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Do Oil-Rich GCC Countries Finance US Current Account Deficit

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ABSTRACT

Given the secrecy that wraps the flows of the GCC countries' petrodollar surpluses to the United States and the pressures on these countries to spend and recycle more, this study attempts to uncover the direct and reverse causal relationships between the GCC financial accounts and the US current account deficit. It examines whether the GCC petrodollar surpluses are part of the global savings glut (an external factor) that causes the US current account deficit, or on the contrary this deficit is home-grown and the petrodollar savings glut hypothesis does not hold. It particularly focuses on the world's largest oil exporter to find out if the homegrown deficit hypothesis for the world's largest oil consumer holds. It also investigates which types of investments or components of GCC financial accounts help cause the US deficit the most. The implications and policy recommendations for this growing source of global external imbalances are also provided

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1. Introduction

The member states of the Gulf Cooperation Council (GCC), namely Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates (UAE) have a collective GDP of about $750 billion in 2006, making them the 16 th largest economy in the world just below Australia.[1] In 2007, their GDP is estimated to 900 billion dollars. They share common economic, financial, oil and political characteristics. They are currently members of a common market and they aspire to be a monetary union with a common currency and a joint central bank in the near future. Most of these members, which have special relations with the United States, are oil-exporters with vast amounts of oil reserves. They use oil exports to finance their economic growth and prosperity. These countries, however, have limited absorptive capacity as manifested by the accumulation of mammoth foreign assets, reaching about $804 billion in 2004 (Lane and Milesi, 2006), and currently about $1,600 billion in 2007, representing 225 percent of their collective total gross domestic product.[2] These assets are estimated to approach two trillions in 2008, and expected to become about $3 trillion by the end of this decade, necessitating the need for finding safe and profitable places elsewhere for investing those petrodollar surpluses. The GCC countries have complete capital mobility but they still have strong clinging restrictions on their stock markets and banking systems, which limit the sophistication of their financial systems and the pace of their economic developments, and contribute to the accumulation of foreign assets.

The current account surpluses make these countries major net lenders on the capital account. The United States, which is a big recipient of their petrodollars and has had a huge current account deficit

[1] http://en.wikipedia.org/wiki/List_of_countries_by_GDP_%28nominal%29
[2].China's corresponding foreign assets amount to $1,000 billion in 2006, representing 42 per cent of its GDP. http://www.zawya.com/Story.cfm?id=ZAWYA20070606033334&Section=Markets&page=Money&l=033300070606

every year except one since 1982 (see Figure 1), is a major borrower on the current account.[3] A recent study by International Institute of International Finance (IIF) estimates that 55% of the GCC petrodollar surpluses, accumulated during the period 2002-2006, has been invested in the United States, 18% in Europe, 10% stayed in the Middle East, 10% in Asia and the rest went to other countries. But the US official record seems to under-report those investments, which is not the case for the US investment of the North Sea oil-exporting country, Norway (Setser and Ziemba, 2007). This point makes it necessary to use time series techniques to uncover the "secrets" of the GCC investments in the United States, as well as to shed the light on the causes of the US current account deficit when it comes to the petrodollar savings of the major oil-exporting countries.

The GCC countries may reap important financial benefits from financing the US current account deficit. The oil barrel is priced in the US dollar, and thus financing the US current account amounts to some extent to supporting the dollar. A strong dollar is important for the GCC countries because it determines the purchasing power of their oil revenues which are used in importing more goods and services from the Japan and EU zones than from the United States. The share of aggregate GCC imports of their total imports is 25% from the EU bloc and 6.5% from Japan, compared to 9.2% from the United States in 2005 (Eleisa and Hammoudeh, 2007). Furthermore, the GCC countries have complete capital mobility and peg their currencies to the dollar. A stable dollar brings forth to the GCC economies all the benefits associated with a stable exchange rate. However, precipitous dollar depreciation could have a possibly devastating consequence on their dollar peg, their economies and those of other developing countries.[4] Moreover, putting economic, political and diplomatic risks aside,

[3] The US current account deficit reached more than $800 billion at the end of 2006, representing 6.5% of GDP (see Fig. 1, and WSJ, June 16-17, 2007, A 4).
[4] For more information, see Obstfeld and Rogoff (2004) and Roubini and Setser (2004)

the GCC countries are criticized by their fellow Arab and Moslem countries for investing most of their savings in an unfriendly superpower instead of investing them in their countries.[5]

In light of the above special economic, exchange rate and oil characteristics and political considerations it will be interesting to examine the relationship between the financial accounts of these oil-exporting countries and the current account of the United States, the world's largest net borrower on capital account. We will concentrate on two issues: 1) is the US current account caused by external factors and if so, does the petrodollar savings glut of the oil exporters contribute to that?; 2) Is the US current account deficit home-grown and is not caused by the savings glut of the oil exporters? The results should provide unavailable information to the world community on the causes of the US current account deficit from the point of view of the oil-exporters and their petrodollars. They will also provide useful information to the GCC countries on their involvements in supporting the US dollar as an anchor of their currencies, and to the Arab and Moslem countries on diversion of the GCC investments outside the Greater Middle East region.

The academic literature neglects to investigate the role of the oil-exporting countries to help cause the US current account deficit and to be a growing source of global "saving glut" and external imbalances. The literature gives adequate attention to different sources that explain the US record deficit and the global imbalances but not to the petrodollar surpluses. Bems et al. (2007) identify five shocks related to technology and policy that stand in their views as the suspects behind the deteriorations of the US current account. Gruber and Kamin (2007) give several explanations for the US current account deficit and the external account surpluses of the Asian developing countries. Devereux and Genberg (2007) compare the impacts of Asian exchange rate appreciation with fiscal adjustment on the US current account deficit correction. They note that there may be a welfare conflict

[5] Institute of International Finance (IIF) grades the economic, political and diplomatic risks in the Arab countries as Medium, Medium and High (Handy and Reeve, 2007).

between regions on the best way to achieve the adjustment. Chinn and Ito (2007) assess key assertions that underline the global saving glut hypothesis. They contend that the US current account behavior is borderline anomalous. On the other hand, the East Asian developing countries would have smaller current account surpluses if they have more developed financial markets and legal systems, and greater domestic investment.

Our focus in this paper is on the role that the major-oil exporting countries of the GCC region play in causing the US current account deficit if their petrodollar surpluses are part of the global "saving glut". The US government statistics do not show adequately the flows of their surpluses to the United States.[6] We also pay ample attention to the types of investments the individual GCC countries use to "cause", if so, the US current account deficit as much as the data allow. To our knowledge, no academic research has been done on this subject and there is a current need to fill this gap. In a series of VARs, we seek to discern if any of the six GCC countries' financial accounts cause the US current account deficit by examining the causal relation between the two accounts. We will also use multivariate models to test the causal account relationships. Finally, we will also use a four-variable VAR that includes the financial components of the GCC financial accounts to detect whether any of these components are part of the "saving glut" and help cause or finance the US current account imbalance.[7] In general, the foreign direct investment (FDI) component of a financial account is considered to be stable, while the portfolio investment component is known to be volatile. It will be interesting to find out if any and which one of these components causes the US current account. This finer knowledge has important implications for the GCC, the US and the world community in the future.

