

2016 oil price forecast: who predicts best?

Information document



Since 2007, Roland Berger has published a yearly overview of all available oil price forecasts

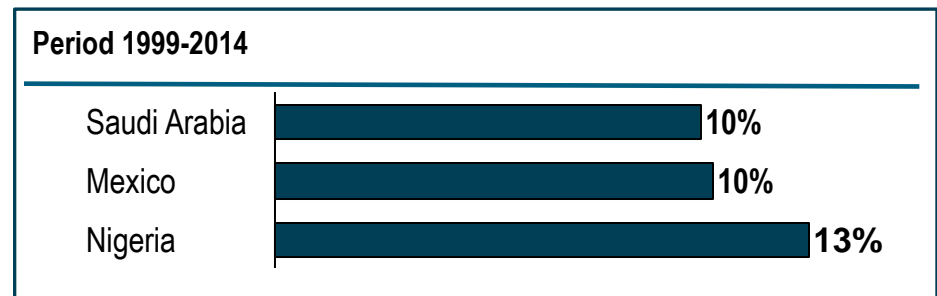
Roland Berger study of oil price forecasts, January 2016, WTI based

- > Since 2007, Roland Berger has published a yearly study on the oil price forecast
- > Major oil producing countries use a forecasted value of the oil price in their annual budgets
- > We have studied the forecasting track records of the nine largest oil-exporting countries from 1999 to 2015
- > The budgeted oil prices of the top 3 most accurate countries are used to forecast the oil price for the year ahead
- > The oil price forecast of the countries is compared to that of the major energy institutions: NYMEX, EIA and IEA

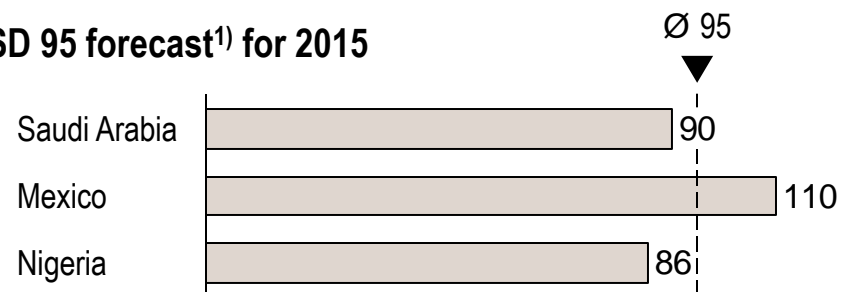
Last year's results

Nigeria replaced Russia in the top 3

Average absolute year-on-year oil price forecasting¹⁾ error [%]



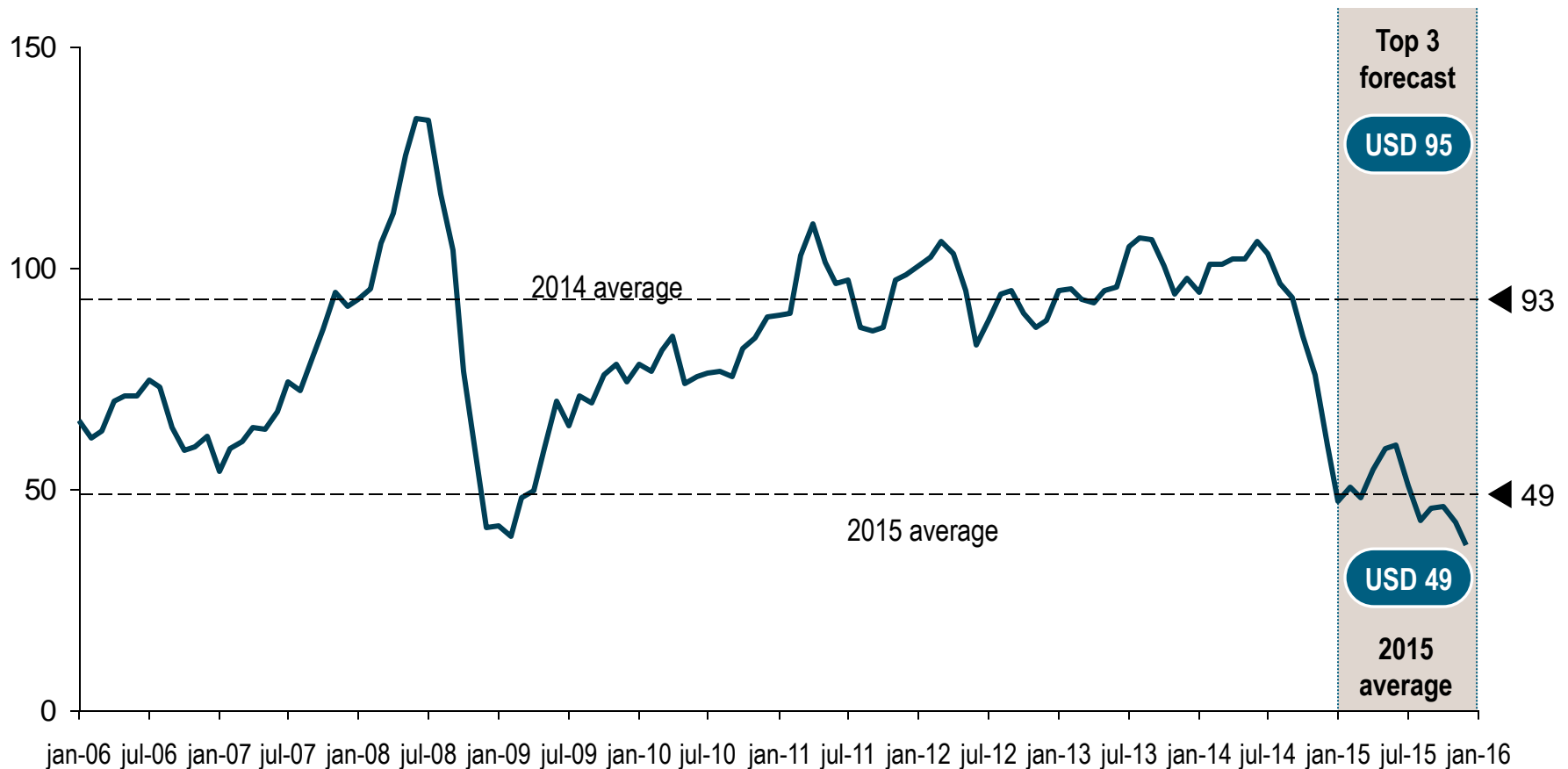
USD 95 forecast¹⁾ for 2015



1) To improve comparability, forecasts are adjusted for the ratio of local oil prices to WTI prices and for average budget deviations

In 2015 the average price for a barrel was USD 49 – nearly half of what the best forecasting countries had budgeted

Development of monthly WTI averages [USD/barrel], Jan 2006 – Dec 2015



This year's study not only contains the accuracy of last year's forecast and next prediction, but also analysis of market dynamics

Elements of this year's study

- 1

**ACCURACY OF OIL
PRICE FORECASTS**

Analysis of the accuracy of countries and institutions as forecasters of the oil price in 2015 and aggregate over the last years

- 2

**CHANGING
MARKET
DYNAMICS**

Analysis of the changing market dynamics since the USA has become a major exporter of (shale) oil and analysis of the current oversupply in the global oil market

- 3

**FUTURE OIL
PRICES**

Analysis of oil price forecast of countries and institutions and underlying political and market dynamics

Institutions have become the better price forecasters – For 2016 they predict an average of USD 46 per barrel. Are they right again?

