

COUNCIL *on*  
FOREIGN  
RELATIONS

*Maurice R. Greenberg  
Center for Geoeconomic Studies*

*DISCUSSION PAPER*

Using External Breakeven Prices  
to Track Vulnerabilities in  
Oil-Exporting Countries

Brad W. Setser and Cole V. Frank  
July 2017

*This Discussion Paper, produced by CFR's Maurice R. Greenberg Center for Geoeconomic Studies, was made possible through the generous support of the Alfred P. Sloan Foundation.*

The Council on Foreign Relations (CFR) is an independent, nonpartisan membership organization, think tank, and publisher dedicated to being a resource for its members, government officials, business executives, journalists, educators and students, civic and religious leaders, and other interested citizens in order to help them better understand the world and the foreign policy choices facing the United States and other countries. Founded in 1921, CFR carries out its mission by maintaining a diverse membership, with special programs to promote interest and develop expertise in the next generation of foreign policy leaders; convening meetings at its headquarters in New York and in Washington, DC, and other cities where senior government officials, members of Congress, global leaders, and prominent thinkers come together with CFR members to discuss and debate major international issues; supporting a Studies Program that fosters independent research, enabling CFR scholars to produce articles, reports, and books and hold roundtables that analyze foreign policy issues and make concrete policy recommendations; publishing *Foreign Affairs*, the preeminent journal on international affairs and U.S. foreign policy; sponsoring Independent Task Forces that produce reports with both findings and policy prescriptions on the most important foreign policy topics; and providing up-to-date information and analysis about world events and American foreign policy on its website, CFR.org.

**The Council on Foreign Relations takes no institutional positions on policy issues and has no affiliation with the U.S. government. All views expressed in its publications and on its website are the sole responsibility of the author or authors.**

For further information about CFR or this paper, please write to the Council on Foreign Relations, 58 East 68th Street, New York, NY 10065, or call Communications at 212.434.9888. Visit CFR's website, [www.cfr.org](http://www.cfr.org).

Copyright © 2017 by the Council on Foreign Relations® Inc.  
All rights reserved.

This paper may not be reproduced in whole or in part, in any form beyond the reproduction permitted by Sections 107 and 108 of the U.S. Copyright Law Act (17 U.S.C. Sections 107 and 108) and excerpts by reviewers for the public press, without express written permission from the Council on Foreign Relations.

## Introduction

Few prices matter more to the world economy than the price of oil. The fall in global oil prices from over \$100 a barrel to around \$50 a barrel—and similar moves in the price of liquefied natural gas and Russian pipeline gas—have reduced the export proceeds of the world’s main oil-exporting economies by about a trillion dollars, over one percentage point of the world’s gross domestic product (GDP). For commodity-exporting economies, the resulting swing in the global flow of funds has been as sharp and sudden as the swings in capital flows that accompanied the global financial crisis. The resilience of the oil exporters, and both the scale of their financial buffers and the adaptability of their broader economic and political systems, has been tested.

Most analyses of the impact of oil price swings on oil-exporting economies focus on their fiscal breakeven price—the oil price that allows the budget to balance. The fiscal breakeven has obvious appeal. Everyone understands the concept of a budget and most oil-producing economies rely heavily on oil revenues—whether through taxes on oil production, taxes on oil exports, or dividend payments from state-owned oil companies—to cover their fiscal spending. Yet this measure suffers from important limitations: budget revenue from oil is not always transparently reported, spending is often kept off-budget, and the actual calculation is country-specific, impeding accurate comparisons across countries.<sup>1</sup>

The best single measure of the resilience of an oil- or gas-exporting economy is not its fiscal breakeven but rather its external breakeven price—the oil price that covers its import bill. The external breakeven highlights how currency moves are often able to substitute, at least in part, for adjustments to the budget: a weaker currency raises the local currency proceeds from the export of a barrel of oil, stabilizing revenue. An external breakeven price below the global oil price thus indicates a potential for either additional fiscal spending or currency appreciation; a breakeven price above the global oil price indicates an underlying pressure for budget cuts or depreciation, at least in the absence of substantial buffers of reserves or borrowing capacity.

Unlike fiscal breakevens, external breakevens can be calculated in a consistent way across time and across countries, using data that is relatively easy to verify. Adding natural gas exports to the breakeven calculations for large gas exporters adds complexity, but also substantially improves the calculation for some important countries: Norway exports about 2 million barrels per day (mbd) of oil equivalent in gas, Qatar exports around 2.5 mbd, and Russia exports more than 3.2 mbd. Adding in natural gas exports requires converting natural gas exports into their oil equivalent and estimating the relationship between gas and oil prices.

External breakevens for individual countries also can sensibly be combined into a global composite that shows the oil price needed by major oil-exporting economies to cover their aggregate import bill. Changes in the composite help illustrate how the major oil-exporting economies have responded to changes in the global oil price. Beginning in 2004, the major oil exporters started to loosen their purse strings. Prior to the 2008 global crisis, though, oil prices rose steadily, offsetting the rise in imports of the major oil-exporting economies. The external savings of most oil exporters remained quite high. Once oil stabilized at around \$100 a barrel, spending on imports started to eat into oil exporters’ annual savings—as domestic spending and investment in many of those countries

continued to rise rapidly. By 2014, important differences developed among the oil exporting economies: a set of major oil-exporting economies needed oil to remain at \$100 a barrel to avoid a current account deficit, while others could cover their import bill with oil at \$50 a barrel. The fall in the price of oil forced rapid adjustments in many of the “high breakeven” economies. In aggregate, the major oil exporters’ composite breakeven fell from \$80 a barrel in 2014 to \$55 per barrel in 2016.

The recent evolution of external breakeven prices challenges aspects of the conventional wisdom about the relative vulnerability of different oil-exporting economies. Saudi Arabia remains better equipped to withstand a prolonged slump than Iraq, Nigeria, Venezuela, and several smaller economies in the Americas and Africa. But even with its substantial reserves, Saudi Arabia is no longer among the economies best prepared to manage a prolonged period of low oil prices. Some analysts have argued that the Saudis opted to maintain production and let prices adjust in 2014 in order to put pressure on regional rival Iran and Syria’s ally Russia. Yet both Iran and Russia are now in a better position to withstand an extended slump in oil prices than the Saudis.<sup>2</sup> Russia took the pain up front, in part because of its decision to allow the ruble to depreciate.<sup>3</sup> Iran never was able to enjoy the full benefits of high oil prices as a result of U.S. and European sanctions, and thus has had less difficulty adapting to lower oil prices.<sup>4</sup>

Of course, no single indicator of vulnerability is perfect. A breakeven price above the current oil price on its own does not automatically force a shift in economic policy, let alone signal imminent political breakdown. The breakeven price matters, but so too does a country’s foreign exchange reserves, unused borrowing capacity, and exchange rate regime.<sup>5</sup> While external breakevens offer significant advantages over harder-to-calculate fiscal breakevens, they—like fiscal breakevens—should not be used in a simplistic or mechanistic way.

## Limits of Fiscal Breakevens

Fiscal breakevens are commonly used by economists and market analysts to analyze the political and economic vulnerability of oil-exporting economies.<sup>6</sup> Yet fiscal breakevens have several analytic limits.<sup>7</sup>

First, some countries do not clearly separate their tax revenues and oil revenues—including taxes on the profits of oil companies. Estimating the fiscal breakeven consequently requires making a series of difficult—and often nontransparent—assumptions to estimate oil-related revenues. By contrast, the volume of oil and gas exports is relatively simple to track.

Second, the fiscal breakeven calculation is relevant only for those countries that have relatively little non-oil tax revenue. A large pool of non-oil revenues should reduce an oil exporter's vulnerability to swings in the oil price. But the mechanics of the fiscal breakeven calculation assume that oil finances all marginal spending, and thus it can produce large swings in the breakeven for countries with substantial non-oil revenues. The fiscal breakevens for countries which get some but not all of their revenue from oil can be volatile. This criticism, of course, also applies to external breakevens for countries with substantial non-oil exports, such as Mexico.

Third, the fiscal breakeven calculation depends heavily on what spending is counted in the formal budget. To take a well-known example, the costs of domestic fuel subsidies are often borne directly by the state-owned national oil companies of the major oil-exporting economies. These subsidies can be sizeable—ranging from 10 to 50 percent of budgetary expenses.<sup>8</sup> Many oil exporters also rely on state oil firms for a range of social and investment spending, indirectly drawing on the proceeds of the oil and gas sector to support quasi-fiscal spending.<sup>9</sup> The oil price that balances the formal budget thus can often understate the true level of government spending. Ad hoc adjustments can be made for off-balance-sheet spending, but such adjustments are difficult to verify and make consistent comparison across countries—and across time—difficult.

Finally, the fiscal breakeven calculation often implicitly assumes a stable exchange rate. Export proceeds are usually in international currency (typically dollars), while spending is usually in the local currency. This underlying currency mismatch means that the government of an oil-exporting economy benefits fiscally from a currency depreciation. A depreciation means that each dollar of export proceeds generates more local currency, helping to stabilize budgets that depend on oil royalties, taxes on oil production, and exports and dividends from state-owned oil companies.<sup>10</sup> A depreciation reduces the external purchasing power of each local currency unit of government spending, with the reduction in external purchasing power substituting for outright budget cuts.<sup>11</sup>

For many countries, the exchange rate consequently can act as a safety valve that takes stress off the budget. The Persian Gulf countries' long-standing peg to the dollar has taken this safety valve off the table, and helped create the illusion that fiscal adjustment is the only response if a fall in the price of oil creates budget pressures. Yet many countries adjust to swings in the price of oil primarily through changes in the value of their currency.

Russia provides the best example. In 2014 and 2015, the ruble fell in line with the dollar price of oil, keeping the government's ruble revenues from oil and gas roughly constant even as the dollar price of oil fell. Calculated fiscal breakevens (generally over \$100 a barrel) before the ruble's fall thus overstated Russia's fiscal vulnerability.<sup>12</sup> Thanks to its fiscal buffers and flexible exchange rate,

Russia was able to run an expansionary fiscal policy—with a 3 percentage point of GDP increase in its structural budget deficit between 2014 and 2016—even as the price of oil fell.<sup>13</sup>

The limits on fiscal breakevens are particularly important when dealing with analyses over periods of time or among multiple countries. Because fiscal breakeven calculations hinge on many country-specific assumptions, they are hard to calculate consistently across countries. Indeed, different analysts will generate different estimates for the same country at any given point of time, and diverge even more across time.<sup>14</sup> Even estimates by the International Monetary Fund (IMF) tend to evolve over time.

## External Breakevens

The external breakeven is perhaps less intuitive than the more commonly used fiscal breakeven. Yet the underlying logic behind the external breakeven is not difficult. Imports can be considered the analog of budgetary spending, and oil export revenues as the analog for fiscal revenues. For countries that are committed to a currency peg, the external breakeven can be interpreted as the oil price that—in most cases—would not result in significant external pressure on either the currency peg or the budget, as exports and imports are in balance. For countries that allow their currencies to float, the external breakeven can signal the direction of pressure on fiscal policy and the exchange rate.

The calculation of the external breakeven price is also straightforward: it requires only a country's current account balance, its net oil exports, and the price of oil. For example, if a country exports 8 mbd with an oil price of \$100 per barrel, it will, in one year, generate a bit less than \$300 billion in oil export revenues. If that country's current account surplus is \$100 billion, its non-oil current account deficit would be about \$200 billion. The non-oil current account is a country's spending on imports (including imports of labor), the net of its non-oil exports, and the income on its external assets. To get the breakeven, the non-oil balance is divided by the oil export volumes. In the prior example, about two-thirds of the oil proceeds are financing imports (broadly defined), so the breakeven oil price is around \$65 a barrel. The remaining one-third of the proceeds of each exported barrel is being saved and used to build up assets abroad.