[6] GCC investors quite often use financial intermediaries based in the United Kingdom to buy US securities anonymously. See Toloui (2007)

[7] For more information on the relationship between current accounts and financial accounts of developed and non-GCC developing countries see Yan (2007).

This paper is organized into six sections. After this introduction, Section 2 presents the balance of payments accounting. Section 3 provides the empirical methodology and Section 4 discusses the results. Section 5 examines the impulse function response. Section 6 concludes the paper and provides policy implications.

2. Balance of Payments Accounting

The basic identity for a balance of payments is written as:

Current account + capital account + statistical discrepancy = 0.

If the statistical discrepancy is zero, then a deficit (surplus) in the current account is matched by a surplus (deficit) in the capital account. A country that has a surplus (deficit) in the capital account like the United States (GCC country) has a deficit (surplus) in the current account. A surplus (deficit) in the capital account implies that the country is a net debtor (lender) to the rest of the world. Based on this framework, the United States is a net debtor and most of the GCC countries are net lenders. If the statistical discrepancy is set equal to zero, then above identity can be rewritten as

$$CA + FA + OSA = 0,$$

or

$$CA + (FDI + PI + OI) = OSA$$

where *CA* is the capital account, *FA* is the financial account and *OSA* is the official settlement balance which is a balancing residual in this identity and the IMF refers to it as the "overall balance". Most of the GCC countries surpluses are from oil exports and belong to their governments. They use state-owned wealth funds (SWF) to channel those petrodollar surpluses to foreign private investors, which in

turn place them in appropriate venues. Thus, the line is blurry between GCC financial accounts and their OSAs. The components of the financial account include foreign direct investment (*FDI)*, portfolio investment (*PI*) (mainly equities and bonds), and other investments (*OI*) (mostly bank loans). *FDI* is usually considered to be stable, while *PI* and *OI* are viewed to be volatile. These components may move independently or interdependently from each other in the sense that they can be complementary or substitutable to each other.

The above framework for a given country includes ex post accounting identities and does not provide causal relationships between the current and capital accounts or between the current account and the financial account or its components, despite the fact that the capital or financial account is considered to finance the current account for that country. In this paper, we examine a group of developing countries that have common special characteristics which made them net lenders to developed countries, particularly, the United States. In light of the recent announcement on the relevance of the global "savings glut" to the US current account deficit, the causal relationship that is of interest to us is not the relationship between own current account and own capital or financial account for a certain oil-based GCC country or the United States but the relationship between the individual GCC countries' capital or financial account and the world largest debtor's current account. When oil export revenue, which is denominated in US dollar, flows into a GCC country's current account, part of this revenue will go to that country's official settlement balance and will be monetized, the remaining part depending on the size of the oil revenue will go largely to the three components of the financial accounts of the most developed countries, particularly, the United States. Greater demand for US assets pushes down their yield, and lower borrowing costs induce more borrowing, whether for consumption or investment. The ensuing expansion in US economic activity would increase inflation and appreciate the US real exchange rate (RER), contributing to the deficit in the US current account.

In this case, the individual GCC country's current account drives the U.S. capital (financial) and current accounts. But this relationship could be formed the other way and be demand-induced where the GCC petrodollars could initially have been originated in the United States and transferred to the GCC countries as a result of spending. The U.S consumes 25% of the world's oil production, and Saudi Arabia used to be the top oil-exporter to the U.S., and now is the second after Canada. In this case, the US current account deficit pushes or "causes" the GCC financial accounts.

There is no direct literature on the subject matter of this paper. However, there are studies that examine the impact of capital flowing in the United States on the US current account deficit. Cooper (2001, p. 218) argues that "the U.S. deficit is financed by net capital inflows only in an ex post accounting sense. In economic terms, it is more nearly correct to say that net capital inflows cause the current account deficit." However, Poole (2001) posits that changes in the financial account originated from overseas have been driving the changes in the US current account for many years. In this paper, we will examine different models to test this causal relationship to ascertain whether the petrodollars are part of the global "savings glut" that helps cause the US current account deficit or the US deficit is home-grown and is just attracting foreign funds.

3. The Empirical Method

We will examine several causal relationships between a GCC country's financial account and the U.S. current account defined as shares of respective GDPs, subject to data availability. We use the Toda and Yamamoto (TY hereafter) approach (Toda and Yamamoto, 1995) in our analysis. This approach offers potential solutions to the methodological problems listed in Stern (2004). The TY procedure does not require prior knowledge on cointegration and, therefore, avoids the pre-test bias. It can be employed for any arbitrary level of integration of the series used. Since the GCC financial

accounts' and US current account's variables in the VARs are expressed as ratios of the respective country's GDP, they turn out to have mixed degrees of integration. Finally, the TY approach involves a VAR in levels, and thus, there is no loss of information due to differencing.

The procedure relies on the knowledge of the maximum order of integration, d_{max}, and the optimal lag length, k. In order to determine the order of integration for the variables employed, we utilized the augmented Dickey and Fuller (1979), and Phillips and Perron (1988) unit root tests, referred to as ADF and PP tests. We consult the likelihood ratio test (LR), Akaike information criterion (AIC), Schwarz information criterion (SIC), Hannan-Quinn (HQ) information criterion, and final prediction error (FPE) to determine the optimal lag length k. The ADF and PP tests suggest similar degrees of integration for each series employed. However, the suggested optimal lag length for VAR system changes when different criteria are used. In this case, we will choose the estimated VARs that meet the most criteria for optimal lag length. A Wald test is conducted on the first k parameters of the augmented VAR($k+d_{max}$) model and the statistic follows an asymptotic Chi-square distribution with k degrees of freedom ($\chi^2(k)$).

3.1. Model 1: Causality between GCC FA and US CA

In this subsection, we use a simple bivariate VAR system to test the Granger non-causality between the GCC countries' financial accounts and the U.S. current account. As indicated above, the line is blurry between the GCC financial accounts and the residual OSA. The null hypotheses of the Granger non-causality are from *GCC FA* to *US CA* and/or from *US CA* to *GCC FA*. These hypotheses can be represented by the VAR

$$CA^{US}_{\ t} = \alpha_1 + \Sigma_k^{k+dmax} \beta_{1k} FA^{GCC}_{\ t-k} + \Sigma_k^{k+dmax} \gamma_{1k} CA^{US}_{\ t-k} + u_{1t} \qquad (1)$$

$$FA^{GCC}{}_t = \alpha_2 + \Sigma_k^{k+dmax}\beta_{2k}FA^{GCC}{}_{t-k} + \Sigma_k^{k+dmax}\gamma_{2k}CA^{US}{}_{t-k} + u_{1t}$$

where FA^{GCC} stands for the financial account of *each* of the six GCC countries, CA^{US} represents the US current account, k shows the lag order selected, d_{max} represents the extra lags opted for all the variables in Eqs. (1), and FA^{GCC} and CA^{US} are measured as percentages of their respective GDPs. The rejection of the Granger non-causality hypotheses from $FA^{GCC}{}_{t-k}$ to $CA^{US}{}_t$ and/or from $CA^{US}{}_{t-k}$ to $FA^{GCC}{}_t$ implies that $\beta_{1k} \neq 0$ and/or $\gamma_{2k} \neq 0$, respectively, or past FA^{GCC} predicts current CA^{US} or vice versa. More generally, the rejection of the non causality from past FA^{GCC} to current CA^{US} implies that a GCC country's *FA* petrodollars are part of the global "savings glut" that causes the US current account deficit. In this case the US current account is caused by an external factor. If a GCC's financial account is in surplus and the US current account is in deficit, as has been the case for years, the direct causality relationship may suggest that the financial account for a certain GCC country finances the subsequent US deficit. The rejection of the reverse non causality from past CA^{US} to current FA^{GCC} implies that the US current account is homegrown and is not caused by the "petrodollars savings gluts". This case is relevant to the US oil imports which are part of its consumption of one quarter of World's oil production. Thus, a major exporter like Saudi Arabia has to respond to the US imports' needs.

