View metadata, citation and similar papers at core.ac.uk

brought to you by CORE

provided by Research Papers in Economics

Munich Personal RePEc Archive

The long-run relationship between savings and investment in oil-exporting developing countries: A case study of the Gulf Arab States

Basher, Syed Abul and Fachin, Stefano

17. February 2011

Online at http://mpra.ub.uni-muenchen.de/29077/
MPRA Paper No. 29077, posted 23. February 2011 / 08:07

The Long-Run Relationship Between Savings and Investment in Oil-Exporting Developing Countries: A Case Study of the Gulf Arab States*

Syed Abul Basher†
Dept. of Research & Monetary Policy
Qatar Central Bank
P.O. Box 1234, Doha, Qatar
bashers@qcb.gov.qa

Stefano Fachin
Dip.di Scienze Statistiche
Università di Roma "La Sapienza"
P.le A. Moro 5 - 00185, Roma, Italy
s.fachin@caspur.it

February 17, 2011

Abstract

The relationship between national saving and investment over the long term is examined for six Gulf Arab oil-exporting developing countries – Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates. We show that, provided some large outliers are properly accounted for, long-run equilibrium relationships between saving and investment (both total and fixed) exist in these countries. Since these countries have typically large current account surpluses such relationships cannot be explained by standard arguments. Our hypothesis is that the response of investment to saving largely depends on domestic absorptive capacity.

JEL Codes: C32; E21; E22; H54; O16

Keywords: Saving-investment correlation; oil-exporting developing countries; GCC countries; absorptive capacity; outlier detection; integrated process.

*We thank Elsayed Elsamadisy for very stimulative discussions. The views expressed here are those of the authors and do not reflect the official view of the Qatar Central Bank. The usual disclaimer applies.

†Corresponding author: Tel.: +(974) 44456490; Fax: +(974) 44416771.

1 Introduction

Ever since the publication of Feldstein and Horioka (1980), the correlation between saving (S) and investment (I) as ratios of GDP (Y) has been extensively tested in the literature. According to the Intertemporal Theory of the Current Account, under perfect capital mobility the correlation between saving and investment should be zero.[1] However, examining average investment-to-GDP and saving-to-GDP ratios in 16 OECD countries over the 1960-1974 period, Feldstein and Horioka (1980), henceforth FH, documented regression coefficients within the interval 0.85-0.95, indicating that there is almost a one-to-one positive association between saving and investment rates. FH interpreted their finding as evidence of low capital mobility: investment depends on domestic savings because capitals do not move across economies. This evidence, christened "Feldstein-Horioka puzzle" (in fact, "the mother of all puzzles", according to Obstfeld and Rogoff, 2000) for its stark contrast with the prediction that capital is highly mobile across countries, has stirred an enormous literature. Surveying nearly 200 papers, Apergis and Tsoumas (2009) conclude that the overall evidence of a saving-investment relationship is weaker for developing countries than for richer ones,[2] which is in fact not too surprising in view of the typical importance for the former of foreign aid and foreign direct investments.

Our objective in this paper is to empirically analyze the FH puzzle in a special group of oil-exporting developing economies, the Gulf Cooperation Council (GCC) countries, which includes Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates (UAE), over the period 1970-2008 (hence including all oil shocks and dramatic events such as the Iraqi invasion of Kuwait). The case of oil-exporting developing economies, and especially of the GCC countries, is interesting for two main reasons.

First, unlike in other oil-producing countries, hydrocarbon[3] resources (oil and gas) play a dominant role. For instance, in 2007, the hydrocarbon revenues contributed to 78%, 76% and 40%, respectively, to GCC's government revenues, exports and gross domestic product.[4] It is

[1] This is the case because given the exogenous world interest rate, under perfect capital mobility, the saving and investment schedules are affected by independent factors.

[2] Note however that Di Iorio and Fachin (2010a,b) using robust and powerful bootstrap panel cointegration tests can find evidence of a long-run saving-investment relationship only in some of the largest OECD economies.

[3] Throughout this paper, the words "hydrocarbon" and "oil" are used interchangeably.

[4] As it is well-known, petroleum is heavily concentrated in a relatively small geographic area in the Middle East: the GCC countries hold about 40% of global oil reserve, while the region's population represents less than 1 percent of the global total (Abi-Aad, 2009). See Table A.1 in the Appendix for further details.

thus not surprising to discover that to a large extent, in these countries national saving appears to be strongly linked to the foreign demand for oil. This relationship stands out clearly from the plots reported in Fig. 1: with the only exceptions of Bahrain and Qatar after 2000, savings and oil revenues follow paths so closely related to be difficult to distinguish. The heavy dependence on a single commodity export, *oil*, which serves as the principal source of government revenues, has a significant bearing on saving and investment choices – particularly during times of lower oil price which leads to painful budget cuts in many oil-exporting countries. Depending on single commodity export is not uncommon for developing countries. However, differently from agricultural cash crops, oil is depletable. Although GCC oil reserves are quite large (the average reserves-to-production ratio for GCC oil was estimated in the year 2008 at 73 years: Abi-Aad, 2009), they will not last forever. Therefore, as already pointed out by Amuzegar (1983), any permanent loss in the nation's stock of capital through the sale of a barrel of oil has important consequence on the nation's development strategy, hence investments.

Second, differently from most other economies, the external balances of the countries we examine are almost always positive, in fact strongly so. The annual average current account balance (as a percent of GDP) over the 1980-2008 period was 10.60% for the GCC region, compared to -0.72% for G7 countries. The comparable figures for individual GCC countries ranged from a low of 2.0% for Saudi Arabia, to a high of 25.0% for Qatar.[5] Large accumulation of current account surplus during the recent episode of rising oil prices has helped the GCC region to emerge as a major net supplier of capital on a global scale, second only to East Asian countries (Sturm *et al.* 2008). As a consequence, capital movements are bound to be extremely free; this expectation is confirmed by the Chinn and Ito (2008) capital openness index. [6] The presence of typically large and positive current account balances and free capital movements leads to expect domestic capital formation to be independent from savings: the latter depends on foreign demand for oil, the former should be limited only by the presence of profitable investment opportunities in the domestic economy. As we will see, our results will suggest this not be true: in GCC countries investments do depend on savings, though with elasticities highly

[5]Source: authors' calculations based on IMF World Economic Outlook Database, October 2010.

[6]It is worth mentioning that as GCC economies lack independent monetary policies as a result of the pegged exchange rates (barring Kuwaiti dinar) with the U.S. dollar, free capital movement between GCC and the rest of world, therefore, is a natural consequence of the *Impossible Trinity* demonstrated by Mundell (1963). This unique institutional feature of free capital movement make GCC countries a natural test-bed for the FH puzzle.

variable across countries. We shall argue that these difference are likely to reflect the variations in resource endowment and absorptive capacity across the GCC economies.

The rest of the paper is organized as follows: in Section 2 we briefly discuss some non-standard features of savings and investment in oil-exporting developing economies; in Section 3, we present the empirical results; finally, in Section 4 we draw some conclusions.

2 Income, consumption and savings in oil-exporting developing countries: A non-standard set up[7]

Several complications arise while deciding on the magnitude of oil income to be exchanged for current national consumption and savings, and the allocation of savings for investment. Part of the difficulty stems from the fact that as the State exclusively holds the ownership and extraction rights to hydrocarbon resources, oil export revenues, therefore, accrue directly to the national treasuries. Hence, State's discretion and decision for the saving-investment mix can sharply differ from that of private sector's preferences – leading to "changes in both the character and the composition of GDP, as well as the tempo and direction of the economy's development" (Amuzegar 1983, p. 11). The exhaustibility of oil reserves also poses a long-term challenge concerning the issue of fiscal sustainability and intergenerational resource allocation. As such, oil left underground is a form of autoinvestment for future exploitation and use, whose real yield will be determined by changes in the future real net price of oil. But this is no occasion for discussing the operational aspects of fiscal policy in oil-exporting developing countries, interested readers are referred to Barnett and Ossowski (2002) and the references therein.

