Substitutability between Government and Private Consumption in the GCC Countries

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Abstract

In this paper, we estimate direct long run elasticity of substitution between government spending and private consumption for the GCC countries. Panel estimates indicate that they are most likely to be substitutes. Individual country estimates indicate that government spending is a strong substitute to private consumption in Bahrain, Qatar, UAE, a strong complements in KSA and a relatively weaker complements in Kuwait and Oman. Estimated elasticity of substitution for major components of government spending indicates mixed results. Public spending on education appears to be substitutes in three and complements in three other GCC countries. Public spending on health and military spending appears to be complements to private consumption in most of the GCC countries.

JEL classification: E6; H5

Keywords: Elasticity of substitution; crowding-out; co integration; unit root; GCC countries.

1. Introduction

The relationship between government spending and private consumption is crucial for the design, implementation and effectiveness of fiscal policy. In addition to its direct effect on the macro economy, government spending can indirectly affect economic activity through two other components of the GDP, namely private consumption spending and private investment spending. In countries where government is a major player in the macroeconomic activity, understanding these effects becomes even more important. The present paper focuses on the Gulf Cooperation Council (GCC) which was established in 1981. It consists of six countries, Bahrain, Kuwait, Oman, Qatar, Kingdom of Saudi Arabia (KSA) and United Arab Emirates (UAE). The economies of the GCC countries

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share many structural features, face similar constraints, and are influenced broadly by the same set of trends in the world economy. In their 1996 study on the GCC countries, IMF highlighted several common trends in economic development in this region. First, fueled by a consistent flow of oil revenue, these counties have created a modern physical and social infrastructure and have substantially raised the standard of living of the population. Second, public sectors play a major role in the economic development in all these countries. Oil production, distribution and sale are entirely controlled by the government. Major industrial sectors such as petro-chemical, utility, telecommunication have dominant presence of the government in all of the GCC countries. Third, government also happens to be the largest employer of the workforce in all these countries. Fourth, expenditure for defense and security needs is considerable for most of these countries. Finally, the subsidy system in the GCC countries has evolved over the years within the broad objectives of distributing the oil wealth to the population and supporting private sector economic activity. Together with other protective policies, subsidies benefiting both consumers and producers have aimed at ensuring low and stable prices for essential food items and basic services, achieving social objectives in the health and education areas, and promoting basic industries and supporting specific sectors for strategic reasons (e.g., food production for security reasons). Explicit subsidies through the budget have generally included cash payments to farmers to maintain high procurement prices and to utility companies to cover their operating losses. While the magnitude of explicit budgetary subsidies in the GCC countries is not large by international comparisons, there are substantial implicit subsidies in the form of free or below-cost provision of government services (utilities, education, health, transportation, and sector-specific inputs). Implicit subsidies are also provided through low petroleum product prices in some GCC countries and through subsidized long-term loans. Governments in all these countries have an explicit policy to keep real consumption and purchasing power of their population at a stable level. This has called for both direct and indirect role of the government in all the economic activity of these countries. In summary, government is a major stake holder in the economic development of all the GCC countries. Without an extensive tax system, government spending is the sole fiscal policy instrument that is at the disposal to these governments.

Figure 1 shows the time series plots of government spending and private consumption as a percentage of GDP for all the GCC countries. For most of the time between 1980 and 2008 share of government spending to GDP (dotted line) was more than 25% with the exception of UAE. For Kuwait, this ratio jumped up as high as 78% during the gulf war.

Consumption spending (dashed line), on the other hand, has been higher than 40% for all the countries, with the exception of Qatar. Interestingly, private consumption rose to an enormous 80% of GDP for Kuwait during the gulf war. For all the GCC countries, there appears to be clear positive co-movement between their share of government spending and private consumption to GDP. This clearly sets forth the rationale to try to understand the relationship between government consumption and private consumption for this region. The present study attempts to analyze the relationship between the government spending and the private consumption for the GCC countries from an empirical perspective. Our objective is to understand the direct relationship between government spending and private consumption. In this paper, we present empirical estimates of direct long run elasticity of substitution between government spending and private consumption for each of the GCC countries as well provide panel estimates which could shed light on the importance of government in the consumer welfare of the region altogether. The paper is organized as follows; section 2 discusses the theoretical relationship between government spending and consumption and outlines the empirical approaches that have been taken to estimate this relationship. Section 3 outlines the theoretical models that will be used to establish the direct relationship between government and private consumption and develops the econometric specifications that will be used to carry out the empirical exercises. Section 4 reports main estimation results and discusses their robustness and significance. Section 5 estimates the elasticity of substitution between various important components of government spending and private consumption and tries to interpret their significance. Section 6 concludes.

