employment (*PTE*). Thus, the estimated equations became as follows:

$$\begin{aligned} \Delta \text{GTE}_{jt} = & \alpha_{0j} + \alpha_j \Delta \text{GEC}_{jt} + \beta_j \Delta \text{PEC}_{jt} + \gamma_j \Delta \text{LIR}_{jt} \\ & + \delta_j \Delta \text{GDP}_{jt} + \eta_j \Delta \text{PTE}_{jt} + e_{jt}, \end{aligned} \quad (5)$$

To analyze the results using elasticities of the variables, equation 5 was re-estimated in growth rate forms as follows:

$$\begin{aligned} \Delta \ln \text{GTE}_{jt} = & \alpha_{0j} + \alpha_j \Delta \ln \text{GEC}_{jt} + \beta_j \Delta \ln \text{PEC}_{jt} + \gamma_j \Delta \ln \text{LIR}_{jt} \\ & + \delta_j \Delta \ln \text{GDP}_{jt} + \eta_j \Delta \ln \text{PTE}_{jt} + e_{jt}, \end{aligned} \quad (6)$$

B. Estimation Procedures

Using the pooled cross-section time-series estimation techniques, we started by allowing slopes variations for all variables across states and also by allowing for fixed effects in the intercept terms. This amounts to conducting separate regressions for each cross-sectional unit. Proceeding in due course within a general to specific estimation procedure, in the manner of the Hendry/LSE approach,⁷ we tested hypotheses that all states coefficients for each variable in the estimated equation are common; for example, the null hypothesis for the GEC states coefficients is:⁸

$$H_0 : \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6$$

against the alternative hypothesis for the same variable coefficients which is:

$$H_1 : H_0, \quad \text{not true.}$$

i.e., at least, two coefficients for the same variable are not equal across states. The criterion through which a certain variable has been selected for testing is the similarity in terms of signs and magnitudes of its coefficients across states. If the null-hypothesis for the selected variable for testing happens to be accepted, a restriction on its coefficients to be equal across states was then imposed and the model was subsequently re-estimated. Whether the restriction was imposed or not, we proceeded to test the null hypothesis for another variable and the procedure repeated. This continued until we

came up with statistically accepted coefficients, either common or variable in slopes across states. Thus, we performed tests of the above mentioned hypothesis for each variable in the model; starting from a general model where coefficients vary across states for all variables included in the equation, and ending up with a specific model where there are few or no coefficients that are significantly different across states.

VI. THE EMPIRICAL RESULTS

Following the above estimation procedure, the government labor demand equation (eq. 5) was estimated using pooled cross-section time-series estimation methods. The results of the regressions indicate that all variables ought to be restricted to be common across states, including the constant, since all the null hypotheses, where coefficients are common across states for each variable, were accepted at conventional levels of significance.

For comparison purposes, however, the government labor demand equation (eq. 5) was re-estimated without the interest rate (LIR). This was done because data for the interest rate variable were only available for four countries and data for the other two countries (Qatar and the UAE) were approximated. The results of both estimates are given below:

Table (4)
Estimation of Government Labor Demand
in the GCC States
(The linear first difference form)

Dependent variable: Δ GTE

Estimation method: Generalized Least Square (GLS-cross section weights)

Country	Constant	Independent variables					statistics	
		Δ GEC	Δ PEC	Δ PTE	Δ GDP	Δ LIR	R ²	D-W
(1) All GCC	3272.30 (3.70)	-1464.68 (-5.68)	-3622.8 (-9.60)	-0.08 (-11.93)	0.003 (7.48)	-.2546.22 (-2.73)	0.90	1.62
(2) All GCC	2320.27 (3.13)	-1362.73 (-4.71)	-3604.71 (-7.78)	-0.08 (-9.45)	0.003 (8.39)	--- ---	0.82	1.58

Note: Numbers in parentheses are t-statistics.

Note: When comparing the results with those using the OLS method of estimation, we found that these results (using the GLS estimation method) are slightly better in terms of conventional standard tests (e. g., D.W., and t-tests).

