

# Oil and the Global Economy

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## Abbreviations

CO <sub>2</sub>	carbon dioxide
COP	Conference of the Parties
EIA	US Energy Information Administration
FDI	foreign direct investment
GCC	Gulf Cooperation Council
GDP	gross domestic product
IMF	International Monetary Fund
MENA	Middle East and North Africa
OPEC	Organization of the Petroleum Exporting Countries
PCs	personal computers
UN	United Nations

## Introduction

The Group of Thirty's mission is to deepen the understanding of international economic and financial issues, to explore the international repercussions of decisions taken in the public and private sectors, and to examine the choices available to market practitioners and policy makers. In striving to achieve those goals, we publish incisive individual contributions to the debates that are underway among the global economics and financial community.

We are delighted to publish this special occasional paper on oil and the global economy.

Abdlatif Al-Hamad's contribution on "The Challenges Ahead for the Oil Producer and Consumer Countries in the Middle East and North Africa Region" lays out the unprecedented circumstances that underpin the current oil price cycle, with the shale oil breakthroughs in the United States and elsewhere, the economic slowdown in the region (and globally), the budgetary and spending challenges facing states in the region, and the social conflicts that are shaking the region. The author makes a strong case that structural and economic reforms are crucially important if states are to move away from undue reliance on oil, and to ensure sustainable growth and stability in the region.

Philip Verleger, Jr. joins the debate with "Oil: An Ossified Industry," and argues that the world's largest firms face huge challenges, from technological breakthroughs, to shifts in consumer preferences, to innovation, and that the business models used by the largest firms are out of step with the new economic and oil price reality. Mr. Verleger

warns that much of the debt built up by oil majors in pursuit of their flawed strategies may never be repaid; if so, the defaults will cascade through the global financial system, with many negative effects.

We thank the authors for their timely contributions to the discussion on the future of oil. We hope they are useful as we seek to understand the evolution of this crucial market, its complexities, and challenges.



# **The Challenges Ahead for the Oil Producer and Consumer Countries in the Middle East and North Africa Region**

**ABDLATIF AL-HAMAD**

Unlike its predecessors, the present oil price cycle, which started in June 2014, is unfolding under an unprecedented combination of circumstances and is expected to have far-reaching consequences for the oil-exporting and oil-importing countries of the Middle East and North Africa (MENA).

This is mainly driven by shale oil development and the spectacular increase in oil production by the United States through technology-driven hydraulic fracturing, commonly called fracking. This new development has dramatically changed the outlook of the oil market. It is also coinciding with a recessionary world economy and occurring in the context in which MENA oil-exporting countries have developed a huge spending habit, which deepened their dependencies on oil revenues.

Moreover, it is taking place in the aftermath of social uprisings that shook several countries in the region and have resulted in widespread conflicts, insecurity, and increased pressure for more accountability, which compelled many governments to expand social spending and transfers in order to avert risks of political instability.

Against this backdrop and regardless of the future trends in oil prices and the evolution of oil market fundamentals, it is crucial for the countries of the region to strengthen the immunity of their economies

against the vagaries of oil markets, by enacting decisive reforms. These reforms are crucial for achieving sustainable growth and stability in the region. These will help address many of the challenges posed by overdependence on oil for the oil-exporting countries, and offer valuable opportunities for the oil-importing countries to rid themselves of many inefficient policies.

This paper highlights the challenges that lie ahead for the oil-exporting and -importing countries of the MENA region as a result of the recent oil price collapse. The oil-exporting countries that will be considered are the countries of the Gulf Cooperation Council: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates, in addition to Algeria, Iran, Iraq, Libya, and Yemen. The oil-importing countries are Egypt, Jordan, Lebanon, Mauritania, Morocco, Sudan, Syria, and Tunisia.

There is great diversity among these countries in terms of size, economic structure, natural and human resources, geography, and culture. Each country has specific characteristics and challenges that defy easy generalization. This paper will only focus on the main common challenges and issues where the countries of each group are falling short.

The first section addresses the implications of the current oil price cycle on the countries of the region, and the reasons why these implications are different from previous cycles. The second section analyzes the challenges engendered by the current oil collapse and a plausible course of action that might be embraced by the oil-exporting countries. The third section underlines the challenges and the scenarios that may unfold from the perspective of the oil-importing countries. The final section offers concluding remarks.

## **The new game—changing challenges in the oil market**

Many see the current price decline that started in June 2014 as nothing more than another oil cycle like many others that is not expected to dramatically change the outlook of the oil market. All predictions and scenario analyses made by renowned international institutions, such as the International Energy Agency, show that under the most pessimistic scenarios oil prices are going to recover progressively. The Organization of the Petroleum Exporting Countries (OPEC) is also expected to have a higher share in the oil market because supply from key non-OPEC producers will reach a peak during the next decade.

However, despite the relative similarities between the market conditions surrounding the previous oil price shocks and the present one, the current cycle is perceived as different for a number of reasons. First, the recent price fall was both simultaneously supply and demand driven. However, supply played a far more important role than in the past, and definitely mattered more than demand. The International Monetary Fund (IMF) estimates that supply factors account for about 60 percent of the recent price slump.<sup>1</sup> Although the 1986 price collapse was also ascribed mostly to supply factors due to Saudi Arabia giving up its role as a swing producer, the supply factors that have contributed to the present decline in oil prices are more diverse and a lot more complicated than the typical one-off factors, and are expected to have lasting impacts.

In addition to the fragile security situation in the region, the technology-driven supply of shale oil, OPEC's shift in strategy and diverging interest of its members, and the significantly higher sensitivity of the economies of the major oil-exporting countries to oil price fluctuations, also represent important factors that are likely to produce profound changes in the global oil and energy markets.

## THE SHALE SUPPLY SHOCK

The main reason for oil oversupply in the current price cycle is fracking, which increased oil output by about 60 percent between 2008 and early 2016, following the intensive exploitation of shale oil in North America. This development, as many have put it, is nothing short of a revolution in the oil market, which has altered many established market dynamics regarding price, supply, and demand in the trade of oil, and will have two significant impacts.

First, shale suppliers could change their capacity swiftly in response to changing market conditions thanks to their mobile exploration technology and lower investment sunk costs. Their greater responsiveness to oil price increases leads to a more elastic world oil supply, hence reducing the impact of any positive shock on oil prices.<sup>2</sup> This dampening impact on prices may have serious implications for the revenues of oil producers.

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1 Rabah and Blanchard 2014.

2 Fattouh 2014a.

However, there is the question of whether the shale-oil producers will continue to be serious competitors for OPEC producers and whether shale-oil producers will sustain the heavy financial burden incurred due to its large debt and the tough competition by traditional oil producers. Notwithstanding the recent decline in the number of new explorations, large shale oil producers in the United States turned out to be far more resilient to low output prices and high costs of extraction than expected by their competitors.

Advances in fracking technology should not be discounted, and its diffusion will certainly hinge on the prospects of further reduction in costs. Shale oil extraction costs have fallen and it is likely that exploration using fracking technology will expand outside the United States in the future. In addition, other nonconventional sources of supply such as oil sands in Canada and the light oil from the pre-salt cluster<sup>3</sup> areas in Brazil are poised to become competitive fringe.<sup>4</sup>

The second impact relates to the fact that the United States not only expanded its domestic production and reduced its dependency on oil imports, notably from the MENA countries, but it has become an exporter. After the lifting of the oil export ban by the U.S. Congress in December 2015, the United States is poised to become an important exporter of refined products, oil condensates, and petrochemicals, leading to reduced market share of many oil exporters from the Middle East in their traditional markets, particularly in Asia. It is estimated that the share of US crude oil imports from Arab countries fell from 20 percent of total imports in 2008 to less than 10 percent in 2015.<sup>5</sup> Therefore, the shale industry will continue to change the structure of oil trade in the foreseeable future.

## OPEC AND FUTURE UNCERTAINTIES

In conjunction with shale oil supply, the decision of OPEC producers in November 2014 not to cut production was intended to defend market share and drive the new competitors out of the market. This decision stands in contrast with previously followed OPEC strategy of

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3 Pre-salt clusters are areas of petroleum that are located below, and thus formed before, a geological formation of salt on the continental shelves.

4 Competitive fringe refers to small competitors in a market with a dominant firm.

5 Killian 2016.

accommodating changes in global demand or supply by competitors by adjusting supply in response to changes in market conditions.<sup>6</sup>

The availability of important spare capacity in OPEC countries, estimated at about 6 million barrels per day by 2018, may prove a challenge for maintaining discipline among OPEC members.<sup>7</sup> This risk is exacerbated by several factors.

First, Iraq may be tempted to increase its production to meet its reconstruction needs, especially since it is one of the large-reserve, low-cost oil producers among OPEC members. Second is the recent lifting of the international sanctions against Iran, and its desire to increase production and make up for the underutilization of its production quota during the period under sanctions. Third, countries like Nigeria and Venezuela are financially squeezed and may not be able to sustain a protracted period of falling revenues. Fourth, the mutual grievances between Saudi Arabia and Iran may negatively affect the decision-making process within OPEC if these grievances continue unabated.

