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23. June 2008

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23 June 2008

Abstract:

This paper studies the long and short-run relationship between oil exports, non oil GDP and investment in five major oil exporting countries. Its goal is to verify the effect of natural resources exports on the economic performance. It considers the effect of cross sectional correlations and uses the corresponding panel unit root tests to study the long-run characteristics of our series. The results show that resources' exports have no long-run relationship with the macro variables. A VAR analysis is used to estimate the short-run dynamics and shows that the effect of oil exports on those variables depends on local policies.

Keywords: GCC, Natural Resources, Oil, Productivity, Investment, Labor Force, Unit root, Growth, Cointegration, VAR.

JEL Classfication: C22, C23, F43, O40, O53

* The author would like to thank Gengenbach. C., Lee, J., Ng, S., Pedroni, P., Perron, B., Pesaran, H., and Westerlund, J. for supplying the different codes.

I - Introduction

The exports role in the local economy has well been debated in the literature on whether they cause growth or are caused by growth (see Giles & Williams, 2000 for a review). Similarly, the causality direction between investment and growth has undergone many studies (see Blomstrom, Lipsey, & Zejan, 1996; De Long & Summers, 1991; Podrecca & Carmeci, 2001; Rogers, 2003).

In spite of the large literature on the relationship between exports and growth, this topic has not been thoroughly analyzed in the Gulf Cooperation Council (GCC) countries. Those countries have a unique situation: a small indigenous population and a large oil wealth. Other low populated countries have witnessed some remarkable growth such as Singapore and Ireland, but the case of the GCC countries is different because of their considerable reliance on oil exports (figure 1).

The effect of investment on growth and productivity in the GCC countries has not been directly investigated either. Rather, some authors focused on the relationship between Foreign Direct investment and economic growth in some Arab countries such as Omran and Bolbol (2003) without any specific attention to oil rich countries.

This paper investigates the relationship between Oil Exports Revenues (OER), Non Oil GDP (NGDP), and investment in five countries of the GCC: Kuwait, Oman, Qatar, Kingdom of Saudi Arabia (KSA), and the United Arab Emirates (UAE)[1]. The OER generated huge flows of foreign exchange and allowed the local economies to finance the imports of consumption and capital goods, to build a modern infrastructure and to recruit massive foreign labor force. Many papers, as we shall see below, discussed the impact of natural resources on the economy elsewhere (Altman, 2003; D.C. North, 1959; Sachs & Warner, 1997).

The closest work to the current paper is Al-Youssif (1997) where two models were used to study the relationship between exports and economic growth in each of four GCC countries: Kuwait, Oman, KSA and UAE. The data covers 21 years of observations. The author used ADF test to conclude that there is no cointegration, and no long-run relationship therefore between exports

[1] Bahrain is the sixth member of the GCC. We exclude it from our analysis because it is not a significant oil exporter.

and GDP. The short-run analysis, however, suggested a positive association. He performed no causality tests.

On the other hand, Abu-Quarn and Abu-Bader (2004) examined the causality direction between exports and growth in nine Middle East and North African (MENA) countries. Two oil exporters were included in their sample: Algeria and Iran. The authors concluded some evidence that manufactured exports lead to growth when they represent a substantial volume of total exports.

Neither one of the above mentioned papers dealt with the effects of primary exports on non oil sector nor on productivity. Moreover, the 1997 paper of Al-Youssif did not distinguish between total GDP and NGDP. It is important to study the effect of exports on the local non oil economy as these countries struggle to diversify their income resources. Oil exports fluctuations reflect mainly variations in the price of oil rather than quantity as we shall see below; it is therefore not growth led.

The main contribution of the present paper is that it focuses on studying the macro characteristics of OER, NGDP, NGDP per worker (as a proxy for productivity[2]), aggregate investment, and investment per worker in the GCC countries; and the impact of OER on those aggregates. Moreover, it benefits from panel econometric developments which eliminate the harmful effects of cross sectional correlation observed amongst some GCC data as we shall observe below.

Our results show that there exists a non stationary common component in OER which has some positive short-run effects on the remaining aggregate variables. No long-run relationship is detected. The effect of the idiosyncratic component in OER depends on the local economic circumstances. Investment and NGDP are shown to be cointegrated.

The remaining of this article is organized as follows: next section (II) sheds lights on some previous work relating growth to natural resources abundance. Section (III) presents a visual analysis on oil and growth in the GCC countries. Section (IV) studies the methodology used in this paper, section (V) discusses the data and the main results of the paper. We conclude in section (VI).

[2] We understand that this is not the perfect measure for productivity. Data needed to calculate productivity is rarely available in those countries.

II - Natural Resources and Growth

The literature on the effect of natural resources on the economy is not recent. Whether this effect is positive or negative is still a debatable topic. Innis (1930) developed the slope theory in his attempt to explain how the early Canadian economic growth was initiated by wheat, fur and other staple products. Altman (2003) provided a detailed explanation on how staple exports may boost economics growth. The main argument was that Canadians became more productive in their attempt to reduce production cost, which initiated per capita income growth. For the other sectors such as the industrial, financial and other sectors, their growth followed in order to service the staple producers.

Many authors contributed to the development of staple theory such as North (1955; 1959) and Baldwin (1956). They introduced the concept of backward, forward, demand and fiscal linkages. Backward and forward linkages refer to industries related to the production and services needed to produce staple and processing it respectively. Demand linkage refers to the production of goods and services needed to satisfy the local consumption (referred to as residential industries). Fiscal linkages consist of the collected taxes that help the local government to invest in transportation, education, research, etc…

Baldwin (1956) argued that it is the distribution of income that matters in the demand linkage. A more equally distributed income generates purchasing capacity which enlarges the local market. As income increases, demand goes beyond basic necessities to a diversified set of goods and services. This allows producers to increase their investments. Hence, productivity benefits from a more capitalized industries and a larger scale production which result in higher income per capita and growth.

Hirschman (1958) and Baldwin (1966) maintained that the forward and backward linkages are small when the exports consist of primary goods. Manufacturing goods leads to a complex division of labor which yields a higher productivity and stronger growth.

In a seminal work, Sachs and Warner (1995; 1997) provided evidence of a negative relationship between growth and exports of primary goods with a sample of 95 abundant natural resources' countries. They offered four arguments to explain this negative correlation as follows:

i. Abundant natural resources promote de-industrialization (the Dutch Disease). When natural resources are abundant, factors of production that might be used in manufacturing sector are directed towards the non tradable sector. Hence, the economy will be deprived from many external positive effects on productivity (division of labor, learning by doing, spillover..).
ii. Prebish (1950) hypothesis states that in the long run, demand for manufacturing goods rises faster than demand for natural resources leading to a loss in the term of trade advantage in favor of manufacturing skilled countries. Hence, natural resources abundant countries grow slower than others.
iii. Natural resource production leads to high economic rents, corruption, inefficient bureaucracy which hinder innovations and shifts resources towards less efficient use.
iv. The volatility of natural resources' prices leads to more risk and uncertainty which reduce factor accumulation.

On top of arguments i, ii, and iv, cited by Sachs and Warner (1995; 1997), Gylfason (2001) cited the channel of education where abundance of natural resources weakens public and private incentives to accumulate human capital. Public expenditures on education may fail to promote efficiency and growth because of a mediocre quality.