3.2. Model 2: Simple Causality Test among GCC FA, US CA and US ER

The specification in Eqs. (1) of Model 1 may suffer from the omitted variable phenomenon, and structurally does not include a link or a mechanism that allows a GCC *FA* savings to cause US *CA* or be caused by a homegrown deficit in the United States while letting the US dollar correct the US imbalances. Therefore, we first augment the causality test of Model 1 to include the trade-weighted

dollar real exchange rate as a link between the two accounts.[8] An appreciation of the US real effective exchange rate leads to increases in imports and decreases in exports, worsening deficit in the US current account and vice versa. This deficit is usually financed by foreign countries' private and public savings including those of the GCC countries. Thus, the above model can be expanded to include the US real effective exchange rate as follows.

$$CA^{US}{}_t = \alpha_1 + \Sigma_k^{k+dmax}\beta_{1k}FA^{GCC}{}_{t-k} + \Sigma_k^{k+dmax}\gamma_{1k}CA^{US}{}_{t-k} + \Sigma_k^{k+dmax}\lambda_{1k}E^{US}{}_{t-k} + u_{1t}$$

$$E^{US}{}_{t} = \alpha_2 + \Sigma_k^{k+dmax}\beta_{2k}FA^{GCC}{}_{t-k} + \Sigma_k^{k+dmax}\gamma_{2k}CA^{US}{}_{t-k} + \Sigma_k^{k+dmax}\lambda_{2k}E^{US}{}_{t-k} + u_{2t}$$

$$FA^{GCC}{}_t = \alpha_3 + \Sigma_k^{k+dmax}\beta_{3k}FA^{GCC}{}_{t-k} + \Sigma_k^{k+dmax}\gamma_{3k}CA^{US}{}_{t-k} + \Sigma_k^{k+dmax}\lambda_{3k}E^{US}{}_{t-k} + u_{3t} \quad (2)$$

where E^{US} is the trade-weighted dollar exchange rate. All the other variables in Eqs. (2) are also measured as percentages of their respective GDP as in Eqs. (1). The direct and reverse causalities can be tested as is the case in model.

3.3. Model 3: Causality among US CA, GCC FA and GCC Oil Production

Model 3 is a variant of Model 2 and also augments Model 1 to deal with the omitted variables phenomenon. It replaces the US exchange rate included in Model 2, which has most of its relevance and impact related to the United States' side of the model, by the GCC countries' oil production index. Oil production is a mechanism that links the GCC oil exports on the current account to the generation of petrodollar surpluses on the financial account, which in turn could cause changes in the US current account deficit. The equations of Model 3 are similar to Eqs. (2), with the modification that current and lagged US exchange rates are replaced by the GCC oil production index, and thus are

[8] We can not use the individual dollar/GCC exchange rates because all the GCC currencies are officially or effectively pegged to the US dollar, and thus maintain fixed relationships.

not stated here. Thus, Model 3's VAR equations are for *US CA*, *GCC FA* and *GCC oil index*; replacing the *US ER* equation in Eqs. (2) of Model 2 by the new GCC oil production equation, while accounting for the appropriate lagged variables. What makes this model different from the two previous ones is that the presence of GCC oil production in the model gives ample opportunity for the homegrown hypothesis to hold, given the fact that the United States consumes one fourth of world's oil production and imports are half of that. The United States imports a good amount of oil from Saudi Arabia. It will be interesting to find out if the homegrown hypothesis holds in the case of the world's major oil exporter.

3.4. Model 4: VAR between US CA, GCC FA, US ER and GCC Oil Production

This four-variable VAR represents more realistically the structures of the US and GCC economies by combining both the US dollar exchange rate and the individual GCC oil production of the two previous models in one expanded system. The objective in this model is to test if more GCC countries petrodollar saving glut causes the US deficit or this deficit is homegrown and is not caused by external factors while allowing accounting for both the US exchange rate and the GCC individual country's oil production. The VAR equations for this model are for the variables *US CA*, *GCC FA, US ER* and *GCC oil index*. One more equation representing the GCC oil production is added in this model than in the equations provided in Eqs. (2) of Model 2, while accounting for the adjustments in the past variables. The same question that was raised in the previous model regarding whether the homegrown hypothesis holds in this model for the world's largest oil exporter, Saudi Arabia is still valid.

3.5. Model 5: VAR between US CA and GCC FA's Three Components

This system is also a four-variable VAR that includes the U.S. current account CA^{US} and the three components (DI^{GCC} for FDI, PI^{GCC} for portfolio investment *and* OI^{GCC} for other investments) of

the individual GCC country's financial account. The idea here is to test within the global saving glut hypothesis if any of the GCC country's financial account components would be an external factor that causes the US current account deficit. The reverse causality in this case would be to test which one of the GCC financial account components is pulled to satisfy the homegrown US deficit. Model 5 is defined by:

$$CA^{US}_{t} = \alpha_1 + \Sigma_k^{k+dmax} \beta_{1k} DI^{GCC}_{t-k} + \Sigma_k^{k+dmax} \gamma_{1k} PI^{GCC}_{t-k} + \Sigma_k^{k+dmax} \eta_{1k} OI^{GCC}_{t-k} + \Sigma_k^{k+dmax} \lambda_{1k} CA^{US}_{t-k} + u_{1t}$$

$$DI^{GCC}_{t} = \alpha_2 + \Sigma_k^{k+dmax} \beta_{2k} DI^{GCC}_{t-k} + \Sigma_k^{k+dmax} \gamma_{2k} PI^{GCC}_{t-k} + \Sigma_k^{k+dmax} \eta_{2k} OI^{GCC}_{t-k} + \Sigma_k^{k+dmax} \lambda_{2k} CA^{US}_{t-k} + u_{2t}$$

$$PI^{GCC}_{t} = \alpha_3 + \Sigma_k^{k+dmax} \beta_{3k} DI^{GCC}_{t-k} + \Sigma_k^{k+dmax} \gamma_{3k} PI^{GCC}_{t-k} + \Sigma_k^{k+dmax} \eta_{3k} OI^{GCC}_{t-k} + \Sigma_k^{k+dmax} \lambda_{3k} CA^{US}_{t-k} + u_{3t}$$

$$OI^{GCC}_{t} = \alpha_4 + \Sigma_k^{k+dmax} \beta_{4k} DI^{GCC}_{t-k} + \Sigma_k^{k+dmax} \gamma_{4k} PI^{GCC}_{t-k} + \Sigma_k^{k+dmax} \eta_{4k} OI^{GCC}_{t-k} + \Sigma_k^{k+dmax} \lambda_{4k} CA^{US}_{t-k} + u \quad (3)$$

where GCC stands for each of the individual GCC countries as indicated above, and *DI*, *PI* and *OI* are the three components foreign direct investment, portfolio investment and other investments, respectively, of a GCC country's financial account and are considered as shares of GDP.

