

**REPORT**

# **Impacts of oil shocks**

**Implications for GCC economies**

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## Oil and Macroeconomy

Oil is perhaps the most important global commodity. Its price is determined on a global market by supply and demand forces reflecting a myriad of factors. Yet understanding the origins of oil price movements and their potential impact on the world economy has never been more important for Gulf Cooperation Council (GCC) economies which possess 40% of world oil reserves (Figure 1).

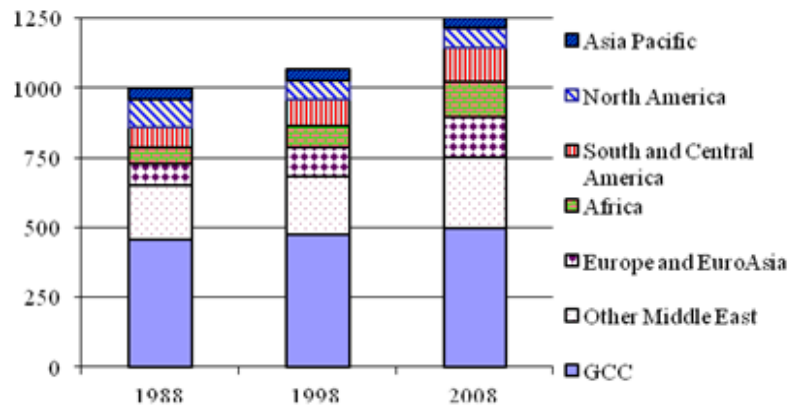


Figure 1. World's proven oil reserves by region (thousand million barrels).  
Source: BP Statistical Review 2009.

Ten of the eleven post-war recessions in the biggest oil consuming nation, the U.S.A., were preceded by large increases in oil prices (Figure 2). Although less documented in the academic literature and popular press, some of these recessions were not U.S. specific but more global in nature. Given that high oil prices and the subsequent economic stagnation often entails a boost in investment in alternative energy sources and energy efficiency technology, it is in the strategic interest of the GCC countries to synchronize their efforts in streamlining upstream investment in capacity development to maintain price stability.

Oil prices have increased steadily and substantially over the last decade. They rose from a low of about \$20 per barrel at the end of the 2001 recession to a high of \$140 in mid-2008. This seven-fold price increase rivals those of the oil shocks of the 1970s and the 1980s. However, the macroeconomic environment in which it occurred and the impact it had on the macroeconomy were very different (see Box 1 for various channels). Though inflation was creeping up during the recent oil price rise, it did not spike as it did in the 1970s and it took much longer for the price surge to affect the global economy. Another difference was that earlier shocks came in sharp and short bursts in contrast to the gradual oil price increase over the last decade, unfolding over the six years from the 2001 recession.

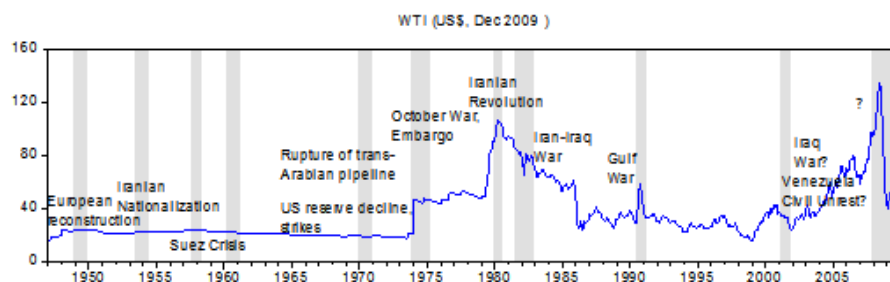


Figure 2. Real price of oil expressed in Dec. 2009 U.S. dollar. Shaded bars are U.S. recession dates by NBER. Question marks indicate the absence of exogenous events.

## Last oil shock

Before discussing the perceived impact of oil prices on the global economy and the cause of the recession, some lessons might be drawn from the macroeconomic environment of the last oil episode.

