Oil Market Dynamics in Turbulent Times

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Introduction

• Current events in MENA and recent oil price behaviour reignited many old debates
  – Reliability of Middle East as an oil and gas supplier
  – Role of speculators in oil price formation process
  – Effectiveness of oil markets in adjusting to disruptions
  – Players’ response to disruptions and role of Saudi Arabia

• But context of debate has changed
  – Global economy still recovering from one of deepest financial crisis since post World War II period
  – Shifts in global demand dynamics and trade flows towards non-OECD
  – Concerns about peak oil and scarcity premium (IMF, 2011)
  – Sweeping changes in MENA’s political landscape
A Structural Transformation?

• Main messages
  – Current oil market disruption so far is small in terms of historical ones
  – Oil market showed great resilience in dealing with physical disruption through adjustment in price differentials
  – Price level increases reflect perception of lack of feedbacks from demand and supply and movements in price levels less important than differentials for market adjustment
  – Libyan disruptions reinforce dominant story of tight market fundamentals
  – Main concern for market is context: current events would engulf other key oil exporters, especially SA
    • But concern not new; Huntington(1968): not whether regimes in Gulf would be toppled but “the scope of the violence of their demise and who wields the violence”
    • Current events caused market players to update probability of disruptions from region
    • Updating + actual loss of output will induce change in prices
Structure of Presentation

• Importance of MENA in the Global Energy Scene
  – Oil
  – Natural Gas

• Double Dependency on oil

• Libyan Disruptions in Historical Context

• The Libyan Disruption and Oil Price Behaviour

• The Battle of the Stories

• What Factors Could Change the Current Oil Market Dynamics?
# Importance of MENA in Global Oil Scene

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Proven Oil Reserves (billion of barrels)</td>
<td>816</td>
<td>61%</td>
</tr>
<tr>
<td>Production (mb/d)</td>
<td>28.6</td>
<td>36%</td>
</tr>
<tr>
<td>Consumption (mb/d)</td>
<td>8.2</td>
<td>10%</td>
</tr>
<tr>
<td>International Exports (mb/d)</td>
<td>21.2</td>
<td>40%</td>
</tr>
<tr>
<td>Surplus Capacity (2010)</td>
<td>4.51</td>
<td>100%</td>
</tr>
</tbody>
</table>
High Concentration of Reserves

88% of MENA Proven Oil Reserves concentrated in five countries

Source: 2010 BP Statistical Review
Middle East is an Important Growth Consumption Area

Annual Change in Oil Demand in China, India and Middle East (tbd)

Source: EIA Website
Strong Position in International Trade

Figure 4.19: Oil Exports to Net Importing Regions from MENA and Non-MENA Countries in the Reference Scenario

Source: IEA
Spare Capacity Holder

OPEC Spare Crude Oil Production Capacity b/d, 2010

Kuwait 300,000
Qatar 150,000
Saudi Arabia 3,740,000
United Arab Emirates 300,000

Source: EIA Website
MENA Gas Does Not Have Same Geopolitical Relevance as MENA Oil

<table>
<thead>
<tr>
<th></th>
<th>Level (2009)</th>
<th>Share in Global</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proved Reserves (tcm)</td>
<td>84.4</td>
<td>45%</td>
</tr>
<tr>
<td>Marketed Production (bcm)</td>
<td>591.5</td>
<td>19.8%</td>
</tr>
<tr>
<td>Consumption (bcm)</td>
<td>415</td>
<td>14%</td>
</tr>
<tr>
<td>Total Pipeline Imports (bcm)</td>
<td>32.2</td>
<td>5%</td>
</tr>
<tr>
<td>Total LNG Imports (bcm)</td>
<td>0.9</td>
<td>0.4%</td>
</tr>
<tr>
<td>Total Pipeline Exports (bcm)</td>
<td>70.9</td>
<td>11%</td>
</tr>
<tr>
<td>Total LNG Exports (bcm)</td>
<td>102.8</td>
<td>42.4%</td>
</tr>
</tbody>
</table>
Distribution of Reserves Uneven