2. Relationship between Government Spending and Private Consumption: Theory and Empirics

Research on understanding the relationship between government spending and private consumption has been done in two separate streams, each motivated by theoretical, policy and empirical issues. Economic theory provides the background for understanding this crucial relationship. One can analyze the relationship between private and government consumption in three aspects. First, government consumption could effect private consumption through wealth effect. Private consumption is crowded out either because the consumers may feel poorer as a result of negative wealth effect caused by an increase in government spending or they may be induced to postpone consumption in response to deficit–financed government spending. Bailey (1971) and Barro (1981) first suggested

incorporating government consumption into the representative agent decision problem, making the public sector part of the general equilibrium system. The idea is that many government goods are to some extent substitutes for private consumption goods. Second, government may provide public goods which households could consume along with other private goods. Government consumption, in this way, can also become complements to private consumption. Third, government might undertake spending like expenditure on R&D which might not effect private consumption directly but could have a spill over effect.

Traditional macroeconomic theory also argues that efficient design of fiscal policy depends heavily on the substitutability between government and private consumption. If the private sector derives utility from government–provided goods and services and regards private and government consumption as close substitutes, an increase in government consumption will be offset by a corresponding decrease in private consumption, rendering the size of the fiscal multiplier relatively small and even potentially negative. On the other hand, if private and government consumption are complements, an expansionary fiscal policy will be relatively effective in stimulating aggregate demand as private consumption will reinforce the initial fiscal impulse.

In recent theoretical literature, the interaction between government and private consumption has been assigned a central role in the study of fiscal policy, in both the neoclassical real business cycle fashion (e.g. Aiyagari et al. (1992) and Baxter and King (1993)) and the new Keynesian fashion with monopolistic competition, increasing returns, and nominal rigidities (e.g. Devereux et al. (1996) and Ganelli (2003)). However, depending on their assumptions about market structure and technology, these models can predict totally different reaction of private consumption in response to government spending shocks. On the empirical front, a large literature has been developed to estimate the relationship between government and private consumption. Kormendi (1983) and Aschauer (1985) is representative of the earlier approach that relies on estimating a consumption function. Karras (1994), Ni (1995), Evans and Karras (1996), and Fiorito and Kollintzas (2004) are some of the more recent contributions along this approach. The empirical analysis in this paper follows Amano and Wirjanto (1997, 1998), Kwan (2006), Auteri and Constantini(2010) and Ho(2001). These papers make use of the co integration approach of Ogaki (1992) and Ogaki and Park (1997) to estimate the preference parameter that governs the relationship between government and private consumption. The idea is to exploit the long run restriction imposed by the intra-period first order condition that

characterizes the optimal choice of private and government consumption. Each of the four papers uses macroeconomic models as the theoretical background of their papers. But in all of the cases, both private consumption and government spending enters directly into the utility function of the consumer. This enabled the papers to derive first order conditions that directly connects government spending and private consumption and allowed them to derive their econometric models where elasticity of substitution government spending and private consumption could be directly estimated.

3. Economic Models and Econometric Specifications

Model 1 is a classical macroeconomic model developed in Barro(1981) and has been followed in the empirical literature extensively in papers like Ogaki (1992), Ogaki and Park (1997), Ogaki and Reinhart (1998) and Kwan(2006). Assume that the representative consumer values two goods, private and government, according to an expected life--time utility function subject to stationary preference shocks:

$$U = E_t[\sum_{j=0}^{\infty} d^j u(C^*_{t+j})] \tag{0.1}$$

Where:

$$C^*_t = [\phi\varepsilon_t C_t^{1-(1/\sigma)} + (1-\phi)\nu_t G_t^{1-(1/\sigma)}]^{(1/(1-(1/\sigma)))} \tag{0.2}$$

Here (ε_t, ν_t) are random preference shocks which are assumed to be strictly stationary, have unit mean and finite variances. The stationarity assumption amounts to say preferences are stable in the long run. The period utility function is assumed to possess the usual properties u′> 0 and u″< 0. (ϕ, σ) are preference parameters which characterize the representative agent's utility function: φ is the relative weight assigned to private goods and σ is the substitution parameter which measures the curvature of the indifference curves. Given time-separability of the utility function, the optimal consumption bundle will have to satisfy the equality between marginal rate of substitution and relative price:

$$\frac{\frac{\partial U}{\partial G}}{\frac{\partial U}{\partial C}} = \frac{v_t(1-\phi)G_t^{\frac{-1}{\sigma}}}{\varepsilon_t C_t^{\frac{-1}{\sigma}}} = \frac{P_t^g}{P_t^c} \tag{0.3}$$