### *Macroeconomic environment*

Most economists agree that the global economy showed greater resilience to the last oil price shock than in the past. Different explanations are offered. First, oil prices started to rise in a period called the **'Great Moderation'**, where macroeconomic fluctuations in industrialized countries were much more subdued than previously. Secondly, high oil prices were a result of a strong world economy. **Demand rather than supply shocks** may be less disruptive to economic activity. Thirdly, in the absence of strong trade unions and high wage indexation there is greater (real) **wage flexibility** than in the past to absorb oil price shocks. Fourthly, developed countries that make up the bulk of the global economy are **less manufacturing based and the energy share in total consumption is smaller**. Finally, **monetary policy** has become more focused upon combating inflationary effects and anchoring inflation expectations. To the extent that today's policy makers have more experience with - and a better understanding of - exogenous oil shocks as well as greater public credibility, inflation expectations are less likely to be upgraded by oil price rises. The adverse effects upon output are lessened when monetary authorities do not have to raise interest rates to rein in second round inflationary expectations.

However, there was a **fall in price elasticities**: of both demand and supply. Increased demand was mostly from emerging markets, whose oil demands were less price sensitive; and the near-full capacity utilization in oil exporting countries severely constrained supply (Figure 3). The consequence was that any small disturbance had a very large impact on price.

**Box 1: Transmission channels from oil to the broader economy**

There is a huge literature on how oil affects the economy. Theoretical works have identified several main channels through which oil price changes affect the overall economy. These include supply shock, real balance effect, income transfers, monetary policy, adjustment costs and uncertainty effects. Note however that not all effects are expected to be unidirectional. Indeed the latter two channels anticipate a negative impact on the economy from both price increases and decreases.

**Supply shock**

The most common view of a sudden oil price increase is that of a supply shock. If oil (imported energy, to be specific) and capital are complements in the production process, then oil price increases lead to a decline in the economy's productive capacity as producers respond to higher oil prices by reducing their utilization of both oil and capital. In this case, oil price increases lead to negative transitional output growth as the economy moves to a new steady-state equilibrium growth.

**Real Balance effect**

Rising oil prices increases transportation costs, heating bills, and the prices of goods made with petroleum products. It will lead to increased money demand as people seek to rebalance their portfolios toward liquidity. A failure of the monetary authority to meet growing money demand with an increased money supply boosts interest rates, thus leading to a weaker economic performance.

**Monetary policy response**

When a higher oil price raises a firm's costs, the real consumption wage must fall for firms to maintain profit share and employment in a competitive market. However, if the workers resist the fall in real wages by asking for more nominal wages to compensate the loss in real income, the so-called second round effect of oil price rise emerges. When the monetary authorities put more weight on combating inflationary pressure they could respond to this with a contractionary monetary policy that boosts interest rates, again leading to lower growth.

**Income transfers**

Oil price increases lead to income transfers from countries that are net importers of oil, such as the U.S.A. and Euro Area to oil exporting countries such as GCC economies. If this increase is perceived to be permanent the reduction in income causes rational consumers in oil importing countries to reduce their spending on non-fuel items, which then depresses aggregate demand. Rising oil prices can be thought of a tax that is collected from oil-importing nations by oil-exporting nations. At the same time, rising income increases purchasing power and consumer demand in the oil-exporting nations. The prevailing view, however, is that not all of this increased income (so called petro-dollars) is recycled back to the global economy. Only countries whose trade is predominantly with the oil exporters would benefit.

**Adjustment cost**

In a multi-sector economy where it is costly to shift specialized labour and capital inputs between sectors, a sudden change in oil prices is more likely to reduce employment. Workers and capital in adversely affected sectors are likely to remain unemployed as they wait for conditions to improve in their sector, rather than to actively seek work in more buoyant sectors.

**Uncertainty effect**

When firms and households are uncertain about future oil prices, they find it increasingly desirable to postpone investment decisions. Where technology is embedded in capital and household items, such decisions make an irreversible commitment to the energy intensity of respective process/consumption items. As uncertainty about future oil change increases, the value of postponing investment decisions increases. In addition, uncertainty about how firms might fare in an environment of higher energy prices is likely to reduce investor confidence and increase the interest rates that firms must pay for capital. Together, these two effects work to reduce investment spending and weaken economic activity..