Improved performance of institutions vs. countries in the oil price forecast

1

Over the last 15 years, the top oil exporting **countries** have **outperformed the institutions** (NYMEX, IEA, EIA) in correctly forecasting the oil price

Accuracy of oil price forecasts

Over the last 5 years however, the **institutions** have forecasted the oil price **significantly better** than the countries

2

Since the start of the **shale gas boom**, the **US** has not only been one of the major producers of oil, but is also **exporting significant amounts of petroleum products**

Changing market dynamics

Oil producing countries – Saudi Arabia in particular – **have often adapted their oil output** to price levels, thereby influencing the oil price.

The dynamics have changed since American shale oil entered the equation. North American shale oil is moving towards being the **swing supply**

Despite requiring a significantly higher oil price to balance their budgets, Saudi Arabia and other **oil-producing countries** have **refused to cut down production**, at least partly in fear of encouraging American producers. As a result, the oil market has **oversupply** and the price is **historically low**

3

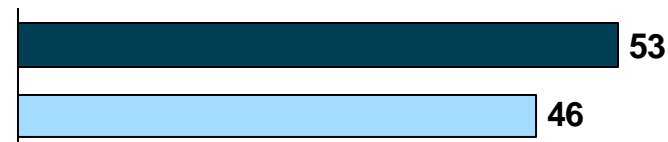
What will the future bring? Will the oversupply be curtailed by OPEC countries?

Future oil prices

Prediction for the 2016 oil price
[USD/barrel]

Top-3 countries

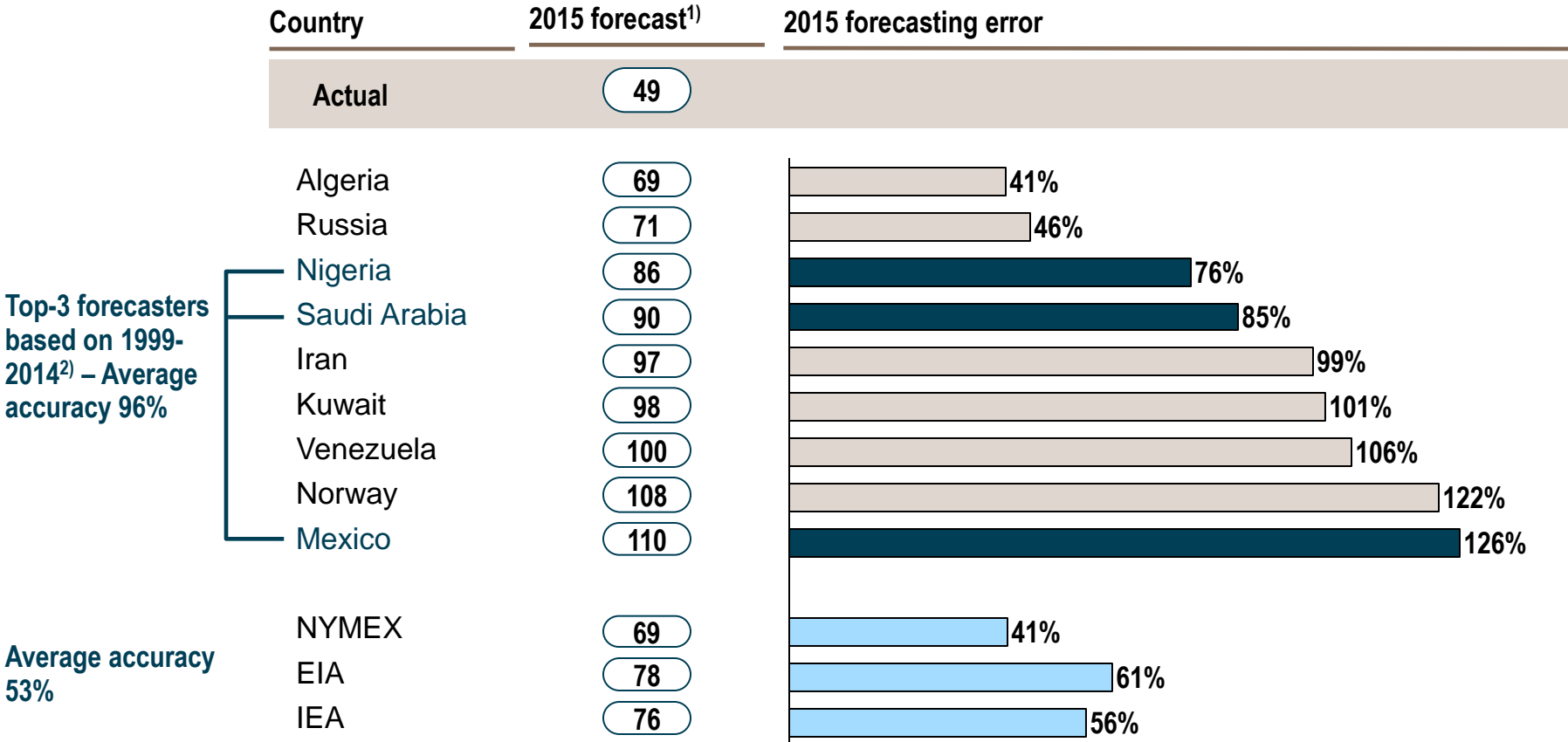
Institutions



1. Accuracy of oil price forecasts

Neither countries nor institutions accurately predicted the oil price decline of 2015