The external breakeven price has two important advantages over the fiscal breakeven calculations: the needed inputs are relatively easy to verify, and the required inputs use data that is consistent across countries, thereby facilitating useful comparisons

The calculation of the external breakeven—the oil price that assures a balanced current account—requires a limited number of readily available analytic inputs. The current account is a country's balance on trade, external income (including investment income on assets abroad), and external transfers. It is part of the data that the IMF makes available for all countries. The net proceeds from oil exports are calculated from the global oil price and the physical volume of oil exports, and the non-oil current account balance can be calculated by the difference between net oil proceeds and the current account balance. Using, in effect, imports and exports to measure the breakeven price avoids many of the complexities of the fiscal calculation. It does not matter how much of the revenue from the export of oil is retained by a state oil company and invested internally, how much is formally remitted to the government, or how much spending is off-budget. All that matters is how much of the country's oil revenue is spent on imports.

Because the data needed for this calculation does not depend on country-specific adjustments, an individual country's external breakeven can be compared to that of other countries, as well as the country's own history. Exports and imports can also be summed across countries, allowing the calculation of a composite breakeven for different sets of countries. The global breakeven is the oil price that balances the imports and the exports of the major oil- and gas-exporting economies.

Unfortunately, external breakevens are not used consistently in the evaluation of the economic health of the major oil-exporting economies. For example, the IMF's latest assessment of Saudi Arabia did not mention its external breakeven oil price (data on the breakevens is available in an appendix to the IMF's regional outlook for the Middle East).<sup>15</sup>

Of course, a country's resilience to a period of low oil prices depends on more than its breakeven price, as countries with large stockpiles of assets can use them to offset a temporary shortfall in oil export proceeds and countries with unused borrowing capacity can take on new debt. An oil price below the breakeven price signals the direction of pressure, not the outcome of the pressure. It does not mechanically portend immediate fiscal trouble, a shift in the exchange rate, or political strife.

#### *EXTERNAL AND FISCAL BREAKEVENS ARE RELATED*

While the external and fiscal breakevens are calculated in different ways, they are theoretically and empirically linked. A basic macroeconomic principle is that the current account balance—the difference between external receipts and external payments—is equal to the difference between national savings and national investment. A current account deficit necessarily means that a country invests more than it saves, and makes up the difference by borrowing from abroad or attracting inflows of foreign equity investment. A current account surplus implies that a country saves more than it invests, and is building up assets abroad.

National savings can be disaggregated into public and private savings. The public sector's deficit or surplus (i.e., the fiscal balance) is thus a critical component of a country's overall savings and investment balance. In economies where the bulk of the government's revenues is generated by oil royalties, oil production, and export taxes, together with the profits of the state-owned oil companies, the link between the fiscal balance and the external balance is particularly direct.<sup>16</sup>

In all economies, government surpluses tend to raise national savings, and government deficits tend to lower national savings. But it is particularly easy to see the linkage between the fiscal balance and the external balance in many oil-exporting economies: oil-exporting economies with budget surpluses channel their oil export earnings into the purchase of foreign assets.<sup>17</sup> Oil exporters that use their oil proceeds to support a high level of government spending (or a large government-sponsored investment program) will tend to push up imports as well.

However, it is a mistake to conclude from these links that the only way to adjust to changes in oil prices is through fiscal cuts that directly change public savings. A weaker exchange rate can often substitute in full or in part for fiscal adjustment. A depreciation keeps the government's revenue up in local currency terms while reducing the external purchasing power of all local-currency salaries and local-currency-denominated assets. Unless private actors draw down their savings or borrow to maintain existing imports, including those imports that cannot be produced domestically, imports will fall. This will bring the current account deficit down. There will be associated changes in the private savings and investment balance as the price of imports rises: for example, a higher cost of imported capital goods often will force a reduction in private investment.



## The Evolution of External Breakeven Prices Over Time

It is analytically useful to divide the last twenty-five years into a set of phases based on the evolution of the global breakeven oil price. National stories can differ from the global story, but it is still useful to divide the last twenty-five years into four distinct periods:

- An era of forced prudence in the 1990s and early 2000s. After oil prices fell from their early 1980s highs, the major oil-exporting economies were forced to scale back their imports. The composite breakeven price of the main oil exporters was under \$20 from 1995 to 2002, and under \$30 through 2005.
- A period from 2004 and 2008 marked by eroding discipline but still high savings. Over these years the composite breakeven rose from \$25 in 2004 to \$60 in 2008. Yet with oil prices rising, even more oil exporters were still saving a substantial portion of their export proceeds. Out of every ten dollars earned in export proceeds over this period, roughly four were saved.
- The boom period from 2009 to 2014. The composite breakeven rose to \$80 a barrel—so that by 2013, only about two and a half out of every ten dollars of export proceeds were saved. The composite number masks substantial differences among the oil exporters.
- The recent period of adjustment and falling imports, from 2014 to the present. Here too there is a marked difference between those countries that took the pain upfront and those that have deferred adjustment. The composite breakeven has fallen to about \$55 a barrel, largely from a brutal fall in imports.

In addition to tracking the evolution of the global composite, it is also helpful to calculate and track the evolution of various sub-indexes. Saudi Arabia and Russia are large enough to track individually, and—thanks to rigorous sanctions that limited its oil exports—Iran is also a case apart. The remaining oil exporters can be divided into two analytic groupings: a set of oil-exporting economies that kept their imports down and savings up even when oil prices were above \$100, and a set of economies that were less disciplined (in part because they have larger populations and faced greater popular demands than many of their more cautious peers) and allowed their imports to rise to levels consistent with sustained \$100 oil.<sup>18</sup> Azerbaijan, Bahrain, Brunei, Kuwait, Norway, Qatar, Trinidad and Tobago, the United Arab Emirates, and Uzbekistan constitute the low breakeven countries. They account for about 15 mbd of oil and gas exports. The high breakeven oil exporters are Algeria, Angola, Chad, Colombia, Ecuador, Gabon, Iraq, Kazakhstan, Libya, Nigeria, Oman, Turkmenistan, Venezuela and Yemen. Together, they account for around 16 mbd of the roughly 50 mbd of oil and gas exports supplied by the world's oil-exporting economies. Saudi Arabia, Russia, and Iran account for the remaining 21 mbd of oil and gas exports in the global composite (figure 1).

**Figure 1. Oil Exporter Groupings**

Country or Group	Combined Volume of Oil and Gas Net Exports (mbd)	2015 Breakeven Price (USD Per Barrel)
Global Composite	52.4	56
Saudi Arabia	8.1	70
Russia	11.2	35
Iran	2.0	41
High Breakeven Composite <sup>1</sup>	16.0	78
Low Breakeven Composite <sup>2</sup>	15.1	41

1. Algeria, Angola, Chad, Colombia, Ecuador, Gabon, Iraq, Kazakhstan, Libya, Nigeria, Oman, Turkmenistan, Venezuela, and Yemen

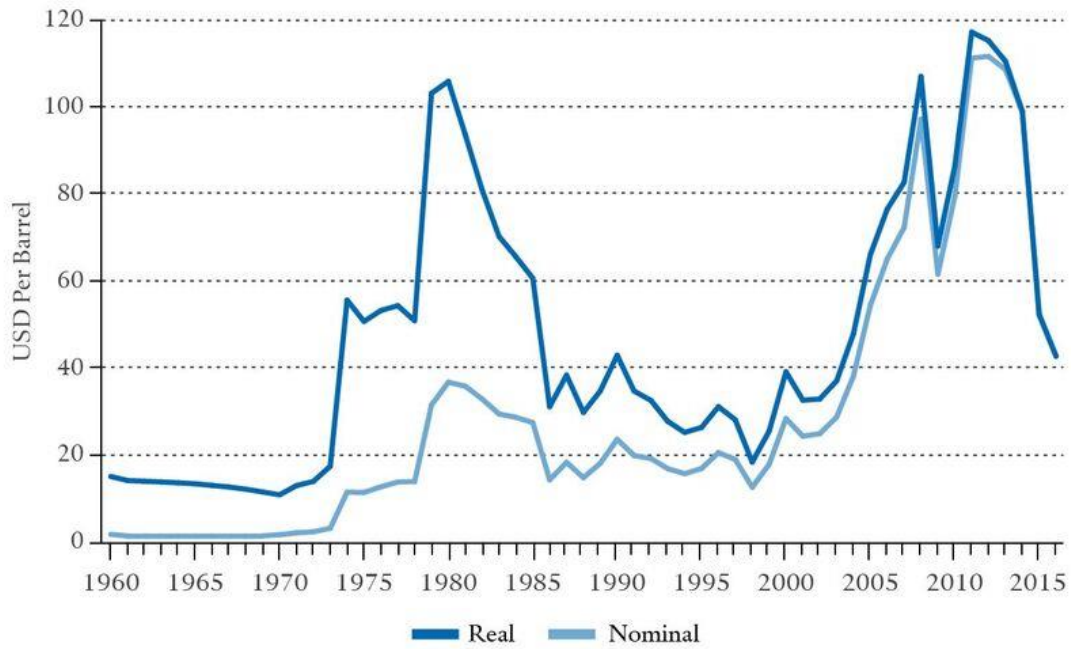
2. Azerbaijan, Bahrain, Brunei, Kuwait, Norway, Qatar, Trinidad and Tobago, United Arab Emirates, and Uzbekistan

Sources: British Petroleum; International Monetary Fund; Haver Analytics; authors' own calculations.

### *THE 1990S AND EARLY 2000S: A PAINFUL ADJUSTMENT*

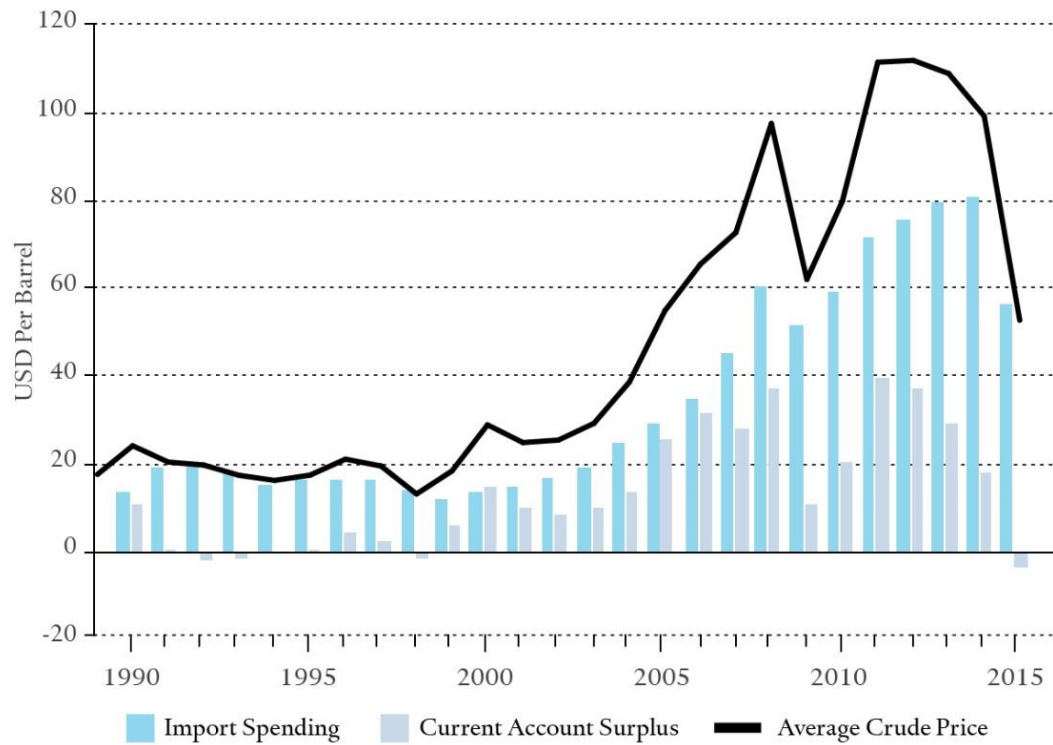
Oil prices were relatively stable but low during the 1990s (figure 2). Many oil-exporting economies entered the 1990s with a level of spending and imports inherited from the high oil prices of the late 1970s and early 1980s (figure 3). The rise in real oil prices in the 1970s had led to higher government spending in most oil exporters, as these countries sought growth through increased public investment and social spending. The sudden price drop in 1986 and ensuing fall in oil revenue left many of these countries facing large budget and trade deficits.