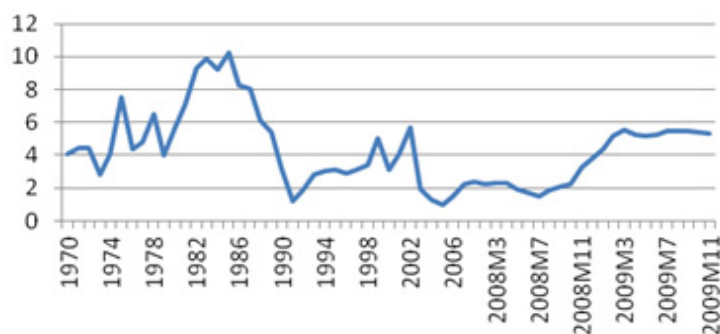


Figure 3. OPEC spare capacity (million barrels a day). Source: IMF World Economic Outlook.

### Impacts

Although the most recent economic collapse in the world economy is widely attributed to the financial crisis, others point to the sustained and unexpected surge in oil prices over many years. The main transmission mechanism is believed to be the reduction in disposable income after fuel expenses on consumption and real estate investments and a fall in corporate earnings for the non-energy producing sectors. For example U.S. home buyers, especially those in remote areas, started to default on their mortgages once the price of petrol almost tripled from a low of \$1.5/gallon in early 2002 to \$4.1/gallon in July 2008 (Figure 4).

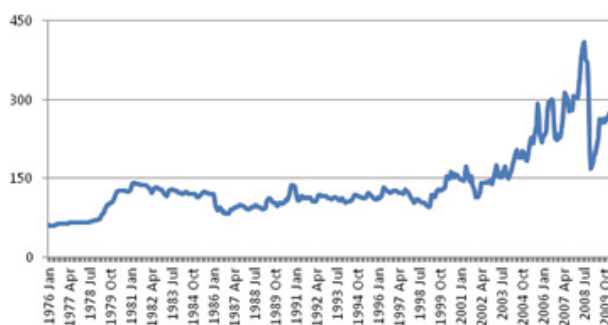


Figure 4. Nominal U.S. Cents per gallon of unleaded regular petrol including taxes. Source: U.S. Department of Energy.

Since the transition from the 'official price' regime, when the oil price was negotiated on long-term contracts, to the current market-based system of direct trading in spot and futures markets, the power balance has significantly shifted away from OPEC. Surprising to many was the inability of both OPEC (and other oil producers) and financial market participants to predict the surge in demand from emerging economies.

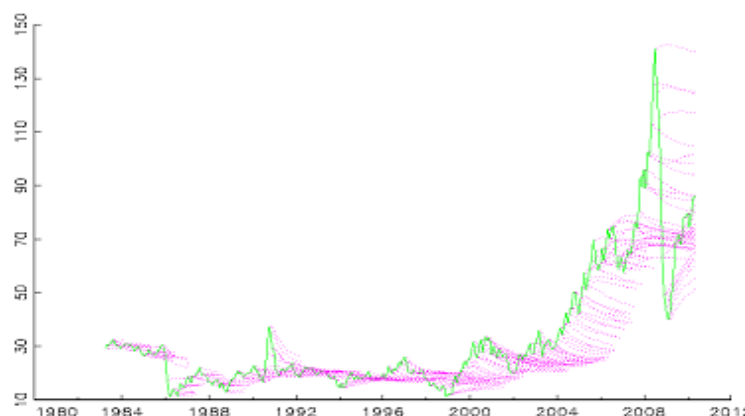


Figure 5. Spot (solid-green line) and Futures prices (dotted-pink lines) of light sweet crude oil in NYMEX. US\$/barrel.

Figure 5 illustrates the spot price (solid green) movements of light sweet crude oil on the New York Mercantile Exchange (NYMEX) since 1983. The expected evolution of this price indicated by futures contracts of various maturities (dotted pink) is also shown. It shows that futures prices were strongly correlated with subsequent movements in oil price. For example, immediately after the Iraqi invasion of Kuwait in 1990 the futures market provided an accurate forecast of the subsequent decline in the oil price. However, from early 2000 that pattern was broken, as the futures market constantly indicated a price reduction or no-change, only to find the price moving upwards in the subsequent period. Thus the last episode does indeed seem qualitatively different from the previous oil shocks. The former was demand driven, whereas earlier shocks were caused by disruptions to supply in consequence of political instability in the oil exporting nations.