The ability of OPEC to mitigate the above risks and accommodate the diverse interests of its members will face severe tests in case of protracted low oil prices. The long-term challenge for OPEC is to maintain oil prices at levels that would reduce the pace of high-carbon substitution in major consuming countries. This may run against the interest of small and financially constrained producers, and therefore may undermine the cohesiveness of the organization.

## SHIFTING DEMAND TOWARD OTHER SOURCES OF ENERGY

The transition to low-carbon energy sources, or “decarbonization” of energy supply, has advanced rapidly in the power industry and to a lesser degree in transportation. Renewable sources of energy are expected to have an even bigger share in power generation over the next 25 years that represent about one-third of total world generation.<sup>8</sup>

Climate change and energy efficiency have become the buzzwords in many global forums, including the global environment conference COP21<sup>9</sup> held in Paris in December 2015. This conference marked the resolve of the international community to reduce carbon dioxide

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6 Behar and Ritz 2016.

7 Fattouh 2014b.

8 International Energy Agency 2015.

9 COP = Conference of the Parties.

emission and adopt more energy-efficient systems in order to limit the rise in global temperature. This is expected to have serious implications on the energy mix that will be used in the future, at the expense of high-carbon energy systems.

Over the foreseeable future, demand for crude oil and natural gas liquids is expected to remain relatively steady, especially in the transport sector, and low oil prices may delay transition to low-carbon sources of energy. However, the pace of this transition may evolve in many ways in other sectors due to the impressive advances in technology. The fast-unfolding technological changes are adding credence to the widely held belief that the peak of oil demand is likely to take place well before reserves run out, which should provide an impetus for real reforms in the oil-exporting countries.

## **Main challenges for the oil-exporting countries**

The drastic decline in oil prices that took place between June 2014 and March 2016 is threatening the fiscal sustainability of many oil exporters. If prices remain below budget-balancing levels for a protracted period of time, the fiscal management challenges that this likely scenario would entail require not only substantive budget consolidation measures but also deeper structural reforms.

The largest oil exporters from the Gulf Cooperation Council (GCC) are relatively more protected than other oil exporters thanks to the substantial buffers of financial assets accumulated over previous decades, and their ability to borrow in domestic and international markets. Small countries with depleting oil reserves, such as Bahrain and Oman, will face an adverse environment and tougher challenges in the long term, despite their current efforts to reduce their dependence on oil.

With the hydrocarbons sector accounting for up to 90 percent of government revenues and 80 percent of exports in major oil producers, the recent oil price collapse resulted in substantial losses for these countries. It is estimated that MENA oil-exporting countries lost about US\$390 billion in 2015.<sup>10</sup> The bloated government expenditures in the aftermath of the last oil boom have resulted in substantial increases in breakeven budget oil prices in producing countries. For instance, at the end of 2015 the fiscal breakeven price was about US\$184 in Libya,

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<sup>10</sup> IMF 2016.

US\$117 in Bahrain, US\$106 in Saudi Arabia, US\$96 in Algeria, US\$87 in Iran, and US\$81 in Iraq. The fiscal breakeven price has also increased even in countries that had a comfortable fiscal space prior to the start of this price cycle. The breakeven price in Kuwait, for example, increased from about US\$47 in 2014 to US\$65 in early 2016.

There is a pressing need for the oil producers to enact bold reforms and rationalize their budgets by increasing investment in vital sectors, raising non-oil revenues through taxation, prioritizing public investment, and improving efficiency. These reforms are urgent and must be carried out after decades of rhetoric and inaction. Oil producers must diversify their economies and adopt more efficient ways to distribute oil rent.

## **STRENGTHENING FISCAL SUSTAINABILITY**

Crucial to reforming fiscal management in the oil-producing countries is the reduction of the procyclicality of public spending, or the unhealthy links between oil prices and spending. While the experience of countries in delinking spending from oil revenues through statutory oil savings and stabilization funds vary, the containment of public spending has proven more difficult in practice in all oil-exporting countries.

Since procyclicality of public spending in the region is often driven by politics that are related to regime stability, rather than economic reasons, fiscal sustainability might be better achieved through strong political commitment to a system of better checks and balances.<sup>11</sup> This commitment should be strongly signaled and anchored in a fiscal law.

Recent studies made it clear that oil abundance can be a blessing or a curse depending on the quality of institutions and the soundness of managing public finances. Strong institutions are crucial for fiscal sustainability and for immunizing the economy from oil price shocks. Better fiscal institutions involve transparent and predictable fiscal rules. In this regard, the experiences of Chile and Norway have shown the importance of such rules for smoothing spending and promoting fiscal discipline.

Experience has also shown that extended budget horizons that link longer-term development objectives with sound fiscal targets are necessary to achieve sustainability without compromising economic and

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<sup>11</sup> Malik 2015.

social projects. Because most MENA countries peg their currencies to the US dollar, hence aligning their monetary policy with that of the United States, fiscal policy is the only real independent macroeconomic policy at their disposal to stabilize their economies in the face of oil revenue fluctuation.

The spending booms during the past high oil price periods have magnified oil dependence and contributed to the entrenchment of unsustainable welfare systems with high public wages, generous social benefits, and underpriced public services. Against this backdrop, restoring fiscal sustainability is a real challenge.

In Kuwait, wages and subsidies represent about 70 percent of the budget. The GCC countries in general spend, on average, twice as much on public wages as typical developing countries.<sup>12</sup> These represented in 2015 about 10 percent of the aggregate gross domestic product (GDP) of the GCC countries. Nonetheless, these wages were without consideration for productivity or the pay scale in the private sector in these countries.

Placing caps on public sector hiring, standardization of wages across all sectors, and adoption of transparent merit-based hiring procedures are important steps being contemplated by countries in the region. In addition to these measures, incentives for young job seekers to work in the private sector must be implemented in order to contain demand for public sector jobs.

Energy subsidies, however, have led to large fiscal costs at the expense of vital spending on health, education, and infrastructure. In 2011, subsidies represented more than 16 percent of GDP in Saudi Arabia and Iraq, and above 50 percent of government revenues in Bahrain.

These subsidies also led to wasteful consumption. Some of the oil-exporting countries in the region are among the most energy-intensive and least energy-efficient economies. In addition, energy subsidies have engendered a bias in favor of energy-intensive industries. But more important, these subsidies are also inequitable since they mostly benefited the rich. For instance, in Iran the top decile was benefiting about 15 times as much as the bottom decile from gasoline subsidies.<sup>13</sup> Fuel subsidies have also encouraged cross-border smuggling and aggravated the level of pollution. The six GCC countries are among the top eleven countries in the world in terms of CO<sub>2</sub> emission per capita.<sup>14</sup>

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<sup>12</sup> IMF 2016.

<sup>13</sup> Salehi-Isfahani 2014.

<sup>14</sup> World Bank 2016.



Recognizing the importance of reducing subsidies, many oil-producing countries of the region have prepared plans to overhaul the subsidies. However, progress in implementing these plans has been slow and uneven. It is estimated that spending on energy subsidies in GCC countries declined by 44 percent from 2013 to 2015.<sup>15</sup> However, most countries are still grappling with the political challenges and instability posed by such plans, because people are resisting the idea of losing what they consider their entitlements.<sup>16</sup>

Reforms in countries like Kuwait have become the subject of political struggle between the parliament and the government. Bahrain, which raised fuel prices by more than 50 percent in January 2016, may not be able to further cut subsidies because that would engender public resistance and increase sectarian tensions. Despite recent efforts in most oil-exporting countries, subsidies remain high by international standards, and are unsustainable at current levels.

The chances of successful energy subsidy reforms may, however, be increased by engaging the various stakeholders and securing wide acceptance by the public of the reform measures. The subsidy reforms need to be embedded in a holistic vision to reform the energy sector toward higher efficiency. Moreover, budget savings from subsidy reform should be used to finance targeted mitigation programs for the poor, and the domestic prices of energy products should be aligned with international prices. Only a few countries, such as Saudi Arabia and the United Arab Emirates, seem to have followed this path of international best practice.

## ALTERNATIVE MEANS OF REDISTRIBUTING OIL RENT

Redistributing oil rent is a tool used by most oil-exporting countries in the region to maintain social stability. However, because the whole region is living in a period of tension and conflict, there is mounting pressure calling for more government accountability and transparency.<sup>17</sup>

The indirect means of redistributing oil rent through subsidies, transfers, and free public services is inefficient, inequitable, and unsustainable. Some countries, such as Iran, lifted fuel subsidies and replaced them with cash transfers to citizens. However, these cash transfers of US\$45 per person per month were set higher than budget savings from

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<sup>15</sup> National Bank of Dubai 2015.

<sup>16</sup> Glezakos and Nugent 1997.

<sup>17</sup> Gelb and Grasmann 2009.

the reform, fueling inflation and undermining the reform.<sup>18</sup> Recently, transfers for households with income exceeding about US\$12,000 per year were cancelled to reduce the total cost.<sup>19</sup>

Therefore, in considering options for redistributing oil wealth, oil producers must assess the comparative effectiveness of alternatives in terms of efficiency, equity, and sustainability. In general, cash transfers are a superior form of transfers than in-kind or indirect transfers. They are more efficient, because they give people the choice of using the money more effectively. Moreover, if they are well targeted they may achieve the objectives of equity and sustainability. Alternative means for redistributing oil wealth also need to be evaluated and compared in light of available administrative and institutional capacity, because many conditional and means-tested programs to redistribute income may be hampered by the lack of implementation capacity in terms of skills and information.