4. Empirical Results

The correlation coefficient matrix in **Table 1** displays the contemporaneous correlations between the United States' share of its current account in its GDP and the shares of the individual GCC

countries' financial accounts in their respective GDPs. This matrix shows that all GCC countries' financial accounts have a positive correlation with the current account, with the exception of that of Qatar. Interestingly, Oman has the highest correlation followed by Bahrain. This result implies that in the short-run an increase in the US current account deficit is associated with an increase in the financial accounts of most GCC countries and vice versa. This paves the way to test the causal relationships between these accounts.

We will use the modified Wald test to discern the significance of the causal relationships in the systems presented above.

Model 1:

This model is a bivariate VAR that includes only the GCC individual country's financial account (FA^{GCC}) and the US current account (CA^{US}). The estimates of Model 1 suggest that there are uni-directional causalities from the individual financial accounts of Kuwait, Qatar, and Saudi Arabia to the US current account deficit (see **Table 2**).[9] There are however no causal relationships from any direction in the case of Bahrain, Oman and UAE.[10] The non- causality is understandable for Oman which is a minor oil producer and exporter, and thus is not a member of OPEC. The Institute of International Finance (IIF) estimates Oman's accumulated foreign assets up to 2006 to be a meager $10 billion (Handy and Reeve, 2007). It is also understandable for the small three-island kingdom of Bahrain, which is a refining center and is not a real oil producer and does not have any significant petrodollar surpluses of its own. The IIF estimates Bahrain's foreign assets since its independence in 1971 to be $20 billion (Handy and Reeve, 2007). Bahrain however receives capital inflows from its GCC neighbors, particularly, Saudi Arabia, and serves as an international offshore financial hub.

[9] The Institute of International Finance (IIF) estimates that nearly 98% of GCC's $1,550 combined foreign assets in 2006 belongs to four countries: United Arab Emirates, Saudi Arabia, Kuwait and Qatar (Handy and Reeve, 2007).
[10] Oman is excluded based on our adopted rule that we select the relationships that satisfy the most lag selection criteria.

Surprisingly, causal relationships do not also exist in the case of the United Arab Emirates which has accumulated foreign assets of about $600 billion in 2006. Only one of the seven-emirate confederation is a major oil producer and this emirate, Abu Dhabi, invests some within and more in large countries in South East Asia and Europe (Fasano, 2002).[11] The second largest UAE emirate, Dubai, serves as world tourist attraction center and tourism makes 70% of its income. This investment pattern for UAE emirates has started to change since 2007 as the government-owned wealth funds of Dubai and Abu Dhabi have opted to invest more in companies in the United States. However, UAE is still sensitive to political backlash after the Dubai's World Ports failed to invest in US ports.

Overall, in Model 1 we can say that most of the highly petrodollar endowed GCC countries Granger-causes the US current account. These direct causality results imply that the GCC petrodollars savings glut causes the US current account deficit. The test shows no reverse causality is coming from the US current account to any of the GCC financial accounts, demonstrating that the US current account is not homegrown. Thus, we can conclude from Model 1 that when it comes to the petrodollar surpluses, the US current account is caused by an external source. But we should qualify this result until we research the results of the highly expanded model, Model 4. In absence of detailed and accurate anecdotal bilateral data on direction of GCC foreign investment destinations, this empirical finding implies that the GCC countries at the aggregate account level may help finance the US current account deficit. This result is consistent with IIF's assertion that 55 percent of the GCC foreign assets is invested in the United States.[12]

[11] The UAE's growing preference for investing in emerging markets was revealed by Abu Dhabi Investment Authority (ADIA) in April 2006. See Euromoney "Money and Mystery: ADIA Reveals its Secrets." http://www.euromoney.com/article.asp?PositionID=2195&ArticleID=1018077

[12] Howard Handy, "Tracking GCC Petrodollars: How and Where they are Being Invested around the World, "Institute of International Finance, paper presented in a joint press conference in Kuwait in June 2007.

Model 2:

This trivariate VAR includes the GCC individual country's financial account (FA^{CC}) and US current account (CA^{US}) of Model 1, and additionally the US exchange rate (E^{US}) as the third variable. As indicated in the previous section, the exchange rate can be considered a link mechanism that overweighs the United States' side in this model and may provide an option (if significant), that is dollar depreciation, for dealing with the US current account deficit. The US exchange rate is intended to link the US current account with international trade and financial shocks including those coming from the GCC countries. Overall in this model, we test direct causality for the petrodollar savings glut hypothesis and the reverse causality for the homegrown deficit hypothesis, while allowing the US dollar to play a corrective role.

In contrast to Model 1, the first result of this model seems to underline a corrective role for the dollar to make adjustment in the US current account deficit (see **Table** 3). The second result shows no reverse causality; implying and supporting the result of Model 1 that the US current account deficit is not homegrown even in this case if the corrective role of the dollar is accounted for. The third result suggests there is also strong evidence that the dollar Granger-causes the financial accounts of all GCC countries, with the exception of Oman. This result reflects the effective peg between the GCC currencies and the US dollar, the denomination of most GCC foreign assets in the US dollar and the pricing of oil exports in the US dollar.

As far as our goal in this paper, we can conclude from the results of Model 2 that in presence of the petrodollar surplus, dollar depreciation is a vital approach to correct the US external imbalances. The anecdotal evidence points to this direction. The US deficit has started to narrow as the dollar continues to fall, dropping from 6.8 percent of GDP in the fourth quarter of 2005 to 5.1 percent at the end of the third quarter of 2007. The conclusion is reinforced by the fact that the GCC countries have

limited absorptive capacity to spend more within, and the petrodollar surpluses have resulted from higher oil prices and have to be placed abroad. The dollar influences the placements of the petrodollar overhang.

Model 3:

As indicated before, this model is a variant of Model 2. It replaces the US effective exchange rate by the individual GCC countries' oil production index. In contrast to Model 2, the transmission mechanism in this model works on the GCC oil side. The GCC countries produce oil, most of which turns into exports revenues, a good portion of it flows as a surplus in their current accounts and finally finds its way to state-owned wealth funds (SWF) and private investments. The surplus petrodollars glut looks for an overseas investment harbor, most of which favor the United States, and thus help finance the US capital account.

