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The Great Plunge in Oil Prices: *Causes, Consequences and Policy Responses*

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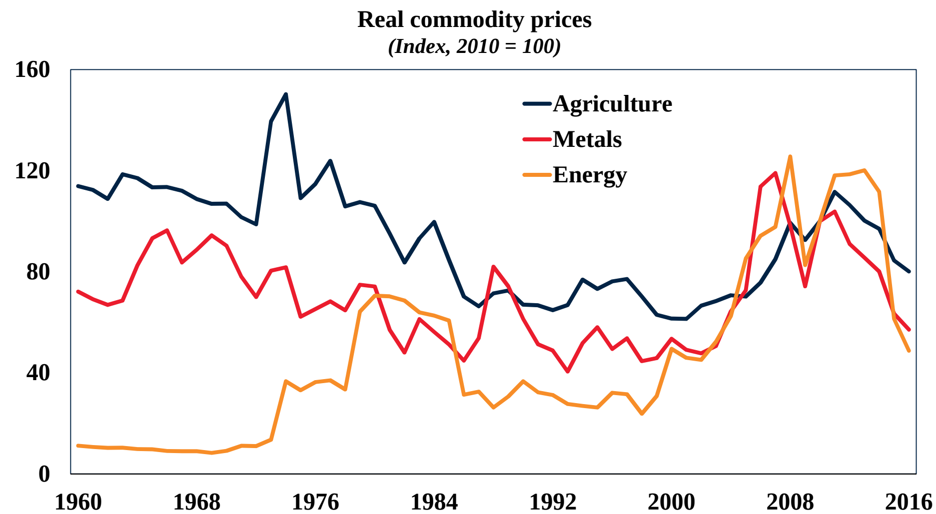
Select Publications on Global Economy

- *Global Economic Prospects – January 2017*
  (January and June)
- *Commodity Markets Outlook – October 2016*
  (January, April, July, and October)
- *Global Monthly, Global Weekly, and Global Daily*
- *Negative Interest Rate Policies: Sources and Implications*
  Arteta, Kose, Stocker and Taskin, Policy Research Working Paper – August 2016

The Latest Commodity Price (Super-)Cycle: *Possibly Ended…*



Source: World Bank.
Note: 2016 values are forecast as of July 26, 2016.

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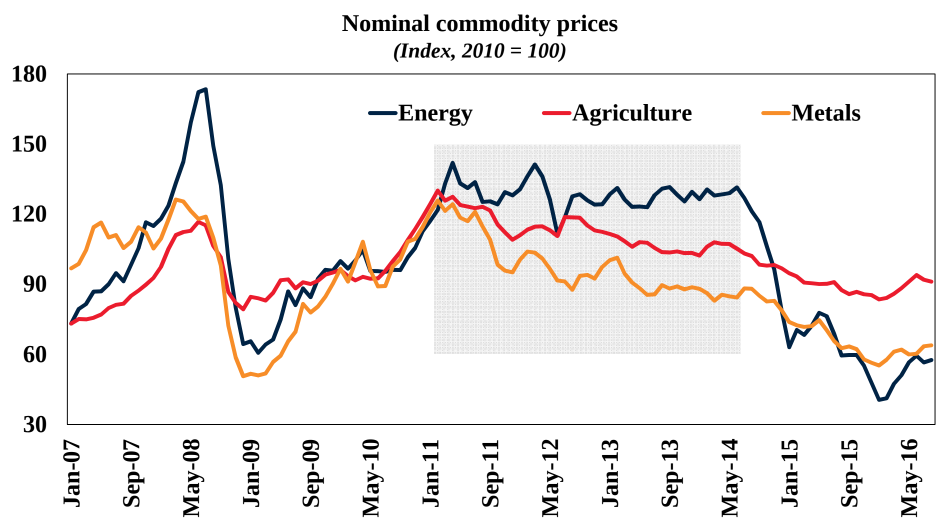
Energy Prices: *Last Group to "Join" the Collapse*



Source: World Bank.
Note: The latest observation is August 2016.

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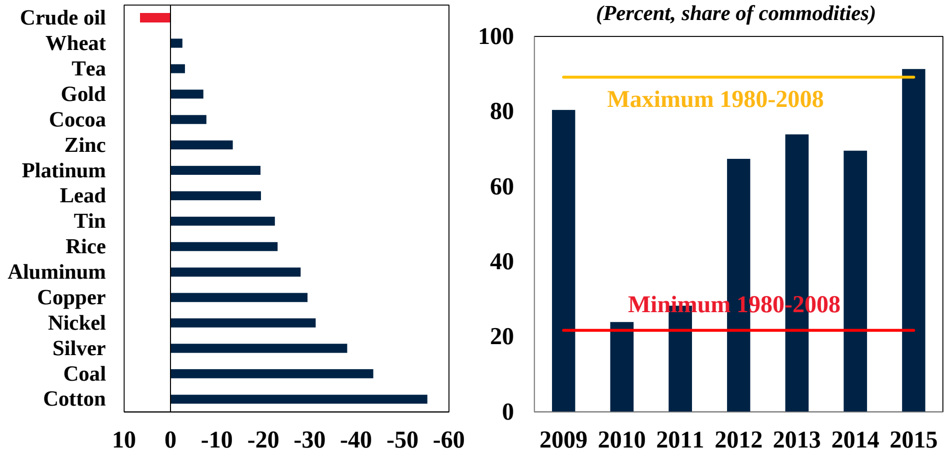
Commodity Prices:
Resilient Oil Prior to 2014:2; But Then..

Commodity price changes
(Percent, change from 2011Q1 to 2014Q2)

Commodities with lower prices from previous years
(Percent, share of commodities)



Source: World Bank.
Right Panel. Fraction of commodities (out of a total of almost 50 commodities) for which prices declined from the previous year.