#### **PRIORITIZING INVESTMENT SPENDING**

Notwithstanding the fiscal pressure caused by the current oil price cycle, many oil-exporting countries are moving ahead with their upstream and downstream investment plans. The Arab Petroleum Investments Corporation (APICORP) estimates that for the five-year period 2016–20, the energy investment for the MENA region is expected to be about US\$900 billion of which US\$289 billion is committed investments, currently under execution.<sup>20</sup> The oil sector accounts for about 38 percent of these investments and 31 percent of the planned investments, which for the most part are upstream. But countries like Bahrain and Oman are allocating the major shares of their planned investments to downstream oil activities, notably in refining and petrochemicals. This trend is understandable because oil-exporting countries need to stand ready to compete for a larger share in the oil market in anticipation of the declining production of many non-OPEC countries.

However, there may be two major challenges for energy investment plans in the region: project cost inflation, which is raising the capital

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18 Salehi-Isfahani 2014.

19 Economist Intelligence Unit 2016.

20 APICORP 2016.

cost requirements for energy sector projects<sup>21</sup>; and limited funding amid declining government revenue and domestic resources.

In addition to investment in the energy sector, investment in sectors with a lasting impact on growth and employment should be increased. Oil-producing countries must build capacity for public and private investment by continuing to improve the business environment and to invest in better education programs and in building supportive infrastructure for investment in the non-oil sector.

The real challenge is financing these investments amid declining oil revenues. Savings out of fiscal consolidation are likely to be insufficient to finance these investment plans. That is why most of the oil-producing countries in MENA—including Algeria, Iraq, Oman, Saudi Arabia and the United Arab Emirates<sup>22</sup>—are reducing their overall capital spending. But the real tradeoff is between drawing down accumulated foreign assets and borrowing.

The first option, drawing down financial assets, is in practical terms an option only for countries that have accumulated large foreign financial reserves, such as Kuwait, Qatar, Saudi Arabia, and the United Arab Emirates. The GCC countries can also borrow internationally because they have substantial financial assets as leverage and can afford the higher funding costs. Bahrain has, for instance, successfully issued international bonds twice since November 2015. Issuing domestic bonds has also been used in the other GCC countries, because they have more developed capital markets and healthy banking sectors.

But borrowing from domestic financial markets may be the only option for a country like Iran due to the limited possibility of borrowing from international markets as a consequence of the economic sanctions imposed on it by the United Nations Security Council since 2006.

However, the availability of domestic financing may be affected by the risk to the domestic banks if the period of low oil prices is protracted, hampering, in turn, investment in the non-oil sector, which is directly linked with government spending.

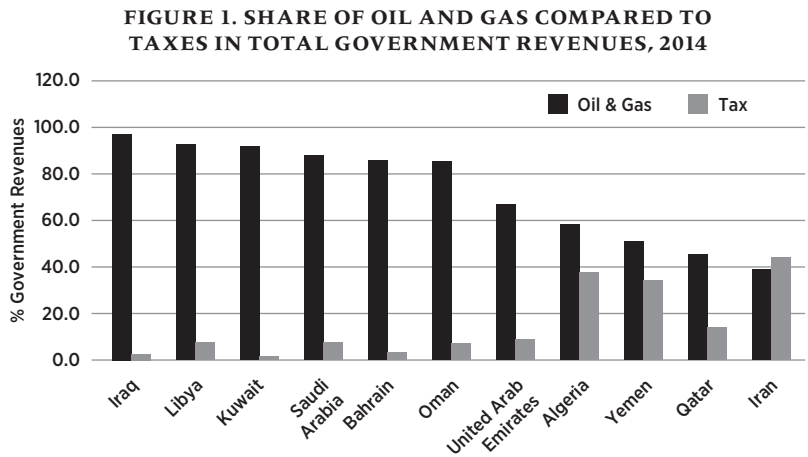
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21 Issaoui 2014.

22 IMF 2016.

RAISING NON-OIL REVENUES THROUGH TAXATION

Oil-exporting countries in the region have a relatively low tax base. Taxes represent only a small fraction of total government revenues (figure 1).



Sources: Arab Monetary Fund 2015; and IMF 2015a.

To reduce fiscal pressure and mitigate the negative impact of lower oil revenues on the budget, many countries of the region must implement tax reforms. These reforms aim at achieving fiscal diversification and lowering exposure to oil market fluctuations. In the GCC countries, these reforms aim at introducing 5 percent value-added taxes on certain goods and services by 2018, which, according to IMF estimates, could generate about 1.5 percent of their aggregate GDP.<sup>23</sup> But progress has been uneven so far among the six countries in the group, with Bahrain, Oman, Saudi Arabia, and the United Arab Emirates being in the final stages of implementation, and Kuwait and Qatar lagging behind.

While introducing taxes is an important step toward raising government revenue in a more sustainable manner, a few broad observations are in order.

First, while the ratios of tax revenue to GDP in the oil-exporting countries of the region are low by international standards and there is ample room to raise them, these ratios should not be expected to increase dramatically over a short period of time. For instance, the

23 IMF 2016.

ratio of tax revenue to GDP is 0.8 percent in Bahrain and Kuwait, 6.4 percent in Iran, and 12.5 percent in Algeria,<sup>24</sup> compared to 15 to 20 percent in developing countries and 30 percent in developed countries. The tax systems in GCC countries rely on corporate rather than personal taxes, and more on indirect taxation, especially on trade, than on direct taxes. Imposing new personal income taxes or consumption taxes may face public resistance.

Second, there are challenges to creating and administering a modern tax system. The envisaged tax reform programs in several GCC countries will be severely constrained by a lack of data on taxpayers and weak administrative capacity. The tax system should be simple, broad-based, efficient, accountable, and mindful of equity considerations.

Third, for a tax reform program to be successful, it must be embedded in a more comprehensive reform program to rationalize budgets that must be linked to other aspects of development priorities such as encouraging employment of nationals in the private sector.

Revenues raised by broadening the tax base could be substantial. In Kuwait, for instance, very modest tax rates could raise up to US\$3.3 billion in corporate taxes for large national companies, US\$1 billion from personal income taxes, and US\$2.7 billion in value-added taxes.<sup>25</sup>

## MEETING THE ELUSIVE QUEST FOR DIVERSIFICATION

Past oil windfalls have been used to build needed infrastructure and achieve substantial advances in human and social development in many oil-exporting countries. However, they have not been used to diversify the economies and increase jobs outside the public sector. Quite the contrary, the state-led development model followed by most countries of the region did not lead to a significant leap in diversification, stifled private initiative, and biased industrial policy toward the public sector.

First and foremost, diversification is associated with the competitive use of knowledge. Therefore, it must start with high-quality education and strong human capital development. The experiences of Chile,

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24 Arab Monetary Fund 2015; IMF 2015a.

25 Carvalho and Youssef 2015; IMF 2014.

Indonesia, and Malaysia are revealing in this respect.<sup>26</sup> However, for those things to happen, the quality of education, training, and research and development systems need to be improved with the goal of improving entrepreneurship and global competitiveness.

In addition to human capital, industrial policy is key in any effort to diversify the economy. It should aim at using crude oil in high-value-added sectors. In this respect, many oil-producing countries are making commendable steps. For instance, Algeria is planning to use oil and natural gas as feedstock in related industries. Saudi Arabia is planning to build a large integrated petrochemical complex called Sadara, and the United Arab Emirates is developing major industrial projects such as those in the Khalifa Industrial Zone.

In addition, oil-exporting countries should increase their investment in renewable and other alternative sources of energy in order to satisfy the fast-growing domestic demand for electricity and water. Several of those countries are developing large renewable energy complexes such as Kuwait's Shagaya Renewable Energy Park, which will boost the share of renewables to 15 percent of energy needs by 2030. Saudi Arabia is planning to produce 52 gigawatts of renewable energy by that year. The United Arab Emirates is planning to start using its four nuclear reactors during 2017–20, to produce about 1.4 gigawatts of electricity. These projects are important to the extent that they will contribute to increasing their oil exports and limiting the imports of feedstocks.

While it is not easy to successfully leapfrog into new production lines that are unrelated to oil, the example of the Republic of Korea, which has become one of the largest steel producers while importing the necessary ingredients of steelmaking,<sup>27</sup> and that of Dubai in the United Arab Emirates, which became a service hub and financial center, may be emulated through both creativity and strong leadership.

In diversifying their economies, the oil countries must be mindful of the fact that following the same industrial and diversification path by all within the same region may be counterproductive. In this regard, the GCC region is already facing a problem of overcapacity in key areas such as petrochemicals, aluminum, and building materials. Bahrain, as

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<sup>26</sup> In comparing the experiences of these three countries in achieving relatively successful diversification, Gelb and Grassman (2009) found that despite their differences, they shared the common feature of accelerating development and sustaining economic and social stability. This was possible mainly through the transformation of part of natural resource rent into human capital (by better investment in education), infrastructure, and institutions. See also Gelb 2012.