Both equations of the government labor demand, with and without the Lending interest rate (LIR) variable, are well estimated according to conventional criteria, and the exclusion of the LIR variable in the second trial did not noticeably alter the results. The common coefficients in both estimates⁹ are shown to be significant at 1% level of significance.

To gauge the robustness of the results and to put the outcomes in more economically meaningful form, we re-estimated the government labor demand equation using variables in log-linear first difference form, i.e., in growth rate terms, again with and without the interest rate variable (LIR).¹⁰ The results are as shown bellow:

Table (5)
Estimation of Government Labor Demand
in the GCC States
(The log-linear first difference form)

Dependent variable: $\Delta \ln \text{GTE}$

Estimation method: Generalized Least Square (GLS-cross section weights)

Country	Constant	Independent variables					R ²	statistics
		$\Delta \ln \text{GEC}$	$\Delta \ln \text{PEC}$	$\Delta \ln \text{PTE}$	$\Delta \ln \text{GDP}$	$\Delta \ln \text{LIR}$		D-W
(1) All GCC	0.03 (3.22)	-0.23 (-1.94)	-0.18 (-1.45)	-0.23 (-1.65)	0.25 (1.72)	-0.08 (-1.96)	0.40	1.46
(2) All GCC	0.3 (3.09)	-0.31 (-2.43)	-0.35 (-2.60)	-0.35 (-2.36)	0.44 (2.94)	--- ---	0.25	1.59

Note: Numbers in parentheses are t-statistics.

Note: Also, when comparing these results with those using the OLS method of estimation, we found that these results (using the GLS estimation method) are slightly better in terms of conventional standard tests (e. g., D.W., and t-tests).

The second trial is shown to be acceptable as judged by all conventional aspects. The PEC and GDP coefficients are statistically significant at 1% level, while the other coefficients are significant at 5%. In contrast, coefficients for the GEC, the GDP, and the LIR in the first estimate were significant at 10% level, while the other coefficients are statistically insignificant. Thus, by dropping the interest rate as in the second trial, results improved markedly. This outcome is however not surprising given the fact that the data used for the interest rate variable for Qatar and the UAE were crudely approximated as an average of the lending interest rates in the other four states.

The coefficients of these estimates are interpretable as short-term elasticities (as the estimations were run using the first difference of the logs). Thus, the analysis thereafter are for the second estimation and will be in elasticities terms.

The compensation elasticity of government labor demand for all states is -0.31, which means that government labor demand is relatively inelastic with respect to the employment compensation rates. The GCC governments are considered to be, as mentioned earlier, the employers of "the first resort" of a citizen-seeking job. Rules and regulations pertaining to governments' jobs prompt lying off or firing a citizen from

his/her job so difficult or almost impossible. Citizens working in the GCC government sectors are enjoying high level of job security.

Given the fact that the majority of the private sector employees in the GCC states are foreign, one may conclude that government labor and foreign labor are substitutes to each other. Results, however, show that the cross-elasticity for government labor demand with respect to private employment compensation rates is equal to -0.35. This reveals that private sector labor, as a resource of production, is complement to labor in the government sector, and the government labor demand responds negatively by about 0.35% to changes in the compensation rates of the private labor demand. Thus, the cross-elasticity of demand between these two factors of production shows them to be complement to each other and inelastic.

Although this outcome might somewhat be surprising, as it is not in line with what is stipulated by economic theory, it can, however, be justified on the basis of certain features pertaining to the GCC states labor markets. Local studies indicate that foreign labor is, on average, more productive than national labor, and many foreign workers (skilled, semi-skilled, and unskilled) are working in certain occupations, and in different economic activities that the majority of national labor avoid; which is due to various economic and social reasons. Also, recent evidence indicates that there is hesitancy on the part of private sectors businessmen to comply with government rules and regulations pertaining to substituting national for foreign labor. Since foreign labor constitutes most of the private sector employment in the GCC states, an increase in the private employment compensation, *ceteris paribus*, would lead to a decline in the private sector demand for labor, a decline in output, and hence a decline in government demand for labor. Thus, one may expect that these two types of labor are complement to each other. Al-Qudsi [4, p.38] argued that “[t]he higher the gap between basic and social salaries [i.e., the higher the government wage relative to private sector wage], the higher the minimum wage and the lower the level of private sector demand for citizens.”