Taking logarithm and rearranging yields:

$$\ln\left(\frac{C_t}{G_t}\right) = -\sigma\ln\left[\frac{1-\phi}{\phi}\right] + \sigma\ln\left[\frac{P_t^G}{P_t^C}\right] - \sigma\ln\left[\frac{\nu_t}{\varepsilon_t}\right] \tag{0.4}$$

Stable preferences implies that the residual term, $-\sigma \ln(v_t / \varepsilon_t)$ is stationary and hence, equation (4) should be a co integrating regression, provided that log consumption ratio $\ln(C_t / G_t)$ and log price ratio, $\ln(P_t^G / P_t^C)$ are both I (1) processes. In other words, the stable preferences assumption, together with the consumer optimality condition in equation (4), imposes a co integration restriction on the movements of the log consumption ratio and the log price ratio series. Formally, the empirical work in this paper centers around a co integrating regression that relates the logarithm of private and government consumption ratio, C_t / G_t, to the logarithm of their relative price P_t^G / P_t^C:

$$\ln\left[\frac{C_t}{G_t}\right] = \alpha + \beta \ln\left[\frac{P_t^G}{P_t^C}\right] + \mu_t \qquad (0.5)$$

Where $\ln(C_t / G_t)$ and $\ln(P_t^G / P_t^C)$ are both difference--stationary I (1) processes, and μ_t is a stationary I (0) process. Formal statistical evidence for the co integration property will be provided below. The slope parameter β is the elasticity of substitution between private and government consumption. A positive (negative) β means that the two goods are substitutes (complements). One attractive feature of co integrating regression is that the slope parameters can be estimated consistently without the assumption that the regressors are econometrically exogenous. In equation (1), for example, β can still be estimated consistently even though there may be stationary omitted variables or measurement errors. Equation (4) provides a structural interpretation to equation (5) which can be regarded as the reduced form equation with parameters and residuals related to their structural counterpart via the relationships:

$$\alpha = -\sigma \ln\left[\frac{1-\phi}{\phi}\right], \beta = \sigma, \mu_t = -\sigma \ln\left(\frac{v_t}{\varepsilon_t}\right) \qquad (0.6)$$

If the $\log(P_t^G / P_t^C)$ series is difficult to attain or is not well-behaved, we will also estimate another econometric model which is taken from Ho (2001) and has a simpler form:

$$Ln\left(\frac{C_t}{Y_t}\right) = \alpha_0 + \alpha_1 Ln\left(\frac{G_t}{Y_t}\right) + v_t \qquad (0.7)$$

Contrary to the previous model, a positive (negative) α_1 in equation (7) means that the two goods are complements (substitutes). In equation (7), we have made two modifications to Ho (2001)'s specification. First, we will use consumption and

government spending as a fraction of GDP data series and secondly, we will use the log series. In the next section we will explain the rationale behind these transformations.

4. Diagnostic Tests and Estimation Results

We use annual data from 1980-2008 from the *World Development Indicators* published by World Bank and is available online. Private and government consumption are taken to be the relevant series from the National Income and Product Accounts (NIPA). The consumption ratio, (C_t / G_t), is calculated from the constant price final household consumption and final government consumption series at local currency. For model 1, the two price series P_t^G, P_t^C are simply respective implicit price deflators constructed by dividing the nominal series by the constant price counterpart. For model 2, $Ln(C_t / GDP_t)$ and $Ln(G_t / GDP_t)$ are also collected from the same database. the Figure 3 shows time series plots for the ratio of log of real private to government consumption, ln(C/G), and ratio of their prices, $\ln(P_g/P_c)$ for each of the GCC countries. For Bahrain, Oman, Qatar, these two series appear to move together which indicate that they are most likely to be co integrated. For KSA, Kuwait and UAE, the scatter plots are not conclusive and we have to rely on formal tests.