In contrast to Model 2, the results of this model that includes oil production show that the financial accounts of three GCC countries: Oman, Qatar and Saudi Arabia Granger-cause the US current account, confirming the strong findings of Model 1. The reverse hypothesis does not hold for any of the GCC country including the largest oil exporter, Saudi Arabia. This implies that the US deficit is not homegrown and is caused by and external factors (see **Table 4**).

An interesting byproduct finding of Model 3, which is not part of our major goals of this study, is that for some GCC countries, namely Kuwait, Oman and UAE, the financial account leads oil production, while for others, Qatar and Saudi Arabia, oil production leads the financial account. Given the fact that the financial account is the opposite mirror of the current account, we can then conclude that Kuwait, Oman and UAE's current accounts, which satisfy the need for generating foreign

exchange, lead the GCC oil production and not the other way around. For Qatar and Saudi Arabia, causality which runs from oil production to financial account is more direct and more expected. It is not clear to us in this model whether the homegrown hypothesis plays indirect roles that lead to this distinct pattern of causality between the GCC oil production and the GCC financial accounts. Regardless of the direction of the causal relationships, these findings underscore the fact that those countries' undiversified economies depend largely on oil exports to generate foreign exchange.

Model 4:

Since this model includes both the US exchange rate and the Individual country's oil production index, it includes mechanisms on both sides so no overweighting of any side should bias its structure. The results now show that Oman and Qatar's (but not Saudi Arabia's) financial accounts still Granger cause the US current account deficit (**Table 5**). The US dollar remains the dominant force in this further expanded model, pointing to the importance of the dollar in correcting the imbalance and influencing the GCC financial accounts as in model 2. In this model, only in the case of Saudi Arabia, the world's largest oil exporter, oil production Granger-causes its financial account and the US dollar exchange rate. This underscores the importance of Saudi Arabia in the oil and financial markets. It also points to the strong influence of the dollar on the US current account deficit and GCC financial accounts. Finally, this model answers the pressing question if the homegrown deficit hypothesis holds in the case of any the GCC countries. It shows at the 5% significance level in the case of Saudi Arabia, the largest oil exporter, the reverse causality holds. The United State's huge appetite for oil makes it the largest oil importer which contributes to the deficit in its current account. Therefore, the most expanded Model 4 suggests that the US current account is caused by a mixture of domestic and external factors.

Model 5:

The estimates of the previous models, particularly Model 1, demonstrate that the individual GCC countries' financial accounts at the aggregate Granger-cause the US current account deficit and the petrodollar savings glut is external source of this deficit. However, to address the second goal of this study which aims at discerning what components of the financial accounts may be considered an external source of the US current account, we must examine the estimates of Model 5. We should point out that the estimates of this model do not include Oman and Saudi Arabia because of lack of detailed data on all three components of the financial account. The results suggest that for Bahrain, which is an offshore financial center for the GCC and is well integrated with the world capital markets, only portfolio investment among its three financial account components Granger-causes the US current account and supports the global glut hypothesis (**Table 6**). This implies that Bahrain helps channel the GCC petrodollar savings into US securities. On the other hand, Kuwait and UAE invest their "other investments or *OI*" type in the United States, and thus help fund the US current account deficit in this regard. These "other investments" are US corporate debt, loans and deposits in banks and other financial institutions and are more liquid but also of short-run nature and relatively low return.

It is interesting to note that none of the GCC countries' foreign direct investments (here denoted *DI*) significantly finances the US current account.[13] If we put aside the quality of the data on FDI, this could probably reflect lack of both expertise and confidence in buying US companies and technologies. IIF gives GCC investments in the United States " Low" risk exposure to both economic and political risks but "High" exposure to diplomatic risks which include: asset confiscation or asset freeze following a hostile attack; negative media campaign leading to consumer boycott against GCC

[13] Handy and Reeve (2006) of IIF estimates that Net FDI holdings account for around 15 percent of the GCC's globally total identified asset base in 2006, up from around 11 percent in 2001.

investments; and the US government prevents the purchase of a US firm by a GCC investor. [14] The case of Dubai Ports World (DPW) attempting to buy six US port facilities is an example of an environment that leads to lack of confidence and more diplomatic risk exposure. The 9/11 attack must have deepened the diplomatic risk as more of recent GCC petrodollars are invested in Europe, Middle East and Asia, particularly in FDIs.[15] During the period 2002-2006, out of the $542 billion accumulated GCC surpluses that entered the global capital markets, $300 billion invested in the United States, while $100 billion invested in Europe, $60 billion invested in the Middle East, $60 billion invested mostly in direct investment in Asia, and $22 billion invested in other locations. Romero (2006) contents that due to political and diplomatic considerations only 1% of more than $1.5 trillion of the foreign direct investment invested in the United States at the end of 2004 were initiated in the Middle East. However, Blustein (2006) argues that the trend had been reversed since 2004, with sharp increases in foreign assets acquisitions in the United States by Middle Eastern investors. But one must put these FDIs in proper perspective by comparing them to the burgeoning size of GCC foreign asset holdings. Regardless, these new investments have not properly been reflected in the estimation of the models.

5. Impulse Response Function Analysis

Figures 1 and 2 provide the results of the generalized impulse response function analysis for Model 1 for Qatar and Saudi Arabia whose external balances as a percentage of GDP are found to be I(1). We are interested in the direct response of US current account deficit to these countries' financial account surpluses and the reverse response. The sign of the impact is also important. At points where

[14] IIF gives Low, Medium and Low to economic, political and diplomatic risks, respectively, in Europe, and Low, Medium and Low to those three risks for investments in China and advanced Asian economies.
[15] For more information, see: "Arab Investors target Asia as U.S. ties Wane", Reuters, March 28, 2007: http://www.reuters.com/article/MiddleEastInvestment07/idUSL2967227020070329

IRF confidence bands do *not* straddle the zero line of the horizontal axis, the impulse response is considered statistically different from zero between the upper 5% and lower 5% limits of the band.

The shocks to the Saudi financial account defined as a share of GDP initially and briefly reduce the US current account deficit and then after three years they increase it. However, this impact is significant and different from zero only in the second year where it is negative. For example, a positive shock to the oil price that leads to an increase in the Saudi financial account significantly impacts the US current account in the second year. The relative speed at which the impact hits the US current account can be interpreted as the Saudi surpluses are directly placed in portfolio and other investments and not as direct foreign investment. This result shores up the petrodollar savings glut hypothesis which implies that the US current account deficit is caused by external sources. This finding is also supported by the reverse GIRF result purporting that the shocks to US current account do not impact the Saudi financial account surpluses as can be seen in the graph that show the response of DFAGDP to DUSCAGDP, implying that the US current account deficit is not homegrown.

The same analysis applies to Qatar's GIRF. The impact is significant and different from zero only in the second year after the shock originates from Qatar's financial account. The impact in this case is slightly less potent than in the case of Saudi Arabia. This may be due to the fact that Qatar is a much smaller oil exporter with significantly less financial account surpluses.