**Figure 2. Historical Price of Crude Oil (1960–2016)**



Source: British Petroleum.

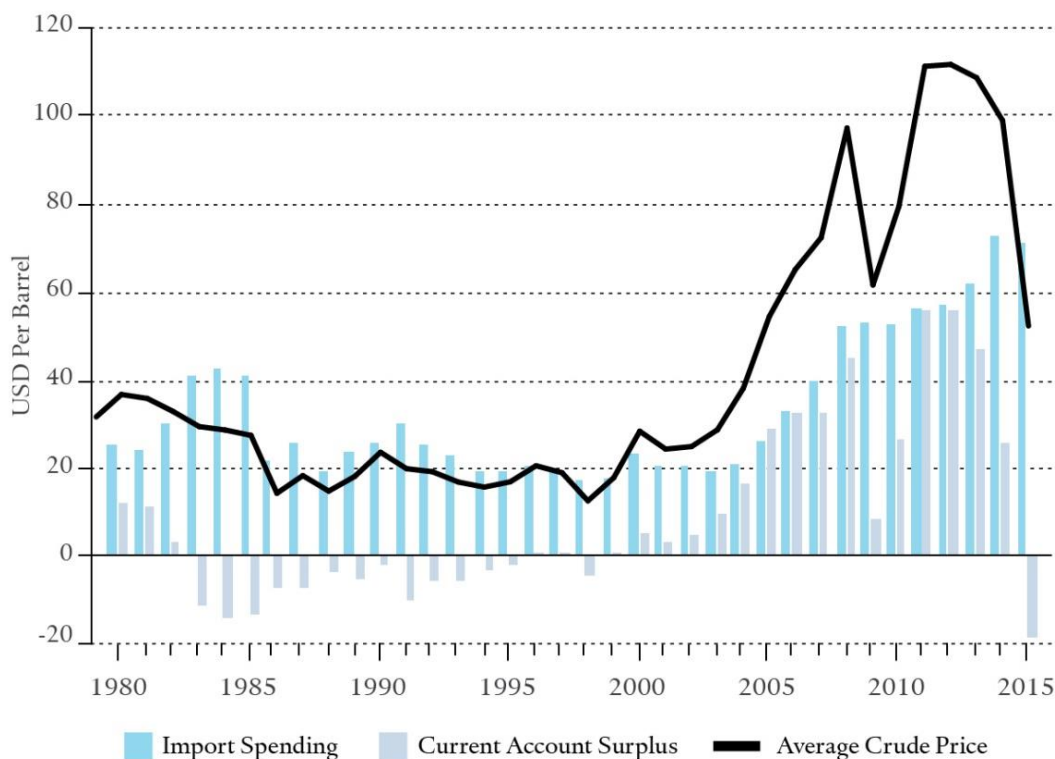
**Figure 3. Composite External Breakeven Price for All Oil Exporters**



Sources: British Petroleum; International Monetary Fund; Haver Analytics; authors' own calculations.

Some countries adapted to the low oil prices of the 1990s quickly, but others consistently ran sustained deficits. Saudi Arabia's external breakeven, for example, had risen to over \$40 a barrel in the mid-1980s (figure 4), a price that, when adjusted for inflation, corresponds with a current breakeven price of around \$95. The Saudis pared back in the late 1980s, but ran a current account deficit every year between 1983 and 1995, and had a cumulative current account deficit of \$180 billion between 1983 and 1999. The counterpart to these external deficits on the domestic side was sustained budget deficits: Saudi Arabia ran a budget deficit every year between 1983 and 1999.<sup>19</sup> Only in the late 1990s did the Saudis bring their breakeven price below the global oil price.

**Figure 4. Saudi Arabia's External Breakeven Price**



Sources: British Petroleum; International Monetary Fund; Haver Analytics; authors' own calculations.

This adjustment was painful. The 1990s were a dismal decade for oil exporters. Several oil exporters, including Saudi Arabia, ended the decade with lower real GDP per capita rates than they had had during the 1970s.<sup>20</sup> The median public debt ratio for oil exporters in the Middle East, North Africa, and Central Asia grew from around 20 percent in the mid-1980s to 40 percent by the end of the 1990s, with several countries' ratios at or above 100 percent.<sup>21</sup> Russia was forced to devalue the ruble and default on much of its debt in 1998, when oil fell below \$15 a barrel.

By the late 1990s, low oil prices had forced the oil-exporting countries to make conservative budget forecasts about the long-term price of oil—and many were forced to devalue their currencies. The breakeven oil price of the world's main oil exporters had fallen to less than \$15 a barrel, and, by 1999, oil exporters in aggregate started to save substantial portions of their oil receipts—even with oil at \$18 a barrel.<sup>22</sup>

This prudence continued for several years even after global oil prices rose to around \$30 a barrel. The 2000 oil price increase was almost entirely saved (in aggregate, the oil exporters shifted from running a current account deficit of roughly \$20 billion in 1998 to a surplus of \$190 billion in 2000) and the external breakeven of the oil exporters stayed at \$20 and under through 2003.<sup>23</sup>

Most oil exporters slowly rebuilt their fiscal stabilization funds and reserves during this period. When oil rose from an average of \$28 a barrel in 2003 to \$55 in 2005, spending on imports did begin to move up, but not at the expense of external savings. The rise in government spending—and associated rise in imports—was much more subdued than during earlier oil booms.

Even the countries that fared the worst during the late 1990s were able to return to financial health.<sup>24</sup> Saudi Arabia, for example, allocated nearly three-quarters of its 2003–2005 marginal oil windfall toward building up foreign assets. The Saudis were not atypical. Between 2003 and 2005, the Gulf Cooperation Council countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates) increased their imports by about 15 percent of the total increase in their oil export revenues, Russia increased its by 20 percent, and both Iran and Venezuela by between 35 and 45 percent.<sup>25</sup> Most of the windfall was saved.

#### *2004–2008: ERODING DISCIPLINE AND THE GLOBAL CRISIS*

The surge in accumulation of foreign assets from 2003 to 2005 was not so much a permanent policy to increase the share of oil export receipts allocated to foreign assets as it was a wait-and-see period to determine whether the high oil prices were sustainable. The composite breakeven price of all oil exporters nearly doubled from 2004 to 2007, going from \$24 to \$45. In 2007, oil exporters saved less per barrel than in 2006—\$27 a barrel versus \$31 a barrel—despite higher oil prices. Broadly speaking, the oil exporters went from saving around 50 percent of their oil export proceeds in 2005 and 2006 to saving about 40 percent in 2007 and 2008.

The fall in commodity prices in the aftermath of the 2008 financial crisis was the first significant drop in oil prices since the 1990s. Oil fell from an all-time high of around \$140 a barrel in July 2008 to a low of \$40 by December. Nevertheless, the legacy of the oil exporters' relatively prudent management of the initial phase of the oil price rise meant that the oil exporters were generally much better prepared to manage oil price volatility in 2009 than they had been in the late 1990s.

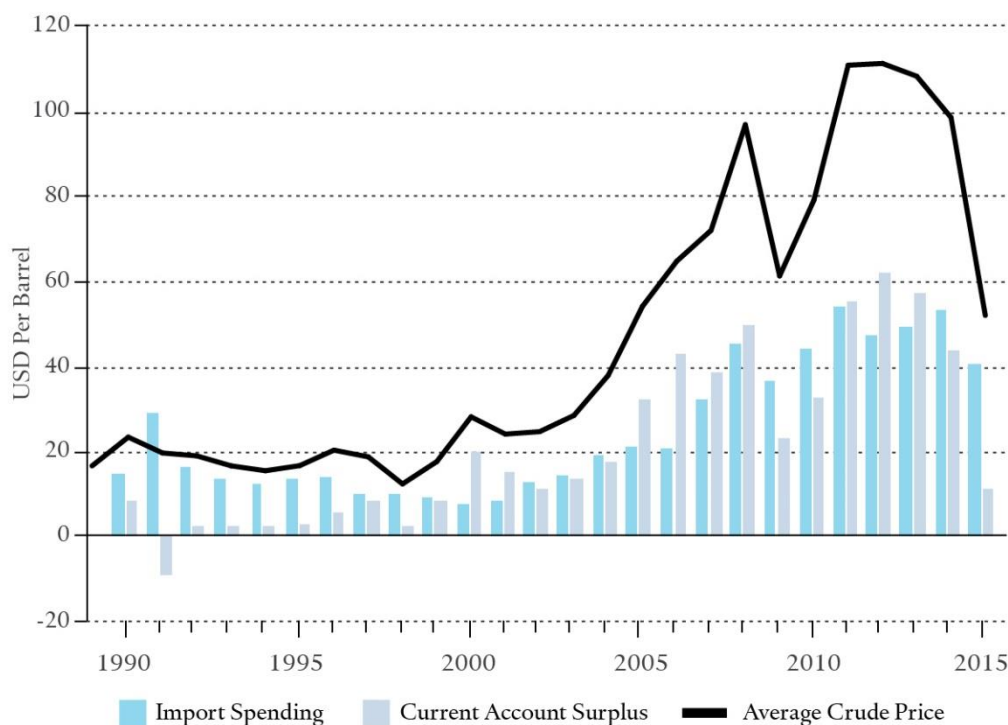
In 2009, as figure 3 shows, oil exporters were, in aggregate, still able to run current account surpluses as weaker exchange rates led the oil exporters' composite breakeven to fall by \$10 a barrel to \$51 (oil averaged \$60 a barrel in 2009). Most of the big oil exporters—with the exception of Russia—avoided a pro-cyclical fiscal tightening. Some countries were in a position to pursue countercyclical fiscal policies. The Saudis' breakeven price did not fall in 2009. The relatively rapid stabilization of the global oil price also helped: six months after hitting a trough of \$40 per barrel at the end of 2008, oil was already back around \$70, a level that more than covered the import levels prior to the global crisis.

#### *2009–2014: A POST-CRISIS BOOM*

As oil prices moved above \$100 a barrel following the disruptions associated with the Arab Spring, oil exporters broadly fell into one of two groups. Even with oil prices over \$100 a barrel from 2011 through 2013, some countries only incrementally increased domestic spending and investment, channeling most export proceeds into foreign assets. Others raised spending—and increased investment—more aggressively, and saw their external breakevens rise sharply.