Table 1 reports panel unit root tests for the of GCC countries. It is well known that unit root tests have low power and the problem may be even worse for our application as we have short time series. To better utilize sample information, we have pooled the six countries' data to perform panel unit root tests, which have been shown to be more powerful than the individual time series version. For robustness check, we report three tests; IPS: Im, Pesaran and Shin (2003) test, ADF: Augmented Dickey– Fuller (ADF) and PP-Phillips-Perron unit–root tests. In each test, the null hypothesis of '*each country follows an individual unit root test*' is tested against the alternative hypothesis that '*at least one country's process is trend stationary*'. P–values are reported in parentheses. Each test assumes individual effects and individual linear trends which we do not report. High p-values for all the three tests for panel without Kuwait and KSA indicate that the null hypothesis for both $Ln(\frac{C}{G})$ and $Ln(\frac{P_g}{P_c})$ cannot be rejected. Insignificant p-values under all three tests for $\Delta Ln(\frac{C}{G})$ and $\Delta Ln(\frac{P_g}{P_c})$ indicate that null hypothesis is strongly rejected. This indicates that both $Ln(\frac{C}{G})$ and $Ln(\frac{P_g}{P_c})$ is indeed I(1). Furthermore, similar p-values for $Ln(\frac{C}{G})$ and $Ln(\frac{P_g}{P_c})$ under IPS and PP tests indicate that both of these series are

integrated in similar ways, with $Ln(\frac{C}{G})$ slightly less integrated (larger p-values) in the sense that it has a weaker random walk component. Therefore, according to Ng and Perron (1997), we can be econometrically indifferent as to our choice of the regressor and the regressand. Since our model naturally delivers $Ln(\frac{P_g}{P_c})$ as the regressor, we will use the same convention in our regression for convenient interpretation. For the panel with Kuwait, the p-values for all tests are smaller for both the log series, although unable to reject the null hypothesis. The tests, however, conclusively reject the null hypothesis for the first differenced series. We therefore suspect that $Ln(\frac{C}{G})$ and $Ln(\frac{P_g}{P_c})$ are probably not I (1) for Kuwait and KSA and will not include them in the panel regression.

Table 1 also reports the Granger-causality test for the panel without KSA and Kuwait. Large p-values indicate that the null hypothesis of '$Ln(\frac{C}{G})$ *does not Granger cause* $Ln(\frac{P_g}{P_c})$' cannot be rejected. This result further strengthens out argument that $Ln(\frac{P_g}{P_c})$ should be used as the regressor in our co integrating regressions.

Table 2 reports individual country unit root tests. Again, for robustness check, we report three tests; ADF, PP and DFGLS- Elliott-Rothenberg-Stock (1996)'s unit root test. Numbers in the parentheses indicate p-values while numbers in the square brackets indicate 5% confidence level for the DFGLS test statistics. For Bahrain, Oman, Qatar and UAE, all three tests indicate that the two log series are I (1). For both KSA and Kuwait, we use the model specification of equation (7). For KSA, the assumption of unit root is rejected for both $Ln\left(\frac{G_t}{Y_t}\right)$ and $Ln\left(\frac{C_t}{Y_t}\right)$ under the ADF and PP test while it cannot be rejected under the DFGLS test. For Kuwait the results shows that $Ln\left(\frac{G_t}{Y_t}\right)$ is I (1) and $Ln\left(\frac{C_t}{Y_t}\right)$ is weakly I (1).

Table 3 reports co integration tests for the panel countries without Kuwait and KSA. We report two types of tests; Kao (1999)'s ADF test and the famous Johansen-Fisher Test. Numbers in the square brackets indicate p-values. Both test statistics conclusively reject the null hypothesis of no co integration for the panel. We also report co integration tests for individual countries. We report two types of tests; Engle-Granger test and Phillips-Ouliaris test. Low p-values for test statistics for Oman and Qatar indicate that there is strong con integrating relationship while p-values for UAE and Bahrain indicate that there is weak co integrating relationship. For Kuwait (using alternative specification), p-values

for test statistics indicate presence of strong co integrating relationship. For KSA, the co integrating relationship appears to be weak.

Table 3 also reports the co integrating regression results from three alternative methods; Phillips and Hansen (1990) fully modified ordinary least square (FM-OLS), Park (1992) canonical co integrating regression (CCR), and Stock and Watson (1993) dynamic ordinary least squares (DOLS). For the panel, the elasticity of substitution between private consumption and government spending- the estimated co-efficient of $Ln(\frac{P_g}{P_c})$, appears to be significantly positive, ranging from 0.48 to 0.56. The empirical results suggest that average private consumption and government spending for the GCC countries are substitutes with an elasticity of substitution of around 0.50. Given the small size of the panel, the standard errors appear to be quite small.