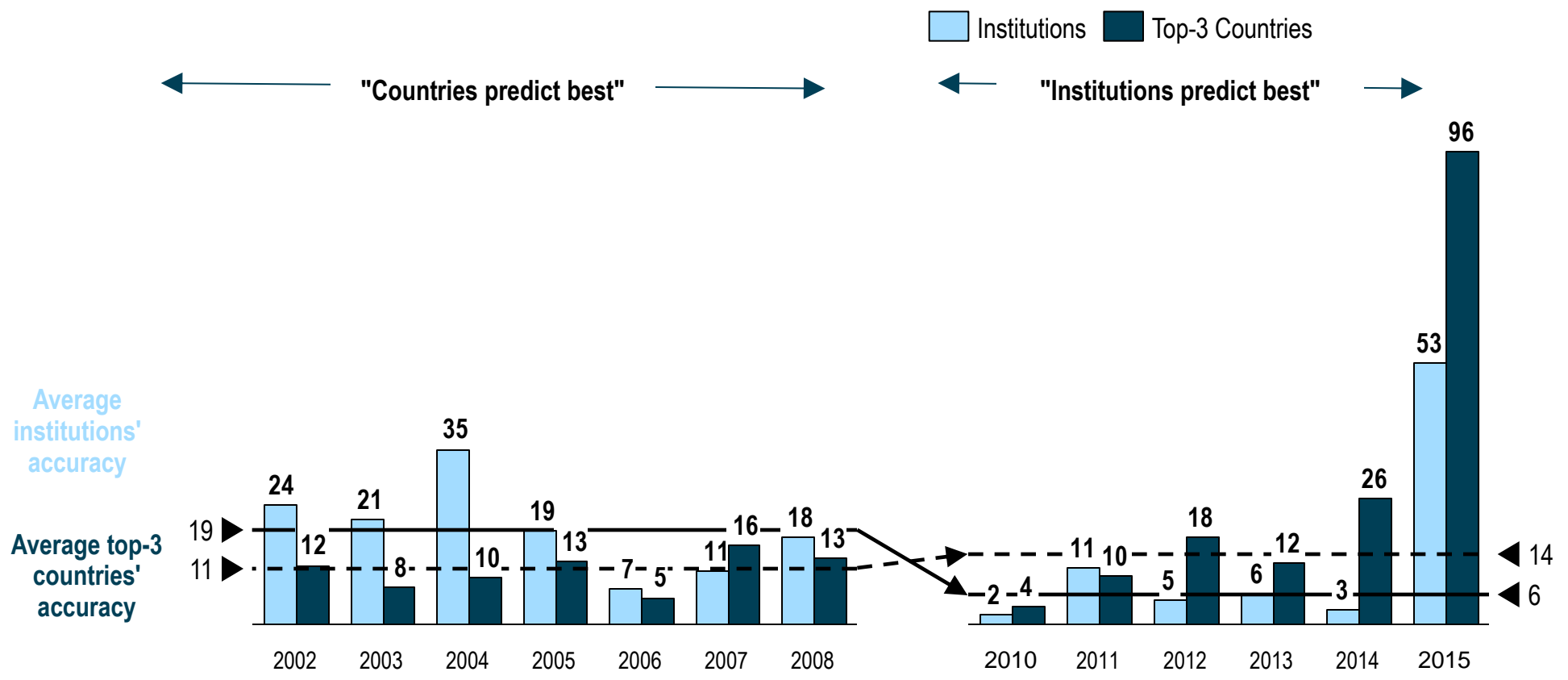
Absolute year-ahead oil price forecasting error, 2015 [%]



1) To improve comparability, forecasts are adjusted for the ratio of local oil prices to WTI prices and for average budget deviations; 2) Excluding crisis years 2001 and 2009 which saw large swings in the oil price

Since 2010 institutions forecast better than oil producing countries, but even so for 2015 everyone's forecast was way off

Yearly absolute error, oil price forecast, institutions and top-3 countries¹, 2002-2015 [%]

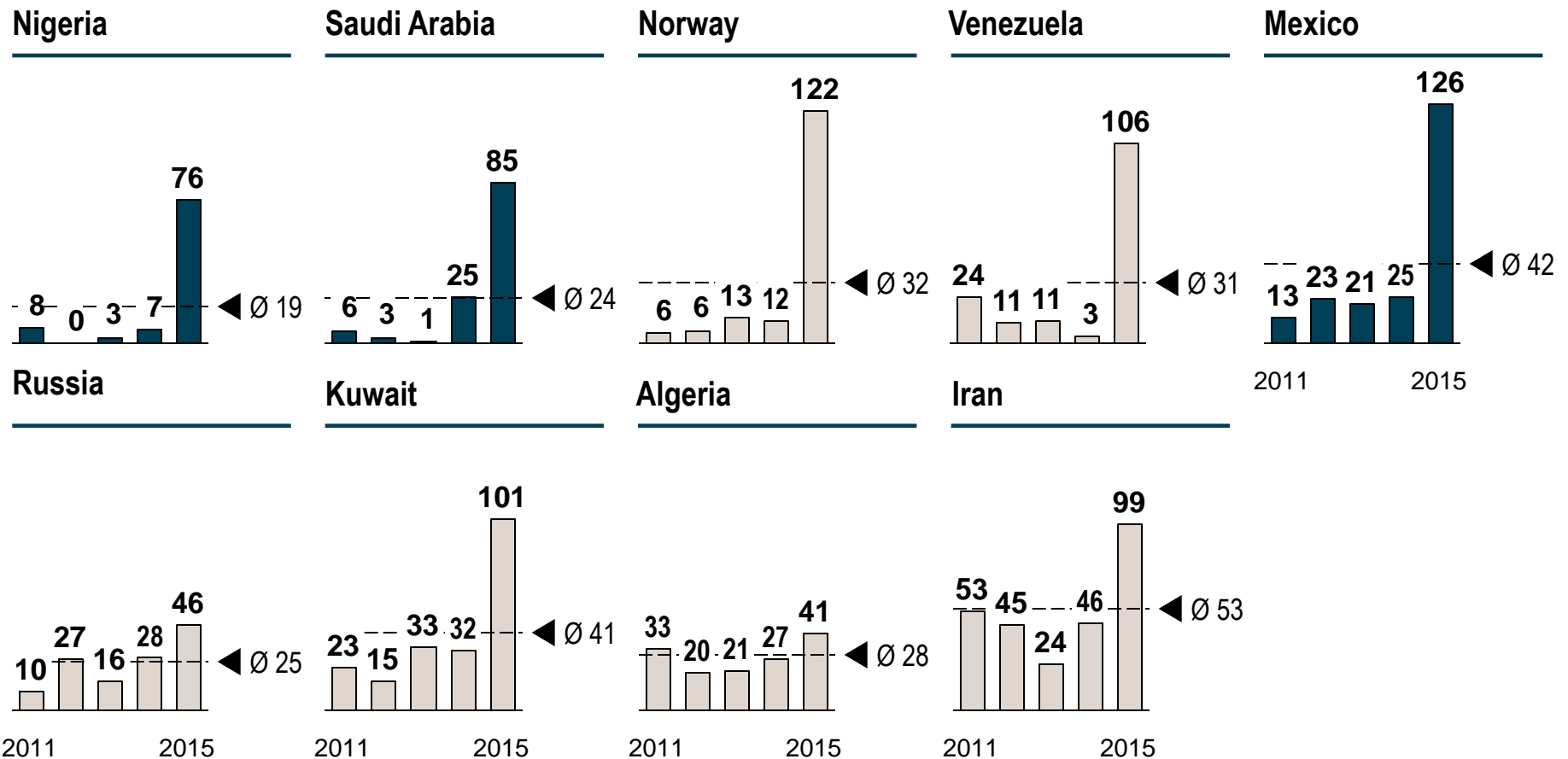


1) Top-3 countries based on total forecasting accuracy up to year n-1; 2009 excluded as this was a shock year with a large swing in the oil price, leading to considerable inaccuracies in each of the forecasts

Source: Ministries of Finance of selected countries; EIA; NYMEX; IEA; Press reports

Countries' predictions for the 2015 oil price were particularly far off – Almost all countries performed worse than their 5-year average