As the current levels of consumption per capita in most oil-exporting developing countries are low by international standards,[8] (political) pressures for immediate distribution of the oil proceeds escalate during the oil revenue boom. According to the classical intertemporal model of consumption, higher saving comes at the expense of current consumption. However, when

[7]Some of this discussion draws heavily on Amuzegar (1983), which, although a bit dated, remains a classic introduction to this subject.

[8]For instance, over the 1970-2008 period real household consumption per capita in the G7 countries was 2.36 times higher than it was in the GCC countries. The difference rose to 2.64 during the recent oil price boom (2002 to mid-2008), mostly due to rising inflationary pressures from higher consumption spending in GCC economies. Source: authors' calculations based on the *National Accounts Main Aggregates Database*, United Nations.

the magnitude of oil revenue accumulation is high enough, both consumption and saving can increase simultaneously, thereby obscuring the classical notion that saving and investment come at the expense of current consumption (Amuzegar, 1983).[9] Thus, here a domestic resource (hydrocarbon) plays the role normally played by external lending or foreign direct investment (FDI). Furthermore, the level of potential national saving in oil-exporting developing economies is also determined by the *degree* of their domestic absorptive capacity – due to differences in population, complementary resources, supply of skilled labor and domestic market size. Too high a level of domestic investment, relative to available capacity to produce, often result in an increase in prices of non-tradable goods. In such a case, a general policy prescription is to partially restrict public investment until the capacity of the economy to respond has improved (World Bank, 2006).[10] Thus, at times when the overall savings from oil revenues are atypically high, in general, a greater fraction of these savings is temporarily saved abroad until the domestic production base has been reasonably expanded. It is therefore not surprising to discover that savings rates in many oil-exporting developing countries are typically higher than those of other groups of nations.[11] Further evidence is provided in the next section.

Once the essential decision is made regarding the level of consumption and therefore savings, the subsequent options involve various investment alternatives available to the State.[12] Two obvious alternatives are investment in domestic real assets and investment in foreign assets (real and/or financial). Domestic capital formation can occur in both oil and non-oil sector.

[9]For example, during the oil boom of 1974-77, nominal investment expenditure of the 11 OPEC countries grew at an annual average rate of 48.5%, while private and public consumption increased at average rates of 30% and 38%, respectively. Similar trends were also observed during the most recent episode (2004-2008) of higher oil price, when investment, private and public consumption grew by 22%, 19% and 18%, respectively. Source: authors' calculations based on the *National Accounts Main Aggregates Database*, United Nations. The 11 OPEC member countries are: Algeria, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, the United Arab Emirates and Venezuela.

[10]For instance, Collier and Gunning (2007) bring the example of Botswana. In this country whenever there were signs of congestion in the construction sector, public investment project were deferred until the emerging bottlenecks in the construction sector such as skill shortages were properly tackled. This kind of a plan-within-a-plan help ensuring that demand and supply were broadly matched. Analyzing the management of mineral rents between Botswana and Saudi Arabia, Auty (2001) blames the over-rapid domestic absorption of rents, among other factors, as a factor behind Saudi Arabia's long-term growth collapse compared to Botswana. For instance, over the 1980-2008 period, the per-capita real GDP growth rate in Botswana was 4.77%, while it was -1.64% in Saudi Arabia (the lowest in the GCC). Authors' calculations based on World Economic Outlook Database, IMF, October 2010.

[11]To some extent this phenomenon overlaps with capital flight from the oil-exporting countries. An excellent analysis of capital flight from the Middle Eastern economies can be found in ESCWA (2008).

[12]Historically, for most oil-exporting developing countries—especially the low-absorbing GCC countries—the mobilization of domestic savings was seldom a major economic issue. "The critical problem was how best to use available resources, without inflationary consequences, to expand and diversify the economy and to correct existing distortions through subsidies, transfers and rate setting in public agencies" (Amuzegar 1983, p. 44).

Investment outside the oil sector has the advantage of promoting economic diversification by diversifying domestic export and production and thereby reducing the dependence on the oil sector. Now, a notable feature in the Persian Gulf countries examined here, private domestic investment is low relative to public investment. For example, in the GCC countries the private/public investment ratio was less than 2:1 in the 1990s; whereas, for OECD countries it was over 6:1 (Sala-i-Martin and Artadi, 2002). One of the reasons for the low level of private investment in the GCC countries is the exactly lower decoupling of the non-oil sector from the oil sector – resulting in an apparent dearth of investment opportunities.

At a micro level, lack of trustworthiness among people is another likely reason behind the low level of private investment in the oil-exporting Gulf countries. In an experimental study, Bohnet *et al.* (2010) find that Emiratis, Kuwaitis and Omanis require a substantially higher minimum trustworthiness threshold before trusting than did the Americans and Swiss. As investment requires placing one's funds in the hands of another person, investment rates are closely associated with people's willingness to trust others (see Bohnet *et al.* 2010, for further discussion). The dominance of public ownership in many large companies has also been blamed for low levels of financial development in the Arab world (Sala-i-Martin and Artadi, 2002). Underdeveloped financial markets force potential real investors into the hands of the banking system, which has become an economically and politically powerful institution in many oil-exporting developing countries. For example, the share of debt securities in the Middle Eastern capital markets is only 5.6%, while bank assets and equities account for 94.4% of finance (IMF, 2009). As bank lending in the Arab world remains predominantly short-term and trade-related (Sala-i-Martin and Artadi, 2002), domestic savings often are not properly channeled by the financial sector to long-term productive projects. The situation is further exacerbated by public sector's heavy borrowing from the banking system during economic downturns (caused by low oil prices), resulting in a crowding-out of private investment. Supporting evidence is provided by Looney (1992) and Albatel (2005), who show that public expenditure actually has a negative effect on private sector investment in Saudi Arabia; Sturm *et al.* (2009) are unable to find a strong positive effect of a shock to public investment on private investment and non-oil GDP growth in four oil-exporting countries (Algeria, Nigeria, Russia and Saudi Arabia) during 1980-

2008 period.[13]

Because of these limitations of investment in domestic real assets, investment in foreign assets thus appears as a natural alternative. In fact, foreign investment – even when the real yield is low – may be often deemed superior than domestic capital formation because it avoids some of the incidental costs (*e.g.* inflation, relative price distortion) that arise from a rapid increase in domestic spending. Importantly, investment in foreign financial assets serves to achieve the dual purpose of stabilization and precautionary saving. The stabilization objective intends to set aside a portion of oil revenue at times of higher than average expected receipts, which can be used to supplement current revenues in times of below average receipts (World Bank, 2006). Accumulated resources held in oil fund can provide a precautionary cushion against unexpected incidents such as war (*e.g.* the Iraqi invasion of Kuwait in 1990) or financial crisis (*e.g.* the 2007-2008 economic and financial crisis). Given that the withdrawal rules of many oil funds are tied to domestic budgetary needs,[14] investment in foreign financial assets play a crucial role in the development of domestic capital formation during times of weaker international oil prices.[15]

Summing up, the saving-investment relationship in the oil-exporting developing countries seems to be more the consequence of States' discretionary choices rather than of economic forces. While less profitable projects get financed during boom period and good quality projects are axed during the bust, the oil-exporting developing countries have yet to formulate clear-cut economic rules that would smooth out investment flows over the business cycles. Affected by internal pressures of sociopolitical circumstances, domestic development strategy in these countries has not always worked out as intended. Taken this way, most of the major oil-exporting developing countries still remain a variant of Hirschman's (1958) policy of unbalanced growth.