Table 3 also reports co integrating regression results for individual GCC countries which are more important for policy analysis. The estimation results appear to be robust across the three measures. Private consumption and government spending appears to be substitutes in Bahrain, Qatar and UAE while they are complements in Oman, Kuwait and KSA. Comparing the DOLS estimates, UAE has the highest degree of substitutability while KSA has the highest degree of complementarity between private consumption and government spending. The results imply that for UAE, Bahrain and Qatar, a fiscal expansion that makes government goods relatively less expensive will induce substantial contraction in private consumption, thereby offsetting or even out-weighing the positive impact of the fiscal expansion on aggregate demand. For KSA, a fiscal expansion will generate a large positive income effect that will outweigh the substitution effect, leading to a large expansion of private consumption and finally, will have an even larger positive impact on the aggregate demand. Given the small sample size for each individual country, the standard errors appear to be quite small, indicating the estimates are consistent.

5. Elasticity of Substitution between Private Consumption and Components of Government Spending

Table 4 reports co integrating regression results for elasticity of substitution between selected components of government spending and private consumption. We report estimation results for public spending on education, grants and other revenues, public expenditure on education, public expenditure on R&D, social contribution, subsidies and other transfers and military expenditure. We only report results from FMOLS and CCR because we could not use DOLS method for many components due to the small sample

size. The reported standard errors are also quite high because of the same reason. We also report elasticity of substitution for 'productive government spending' and 'neutral government spending'. The former is sum of spending on education, health, R&D and grant while the latter is sum of social contribution and subsidies. Military expenditure is regarded as the 'unproductive government spending'. Empty blocks indicate elasticities which could not be estimated because of lack of sufficient data. For the panel without KSA and Kuwait, spending on education, grants, health, R&D, social contribution and subsidies all appear to strong substitutes to private consumption while military expenditure appears to be complementary. Individual country regressions reveal contrasting results for the GCC countries. Productive government spending appears to be complementary to private consumption only in Bahrain. Neutral government spending appears to be highly complementary to private consumption in UAE, Bahrain and Kuwait. Public spending on health appears to be complements to private consumption in most of the GCC countries. One potential explanation of this positive relationship is that education is heavily subsidized by most of the GCC countries. This releases resources from the households' budget and enables them to buy other goods in their consumption bundle. Similar phenomenon is observed in case of public spending on education where it has complementary effect on private consumption in 3 out of 6 of the GCC countries, with insignificant effect in Oman. Social contribution increases households' income and should increase private consumption, as evident in Bahrain and in UAE. R&D expenditures should generate spill-over effects on private consumption, as can be seen in KSA. Grants appear to be substitutes to private consumption in all the GCC countries. This defies an economic explanation and needs to be analyzed more rigorously. For most of the GCC countries and also for the panel, military spending appears to be complements to private consumption. This result needs to be analyzed very carefully. As Evans and Karras(1996) pointed out, the larger the share of defense expenditure, the higher is the public goods component in government expenditure, which reduces its ability to substitute for private consumption, thereby appearing to be complementary to the latter.

6. Conclusion

In this paper, we have undertaken an extensive study to understand the relationship between government spending and private consumption for the GCC countries. In general, government spending crowds out private consumption in the sense that they are substitutes. At the country level, government spending is a strong substitute to private

consumption in Bahrain, Qatar and UAE and almost equally complementary to private consumption in KSA. They are weakly complementary in Kuwait and Oman. The study also reveals interesting features about the substitutability between various components of government spending with private consumption. Grants and explicit transfers appear to be substitutes while social contributions are complements. R&D appears to exhibit spillover effects. Major government expenditures such public spending on education appear to be substitutes in Bahrain, Oman and Qatar while they are complementary to private consumption in UAE, Kuwait and in KSA. Furthermore, public expenditure on health appears to be complementary in Bahrain, Oman, UAE and KSA while they are weak substitutes in Qatar. Finally, military spending appears to be complementary to private consumption in most of the GCC countries. However, these results have to be considered with a grain of salt. Due to lack of sufficient time series data, most of estimates have large standard errors, although they appear to be robust. Therefore, future research on this topic should utilize a more extensive database, possibly collected from country level authorities rather than using internationally available data set.