However, some would dispute that the last episode reflected excess demand. It is argued that the doubling of oil prices in the first half of 2008 was more like past supply shocks: "... it clearly was not due to strong demand because the global economy was weakening and oil consumption growth was slowing" (Harris, Kasman, Shapiro and West, 2009. p. 3; see however Figure 3, where the suppressed spare capacity is visible until the second half of the year). Hamilton (2009) also points out that Saudi production in 2007 was 850,000 barrels a day below the level of 2005 and questions if this decline was due to the depletion of the country's Ghawar oilfield (the world's largest) or to a deliberate policy decision in response to a perceived decline in demand.

Speculation in the context of historically low interest rates is mooted by some, including OPEC. Indeed in a testimony before the U.S. Senate in May 2008 Michael Masters, a successful portfolio manager, cited the amount of commodity index trading strategies, which had risen from \$13 billion at the end of 2003 to \$260 billion at March 2008, as evidence of excess speculation in the commodities markets at March 2008, as evidence of excess speculation in the commodities markets.

### Reassessment

Since price rises that result from demand shocks have apparently different impact on the economy than those emanating from supply shocks, a consensus is emerging among macroeconomists that a proper accounting for the sources of fluctuations in the oil market is critical for understanding the behaviour of oil prices at least since early 2000 .

In response to this emphasis on the different sources of the oil price shocks and their potential impact on the economy, Kilian (2009, 2010) proposes a method to decompose oil price movements by their origins: those caused by demand shocks, supply shocks and precautionary/speculative demand shocks. However, the models he uses to classify shocks and to assess their impact are time invariant, thus quite restrictive; which implies the potential to overlook important structural changes both in the oil market and the macroeconomy.

Current research at GOLCER centre is attempting to extending Kalian's work to capture these important developments. Figure 6 identifies oil supply shock, aggregate demand shock and oil specific demand shock using real price data from 1973-2009. In contrast to Kilian's (2009, 2010) decomposition (dashed blue line), where model stability throughout the sample period, GOLCER (solid green line) allows for endogenously determined structural breaks. The main difference relates to the relative importance of supply and demand shocks, the former dominating in GOLCER's identification.

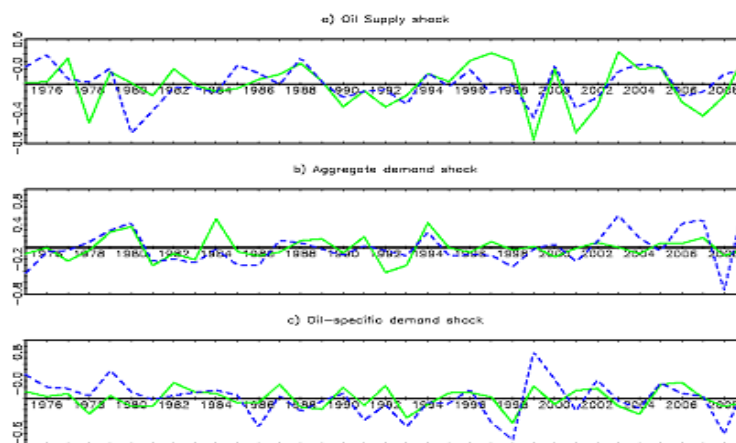


Figure 6. Oil shock identification: constant (dashed blue) vs. time variant model (solid green)

### Implications for GCC

What policy recommendations can be inferred from this discussion? What are the opportunities for and the challenges facing the GCC countries to ensure that the access to oil resources is appropriately utilised?



GCC economies should be aware of potentially important long-run global trends. The developed world's (countries in the OECD) share in total demand has shrunk from 74.4% in 1969 to 55.5% in 2008 but more importantly, the absolute amount of oil fell from 2281.6 million tonnes in 2005 to 2179.8 million tonnes in 2008 (Figure 7). This could be due to ongoing demographic and socioeconomic changes in the developed world, as well as an increased emphasis on improving transportation efficiency and encroachment by substitutes such as bio-fuels, natural gas and wind and solar energy. Secondly, as the manufacturing base shifts from the developed countries to emerging markets, the latter may inherit the problems associated with the impact of volatile oil prices on economic performance.