[13] FDI is unlikely to have any effect on this. Whilst FDI can generally promote domestic capital formation, inward FDI flows in oil-exporting countries have been heavily directed towards energy and construction sector. In particular, FDI in real estate and construction may contribute little to diversifying the productive base of the economy or upgrading labor skills. It is therefore very unlikely that the average oil-exporting developing country stands to gain from FDI unless it invests in the knowledge economy. See ESCWA (2008) for further discussion.

[14] See Appendix III in Ossowski *et al.* (2008) for stylized features of oil funds in selected oil-producing countries.

[15] This is based on the assumption that foreign financial assets can be converted easily into money. Nonetheless, foreign portfolio investment option has serious drawbacks, as was discovered during the recent financial crisis during which the market value of GCC's external portfolio dropped by 27% or equivalent to a capital loss of $350 billion (see, Sester and Ziemba, 2009).

3 Empirical results

As a first step, let us comment on the average savings and investment rates reported in Table 1, where we divided our study period (1970-2008) into subperiods marked by the various oil shocks. Investment is measured by both total investment (which includes inventory changes and gross fixed investments) and by fixed investment.

It is immediately evident that, while the investment rates in the Gulf countries (GCC) have always been comparable to those of the largest industrial economies (G7: Canada, France, Germany, Italy, Japan, UK, USA), savings rates have been consistently much higher, in fact often almost twice as large. More precisely, on average over the 1970-2008 period savings and total investments have been respectively 42% and 23.3% of Gross National Income (GNI) in the GCC, compared to 21.9% and 22.2% in the G7. In the GCC these averages hide pretty large variations in time, as well as differentials across countries. The GCC 1990-2008 savings average, 37.9%, is only two-third of the 1974-1980 savings rate (55%), while the highest 1970-2008 national average (Qatar, 50.6%) is almost twice as large as the lowest (Bahrain, 30.4%). In fact, the smallest saving rates are always found in Bahrain and the highest in the UAE up to 1989, and in Qatar thereafter. Investment rates are relatively less variable. Looking at the GCC aggregate over time, we find pretty similar values in all periods but 1974-1980, when the peak was registered. Across countries, investment rates have always been quite low in Kuwait and high in Oman and UAE; remarkably, Qatar is the only country where the 1990-2008 value is higher than those of the 1974-1989 period for both total and fixed investment. Looking at the plots in Fig. 2 some large additive outliers are also evident: savings in Kuwait (1991) and Oman (1973), total investments in Saudi Arabia (1973), both fixed and total investments in the UAE (1974). All these outliers are easily explained with dramatic political events. The 1973-74 outliers are the consequences of first oil shock caused by the OPEC embargo. In Oman this caused national income to fall in 1973 (-4.6% at current prices in local currency; the same applies for the growth rates that will be quoted below). Since consumption grew strongly (+34.9%) savings registered a large drop. At the same time, inventories fell dramatically in Saudi Arabia, and both measures of investments in UAE (though not as strongly). Finally, Iraq's invasion of Kuwait in 1990 caused the GNI of the latter to fall by nearly 38% and national consumption to increase by 78%. From Fig. 2 we can further appreciate that saving and investment rates,

though sometimes have radically different mean levels, may be dynamically related. The next natural step is thus to establish their time series properties; this task, usually routinely, here requires some care for the presence of the additive outliers (AOs) discussed above. Vogelsang (1999) showed that AOs cause the standard Dickey-Fuller (DF) tests to overreject the null hypothesis of a unit root (intuitively, the mean reversion taking place after the AOs overshadow the behavior in the rest of the sample). To tackle this problem we have two options. The first is, following Vogelsang (1999), to augment the usual DF autoregressions with dummy variables[16] for each AO. Fortunately, the most delicate part of this procedure, which is identifying the precise dates of the outliers, in our case does not create any problems: our outliers are all very large and have natural political/economic explanations.

The other option is to remove the AOs, *e.g.* using the program TRAMO (Gómez and Maravall, 2001) and use the standard DF tests. In fact, as pointed out by Nielsen (2004) in his discussion of the related problem of cointegration analysis with outliers, the two approaches are closely related, as impulse dummies remove completely the outlying observation. In our data set removing the AOs has the non-trivial advantage of allowing the use of logarithms for the saving rate in Kuwait and the investment rate in Saudi Arabia, where the AO are negative. For robustness' sake we however decided to check both methods. The TRAMO procedure identified AOs precisely in the expected periods (for savings: Kuwait 1991, Oman 1973; for investments: Saudi Arabia 1973, UAE 1974). From Table 2 we can see that the two approaches lead to the same conclusions. Very much the same applies to the standard and GLS versions of the ADF tests, computed for the other cases. The results of this battery of tests suggest non-stationarity for savings with the only exception of Oman and mostly stationarity for total investments (except Qatar and the UAE). Fixed investments appear to be I(1) in Qatar and Saudi Arabia, I(0) in Bahrain, Kuwait (though here the ADF and ADF-GLS tests yield conflicting results), Oman and the UAE. The picture is therefore rather confused. Given the nature of our data we should not forget that an underlying non-stationary behavior may be overshadowed by the presence of few large, isolated swings. We therefore decided to test for a cointegrating relationship in all cases.

Following Juselius (2006), we removed the AOs prior to estimation and testing, so to be

[16] 1 only in the outlying observation) of length equal to that of the ADF polynomial plus one.

able to specify for all cases the following vector autoregression (VAR) in logs[17]:

$$\begin{bmatrix} \Delta i_t \\ \Delta s_t \end{bmatrix} = \begin{bmatrix} \theta_1 \\ \theta_2 \end{bmatrix} + \mathbf{\Pi}_i \begin{bmatrix} i_{t-1} \\ s_{t-1} \end{bmatrix} + \sum\nolimits_{j=1}^{p} \gamma_j \begin{bmatrix} \Delta i_{t-j} \\ \Delta s_{t-j} \end{bmatrix} + \begin{bmatrix} \varepsilon_{it} \\ \varepsilon_{st} \end{bmatrix} \tag{1}$$

where $s = ln(S/Y)$, $i = ln(I/Y)$. When cointegration holds $\mathbf{\Pi} = [\alpha_1 \alpha_2]'[\beta_1 \beta_2]$, so that the long-run saving retention ratio is $\rho = -\beta_2/\beta_1$. From the results of ADF tests we expect the stationary dynamic model

$$i_t = \delta_1 + \sum\nolimits_{j=1}^{p} \phi_i i_{t-1} + \sum\nolimits_{j=1}^{p} \psi_j s_{t-j} + \eta_{it} \tag{2}$$

to be possibly adequate for Oman; in this case $\rho = \sum_{j=1}^{p} \psi_j / (1 - \sum_{j=1}^{p} \phi_j)$. The cointegration statistics are reported in Table 3 for the total investment rates-savings VARs, and in Table 4 for the fixed investment rates-savings ones, while the estimates of the long-run retention rates ρ are collected in Table 5; some more details on the VARs (lag order, diagnostics) can be found in Table A.2 in the Appendix. A first remark is that, consistently with the ADF tests, in Oman all variables are found to be stationary. Second, the relationship between total and fixed capital investments and savings is generally, but not always, the same. More specifically, cointegration always holds in Bahrain, Kuwait, and Saudi Arabia, while in Qatar and the UAE the evidence of a relationship is somehow weaker. In Qatar over the entire 1970-2008 period savings appear to cointegrate with total investment, but not with fixed investment, while in the UAE the opposite happens (savings cointegrate with fixed investment, but not with total investment). In both cases a level relationship does seem to exist if we take only the years after the first oil shock (1975-2008). The p-value for total investment in UAE is slightly larger than 10% (13% for the Trace test), but it may be considered significant in view of the low power which should be expected with our rather small sample size (33 years).