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Appendix

Figure 1: Private Consumption and Government Consumption as a % of GDP

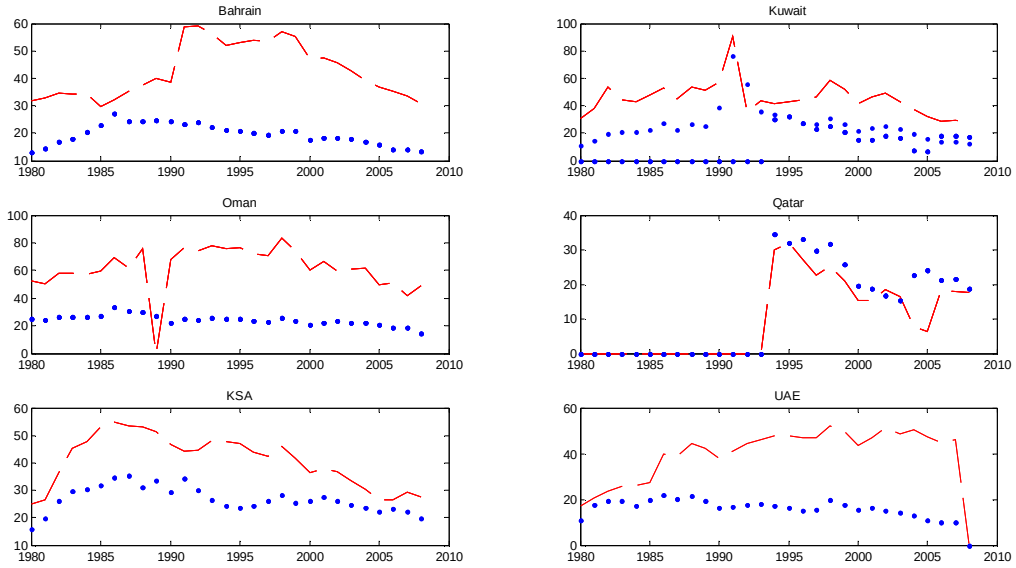

Figure 2: Country specific Time series plots for Ln(C/G) and Ln(P_g/P_c)

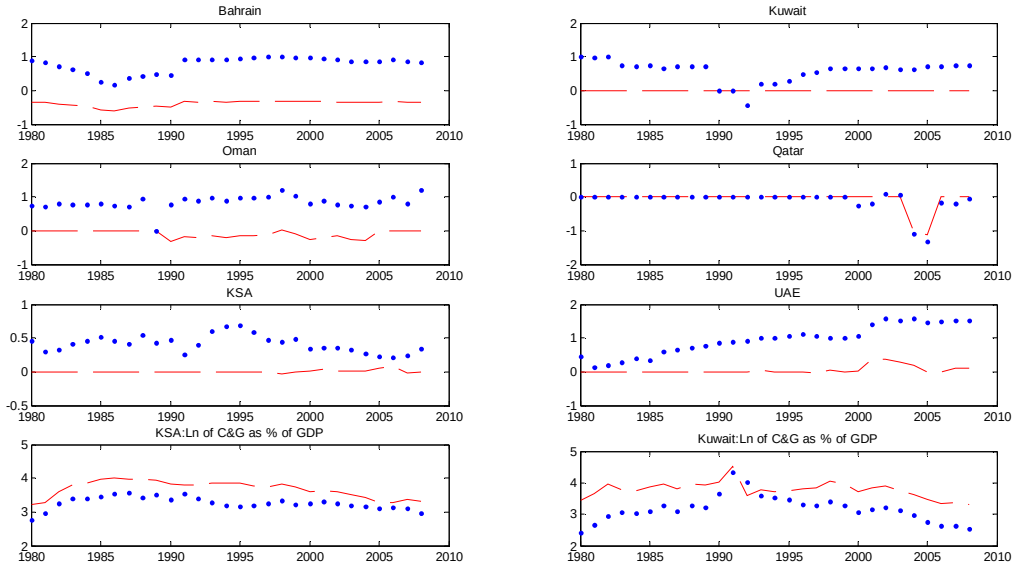

Table 1: Panel Unit Root Tests and Granger Causality Tests

	Ln(C/G)	ΔLn(C/G)	Ln(P_g/P_c)	ΔLn(P_g/P_c)
Unit Root tests with KSA and Kuwait				
IPS W-Statistics	-0.36 (0.36)	-2.91 (0.00)	-0.82 (0.21)	-2.14 (0.02)
ADF - Fisher Chi-square	12.39 (0.26)	21.79 (0.01)	19.56 (0.08)	34.74 (0.00)
PP - Fisher Chi-square	56.90 (0.00)	53.10 (0.00)	23.87 (0.02)	159.55 (0.00)
Unit Root tests without KSA and Kuwait				
IPS W-Statistics	0.04 (0.52)	-2.42 (0.01)	-0.05 (0.48)	-1.04 (0.15)
ADF - Fisher Chi-square	6.45 (0.60)	15.79 (0.02)	7.87 (0.45)	17.08 (0.01)
PP - Fisher Chi-square	10.35 (0.31)	39.77 (0.00)	6.83 (0.55)	117.21 (0.00)
Granger Causality Test for the Panel without KSA and Kuwait				
Null Hypothesis				P-Value
$\ln\left[\frac{P_t^G}{P_t^C}\right]$ does not Granger Cause $\ln\left(\frac{C_t}{G_t}\right)$				0.35
$\ln\left(\frac{C_t}{G_t}\right)$ does not Granger Cause $\ln\left[\frac{P_t^G}{P_t^C}\right]$				0.85