Stijns (2005) distinguished between the exports of natural resources and their abundance. A country with abundant natural resources does not necessarily export them. His results showed a negative correlation between exports of natural resources and growth. As for resources abundance per se, he showed – after controlling for many variables such as openness, initial GDP, terms of trade - no conclusive results. The type of resources (land, coal, fuel, or mineral) is decisive on the effect sign and its significance. He found some evidence of Dutch Disease in countries with abundant oil reserves. Moreover, he states that "there is no clear historical evidence that […] learning by doing is restricted to manufacturing sector and is nonexistent in other sectors, such as resource production and agriculture" (Stijns, 2005, p. 108).

Other authors showed that the negative role of resource abundance on economic performance is due to the corruption and rent seeking behavior caused by the resources (Auty, 2001; Ross, 2001; Sala-i-Martin & Subramanian, 2003).

Brunnschweiler (2008) studied the effect of natural resources abundance while considering the impact of institutional quality on growth. His results challenged the "curse" of the abundant resources. That is, he concluded that institutional quality and natural resources abundance – especially subsoil resources – have positive effect on growth average.

Since the lack of indigenous labor force has been compensated by using foreigners, Dutch Disease is not expected to materialize in the GCC. There was no evidence of a resources shift from one sector to another as most of production factors, especially labor, were imported in the process of building the local economy. The deterioration of the terms of trade effect does not apply literally in the case of the GCC countries. History shows that throughout the last 40 years, the term of trade was not continuously disfavoring oil producers as Prebish (1950) expected (figure 2).

Therefore, it is expected that natural resources play a positive effect on productivity through their demand effect which is enhanced with income distribution (backward and forward effects are negligible in this case) or negative by the third and fourth points of Sachs and Warner (1995; 1997) or through education as cited by Gylfason (2001).

In the next section, we provide a graphical analysis of the relation between oil exports and economic aggregates in our sample.

III - Oil Exports Revenues, Investment and NGDP in the GCC Countries

The first column of figure (3) displays the path of OER, NGDP and Gross Capital Formation (GCF) as a proxy for investment between 1973 and 2005. All variables are real. The visual inspection shows that NGDP and GCF have more harmonious movements together than with OER. Also, their long-run path is different from OER's. In general, OER has witnessed large and continuous fluctuations since 1973. NGDP has been less volatile, and so has GCF.

In the seventies, oil revenues increased and poured huge foreign exchange into all five countries due to the two oil price hikes (1973, 1979). This boosted investment and non oil sector in most cases. In the eighties, oil revenues where at low levels and witnessed much fluctuations. NGDP

continued to grow slowly (except for Oman), while investment appears to slowdown in that period in all five countries discouraged by low oil revenue and by the Iran-Iraq war (1980-1988). In the nineties, OER experienced higher growth along with higher investment growth. NGDP growth was slower, however. In most cases, the average growth of NGDP in the nineties was less than in the eighties. With higher oil revenue in the early years of the 21st century, investment do not seem to respond promptly. But again, NGDP grew at even slower rates.

In the second column of figure (3), we show productivity and investment per worker. It is evident that the movements of productivity and investment per worker differ from their aggregate counterpart. This is probably due to the large variations in labor force (table 1, col. I). Therefore, fluctuations in aggregate production or investment do not necessarily match their per worker levels.

Note that we keep comparing the per-worker variables with aggregate OER because oil revenue movements do not reflect changes in productivity or in labor force. Rather, they reflect mainly world market stance. Moreover, oil revenues end up as government revenues and reflect, therefore, a public tool and a major source for public finance.

We observe that despite the increase of OER over the long run, productivity has not been steadily growing. It has well grown in the seventies in four countries (Kuwait, Oman, KSA and UAE) and in the early 21st century in Oman and Qatar. UAE showed the worst performance with a continuous decreasing productivity over the whole period. Apparently, productivity was closely following the movement of investment per worker. It is also clear that oil exports follow a different stochastic trend that is apparently different from the trend of productivity and investment per worker.

From the above discussion, it appears that there are no strong long-run relationship between OER and the macro variables, and that NGDP and investment are more linked to each other - at the aggregate or at the per worker level - than to OER. This may suggest a smoothing behavior of NGDP and investment.

On the other hand, table (1) displays the average growth of our macro variables. It shows that NGDP average growth was on average higher than investment (except for Kuwait). The large growth of OER in the seventies was accompanied by a larger growth in NGDP and investment.

Both aggregates have not grown as much in the early years of the 21st century despite a large growth of OER. This can be explained probably by the huge need of infrastructure in the seventies when the GCC economies were well underdeveloped and needed huge investments in infrastructure.

We note, on the other hand, that labor force growth rate was not fluctuating as much as the other variables. It has been steadily growing with no apparent cyclical relationship. Moreover, we observe that the higher the average growth of investment per worker, the greater is the productivity growth.

Another major characteristic of the GCC economies is their low national population and indigenous labor force. High investments have been hence accompanied by large inflows of expatriate workers from all across the world especially from surrounding more populated countries: Egypt, Iran, Syria, and Indian subcontinent. Even if all five countries depended heavily on expatriate labor force, we can still observe that KSA and Oman had less relied on foreigners than Kuwait, Qatar and UAE. This led to a high proportion of expatriate workers in the latter group than in the former as it is obvious in table (2). It is expected then that the educational policies of the local governments do not have a significant effect on the majority of the labor force. Therefore, we expect that investment plays the major role in productivity rather than education. Table (1) shows that in most cases, the growth of labor force was higher than investment. There have been no studies on the skills and productivity of this labor force to assess the productivity effects of the oil exports. But with the easy access to the low cost labor force, we can expect that producers shift towards the cheaper factor of production which may explain the observed low productivity of labor.

IV - Methodology

In order to study the relationship amongst our different variables, we need to study the existence of a unit root in our data benefiting from panel econometrics. Testing for unit root and cointegration in panels allows for more power because of the larger number of observations. Exploiting the benefits of panel data has been the subject of many recent econometric

developments as we shall see below. It turned out that the progress in this field benefited especially developing countries that lack long span data series.

In this paper, we use a battery of five unit root tests: Im, Pesaran and Shin (2003), Moon and Perron (2004), Pesaran (2007), and Bai and Ng (2004), and Im, Lee and Tieslau (2005).

Im, Pesaran and Shin (2003) are amongst the first that considered heterogeneity in a panel unit root test. They proposed a *t-bar* and an *LM-bar* test based respectively on the average *t* test of the average of Dickey-Fuller regression and Lagrange Multiplier test. Both tests follow a normal distribution. Since cross sectional correlation can cause size distortions, they cross-sectionally demeaned their series to get rid of the problem. Monte Carlo experiments show superiority of *t-bar* test compared to *LM-bar* test when N and T are small. Hence, we discard the latter hereafter.

Recognizing that cross-sectional demeaning may not be sufficient to solve the problem of cross section correlation (Pesaran, 2003), different authors tried to come out with new tests that deal with this problem.

Moon and Perron (2004) considered a simple dynamic linear heterogeneous model as follows:

$$y_{i,t} = (1-\phi_i)\mu_i + \phi_i y_{i,t-1} + u_{i,t} \qquad i = 1,...N \qquad t = 1,....T \qquad (1)$$

where $y_{i,t}$ is the variable to be tested for unit root. N and T are the cross section and the time dimensions respectively. ϕ_i is an idiosyncratic autocorrelation coefficient, and $u_{i,t}$ is a disturbance with the following reduced form

$$u_{i,t} = \lambda_i^{'} c_t + e_{i,t} . \qquad (2)$$

where c_t is a ($K \times 1$) vector of common factors and λ_i is a ($K \times 1$) vector of factor loading for member i of the panel. The idiosyncratic $e_{i,t}$ is an infinite and invertible moving average process of $\varepsilon_{i,t} \sim i.i.d\ (0, 1)$.