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Four Questions

1 What has been the role of supply?
Looks like played a major role

2 What has been the role of demand?
Somewhat smaller role but..

3 What has been the driving force behind the collapse in oil prices?
Mostly supply…

4 What are the implications for commodity-exporters?
Weak growth in commodity-exporters; stronger policy support needed…

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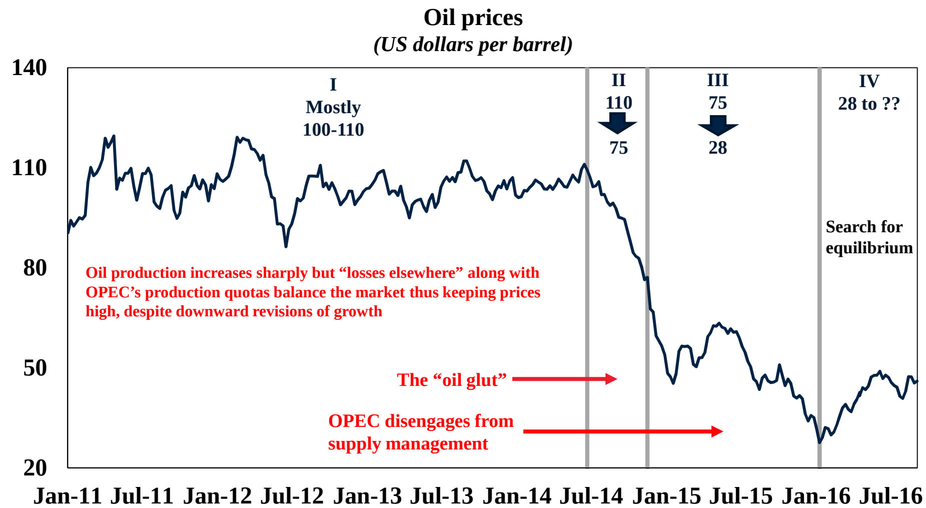
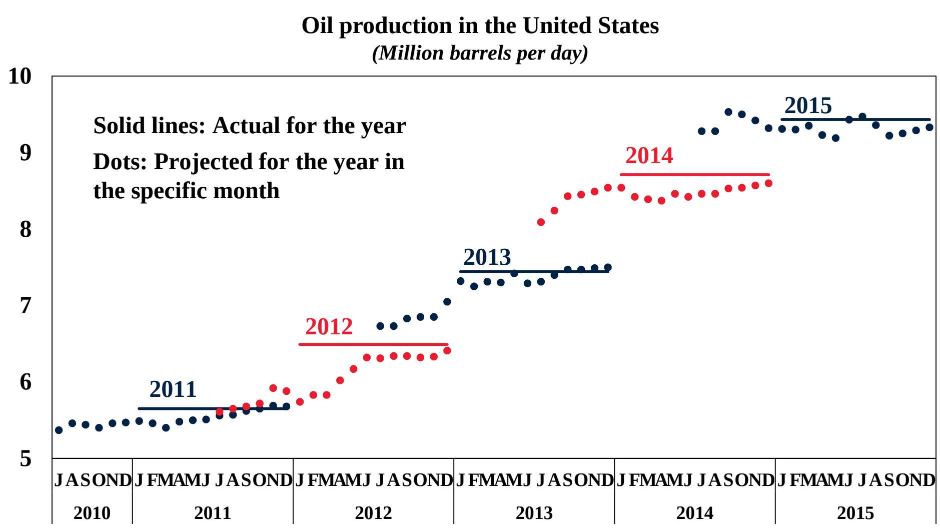
Recent History of Oil Prices:
Four Acts



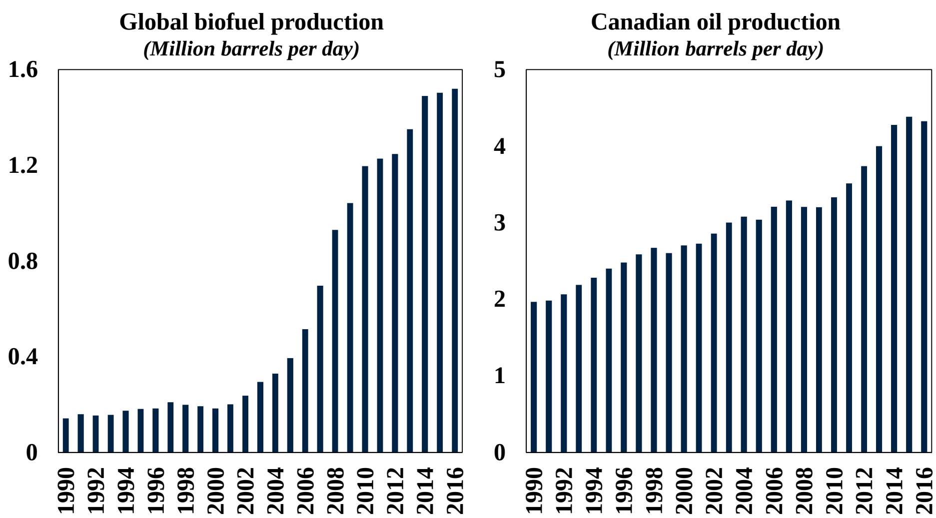
Source: World Bank.
Note: The latest observation is September 9, 2016.

Forecasts of U.S. Oil Production - 2:
Consistently Revised Upward



Sources: Energy Information Agency, World Bank.
Note: The latest observation is December 2015.

Oil Supply from Other Unconventional Sources: *Substantial Increase in Biofuel*



Sources: BP Statistical Review of World Energy 2016, IEA, World Bank.

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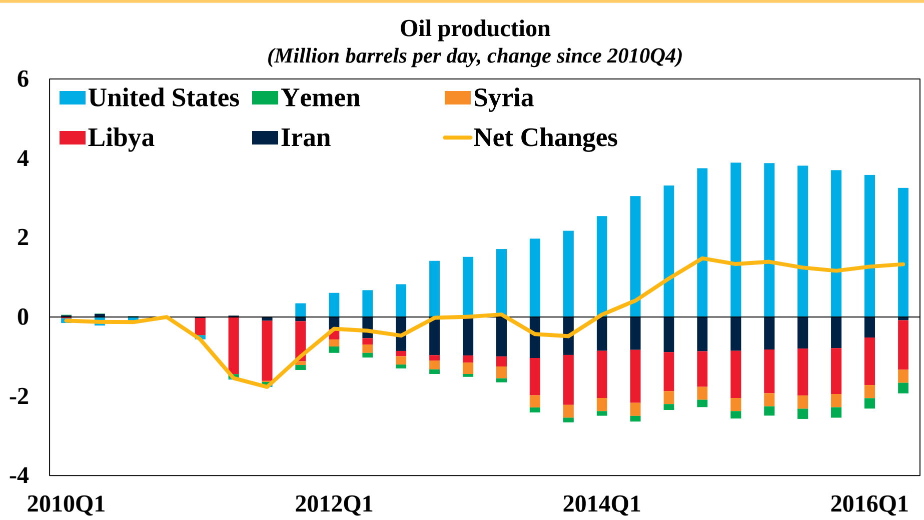
Surplus in Oil Supply: *Became Apparent in Mid-2014*



Sources: IEA, World Bank.
Note: The latest observation is 2016Q2.

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OPEC's Objective:
Changing with the Market…

- Following the East Asian financial crisis when oil dropped below $10/bbl, OPEC began setting a price target range, initially at $20-25/bbl and gradually reaching $100-110/bbl.
- In the face of weakening demand and increasingly strong supplies from unconventional sources, OPEC decided not to cut production in order to defend market share (November 27, 2014). An earlier, similar move was taken in 1985-86.
- The decision most likely reflects the realization that global commodity markets cannot be "managed" for long. Artificially maintaining high and stable prices not only attracts suppliers not bound by the agreements but also encourages development of substitute products.