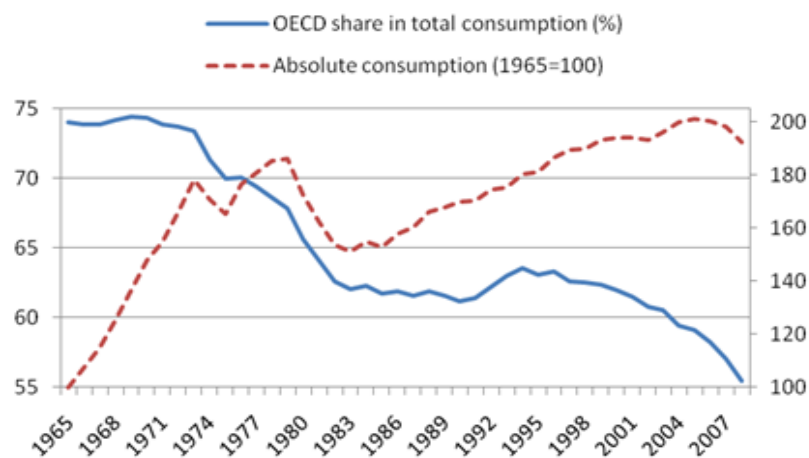


Figure 7. OECD share in world oil consumption. Source: International Energy Agency

The last oil episode also magnifies the ultimate danger of unsustainably high and volatile oil prices for the GCC economies. When prices are high, oil importing countries have an incentive to discourage oil consumption by taxing it in their domestic markets; thus the consumption of oil is falling (perhaps irreversibly) in those countries not only because of higher prices on the oil market but also higher taxes, that are levied proportional to the price. In this case the promotion of fuel efficiency in the GCC economies makes sense, despite their seemingly abundant oil reserves. The price of oil has to be competitively low enough to discourage the move to alternative energy sources. But the amount of oil the GCC economies consume today is not insignificant and it is increasing fast (Figure 8). They could indeed soon become large enough to drive up the oil prices.

A challenge facing the GCC economies is to make sure that this increase in consumption is not excessively driven by the subsidized prices of oil products. Notwithstanding their useful role in limiting the pass-through of the sizeable increase in oil prices to inflation, it is important not to forget every barrel of oil that is not consumed by the domestic market today can be exported in the future and the



## Impacts of Oil Shocks Implications for GCC

GCC economies will have to cope with non-subsidized prices once the oil runs out. Experience shows that the long-term effect of the subsidized prices lead to inefficient resource utilization and allocation. A large rise in oil consumption, against the global trend, mostly in GCC and other price subsidizing countries during the last oil price hike could be the evidence to that end (Figure 9). Artificially low-set prices could also prevent the GCC economies from benefiting from the developments of energy efficient technologies and discourage investments in other potentially successful indigenous and renewable energy resources such as wind and solar power.

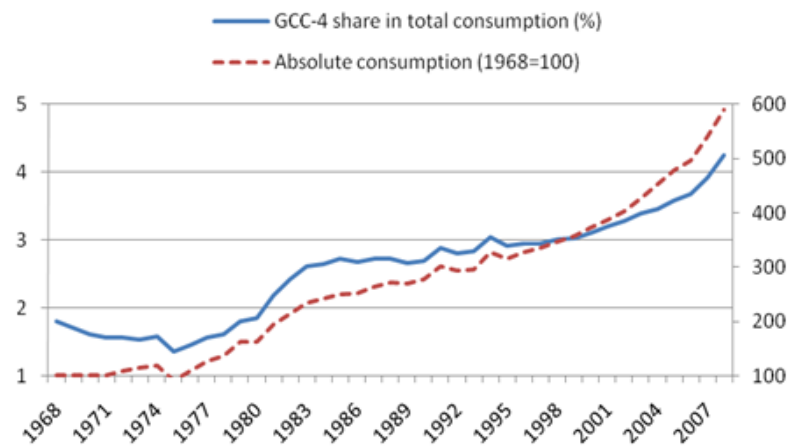


Figure 8. GCC-4 share in world oil consumption. Source: International Energy Agency