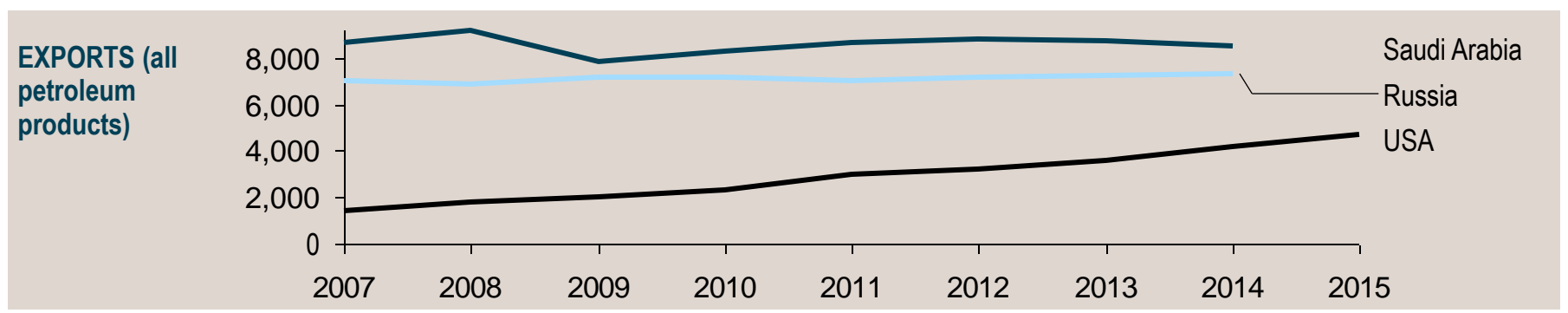
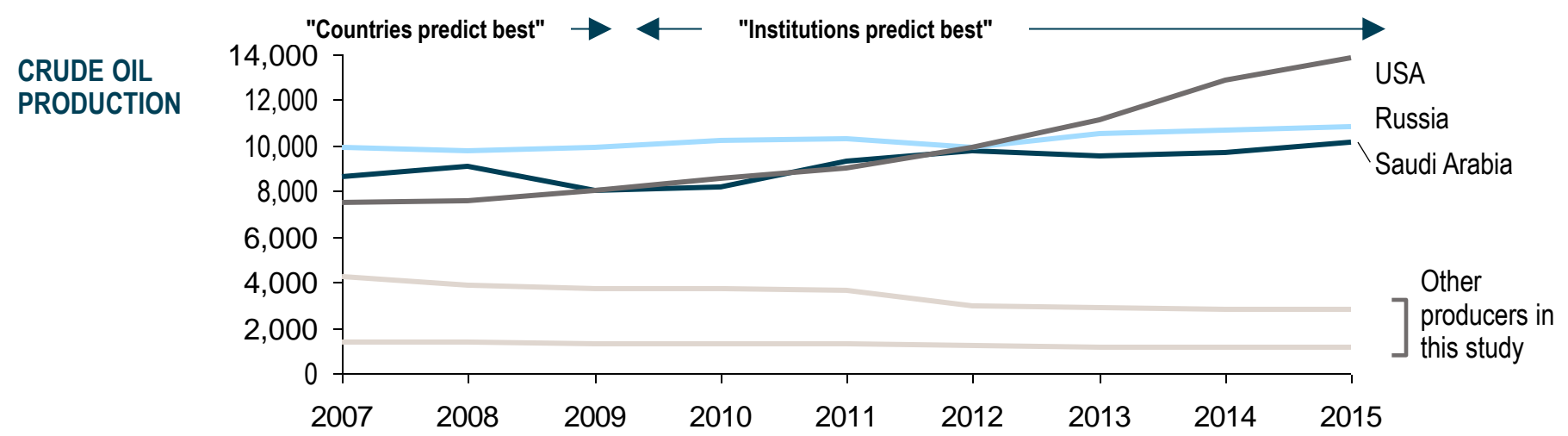
Forecasting errors or budget safety margin, 2010-2015 [%]



2. Changing market dynamics

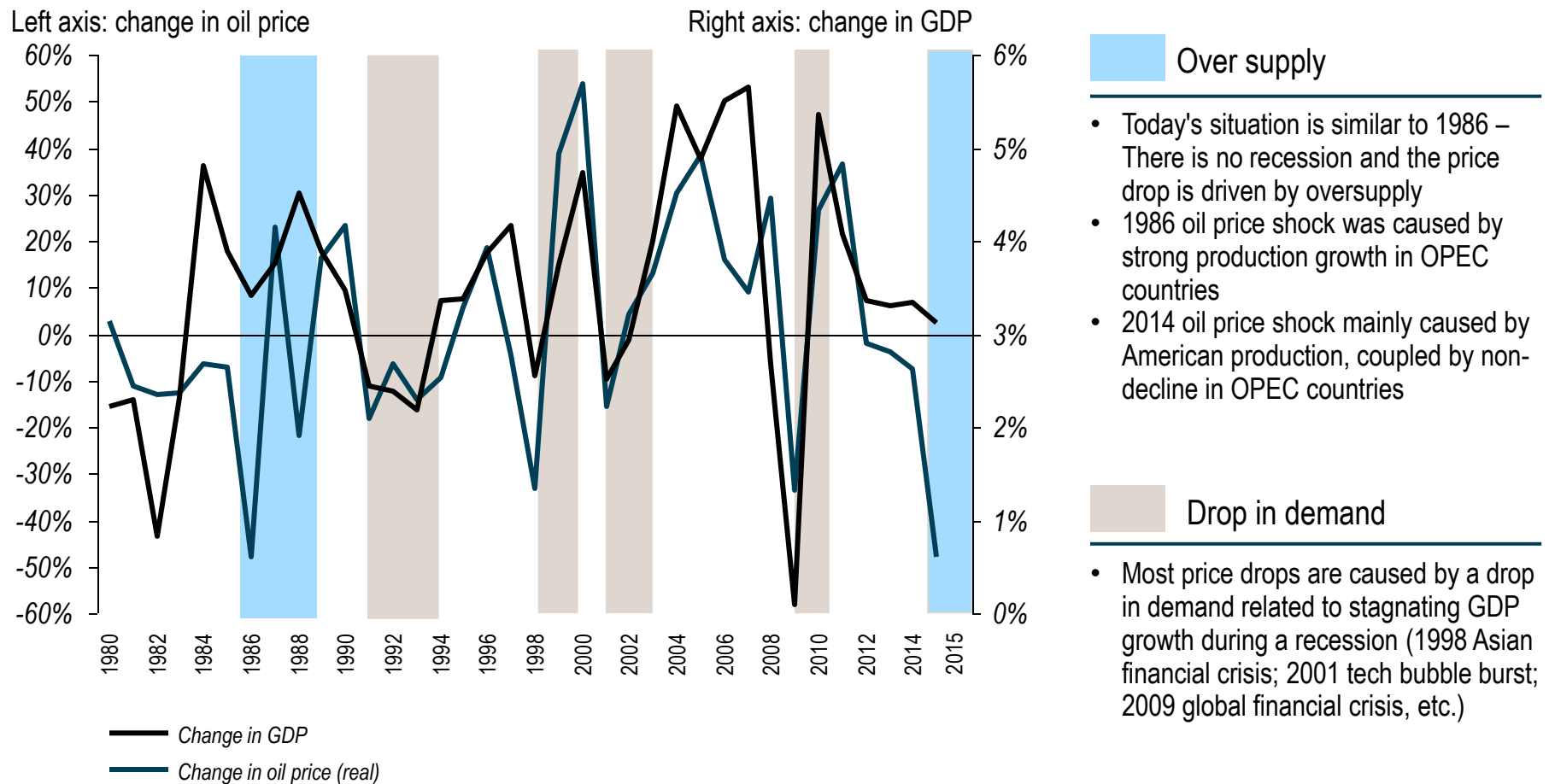
The rise of the institutions as better predictors coincides with the rise of the US as a major (shale) oil producer and exporter