<sup>27</sup> Chang 2016.

a financial hub, is being rivaled by Qatar and the United Arab Emirates. Therefore, a coordinated path for diversification is likely to be a better course of action.

Industrial policy should also focus on changing the incentive structure in the economy to encourage new investments in non-oil-related sectors that reduce dependency on the hydrocarbon sector. The creation of new niches of activities requires close collaboration with the private sector.

Prudent macroeconomic policy in terms of more flexible exchange arrangements, better fiscal institutions, transparent rules and budgetary procedures, suitable systems of checks and balances, and an enabling business environment are essential for diversification.

## **TOWARD MORE SENSIBLE ENERGY SUPPLY AND TRADE POLICIES**

With the United States reducing its dependence on MENA region oil and increasingly becoming a serious competitor for refined petrochemical products in the traditional markets of Asia, the oil-exporting countries of the MENA region will be compelled to compete more aggressively for market share especially in Asia, which is poised to become the largest market for oil and refined products in the future.

According to International Energy Agency predictions, India is expected to have the largest growth in demand for oil, and China is expected to displace the United States to become the largest consumer of oil starting in 2030.<sup>28</sup> In this regard, the oil-exporting countries must adopt innovative marketing and pricing strategies in this large market. Some countries, such as Iraq, are already offering their oil at a discount; Iran is exporting oil at discounted freight<sup>29</sup> rates using its own vessels; and Kuwait is buying shares in Asian refineries to secure markets for its own crude supplies.<sup>30</sup> Saudi Arabia envisages selling a stake in the Saudi Arabian Oil Company, popularly known as Aramco, which is probably the world's largest oil and gas company, in addition to investing in natural gas projects and broadening its activities overseas in refining and petrochemicals.<sup>31</sup> Oil-exporting countries should consider

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28 IEA 2015.

29 These rates vary mainly by route and vessel size.

30 Fattouh 2014a.

31 *Economist* 2016.

other markets, as well, in addition to their traditional markets, such as Africa, where demand for energy is expected to grow.

## **Main challenges for the oil-importing countries**

Since oil prices are important determinants of their external and fiscal positions, the oil-importing countries in MENA are vulnerable to oil price fluctuations. The recent decline in oil prices in international markets has had a salutary impact on the budget of many oil importers through the decrease of fiscal spending on fuel subsidies, and on their current account balance due to the reduction of oil import bills. The drop in oil prices may have also contributed to the reduction of the cost of production of firms using hydrocarbons, such as utilities, especially in countries that allow domestic prices to adjust in line with international prices.

However, the size of these gains depends on a host of factors including the structure of the economy and its energy intensity, and the share of oil imports in total imports. The IMF estimates that the resulting gains in 2015 from the current oil price drop represented 4.5 percent of GDP in Lebanon, 4.3 percent in Morocco, 3 percent in Mauritania, and 2 percent in both Jordan and Tunisia.<sup>32</sup>

These gains have been partially offset by an appreciating dollar, a fragile security situation, and recessionary European economies, which are the main trading partners of the MENA region. The oil-importing countries also have been affected negatively by lower oil prices, through lower worker remittances, tourism flows, aid transfers, and foreign direct investment from the oil-exporting countries of the region, especially the GCC countries.

However, the expanding fiscal space provided by sustained lower oil prices will alleviate fiscal pressure and free resources for spending on health, education, and infrastructure. More importantly, it provides an opportunity for reducing vulnerability to oil price fluctuation by engaging crucial reforms.

While it is difficult to present a detailed account of all the pressing problems and reform areas that ought to be addressed by the different countries in the region, we can still highlight the most urgent common areas of reforms, despite the fact that the breadth and scope of these reforms vary from one country to another.

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<sup>32</sup> IMF 2015b.



## REFORMING SUBSIDIES AND SAFETY NET SYSTEMS

The erosion of the social contract inherent to the development model, which has been pursued by virtually all the countries of the MENA region during the postindependence era, is evident. The premise of this social contract has been the emphasis on equity and redistribution of income through guaranteed employment in the public sector, subsidies, and underpriced public services such as health, education, and housing.

Governments are no longer able to guarantee employment to university graduates and to provide adequate social services to the growing populations. Moreover, spending on subsidies, especially on energy, has become unsustainable. These subsidies were inefficient, ill-targeted, encouraged overconsumption, and represented a drain on foreign exchange reserves. Subsidies were also crowding out public spending on health and education. In the prereform period, energy subsidies represented, in a country like Egypt, three times the spending on education and seven times the spending on health. Moreover, the share of fuel subsidies going to the richest 20 percent of the population was 45 percent in Jordan and 60 percent in Egypt.<sup>33</sup>

Many countries in the region have started implementing progressive reforms aimed at streamlining benefits and using the budget savings to finance targeted programs to protect the poor, including through existing social safety nets. However, much remains to be done. Energy subsidies still represent more than 5 percent of GDP even in countries that started reforms early on, such as Egypt and Tunisia. These reforms need to be consolidated to further alleviate the pressure on budgets, limit energy dependence, and reduce the inefficiencies inherent in the current subsidy system.

Reform should also involve overhauling the current social safety net systems. More important is the problem of the unsustainability of the pension systems in the region. Most of these systems are on a pay-as-you-go basis and face tremendous financial problems despite the high share of young populations and limited coverage.<sup>34</sup> The outdated design of these systems, and of coverage and pension benefits, need urgent reform to avoid collapse of the pension systems, of which future generations will bear the brunt. The transition to fully funded systems or more sustainable pension systems is vital in light of the increasing

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<sup>33</sup> World Bank 2014.

<sup>34</sup> Robalino 2005.

dependency ratios, lower payroll growth, and the mounting financial difficulties of the current pay-as-you-go systems.

## **THE GROWTH AND YOUTH EMPLOYMENT CHALLENGES**

It takes stronger and broad-based growth to generate enough resources to reduce vulnerability and meet the most urgent challenges for the region, especially the creation of enough jobs for the rapidly growing labor force. Increasing employment opportunities, especially for the youth, is the most critical development challenge in the region. Unemployment is a serious problem not only because of its high rate, but more importantly because of its concentration among educated youth, females, and first-time job seekers. The average unemployment rate is about 15 percent of the labor force. It is higher than in any other region in the world. In addition, one in every four unemployed people is a university graduate and about half of the unemployed are between the ages of 15 and 24. The high number of young jobless with great expectations about the future is a major threat to the social and political stability in the region.

The wide gap between the growth rates of the labor force, the fastest growing in the world, and the employment rates is such that by 2020, around 20 million additional jobs will be needed just to halve the current unemployment rates in the region.<sup>35</sup> This would imply sustainable growth at much higher rates than have been achieved in the region during the past four decades.

Achieving rapid growth rates and improving the job content of growth require deeper reliance on a more market-oriented and private-sector-led development model. The overall competitiveness of the economy needs to be improved by moving up the value chain, diversifying the economic base, and increasing the relevance of education to the changing requirements of international markets.

## **BETTER INCLUSIVENESS AND MORE EFFECTIVE GOVERNMENT INSTITUTIONS**

The uprisings that took place in many countries of the MENA region are mostly ascribed to the discontent of the youth and the marginalized fringes of society about inequality of opportunities and unfairness. Their

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<sup>35</sup> Arab Fund's calculations based on the Joint Arab Economic Report Database.

exclusion from the old welfare state inherent in the unraveling social contract through lower job opportunities and deteriorating education quality was an important trigger of the social uprisings.<sup>36</sup>

Therefore, improving economic opportunities and inclusiveness for the youth and those living in less developed rural areas is key to achieving sustainable growth and improving social stability in the region. Employment opportunities must be expanded by improving the flexibility of labor market regulations, and education must be improved by conducting a serious assessment of current educational standards.

Promotion of inclusive growth and developing economic opportunities for the youth require improvement of the effectiveness and implementation capacity of public institutions. Serious governance issues in relation to cronyism and unaccountability must be addressed. The public institutions lag behind other regions in the factors found to have the strongest links with economic development. They negatively influence the investment climate through lack of transparency and predictability of the rules; barriers to entry, exit, and operation of the business sector; and weak delivery of key public services. Sustainability and inclusiveness of growth might not be achieved without addressing these impediments.

## **IMPROVING EDUCATION QUALITY AND CLOSING THE KNOWLEDGE DEFICIT**

The low quality of education and deficient knowledge capabilities represent daunting obstacles for economic diversification and better global competitiveness. Education systems have not kept pace with advances in science and technology and are not delivering employable graduates. For example, according to the 2012 World Bank Enterprise Survey (World Bank 2012), about 39 percent of interviewed Tunisian employers assert that workers' skills are a leading constraint for their business. Moreover, 70 percent of employers believe that engineers and professionals do not have the required skills for the job.

In addition, the available research activities in the region are focused on traditional fields with a weak connection with the productive sector, and are not conducive to niches for new competitive advantages in international markets.

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<sup>36</sup> Amin et al. 2012.

There is a dire need for better entrepreneurship and innovation systems. This can be achieved by improving the responsiveness of the education and research and development systems to market demand and global competitiveness, notably by facilitating academic spinoffs and access to global knowledge.