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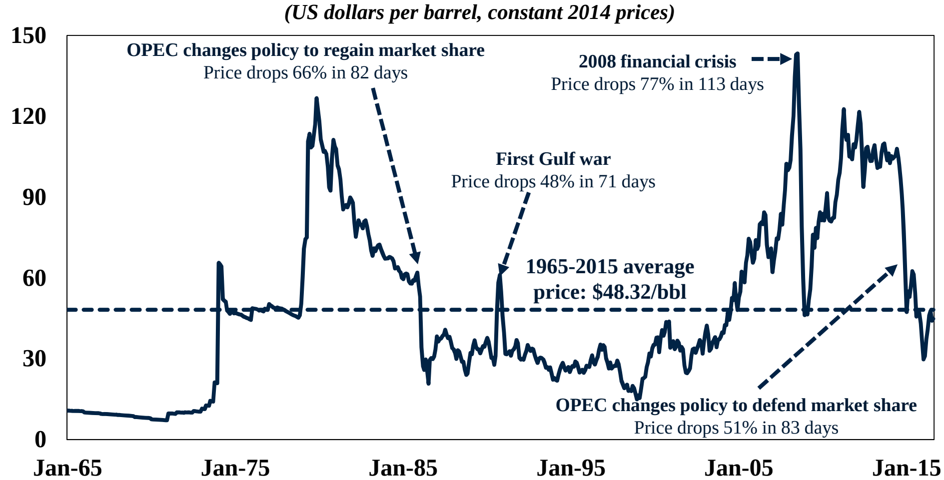
Oil Price Collapses - 1:
Four Major Ones

Real oil price

(US dollars per barrel, constant 2014 prices)



Source: World Bank, Bloomberg.
Note: The latest observation is August 2016. The nominal price is deflated by the US CPI.

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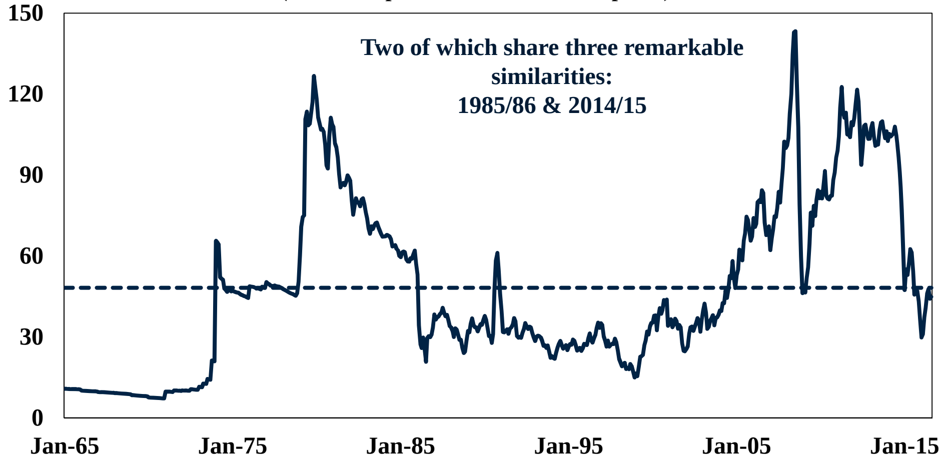
Oil Price Collapses - 2:
Two of Which Are Similar

Real oil price
(US dollars per barrel, constant 2014 prices)



Source: World Bank, Bloomberg.
Note: The latest observation is August 2016. The nominal price is deflated by the US CPI.

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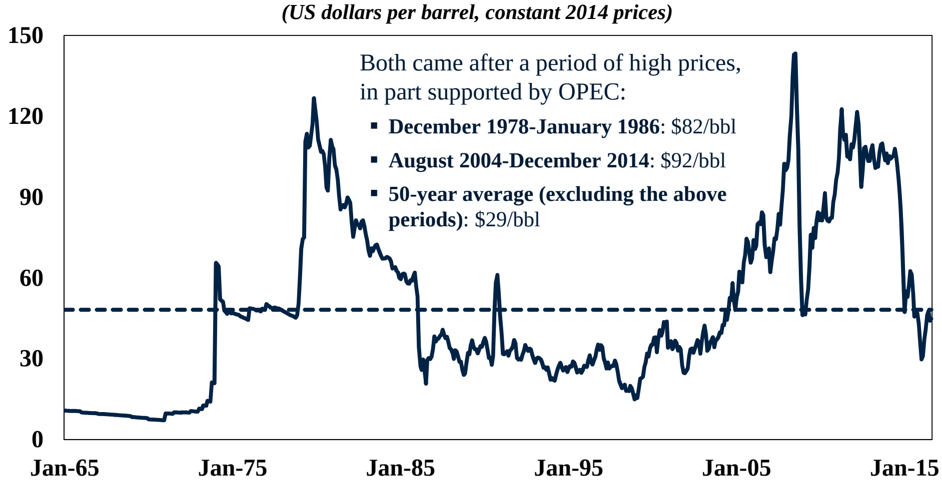
Oil Price Collapses - 3:
After a Period of High Prices

Real oil price
(US dollars per barrel, constant 2014 prices)



Source: World Bank, Bloomberg.
Note: The latest observation is August 2016. The nominal price is deflated by the US CPI.

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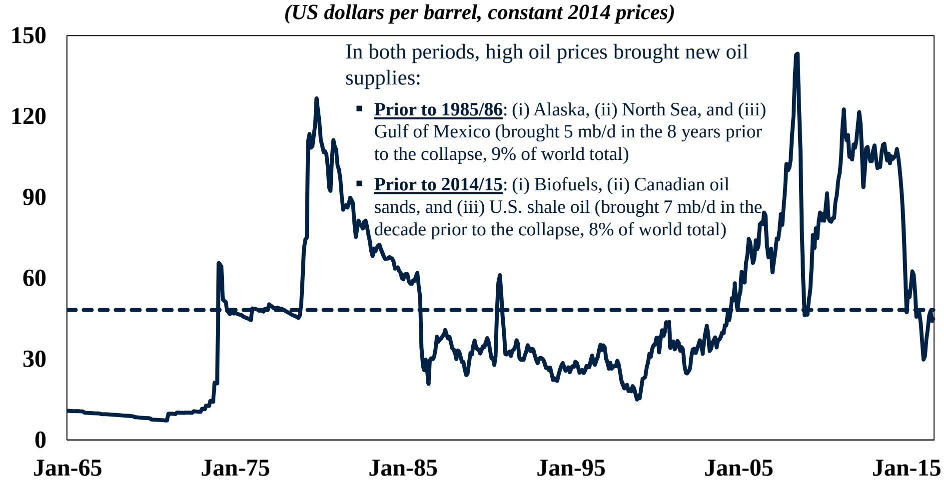
Oil Price Collapses - 4:
New Supplies Brought by High Prices

Real oil price
(US dollars per barrel, constant 2014 prices)



Source: World Bank, Bloomberg.
Note: The latest observation is August 2016. The nominal price is deflated by the US CPI.