The estimates of the long-run saving retention ratio range from 0.15 (Kuwait, total investment) to 0.84 (UAE, total investment), values comparable to those found for the OECD economies (see, *e.g.* Di Iorio and Fachin, 2010a). Although most estimates are rather unprecise, it is fairly clear that the association between savings and capital formation (both total and fixed)

[17]The VAR augmented with dummy variables lead to the same conclusions for the UAE, the only non-stationary case with non-negative AOs (detailed results are available on request).

is rather close in Qatar, Oman, Bahrain and UAE, while it is quite weak in Kuwait and Saudi Arabia. In light of the structural bottlenecks prevailing in the GCC region (Section 2), domestic investment is expected to strongly depend on national saving largely because hydrocarbon revenues (and therefore government expenditure) remain the engine of economic growth. As capital accounts are equally open across the GCC region, the differences in coefficient estimates cannot be explained by varying degrees of international capital mobility. Hence, we need to search for other explanations: one such factor is the degree of domestic absorptive capacity mentioned in Section 2. This factor is likely to be particularly important for Kuwait, which has extremely limited absorptive capacity in both agriculture and industry, relative to other GCC members. Kuwait's rate of domestic investment (total, fixed) is lowest among GCC members (see Table 1), possibly because of the low capital-to-government spending ratio.[18] The limited domestic absorption capacity has prompted Kuwait to place a large portion of its oil revenue in foreign assets, which generated substantial investment income that sometimes exceeded the income from oil exports.[19] In fact, income from foreign assets helped Kuwait to deal with two large crises in its history: the 1982 Souk al-Manakh (informal) stock market crash and the 1990 Iraqi invasion.[20] In contrast, the high retentions rates in Qatar and the UAE can be explained by these countries efforts to deepen economic diversification by expanding their non-oil production capacities. Although, in the case of Qatar, the diversification embarked on by investing a substantial amount of capital to expand production facilities of its natural gas sector. Thus, while Qatar's oil production is dwarfed by its neighbors Saudi Arabia, Kuwait and the UAE, it is now the world's leading exporter of liquified natural gas (LNG). In fact, export proceedings from LNG have recently surpassed those from oil, helping Qatar to partially decouple from volatile oil cycles.[21]

[18] In fact, the lowest in the GCC region: Over the 1975-2008 period, the capital-to-government spending ratio ranged from 14% (Kuwait) to 21% (Qatar and UAE), 23% (Oman) and 26% (Saudi Arabia). Data for Bahrain was not available. Source: authors' calculation based on national authorities.

[19] Kuwait is one of the few OPEC members with oil operations (production and refinery) worldwide. Kuwait Petroleum Corp. has over 4000 service stations in six European countries under its Q8 brand. Further discussion is available in Amuzegar (2001, pp. 77-84). See also Figure 3.2 in Fennell (1997) for a time series plot of Kuwait's developments in fiscal revenue.

[20] For further discussions on these two events, see IMF (1997).

[21] Figure 1(d) depicts the recent (partial) decoupling of national savings from oil revenue in Qatar, largely due to new gas facilities coming on stream. While oil production remains an important part of Qatar's hydrocarbons composition, in terms of the volume of energy output it is eclipsed by the gas sector. In 2007, Qatar's gas reserves are estimated to be equivalent to 161 billion barrels of oil (nearly six times of its current 27.4 billion barrels of crude oil reserves), see IIF (2008). Although spot gas price is as volatile as oil price (Pindyck, 2004), in reality LNG market is primarily driven by long-term contracts (and therefore stable demand) with pricing mechanism

Measured as the ratio of oil output to GDP, the UAE is by far the economy least dependent on oil in the region. The oil-to-GDP ratio has declined from 57% in 1980 to only 11% in 2007 – see Table A.1 in the Appendix. The scale of industrial development across various UAE regions has surpassed than that of other GCC states, while Dubai, the second largest Emirates in the UAE, has emerged as the leading financial center in the Middle East. We believe that these unique developments in Qatar and the UAE are behind the comparatively higher correlation between saving and investment in these countries. Bahrain and Oman, whose oil resources are relatively smaller, were under severe pressure to diversify and to create a viable non-oil economy. Pragmatic development policies by respective government have helped both Oman and Bahrain to progress to higher levels of economic sophistication and welfare.[22] While both nations relied on oil revenues to support their development efforts, these were never large enough to do serious damage. Over the 1980-2008 period, Oman recorded the highest and Bahrain the second highest positive rate of real per capita GDP growth, while the remaining four Gulf countries registered negative growth.[23] Further, both countries have enjoyed relatively stable growth rates, which was conducive to private sector-led growth. In contrast, the low retention rates estimated for Saudi Arabia in spite of a comparably large domestic production base including a strong private non-oil sector appears to be in stark contrast with the picture just drawn for these two countries. In fact, a recent study by Looney (2004) reveals that over the 1960-2002 period the Saudi Arabian economy registered a falling public and a stagnating private investment rates in the context of a rapidly growing population. During this period, private investment averaged just over 10% of total expenditure, while the share of public investment gradually declined from 25% in 1975 to around 5% in 2002. Surprisingly, private investment was not significantly affected by the 1973-74 oil boom, nor did it expand in line with the post- 1973-74 to 1985 expansion in the share of private sector activity in GDP. Further, Saudi Arabia's budgetary allocation to economic expenditures, which add to productive capital formation, declined from around 25% in 1980 to a little over 7% by 2003 (Looney, 2004). By comparison, about one third

pegged to a competing fuel (*e.g.*, crude oil). Changes in spot price or operating costs are unlikely to affect LNG prices in the short term. Qatar's steady increase in reliance on LNG exports over oil exports is, therefore, can be regarded as an indication of the partial (revenue) decoupling from the volatile oil (revenue) cycle; or a case of production diversification within the hydrocarbon sector.

[22] In fact, Oman has been classified as the only Arab 'success story' by the prestigious US Commission on Growth and Development (2008, Table 1). Looney (2009) provides a detailed comparative analysis of development stories in Oman and Bahrain.

[23] Authors' calculation based on IMF World Economic Outlook database (October 2010 version).

of the budget was spent on defence and security, and half on salaries, helping Saudi Arabia to turn into a full-fledged rentier state (Amuzegar, 2001, pp. 96-102). Summing up, the rather low (aggregate) investment rate compared to other regional neighbors (Table 1) appears consistent with Saudi Arabia's falling public and stagnating private investment rates. Moreover, compared to other regional economies, Saudi Arabia is less integrated to world financial markets in the sense of its lack of banking sophistication and the very low foreign participation in the domestic financial sector.[24]

It is interesting to compare the findings of this paper to those of other oil-exporting countries (both developed and developing). Using Norwegian data, Jansen and Schulze (1996) found short-run correlation between saving and investment around 0.70 from the fifties to the early seventies during which strict capital controls were in place, negative correlation during Norway's structural adjustment to the oil discoveries, and zero correlation after 1978 suggesting that the FH puzzle does not exist for Norway. Based on 1961-86 data for selected OECD countries, Bayoumi (1990) found negative but statistically insignificant relationship (-0.21) between saving and total investment in Norway, and negative and significant correlation (-0.55) between saving and fixed investment. For Canada, Bayoumi (1990) observed a high positive and significant correlation (0.83) between saving and total investment, and a significant correlation of 0.25 between saving and fixed investment, implying that cyclical factors accounted for the bulk of time series correlation of Canadian saving and investment. More recently, over the post-1975 period, Nason and Rogers (2002) observed that investment booms in Canada are associated with current account deficit, highlighting the role of capital mobility or that the FH puzzle does not hold for Canada. This result may come as no surprise given that Canada, a prototype small open economy, would satisfy most of the aspects of the intertemporal small open economy model – see Obstfeld and Rogoff (1995) for an excellent review of this research.