Upgrading the quality of education, supporting education in science and technology, increasing investment in research and development related to innovative and advanced fields, and strengthening the connection between the production of knowledge and the productive sectors in the economy, should be among the priorities of the region in that respect.

## **REINVIGORATING THE ROLE OF THE PRIVATE SECTOR**

The omnipresence of the state in the region is precluding economic diversification, encouraging unproductive activities, proliferating uncompetitive attitudes, crowding out private investment, and stifling private sector initiatives. Given those circumstances, it is no surprise that the region, as a whole, has one of the lowest ratios of private to public investment in the world. As a consequence of the underdevelopment of the private sector, only a few of countries have managed to somewhat diversify their economies. For example, over the past four decades, only Jordan, Morocco, and Tunisia have made important progress in increasing the share of manufacturing exports in their total exports.

The public sector is no longer able to create enough jobs for the fast-growing labor force, hence the need for a more active role for the private sector, which should be more involved in production and investment in all sectors conducive to the diversification of the economy and improvement of its competitiveness.

However, the private sector cannot be expected to contribute to the effort of diversifying economies and meeting the employment challenge in the presence of cronyism and an inadequate business environment. The business sector in the region is often crippled by an unlevel playing field, complex business regulation, and weak infrastructure. Therefore, governments should act as facilitators and regulators while enforcing market discipline and the rule of law. They should also incentivize the private sector into new job-creating activities, including through better integration in the world economy.

## **BETTER INTEGRATION IN THE WORLD ECONOMY**

Most countries in the region have made little effort to integrate into the global economy. Many non-oil MENA countries are still not integrated well in terms of trade and foreign direct investment (FDI). The countries of the region are not actively participating in the international globalization of production and are still minor players in logistics and many dynamic tradable services. Only a few are engaged in the production of high-value-added products.

Despite the fact that tariff rates have been reduced, non-tariff barriers and high transaction and trade costs continue to hamper international trade in the region. In addition to security concerns, the region continues to be unattractive to FDI due to a poor regulatory framework and the lack of needed managerial and technical skills. The share of the whole MENA region in FDI, representing less than 4 percent of world's FDI, is low compared to countries in Asia and Latin America. Moreover, available FDI remains focused in enclave sectors such as energy or low-value-added manufacturing industries with modest impacts on economies.

The potential of the region for boosting growth and employment through better trade and investment ties with the rest of the world could be improved if the barriers to trade and investment were removed and adequate incentive mechanisms developed. Governments should encourage the development of new export niches in high-value-added sectors by providing adequate support for startups and the creation of technology-driven small and medium enterprises and industrial clusters in sophisticated products. Moreover, they should also attract FDI into high-value-added and knowledge-intensive sectors in order to provide better employment opportunities for educated job seekers, in addition to contributing modern technology and know-how for the rest of the economy.

## **Concluding Remarks**

Under the pressure from recent oil market and regional developments, most countries in the MENA region are being challenged to reform. Proper response to these recent developments requires a clear vision about the future and a long-term reading of the challenges and opportunities ahead.

The recent oil price collapse episode offers a great opportunity for the oil-producing countries to achieve fiscal consolidation by reforming long-standing inefficient energy subsidies, streamlining the wage structure, strengthening fiscal institutions, implementing necessary tax reform, and reducing oil dependency by diversifying their economies.

For the oil importers of the region, the current oil price cycle has been a boon, since the oil price slump reduced oil-import bills, hence creating better external positions and lower costs of energy subsidies. This allowed them to free fiscal resources for spending on education, health, and infrastructure. It also gives them the opportunity to reduce their vulnerability to oil market fluctuations and undertake crucial reforms in a number of important areas.

The many economic reforms carried out by MENA countries are yet to show progress toward higher growth and more diversified and competitive economies. The countries should enact creative policies that ensure sustainable inclusive growth and shield their economies from external shocks. Drastic and bold reforms for improving the quality of education and strengthening the connection between knowledge and the productive sectors in the economy are needed. This is crucial since for a long time the low quality of education has exacerbated the effect of cultural factors that do not value work, freedom of thought, and innovation.

The region needs bold and creative governments that show the way for the youth and new entrepreneurs, encourage private initiative without preserving vested interests, and change attitudes from idleness and dependency to diligence and self-reliance. However, creative ideas need to be transformed into concrete action plans. That is why there are no alternatives for strong leadership and sound management.

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## Oil: An Ossified Industry

PHILIP K. VERLEGER, JR.

The large firms involved for decades in hydrocarbon extraction, particularly those engaged in oil and gas production, are economically ossified. Despite momentous changes in the character of demand, competition from other energy sources, and technological breakthroughs in production, these firms have continued to follow traditional practices, seeking very large oil and gas reserves in difficult, extraordinarily expensive areas. To finance their conventional operations, they have issued long-term debt in excess of US\$2 trillion. Some of it will be rescheduled. Much, perhaps half, will never be repaid because the issuing firms comprehend neither how dramatically their industry has changed nor how these changes threaten to soon engulf them. The collapse of crude oil prices in 2014, and low natural gas prices, are but the first of several critical shifts that will overwhelm these companies and, tragically, those nations whose economies depend excessively on hydrocarbon production.

Three forces threaten to permanently transform the oil industry from riches to ruin: technical change, shifts in consumer preferences, and innovation. In the near term, say to 2020, firms in the industry (both publicly held companies such as Chevron and state-owned companies such as Petrobras and Saudi Aramco) will feel ongoing pressure from fracking, a disruptive technology that has unexpectedly and permanently driven down the cost of finding and producing crude oil. Over

the intermediate future, say to 2030, the industry must confront evolving consumer preferences that favor anything but fossil fuels. Rightly or wrongly, oil and gas firms are now less popular than tobacco firms. Oil and gas use will peak and then decline even if prices are low. The drop could come soon if the global economy remains mired in secular stagnation.<sup>1</sup>

In the long run, the industry's future is even bleaker because innovation, driven especially by concerns over global warming, will slowly but steadily push fossil fuels out of all but a few activities. Petroleum or a fuel derived from natural gas, as an example, may be required for air and sea transportation for many decades, but innovation could displace fossil fuels in almost all other uses.

## Fracking: disrupting the old order

In his 1997 book, *The Innovator's Dilemma*, Clayton Christensen examines disruptive technologies and shows how they can seriously alter competition in any industry, destroying traditional firms that do not adapt while creating opportunities for new, agile firms to expand rapidly.<sup>2</sup> Using computer storage devices as an example, he illustrates how very low cost but inferior digital storage media such as floppy disks and thumb drives undermined and eventually bankrupted entrenched firms that marketed superior but far more expensive technologies—for example, the large, high-speed storage media used on mainframe computers. Christensen points out that often the manufacturers of the superior equipment did not respond to the disruptive threat or responded too late because their customers saw no use for the lower-cost alternatives and thus did not demand them.

Disruptive developments such as the ones in digital storage media observed by Christensen also affected computers themselves. Apple's introduction of one of the first personal computers (PCs) was not seen as a threat by the mainframe computer manufacturers of the early 1980s, particularly IBM and BUNCH (Burrows, Univac, National Cash Register, Control Data, and Honeywell). Thirty-five years later, only IBM still makes mainframes. PCs have conquered information processing, and Apple is now the world's largest company.

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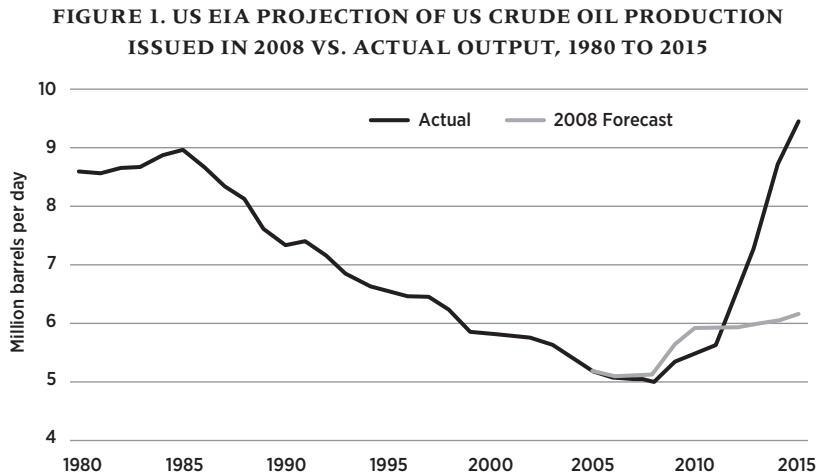
1 For a detailed discussion of secular stagnation, see Summers (2015).

2 Christensen 1997.

Fracking fits the disruptive model perfectly. A fracked well produces much less than the large wells drilled by the major oil companies. A fracked well also costs much less, sometimes under US\$10 million.<sup>3</sup> On its introduction, fracking technology was not of interest to big companies such as Shell because the per-well production volumes were so small. Other entrepreneurs, though, seized on the idea, especially in the United States, where tight oil reserves were available for development and resources could be owned by virtually anyone rather than being strictly controlled by the state.