The low breakeven countries account for about 15 mbd of oil and gas exports. These countries kept their external breakevens fairly close to \$50 a barrel, and saved roughly half of the per-barrel proceeds of their oil exports (figure 5). They were able to build even larger external buffers than before the crisis, though a lack of complete transparency around the assets of various sovereign wealth funds hinders a full analysis of these buffers in several important countries. Saudi Arabia broadly fits with the low breakeven countries until 2014.

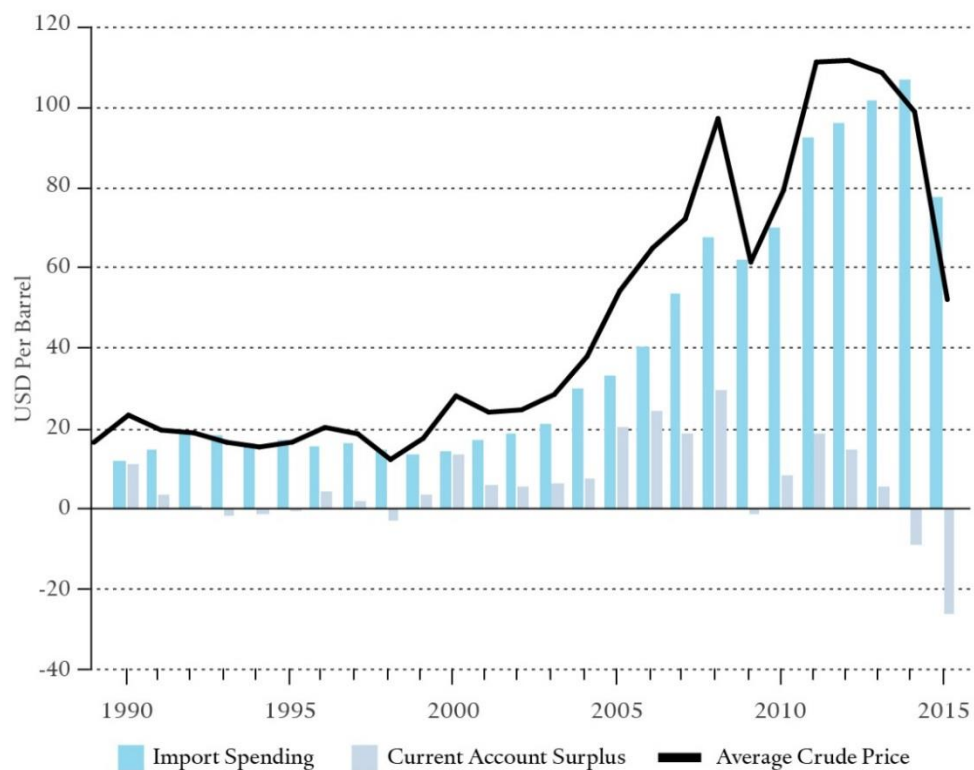
**Figure 5. Low Breakeven Group Composite External Breakeven Price**



Sources: British Petroleum; International Monetary Fund; Haver Analytics; authors' own calculations.

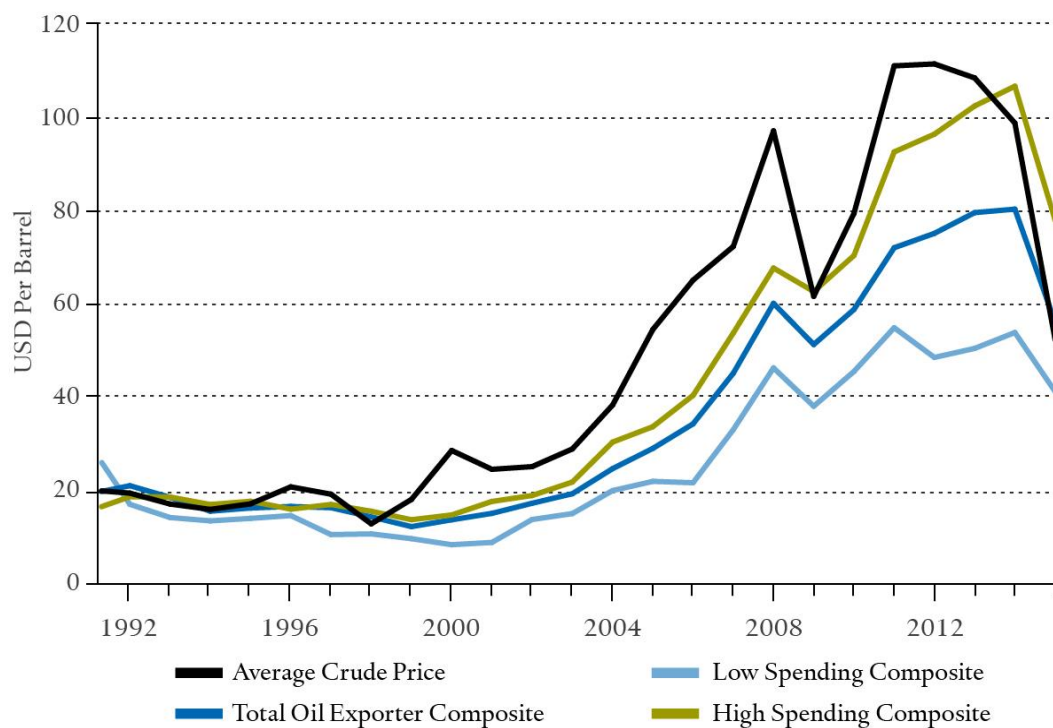
Other countries, perhaps lulled into a false sense of security by the mild consequences of the financial crisis, matched the swift growth of oil prices and revenues with larger import bills and swelling budgets, such that their breakeven prices remained close to, and in some cases exceeded, the price of oil (figure 6). These high-spending oil exporters saved less of their oil export revenues during the 2010 to 2013 period than during the 2005 to 2008 period (both as a dollar amount and a percentage). By 2013, when the average annual price of oil was \$108 a barrel, the high breakeven oil exporters' breakeven price was \$103. Whereas the low breakeven composite saved almost half of their oil proceeds between 2011 and 2013, the high breakeven composite devoted about 90 percent of their oil revenue to covering their import bill (figure 7). Russia broadly tracked the high breakeven countries until 2014, and then adjusted to the fall in the price of oil remarkably quickly.

**Figure 6. High Breakeven Group Composite External Breakeven Price**



Sources: British Petroleum; International Monetary Fund; Haver Analytics; authors' own calculations.

**Figure 7. External Breakeven Price Composites**



Sources: British Petroleum; International Monetary Fund; Haver Analytics; authors' own calculations.

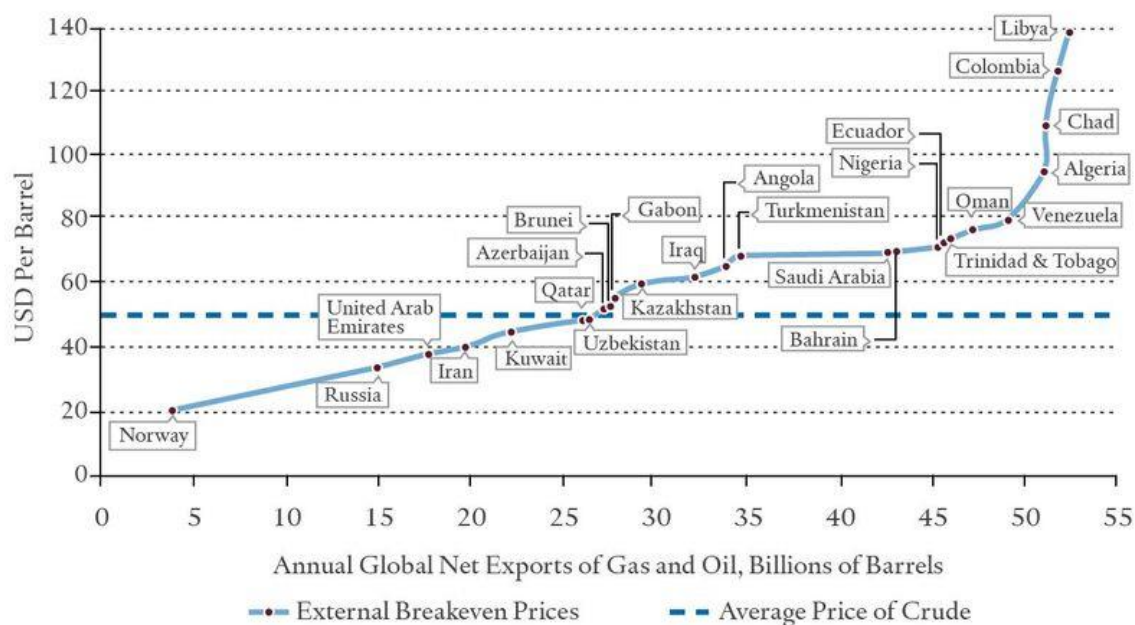
## 2015 AND 2016: FORCED ADJUSTMENT

Oil's dramatic fall, from around \$100 a barrel in September 2014 to \$45 a barrel by February 2015, roughly halved the oil export revenues of the main oil-exporting economies. After a nearly uninterrupted decade of high oil prices, import spending by oil-exporting countries had increased to the point that \$80 a barrel was required for the oil exporters in aggregate to have a balanced current account. Many oil exporters had external breakevens of over \$100, and even the more conservatively managed oil exporters generally needed an oil price of around \$54 to avoid current account deficits. In 2014, only Norway and Kuwait had an external breakeven price of less than \$45 per barrel.

The necessary adjustment—in the form of a reduced import bill—happened relatively quickly. The composite breakeven for all exporters dropped from \$80 a barrel in 2014 to \$56 in 2015. The high breakeven group cut their composite breakeven price by about \$30 (from \$107 to \$78), while the low breakeven group only adjusted their breakeven down by about \$13 (from \$54 to \$41).<sup>26</sup>

Plotting the oil exporters' production together, their external breakeven creates a snapshot that illustrates how many oil-producing countries can cover their import bill at a given oil price (figure 8). This graph looks similar to the chart charts of the global supply curve for oil production but it depends on a country's spending on imports, not its production costs.

**Figure 8. 2015 External Breakeven Curve**



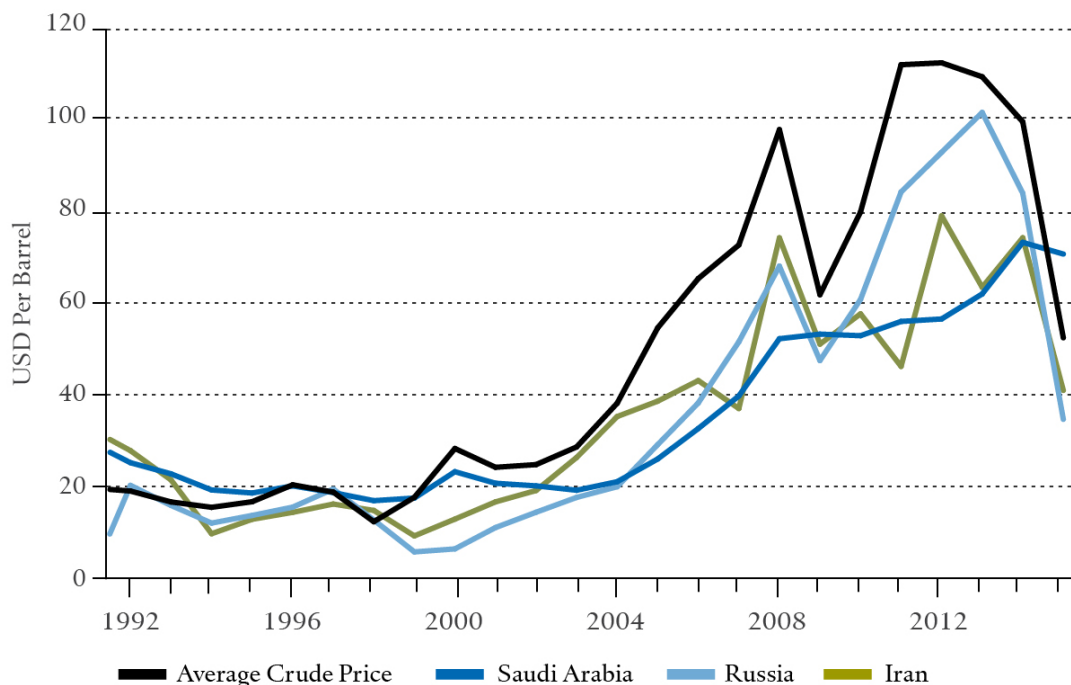
Sources: British Petroleum; International Monetary Fund; Haver Analytics; authors' own calculations.