Hadiwibowo (2010) finds an almost one to one relation between saving and investment in the short- and long-run for Indonesia based on quarterly observations from 1984-1995. The high correlation between saving and investment coexists with free capital mobility in Indonesia, implying that domestic investment was financed by domestic or national savings, and much of the capital inflows were used to pay for the net factor income. Hadiwibowo's (2010) results appear to

[24] Market share of foreign banks by total assets is 2% in Saudi Arabia, compared to 10% in Kuwait and Qatar, 12% in Oman, 21% in UAE and 57% in Bahrain. See Al-Hassan *et al.* (2010) for additional discussion.

be consistent with Sinha and Sinha (2004), who obtained a short-run coefficient of 1.22 between saving and fixed investment for Indonesia. Sinha and Sinha (2004), in their multicountry analysis, also report short-run correlation between saving and fixed investment for Algeria (0.13), Bolivia (1.06), Canada (1.33), Congo (-0.20), Ecuador (0.54), Gabon (0.79), Norway (0.12), Syria (0.52), Trinidad and Tobago (0.23) and (former) Soviet Union (0.87). These estimates, however, differ greatly in terms of their statistical significance, number of sample observations and the way the autoregressive error processes were modeled. Montiel (1994) provides series of estimates of FH regressions for developing countries over the 1970-90 period. Focusing on the results for oil-exporting developing countries based on error-correction instrumental variable regressions,[25] the estimates ranged between -0.13 (Angola), 0.03 (Mexico), 0.19 (Gabon), 0.22 (Ecuador), 0.23 (Indonesia), 0.29 (Congo), 0.74 (Nigeria) and 1.59 (Venezuela). Although in view of the differences in estimation methods any comparison is to be taken with great care, overall the impression is that the relationship estimated for our dataset of GCC countries does seem to be stronger than for most other oil-producing countries.

4 Conclusions

The evidence brought together in this paper suggests that a long-run association between saving and investment is a robust empirical regularity in the six GCC oil-exporting developing countries. However, this evidence cannot be taken as supporting the existence of a Feldstein-Horioka puzzle, as capital accounts are known to be extremely open across all the six GCC economies. Rather, the positive long-run relationships between levels of saving and investment rates are to interpreted taking into account two main factors: (i) all countries need to diversify revenues in view of the depletable nature of oil reserves; (ii) the absorptive capacity is different across economies. Point (i) explains why in all cases investment depends on savings: essentially, oil revenues are spent partly in domestic developments plans, partly in acquiring fixed or financial assets abroad. Point (ii) explains why the mix of these two options varies across economies. The particularly weak saving-investment link in Kuwait is likely to be due to its extremely limited absorptive capacity, whereas the strong link found for Qatar and UAE is easily explained by

[25] Of the six specifications, the error-correction instrumental variable framework was preferred by the author as it addressed all of the econometric issues raised in his paper.

the sustained quest of these countries to reduce dependence on oil by expanding other sectors of their economies. Similar considerations apply to Bahrain and Oman, which were forced early on to follow this path by the paucity of their oil reserves. The wise use of oil revenues helped these countries to muster high rates of internal saving and investment and to eventually become the leading long-term economic performers among the six Gulf oil-producing nations. Finally, the very weak saving-investment link in Saudi Arabia appears consistent with the falling public and stagnating private investment rates in this country.

References

Abi-Aad, N. (2009): Energy in the Mediterranean and the Gulf: Opportunities for synergies, Documenti IAI 0935, Istituto Affari Internazionali, December.

Albatel, A.H. (2005): Government budget deficits and the crowding out of private sector investment in Saudi Arabia, *Journal of King Saud University*, Administrative Sciences, 17, 1-28.

Al-Hassan, A., Oulidi, N. and Khamis, M. (2010): The GCC banking sector: Topography and analysis, IMF Working Paper No. 10/87 (Washington: International Monetary Fund).

Amuzegar, J. (1983). Oil Exporters' Economic Development in an Interdependent World, Occasional Paper No. 18, (Washington: International Monetary Fund).

Amuzegar, J. (2001). *Managing The Oil Wealth*, I.B. Tauris Publishers, London.

Apergis, N. and Tsoumas, C. (2009). A survey of the FeldsteinHorioka puzzle: What has been done and where we stand, *Research in Economics* 63, 64-76.

Auty, R.M. (2001). The political state and the management of mineral rents in capital surplus economies: Botswana and Saudi Arabia, *Resources Policy* 27, 77-86.

Barnett, S. and Ossowski, R. (2002). Operational aspects of fiscal policy in oil-producing countries, IMF Working Paper No. 02/177 (Washington: International Monetary Fund).

Basher, S.A. (2010). Has the non-oil sector decoupled from oil sector? A case study of Gulf Cooperation Council countries. *Manuscript*.

Bayoumi, T.A. (1990). Saving-investment correlation: Immobile capital, government policy, or endogenous behavior? *IMF Staff papers* 37, 360-387.

Bohnet, I., Herrmann, B. and Zeckhauser, R. (2010). Trust and the reference points for trustworthiness in Gulf and Western countries, *Quarterly Journal of Economics* 125, 811-828.

Chinn, M.D. and Ito, H. (2008). A new measure of financial openness, *Journal of Comparative Policy Analysis: Research and Practice* 10, 309-322.

Collier, P. and Gunning, J.W. (2007). Savings and Investment in a Poor Oil Economy: Beyond the Textbook Case, *Manuscript*, Centre for the Study of African Economies, Oxford University.

Commission on Growth and Development (2008). *The Growth Report: Strategies for Sustained Growth and Inclusive Development*, Washington DC.

Di Iorio, F. and Fachin, S. (2010a). A Panel Cointegration Study of the Long-Run Relationship between Savings and Investments in the OECD Economies, 1970-2007, *MRPA Working Paper No. 25873*.

Di Iorio, F. and Fachin, S. (2010b). Savings and Investments in the OECD, 1970-2007: A Panel Cointegration Test with Breaks, *MRPA Working Paper No. 26969*.

ESCWA (2008). Capital flows in ESCWA countries, Chapter 2 In *Survey of Economic and Social Developments in the ESCWA Region*, 2007-2008, Economic and Social Commission for Western Asia, United Nation.

Feldstein, M. and Horioka, C. (1980). Domestic saving and international capital flows, *Economic Journal* 90, 314-329

Fennell, S.J. (1997). Budget structure and implications for fiscal policy, in *Kuwait: From Reconstruction to Accumulation for Future Generation*, by Chalk, N.A., El-Erian, M.A., Fennell, S.J., Kireyev, A.P. and Wilson, J.F. IMF Occasional Paper No. 150, (Washington: International Monetary Fund).

Gómez, V. and Maravall, A. (2001) Automatic Modeling Methods for Univariate Series, Ch.7 in Peña D., Tiao G.C. and Tsay, R.S. (eds.), *A Course in Time Series Analysis*, New York: J. Wiley and Sons.