6. **Conclusions**

Because of lack of data on the patterns of investments of the GCC countries' petrodollar surpluses in other countries, particularly, the United States, this study employs several times-series models to detect whether the petrodollar savings glut of the oil exporters has contributed to the US chronic

current account deficit. In reverse, it investigates whether the US deficit is homegrown and is not caused by external factors. It particularly uses an expanded model that includes the effective US dollar exchange rate and the GCC oil production to ascertain whether the homegrown hypothesis is satisfied. This issue is interesting because on side it involves the current account deficit of the country that consumes one fourth of world's oil production, half of which is imported, and whose currency is the anchor of the GCC currencies and the denominator of the GCC foreign assets, and on the other hand the petrodollar surpluses of the country that is the world's largest oil exporter. It also examines which of the three components of the GCC financial accounts causes the US deficit, an issue of important implications for the GCC countries, the United States and the world community.

The results at the aggregate balance level demonstrate that most of the GCC's hefty financial accounts cause the US deficit giving credence to the global savings glut hypothesis; the exceptions are those for Bahrain, Oman and UAE. Bahrain is not an oil-exporter and has the second lowest foreign assets ($25 billion in 2006), while UAE diversifies the patterns and venues of its investments more than the others. Oman is a minor oil exporter and possesses the lowest foreign assets ($10 billion in 2006) among all the GCC countries, amounting to less than 1%. Regarding the reverse causality, the results underscore the importance of oil imports in supporting the homegrown deficit hypothesis. In the case of Saudi Arabia, in particular, the largest oil exporter, and the United States the largest oil importer the homegrown hypothesis holds. The implication of this is that improvement in the US deficit has something to do with developing alternative of energy and energy independence.

Also interestingly, when detailed data on the three components of the financial accounts are used, Bahrain which is an offshore financial center emerges as a provider of portfolio investment in causing the US deficit. This three-island country doesn't have much surpluses of its own; it just stands as an intermediary that channels GCC funds to global capital markets, particularly in the United States. The

findings also suggest that Kuwait and UAE use short-term bank loans and deposits to invest their surpluses in the United States. Investments in this form by those two major oil-exporters could probably reflect the avoidance of exposure to experiential and political/diplomatic risks in the United States.

In fact, according to our results none of the GCC countries uses direct investment (FDI) as a primary source to invest in the United States. This implies that those countries have not realized the highest rates of return by investing more that 55% of their foreign assets largely in securities and bank loans in the United States.[16] If politics is a barrier to higher returns in the United States, then the GCC countries should invest more in projects and companies (such as telecom firms, hotels and downstream energy companies) in China, advanced Asian countries, Europe and the safe countries of the Middle East where they can optimize the returns on their investment and reduce exposure to economic, political and diplomatic risks. Additionally, given the liquid nature of the GCC investments in the United States, a dollar collapse or steep depreciation, which is two of the downside scenarios envisioned for the correction of the chronic current account deficit, will bring great losses on those short-term investments.[17]

The GCC countries still have more work to do on their own to alleviate the pressure on them to spend more in order to help correct the current and future global external imbalances. They could help reduce their petrodollar overhang which is part of the global savings glut by developing their institutions in terms of upgrading their financial markets, increasing their integration with the world markets, and building up their legal systems. Increasing investment domestically and in their region

[16] Handy and Reeve (2007) note that Europe has attracted possibly 55 percent of identified flows of direct investment from the GCC over the last five years.

[17] For more information on those scenarios, see "The U.S. Imbalancing Act: Can the Current Account Deficit Continue?"at www.mckinsey.com/mgi/publications/US_imbalancing_act/index.asp

should also contribute to the adjustment of global trade imbalances. This is one of the several conditions for the world economy to survive $100 a barrel of crude oil (Fritsch and Evans, 2007). However, some economists believe that the GCC economies are maxed up for the near term and that other alternatives should be sought out,

While appreciation of the GCC currencies relative to the dollar will not lead to any significant adjustments in their external balances on the GCC export side because those exports are dominantly oil-based and oil is priced in US dollars, it could impact their imports and induce more spending. Additionally, if appreciation allows some GCC countries to relax their fiscal sterilization (i.e. holding their export earnings offshore to avoid putting inflationary pressure on their local economies), it might induce adjustments in those countries by relaxing a policy constraint. The recent step by Kuwait to peg its currency to a currency basket instead of to the US dollar is an important step towards currencies appreciation which should provide stimulations of imports. The US dollar-pegged exchange rate regime has become a major reason for macroeconomic imbalances of burgeoning current account surpluses and significant currency depreciation in real terms. For example, Saudi Arabia, by far the largest economy in the GCC regions, has its current account surpluses reaching 27.9 percent of its GDP while at the same time has its real exchange rate depreciating by about 24.5%, an inconsistent phenomenon that shows the external imbalances abroad are now being coupled with domestic GCC macroeconomic imbalances.

More academic research should recognize the importance of the petrodollar surpluses of the oil-exporting countries as a major source of global imbalances. This source should increase in importance as the price of oil approaches the $100 mark in the near future. Lack of knowledge on this source could lead to poor policy implementations and inefficiencies in dealing with domestic policies at home and the external imbalances abroad.

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Table 1: Contemporaneous Correlations between GCC FAs and US CA

	USCAGDP	*Bahrain*	*Kuwait*	*Oman*	*Qatar*	*S. Arabia*	*UAE*
USCAGDP	1						
Bahrain	0.222122	1					
Kuwait	0.140552	0.273855	1				
Oman	**0.316928**	0.463884	-0.02264	1			
Qatar	-0.20953	0.231746	0.401497	0.392822	1		
S. Arabia	0.135521	0.471685	0.465225	0.200594	0.252991769	1	
UAE	0.19163	0.396843	0.11506	0.653176	0.487198042	0.110008754	1

Notes: USCAGDP is the share of the United States' current account in its GDP. The GCC countries represent their financial accounts as shares in their respective GDPs.

Table 2: Model 1's US CA - GCC FA Granger Causality Tests

	Dependent Variables	Lagged Variables	
		CA^{US}	FA^{GCC}
Bahrain[1+1](ALL)	CA^{US}		0.198098
	FA^{GCC}	0.066346	
Kuwait[1+1] (ALL)	CA^{US}		2.784498 (0.09)[c]
	FA^{GCC}	0.147585	
Oman[2+1] (FPE,AIC,HQ)	CA^{US}		3.446281
	FA^{GCC}	0.081605	
Qatar[2+1] (LR,FPE,AIC,HQ)	CA^{US}		4.41136 (0.02)[b]
	FA^{GCC}	0.503457	
Saudi Arabia[2+1] (ALL)	CA^{US}		7.309215(0.02)[b]
	FA^{GCC}	1.606595	
UAE[1+1] (ALL)	CA^{US}		0.179455
	FA^{GCC}	0.640332	

Notes: These estimated bivariate models are defined in Eqs. (1) (where max lag = 3). *CA* stands for the US current account and *FA* for the financial account of a GCC country. The values in brackets after the country names *are* $k + d_{max}$, where k is the extra lag selected by LR, FPE, AIC, HQ, and/or SC, and d_{max} represents the order of integration as shown in parentheses after the country names. "All" refers to all those criteria. The values are Chi-squares from the modified Wald test. The figures in the parentheses after the Chi-squares are the p-values. [a], [b], and [c] stand for the 1%, 5%, and 10% significance levels, respectively. We chose the relationships that satisfy the greatest number of criteria. This rules out the additional relationships for Oman and Qatar.