Crude oil production per country and US exports, 2007-2015 ['000 barrels/day]



The latest drop in the oil price is due to oversupply

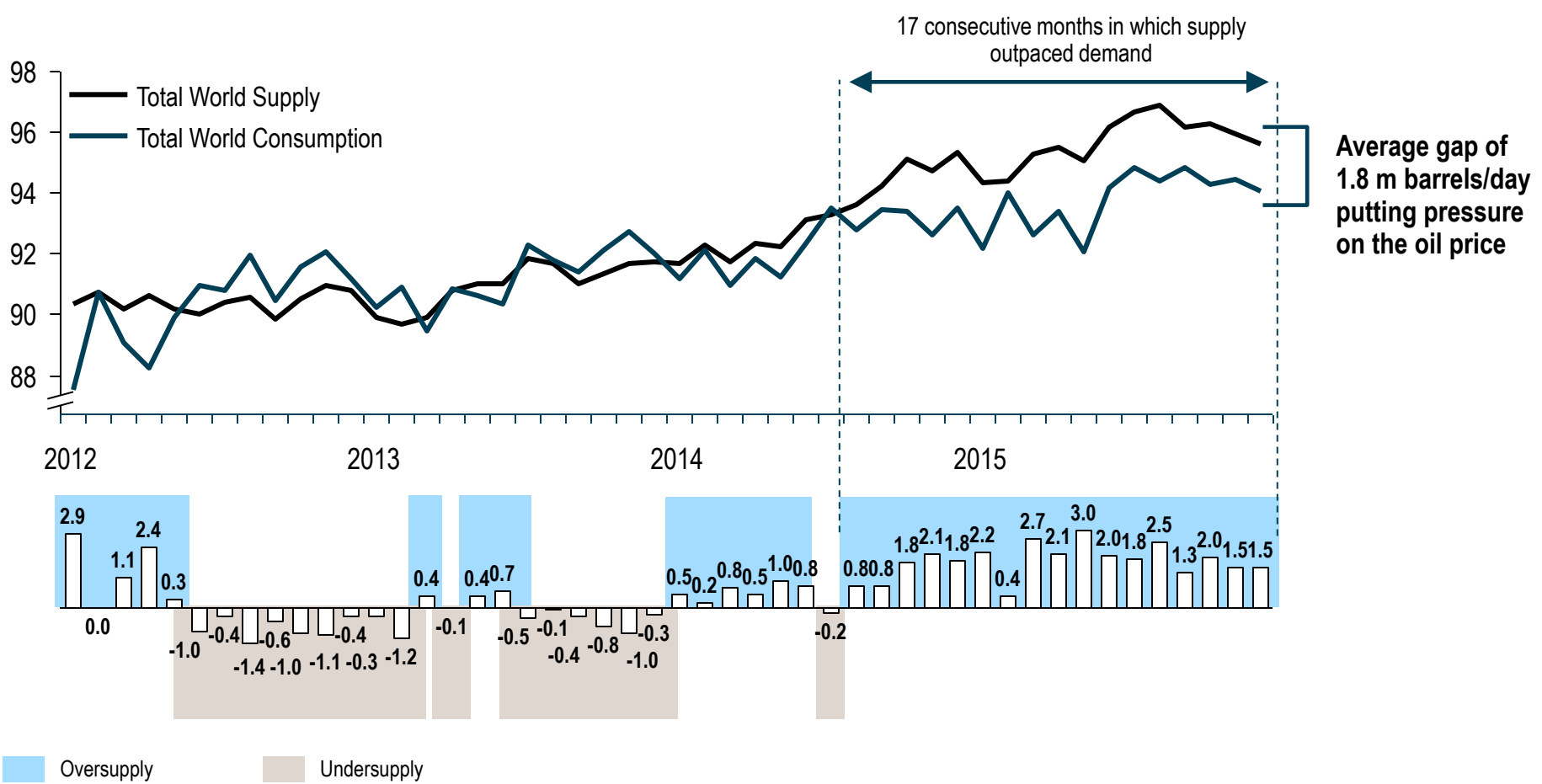
(Real) oil price development and GDP change during previous oil price drops



- Today's situation is similar to 1986 – There is no recession and the price drop is driven by oversupply
 - 1986 oil price shock was caused by strong production growth in OPEC countries
 - 2014 oil price shock mainly caused by American production, coupled by non-decline in OPEC countries
-
- Most price drops are caused by a drop in demand related to stagnating GDP growth during a recession (1998 Asian financial crisis; 2001 tech bubble burst; 2009 global financial crisis, etc.)

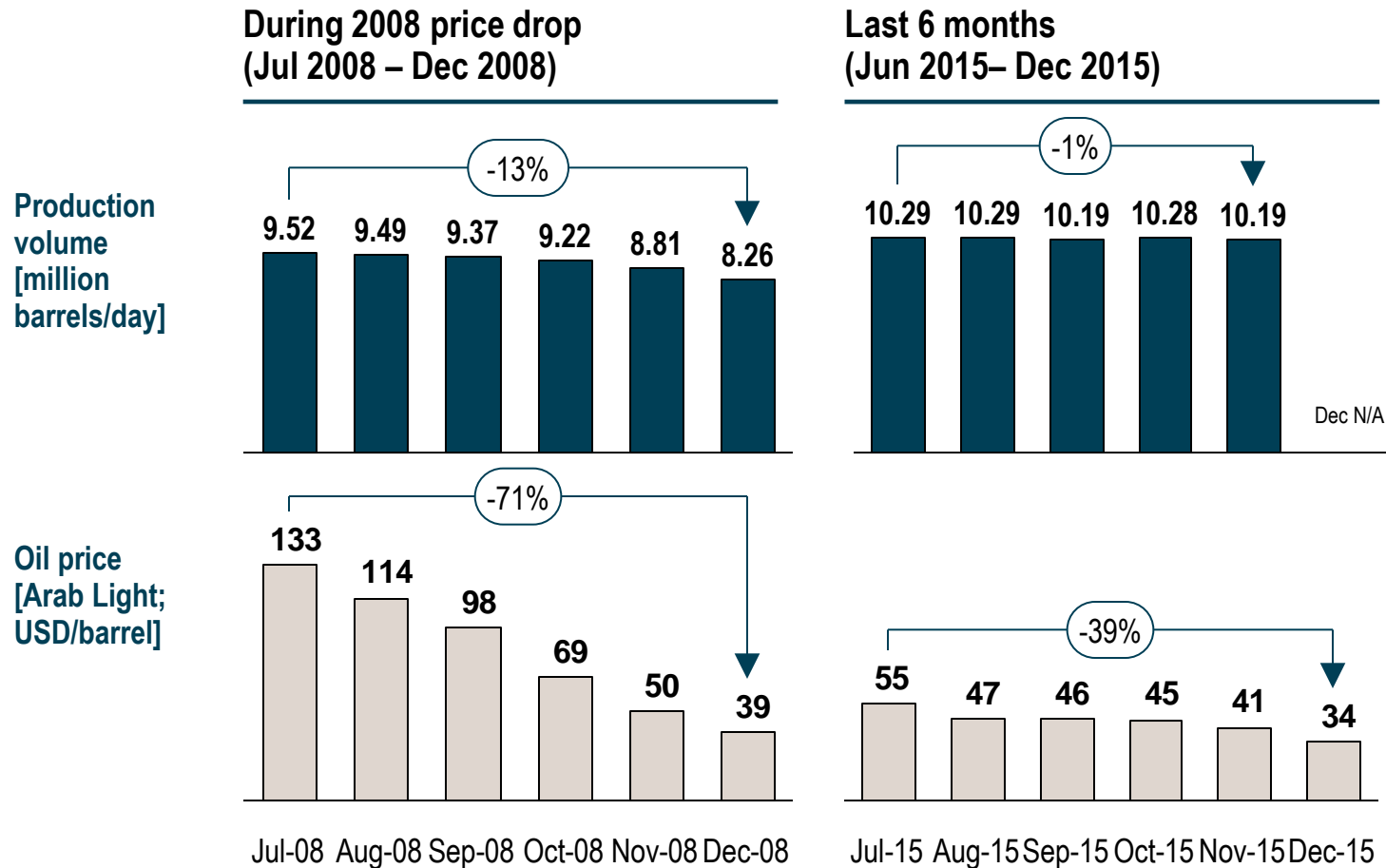
Brief periods of oversupply generally do not distort the price, but now for 17 consecutive months there is more supply than demand