Hadiwibowo, Y. (2010). Capital inflows and investment in developing countries: The case of Indonesia. *International Journal of Applied Economics and Finance* 4, 220-229.

Hirschman, A.O. (1958). *The Strategy of Economic Development.* New Haven: Yale University Press.

IIF. (2008). *Country Report: Qatar*, September 11, 2008, Institute of International Finance, Washington.

IMF. (1997). *Kuwait: From Reconstruction to Accumulation for Future Generation*, IMF Occasional Paper No. 150, (Washington: International Monetary Fund).

IMF. (2008). The rise in inflation in the GCC countries, In *Regional Economic Outlook: Middle East and Central Asia*, May 2008. (Washington: International Monetary Fund).

IMF. (2009). *Global Financial Stability Report*, October Update (Washington: International Monetary Fund).

Jansen, W.J. and Schulze, G.G. (1996). Theory-based measurement of the saving-investment correlation with an application to Norway, *Economic Inquiry* 34, 116-132.

Juselius, K. (2006) *The Cointegrated VAR Model: Methodology and Applications* Oxford University Press, Oxford.

Looney, R. (1992). Real or illusory growth in an oil-based economy: Government expenditures and private sector investment in Saudi Arabia, *World Development* 20, 1367-1375.

Looney, R. (2004). The Saudi Arabian quandary: The economy's inability to sustain growth, *METU Studies in Development* 31, 71-92.

Looney, R. (2009). The Omani and Bahraini paths to development: Rare and contrasting oil-based economic success stories, UNU-WIDER Research Paper No. 2009/38, available online: http://ideas.repec.org/p/unu/wpaper/rp2009-38.html.

Montiel, P.J. (1994). Capital mobility in developing countries: Some measurement issues and empirical estimates, *World Bank Economic Review* 8, 311-350.

Mundell, R.A. (1963). Capital mobility and stabilization policy under fixed and flexible exchange rates, *Canadian Journal of Economics* 29, 475-485.

Murphy, R.G. (1984). Capital mobility and the relationship between saving and investment in OECD countries, *Journal of International Money and Finance* 3, 327-342.

Nason, J.M. and Rogers, J.H. (2002). Investment and the current account in the short run and the long run, *Journal of Money, Credit and Banking* 34, 967-986.

Nielsen, H.B. (2004). Cointegration analysis in the presence of outliers, *Econometrics Journal* 7, 249-271.

Obstfeld, M. and Rogoff, K. (1995). The intertemporal approach to the current account, In *Handbook of International Economics*, edited by Gene M. Grossman and Kenneth Rogoff. New York: North-Holland Publishing Co.

Obstfeld, M. and Rogoff, K. (2000). The six major puzzles in international macroeconomics: Is there a common cause? NBER Working Paper No. 7777.

Ossowski, R., Villafuerte, M., Medas, P.A. and Thomas, T. (2008). Managing the Oil Revenue Boom: The Role of Fiscal Institutions, Occasional Paper No. 260, (Washington: International Monetary Fund).

Pindyck, R.S. (2004): Volatility in natural gas and oil markets, *Journal of Energy and Development* 30, 1-19.

Sala-i-Martin, X. and Artadi, E.V. (2002). Economic Growth and Investment in the Arab World, Columbia University Working Paper.

Sester, B. and Ziemba, R. (2009). GCC Sovereign Funds: Reversal of Fortune, Working Paper, January. New York: Council on Foreign Relations.

Sinha, T. and Sinha, D. (2004). The mother of all puzzles would not go away, *Economics Letters* 82, 259-267.

Sturm, M., Stráský, J., Adolf, P. and Peschel, D. (2008). The Gulf Cooperation Council countries economic structures, recent developments and role in the global economy, ECB Occasional Paper Series No. 92, June (Frankfurt: European Central Bank).

Sturm, M., Gurtner, F. and Alegre, J.G. (2009). Fiscal policy challenges in oil-exporting countries: A review of key issues, ECB Occasional Paper Series No. 104, June (Frankfurt: European Central Bank).

Vogelsang, T.J. (1999). Two simple procedures for testing for a unit root when there are additive outliers, *Journal of Time Series Analysis* 20, 237-252.

World Bank. (2006). *Experiences with Oil Funds: Institutional and Financial Aspects*, Energy Sector Management Assistance Program Report No. 321/06 (Washington).

Table 1: Investment and Savings rates in the Gulf economies, 1970-2008

	Bahrain	*Kuwait*	*Oman*	*Qatar*	*Saudi A.*	*UAE*	*GCC*	*G7*
	Saving rate							
1970-1973	26.9	45.0	41.6	53.6	44.0	69.6	46.8	25.7
1974-1980	31.3	65.5	46.6	55.7	59.4	71.6	55.0	23.4
1981-1989	29.5	46.1	41.0	41.0	26.2	47.7	38.6	21.4
1990-2008	31.2	33.7	35.8	52.6	36.1	38.1	37.9	20.8
1970-2008	30.4	43.4	39.5	50.6	38.8	49.5	42.0	21.9
	Total Investment rate							
1970-1973	21.6	12.4	30.3	25.6	10.9	30.8	21.9	25.7
1974-1980	26.8	13.7	39.7	23.6	28.3	33.6	27.6	24.6
1981-1989	25.9	14.8	30.5	17.2	22.5	27.1	23.0	22.3
1990-2008	21.9	14.7	23.5	28.8	19.6	24.7	22.2	20.5
1970-2008	23.7	14.3	28.8	24.9	20.9	27.5	23.3	22.2
	Fixed Investment rate							
1970-1973	23.5	12.1	30.7	25.1	17.8	26.6	22.6	24.6
1974-1980	24.8	12.2	37.2	23.1	21.6	33.1	25.3	23.8
1981-1989	21.8	14.2	27.8	17.2	21.6	26.4	21.5	22.0
1990-2008	20.7	13.7	22.3	26.8	18.6	23.6	21.0	20.3
1970-2008	22.0	13.4	27.1	23.7	19.7	26.3	22.0	21.8

Saving rate: 100×(Gross Savings)/Gross National Income);

Savings: Gross National Income-National Consumption;

Total Investment rate: 100×(Gross Capital Formation/Gross National Income);

Fixed Investment rate: 100×(Gross Fixed Capital Formation/Gross National Income);

Saudi A.: Saudi Arabia; *UAE*: United Arab Emirates;

GCC: Gulf Cooperation Countries, aggregate of all Gulf countries;

G7: Canada, France, Germany, Italy, Japan, UK, USA.

Source: Authors' calculations based on *National Accounts Main Aggregates Database*, United Nations, October 2009.