## Three Cases

Iran, Russia, and Saudi Arabia (figure 9) were all left out of the high and low breakeven composites. Saudi Arabia and Russia were separated because of their size and because their trajectories over the past few years have diverged significantly from global trends, and Iran because it was subject to rigorous sanctions.

**Figure 9. External Breakeven Price Comparisons: Saudi Arabia, Russia, and Iran**

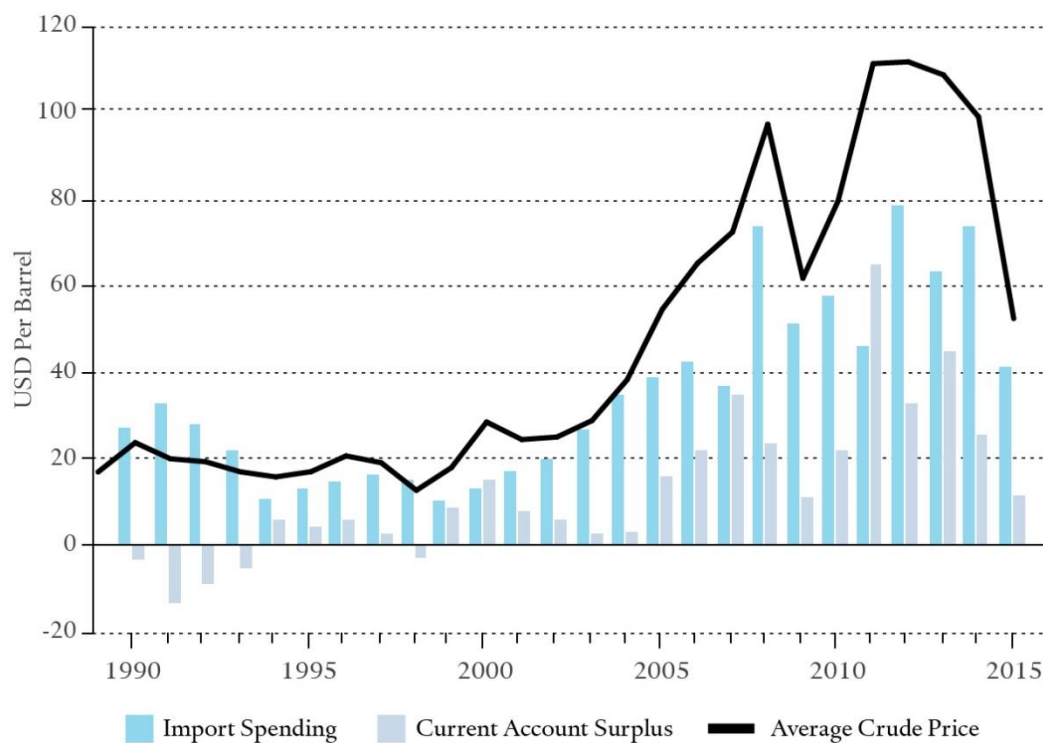


Sources: British Petroleum; International Monetary Fund; Haver Analytics; authors' own calculations.

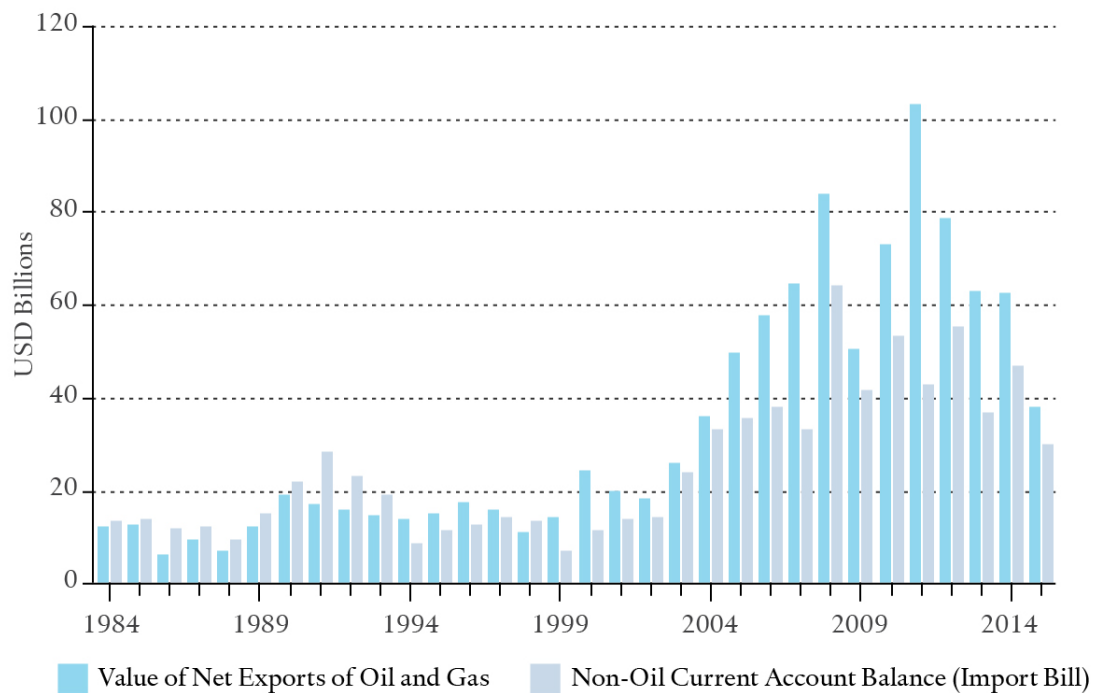
### IRAN

Iran was unable to reap the full benefits of the 2010–2014 oil price windfall as U.S. and EU sanctions curbed both the production and export of Iranian oil. Iranian petroleum production tumbled 25 percent, from more than 4.2 mbd in mid-2011 to less than 3.2 mbd by the end of 2012—the lowest it had been since 1986, during the Iran-Iraq War.<sup>27</sup> The effects on Iran's net exports of oil and gas were similarly severe; net exports fell from an average of 2.5 mbd in 2011 to 1.98 in 2012 and 1.63 mbd in 2014.<sup>28</sup>

The fall in oil export volumes mechanically caused a spike in Iran's breakeven price from \$46 in 2011 to \$78 in 2012 and \$63 in 2013 (figure 10), as it had fewer oil exports with which to cover its import bill. However, in this case, the change in the breakeven is less relevant than the evolution of Iran's total import bill, which remained around \$40 billion a year apart from 2012 (figure 11). With an export volume of about 2.5 mbd, Iran's breakeven would have jumped from around \$45 a barrel to around \$60 in 2012 and then fallen back to \$40 in 2013.

**Figure 10. Iran's External Breakeven Price**

Sources: British Petroleum; International Monetary Fund; Haver Analytics; authors' own calculations.

**Figure 11. Iran: Export Revenue Versus Import Bill**

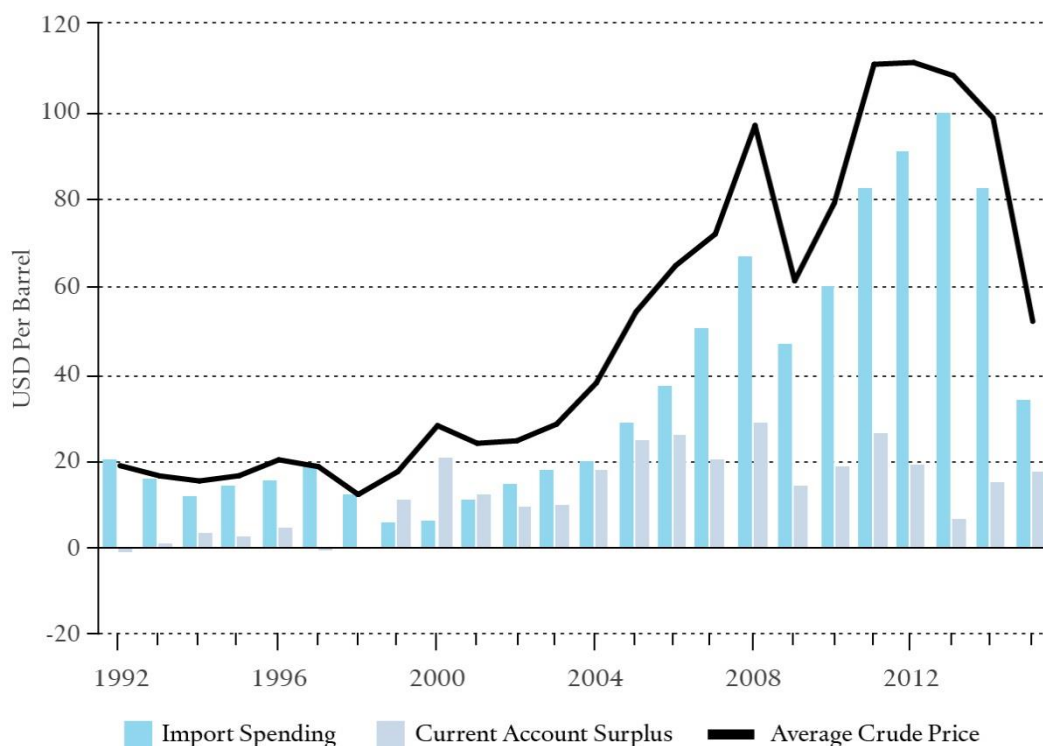
Sources: British Petroleum; International Monetary Fund; Haver Analytics; authors' own calculations.

## RUSSIA

Russia has traditionally fit in well with the high breakeven, low savings group. In Russia, the roughly \$40 dollar per barrel increase in the price of oil between 2005 and 2008 went almost entirely toward financing greater imports (figure 12), pushing the breakeven oil price from \$30 to \$68. In 2008, Russia was saving only marginally more per barrel, with oil at close to \$100, as it did in 2000, when oil was \$30. After a difficult period during the global financial crisis, Russia allowed its breakeven to rise to \$92 a barrel in 2012 and \$101 a barrel in 2013. With an average oil price of \$108 in 2013, Russia's external savings per barrel was roughly \$7, or less than 10 percent of its oil revenue—the lowest sum since 1998.