Fracking's debut in the United States led to large increases in oil and gas output that were not anticipated five years earlier. The effect can be seen in figure 1. This figure compares the US Energy Information Administration's (EIA's) forecast for US crude production made in 2008 with actual output for 1980 to 2015. Notice that in 2008 the EIA projected US crude production would reach 6 million barrels per day in 2015. At the time, this outlook reflected the views of all experts.

Yet all the experts were wrong, as illustrated by the rise in actual production. In 2015, output was 9.4 million barrels per day, or 53 percent higher than projected. The sharp boost in US oil output displaced production by Organization of the Petroleum Exporting Countries (OPEC) members.



Source: US EIA.

3 Gold 2014.

Fracking's success can only be explained by the unique structure of resource ownership in the United States. In most nations, the state owns resources and entrusts development to state-owned companies or large multinational companies. Modern fracking would not have been of interest to these firms and, had the state-owned resource model been ubiquitous, fracking would not have been pursued or would have been pursued much more slowly.

The United States is different. Its culture promotes entrepreneurship and experimentation. Its laws permit those who find technological breakthroughs for resource development to capture much or all of the rents.

Fracking has had a profound impact on world resource balances. For decades, there was almost total agreement that Saudi Arabia led the world in oil reserves. Then, on July 4, 2016, the day the United States celebrates its independence from Great Britain, Rystad Energy, a highly respected Norwegian consulting firm, announced that reserves in the United States and Russia exceeded those of Saudi Arabia. While Saudi Arabia holds by far the largest amount of "conventional reserves" (that is, producible via conventional technologies), the United States' unconventional reserves (meaning shale) were large enough to move the US ahead of Saudi Arabia.<sup>4</sup> This development was reported in the industry press and by the *Financial Times* and other news media.

For some of those who have followed the oil industry for decades, the announcement was not surprising. They recognize that, as Professor Morris Adelman, long a fixture at MIT, had asserted often, a difference exists between a nation's resources and its reserves. Resources represent a country's total endowment, while reserves represent oil that can be produced using *existing* technology.<sup>5</sup>

The Rystad estimates will be disputed by Saudi Arabia. Even so, it and all other countries that rely on oil for much of their income have been rudely surprised by fracking's success.

## Low-cost producers: no longer bystanders

Key oil and gas producers have belatedly recognized the trend created by fracking, and their new understanding has dictated their actions, in particular those of Saudi Arabia and other Arab Gulf nations in November 2014. At that time, they rejected as a group a production cut

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4 Nysveen 2016.

5 See Chapter 1 Adelman 1972.

put forward in an OPEC meeting. Their decision led to the rapid drop in oil prices. In the following month, at a gathering of experts in Doha, Ali al-Naimi, at that time the Saudi oil minister, revealed the rationale behind the production cut rejection:

“There are many things happening in the energy sphere—technology on one hand and efficiency on the other, there are politics. All of these are good for humanity, but they will be definitely a threat to oil demand in the future. My question to the panel—is there a black swan that we don’t know about which will come by 2050 and we will have no demand?”<sup>6</sup>

With al-Naimi’s question in mind, Saudi Arabia maximized production rather than holding back in an effort to push prices higher. In the past, holding back production allowed high-cost producers to continue operating profitably and to expand, taking market share from Saudi Arabia and other Arab oil-exporting countries that produce at far lower costs. The shift to a strategy of maximizing output was driven by an apparent decision to abandon the long-held belief that oil prices would rise inexorably, a view first advanced by economist Harold Hotelling in 1931.<sup>7</sup> Theodore Moran explains why Hotelling’s assertion had previously seemed so important to producers of raw materials such as oil:

“Hotelling views resources as assets just like any other asset. They can yield a return to the owner either as a current dividend or as capital appreciation. To achieve equilibrium in asset markets returns must be equal. As a consequence, the value of a resource in the ground must be growing fast enough to equal the value of a future sale for a producer to be willing to leave it there. Hence, the choice between exploiting or conserving the resource will depend on whether he expects its net price to increase exponentially at a rate equal to his discount rate on future earnings. If he forecasts a higher rate, he should delay production and enjoy the capital appreciation of the assets in the ground. On this

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6 *Petroleum Intelligence Weekly* 2015.

7 Hotelling 1931.

calculation will be based his decisions about building more, or less, capacity.”<sup>8</sup>

The advent of technical change combined with concerns regarding the pressure to limit hydrocarbon combustion negated this axiom. By the end of 2014, many experts in countries possessing large reserves of low-cost oil and natural gas seemed to worry that much of the world’s hydrocarbon resources could never be burned. The phrase “stranded hydrocarbon assets” became part of the lexicon. These environmental-related worries were fanned by successive meetings on global warming by the Conference of the Parties, or COP, each of which issued stronger calls to limit hydrocarbon use. Public talks on stranded hydrocarbon assets began around 2011 but became more urgent three years later.<sup>9</sup>

Such discussions of the need to leave much of the world’s hydrocarbons unburned undoubtedly influenced the Middle Eastern oil-producing countries’ change in strategy. The anxieties of nations and producers holding low-cost oil and gas reserves regarding their futures were increased by the success of fracking, the disruptive technology described above.

Confronted by the threat from fracking and the specter of a shrinking market, oil-exporting countries elected to fight for market share. Their goal in maintaining production levels was to put high-cost producers out of business. To date, the effort has achieved only limited success.

Still, Saudi Arabia and other Middle Eastern producers have no choice but to continue the battle because they lack the market power needed to boost their income by cutting production. As of this writing, the five key Middle Eastern oil producers (Iran, Iraq, Kuwait, Saudi Arabia, and the United Arab Emirates) jointly account for 25 percent of world crude production. These countries could raise income as much as 10 percent for a year or so were they to share a production cut of 2 million barrels per day and *if* these four assumptions hold: no producers cheat, non-OPEC producers such as the United States do not increase output, the supply response from unconventional production (fracking) is slow, and the price elasticity of demand is -0.1.

Saudi Arabia and other low-cost producers seem to understand that such assumptions will likely not materialize. Some producers will not accept cuts in quotas. Russia and Iran, for example, have indicated

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8 Moran 1981, p. 96.

9 *Economist* 2013.

they cannot or will not comply with any agreement to reduce output. Furthermore, non-OPEC production, particularly in the United States, is highly sensitive to price, and this output would likely rise in an ongoing low-price scenario. Were low-cost producers to do otherwise—for example, allow prices to rise to, say, US\$75 per barrel—they would motivate independent producers who have perfected fracking techniques to accelerate drilling, boost production, and take further market share from traditional suppliers. This means the only seemingly certain assumption among the four is the one regarding the price inelasticity of demand.

In reality, the assumption regarding the price elasticity of demand is extremely suspect. Price elasticities are known to be low in the short term but to rise over time. A higher-price strategy would lose money for producers if the elasticity were -0.2 rather than -0.1, even if there were no supply response from fracking.

Under current circumstances, the rational income-maximizing strategy for the low-cost producers seems to be continuing to produce crude oil at high rates. This strategy will likely leave prices low for many years. It will also doom many of the economically ossified hydrocarbon producers that have borrowed on the expectation of very high prices.

The problems that will confront the latter firms stem from the excesses of the first decade of this century. Prices rose sharply from 2005 to 2008 and again from 2009 to 2014. The increases were attributed to an insatiable demand for oil. While the truth was otherwise,<sup>10</sup> those in the industry welcomed the high prices, seeing them as an opportunity to boost investment and drilling.

The 2009 global economic collapse that followed Lehman Brothers' failure may have slowed energy sector activity. The slowdown, though, was short-lived. Subsequent events, including the imposition of UN sanctions on Iran and Syria and the civil war in Libya, removed almost 3 million barrels per day, or more than 3.2 percent of the world crude oil supply, from the market.

The conflict in Libya is especially noteworthy because it quickly eliminated 13 percent of the world's light crude supply from the market during 2011. Prices held at over US\$110 per barrel for much of the

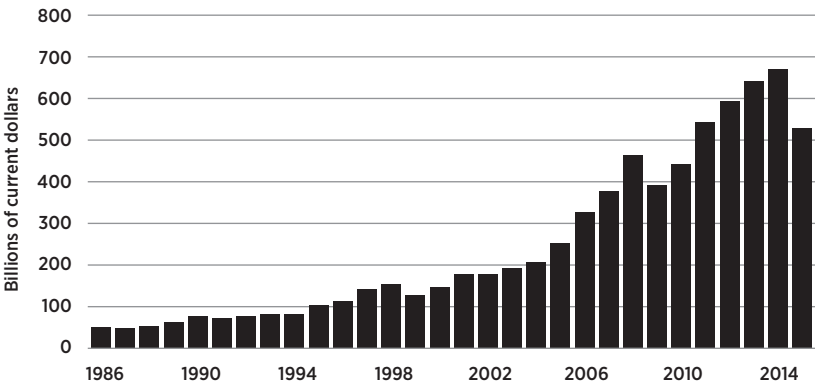
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10 The 2005 to 2008 increase in prices, which peaked at over US\$140 per barrel, was linked to environmental regulations on diesel fuel sulfur content that forced refiners to turn to producers of very light crude oil. Nigeria, the largest producer of this type of crude, experienced an unfortunately timed revolt in oil-producing areas that reduced production. The US government compounded the issue by taking light crude off the market and storing it in the Strategic Petroleum Reserve for use in a future emergency.

period due to the dearth of this type of crude. The strategic reserves of consuming nations should have been used to mitigate the effects of this event. However, except for one feeble, uncoordinated effort, the reserves were not touched. Prices were allowed to rise while oil executives asserted that the market had “worked.”