Table 3: Model 2's Granger Causality Test (US CA, GCC FA and US ER)

	Dependent Variables	Lagged variables		
		CA^{US}	FA^{GCC}	ER
Bahrain[1+1](ALL)	CA^{US}		0.234830	2.329395
	FA^{GCC}	0.040196		2.866124(0.09)[c]
	ER	0.316636	0.042243	
Kuwait[3+1] (ALL)	CA^{US}		5.035232	12.50362(0.00)[a]
	FA^{GCC}	2.487710		8.439970(0.03)[b]
	ER	5.818979	6.430264(0.09)[c]	
Oman[2+1] (LR,FPE, AIC)	CA^{US}		3.863915	2.984231
	FA^{GCC}	0.159916		0.520524
	ER	3.511260	0.493428	
Qatar[2+1] (LR,FPE, AIC, HQ)	CA^{US}		3.515399	1.772775
	FA^{GCC}	3.210616		14.29889(0.00)[a]
	ER	5.952268(0.05)[b]	2.687037	
Saudi Arabia[3+1] (LR,FPE, AIC, HQ)	CA^{US}		4.823076	1.161540
	FA^{GCC}	12.64157(0.00)[a]		10.84507(0.01)[b]
	ER	3.367358	2.976990	
UAE[3+1] (FPE, AIC, HQ)	CA^{US}		2.136757	8.344616(0.03)[b]
	FA^{GCC}	6.138138		6.538610(0.08)[c]
	ER	2.458633	4.357296	

Notes: These estimated trivariate models are defined in Eqs. (2). (max lag = 3). *CA* is the US current account, *FA* is financial accou of a GCC country and *ER* is the US dollar effective exchange rate. The values in brackets after the country names *are* $k + d_{max}$, whe is the extra lag selected by LR, FPE, AIC, HQ, and/or SC, and d_{max} represents the order of integration as shown in parentheses afte country names. "All" refers to all those criteria. The values are Chi-squares from the modified Wald test. The figures in the parentl after the Chi-squares are the p-values [a] , [b] , and [c] stand for the 1%, 5%, and 10% significance levels, respectively. We chose the relationships that satisfy the greatest number of criteria, resulting in ruling out the additional relationships for Oman, Qatar and UA

.

Table 4: Model 3's Granger Causality Test (US CA, GCC FA and GCC oil index)

	Dependent Variables	Lagged variables		
		CA^{US}	FA^{GCC}	Oil Production
Bahrain[1+1](ALL)	CA^{US}		0.103819	1.301587
	FA^{GCC}	0.000572		0.003683
	Oil Prod	0.413118	1.107175	
Kuwait[1+1] (ALL)	CA^{US}		1.465143	0.028480
	FA^{GCC}	0.172532	1.196247	
	Oil Prod	1.135187	5.978613(0.01)[b]	
Oman[2+2] (LR,FPE, AIC, HQ)	CA^{US}		9.047254(0.01)[b]	2.948600
	FA^{GCC}	0.081992		1.777434
	Oil Prod	5.934014(0.05)[b]	13.36252(0.00)[a]	
Qatar[1+1] (ALL)	CA^{US}		12.23472(0.00)[a]	0.061912
	FA^{GCC}	0.027628		4.912298(0.02)[b]
	Oil Prod	0.567463	2.417889	
Saudi Arabia[2+1] (LR,FPE, AIC, HQ)	CA^{US}		6.061947(0.04)[b]	0.007317
	FA^{GCC}	2.631716		5.323237(0.06)[c]
	Oil Prod	1.680203	0.642267	
UAE[1+1] (LR,FPE, AIC, SC)	CA^{US}		0.085279	0.011269
	FA^{GCC}	0.724437		0.445090
	Oil Prod	0.792743	8.378827(0.00)[a]	

Notes: These estimated trivariate models are a variant of the models in **Table 3.** The only difference is that the US exchange rate is replaced by the respective country's oil production index. The remaining notes are similar to those under **Table 3.** We chose the relationships that satisfy the greatest number of criteria.

Table 5: Model 4's Granger Causality Test (US CA, GCC FA, US ER and GCC oil index)

	Dependent Variables	Lagged variables			
		CA^{US}	FA^{GCC}	ER	Oil Production
Bahrain[1+1](ALL)	CA^{US}		0.125947	2.521157	1.664942
	FA^{GCC}	0.216477		3.064511(0.08)[c]	0.048606
	ER	0.241637	0.039255		0.003831
	Oil Prod	0.517818	1.328393	0.042608	
Kuwait[3+1] (LR, FPE, AIC, HQ)	CA^{US}		1.067687	4.481266	0.738489
	FA^{GCC}	2.528607		5.113204	4.652038
	ER	1.791810	11.04157(0.01)[b]		5.450861
	Oil Prod	5.942464	2.357520	4.063746	
Oman[1+2](SC, HQ)	CA^{US}		2.620994(0.10)[c]	9.49275(0.00)[a]	0.392018
	FA^{GCC}	0.184556		0.026647	0.157245
	ER	0.024963	0.349011		0.685991
	Oil Prod	0.460408	0.000497	0.160746	
Qatar[2+1](LR, FPE, AIC)	CA^{US}		7.193851(0.03)[b]	0.878263	0.954016
	FA^{GCC}	0.620596		9.138295(0.01)[b]	1.603224
	ER	5.34951(0.06)[c]	1.392865		0.359107
	Oil Prod	0.703055	1.415873	0.921705	
S. Arabia [3+1] (FPE, AIC, HQ)	CA^{US}		1.321459	1.214095	0.728597
	FA^{GCC}	14.9647(0.00)[a]		16.52127(0.00)[a]	8.389719(0.04)[b]
	ER	2.949898	6.555327(0.09)[c]		12.28853(0.00)[a]
	Oil Prod	4.327591	3.806803	4.894302	
UAE[3+1](LR, FPE, AIC, HQ)	CA^{US}		2.198983	6.888178(0.08)[c]	4.731094
	FA^{GCC}	3.704199		1.143414	1.254644
	ER	6.09161(0.10)[c]	3.024705		6.015812
	Oil Prod	0.776541	14.79756(0.00)[a]	9.491367(0.03)[b]	