National unemployment has become a major problem for the GCC states since late 1980s. The GCC states governments have made intensive efforts, through consultations with businessmen and chambers of commerce officials, to encourage the private sectors to employ nationals, either through the creation of new job opportunities

and/or through replacing national for foreign employees. Saudi Arabia, for example, has imposed across the board annual 5.0% increases in national employment on every private enterprise that employs more than 20 workers. Also, it taxes a firm (and an individual) SR. 2000 per foreign worker entering the Kingdom with a job visa, in addition to SR. 600 per worker a year for issuing a working permit. These efforts by the GCC governments have been enforced over time due to the continuous rise in national labor supply, especially youth who are newly entrants to the labor markets, and due to the limited financial capacity of the governments that could not continue employing national labour at a high growth rate.

Given the fact that the GCC states governments have been politically and socially inclined to employ their citizens, government labor demand, therefore, responds, *ceteris paribus*, in the opposite direction to changes in private labor demand. Our results show inelastic government labor demand with respect to private employment size, the elasticity being equal to -0.35. An increase in private labor demand by 10%, *ceteris paribus*, would lead to a decrease in government labor demand by 3.5%.

Results also show that the elasticity of government labor demand with respect to the GDP variable for all the GCC states is 0.44. As GDP grows by 10%, government labor demand would rise by 4.4%, i.e., there exists increasing returns to scale with respect to government labor. However, when we estimated the government labor demand equation using oil GDP and then non-oil GDP, instead of the aggregate GDP variable, the increasing returns to scale feature was attributed to only oil sectors that are capital intensive. The elasticity of government labor demand with respect to oil GDP equals 0.24.

Fixed Effects: Fixed effects assume that differences in government labor demand across the GCC states are captured in differences among intercepts. The empirical results in all estimates (table 4 and 5) show that intercepts are common across states, and testing for that, using a Wald test, indicates no rejections of the null-hypotheses of common intercepts across states at 1% level of significance.¹¹ For example, testing a null-hypothesis of a common intercept in the last estimate, i. e., using first difference of the logs with no interest rate, yields an F-statistics which equal 1.32 with a p-value of

0.29; thus, indicating an acceptance of the null-hypothesis. The GCC states have a common intercept in terms of growth rates of government labor demand.

VII. SUMMARY AND CONCLUSIONS

The GCC states have common economic features and characteristics that are reflected in their labor markets. The GCC governments' employment is mostly nationals, and the private sectors are largely dependent on foreign labor. These features and others manifested themselves in the government labor demand equation that was estimated in this paper. Results show that the GCC states have common factors affecting their government labor demand. These factors encompass government and private sectors compensations, oil sector GDP, and private employment. The government labor demand responds in an opposite directions to all of these variables, except for oil GDP which assumes a positive sign. Also, the government labor demand was inelastic with respect to all these variables.

The results show that the two factors of production, national and foreign labor, are complement to each other. If this is indeed the case, it may lead to the conclusion that imposing government fees or taxes on wages or employment compensations of foreign labor may not succeed in tackling the unemployment problem among the GCC nationals in the short run. The two types of labor are largely concentrated in different occupations and acquire different skills and productivity potentials, i.e., the productivity rates being higher among foreign labor. However, in the long run, other policies such as quality education and efficient training might be necessary to enhance the national labor productivity potential and to improve their work ethics, and thus to reduce the gap between their skills and those of foreign labor. Training, for example, that is directed towards these ends would finally reduce the unemployment problem among nationals. Imposing taxes or raising fees on employers employing foreign labor may fail to solve the unemployment problem unless skills and productivity gaps between national and foreign labor are significantly narrowed. The GCC government may, therefore, allocate more financial resources to investing in human capital, especially to education and training that enhance productivity. Other supply-side policies might be appropriate to remedy the unemployment problem in the long run. An example of that is streamlining employment regulations and policies between the government and the private sectors. Demand-side policies such as encouraging the growth of small and medium-size enterprises would also serve this end.