The oil industry responded to the high prices with what can only be described as “irrational exuberance,” to borrow a term made famous by Nobel Laureate Robert Shiller. Figure 2 provides a measure of this exuberance. This figure tracks oil industry expenditures on exploration and production using data from Barclays. The numbers are in current dollars from 1986 to 2015. Most of the expenditures were directed overseas. From 1986 to 2004, industry spending was disciplined, rising at a rate of US\$10 billion to US\$20 billion per year. However, the rate of increase surged after 2004 following OPEC’s two successful efforts to sustain high prices. From 2004 to 2014, the annual rate of increase jumped from US\$10 billion per year to US\$50 billion per year.

**FIGURE 2. THE GLOBAL OIL INVESTMENT BUBBLE: EXPENDITURES ON OIL AND GAS EXPLORATION AND DEVELOPMENT, 1986 TO 2015**



Source: Barclays.

Again, most of the investment occurred outside the United States. Investments in US oil and gas drilling as tabulated by the US Bureau of Economic Analysis rose but not at the overseas rate. Even so, US oil and natural gas production rose dramatically. The disruptive technology, fracking, made the difference, as figure 1 illustrated. As a reminder, figure 1 shows future US output as projected by the US EIA in 2008 and the output levels realized. By the end of 2015, US output was 3.6



million barrels per day above the level projected only nine years earlier. As a result, the United States accounted for 87 percent of the increase in non-OPEC global supply from 2008 despite the fact that most investment was concentrated outside the country.<sup>11</sup>

The US increase was beyond the control of traditional players in the oil industry. Oil-producing countries had no influence. The large multinational oil companies that traditionally worked with OPEC (and had strong interests in maintaining higher prices) were only tangentially involved. The forces driving the fracking expansion were high prices, the availability of land, smaller independent oil companies, suppliers, and investors seeking returns in a low-interest environment. It was a perfect combination. Investors funded the activities directly by purchasing equity and, most importantly, buying the high-yield debt issued by the independent firms. There were no brakes.

The sharp oil price decline that followed has devastated the private oil industry, as well as state companies in oil-exporting countries and even nations such as Venezuela. The impacts will likely spread to the financial sector as much of the debt issued during the period of artificially high prices goes into default. In the years to come, experts may conclude that the worldwide battle against global warming was set back or even lost because oil prices dropped precipitously. In many respects, then, the decrease could do greater long-term damage to the world economy than the 2009 financial downturn brought about by the 2008 crisis, a catastrophe whose origins can be traced to the excesses in the US real estate sector.

The critical differences between the housing and oil crises relates to derivatives, the role of the rating agencies, and the financial situation of the banks. The economic collapse after the housing bubble deflated was exacerbated by the securitization of mortgage debt, the classification of packages of subprime mortgages as creditworthy, and the exposure of banks to the housing sector. The failure of investment banks such as Bear Stearns and Lehman Brothers resulted from their large bets on these financial instruments.<sup>12</sup> Banks and regulators did learn from this experience, though. Few financial institutions appear threatened by

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11 Calculated from the *BP Statistical Review of World Energy*, which shows an increase in non-OPEC production of crude and liquids of 6.8 million barrels per day and an increase in US production of crude and liquids of 5.8 million barrels per day. This calculation differs from the data presented in figure 1 because the EIA forecast excludes liquids.

12 Blinder 2013.

the oil price collapse and borrower defaults. Bank regulators deserve immense credit if this is the case.

Today's low energy prices will still lead, however, to serious financial difficulties. These problems will include write-offs of bond debts issued by the many firms that rushed into oil and gas exploration, and write-offs of loans made to independent producers. The write-offs may amount to more than US\$1 trillion. In addition, portions of key sectors serving the oil and gas industry could be affected, the pipeline firms in particular.

More specifically, pipeline companies worth up to US\$500 billion may be at risk if more producers file for bankruptcy. The pipeline firms are protected by long-term contracts with producers, but some producers are seeking to escape these pacts as they attempt to emerge from bankruptcy.<sup>13</sup> Other contracts are not being renewed. One pipeline company, TransCanada, has warned of lower earnings as contracts with producers expire. Kinder Morgan, another major pipeline firm, cut its dividend 75 percent to preserve cash.<sup>14</sup>

Overall, the situation seems dire. The consulting firm Deloitte has warned that up to a third of US oil and gas firms are at risk for bankruptcy in 2016. The company reviewed 500 independent producers and concluded that 150 of the 500 firms were in danger of failing. The companies have outstanding debt of US\$150 billion.

Bank for International Settlements general manager Jaime Caruana put the issue in a global context in a lecture to the London School of Economics on February 5, 2016, providing excellent quantitative detail. After discussing emerging market debt and financial market exposure in general, Caruana turned his attention to oil, emphasizing that the large debts accumulated by firms in emerging markets and the United States were tied together by the extent of "leverage" in the sector:

"The greater willingness of investors to lend against oil reserves and revenue had enabled oil firms to borrow large amounts in a period when debt levels have increased more. Companies in the oil sector borrowed both from banks and in bond markets. Issuance of debt securities by oil and other energy companies far outpaced the substantial overall issuance by other sectors.

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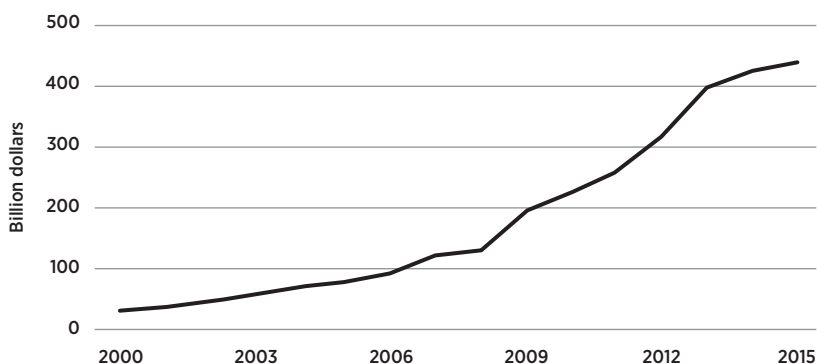
13 Hals 2016.

14 Meyer 2016.

Oil and gas companies’ bonds outstanding increased from \$455 billion in 2006 to \$1.4 trillion in 2014, an annual growth rate of 15%. Energy companies also borrowed heavily from banks. Syndicated loans to the oil and gas sector in 2014 amounted to an estimated \$1.6 trillion, an annual increase of 13% from \$600 billion in 2006.”<sup>15</sup>

The Bank for International Settlements numbers cited by Caruana showed a large increase in the debt of state-owned oil companies from emerging market economies. As figure 3 illustrates, total debt increased to over US\$400 billion by 2015. Over half the debt was issued through offshore affiliates (such as debt sales by Citgo, the US affiliate of Venezuela’s PDVSA [Petróleos de Venezuela]).

**FIGURE 3. DEBT SECURITIES ISSUED BY OIL AND GAS FIRMS WORKING IN SELECTED EMERGING NATIONS, 2000 TO 2015**



*Note:* EMEs with oil production above 1 million barrels per day: China, Colombia, Indonesia, Kazakhstan, Malaysia, Mexico, Nigeria, Qatar, Russia, UAE, and Venezuela.

*Source:* Bank for International Settlements.

Caruana highlighted the exposure of these firms to falling oil prices:

“As with any leveraged sector, the combination of falling oil prices and higher leverage can lead to financial strains for oil-related firms.

<sup>15</sup> Caruana 2016, p. 12.

“First, the price of oil underpins the value of assets that back these firms’ debts. Lower prices will tend to reduce profitability, increase the risk of default and lead to higher financing costs. Indeed, spreads on energy high-yield bonds have widened from a low of 330 basis points in June 2014 to over 1,600 basis points recently, much more than the increase for the yield on high-yield debt in general....

“Second, a lower price of oil reduces the cash flows associated with current production and increases the risk of liquidity shortfalls in which firms are unable to meet interest payments. Such strains may affect the way firms respond to lower oil prices in two main ways. The first is by adjusting investment and production. Where a substantial portion of investment is debt-financed, higher costs and tighter lending conditions may accelerate the reduction in capital spending. Highly indebted firms could even be forced to sell assets, including rights, plants and equipment.”<sup>16</sup>

The rise in the corporate bonds issued by US energy companies illustrates the trend. The increase in the sector’s debt is staggering. At the end of 2009, it was US\$415 billion. Six years later, at the end of 2015, it had increased to US\$888 billion (see figure 4).