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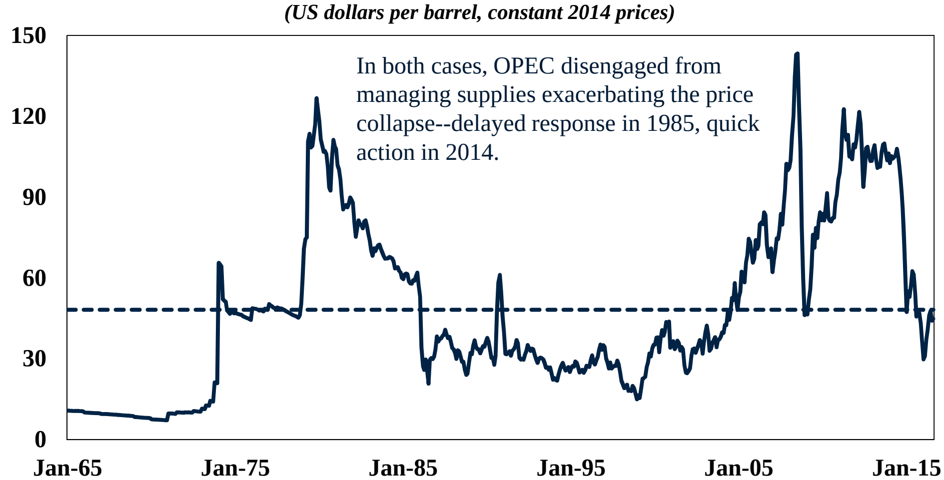
Oil Price Collapses - 5:
…and OPEC Responses

Real oil price
(US dollars per barrel, constant 2014 prices)



Source: World Bank, Bloomberg.
Note: The latest observation is August 2016. The nominal price is deflated by the US CPI.

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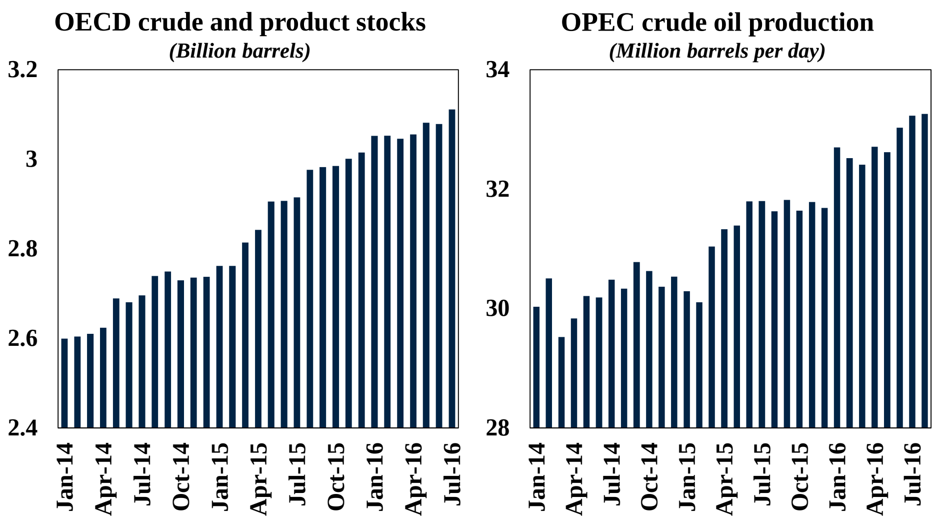
Surge in Oil Stocks and Production in 2015-16



Source: International Energy Agency.
Left Panel. The latest observation is July 2016. Right Panel. The latest observation is August 2016.

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Four Questions

2 What has been the role of demand?

Somewhat smaller role but..

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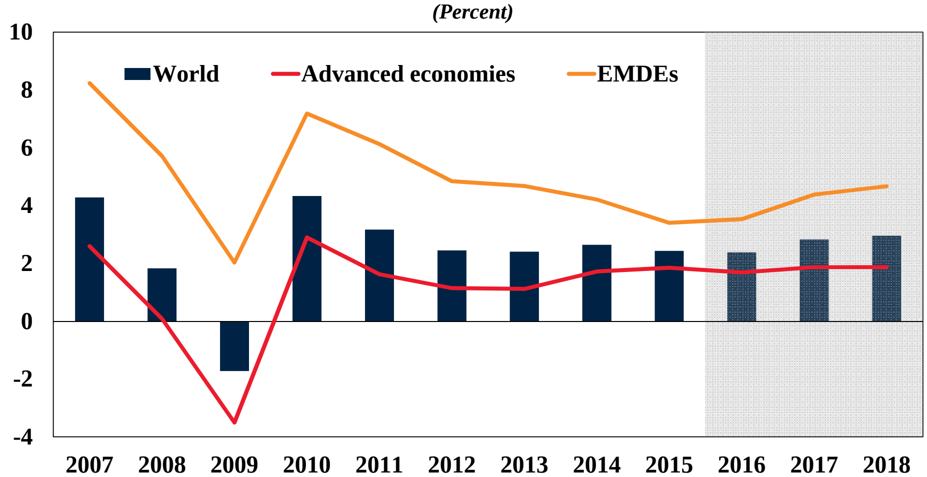
Global Economy:
A Mediocre Expansion with Repeated Disappointments…

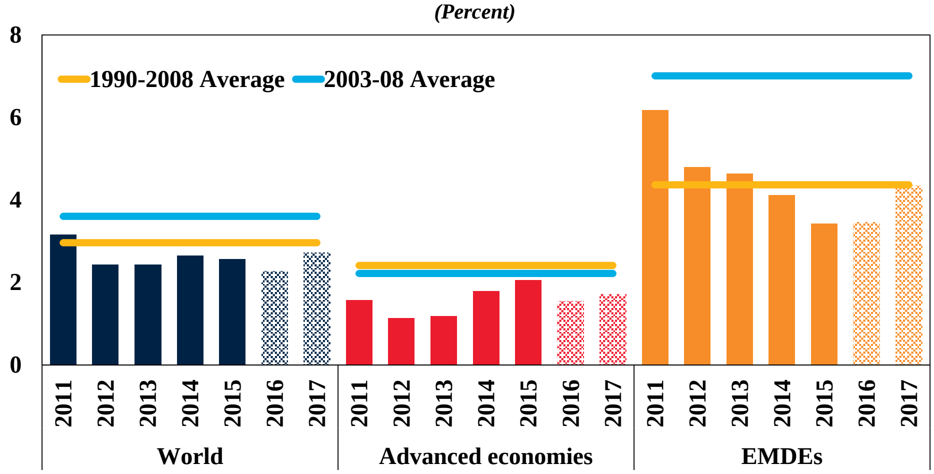
GDP Growth
(Percent)



Source: World Bank.
Note: The shared area indicates forecasts. EMDEs refer to emerging market and developing economies.