65% of the region’s proven gas reserves in Iran and Qatar
Rapid Growth in Natural Gas Consumption

MENA gas consumption, 1999-2009

Source: BP and Cedigaz

Source: Cedigaz
Average Wholesale Gas Prices by Region, 2009

Middle East region has the lowest domestic gas prices in the world

Source: Mike Fulwood, 2009 IGU Survey of Wholesale Gas Prices
## 2009 Pipeline Exports: 71 Bcm

<table>
<thead>
<tr>
<th>Country</th>
<th>Exports (bcm)</th>
<th>Destination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iran</td>
<td>5.67</td>
<td>Azarbaijan (0.42), Turkey (5.25)</td>
</tr>
<tr>
<td>Algeria</td>
<td>31.77</td>
<td>Italy (21.37), Spain (6.94), Other</td>
</tr>
<tr>
<td>Qatar</td>
<td>18.75</td>
<td>UAE (17.25), Oman (1.5)</td>
</tr>
<tr>
<td>Libya</td>
<td>9.17</td>
<td>Italy (9.17)</td>
</tr>
<tr>
<td>Egypt</td>
<td>5.5</td>
<td>Jordan (2.85), Israel (1.70), Syria (0.91), Lebanon (0.04)</td>
</tr>
</tbody>
</table>

Source: 2010 BP Statistical Review
Large Share in LNG Trade Thanks to Qatar

2009 LNG Exports, 102.8 bcm

- Qatar: 49.44
- Algeria: 20.9
- Egypt: 12.82
- Oman: 11.54
- Abu-Dhabi: 7.01
- Libya: 0.72
- Yemen: 0.42
Dependency on Middle East Oil

• High dependency on MENA oil roots of energy security concerns and key driver of foreign and energy policy in consuming countries

• List of potential causes for concern quite long
  – Region experienced relatively large number of disruptions in past
  – ME Oil exporters could be hit by international/regional wars
  – Oil exporting countries may witness long periods of instability/civil conflicts and cripple oil industry
  – Terrorists networks succeed in hitting key oil installations/transport lines
  – ME countries could be tempted to use oil weapon & restrict trade routes
  – West often reacts to political developments in ME by imposing sanctions on oil exporters

• But it has not been all bad news
  – MENA continues to act as main supplier of oil and gas to global markets
  – Region played role of swing producer absorbing big supply shocks (Iran-Iraq War, Iraq Invasion of Kuwait, US invasion of Iraq, Venezuela strike, Nigeria unrest)
Two-Way Oil Dependency

GCC: Sectoral Shares in 2007
Nominal GDP (%)

GCC: Composition of Exports, 2007
(%)

Source: IIF

GCC: composition of government’s revenues
($ billion), 2000-2009

Source: official sources and NBK estimates and forecasts.
## MENA Disruptions in Historical Perspectives

### Significant Middle East and North African Oil Crises, 1950-2011

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Gross Loss (million barrels)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iranian Nationalisation</td>
<td>03/1951–10/1954</td>
<td>924</td>
</tr>
<tr>
<td>Suez Crisis</td>
<td>11/1956–03/1957</td>
<td>240</td>
</tr>
<tr>
<td>Syrian transit fee dispute</td>
<td>12/1966–03/1967</td>
<td>63</td>
</tr>
<tr>
<td>Six Day War</td>
<td>06/1967–08/1967</td>
<td>120</td>
</tr>
<tr>
<td>Libyan price controversy; damage to tapline</td>
<td>05/1970–01/1971</td>
<td>351</td>
</tr>
<tr>
<td>Algerian–French nationalization</td>
<td>04/1971–08/1971</td>
<td>90</td>
</tr>
<tr>
<td>October Arab–Israeli War; Arab oil embargo</td>
<td>10/1973–03/1974</td>
<td>468</td>
</tr>
<tr>
<td>Gulf Crisis</td>
<td>1990–1991</td>
<td>420</td>
</tr>
<tr>
<td>US Invasion of Iraq</td>
<td>03/2003–06/2008</td>
<td>1150</td>
</tr>
<tr>
<td>Libyan Disruption</td>
<td>03/2011–continuing</td>
<td>99</td>
</tr>
</tbody>
</table>