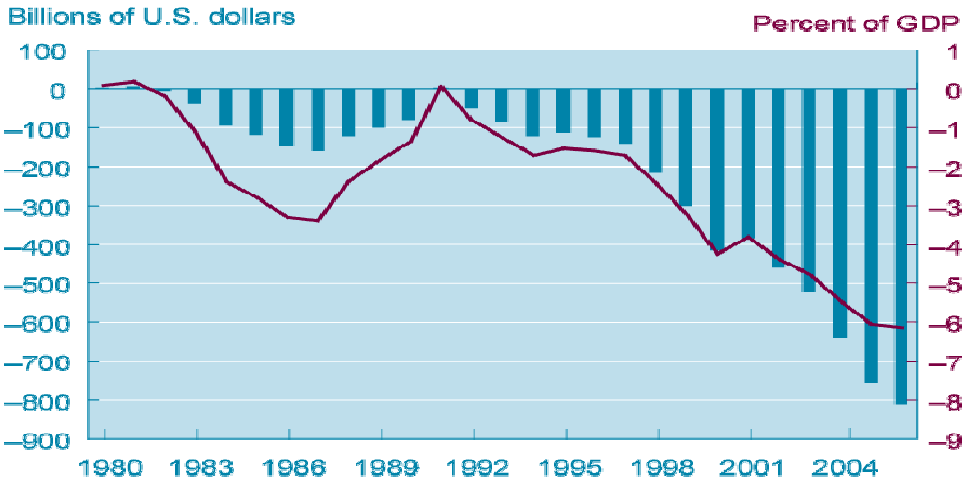
These estimated trivariate models are a variant of the models in **Table 3.** The only difference is that the US exchange rate and the respective country's oil production index are both included in this model. The remaining notes are similar to those under **Table 3.** We chose the relationships that satisfy the greatest number of criteria.

Table 6: Model 5's Granger Causality Test (*US CA, GCC DI, GCC OI, GCC PI*)

	Depend. Variables	Lagged variables			
		CA^{US}	DI^{GCC}	OI^{GCC}	PI^{GCC}
Bahrain[1+1](ALL)	CA^{US}		0.049944	0.306888	7.927508(0.00)[a]
	DI^{GCC}	0.014730		0.146139	0.008787
	OI^{GCC}	0.058388	0.095235		10.34383(0.00)[a]
	PI^{GCC}	0.206331	0.003916	0.163142	
Kuwait[3+2] (LR, FPE, AIC)	CA^{US}		4.721202	6.518636(0.08)[c]	2.639463
	DI^{GCC}	3.720377		4.901367	20.32706(0.00)[a]
	OI^{GCC}	2.517084	6.072220(0.08)[c]		4.092369
	PI^{GCC}	1.078491	20.42344(0.00)[a]	3.223601	
UAE[2+1](LR, FPE, AIC, HQ)	CA^{US}		1.580882	10.29216(0.00)[a]	0.566720
	DI^{GCC}	6.502919(0.03)[b]		5.883889(0.05)[b]	3.216206
	OI^{GCC}	0.159140	2.131092		1.847917
	PI^{GCC}	2.624938	0.042697	2.766834	

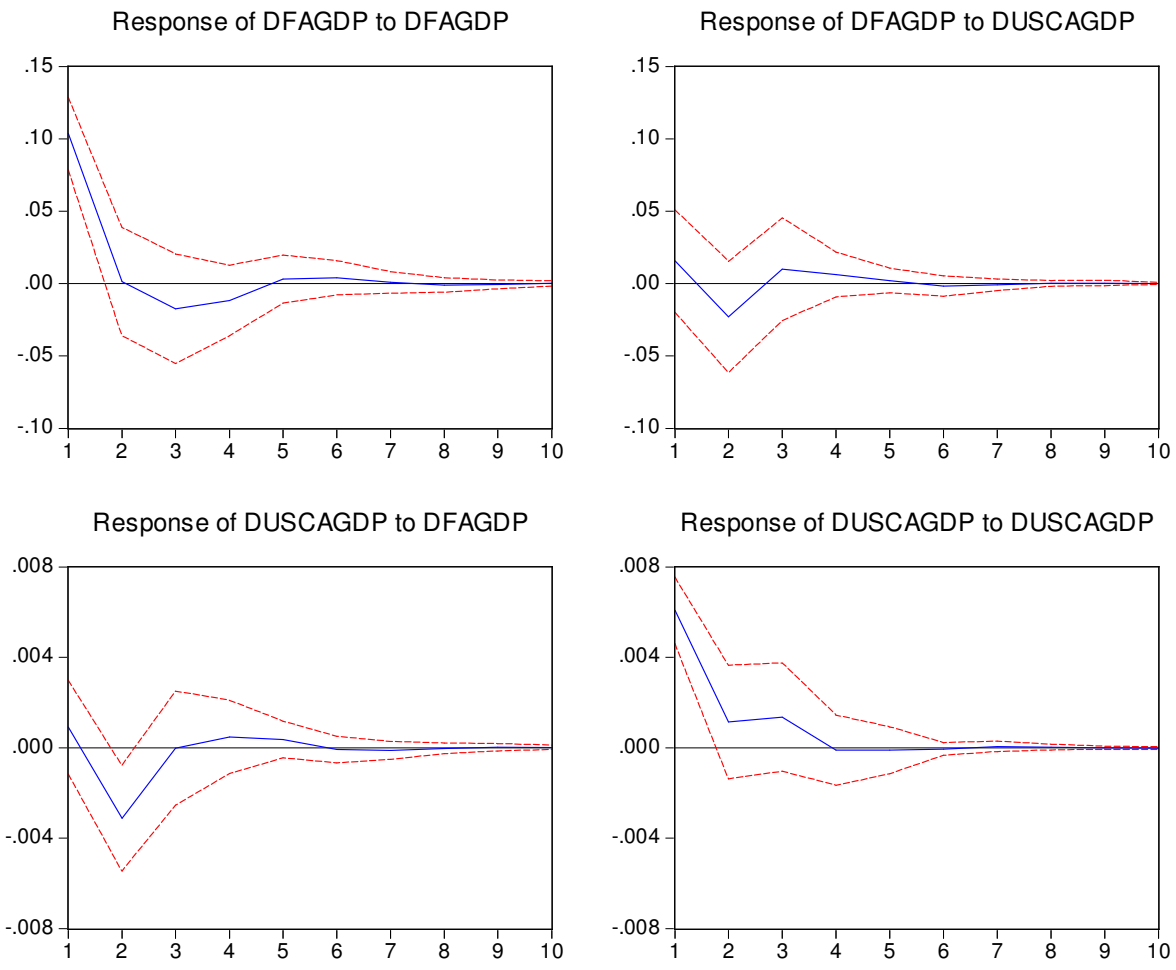
Notes: These estimated four-variable models are defined in Eqs. (3). *GCC DI* stands for a GCC country's foreign direct investment, *OI* for other investments and *PI* for portfolio investment. The estimated models are defined in Eqs. (3).of Mode3 (max lag selection = 3). The values in brackets after the country names are k +dmax. where K is the extra lag selected by LR, FPE, AIC, HQ, and/or SC, and dmax represents the order of integration as shown in parentheses after the country names. "All" refers to those criteria. The values are Chi-squares from the modified Wald test. The figures in the parentheses after the Chi-squares are the p-values. [a] and [b] stands for 1% and 5% significance level, respectively.

Figure 1: Current Account Deficit



Sources: Bureau of Economic Analysis; Haver Analytics

Figure 2: Generalized Impulse Response function Analysis for Saudi Arabia



Notes: DUSCAPGDP is the first log difference of the share of US capital account in its GDP and DFAGDP is the first log difference of a GCC financial account as share of a GCC's GDP

Figure 3: Generalized Impulse Response function Analysis for Qatar