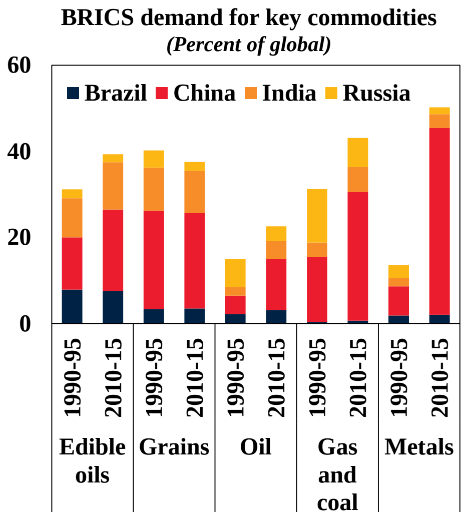
Advanced Economies and EMDEs:
Slow Growth All Around

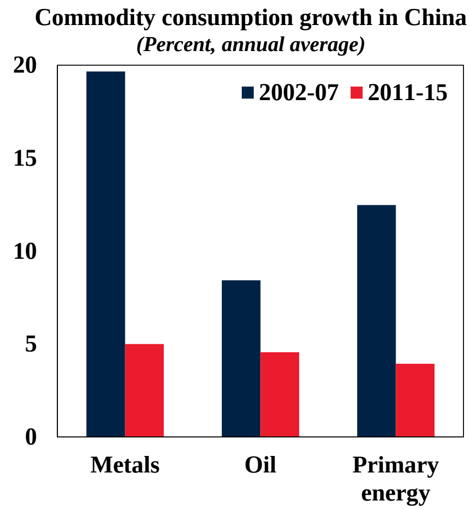
GDP growth
(Percent)



Source: World Bank.
Note: Weighted average growth.

Growth of Commodity Demand in BRICS: *Weaker Now..*





Sources: BP Statistical Review of World Energy 2016, U.S. Department of Agriculture, World Bureau of Metal Statistics.
Right Panel. The declines in the growth rate of oil and primary energy are nearly identical because declines in the growth rate of coal have been compensated by corresponding increases in natural gas.

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A Constant Question: *Is a Global Recession Coming?*

- A global recession is defined as a decline in world real GDP per capita accompanied by a broad synchronized deceleration in multiple measures of global economic activity (IP, trade, capital flows, employment, energy consumption).
- Four global recessions: 1975 (1.5; -0.4), 1982 (0.7; -1.0);
  1991 (1.1; -0.5), 2009 (-2.0; -3.2)
- The average decline in world per-capita output is 1.3 percent during these episodes; about 3 percentage points lower than the average (with market weights)
- Two global downturns: Lowest global growth except recessions
  1998 (2.3; 0.9), 2001 (1.7; 0.4)

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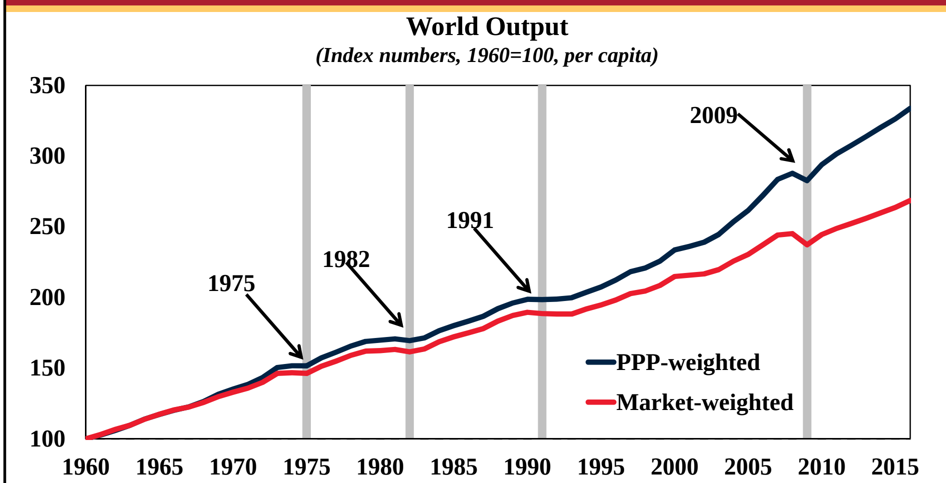
Global Recessions: *Contractions in World Output per Capita*



Sources: Kose and Terrones (2015), World Bank, IMF.
Notes: The index number is equal to 100 in 1960. Shaded bars indicate the years of global recessions: 1975, 1982, 1991 and 2009. PPP-weighted refers to "Purchasing Power Parity" weighted global GDP growth and Market-weighted refers to market exchange rate weighted global GDP growth.

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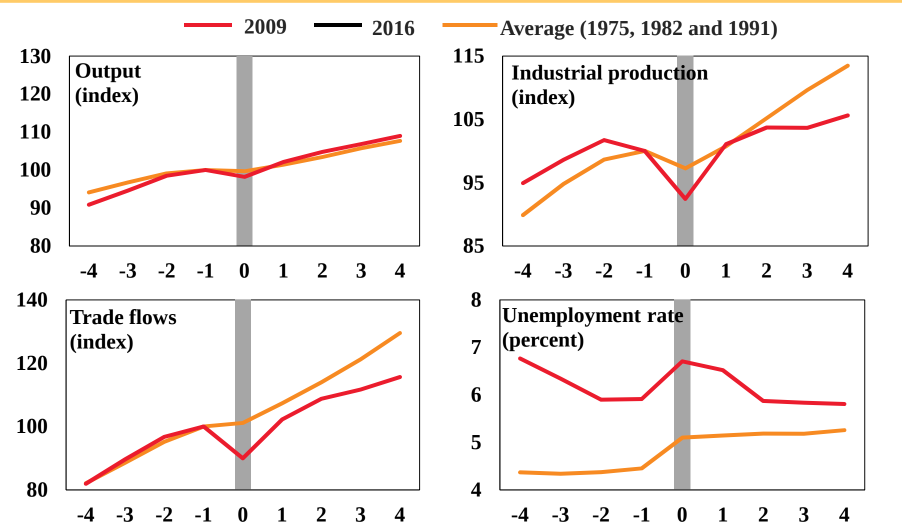
An Ongoing Global Recession? *Not now…*



Sources: Kose and Terrones (2015), World Bank, IMF.
Notes: Time 0 denotes the year of the respective global recession (shaded with gray). All variables are in annual frequency. Output, industrial production, and trade are index numbers equal to 100 one period before the global recession year.

