Cyclical behaviour of oil prices

"there is no new thing under the sun"

JOHN KEMP
REUTERS
4 Jun 2018

Outline

Cyclical nature of oil market

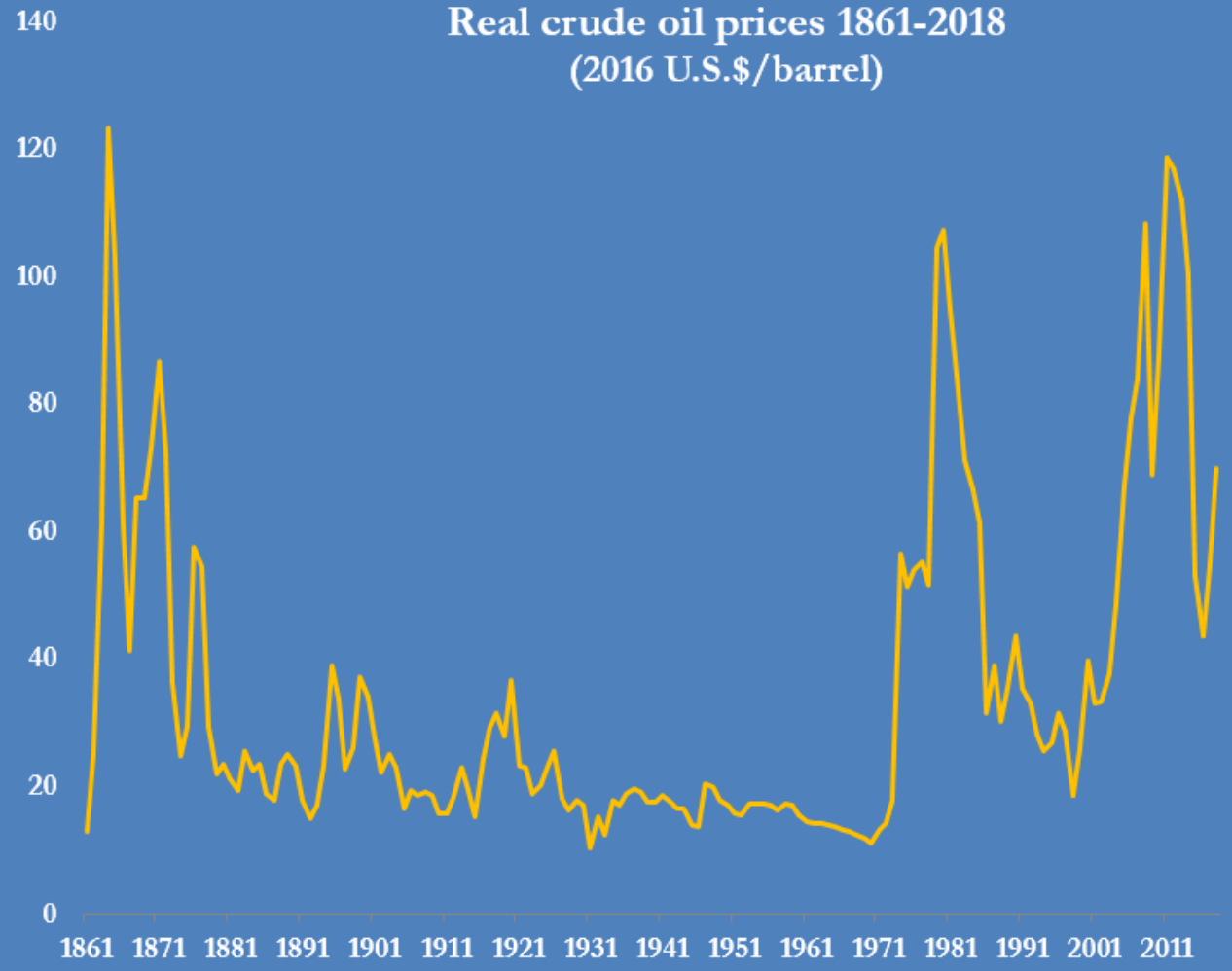
Current position in the cycle

Next steps on the journey

Sources of uncertainty

Long-term outlook

Oil prices since the start of the modern petroleum industry



Source: *BP Statistical Review of World Energy 2017* Reuters calculations for 2017 and 2018
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Oil market fundamentals

Oil industry has always been subject to deep and prolonged cycles of boom and bust and there is no reason to think the future will be any different

Cyclical behaviour is the distinguishing characteristic of oil markets and prices and rooted in the industry's structure

- Low price elasticity of supply and demand
- Backward-looking expectations and behaviour
- Positive and negative feedback mechanisms
- Complex adaptive systems

Multiple markets for crude, fuels, refining, services, engineering, construction, drilling, skilled labour, raw materials etc

Each market subject to its own feedback mechanisms, operating at different speeds and timescales, with constantly changing balances between supply and demand

Balancing "the oil market" actually means balancing all these markets simultaneously