However, Russia subsequently reduced its breakeven by even more than a typical member of the high breakeven group. Soon after the price of oil collapsed in late 2014, Russia allowed its currency, the ruble, to depreciate drastically—in part because U.S. and EU financial sanctions limited the ability of major Russian companies to borrow offshore and reduced Russia's financial freedom to maneuver.<sup>29</sup> Russia's breakeven price fell from \$100 in 2013 to \$84 in 2014 and then to \$35 in 2015 (figure 12), keeping Russia's current account in surplus.<sup>30</sup> Real GDP contracted by 3.7 percent between 2014 and 2015 and, with inflation far in excess of nominal wage growth, real living standards fell sharply.<sup>31</sup> But by adjusting quickly, Russia has clearly reduced its vulnerability to a prolonged period of low oil prices. Russia's adjustment shows that external adjustment is possible even in the absence of large swings in the fiscal deficit if the exchange rate adjusts. Russia's headline fiscal deficit and cyclically adjusted fiscal balance both deteriorated by about 3 percentage points of GDP between 2014 and 2016.<sup>32</sup>

**Figure 12. Russia's External Breakeven Price**

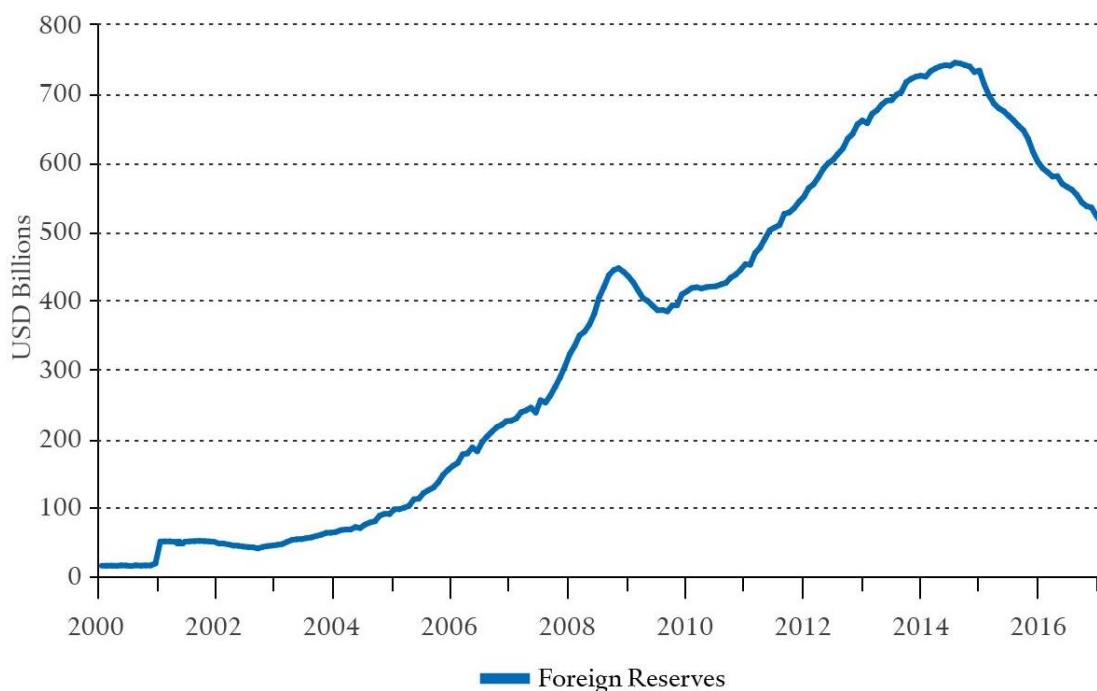


Sources: British Petroleum; International Monetary Fund; Haver Analytics; authors' own calculations.

## SAUDI ARABIA

Saudi Arabia has traditionally been close to the low breakeven, high savings group. During the run-up in prices from 2003 to 2008, the Saudis came close to saving half of the proceeds of each barrel of oil they exported, only falling a bit short in 2007 and 2008. The foreign exchange reserves of Saudi Arabia's central bank, the Saudi Arabian Monetary Authority (SAMA), are illustrative (figure 13). SAMA's reserves grew from \$50 billion in 2000 to \$100 billion in 2005, then soared to \$450 billion by late 2008. After the price of oil dropped, SAMA's reserves declined by around \$65 billion to a low of \$385 billion in September 2009. But by the end of 2009, after less than a year of declining reserves, SAMA was able to resume accumulating reserves.

**Figure 13. Saudi Arabian Monetary Agency Foreign Reserves**



Sources: Saudi Arabian Monetary Authority; Haver Analytics.

After the global crisis, the Saudis remained relatively prudent, certainly more so than the Russians. Saudi Arabia's external breakeven remained between \$50 and \$56 a barrel from 2008 to 2012, with savings of over \$50 per barrel in 2011 and 2012 (figure 4).

However, with hindsight, the Saudis' discipline started to waver in 2013 and 2014, if not a bit earlier—partially in response to the political pressures that manifested in the Arab Spring. Per barrel spending rose from close to \$55 a barrel to just under \$75 a barrel during this period.

Ironically, the Saudi breakeven stopped following the low breakeven set of countries just before the Saudis changed their oil policy and shifted away from trying to manage the global oil price—largely because relatively high-cost sources of supply (including the oil the United States produced by “fracking”) were eating into Saudi and Organization of the Petroleum Exporting Countries (OPEC) market share. This alone shows that the breakeven price cannot mechanically be used to infer the oil policy preferences of important countries.

At first, the Saudis were slow to adjust to the new era of low oil prices. They reduced their breakeven by just \$3 (from \$73 to \$70) in 2015, and as a result became one of the high breakeven, low savings countries. The Saudis were able to postpone most adjustments more easily than others

as a result of their large accumulated reserves and their ability to issue debt both domestically and abroad. Between August 2014 and April 2017, SAMA sold more than \$245 billion in reserves. The Saudis also started to borrow externally, tapping the international capital markets for an unprecedented \$17.5 billion sovereign bond issue.<sup>33</sup>

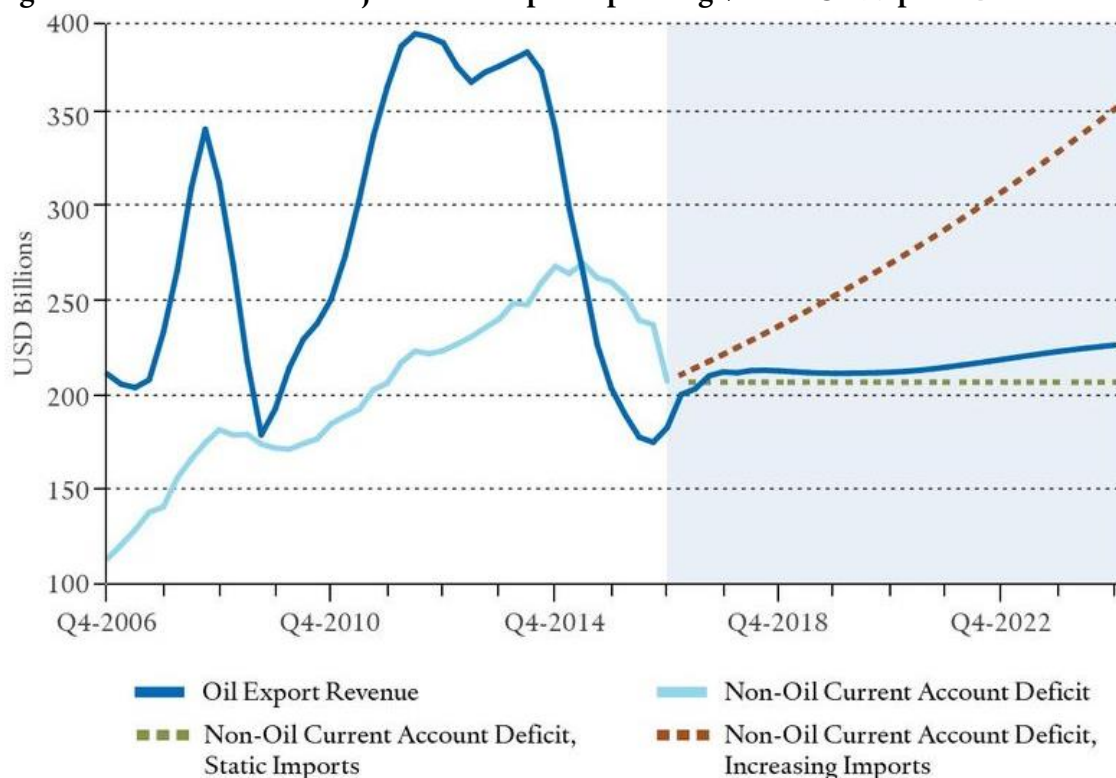
Yet even the Saudis found it difficult to continue to defer economic adjustment.<sup>34</sup> Beginning in early 2016, Saudi Arabia took further measures to rein in both new investments and current expenditure, reducing its breakeven price to an estimated \$50 in 2016 through a 20 percent fall in imports.<sup>35</sup>

Figure 14 plots Saudi Arabia's non-oil current account balance against its oil export revenues. If imports remain at their low 2016 levels (because the Saudi population is growing by 2 percent a year, per capita imports need to fall over time) and oil prices rise in line with the futures contract curve, Saudi Arabia will run a very modest current account surplus for the next five years. If their imports instead resume the same average pace of growth as they experienced between 2009 and 2014, Saudi Arabia will face a rapidly widening external deficit. There are already signs that the fiscal discipline that brought down imports in 2016 will be difficult to sustain.<sup>36</sup>

The Saudis face a second potential vulnerability: the breakeven calculation assumes that there is no net outflow of private capital, a condition that could be satisfied if private inflows from the sale of government bonds, for example, offset private outflows. Historically, that has not been the case: net private outflows were a bit over \$50 billion a year (roughly \$20 per barrel of Saudi oil exports) from 2010 to 2015. Covering both the 2016 import bill and \$50 billion a year in outflows without drawing on reserves would require an average oil price of around \$70 a barrel.

With around \$500 billion left in reserves, Saudi Arabia still has plenty of financial fire power. However, any significant changes to either the level of imports or the oil price curve also would throw Saudi Arabia off track.

**Figure 14. Saudi Arabia: Projection of Import Spending Versus Oil Export Revenue**



Sources: Saudi Arabian Monetary Agency; Bloomberg; Haver Analytics; authors' own calculations.

## Recommendations

There are no simple policy recommendations that hold across all the oil-exporting economies. Countries' individual vulnerabilities differ, and countries' relative vulnerability can change. But broadly speaking, a review of the oil boom and bust suggests that both oil-exporting economies and the international institutions advising them would benefit from setting realistic goals: oil-exporting economies should recognize that they are not going to end their exposure to volatile oil markets by diversifying their economies away from oil and should focus more on managing the intrinsic vulnerability that comes from depending on a single volatile export. International institutions should devote more effort to developing policy rules that do not require oil exporters to simply save any oil windfall.