The source of non stationarity is idiosyncratic and depends on the value of ϕ_i. Their tests therefore are based on the following two hypotheses: $H_0 : \phi_i = 1$ for all $i = 1,..., N$ versus $H_1 : \phi_i < 1$ for some is. They used de-factored panel data (by projecting the panel into a space that is orthogonal to the factor loading) to construct two test statistics t_a^* and t_b^* that allow for

heterogeneity under the alternative. Their tests have a limiting normal distribution and reject the null if less than (-1.645) at 5% significance level.

Unlike Moon and Perron (2004), Pesaran (2003; 2007) assumed only one stationary common factor. He constructed a Cross sectional Augmented Dickey Fuller (*CADF*) individual test and proposed a Cross sectional IPS (in reference to Im, Pesaran and Shin 2003) test (*CIPS*). *CIPS* has a non standard limiting distribution. Critical values are tabulated in Pesaran (2007). In our case, with 5 countries and 33 observations each, we reject the null of unit root if *CIPS* is less than (-2.33).

Bai and Ng (2004) assumed that the observed data $y_{i,t}$ is described as follows:

$$y_{i,t} = D_{i,t} + \lambda_i^{'} F_t + E_{i,t} \qquad i = 1,...N \qquad t = 1,....T. \qquad (3)$$

where $D_{i,t}$ is a deterministic part, λ_i is a ($K \times 1$) vector of factor loading, F_t is a ($K \times 1$) vector of common factors, *K* is the number of common factors, and $E_{i,t}$ is the error term.

In contrast to Moon and Perron (2004) and Pesaran (2007), they allow the source of non stationarity to stem from either the common factors F_t or from the idiosyncratic errors $E_{i,t}$.

The number of common factors is determined by the principal factors components as described in Bai and Ng (2002). They propose two panel tests: $P^c_{\hat{E}_t}$ (where the ^ stands for the estimate of the corresponding series) test for the pooled idiosyncratic factors, and $ADF^c_{\hat{F}}$ to test the non stationarity of the common factors. The first test follows a normal distribution and rejects the null of unit root when if greater than 1.645 (5% confidence level) while the second has a similar distribution to Dickey-Fuller test and rejects the null if less than (-2.86).

The last unit root test that we use in the present article is Γ^B_{LM} test proposed by Im, Lee and Tieslau (2005, ILT hereafter) . The Γ^B_{LM} test is based on Lagrange multiplier principle. Unlike the above mentioned tests, ILT test does not consider the existence of common factors amongst units of the panel. It allows for a level shift in the data though. ILT show that their test outperforms IPS'. It follows a normal distribution under the null hypothesis and rejects the null if less than (-1.645).

If, when testing for cointegration in a heterogeneous panel by imposing homogeneity across panel, a non stationary component in the residuals is generated which leads to a rejection of the cointegration hypothesis even if it is true. Pedroni (2004) considers this fact and developed two sets of statistics to test the null of no cointegration for the case of heterogeneous panels. The first one, the set of panel statistics (Panel-*v*, Panel-*ρ*, Panel-*t*), is based on pooling the residuals along the within dimension of the panel. It considers that cointegrating vectors are homogenous under the alternative. Heterogeneity is considered under the alternative in the second set of statistics, (Group-*ρ*, Group-*t*), the group mean statistics, which is based on pooling the residuals along the between dimension of the panel. All the five tests follow a standard normal distribution. Panel-*v* rejects the null if greater than 1.645, while the remaining tests rejects the null if less than (-1.645) at 5% significance.

Ignoring common factors in testing for cointegration may be harmful for cointegration testing as stated in Westerlund (Forthcoming). In order to avoid this problem, he allows for common factors in his model and estimates them by principal components method. He proposed two Durbin-Hausman cointegration statistics based on a consistent estimate of the residuals: *DHp* and *DHg*. As in Pedroni (2004), the first test assumes homogeneity in the cointegrating vector under the alternative while the latter considers heterogeneity. Both tests follow a standard normal distribution and are shown to be more powerful than other tests and have better small sample properties even if no common factors exist within the panel.

V - Data and results

Our data run from 1973 until 2005. Oil exports have been obtained from the Arab Monetary Fund (AMF). Nominal non oil GDP was obtained by subtracting oil exports from nominal GDP. To obtain nominal productivity, non oil GDP was divided by total labor force[3]. Gross Capital Formation was used as an indicator for investment as in many previous studies (see Qin, Cagas, Quising, & He (2006) for instance). It was divided by total labor force to consider the amount of investment per worker. We deflated our data using local Consumer Price Index (CPI). The GDP

[3] In ideal case, unemployed shall be excluded. However, no figure on unemployment is available.

deflator tends to over deflate the non oil output because of the heavy weight of oil in the GDP. On the other hand, deflating oil revenues by the GDP deflator will not reflect their real impact on the economy as the terms of trade effect is removed. All our data were converted to natural logarithm.

The five panels of table (3) show the cross sectional correlation for each of our five series: OER, NGDP, investment, productivity and investment per worker. We have used the cross sectional CD test developed by Pesaran (2004).

Panel "a" shows the cross sectional correlation in OER amongst the 5 countries. Even if Kuwait's correlation with other member is weak (which is due to major drop in oil export in 1990 because of its occupation by Iraqi troops), the remaining correlations are much stronger and the CD test rejects the null of no cross sectional correlation. As for the remaining variables, the CD test does not reject the null of no cross sectional correlation. This might be an indication that despite heavily relying on oil exports, the five economies have reacted differently to their respective OER.

In harmony with Pesaran's CD test, Bai and NG (2002) BIC_3 test - the best test when samples have small cross sectional dimension - shows that only OER has one common factor while the remaining do not have any (see table 4).

To test for unit root in OER, we use IPS (2003), Moon and Perron (2004), Bai and Ng (2004), and Pesaran (2007) tests as they consider the cross sectional effect. The first test deals with the common factors by demeaning the data while the remaining three tests assume the existence of at least one common factor. Table (4) shows the results of those tests. IPS (2003) *t*-test do no show evidence of unit root in OER demeaned, nor does Pesaran's CIPS test. The remaining two tests do not reject the null. As stated above, demeaning across sections may not be sufficient to remove distortions caused by common factors. CIPS assumes the existence of one common stationnary test. Bai and Ng's (2004) $P^{c}_{\hat{E}_t}$ and $ADF^{c}_{\hat{F}}$ test shows evidence that OER's idiosyncratic factors are stationary while the common factor is non stationary. ILT (2005) is not used to test OER as the latter does contain a common factor which is not considered in the test. We conclude that OER is non stationnary because of the stochastic trend in the common factor.

Because the remaining variables contain no common factors, we use only IPS (2003) and ILT (2005) tests. Their results are mixed. The first test indicates stationarity in NGDP and productivity, and non stationarity in GCF/W. It gives mixed signals in GCF. The latter test suggests non stationarity in NGDP, GCF and GCF/W. Since ILT (2005)'s Monte Carlo simulations show that their test has more power than IPS (2003), we tend to consider its results.

The existence of a common non stationary factor in OER and the absence of any common factor in the remaining variables indicate that there is no systematic long-run relationship (either negative or positive) between the common factor and the economic performance. That is, had primary resources exports had a systematic effect on the local economy, it had to materialize through a common effect which is not the case. This fact can be interpreted against the "curse" of resource abundance. On the other hand, it is expected that productivity and investment per worker share a common trend. As investment per worker changes, productivity should follow. However, the stationnarity of productivity versus the unit root in investment per worker suggest that this is not the case here and needs to be addressed below.