Oil market is never really "balanced" or in equilibrium except accidentally and not for very long

Feedback mechanisms operate in oil markets and can delay as well as accelerate process of adjustment

Oil industry is characterised by a multiple feedback loops

Initial conditions  Outcomes

Negative feedback loops dampen impact of an initial change and are therefore stabilising and promote rapid return to "equilibrium"

Positive feedback loops amplify the impact of an initial change and are therefore destabilising and delay return to "equilibrium"

Feedback concept was popularised by communications experts at Bell Telephone Laboratory in the 1920s

Long (implicit) history in economics: Adam Smith's "invisible hand" and David Hume's "price-specie-flow" mechanism are both instances of negative feedback loops

Examples of feedback mechanisms acting on oil supply and demand
Positive feedback deepened slump, now accelerating rebound

	Supply-side	Demand-side
Negative feedback mechanisms (promote return to balance)	Capital budgets Cash flow Equity finance Debt finance	Fuel switching Fuel efficiency Energy conservation policy GDP impact in oil-consuming countries
Positive feedback mechanisms (delay return to balance)	Producers' revenue needs Labour costs Raw material costs Services contract adjustments Fiscal terms (taxes and royalties)	GDP impact in oil-producing countries Fuel consumption within the oil industry (drilling, refining, transportation) Fuel consumption throughout the oil supply chain (service companies and other suppliers)

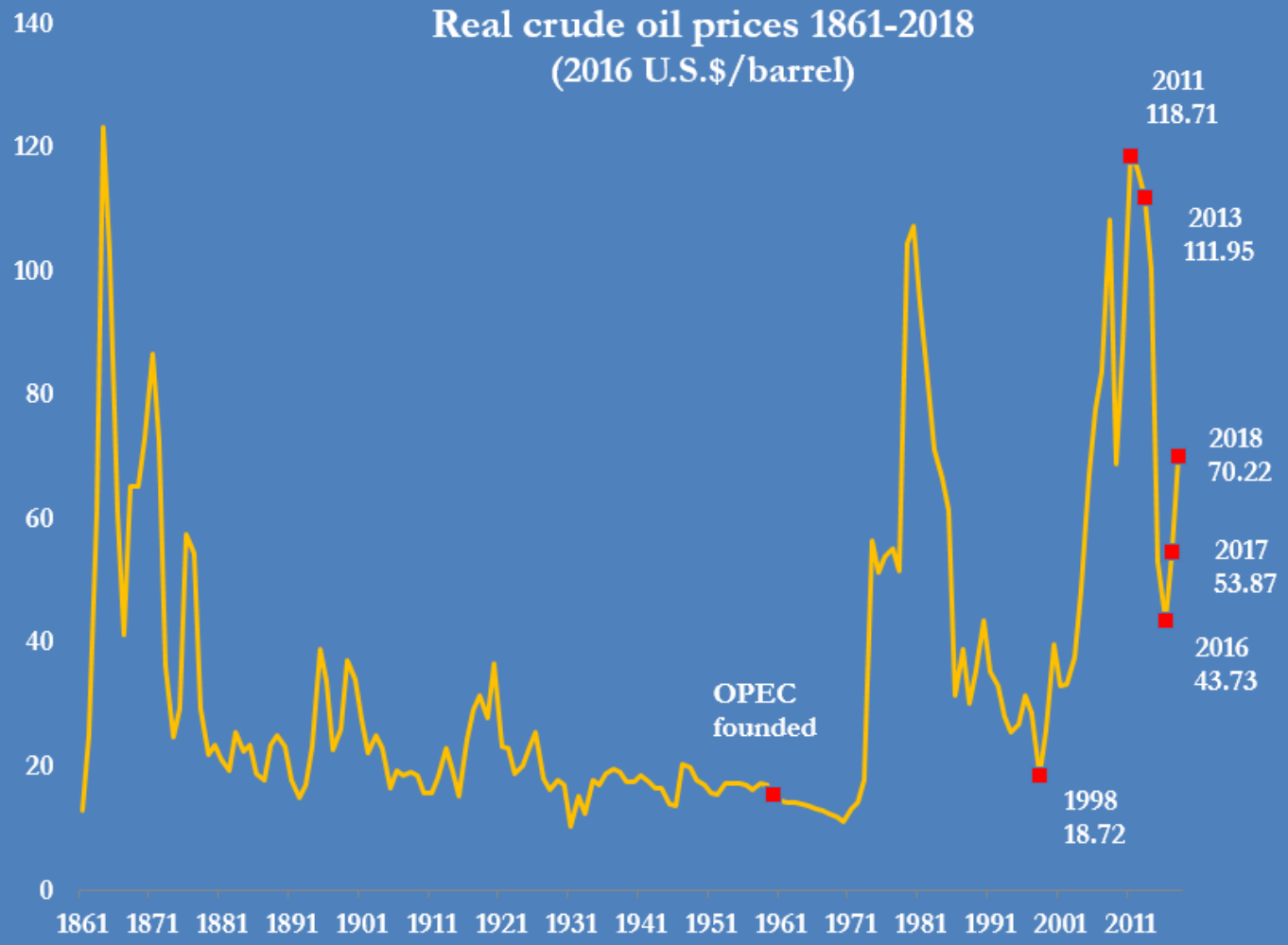
Oil market is cyclical: no bust (or boom) lasts forever