Global supply and demand of oil and net differential (million barrels/day)



Unlike during previous price shocks Saudi Arabia has notably not adapted its production volume to today's oversupply

Production volume and oil price, Saudi Arabia

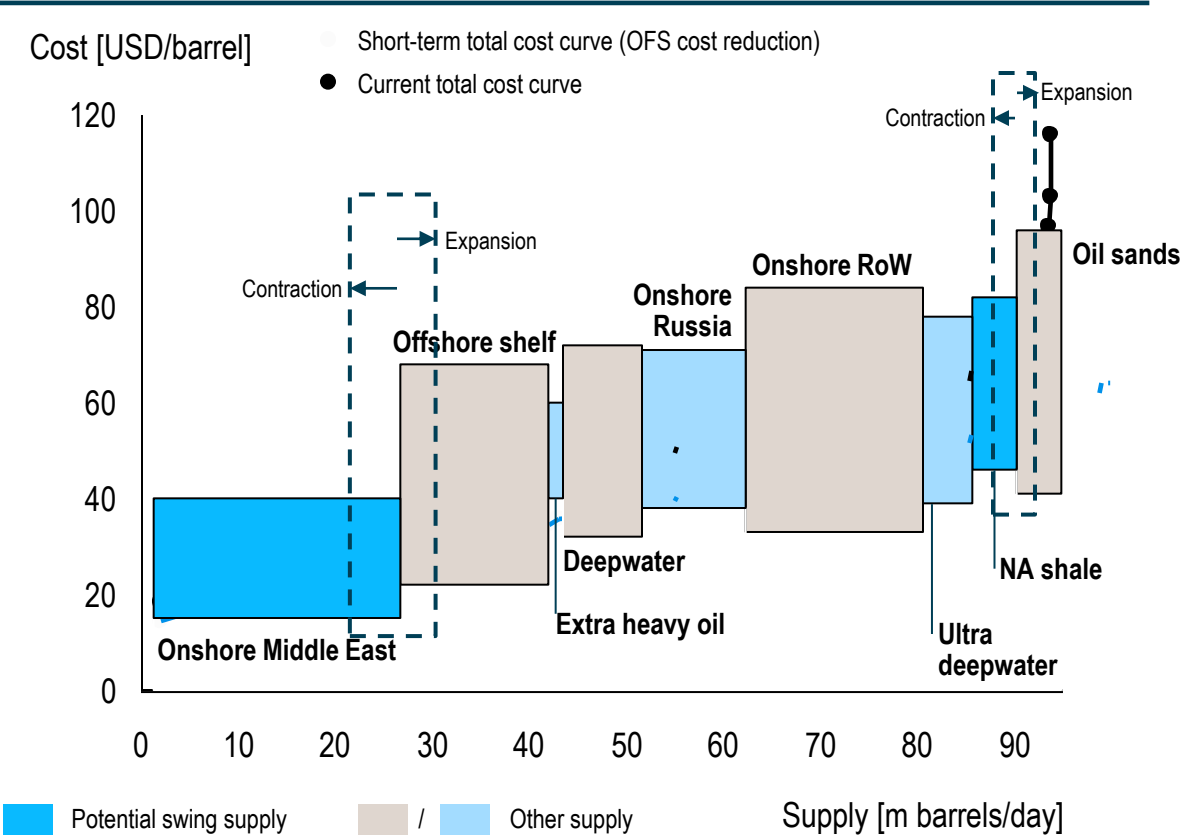


- > Within OPEC, Saudi Arabia has traditionally played the role of the marginal swing supplier
- > During 2014, OPEC univocally announced that it would not cut down production
- > Market share protection cited as main driver of the decision

North American shale seems to have become the swing supply as long as OPEC countries continue to maintain production levels

Global supply curve and possibility to be swing supply by resource type

Global 2015 supply curve¹⁾ by type



Rationale

- Onshore (conventional)**
Typically has low total cost of production. Can be swing supply for political reasons, however, Saudi Arabia has not cut production
- Offshore**
Typically long timelines and large sunk investments
- Heavy oil**
Relatively low price, expected to continue to run under all price levels
- Shale oil**
Most dynamic production, quick impact on market from change in investment profile, development-to-production cycle is short and has rapid decline rates

Oil sands
Thermal nature of operations force oil sands to keep running

Source: OPEC; Roland Berger

3. Future oil prices

What will the future bring for oil prices? Expert opinions are inconclusive

Selected quotes on oil price forecasts

Even lower

"While we are increasingly convinced that the market needs to see lower oil prices for longer to achieve a production cut, the source of this production decline and its forcing mechanism is growing more uncertain, raising the possibility that we may ultimately clear at a sharply lower price with cash costs around **\$20 a barrel Brent prices.**"

11-Sep- 2015 -- Jeffrey Currie, Goldman Sachs

"Oil could fall to \$10 a barrel, but I don't think it would stay there. I think somewhere around \$30 a barrel is probably a fair place to look for stabilization in the oil complex"

12-Jan-2016 -- David Lebovitz, J.P. Morgan

"We think prices could fall as low as \$10 a barrel before most of the money managers in the market conceded that matters had gone too far."

12-Jan-2016 – Analyst at Standard Chartered

Current levels

"...the market continues to look for something to support the prices, but actually there's nothing out there right at the moment"

12-Jan-16 - Andy Lipow, President at Lipow Oil Associates

We don't anticipate a recovery in 2016 because the growth of capacity will be larger than the growth of demand

7-Dec-2015 -- Patrick Pouyanne, CEO at Total

Price rebound

"We could see a price \$30 to \$40 by the middle of the year and I think towards the end of the year it could be into the \$50s."

20 Jan 2016 -- Bob Dudley, CEO at BP

"The oil prices we are seeing today are not sustainable and are going to settle at higher levels ... and higher, in my mind, over the next few decades than the low \$60s that we require to make this deal a good deal"

11-Jan-2016 -- Ben van Beurden, CEO at Shell

"Crude prices will start to recover in 2016 as output from the U.S. and other non-OPEC producers declines."