Figure (4) shows the estimated loaded common factor in each of the five countries (panel a), and the estimated idiosyncratic factors in these countries (panel b). A simple visual inspection leads to conclude that the fluctuations of the common factor and of the terms of trade are quite close. Indeed, we calculate the correlation between both series and found out that it is equal to 0.88. The idiosyncratic factors are more stable though.

On the other hand, the cointegration tests between NGDP and GCF show evidence of common trend as they are cointegrated (table 6). When a trend is considered, Pedroni's tests do not reject the null of no cointegration, while Westerlund's tests do. Since the latter test is more powerful (as seen above), we may conclude that there exist a long run relationship between aggregate NGDP and aggregate GCF.

We conclude that the common factor, which is closely related to the terms of trade, have no long-run effect on economic performance. Since oil exports have no common effects on our macro variables, we will study the effects of those common factors below using individual VAR analysis.

Effect of OER's Common Factor on Economic Performance

We turn next to study the short-run relationship between OER's non stationary common factor on the economic performance. The following subsection deals with the effect of the idiosyncratic factors.

To study the relationship between OER's common factor effect on the economic variables, we estimate the following VAR

$$X_t = \Lambda + \Phi_1 X_{t-1} + \Phi_2 X_{t-2} + \ldots + \Phi_p X_{t-p} + \varepsilon_t = \Phi(L) X_{t-1} \qquad (4)$$

where X_t is a vector of two variables $(X_{1t}, X_{2t})'$. Λ is a (2×1) vector of constants. Φ_i is a (2×2) matrix of coefficients and ε_t is a vector of white noise process. We estimate the model four times. Each time, we set X_{1t} as the variation in the common factor in OER, while X_{2t} is set as the relative variations in NGDP and GCF in the first and second time respectively and as the relative variations in productivity and GCF/W in the third and fourth time respectively.

We have then calculated the impulse response functions by imposing a restriction, that X_{2t} has no long-run effect on OER. Since our sample consists of five small open economies, we expect that local non oil economic activities have no effect on OER. We have also imposed an alternative restriction à la Cholesky, that the macro variables have no effect on OER at time *t*. The results are practically the same. We present here the results of the long-run restriction. The lag length was chosen upon Akaike criterion with a maximum of four because our data is annual. If the chosen lag is zero, we use one lag. If the chosen lag yields non normal or autocorrelated residuals, we add one more.

The impulse response functions are displayed in figures (5) and (6) which show the effect of a one standard deviation of the common factor innovations in oil revenues on NGDP, GCF, productivity and GCF/W in each of the five countries considered. The dotted lines show ±2 standard error deviations. As it is obvious, there is evidence of positive and significant effect of the common factor on aggregate investment in all cases while its impact on NGDP is positive and significant in three cases only (Oman, KSA and UAE). When we consider the per capita variables (figure 6), the results are similar except that the impact in UAE is not significant any more. If more capital is invested, we expect that productivity rises which is the correct in two cases only. Two arguments can explain why this may not be true. Firstly, the capital itself may

not necessarily raise the productivity as expected. Deaton (1999) suggested that the problem of the growth in Africa was the low quality of investment and the absence of complementary factors, especially education. On the other hand, Dhumale (2000) explained the negative impact of the public investment on the economic performance in the GCC by "over-investing to a point where there have been negative implications for productivity" (Dhumale, 2000, p. 319). Also, Shafick (1994) stated that there has been much emphasize in the GCC on the tertiary level of education at the expense of other levels. Moreover, Dhumale (2000, p. 310) mentioned that "there was a greater focus on the quantity of funds expended rather than on the quality of the services supplied" in the Middle East and North African Countries (MENA). Secondly, we observe that the effect of the common factor on productivity is only significant and positive in Oman and KSA. Both countries happen to have the lowest contribution of foreign labor force (see table 2). This may suggest that the local labor policy have an important effect on productivity. That is, using more foreign labor means less control over their quality and skills. Moreover, the openness towards bringing in foreign workers along with the availability of low cost labor, encourage entrepreneurs to use this resource which has a low productivity even if more capital is used. We have calculated the correlation between variation in labor and variation in NGDP per worker in every country (table 7). They are all negative and significant except in Oman.

Unfortunately, to our knowledge, there have been no studies to assess the quality and efficiency of foreign labor, education, and public and private investments in the GCC to verify those hypotheses.

Effect of OER's Idiosyncratic Factors

Because OER's idiosyncratic factors are stationary, they cannot be cointegrated with the remaining variables. In this subsection, we study the short-run effect of those factors on the economy using the same VAR analysis presented above in (4).

Each time, we set X_{1t} as the variation in the idiosyncratic factors in OER, while X_{2t} was set in the same way as above.

Our results do not suggest any specific effect as seen in figures (7) and (8). In three cases (Kuwait, Oman and UAE), those factors have no significant effect while they have a negative impact in Qatar and a positive one KSA. This is another indication of no similar effects across oil exporters.

To wrap up the above results, we brief them in two points:

a) The common factor has a positive and significant effect on the economic performance over the short run only. It appears that local policies may significantly change this impact.
b) Idiosyncratic factors have idiosyncratic effect on the economy.

Our results suggest that a bad performance of the oil rich economy is not a direct result of their exports revenues. However, due to data limitation, one cannot verify the quality of investment, education, and isntitutions as a potential cause for the bad economic performance. This article has shown that education may play a decisive role on the effect of oil exports given that the best performing economies are those who rely more on their own labor force.

VI – Conclusion

We have studied the relationship amongst oil exports' revenues, NGDP and investment. Our results show that oil revenues have no long-run effect on the macro performance of the economy. There is some evidence of a short-run positive effect which depends mainly on the local policies. The idiosyncratic effects are shown to have no conclusive effect on the economic performance.

Our paper suggests that oil revenues cannot be blamed for a bad performance of the economy. We do not observe a systematic negative impact of natural resources over the economic performance.

As mentioned above, there are other factors that affect economic growth such as the quality of education, investment, and the institutionalism. These might be the subjects of further investigation. Even if personal experience in the GCC countries may show evidence of unproductive investment in public enterprises and education, a formal research is needed in that direction. We recognize however, the difficulty in obtaining the corresponding data.

Another line of research is to study the effect of the foreign labor force by conducting a comparative study with another panel of oil exporters with no significant foreign labor force.