Best advice on oil business comes from *Book of Ecclesiastes (Ch 3)*

To every thing there is a season,
and a time to every purpose under the heaven:
a time to be born, and a time to die;
a time to plant, and a time to pluck up that which is planted;
a time to kill, and a time to heal;
a time to break down, and a time to build up;
a time to weep, and a time to laugh;
a time to mourn, and a time to dance;
a time to cast away stones,
and a time to gather stones together;
a time to embrace, and a time to refrain from embracing;
a time to get, and a time to lose;
a time to keep, and a time to cast away;
a time to rend, and a time to sew;
a time to keep silence, and a time to speak;
a time to love, and a time to hate;
a time of war, and a time of peace.

Oil prices in long run perspective

Long boom, wrenching slump, now back to boom



Source: *BP Statistical Review of World Energy 2017* Reuters calculations for 2017 and 2018
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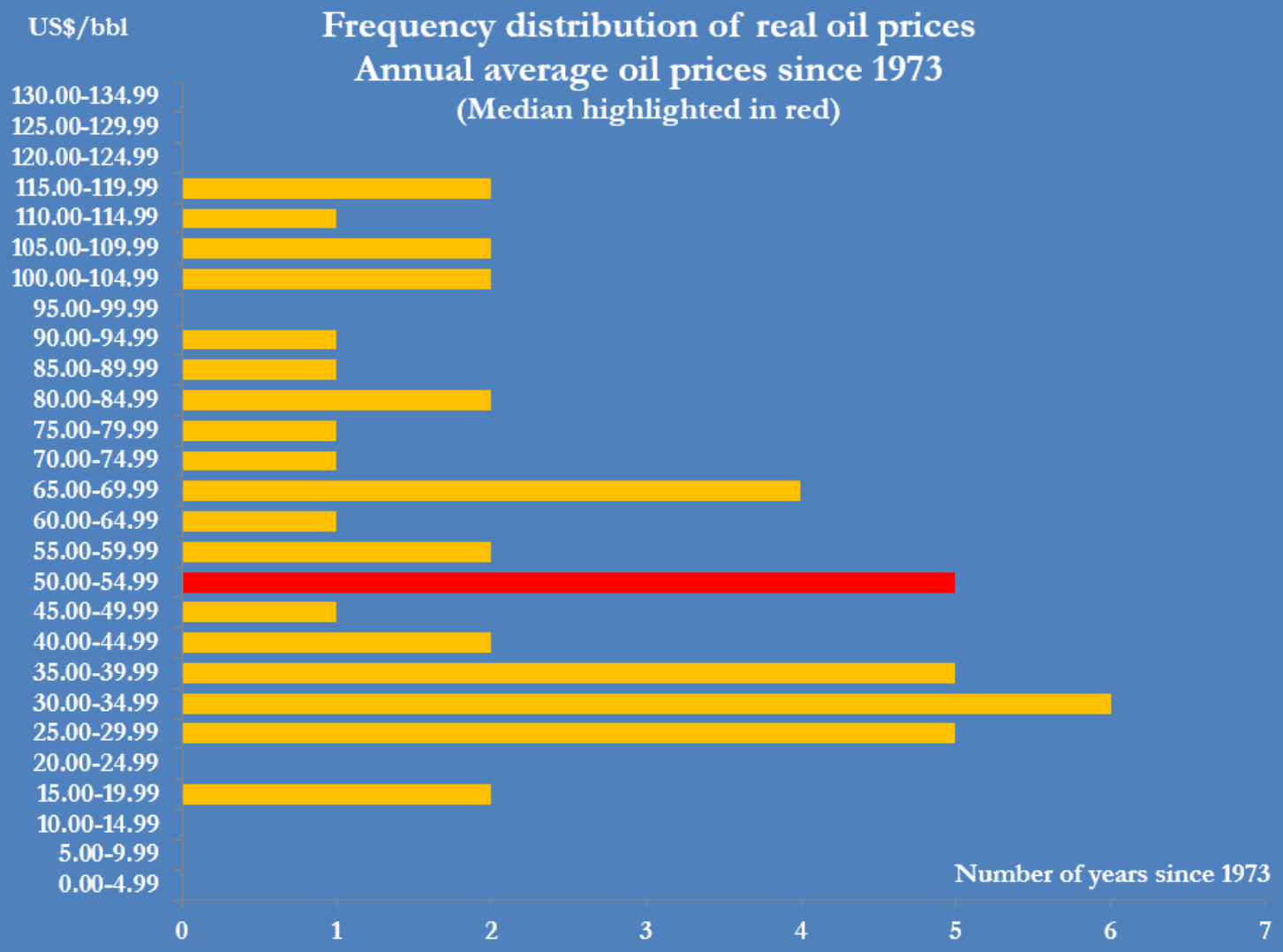
Oil prices are no longer low in real terms