Authors own calculation based on EIA
Disruptions are Different

• Impact of disruptions on oil market dynamics depends on
  – Causes of disruption
    • Technical failures; weather related events (hurricanes, storms); terrorist attacks on oil installations; war and civil strife; regime change; sanctions
    • Disruption occur at any part of supply chain & not only at wellhead
      – Unrest in Egypt caused concerns about oil traffic though the Suez Canal and the SUMED pipeline
      – Continuing unrest in Yemen might raise concerns about disruption in Strait of Aden
      – Tension between GCC and Iran raises concerns about disruption in Strait of Hormuz
    • Change in exporters’ oil policy to balance markets results in larger withdraws oil from market
  – The nature of disruption
    • Crude oil versus products; long haul versus short haul; crude oil quality issues; etc...
  – Length of disruption
  – Oil market conditions at the time
    • Tight market conditions vs available surplus capacity
The Impact is not Uniform

• Disruptions do not have uniform impact on oil market dynamics and prices

• Also important to distinguish between
  – Short-term effects (the immediate output loss and its impact on price behaviour)
  – Long-term effects (productive capacity and long-term supply potential)
# Impact of Disruption Not Uniform

<table>
<thead>
<tr>
<th>Event</th>
<th>Impact on Immediate Supplies</th>
<th>Impact on Productive Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wars and Civil Conflicts</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Regime Change and Revolution</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Successful Terrorist Attacks on Oil Installations</td>
<td>Very Low</td>
<td>Very Low</td>
</tr>
<tr>
<td>Closure of Trade Routes</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Unilateral Sanctions</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Producer Oil Policy</td>
<td>High</td>
<td>Low</td>
</tr>
</tbody>
</table>
The Libyan Disruption: More than one Dimension

• The context of the disruption
  – Largest holder of proven reserves in Africa
  – Robust growth in oil demand
  – But considerable spare capacity and inventories

• The crude oil volume effect
  – Loss of 1.6 million b/d of crude oil
  – Compensated by increase in OPEC production??

• The product volume effect
  – Loss of 136,000 b/d of refined products (gasoline, jet fuel and feedstock naphtha)
  – Crude oil exported to Italy, refined for re-exports increasing loss of refined products

• The quality effect
  – Libya’s crude oil is light, sweet quality
  – Es Sider: slightly lower gravity than Brent and WTI but a slightly lower sulfur content;
  – Sirtica: lighter than Brent and WTI
  – Most of spare crude production capacity is heavy sour end of the barrel

• The short-haul effect
  – The closer the country is to market outlet the more immediate the disruption's impact on oil inventories and prices

• The location effect
  – Buyers will need to find substitute supplies for the disrupted oil
  – Diversion of trade flows impose costs
Robust Demand Growth Driven by Non-OECD

Year-on-Year Change in Liquid Fuels Consumption (mb/d)

Source: EIA Website
Spare Capacity and Crude Inventories Relatively High

OPEC Total Spare Crude Oil Production Capacity

OECD End-of-period Commercial Inventory (million barrels)

Source: EIA Website
# OPEC Response to Libya’s Disruption

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2010</th>
<th>3Q10</th>
<th>4Q10</th>
<th>1Q11</th>
<th>Jan-11</th>
<th>Feb-11</th>
<th>Mar-11</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Saudi Arabia</strong></td>
<td>8.051</td>
<td>8.219</td>
<td>8.248</td>
<td>8.337</td>
<td>8.839</td>
<td>8.659</td>
<td>8.904</td>
<td>8.961</td>
</tr>
</tbody>
</table>