Table 1: Average growth rates

		Aggregate				Per Worker	
		Labor Force (I)	Oil Exports (II)	Non Oil GDP (III)	GCF (IV)	Productivity (V)	GCF (VI)
Kuwait	1973-1979	7.3	19.8	15.8	23.9	8.7	16.9
	1980-1989	5.6	-7.9	3.3	-4.1	-2.1	-9.6
	1990-1999	5.0	-2.1	0.5	1.2	-2.6	-1.9
	2000-2005	4.2	20.0	9.0	18.9	4.9	14.8
	1973-2005	5.5	4.8	6.1	7.6	1.3	2.8
Oman	1973-1979	5.5	14.1	16.9	13.2	11.6	7.9
	1980-1989	5.7	2.4	10.7	-0.7	5.2	-6.2
	1990-1999	5.3	0.7	2.1	3.4	-3.1	-1.7
	2000-2005	1.9	14.8	8.8	14.5	7.0	12.6
	1973-2005	4.8	6.6	9.1	6.3	4.4	1.6
Qatar	1973-1979	7.3	7.0	13.4	6.7	6.3	-0.3
	1980-1989	9.9	-10.5	4.3	-2.5	-5.1	-11.9
	1990-1999	2.1	6.1	2.4	5.6	0.3	3.5
	2000-2005	7.5	19.9	16.0	17.8	8.7	10.5
	1973-2005	6.6	3.8	7.8	5.6	1.5	-0.7
KSA	1973-1979	5.8	17.3	19.1	24.7	13.5	19.1
	1980-1989	6.6	-8.5	4.8	-3.5	-1.5	-9.8
	1990-1999	3.0	5.0	3.6	4.8	0.7	1.9
	2000-2005	2.3	21.7	3.8	6.5	1.5	4.3
	1973-2005	4.5	6.5	7.3	6.8	2.9	2.4
UAE	1973-1979	20.8	8.0	7.6	13.0	-11.1	-5.7
	1980-1989	5.6	-6.1	3.9	-5.0	-1.5	-10.4
	1990-1999	7.4	0.2	4.8	5.1	-2.3	-2.0
	2000-2005	7.7	16.5	8.0	8.6	0.6	1.1
	1973-2005	9.7	2.8	5.6	4.1	-3.2	-4.7

Table 2: Percentage of Foreigners in the GCC Labor force

	1975*	1985*	1997*	2000 **
Kuwait	70	82	84	81.3[+]
Qatar	82	82	82	81.6
Oman	37	51	55	64.3
KSA	43	72	64	55.8
UAE	85	91	90	89.8
Sources: * (Kapizewski, 2001), ** (Shah, 2005), + 2004 statistic				

Table 3: Cross Sectional correlation, Pesaran Test (2004)

Panel a					
Oil Exports			**CD=6.03***		
	Kuwait	Oman	Qatar	KSA	UAE
Kuwait	1				
Oman	0.11	1			
Qatar	0.17	0.53	1		
KSA	-0.11	0.49	0.39	1	
UAE	0.00	0.80	0.53	0.50	1
Panel b					
NGDP			**CD= 1.07**		
	Kuwait	Oman	Qatar	KSA	UAE
Kuwait	1				
Oman	0.45	1			
Qatar	-0.01	0.04	1		
KSA	0.01	-0.07	-0.15	1	
UAE	-0.03	-0.14	-0.10	0.60	1
Panel c					
GCF			**CD = 0.46**		
	Kuwait	Oman	Qatar	KSA	UAE
Kuwait	1				
Oman	0.30	1			
Qatar	0.05	0.14	1		
KSA	-0.14	-0.09	-0.12	1	
UAE	-0.07	0.02	-0.22	0.40	1
Panel d					
Productivity			**CD = 0.95**		
	Kuwait	Oman	Qatar	KSA	UAE
Kuwait	1				
Oman	0.38	1			
Qatar	-0.14	0.05	1		
KSA	0.25	0.37	-0.15	1	
UAE	-0.14	-0.23	-0.04	0.19	1
Panel e					
GCF per worker			**CD = -0.19**		
	Kuwait	Oman	Qatar	KSA	UAE
Kuwait	1				
Oman	0.01	1			
Qatar	0.14	0.13	1		
KSA	-0.18	-0.12	-0.08	1	
UAE	-0.18	-0.02	-0.18	0.37	1

Table 4: Common Factors Tests (BIC_3)

	Common factors
Oil Export Revenues	1
NGDP	0
GCF	0
Productivity	0
GCF / W	0

Table 5: Unit Root Tests

		Oil Export	NGDP	GCF	Productivity	GCF /W
IPS(2003)	t-bar	-0.75	-2.71*	0.18	-1.76*	0.09
	t-bar demeaned	-3.89*	-3.25*	-3.601*	-5.02*	-0.98
Moon-Perron (2004)	t_a^*	0.29	---	---	---	---
	t_b^*	12.4	---	---	---	---
Bai and Ng (2004)	$P^c_{\hat{E}_t}$	3.19*	---	---	---	---
	$ADF^c_{\hat{F}}$	0.38	---	---	---	---
ILT(2005)		---	0.64	-1.48	-2.00*	-0.82
Pesaran (2007)	CIPS	-2.70*	---	---	---	---
* reject the null of unit root						

Table 6: Cointegration Tests

	Test	No trend	With trend
Pedroni's	Panel-v	2.07	0.43
	Panel-ρ	-2.97*	-1.44**
	Panel-t	-2.59*	-1.63*
	Group-ρ	-1.72	-0.35
	Group-t	-1.85*	-0.54
Westerlund's	DH_p	216.2*	21.99*
	DH_g	42.9*	28.06*
*(**) rejects the null of no cointegration at 5% (10%) level.			

Table 7: Correlation between productivity and labor force variations

Country	Kuwait	Oman	Qatar	KSA	UAE
Correlation	-0.51*	-0.01	-0.23**	-0.25**	-0.24**
* (**) correlation negatively significant at 5% (10%) level					

Figure 1: Oil Exports / GDP ratios in GCC countries

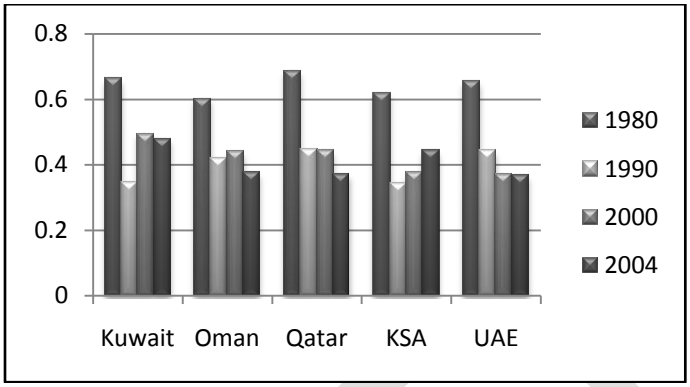
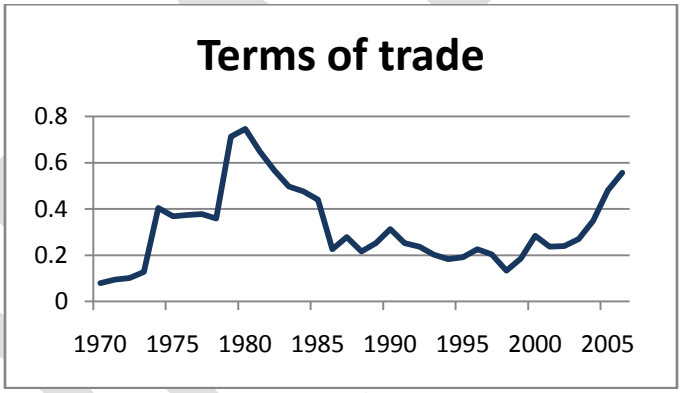


Figure 2: Terms of Trade: Price of Oil / US CPI*



*The US price level is taken as a a proxy for import prices.