Real oil prices now well into the upper half of the post-1973 distribution



Source: *BP Statistical Review of World Energy, 2017* and author calculations

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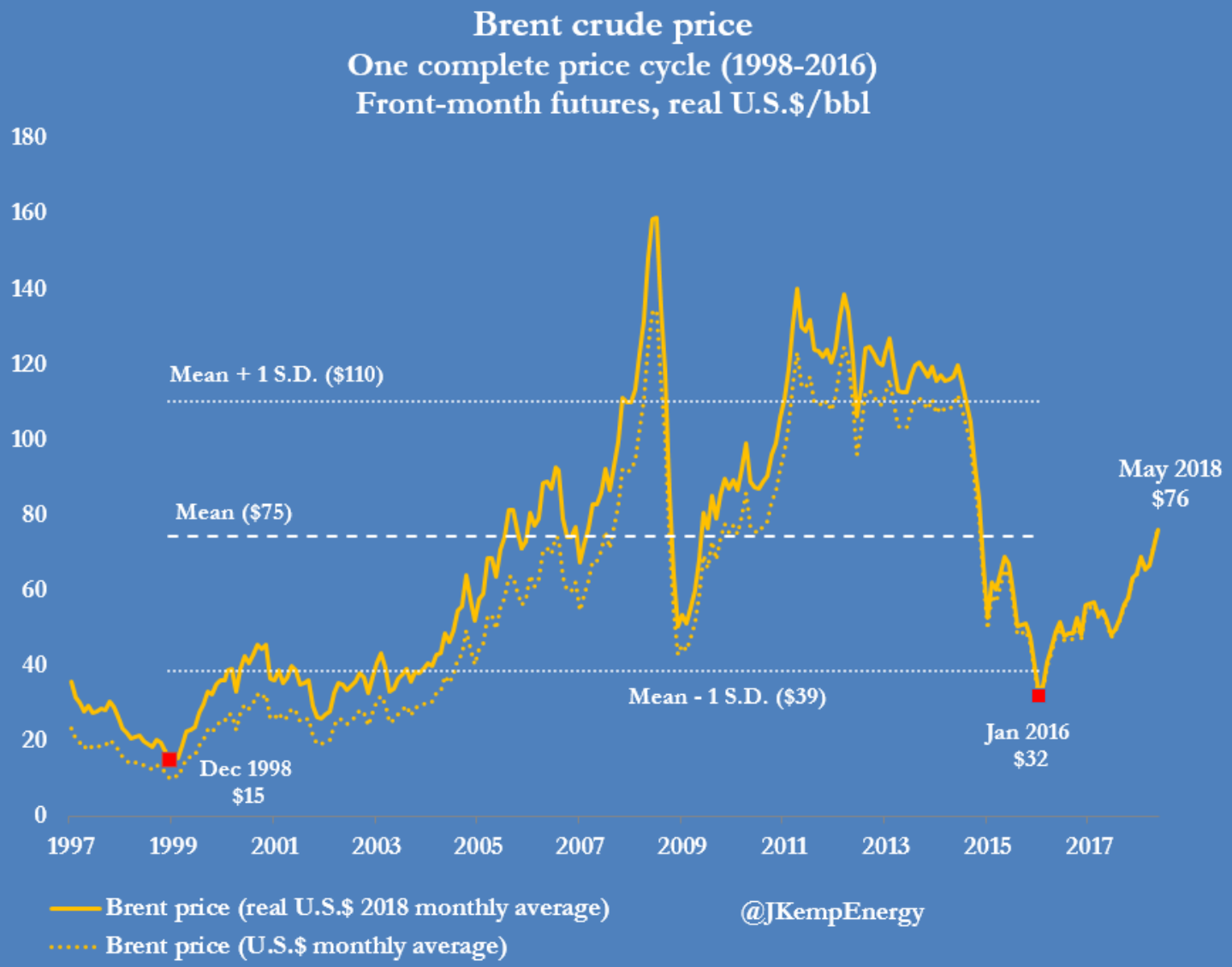
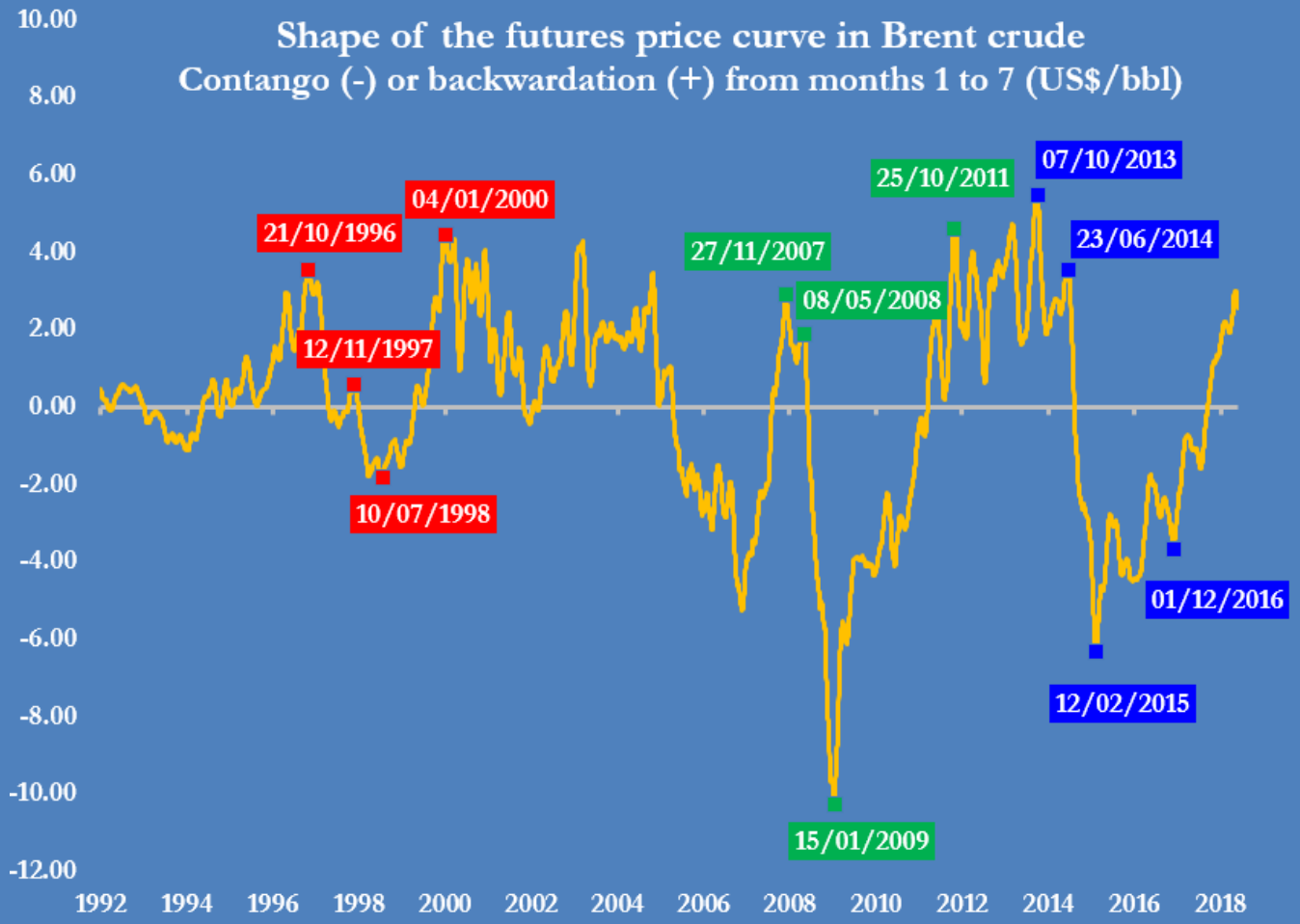
Real oil prices again in the upper half of the cycle