Moreover, the GCC countries' economic strength still overwhelmingly rests on hydrocarbon products. They represent roughly a half of gross domestic product in GCC countries and contribute three fourths of the government revenues. Such lop-sided economies that are so reliant on hydrocarbon's extremely volatile revenue, however, are not sustainable. Some of the GCC countries' hydrocarbon resources will be depleted in roughly two decades and, unless the economies diversify, their respective gross domestic products (GDP) will endure painful adjustments.

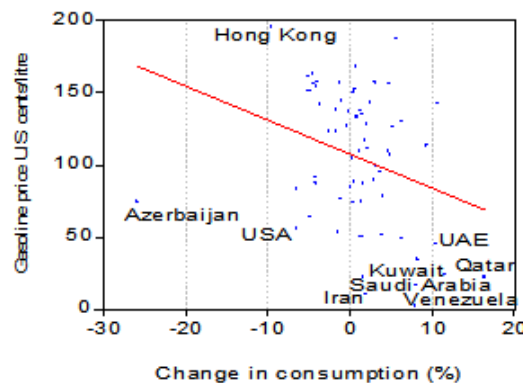


Figure 9. Super gasoline prices in US cents/litre and changes in oil consumption in 2008. Red solid line indicates a negative relationship between the two. Data source: International Energy Agency and GTZ.

A quick look at futures contracts in NYMEX, before we end this discussion, shows a barrel of oil hovering between \$85-95 per barrel in the coming 5-6 years (Figure 10). However, given the recent track record of futures market predictions, these prices should be treated with caution. As the world moves from recession to growth, oil demand will grow once again. Indeed, given growing petroleum demand from countries like China, the price pressures of 2008 are likely to continue and unless the current difficulties in increasing production levels and refining capacities in the GCC and other oil exporting countries are overcome.

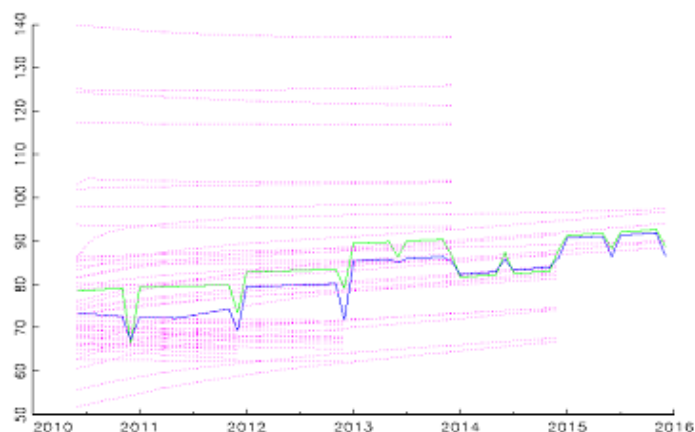


Figure 10. Futures prices of oil (dotted-pink lines) of various contracts and their Mean (solid blue) and Median (solid green) in NYMEX. US\$/barrel.

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## Footnotes

- 1 Due to data availability, Bahrain and Oman are not included.

The Gulf One Lancaster Centre for Economic Research (GOLCER) was established in May 2008 by Lancaster University Management School and Gulf One Investment Bank. The centre is funded by a donation from Gulf One Bank.

The main purpose of the Centre is to conduct empirical research focused on key economic and financial developments in the Middle East and North Africa (MENA) region, with special emphasis on the Gulf region. This region includes Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates, countries that form the Gulf Cooperation Council.

GOLCER's research agenda will include, as primary topics, energy economics, Islamic banking and finance, telecommunication and infrastructure economics. Recent developments in these fields will be assessed in the light of their impact on the economy of the Gulf region.

In addition to its research activities, GOLCER will provide tailored training courses in specialised areas, including quantitative methods and applications of state-of-the-art econometric and statistical software packages to economic and financial phenomena. GOLCER will also provide consultancy services.

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