Source: OPEC Monthly Oil Report

Ramp up in production occurred before the Libyan disruption to meet rise in demand

9.125 mb/d  8.292 mb/d
Exports of Petroleum Products, 2009 (136,000 b/d)

Source: OPEC Website
Libya’s Exports Destination

Libyan oil exports by destination, January 2010 - November 2010

- France: 15%
- Italy: 28%
- Germany: 10%
- China: 11%
- Spain: 10%
- United Kingdom: 4%
- Greece: 5%
- United States: 3%
- Other: 14%

Source: Global Trade Atlas, EIA, IEA, FACTS Global Energy
How Did the Libyan Disruption Manifest Itself?

- Changes in prompt crude prices are just most visible and immediate effect
- Market was reacting to:
- Impact of loss of volume
- The Contagion effect
  - Libya unrest was not an isolated event: Market concerns that unrest in North Africa can spill to Algeria
  - Unrest in Yemen, Bahrain and Oman can spill into Saudi Arabia and other Gulf states
  - Increased Iran-GCC tensions
- Market update probability of disruption
  - Probability assigned to disruption increased - making bets on sharp oil price movements more attractive
  - At one stage, bet on Saudi disruption quite attractive
    - Although probability assigned to such an event low, upside potential very high
The Break Away from the Implicit Band

Europe Brent Spot Price FOB ($/Barrel)

Oil price breaks away from the implicit band

Implicit $70-$80 price band in operation from Oct 2009-Oct 2010
Oil Market Hit By Key Geo-political Events

Europe Brent Spot Price FOB ($/Barrel)

- Protests in Tunisia: Begin, 17 Dec
- Egypt’s Day of Rage: 25 Jan
- Bahrain Day of Rage: 14 Feb
- Libya’s protests begin: 17 Feb
- UNSC resolution to protect Libyan civilian passes
- GCC Forces Enter Bahrain: Japan hit by earthquake

Chart showing changes in Europe Brent Spot Price FOB ($/Barrel) from October 2010 to April 2011.
Adjustment in Price Levels

• Price can move within a wide band without inducing visible supply and demand effects to put a ceiling on the oil price
  – What response does the market expect if oil price increases from $80 to $100?
  – If market does not expect feedback on supply, demand, policy, then oil price could continue on its upward march

• Changes in oil prices may not only reflect current supply-demand fundamentals as these are not known at the time

• Also reflect perceptions about
  – Potential changes in evolution of demand-supply, based on macroeconomic data flows
  – Updating probability of disruptions based on geopolitical developments
  – Coordination of investment decisions on strategies of other players and public signals
Price Volatility

• Market looking for some direction
  – Flow of information about size of disruption difficult to verify at start
  – How long will disruption last?
  – Uncertainty about response of key market players
    • Despite Libyan disruption, OPEC supply declined in March. Weak demand or miscalculation which will tighten future market fundamentals?
  – Data on supply/demand side keep being revised
Adjustment in Price Differentials

• More important than price level movements is adjustments in price differential
  – Between different types of crude oil
  – Time spreads
  – Between crude oil and products
  – Between products

• Adjustments in price differentials needed for market to absorb the wave shocks originating from disruption and direct trade flows
  – Movements in price levels play a lesser role

• Oil market has shown great flexibility to deal with the physical disruption through changes in relative prices which induced shifts in trade flows across markets
• Disruption of Libyan exports plus increasing demand by refiners and electric power utilities in Japan for light-sweet crude oil
• Increasing production of mostly sour grades from Middle Eastern countries