Table 2: Individual Country Unit Root Tests

Country	**Tests**	**Ln(C/G)**	**Ln(P_g/P_c)**	**ΔLn(C/G)**	**ΔLn(P_g/P_c)**
Bahrain	ADF	-2.02 (0.57)	-2.06(0.55)	-4.15(0.02)	-4.10(0.02)
	DF-GLS	-1.77[-3.19]	-1.81[-3.19]	-4.30[-3.19]	-4.26[-3.19]
	PP	-2.17(0.49)	-2.20(0.47)	-4.15(0.02)	-4.10(0.02)
Oman	ADF	-2.83(0.20)	-2.79(0.21)	-5.73(0.00)	na
	DF-GLS	-2.90[-3.19]	-2.36[-3.19]	-5.16[-3.19]	-5.27[-3.19]
	PP	-2.78(0.22)	-2.76(0.22)	-5.72(0.00)	-12.88(0.00)
Qatar	ADF	-1.94(0.54)	-1.73(0.64)	-2.62(0.30)	-2.63(0.30)
	DF-GLS	-2.60[-3.19]	-2.37[-3.19]	-3.17[-3.19]	-3.30[-3.19]
	PP	-0.98(0.88)	-0.89(0.89)	na	-2.66(0.28)
UAE	ADF	-2.70(0.25)	-3.18(0.11)	-5.87(0.00)	-3.81(0.04)
	DF-GLS	-2.95[-3.19]	-3.25[-3.19]	-4.66[-3.19]	-3.59[-3.19]
	PP	-3.49(0.06)	-2.45(0.35)	-5.91(0.00)	-4.17(0.01)
Kuwait**		**Ln(C/GDP)**	**Ln(G/GDP)**	**ΔLn(C/GDP)**	**ΔLn(G/GDP)**
	ADF	-3.61(0.05)	-1.93(0.61)	-7.60(0.0)	-5.02(0.0)
	DF-GLS	-3.30[-3.19]	-1.61[-3.19]	-7.81[-3.19]	-5.16[-3.19]
	PP	-3.55(0.05)	-1.83(0.61)	-17.58(0.00)	-5.46(0.00)
KSA**	ADF	-3.66 (0.04)	-4.39 (0.01)	-4.20 (0.01)	-4.67 (0.00)
	DF-GLS	-1.96[-3.19]	-2.43[-3.19]	-3.73[-3.19]	-5.76[-3.19]
	PP	-5.28 (0.00)	-5.02 (0.04)	-3.60 (0.05)	-4.67 (0.00)

Table 3: Co integrating Regressions

	Regressors						**Co integration Tests**			
	FM-OLS		**CCR**		**DOLS**		**Kao Test**		**Johansen-Fisher**	
	intrcpt	Ln (P_g/P_c)	intrcpt	Ln (P_g/P_c)	intrcpt	Ln (P_g/P_c)	T stat		Fisher stat	
Panel	0.72 (0.09)	0.49 (0.35)	0.72 (0.09)	0.48 (0.37)	0.73 (0.10)	0.56 (0.42)	-1.31 [0.09]		37.1 [0.0]	24.56 [0.00]
	FM-OLS		**CCR**		**DOLS**		**Engle-Granger**		**Phillips-Ouliaris**	
	intrcpt	Ln (P_g/P_c)	intrcpt	Ln (P_g/P_c)	intrcpt	Ln (P_g/P_c)	Tau-Stat	Z-Stat	Tau-Stat	Z-Stat
BH	1.89 (0.02)	2.90 (0.05)	1.89 (0.02)	2.90 (0.05)	1.90 (0.02)	2.91 (0.05)	-2.66 [0.24]	-11.90 [0.19]	-2.66 [0.24]	-11.93 [0.19]
OM	0.86 (0.05)	-0.14 (0.36)	0.86 (0.05)	-0.12 (0.35)	0.82 (0.06)	-0.39 (0.44)	-2.44 [0.33]	-12.32 [0.17]	-2.36 [0.37]	-11.49 [0.20]
QT	-0.08 (0.04)	1.04 (0.07)	-0.08 (0.04)	1.04 (0.08)	0.07 (0.03)	1.41 (0.08)	-3.07 [0.20]	-20.61 [0.47]	-2.09 [0.51]	-5.72 [0.55]
UE	0.81 (0.12)	3.01 (0.95)	0.81 (0.11)	2.97 (0.92)	0.79 (0.10)	3.36 (1.04)	-1.10 [0.88]	-2.77 [0.89]	-1.16 [0.87]	-3.09 [0.87]
	FM-OLS		**CCR**		**DOLS**		**Engle-Granger**		**Phillips-Ouliaris**	
	intrcpt	Ln (G/Gdp)	intrcpt	Ln (G/Gdp)	intrcpt	Ln (G/Gdp)	Tau-Stat	Z-Stat	Tau-Stat	Z-Stat
KW*	2.52 (0.28)	0.40 (0.09)	2.52 (0.27)	0.40 (0.08)	2.84 (0.31)	0.30 (0.10)	-0.347 [0.06]	-17.79 [0.04]	-3.57 [0.05]	-19.48 [0.02]
KS**	-0.80 (0.87)	1.37 (0.26)	-0.54 (0.72)	1.29 (0.22)	-0.69 (1.04)	1.34 (0.31)	-2.31 [0.39]	-8.94 [0.37]	-2.40 [0.34]	-9.94 [0.30]