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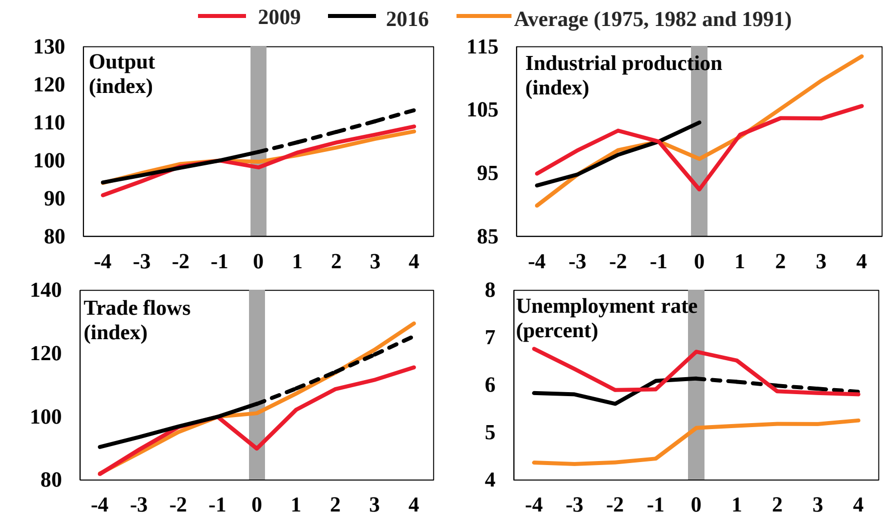
A Ongoing Global Recession? *Not now…*



Sources: Kose and Terrones (2015), World Bank, IMF.
Notes: Time 0 denotes the year of the respective global recession (shaded with gray). All variables are in annual frequency. Output, industrial production, and trade are index numbers equal to 100 one period before the global recession year.

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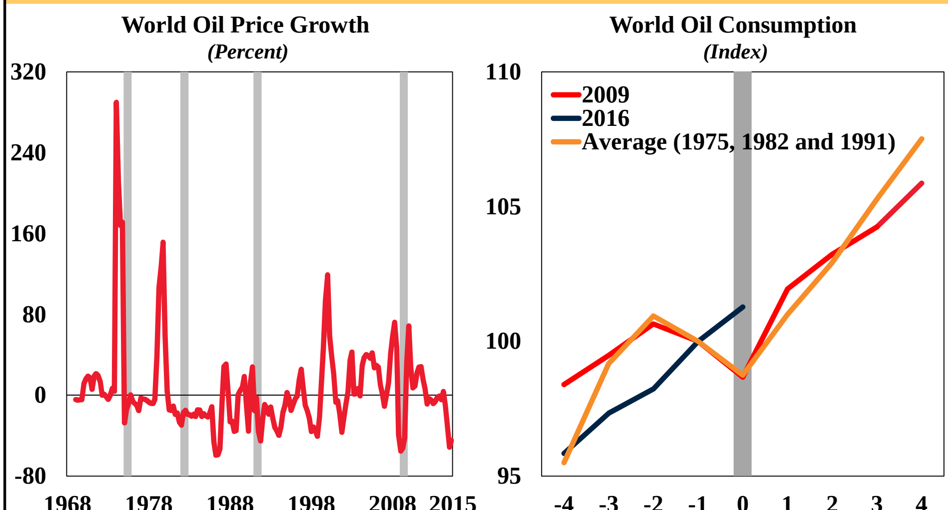
Oil Markets During Global Recessions: *Under Pressure*



Sources: Kose and Terrones (2015), World Bank, IMF.
Left Panel. The figure presents the year-on-year growth rate of real oil price. The real growth rate corresponds to the nominal growth rate deflated by world inflation, which is the year-on-year growth rate of the world consumer price index (CPI). The shared years are 1975, 1982, 1991 and 2009. Right Panel. Time 0 denotes the year of the respective global recession (shaded with gray). The variable is in annual frequency and is an index number equal to 100 one period before the global recession year.

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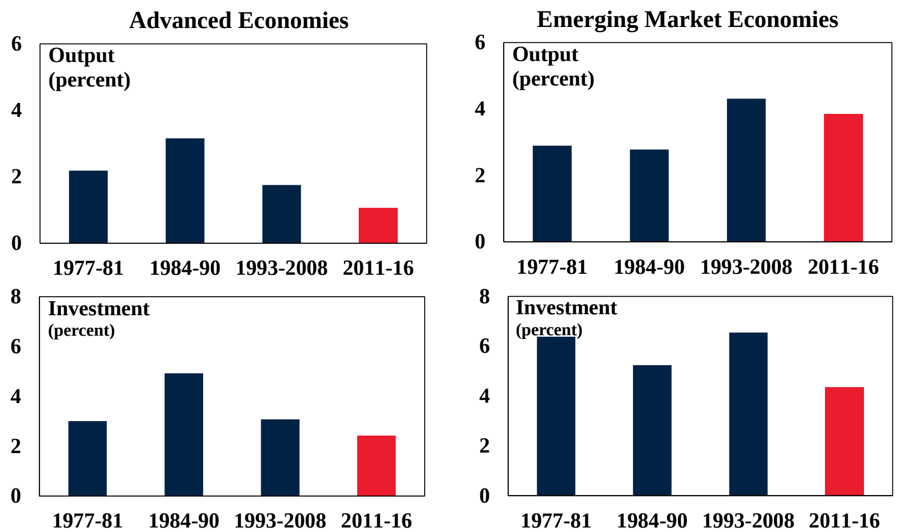
But Risks Rising…
Recovery: Weakest for Advanced, Weakening for Emerging



Sources: Kose and Terrones (2015), World Bank, IMF.
Notes: Each bar represents the average growth of the respective variable during the years of the global expansions (excluding the first year).

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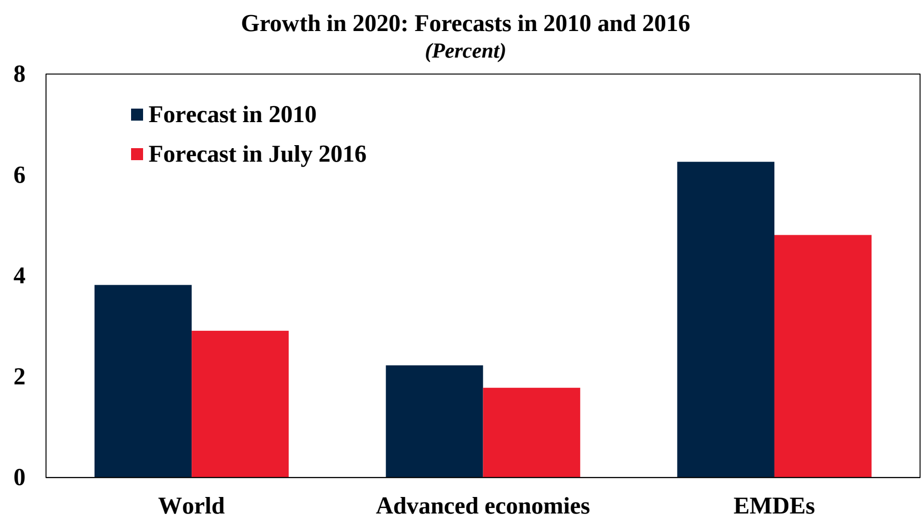
Persistent Growth Pessimism:
Long-Term Forecast Downgrades



Sources: World Bank, Consensus Economics.
Note: Weighted average growth. October forecasts for 46 countries for which long-term consensus forecasts are available.