Figure 3: Oil Exports Revenues, NGDP, Productivity, and Investment in the GCC Countries

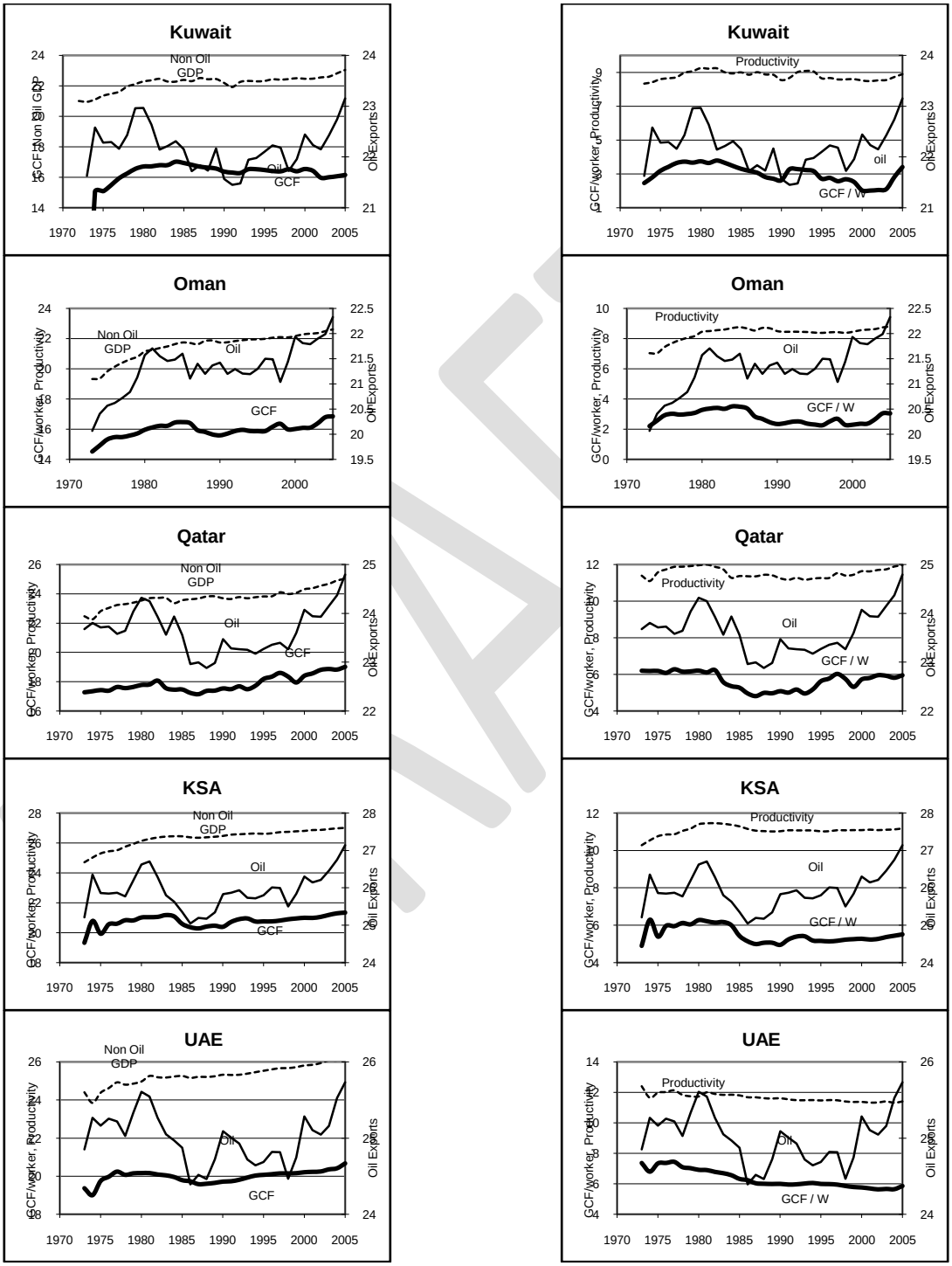
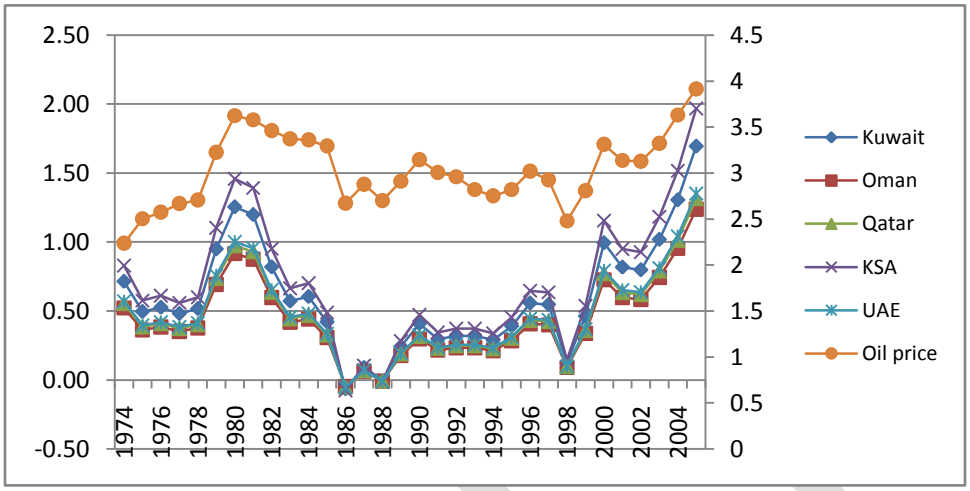
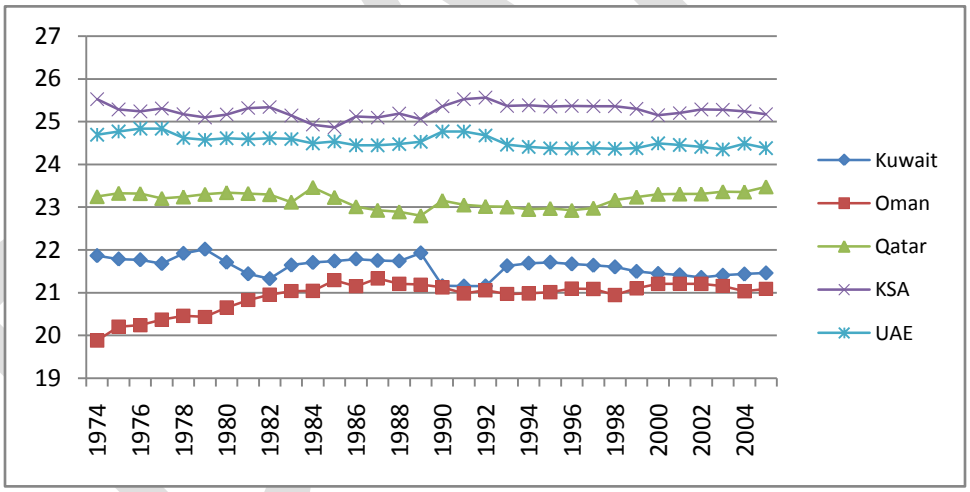