Current oil price now slightly above the $75 average for the last cycle



Oil market alternates between periods of over- and under-supply

Calendar spreads cycle between contango to backwardation



Price difference between 1st listed contract month and 7th listed contract month for Brent futures (U.S.$/bbl)
Contango (-) or backwardation (+) averaged over 30 days

Source: Thomson Reuters Eikon, ICE Futures
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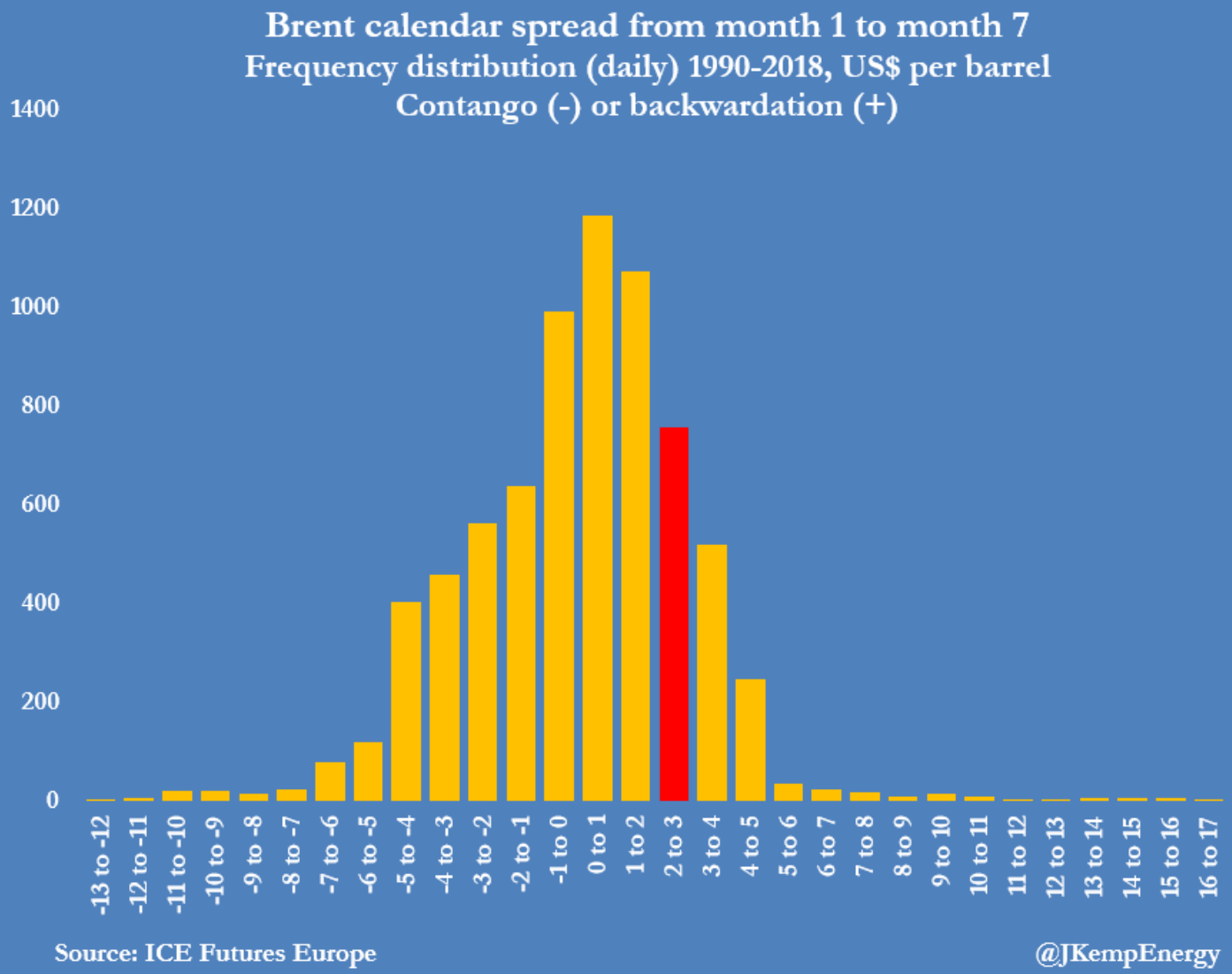
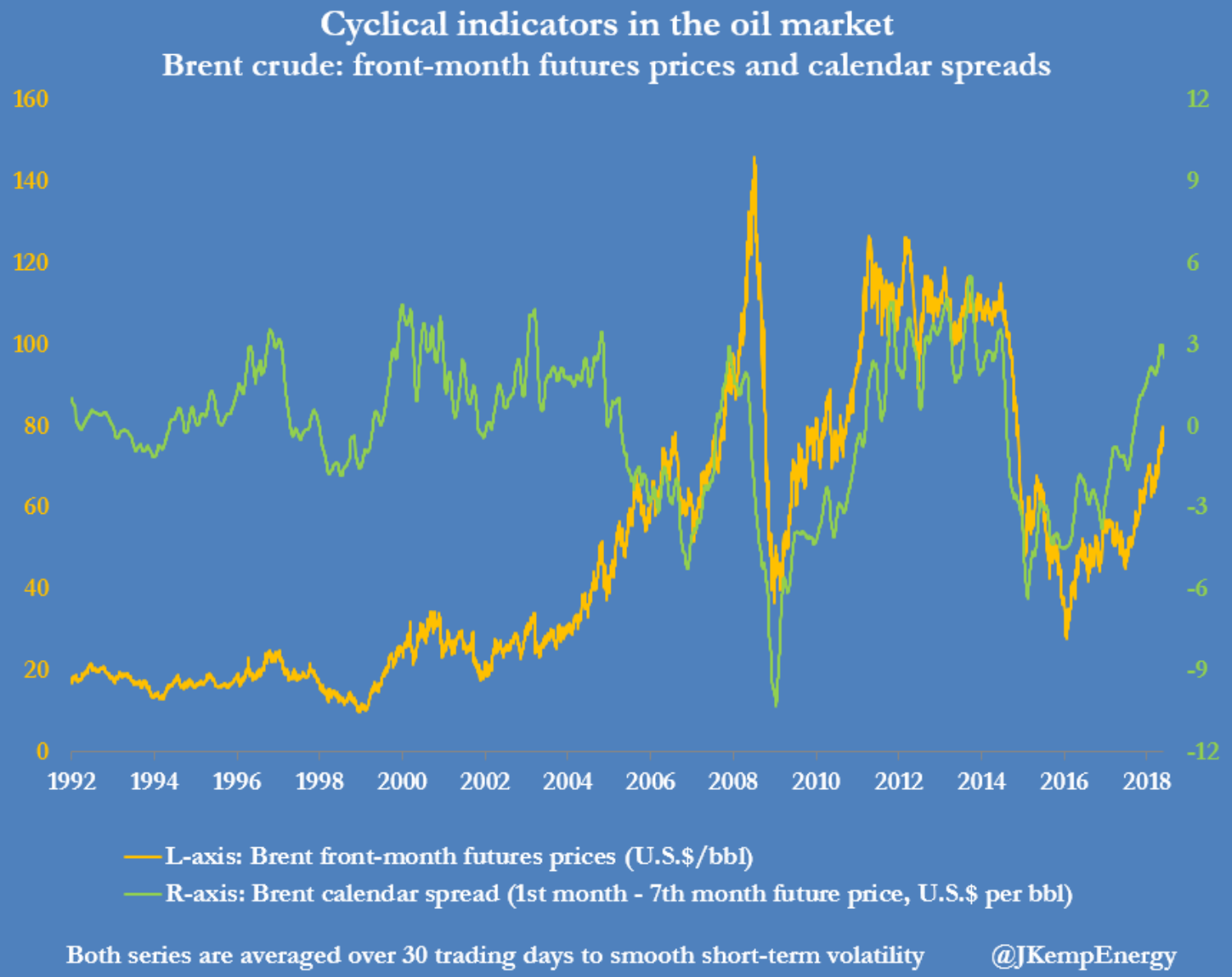
Oil market calendar spreads now in upper half of distribution