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Four Questions

3 What has been the driving force behind the collapse in oil prices?
Mostly supply…

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Methodology:
A Simple VAR Model

- The reduced-form VAR model is:

$$y_t = a_0 + A_1 y_{t-1} + A_2 y_{t-2} + \cdots + A_l y_{t-l} + u_t$$

- The variables included in the model are: oil prices, equity prices, and U.S. exchange rates.

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Methodology:
Shock Identification

- Supply and demand shocks are identified using sign restrictions
- Two orthogonal shocks with impulse responses that satisfy certain signs are estimated using the model
- *Adverse demand shock:* Oil and equity prices decline reflecting a weak economy
- *Favorable supply shock:* Oil prices decline but equity prices increase
- The differing movement of equity prices allows one to discriminate between supply and demand shocks

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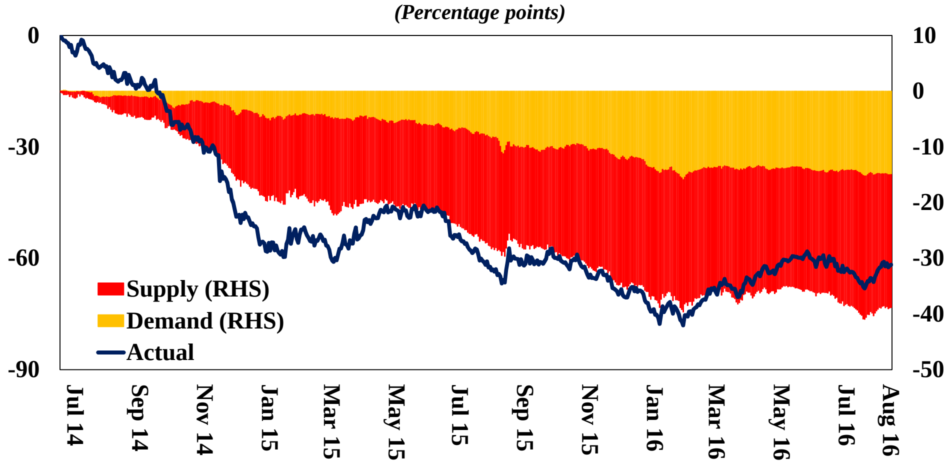
Oil Price Collapse:
Mostly (60 - 40) Due to Supply Shocks

Contributions of supply and demand shocks to the oil price decline
(Percentage points)



Sources: Baffes (2015), Bloomberg, FRED, Haver Analytics, World Bank.
Note: Based on estimates from the model, identifying the demand and supply shocks using sign restrictions. All shocks except the shock of interest are shut off by setting them to zeros and the model is used to trace out the counterfactual oil price. This exercise is performed separately for supply and demand shocks. The red (blue) counterfactual shows how much oil prices would have declined since the second half of 2014 only with the estimated supply (demand) shocks. Numbers shown are in cumulative percentages.

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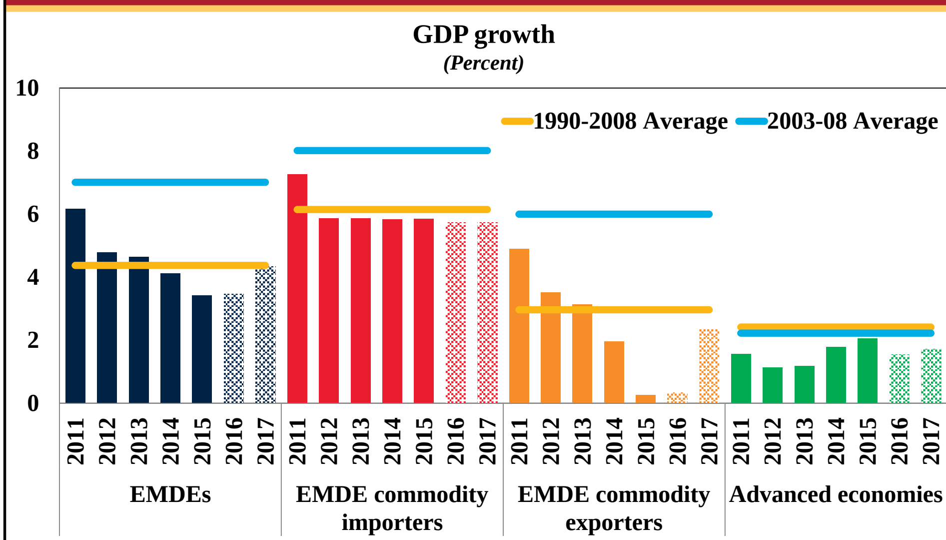
Four Questions

4 What are the implications for commodity-exporters?

Weak growth in commodity-exporters; stronger policy support needed…

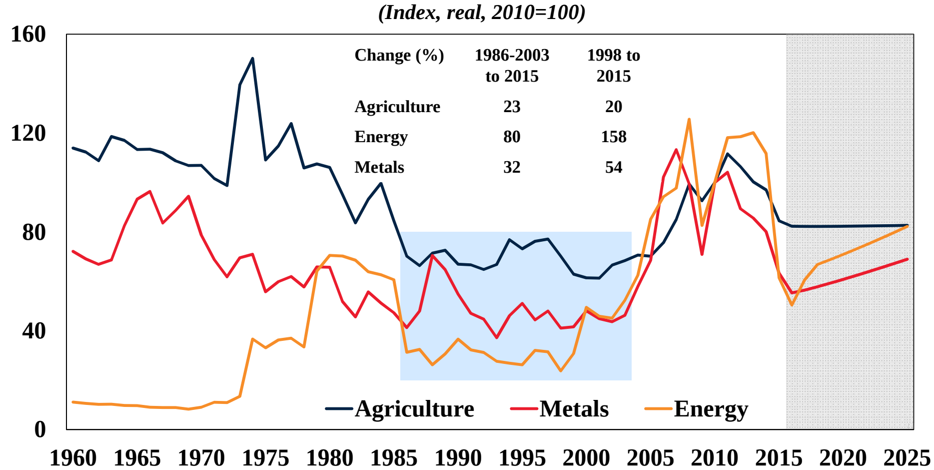
Commodity Exporting EMDEs: *After a Sharp Slowdown, Pick Up in 2017?*



Source: World Bank.
Note: Weighted average growth

Commodity Markets:
Higher Prices Next Year?