Table 2: Unit root tests

	ADF	ADF-GLS	ADF-AO	ADF-TRAMO	Series is:
	Saving rate (log)				
Bahrain	-1.18 [68.6]	-1.28 [18.6]	-	-	$I(1)$
Kuwait	-	-	-2.11[a]	-1.82 [36.4]	$I(1)$
Oman	-	-	-3.34 [*]	-3.44 [1.6]	$I(0)$
Qatar	-1.35 [59.5]	-1.37 [15.7]	-	-	$I(1)$
Saudi A.	-1.17 [67.6]	-1.22 [20.4]	-	-	$I(1)$
UAE	-1.58 [48.3]	-1.17 [22.3]	-	-	$I(1)$
	Total Investment rate (log)				
Bahrain	-2.90 [5.5]	-2.96 [0.0]	-	-	$I(0)$
Kuwait	-4.40 [0.0]	-4.46 [0.0]	-	-	$I(0)$
Oman	-2.82 [6.5]	-2.00 [4.4]	-	-	$I(0)$
Qatar	-1.81 [37.2]	-1.85 [6.1]	-	-	$I(1)$
Saudi A.	-	-	-3.81[a] [**]	-3.42 [1.6]	$I(0)$
UAE	-	-	-1.52	-1.44 [55.5]	$I(1)$
	Fixed Investment rate (log)				
Bahrain	-4.48 [0.0]	-3.13 [1.7]	-	-	$I(0)$
Kuwait	-2.67 [9.0]	-4.47 [0.0]	-	-	$I(0)$
Oman	-2.67 [9.0]	-2.01 [4.3]	-	-	$I(1)$
Qatar	-1.81 [36.8]	-1.87 [6.0]	-	-	$I(1)$
Saudi A.	-	-	-0.30	-1.01 [27.8]	$I(1)$
UAE	-3.06 [3.8]	-3.11 [0.2]	-	-	$I(0)$

ADF: Augmented Dickey-Fuller tests, $100 \times p-$value in brackets;

$ADF-GLS$: ADF with GLS correction, $100 \times p-$value in brackets;

$ADF-AO$: ADF augmented with dummy variables for the following AOs: Savings: Kuwait 1991, Oman 1973; Investments: Saudi Arabia 1973, UAE 1974; Fixed Investments: Saudi Arabia 1974.

$ADF-TRAMO$: ADF on series depurated from AOs with the program TRAMO, AOs as in ADF-AO above;

*,**: significant at 5% ,1%; critical values: 5%: -2.43, 1%:-3.58;

[a] : test computed on the natural values;

In all cases lag length fixed following Ng and Perron (1995);

-: not available; all other abbreviations and definitions: see Table 1.

Table 3: Total investment and Saving rates in the long-run

	Rank	*Trace*	L_{max}	*Series are*:
Bahrain	0	13.52 [9.7]	12.98 [7.8]	
	1	0.54 [46.2]		$CI(1,1)$
Kuwait	0	16.71 [3.1]	14.80 [3.9]	
	1	1.91 [16.7]		$CI(1,1)$
Oman	0	33.67 [0]	30.40 [0]	
	1	3.27 [7.1]		$I(0)$
Qatar	0	16.71 [3.1]	15.48 [3.0]	
	1	1.22 [26.9]		$CI(1,1)$
Saudi A.	0	23.17 [0.2]	20.61 [0.3]	
	1	2.56 [11.0]		$CI(1,1)$
UAE	0	12.53 [13.4]	10.13 [20.8]	
	1	2.41 [12.1]		$CI(1,1)$

Trace Trace test, L_{max} maximal eigenvalue test;
$H_0 : rank = r$, p-value in square brackets;
$CI(1,1) : I(1)$ and cointegrated; $I(0)$: stationary;
Series corrected for AOs: Savings: Kuwait 1991, Oman 1973; Investments: Saudi Arabia 1973, UAE 1974; Fixed Investments: Saudi Arabia 1974.
UAE: 1975-2008.

Table 4: Fixed investment and Saving rates in the long-run

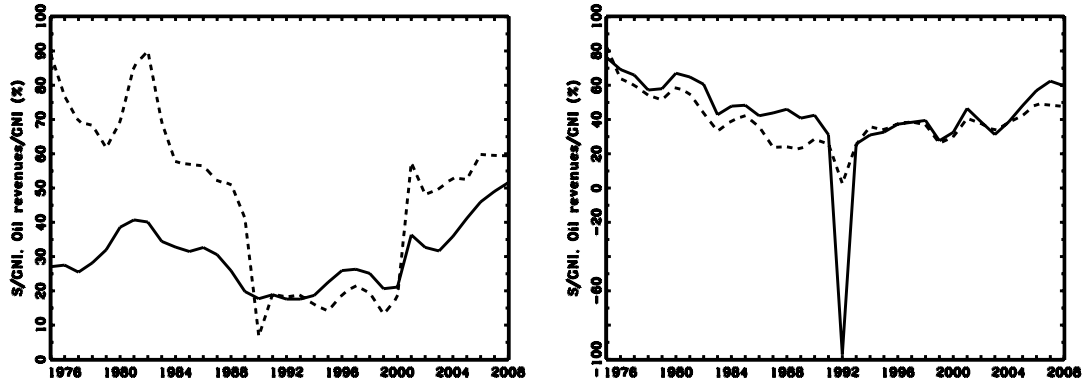
	Rank	*Trace*	L_{max}	*Series are*:
Bahrain	0	13.19 [10.8]	13.06 [7.8]	
	1	13.89 [70.9]		$CI(1,1)$
Kuwait	0	16.76 [3.0]	14.87 [3.8]	
	1	1.89 [16.9]		$CI(1,1)$
Oman	0	32.76 [0]	29.74 [0]	
	1	3.02 [8.2]		$I(0)$
Qatar	0	14.65 [6.5]	13.87 [5.6]	
	1	0.78 [37.6]		$CI(1,1)$
Saudi A.	0	26.21 [0]	24.35 [0]	
	1	1.86 [17.3]		$CI(1,1)$
UAE	0	16.19 [3.7]	14.37 [4.6]	
	1	1.82 [17.7]		$CI(1,1)$

All abbreviations and details: See Table 3;
Qatar: 1975-2008.

Table 5: Long-run saving retention rates in the Gulf economies

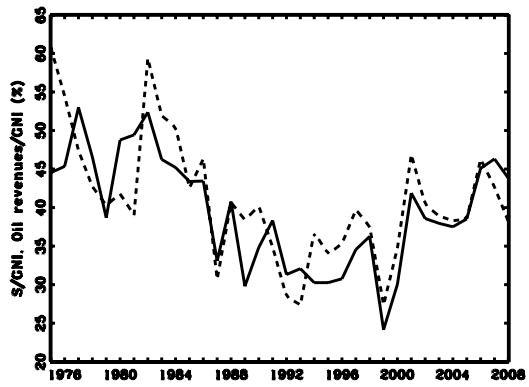
	Bahrain	*Kuwait*	*Oman*	*Qatar*	*Saudi A.*	*UAE*
Total Investments	0.52 (0.24)	0.15 (0.21)	0.69 (11.3)	0.82 (0.23)	0.29 (0.08)	0.84 (0.20)
Fixed Investments	0.41 (0.21)	0.16 (0.23)	0.55 (18.8)	0.78 (0.24)	0.09 (0.06)	0.41 (0.18)

Bahrain, Kuwait, Qatar, Saudi Arabia, UAE: $\widehat{\rho} = -\widehat{\beta}_2/\widehat{\beta}_1$, model (1), FIML estimates, standard errors in brackets;
UAE, Total Investments: 1975-2008;
Qatar, Fixed Investments: 1975-2008;
Oman: $\widehat{\rho} = \sum_{j=1}^{p} \widehat{\psi}_j/(1 - \sum_{j=1}^{p} \widehat{\phi}_j)$, model (2), OLS estimates, in brackets: $100 \times p$-value of $H_0 : \sum_{j=1}^{p} \psi_j = 0$