Although the growth rates of governments national employment has been reduced in virtually all states, the GCC governments are still employing more national citizens when recruitment in the private sector declines. Evidence suggests that governments' employment policies for the government sectors respond to changes in the employment size and growth rates in the private sectors in the opposite directions, i.e., an increase in the private sector employment leads to a decrease in governments employment and vice versa. Employing nationals in the governments sectors in the GCC states have, therefore, been the government tool for reducing unemployment among nationals for a long time.

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FOOT NOTES

¹ Metwally and Daghistani [2] support this argument. They showed that the GCC states have become consumption and import-oriented countries over the period of 1970-1983.

² For series with an underlying constant growth rate, the appropriate specification expresses the logarithm of the series as a linear function of time. Without disturbances, a constant growth series is given by the following equation: $Y_t = Y_0(1+g)^t$, where $g = (Y_t - Y_{t-1}) / Y_{t-1}$ is the constant proportionate rate of growth per period. Taking logs of both sides of the above equation gives $\ln Y_t = c + bt$, where $c = \ln Y_0$ and $b = \ln(1+g)$. This equation can be fitted by least squares, regressing the log of Y against time. The resultant coefficient (b) then provides an estimate of the growth rate. The b coefficient represents the continuous rate of change ($d\ln Y / dt$), whereas g represents the discrete rate.

³ For example, female participation rate was 8 percent in 1980 and 14 percent in 1996 in Saudi Arabia. [14, p. 226].

⁴ For more details see Hamermesh and Grant [19].

⁵ Hamermesh and Grant [19] addressed the reasoning behind the choice among these forms.

⁶ Equation (4) without the first difference, i.e., in terms of levels, was estimated, but the results were unsatisfactory. They yield high R^2 and indicate the presence of serial autocorrelation.

⁷ Ramanathan [20, p.12] stated that "... general to specific modeling starts with a general formulation and carries out a data-based reduction to a simpler model. This methodology, also referred to as the Hendry/LSE approach, is more prevalent in the United Kingdom and other European countries." This basic idea of the general to specific modeling, that has at the beginning more variables and lags than one usually starts with, is that there is a data generation process underlying the values of economic variables, and that the investigator's job is to be approximate it using economic theory, intuition, and experience, and by conducting Wald and t-tests, the model could be simplified and improved. Charemza and Deadman [21, p. 58] stated "[b]y general to specific modeling we mean the formulation of fairly unrestricted ... model, herewith called a general model, which is subsequently tested, transformed, and reduced in size by performing a number of tests for restrictions." The advantage of this estimation procedure (general to specific approach) are: (1) increased precision of estimates because of reduced multicollinearity, (2) more degrees of freedom, (3) greater power of tests, and (4) a simpler model. [20]

⁸ The formula used for the test is $F(n-1, nT-n-k) = \frac{(R_u^2 - R_R^2)/(n-1)}{(1 - R_R^2)/(nT - n - k)}$ see Greene, [22, p.

468], R_u^2 and R_R^2 are the coefficients of determination from the unrestricted and the restricted pooled regressions, respectively, n is the number of cross-sections, T is the number of observations, and K is the number of regressors excluding the constant.

⁹ The null-joint hypothesis $H_0 : \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6$ where 1,2,...6 are the states, was tested for the GEC variable, and similar hypotheses were tested for the other variables. The t test results indicate that we could not reject the null-hypothesis at 1% level of significant. This is expected as the GCC states have similar economic features, as discussed in the previous sections.

¹⁰ The first difference of the log of a variable equals its growth rate. Thus,
 $\Delta \ln y = \ln y - \ln y_{-1}$
 $= \ln y / y_{-1}$
 $= gy$ (growth rate of y).

¹¹ See footnote number 8.