Table 4: Co Integrating Regressions with Decomposition of Government Spending

	Public Spending on Education		**Grants and Other Revenues**		**Public Health Expenditure**		**R&D**		**Productive Government Spending**	
	FMOLS	**CCR**	**FMOLS**	**CCR**	**FMOLS**	**CCR**	**FMOLS**	**CCR**	**FMOLS**	**CCR**
Panel Without KW & KSA	1.35 (0.40)	1.42 (0.43)	1.60 (0.50)	1.60 (0.49)	0.71 (0.16)	0.72 (0.17)			2.21 (0.52)	2.30 (0.56)
BH	0.41 (0.12)	0.48 (0.22)	3.27 (2.38)	2.79 (1.80)	-1.61 (3.96)	-1.46 (3.89)			-3.73 (2.75)	-3.86 (3.14)
OM	0.07 (0.47)	0.12 (0.52)	0.89 (0.23)	0.95 (0.22)	-0.07 (0.18)	-0.09 (0.20)			3.53 (2.10)	3.64 (2.23)
QT	0.24 (0.13)	0.24 (0.14)			0.17 (0.36)	0.17 (0.38)			0.15 (0.35)	0.15 (0.36)
UAE	-0.27 (0.66)	-0.28 (0.59)	0.31 (0.87)	0.28 (2.59)	-0.53 (0.15)	-0.47 (0.10)			2.72 (1.36)	2.69 (1.32)
KW*	0.71 (0.12)	0.84 (0.27)	-0.30 (0.16)	-0.29 (0.17)					-0.19 (0.10)	-0.19 (0.11)
KSA*	1.58 (0.43)	1.58 (0.41)			0.93 (1.15)	1.73 (0.93)	0.66 (0.06)	0.66 (.03)	-0.33 (0.39)	-0.46 (0.54)
	Social Contribution		**Subsidies and Other Transfers**		**Neutral Government Spending**		**Military Expenditure**			
	FMOLS	**CCR**	**FMOLS**	**CCR**	**FMOLS**	**CCR**	**FMOLS**	**CCR**		
Panel Without Kuwait & KSA			0.55 (0.64)	0.54 (0.62)	6.86 (1.81)	6.80 (1.76)	-0.73 (0.54)	-0.76 (0.57)		
BH	-0.31 (1.69)	-0.09 (1.31)	7.45 (3.95)	6.26 (1.33)	-3.91 (1.35)	-3.91 (1.03)	1.45 (0.30)	1.42 (0.25)		
OM			1.37 (0.99)	1.00 (0.85)	1.37 (0.99)	1.00 (0.85)	-0.01 (0.41)	0.01 (0.43)		
QT							0.23 (0.17)	0.23 (0.18)		
UAE	-2.54 (3.26)	-2.67 (9.71)			-2.54 (3.26)	-2.67 (9.71)	-0.10 (0.36)	-0.11 (0.33)		
KW*			0.22 (0.10)	0.23 (0.11)	0.22 (0.10)	0.23 (0.11)	0.24 (0.06)	0.23 (0.06)		
KSA*							1.08 (0.25)	1.07 (0.24)		