7-Dec-2015 -- Ryan Lance, CEO at Conoco

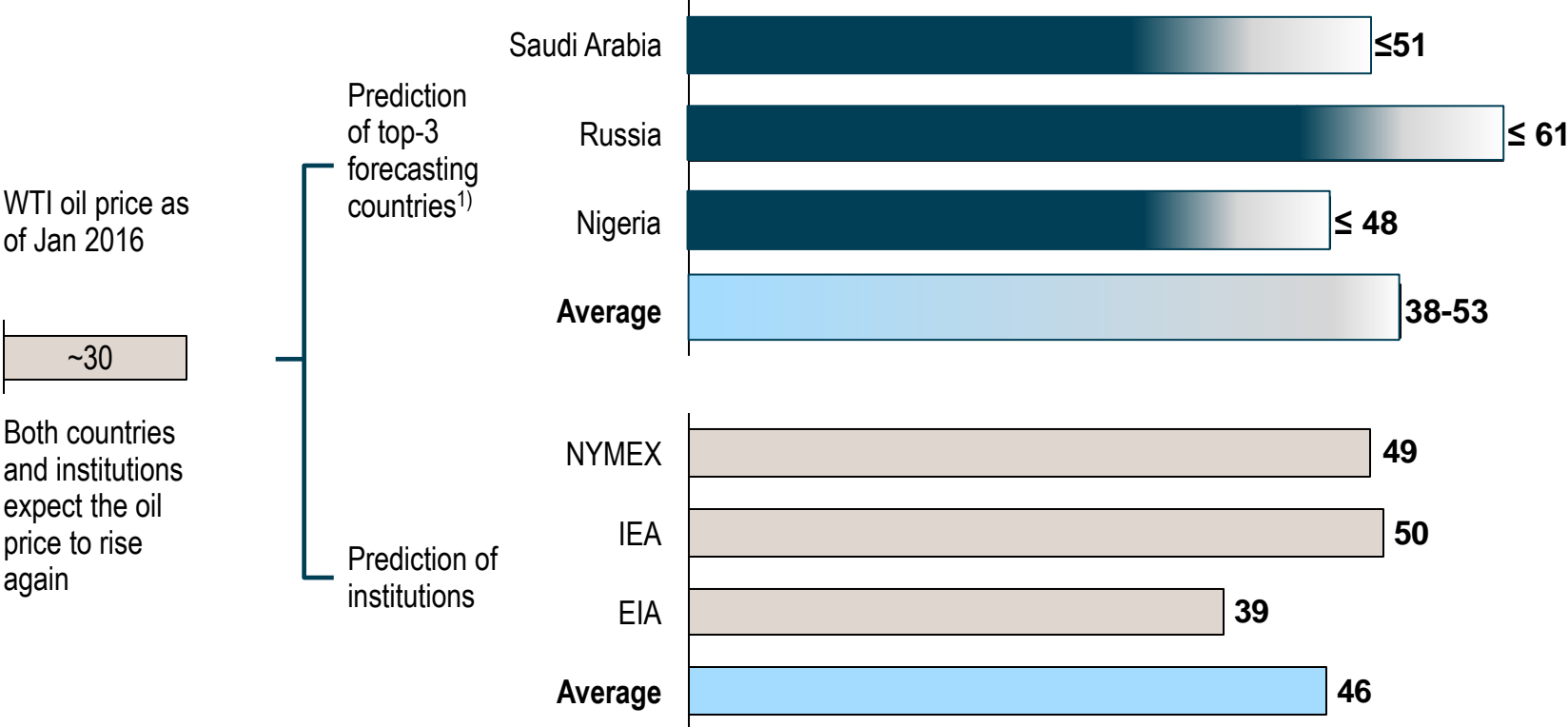
When oil prices are very low oil-exporting countries reduce the safety margin they apply when forecasting the price for their budget

Changes in use of safety margin by oil-exporting countries

- > The Roland Berger annual oil price forecast study is based on the forecasting track records of the nine largest oil-exporting countries from 1999 to 2015
- > Historically oil-exporting countries have used what we call a forecasting error or safety margin in their budget assumptions i.e. they budget for a lower oil price than they actually expect. This safety margin differs per country
- > In the year following a significant drop in oil prices we have seen that the applied safety margin is lower most likely because a low oil price leaves less room
- > For 2016 we have assumed that oil-exporting countries have again used a lower safety margin as the oil price is at its lowest levels since 13 years

The oil price is now ~USD 30, top-3 forecasting oil producers predict USD 38 – 53, institutions predict an average price of USD 39 – 50

2015 WTI price forecasts¹⁾ [USD/barrel]

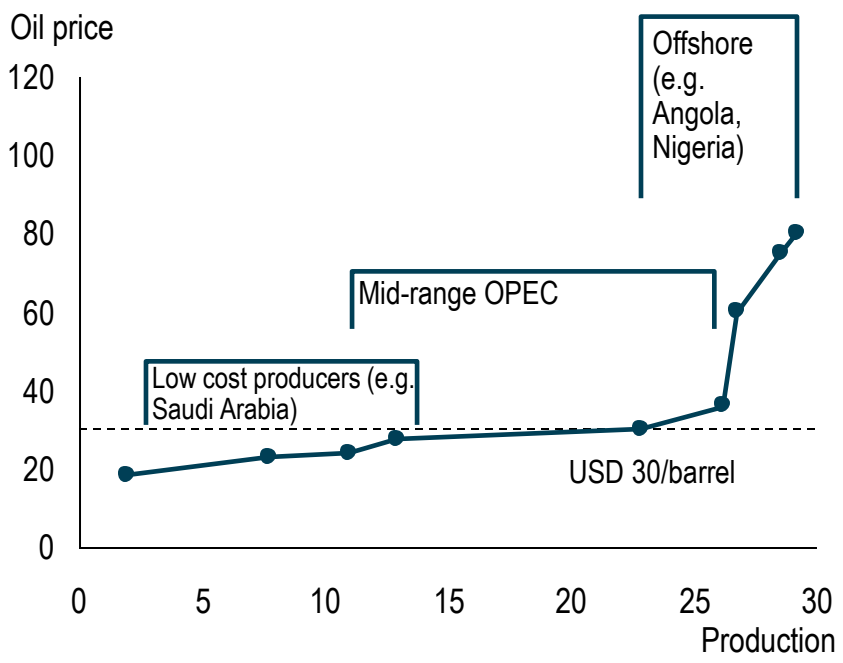


1) Updated top-3: based on 1999-2015, previously Mexico was included but Mexico now hedges the price for most of their exports. To improve comparability, forecasts are adjusted for the ratio of local oil prices to WTI prices (2012-2014) and for average budget deviations (1999-2014, excluding 2001 and 2009); 2) IEA's forecast is based on OECD Economic Outlook