Real commodity price indices
(Index, real, 2010=100)



Source: World Bank.
Note: 2016-25 figures are forecasts as of July 2016.

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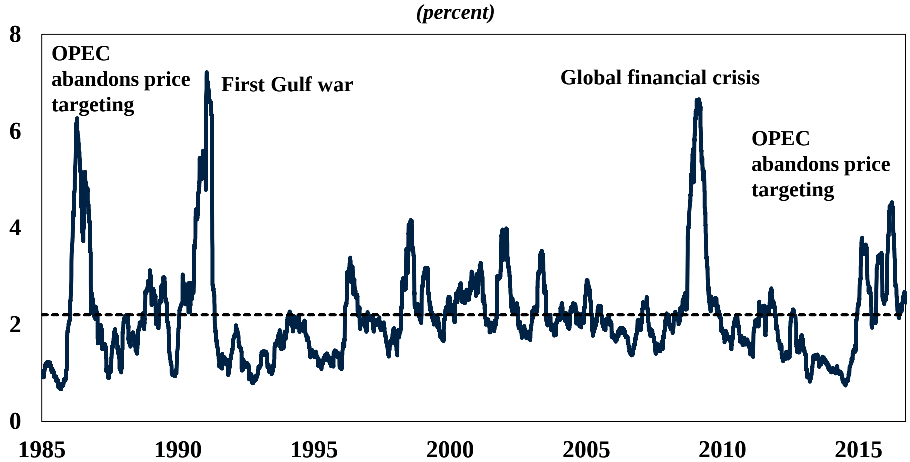
Larger Supply Uncertainty…
Higher Oil Price Volatility?

Oil price volatility
(percent)



Sources: Bloomberg, World Bank.
Note: Volatility is measured as a 3-month moving standard deviation of day-on-day growth in WTI oil prices (nominal, non-seasonally-adjusted). The latest observation is September 23, 2016. The dash line is an average level of volatility for the whole period.

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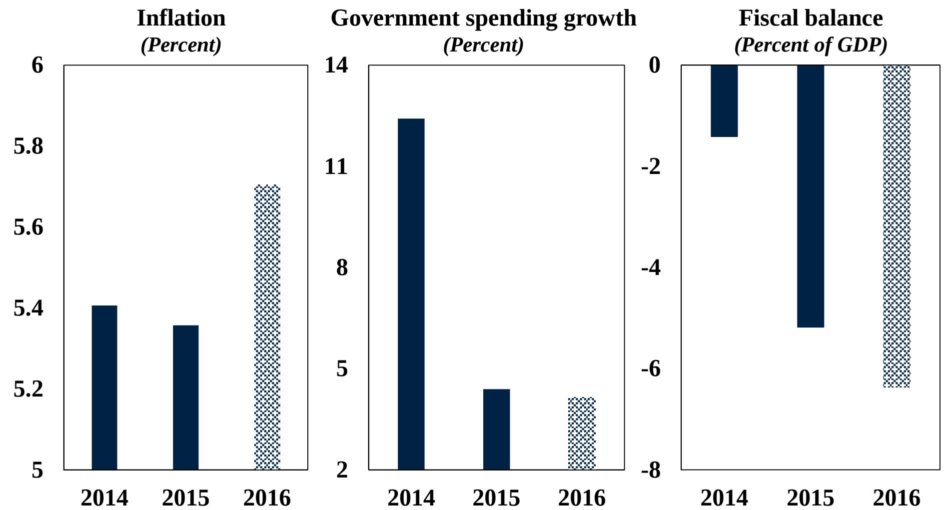
Inflation and Fiscal Balance in Commodity Exporters:
Lower Spending Growth but Larger Deficits and Higher Inflation



Sources: World Bank, IMF.
Note: EMDE commodity-exporting countries, excluding BRICS, are considered. Weighted averages by GDP in market exchange rates are presented. Left Panel. The sample excludes South Sudan, Sudan, Ukraine and Venezuela, RB. Center Panel. Libya, Myanmar, South Sudan, Sudan, Venezuela, RB, and Yemen are excluded.

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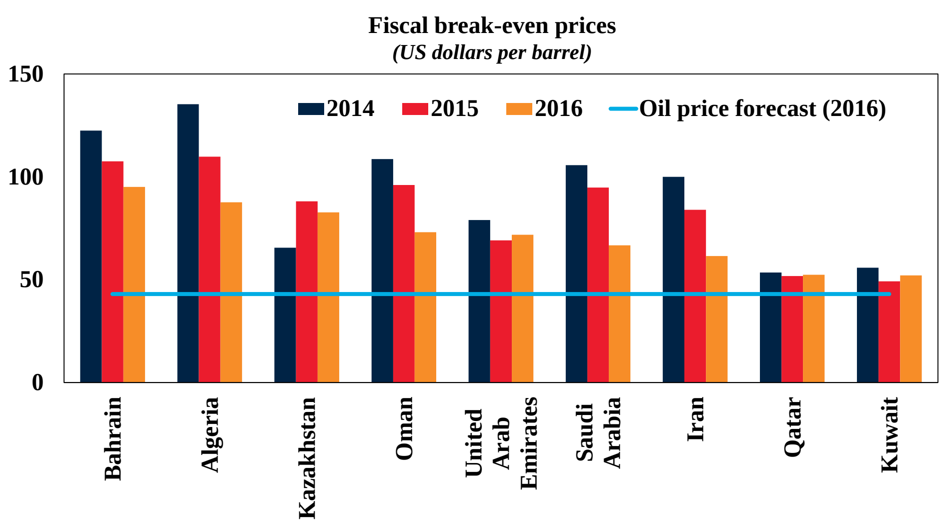
Oil Prices to Balance Budget:
Higher than Current prices



Source: IMF.
Note: Fiscal break-even price is the oil price that balances the budget.

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An Umbrella of Growth Enhancing Policies:
To Address Cyclical and Structural Challenges

What types of policies needed?

Fiscal	Effective; Efficient; Medium-Term fiscal plan
Monetary	Credible; Price stability; Financial stability
Structural	Effective; Demand side implications; Supportive measures
Global	Promotion of trade and financial integration; Supportive measures; Pooling resources for investment

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Four Questions

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   Looks like played a major role
2. What has been the role of demand?
   Somewhat smaller role but..
3. What has been the driving force behind the collapse in oil prices?
   Mostly supply…
4. What are the implications for commodity-exporters?
   Weak growth in commodity-exporters; stronger policy support needed…

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Questions & Comments
Thanks!

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