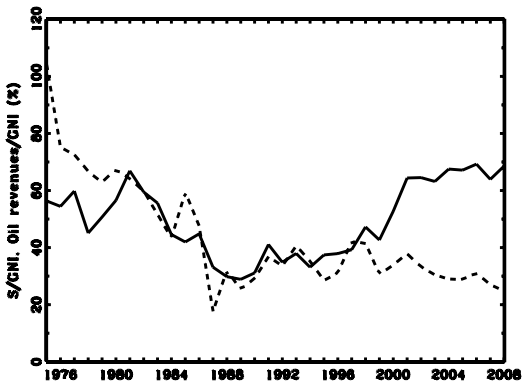


(a) Bahrain

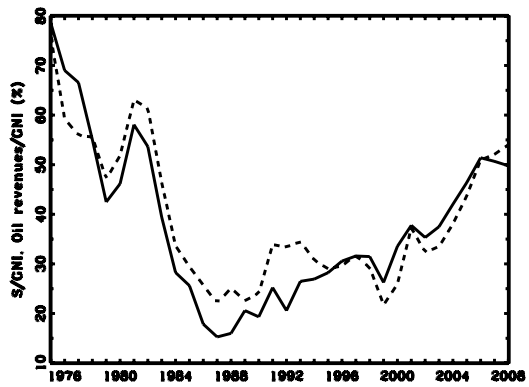
(b) Kuwait



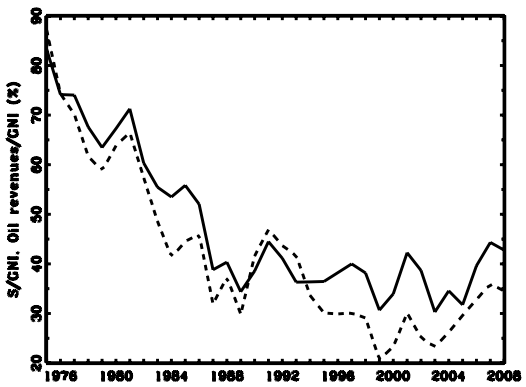
(c) Oman



(d) Qatar

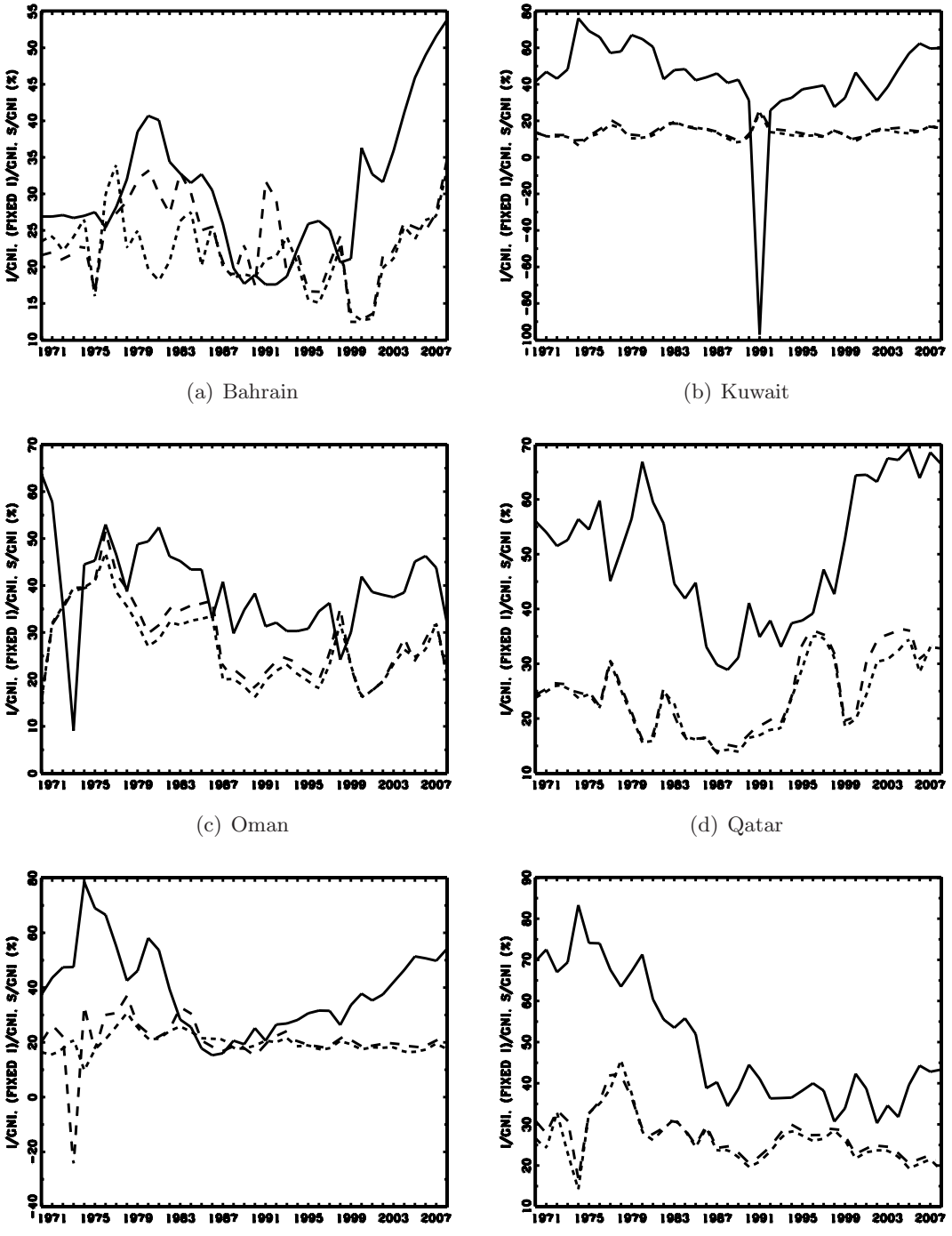


(e) Saudi Arabia



(f) U.A.E.

Figure 1: Savings/GNI (solid line), Oil revenue/GNI (dashed line) in the Gulf economies, 1974-2008 (data for oil revenues not available before 1974). Oil revenue does not include export proceeds from natural gas.



(a) Bahrain

(b) Kuwait

(c) Oman

(d) Qatar

(e) Saudi Arabia

(f) U.A.E.

Figure 2: Savings/GNI (solid line), Total Capital Formation/GNI (dashed line), Gross Fixed Capital Formation/GNI (short dashed line) in the Gulf economies, 1970-2008.

A Appendix

Table A.1: The role of oil in GCC countries' government revenues, exports and GDP (percent)

	Government revenues		Exports		GDP	
	1980	2007	1980	2007	1980	2007
Bahrain	77.0	80.0	33.6	79.2	28.0	24.6
Kuwait	82.0	93.1	90.0	94.4	59.7	53.2
Oman	86.0	76.4	92.4	75.8	59.3	45.1
Qatar	94.0	60.0	95.0	80.8	64.0	56.4
Saudi Arabia	91.2	82.5	99.9	88.0	65.8	50.9
UAE	96.0	77.0	94.0	38.5	57.0	11.1

Source: Basher (2010).

Table A.2: VAR lag orders and autocorrelation tests

	Bahrain	*Kuwait*	*Oman*	*Qatar*	*Saudi Arabia*	*UAE*
Total investment rate - Saving rate						
lags	1	1	1	2	2	1
$p(Q)_S$	67.7	56.3	61.5	94.5	84.5	70.4
$p(Q)_I$	17.0	64.8	56.4	82.5	95.4	24.7
Fixed investment rate - Saving rate						
lags	1	1	1	2	1	1
$p(Q)_S$	87.2	49.5	37.8	74.6	77.4	75.6
$p(Q)_I$	12.8	65.3	26.8	83.5	74.7	90.9

lags: order of the VECM on the basis of AIC, BIC and Hannan-Quinn;
$p(Q)$: $100 \times p$-value of the Ljung-Box test for autocorrelation of order 1;
Qatar, Fixed Investments: 1975-2008.