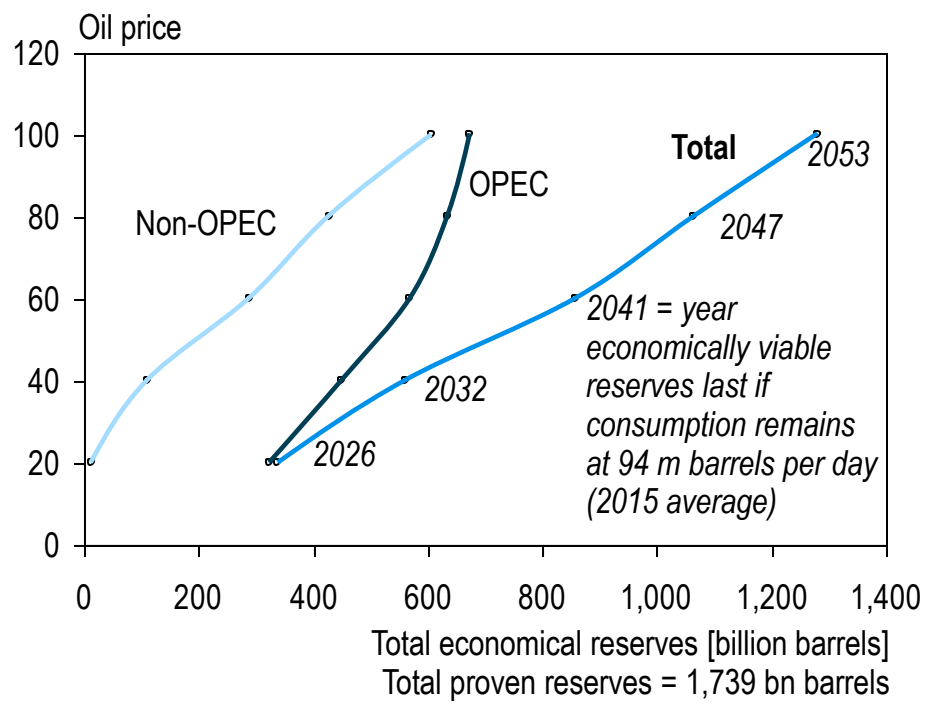
The cost of production and the economically viable reserves of most OPEC countries can sustain low prices for quite some time

OPEC supply curve and spare capacity production

OPEC 2015 supply curve¹⁾ [million barrels/day; USD/barrel]



Economically viable oil reserves by price of Brent Crude [billion barrels; USD/barrel]

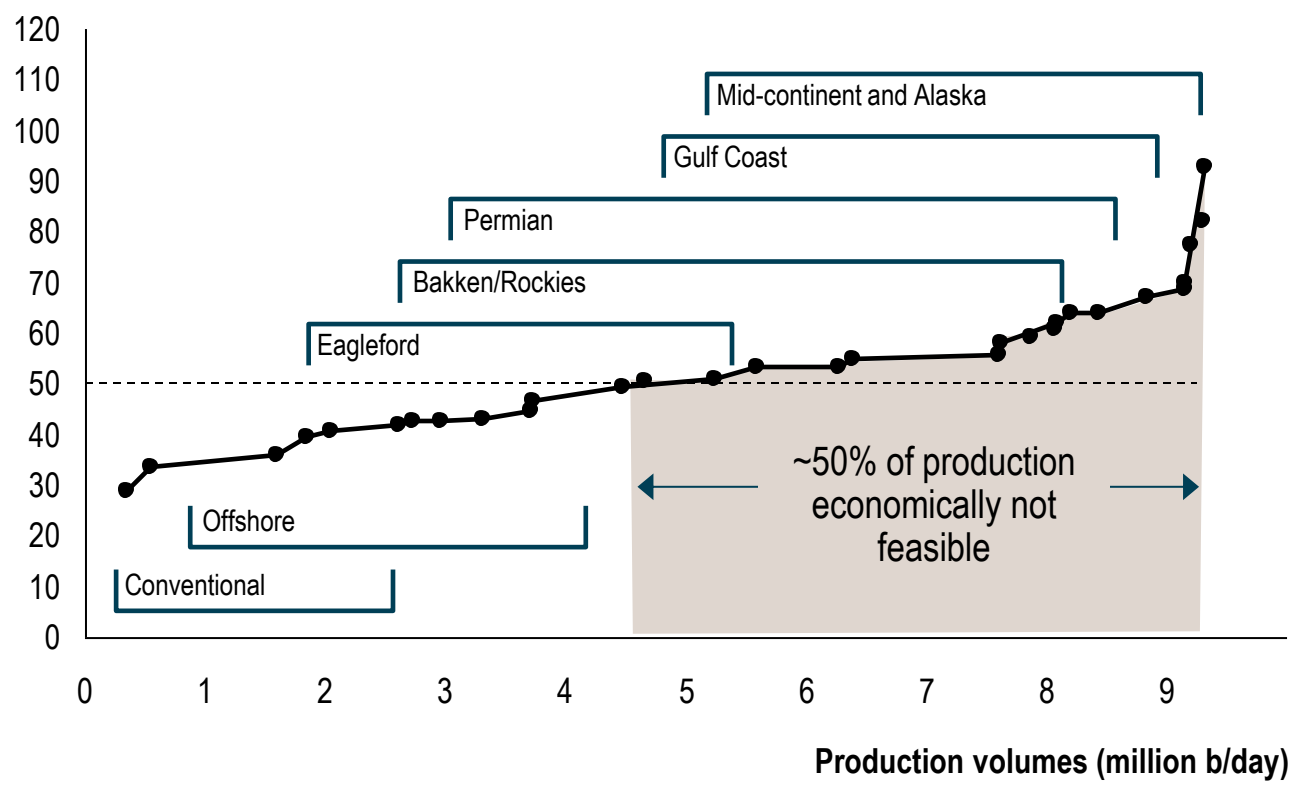


1) Supply curve does not include condensates or NGLs.

Alternatively, US producers might cut production, as ~50% of supply is uneconomical around USD 50/barrel

2015 US crude supply curve projection¹⁾

Oil price (USD/barrel)



- > With lower prices, unit costs will decrease as E&Ps pressure the supply chain
- > EIA production forecast suggests that a production cut from the US is likely – and may even surpass that of the OPEC countries

1) Supply curve does not include condensates or NGLs. The dotted light blue line shows a supply curve adjusted 20% downward to reflect pressure on the supply chain to reduce cost, though once the market balances, costs should increase. The supply curve is based on breakeven or total cost which covers exploration, F+D, production, SG&A, transport, taxes, etc.; 2) USD in 2012 dollars

Both institutions and oil producing countries forecast an average oil price around USD 50, will they be right?

Summary

- > The current oil price is at its lowest level since 13 years – The drop of the oil price at the end of 2014 was not caused by a recession, but by over supply
- > Institutions (NYMEX, EIA, IEA) predict only a moderate rebound of the oil price (to an average of USD 46 per barrel in 2016) – This suggests a continuation of the supply-demand imbalance
 - Arguments in favor of this scenario are slowly growing demand and the fact that production costs are still below the current oil price in most OPEC countries
- > The 3 countries that have provided the best oil price forecast predict a rebound (to between USD 38 and 53 per barrel over the year) – This scenario requires that supply is curbed to remove the supply-demand imbalance
 - Arguments in favor of this scenario are the budget deficits of most OPEC countries that might force them to act and the fact that ~50% of the US oil production is uneconomical at prices below USD 50/barrel
- > Over the last few years the institutions have predicted the oil price best. Are they right again, or will political pricing mechanisms regain control?

Roland
Berger