Source: EIA
Crude Oil Time Spreads

WTI Term Structure: 1\textsuperscript{st} month-2\textsuperscript{nd} month

Brent Term Structure: 1\textsuperscript{st} month-2\textsuperscript{nd} month

Source: Barclay’s Capital
....But there is the Long-Term Dimension

• Current Libyan situation
  – Prolonged civil war
  – Possible fragmentation of country

• Impact of civil conflicts/instability on oil supplies twofold
  – Results in short to medium term supply losses as it reduces ability of country to produce and export oil
  – Affects long term productive capacity of countries through hindering investment
Disruptions and Long-Term Productive Capacity

(change in crude oil production from pre-disruption level)

Source: EIA Website
Summary

- Oil markets have shown strong resilience to disruption
- Adjusted to Libyan output loss through price adjustments (especially in price differentials), use of spare capacity, and shifts in trade flows across regions
- Questions:
  - Will the production infrastructure suffer any lasting damages?
  - How long will the civil war last and how would this affect long term productive capacity?
  - What type of landscape will emerge at the end of conflict?
    - Fragmented country
    - New elites
    - Weak administrative and bureaucratic apparatus
    - New regulatory structure
    - Revision of oil and gas contracts
    - Revision of fiscal terms which were in the first instance unattractive
      - Will a new government be in a position to grant better fiscal terms?
Libya Not Expected to Add Much

Projected Iraq Oil Production Capacity
Over-Optimistic

EIA Latest Projection of Libyan Oil Production

Source: IEA
Dominant Story in the Oil Market

- Market fundamentals are tight and likely to tighten further in near future
  - Limited growth in non-OPEC supply (peak oil and/or over-ground constraints)
  - A slowdown in investment and future production in OPEC countries
  - Rapid growth in global oil demand fuelled mainly by non-OECD economies
- Predict “likely return to energy shortages” and “risk of a crunch in the oil supply”

Source: Barclay’s Capital, Oil Sketches, March 2011
Current Events Fuel this Story

• **Short-term effects**
  – Libya disruption speeded up the erosion of spare capacity
  – Risk of political problems spreading to Saudi Arabia
  – Recent robust demand growth both in OECD and non-OECD

• **Long term effects**
  – *Inability of MENA region to meet the investment requirement and increase production to meet projected global demand increase due to civil unrest/sanctions*
  – *Reform of prices to slowdown growth in oil domestic consumption will become more difficult after recent political shockwaves affecting ability of key OPEC members to export*
  – *Response to current events will increase the reservation price required by OPEC member countries*
Does MENA have capability to increase production?

- Price is only one of the determinants of investment in MENA
  - Under-ground factors
  - Above ground constraints
    - Wars and conflict
    - Sanctions
    - Organisation of the oil sector & capability of National Oil Company
    - Relationship between government and NOC & flow of funds back into industry
      - Fiscal system and openness to foreign investment
  - Inter-generational considerations and optimisation of the reserve base
  - Call on MENA Oil
    - ‘Security of demand’ vs ‘security of supply’
Key Middle East Players and Supply Potential

**Limited Growth Potential**
- Qatar
- Algeria
- Abu Dhabi
- Kuwait

**Medium Growth Potential**
- Iran
- Libya

**High Growth Potential**
- Saudi Arabia
- Iraq

Marginal Players
Predictable pattern of supply growth

Unpredictable pattern of supply growth but likely to be marginal in short to medium term

Game changers
Oil Price Need To Balance Budget Keeps Increasing

Oil Price Needs to Balance Budget in Saudi Arabia

Source: Jadwa Investment
What Could Weaken the Dominant Story?

• Current behaviour of oil prices endanger global growth prospects
  – But major projections of world growth not revised despite disruption

• Current disruptions and oil price behaviour reduce the attractiveness of the oil as a reliable source of energy inducing a structural shift in government policy and consumer behaviour and accelerate oil substitution policies
  – But long term effect
Global Outlook Still Benign

Real GDP Growth

Core Inflation

Source: IMF World Economic Outlook, April 2011