Figure 4: Estimated Common and Idiosyncratic Factors



a: Estimated Common Factors



b: Estimated Idiosyncratic Factors

Figure 5: Response of NGDP and GCF to One S.D. in OER Common Factor Innovations

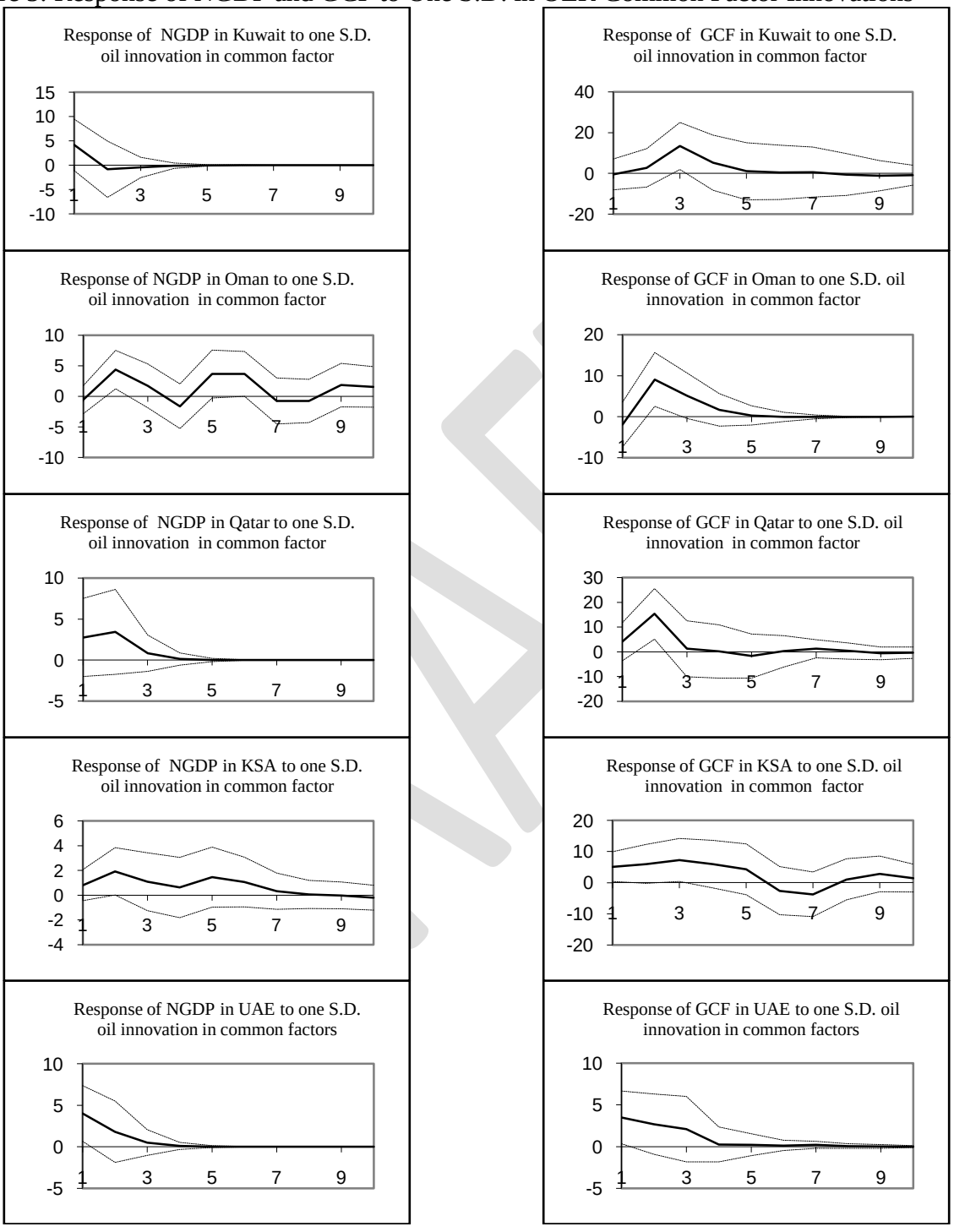


Figure 6: Response of Productivity and GCF/W to One S.D. in OER Common Factor Innovations

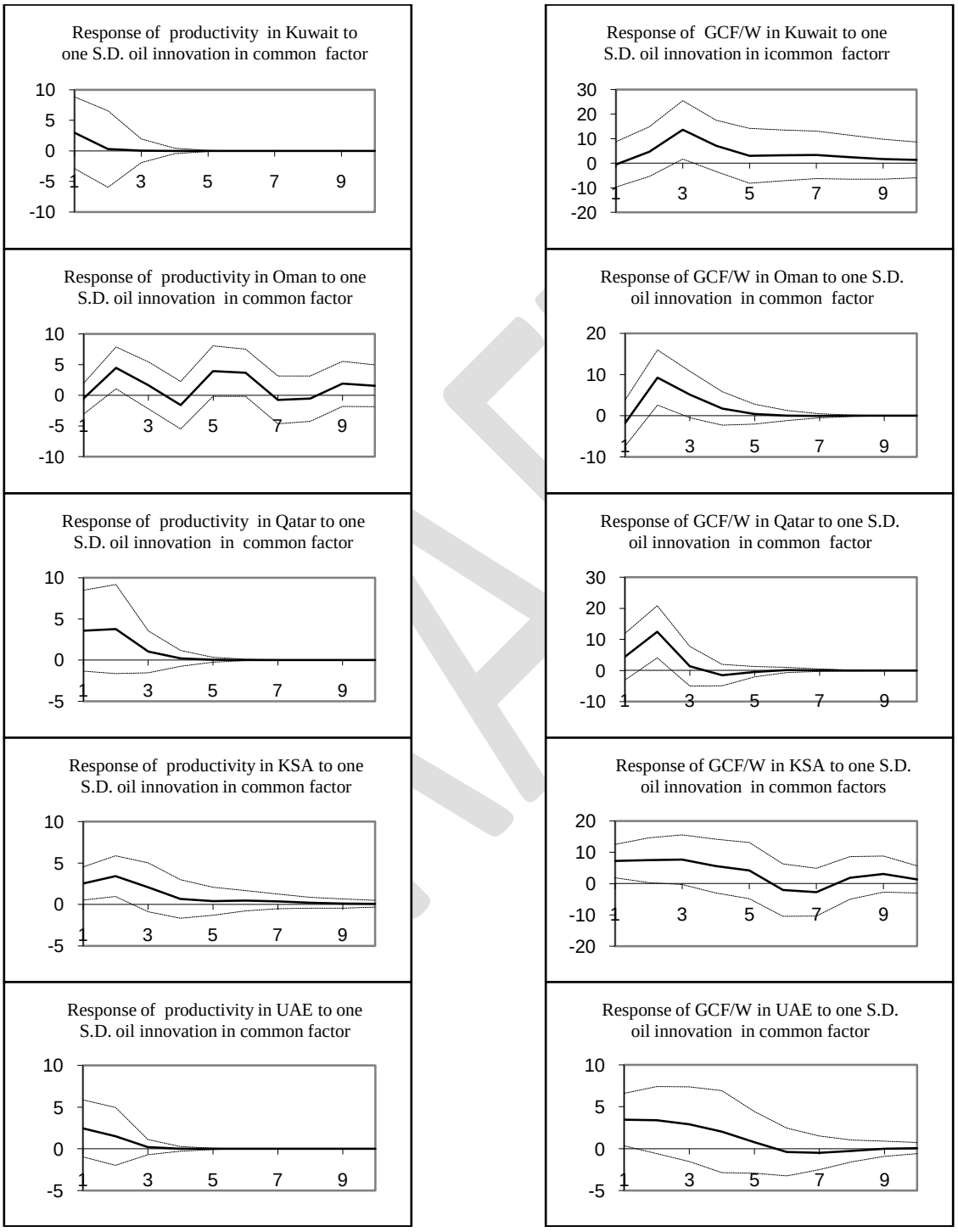


Figure 7: Response of NGDP and GCF to One S.D. in OER Idiosyncratic Factors Innovations