*Diversification is not a realistic goal for many oil exporters.* The oil-exporting economies tend to have a comparative advantage in the production of oil. They rely on the revenue from oil exports to trade for other commodities, manufactured goods, and services. Nigeria is an important exception; it has little oil relative to its population and should have a more diversified economy. For most, better management of the economic challenges that come from oil-related volatility—both the booms and the busts—is a more realistic policy goal than diversifying the economy away from oil.<sup>37</sup>

*High-quality buffers are critical to managing oil price volatility.* The policies that help oil-exporting economies manage volatility are no secret. Fiscal reserves (i.e., oil revenue stabilization funds) provide a pool of external assets that can be drawn on when oil prices fall, to provide time to adjust to any sudden swings. Many oil exporters could also make more use of financial hedges. Mexico, for example, is no longer a net oil exporter, especially considering its imports of gas, but its strategy for hedging against the budget effects of swings in the oil price remains a model. Oil exporters do not need to rely entirely on fiscal buffers, as the budgetary effects of swings in the dollar price of oil can be offset in part by changes in the exchange rate, so long as their currencies move with the price of oil. Since the gains from exchange rate flexibility depend on financial balance sheets that can withstand large exchange rate moves, one bit of good advice for oil exporters is straightforward: countries that are spending a large portion of their oil revenues should try to avoid foreign-currency-denominated debt. The recent surge in external borrowing by Gulf countries thus bears watching, even if most of the Gulf countries still have far more external assets than external debt and remain committed to their currency pegs.

*Do not expect the impossible: oil windfalls will not all be saved.* Just as it is unrealistic for the oil exporters to diversify away from oil, it also is unrealistic to expect that the oil-exporting economies will be able to limit their vulnerability by using the proceeds from oil exports exclusively to build up external assets. The most orthodox policy recommendations often diverge so radically from actual practice that they fail to provide useful policy guidance. Oil exporters spent about 75 percent of the export windfall from the rise in oil prices from \$25 a barrel in 2002 to \$110 a barrel in 2013 on higher imports and saved about 25 percent.

The oil-exporting economies clearly have not been willing to use their oil export proceeds to build external financial assets at the rate implied by either a bird-in-hand policy rule or by the commonly used permanent income hypothesis policy rule. The former requires saving the net earnings from oil

production, and only spending the interest and dividend income from financial assets purchased with the proceeds of oil production; the latter allows an oil exporter to spend the imputed interest income on oil still in the ground as well as the financial income from existing financial assets.<sup>38</sup>

There are also strong theoretical reasons why both the bird-in-hand and the permanent income rules are too severe: using oil export proceeds rather than external borrowing to finance a portion of a country's domestic investment makes sense, especially in poor countries where there is a substantial need for domestic investment.<sup>39</sup>

A challenge going forward is thus to find the healthy middle ground between the most orthodox advice and current practice. One suggestion here is simple, and does not cost anything: benchmarking future policy advice against past experience. A policy rule that implies an external breakeven of \$30 or even \$40 when the price of oil is \$100 is unhelpful for most oil-exporting economies, and conversely, an external breakeven of \$90 when oil is \$100 leaves little scope to defer adjustment should oil prices decline.<sup>40</sup>

## Conclusion

External breakevens provide the single best indicator of the nature of pressure on an oil exporter's budget and exchange rate. They have significant advantages over the commonly used fiscal breakeven.

Comparing the external breakeven of individual countries to the composite breakeven of the major oil-exporting economies provides a simple way of tracking how the world's main oil-exporting economies are adjusting to changes in the global oil price. Individual countries' breakeven prices are not fixed—they evolve in response to policy choices. Saudi Arabia had long been among the most economically conservative of the major oil-exporting countries, with a lower external breakeven than most of its peers. That is no longer the case, as the Saudis have been slow to adjust to the 2014 fall in oil prices. Russia, by contrast, has gone from being among the countries with the highest breakevens to being among the countries with the lowest.

Changes in external breakeven have consequences for the geopolitical positions of the major oil exporters.<sup>41</sup> Rising oil prices can facilitate the pursuit of the strategic aims of major oil-exporting economies: financial assistance to allies is easier to provide, and internal stability can be maintained through generous budgets. Conversely, falling oil prices can make it more difficult to generate the resources needed to sustain an active foreign policy and can limit a government's ability to deliver the services and jobs that help to assure political stability.

At the same time, knowing a country's external breakeven is not sufficient to allow for confident political and strategic forecasting. Russia's high breakeven price, \$100 in 2013, did not prove to be a major constraint on its geopolitical ambitions in the former Soviet Union or the Middle East. Russia's limited foreign currency debts, relatively flexible exchange rate, and willingness to adjust quickly proved more significant. Similarly, the Saudis' breakeven price has not determined Saudi Arabia's strategic behavior, or even its price preferences in the oil markets—though it does highlight how \$50 a barrel oil will continue to pose a serious test to the kingdom's economic management.



## Appendix: Breakeven Calculations

Calculating external breakevens is straightforward. Subtracting each country’s current account balance from the value of its net gas and oil exports yields the non-oil current account balance (a deficit, as long as net oil exports are greater than the total current account balance). Dividing this number by the volume of the country’s annual net gas and oil exports (in terms of barrels) results in the per barrel price that the country would need to balance its current account—the breakeven price:

$$\frac{(\text{Value of Net Exports of Oil and Gas } [\$] - \text{Current Account Balance } [\$])}{\text{Volume of Net Exports of Oil and Gas } [\text{Barrels}]}$$

The oil and gas export data used in this report came from the “Statistical Review of World Energy,” an annual publication of historical energy data compiled by British Petroleum (BP). BP’s report includes detailed country-level production and consumption data for both crude oil and natural gas. The volume of each country’s net exports was calculated by subtracting the amount of energy a country consumed in a given year from the amount of energy it produced that same year. BP does not report oil and gas consumption statistics for some oil exporters (notably Iraq, Oman, Angola, and Nigeria), so for these countries consumption was estimated based on known consumption by other countries in the region and relative GDPs.<sup>42</sup>

To determine the annual value of the net oil exports, each country’s annual export volumes were multiplied by the global average price of crude oil that year (specifically the average price of Brent crude as reported by BP). Similarly, the quantity of natural gas in millions of British thermal units (mmBTUs, the standard energy content measure for natural gas) was multiplied by the average price per mmBTU for that year. Since natural gas prices can vary widely based on the specific product (most notably liquefied natural gas, or LNG, transported by ship versus natural gas transported by pipeline) and location, annual natural gas prices from five different gas-trading hubs were used: LNG in Japan, LNG in Germany, pipeline gas in the United Kingdom, pipeline gas at the U.S. Henry Hub, and pipeline gas in Alberta, Canada. These five prices were used to calculate an annual average composite price for each gas-exporting country based on the regional distribution of its gas exports. For consistency, all current account balance data came from the IMF’s World Economic Outlook database.

Gas volumes were converted from cubic feet to mmBTUs and to barrel of oil equivalents (BoEs, in order to sum with oil volumes) using BP’s published conversion rates. One additional hurdle in incorporating natural gas exports is that, while they fluctuate similarly, per barrel oil prices are much greater than per BoE gas prices. BoEs of gas are equivalent to barrels of oil in terms of volume and energy, but not in terms of price. Consequently, simply dividing a country’s non-oil current account balance by the sum of oil exports (in barrels) and gas exports (in BoEs) would not yield the external breakeven price of oil, but rather the breakeven price of some combination of oil and gas (depending on how much of each the country exports). These discrepancies between oil and gas prices were resolved by computing ratios between the annual oil price per barrel and annual gas prices per BoE. Gas export volumes (in BoEs) were divided by this ratio before being summed with oil export volumes to form the denominator of the breakeven formula. For example, if in a given year Qatar exported 10 billion barrels of oil and 10 billion BoEs of gas, but the annual price per barrel of oil was twice that of the price per BoE of gas (a 2:1 ratio), Qatar’s 10 billion BoEs of gas would be divided by 2 then added to the 10 billion barrels of oil to form a divisor of 15 billion barrels of oil and gas.

## About the Authors

**Brad W. Setser** is a senior fellow and acting director of the Greenberg Center for Geoeconomic Studies at the Council on Foreign Relations. He is the author of *Sovereign Wealth and Sovereign Power* and the coauthor, with Nouriel Roubini, of *Bailouts and Bail-ins: Responding to Financial Crises in Emerging Economies*.

**Cole V. Frank** is a research associate at the Council on Foreign Relations.

---

## Endnotes

1. In the Middle East, oil can account for 75 percent or more of many countries' total revenues. Russia gets around half of its budget revenues from oil and natural gas. See "Oil and the Gulf States: After the Party," *Economist*, March 23, 2016, <http://www.economist.com/news/middle-east-and-africa/21695539-low-oil-price-manageable-short-term-gulf-states-must-make>; Anna Andrianova and Dina Khrennikova, "How Cheap Oil Is Squeezing Russia's Economy," *Bloomberg*, January 26, 2016, <http://www.bloomberg.com/news/articles/2016-01-26/how-cheap-oil-is-squeezing-russia-s-economy>.
2. Thomas L. Friedman, "A Pump War?," *New York Times*, October 14, 2014, <http://www.nytimes.com/2014/10/15/opinion/thomas-friedman-a-pump-war.html>; Mohamad Bazzi, "Saudi Arabia Is Playing Chicken With Its Oil," Reuters, December 15, 2014, <http://blogs.reuters.com/great-debate/2014/12/15/saudi-arabia-is-playing-chicken-with-its-oil/>; Andrew Topf, "Did the Saudis and the U.S. Collude in Dropping Oil Prices?," *Time*, December 29, 2014, <http://time.com/3648604/saudi-us-dropping-oil-prices/>; Keith Johnson, "Saudi Arabia Takes Out Its Energy Weapon," *Foreign Policy*, June 3, 2015, <https://foreignpolicy.com/2015/06/03/saudi-arabia-takes-out-its-energy-weapon-opec-russia-putin-iran-oil/>; Geoff Dyer and Ed Crooks, "Saudi Arabia Tests US Ties With Oil Price," *Financial Times*, October 16, 2014, <https://www.ft.com/content/e2fd08c6-554c-11e4-b750-00144feab7de>.
3. "The Russian Economy: The End of the Line," *Economist*, November 22, 2014, <http://www.economist.com/news/briefing/21633816-more-decade-oil-income-and-consumer-spending-have-delivered-growth-vladimir-putins>; Robert Kahn, "The Russian Crisis: Early Days," *Council on Foreign Relations*, January 6, 2015, <http://www.cfr.org/economics/global-economics-monthly-january-2015/p35923>.
4. U.S. Energy Information Administration, "Under Sanctions, Iran's Crude Oil Exports Have Nearly Halved in Three Years," June 24, 2015, <http://www.eia.gov/todayinenergy/detail.php?id=21792>; U.S. Energy Information Administration, "Iran's Petroleum Production Expected to Increase as Sanctions Are Lifted," January 19, 2016, <http://www.eia.gov/todayinenergy/detail.php?id=24592>; International Monetary Fund, *Regional Economic Outlook: Middle East and Central Asia* (Washington, DC: International Monetary Fund, October 2016); International Monetary Fund, *World Economic Outlook: Adjusting to Lower Commodity Prices* (Washington, DC: International Monetary Fund, October 2015).
5. Blake Clayton and Michael A. Levi, "Fiscal Breakeven Oil Prices: Uses, Abuses, and Opportunities for Improvement," CFR Discussion Paper (Council on Foreign Relations, November 2015), <http://www.cfr.org/oil/fiscal-breakeven-oil-prices-uses-abuses-opportunities-improvement/p37275>.
6. Ali Aissaoui, "Modeling OPEC Fiscal Breakeven Oil Prices: New Findings and Policy Insights," Economic Commentary, APICORP Research (Arab Petroleum Investments Corporation, September 2013), [http://www.apic.com/Research/Commentaries/2013/Commentary\\_V08\\_N08-09\\_2013.pdf](http://www.apic.com/Research/Commentaries/2013/Commentary_V08_N08-09_2013.pdf); Abishek Deshpande and Nic Brown, "Fiscal Breakeven Oil Prices for Major OPEC Members," *Oil & Gas Financial Journal*, April 3, 2014, <http://www.ogfj.com/articles/2014/04/fiscal-breakeven-oil-prices-for-major-opec-members.html>; Robert Burgess et al., "EM Oil Producers: Breakeven Pain Thresholds," Special Report (Deutsche Bank Research, October 16, 2014), <https://etf.deutscheam.com/DEU/DEU/Download/Research-Global/2dd759fe-b80a-4f07-a51c-dd02f4d384e5/EM-oil-producers-breakeven-pain.pdf>; M.R. Raghu, "How GCC States' Breakeven Oil Prices Stack up," *National*, August 24, 2015, <http://www.thenational.ae/business/energy/how-gcc-states-breakeven-oil-prices-stack-up>; International Monetary Fund, "Regional Economic Outlook: Middle East and Central Asia, October 2016," Regional Economic Outlook (International Monetary Fund, October 2016), <http://www.imf.org/external/pubs/ft/reo/2016/mcd/mreo1016.htm>.
7. Clayton and Levi, "Fiscal Breakeven Oil Prices."
8. International Monetary Fund, "The Commodities Roller Coaster: A Fiscal Framework for Uncertain Times," Fiscal Monitor (International Monetary Fund, October 2015), <http://www.imf.org/external/pubs/ft/fm/2015/02/fmindex.htm>.
9. Nicholas Kulish and Mark Mazzeti, "Saudi Royal Family Is Still Spending in an Age of Austerity," *New York Times*, December 27, 2016, <https://www.nytimes.com/2016/12/27/world/middleeast/saudi-royal-family-money.html>.
10. Brad Setser, "The Case for Exchange Rate Flexibility in Oil-Exporting Economies," Policy Brief (Peterson Institute for International Economics, November 2007), <https://piie.com/publications/policy-briefs/case-exchange-rate-flexibility-oil-exporting-economies>.
11. *Ibid.*
12. In late 2014, Deutsche Bank estimated that Russia's 2015 fiscal breakeven price was \$105.2, while Fitch Ratings estimated it at \$98. See Burgess et al., "Breakeven Pain," and an archived version of Bentley, Minczeski, and Juan, "Which Oil Producers Are Breaking Even?" available at <https://web.archive.org/web/20141224195105/http://graphics.wsj.com/oil-producers-breakeven-prices>
13. IMF World Economic Outlook Database.
14. Clayton and Levi, "Fiscal Breakeven Oil Prices."