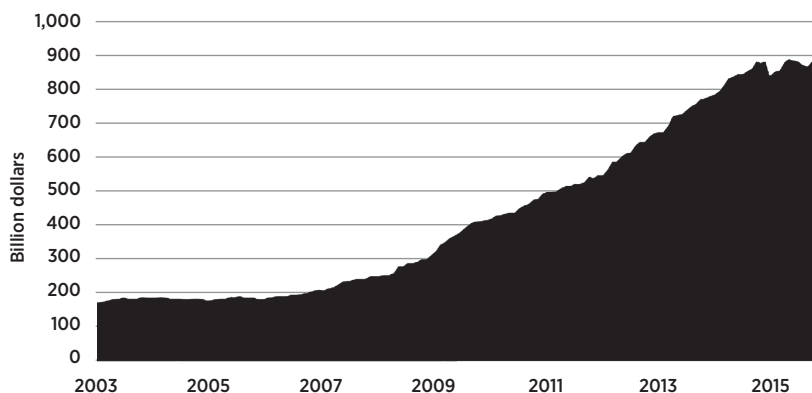
The heavy obligations could lead indebted companies to push output aggressively upward to cover debt payments as prices fall. As Caruana warned, “Highly leveraged producers may attempt to maintain, or even increase, output levels even as the oil price falls in order to remain liquid and to meet interest payments and tighter credit conditions.”<sup>17</sup> He added that leveraged companies will hedge with futures or puts to avoid insolvency as prices fall. The hedged production reduces the likelihood that production will decline as prices fall.

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<sup>16</sup> Caruana 2016, pp. 13–14.

<sup>17</sup> Caruana 2016, p. 14.

**FIGURE 4. DEBT ISSUED BY US ENERGY COMPANIES,  
MONTHLY DATA, 2003 TO 2015**



Source: Bank of International Settlements.

Sadly, the economic ossification of many large traditional firms in the industry compounds the problem. In July, Chevron and its partners announced they would invest US\$36.8 billion in the Tengiz oilfield in Kazakhstan. As the *Financial Times* reported, the investment will add 260,000 barrels per day of production to a field currently producing almost 600,000 barrels per day. The report added that the company would break even with an oil price of roughly US\$50 per barrel, approximately the average price that prevailed in June 2016. One consultant told the *Financial Times* that “the project’s economics are not wonderful, but at the same time they’re solid. You don’t need a preciously high price to recognize the benefits.”<sup>18</sup>

### **Constrained consumption growth: a further complication**

Oil-producing countries such as Venezuela, Nigeria, Saudi Arabia, other Middle Eastern nations, Brazil, Mexico, Norway, and even Canada must also confront the effect of changing consumer energy preferences, as must the large traditional multinational companies. Much of the public no longer sees coal, oil, or natural gas as inputs that promote progress and economic growth. Instead, they are viewed as toxins that must be tolerated but if used in excess will contaminate the planet just as tobacco poisoned the lungs of billions of individuals.

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<sup>18</sup> Crooks and Farchy 2016.

The change in perception will depress petroleum consumption growth in the long run, ultimately forcing use to decline rather than rise as new and less expensive substitutions are developed. Use will also drop as new technologies become available. Indeed, global agreements to limit emissions will incent their development and eventually force oil, gas, and coal use to decline through tax measures or other forms of regulation.

The prospect of long-term irrelevance brought on by environmental regulation leads some, such as the English nongovernmental organization Carbon Tracker, to warn of “carbon asset risk” or, more specifically, that “a significant portion of the world’s fossil fuel resources, especially coal, will need to remain in the ground (that is, unexploited) under climate mitigation scenarios.”<sup>19</sup>

In the near term (five to 10 years), however, global agreements to limit hydrocarbon emissions will not constrain the increase in oil use. Growth will be slowed instead by the world economy’s relatively modest expansion. Bluntly, the secular stagnation described by Larry Summers has terrible implications for the oil sector and growth in oil use.<sup>20</sup> Secular stagnation stems basically from a lack of investment. A nation’s GDP is defined by the sum of consumption, investment, government expenditures, and trade balance. Stagnation occurs, as Summers explains, when private investment and/or government investment in infrastructure slows.

For oil and energy consumption, such slowing has negative implications because investment activity is energy intensive. The surge in energy and oil consumption in China corresponded with that country’s massive industrial expansion. Growth in oil use has slowed as investment decelerated.

Japan, though, offers the best example of the consequences of secular stagnation for growth in energy and oil use. From 1965 to 1991, average annual growth in Japan was 5.8 percent. By 1989, though, Shintaro Ishihara and Akio Morita were writing of “The Japan That Can Say No.”<sup>21</sup> Then, for the next 25 years, Japan’s annual growth rate dropped to 0.8 percent per year as the country suffered a severe, well-documented case of secular stagnation.

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19 Cleveland, Schuwerk, and Weber 2015, p. 7.

20 Summers 2016.

21 This essay, published in book form in 1991, was famous for its critical examination of US business practices, and for advocating Japan’s taking a more independent stance on many issues, from business to foreign affairs. See Ishihara and Morita (1991).

During the period of Japan's growth, oil consumption tracked GDP growth, rising at rates of 4.4 and 4.5 percent per year, approximately 1 percentage point less than GDP. The gap then jumped to 2 percentage points between 1992 and 2016. Oil use declined at a rate of 1.1 percent per year as GDP rose 0.8 percent per year.

The widening gap between Japan's GDP growth and energy consumption growth is easy to explain: construction is energy intensive. Building homes, highways, offices, and railroads requires large amounts of oil, gas, and coal. A slowdown in investment as occurs with secular stagnation will be accompanied by a significant drop in the growth of oil use.

China provides another illustration. Oil use surged in China from 2000 to 2012, rising 154 percent. Economists such as James Hamilton attribute the rise in global oil prices in part to Chinese growth during the period.<sup>22</sup> Indeed, close examination of the data reveals that the character of Chinese growth, particularly the massive investment in infrastructure, explains much of the country's increase in oil use. The recent slowing of investment there, combined with the shift to a more consumer-oriented economy, is now leading to lower use.

A similar trend can be found in the United States if constant dollar investment in highways and structures is compared with diesel fuel consumption. Falling investment, not surprisingly, contributes to lower use because fuel consumption accounts for a large part of construction expenditures.

Thus secular stagnation, particularly as influenced by the European Union's program of economic austerity, could restrain increases in oil consumption over the near term. The slow increase in use will tend to constrain price increases, at least through 2020.

The critical problem for the ossified oil industry, though, is that the world is seeking to move rapidly away from oil and other hydrocarbons. Thus the consumption lost from low economic growth over the next five years likely will not be regained later when economic growth resumes. By then new technologies will have displaced fossil fuels, especially oil and coal. For the energy industries, there may be no tradeoff between growth today and growth in the future.

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22 Hamilton 2009.

## Prospects

In his 2016 book, *The Disruption Dilemma*, Joshua Gans asserts that “*The phenomenon of disruption occurs when successful firms fail because they continue to make the choices that drove their success.*”<sup>23</sup> His book provides a much deeper examination of the effects of disruptions, such as those described above regarding fracking, first introduced by Clayton Christensen.

Gans focuses on firms that failed by ignoring disruptions and companies that succeeded. Two firms, Blockbuster and Research in Motion, are singled out as failures. Blockbuster built a large distribution network of local stores for video rentals. Research in Motion produced the once ubiquitous BlackBerry. Both lost when new technologies made their offerings obsolete.

Gans’s warning regarding the detrimental impact of inflexibility applies to much of the traditional multinational oil industry, the large national oil companies, and several oil-exporting countries. Following the collapse in oil prices, companies such as Shell and Chevron have continued, to borrow from Gans, “to make the choices that drove their success.”<sup>24</sup> Shell purchased BG, a company deeply invested in expensive development of deepwater oil and gas reserves. Chevron inaugurated a US\$56 billion liquefied natural gas project in Australia that probably requires prices in excess of US\$10 per million cubic feet, double the level being paid by Japan, and then doubled down by committing an additional US\$37 billion to a high-cost project in Kazakhstan.

Earlier in the year, Chevron CEO Jack Watson spoke of borrowing to cover the company’s dividend. He told the *Financial Times*’s Ed Crooks that, if the crude oil price fell below the company’s breakeven level of US\$52 per barrel, the firm would borrow to cover the dividend because “the firm’s shareholder base values the ‘predictability’ of the payout.”<sup>25</sup>

Chevron and other large companies act in this way because, as the *Financial Times* headline reads, “Chevron Says World Will Need Big Oil.”<sup>26</sup> These shareholder-owned companies, as well as state companies or partially owned state companies such as Petrobras, Statoil, Pemex, and PDVSA, continue to borrow and continue to invest, holding on to the belief that the decline in oil prices is transitory, that economic stagnation will not constrain growth in oil consumption, that pressures

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23 Gans 2016, p. 9.

24 Gans 2016, p. 9.

25 Crooks 2016.

26 Crooks 2016.



to reduce greenhouse gas emissions will not affect their business, that technological progress will not displace fossil fuels such as oil, and that incremental supplies from the new suppliers perfecting fracking will not capture much of their market.

These are all key assumptions. If they are wrong—as I suspect they are—and they represent an ossified industry that will gradually fade away, hundreds of billions if not trillions in debt issued by these firms and countries may never be repaid.

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