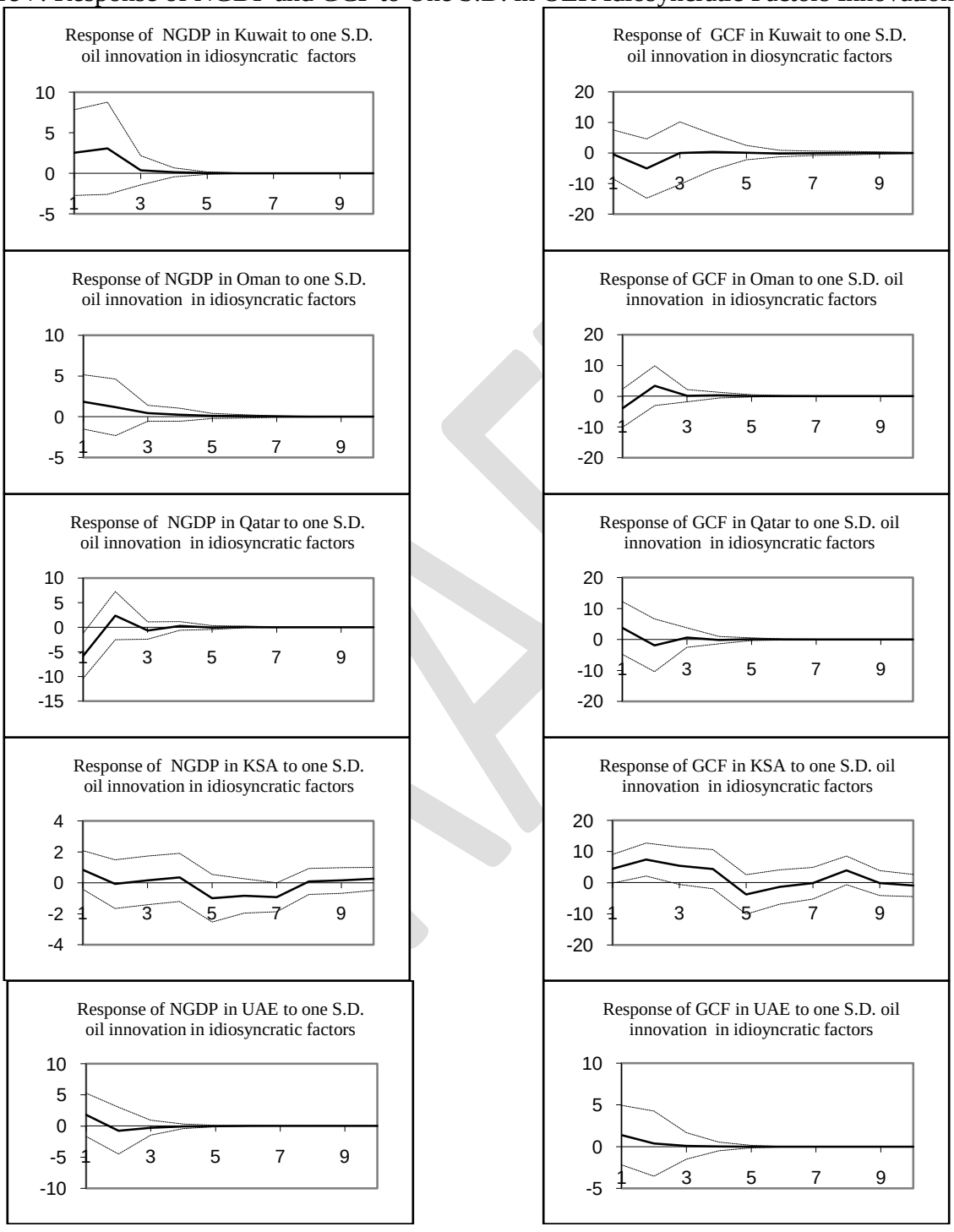
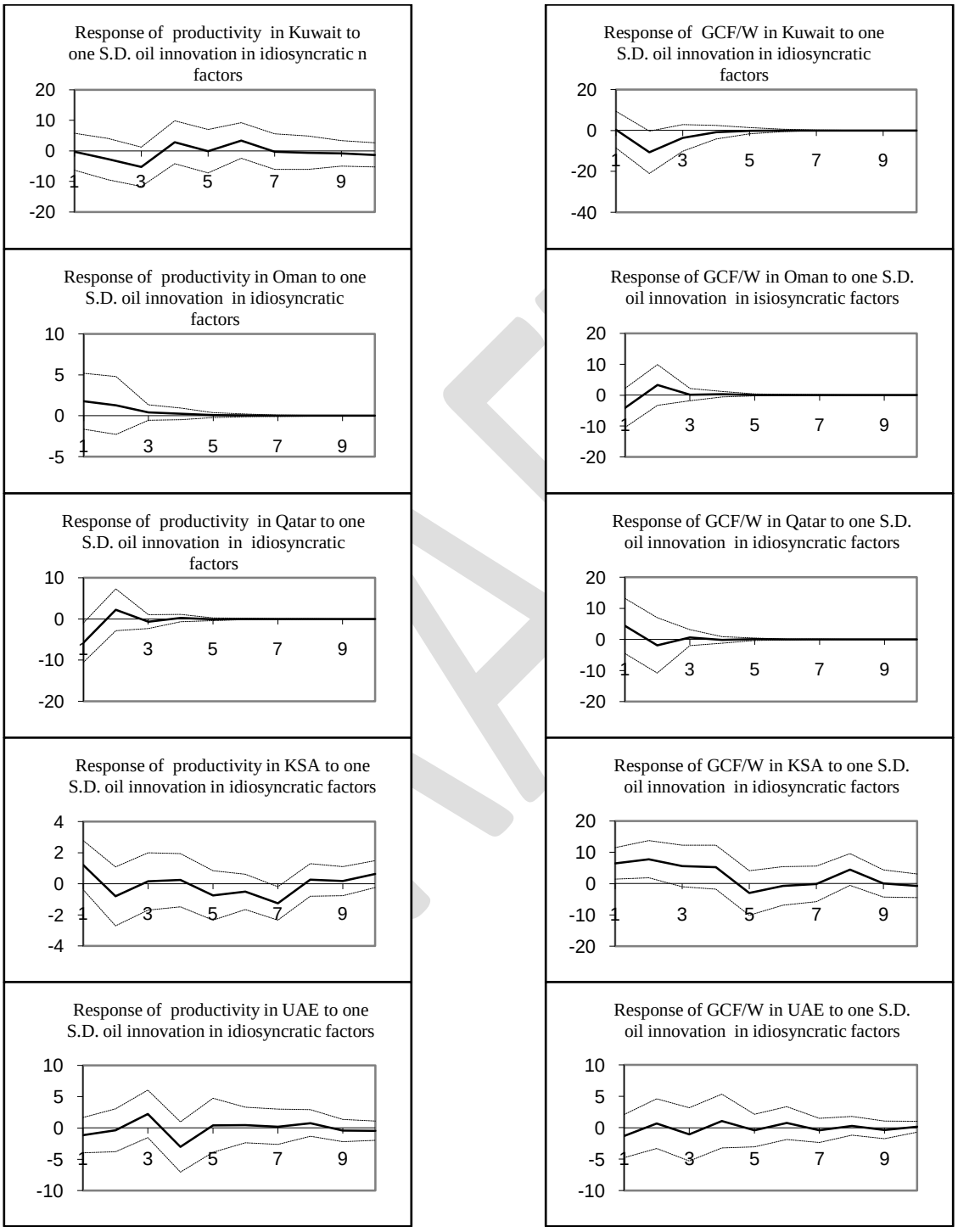


Figure 8: Response of Productivity and GCF/W to One S.D. in OER Idiosyncratic Factors Innovations



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