15. International Monetary Fund, "Saudi Arabia: Staff Report for the 2016 Article IV Consultation," IMF Country Report, no. 16/326, October 2016.
16. International Monetary Fund, "The Commodities Roller Coaster: A Fiscal Framework for Uncertain Times," Fiscal Monitor (International Monetary Fund, October 2015), <http://www.imf.org/external/pubs/ft/fm/2015/02/fmindex.htm>.
17. Empirical work by the IMF on a broad sample of advanced and emerging economies suggests that a 1 percentage point of GDP improvement in a country's fiscal balance is associated with a 0.3–0.4 percent of GDP improvement in the current account balance. However, for countries in which the public sector plays an outsized role in the economy (the case in most oil-dependent economies), there is likely to be a stronger link between the fiscal and external balances. In fact, Behar and Fouejieu (2016) find that for a sample of countries in which greater than 70 percent of goods and services exports are composed of oil and natural gas, the estimated elasticity of the external balance to the fiscal balance is around one. This suggests that a 1 percentage point of GDP change in the fiscal balance is associated with a 1 percentage point of GDP change in the current account. See Alberto Behar and Armand Fouejieu, "External Adjustment in Oil Exporters: The Role of Fiscal Policy and the Exchange Rate," International Monetary Fund Working Paper 16/107, June 2016; Christiane Nickel and Isabel Vansteenkiste, "Fiscal Policies, the Current Account and Ricardian Equivalence," Working Paper Series (European Central Bank, 2008), <https://ideas.repec.org/p/ecb/ecbwps/20080935.html>; S. M. Ali Abbas et al., "Fiscal Policy and the Current Account," *IMF Economic Review* 59, no. 4 (November 1, 2011): 603–29.
18. Categorization of countries into either the high or low breakeven group was based on breakeven prices over the decade preceding oil's fall in 2014. Consequently, these labels do not always reflect the current breakeven prices of these countries. For example, in 2015 two low-breakeven countries—Bahrain and Trinidad and Tobago—had breakeven prices above \$70, while three high breakeven countries—Gabon, Iraq, and Kazakhstan—had breakevens below \$65.
19. International Monetary Fund, "Regional Economic Outlook: Middle East and Central Asia, October 2015," Regional Economic Outlook (IMF, October 2015), <https://www.imf.org/external/pubs/ft/reo/2015/mcd/eng/pdf/menap1015.pdf>.
20. International Monetary Fund, "World Economic Outlook Database," October 2016, <http://www.imf.org/external/pubs/ft/weo/2016/02/index.htm>
21. International Monetary Fund, "Regional Economic Outlook, October 2015."
22. The 1999 adjustment—in which spending on imports fell despite a rise in the price of oil—likely reflects both pro-cyclical fiscal austerity and a recognition of the importance of stabilization funds.
23. IMF World Economic Outlook Database.
24. Setser, "The Case for Exchange Rate Flexibility in Oil-Exporting Economies."
25. Alessandro Rebucci and Nikola Spatafora. "Chapter II: Oil Prices and Global Imbalances," in *World Economic Outlook* (Washington, DC: International Monetary Fund, April 2006).
26. Some small portion of the reduction in the import bills came through lower non-oil commodity prices.
27. U.S. Energy Information Administration, "Sanctions Reduced Iran's Oil Exports and Revenues in 2012," April 26, 2013, <http://www.eia.gov/todayinenergy/detail.php?id=11011>.; Energy Information Administration Database.
28. British Petroleum, "2015 Statistical Review of World Energy," June 2016, <http://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html>
29. Russia did run through about \$120 billion in reserves from mid-2014 to mid-2015, helping many sanctioned state companies pay down their external debt (Central Bank of the Russian Federation via Haver Analytics).
30. Russia's relatively broad export base—as compared to other major oil exporters—further facilitated this swift adjustment. Fuel exports accounted for just under 70 percent of Russia's total exports in 2014, not over 90 percent as in Nigeria, Kuwait, Algeria, Iraq, and Venezuela (World Bank Data Catalog, 2016).
31. Russian Federal State Statistics Service via Haver Analytics.
32. IMF WEO Database.
33. Saudi Arabian Monetary Authority via Haver Analytics; Elaine Moore and Simeon Kerr, "First Saudi Bond Sale Raises \$17.5bn in Emerging Market Record," *Financial Times*, October 19, 2016, <https://www.ft.com/content/b4f1f1da-95e6-11e6-a1dc-bdf38d484582>.
34. Rick Gladstone, "Saudi Arabia, Squeezed by Low Oil Prices, Cuts Spending to Shrink Deficit," *New York Times*, December 28, 2015, <http://www.nytimes.com/2015/12/29/world/middleeast/squeezed-by-low-oil-prices-saudi-arabia-cuts-spending-to-shrink-deficit.html>; Stefania Bianchi, Zainab Fattah, and Matthew Martin, "Saudi Cost-Cutting Drive May Cancel \$20 Billion of Projects," *Bloomberg*, September 6, 2016, <http://www.bloomberg.com/news/articles/2016-09-06/saudi-arabia-said-to-weigh-canceling-20-billion-of-projects>; Ben Hubbard, "Decline in Oil Prices Lands on Government Workers as Saudi Arabia Cuts Paychecks," *New York Times*, September 26, 2016, <http://www.nytimes.com/2016/09/27/world/middleeast/saudi-arabia-cuts-salaries-oil.html>; Nicholas Kulish, "Saudi Arabia, Where Even Milk Depends on Oil, Struggles to Remake Its Economy," *New York Times*, October 13, 2016, <http://www.nytimes.com/2016/10/14/world/middleeast/saudi-arabia-oil-prices-economy.html>.
35. Saudi Arabia General Authority for Statistics.
36. Glen Carey, Nadeem Hamid, and Vivian Nereim, "King Scales Back Austerity Plan That Set Saudis Grumbling," *Bloomberg*, April 22, 2017, <https://www.bloomberg.com/politics/articles/2017-04-22/saudi-king-restores-state-employee-bonuses-as-overhaul-broadens>
37. Philip Daniel, Sanjeev Gupta, Todd Mattina, and Alex Segura-Ubiergo, "Extracting Resource Revenue," *Finance & Development*, Vol. 50, no. 3, September 2013. <http://www.imf.org/external/pubs/ft/fandd/2013/09/daniel.htm>

- 
38. International Monetary Fund, *Macroeconomic Policy Frameworks for Resource-Rich Developing Countries* (Washington, DC: International Monetary Fund, August 2012); International Monetary Fund, *Fiscal Monitor—The Commodities Roller Coaster: A Fiscal Framework for Uncertain Times* (Washington, DC: International Monetary Fund, October 2015).
39. Paul Collier, Rick van der Ploeg, Michael Spence, Anthony J. Venables, “Managing Resource Revenues in Developing Economies,” *IMF Staff Papers*, Vol. 57, no. 1, pp. 84-118; [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1696425#](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1696425#); Anthony J. Venables, “Resource Rents; When to Spend and How to Save,” *CEPR Discussion Paper*, No. DP7875, June 2010. [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1640397##](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1640397##); Frederick van der Ploeg and Anthony J. Venables, “Absorbing a Windfall of Foreign Exchange: Dutch disease dynamics,” *Journal of Development Economics*, Vol. 103, July 2013, pp. 229-243.
40. International Monetary Fund, *Fiscal Regimes for Extractive Industries: Design and Implementation* (Washington, DC: International Monetary Fund, August 2012); Paulo Medas and Daria Zakharova, “A Primer on Fiscal Analysis in Oil-Producing Countries,” *IMF Working Paper*, WP/09/56, March 2009.
41. Elliot Bentley, Pat Minczeski, and Jovi Juan, “Which Oil Producers Are Breaking Even?,” *Wall Street Journal*, November 27, 2014, <http://graphics.wsj.com/oil-producers-breakeven-prices>; Angelina Rascouet, “Oil States Need Price Jump to Balance Budget: OPEC Reality Check,” *Bloomberg*, November 29, 2015, <http://www.bloomberg.com/news/articles/2015-11-30/oil-states-need-price-jump-to-balance-budget-opec-reality-check>; Kate Drew, “Saudi Arabia’s Big Welfare Spending Faces the Oil Abyss,” CNBC, December 3, 2015, <http://www.cnbc.com/2015/12/03/biggest-cash-issue-for-saudi-arabia-goes-beyond-oil.html>; “Oil and Gas Reality Check 2015: A Look at the Top Issues Facing the Oil and Gas Sector” (Deloitte, Global Energy Resources Group, 2015), <https://www2.deloitte.com/ru/en/pages/energy-and-resources/articles/oil-gas-reality-check-2015.html>; Sam Wilkin, “IMF Sees Saudi Breakeven Oil Price Drop Less Than Forecast,” *Bloomberg*, October 19, 2016, <http://www.bloomberg.com/news/articles/2016-10-19/imf-sees-saudi-breakeven-oil-price-falling-less-than-expected>.
42. The countries included in this analysis for which BP does not report energy consumption statistics are Angola, Bahrain, Bolivia, Brunei, Chad, Gabon, Iraq, Libya, Nigeria, Oman, and Yemen.