Stocks are relatively tight and expected to tighten further

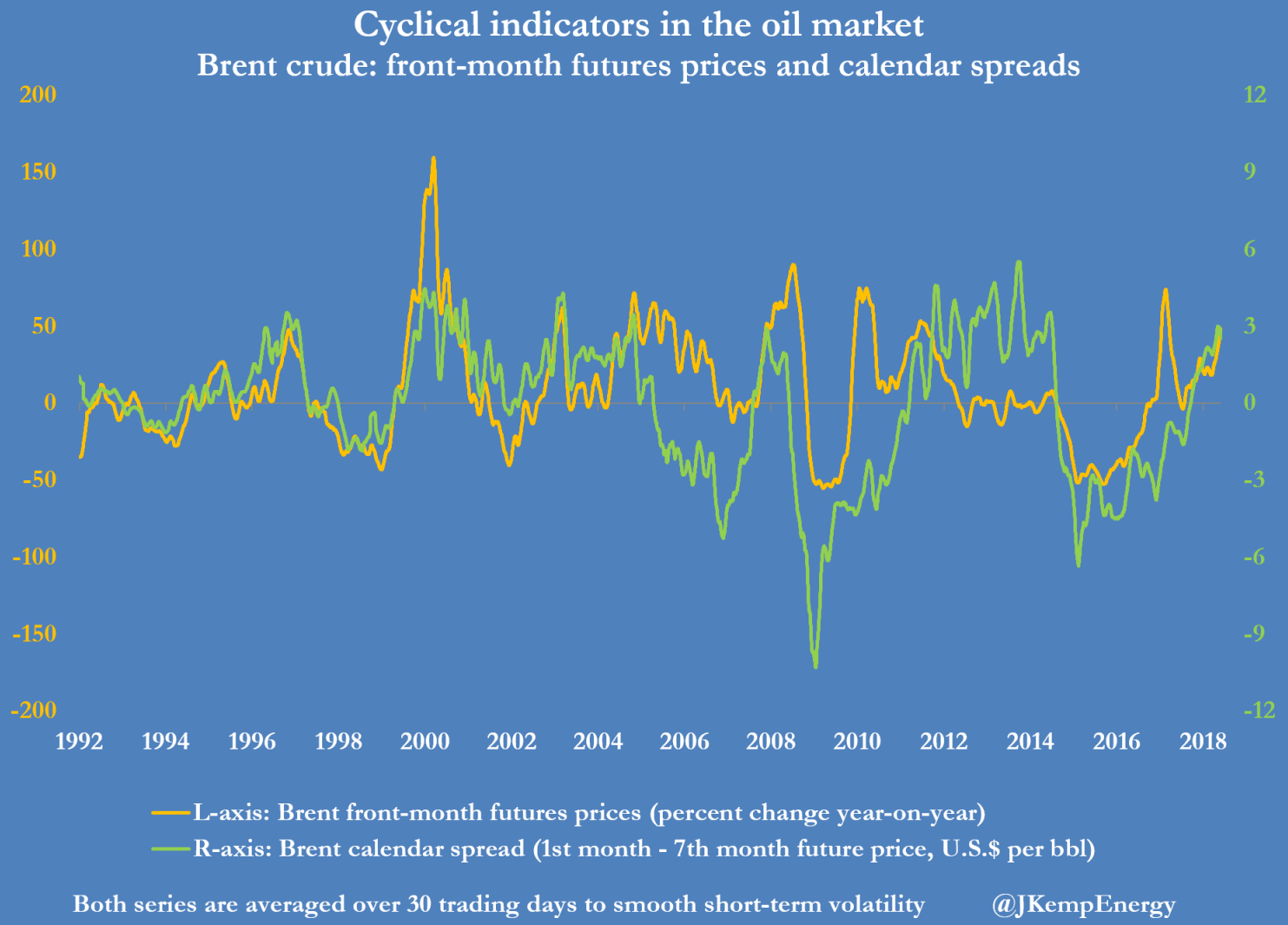


Spot prices and calendar spreads are part of the same cycle



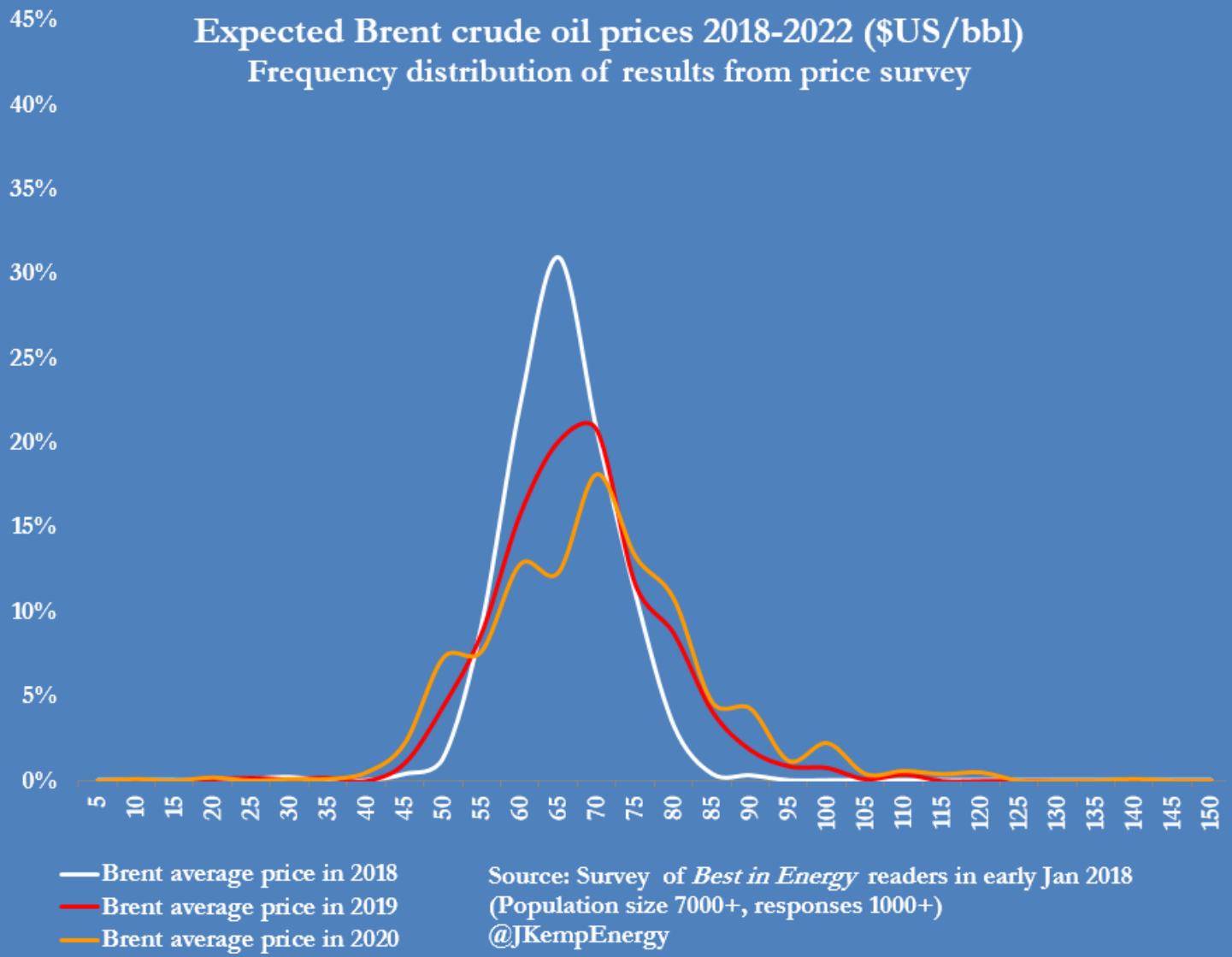
Spot prices and calendar spreads closely correlated

Both currently point to a recovery that is relatively mature



Oil prices are now well above expectations at the start of the year

Energy market professionals expected prices to average $70 by 2020



Oil market has rebalanced in 2017/18 after slump in 2014/15

Production restraint by OPEC and allies

Involuntary production losses especially in Venezuela

Strong growth in consumption for fourth year running

Rebalancing: what do we mean?
At least five elements

Closer balance between supply & demand *(Yes – market now in deficit)*

Normalisation of crude & product stocks *(Yes – back to 5yr average)*

Forward price curve *(Yes – shift from contango to backwardation)*

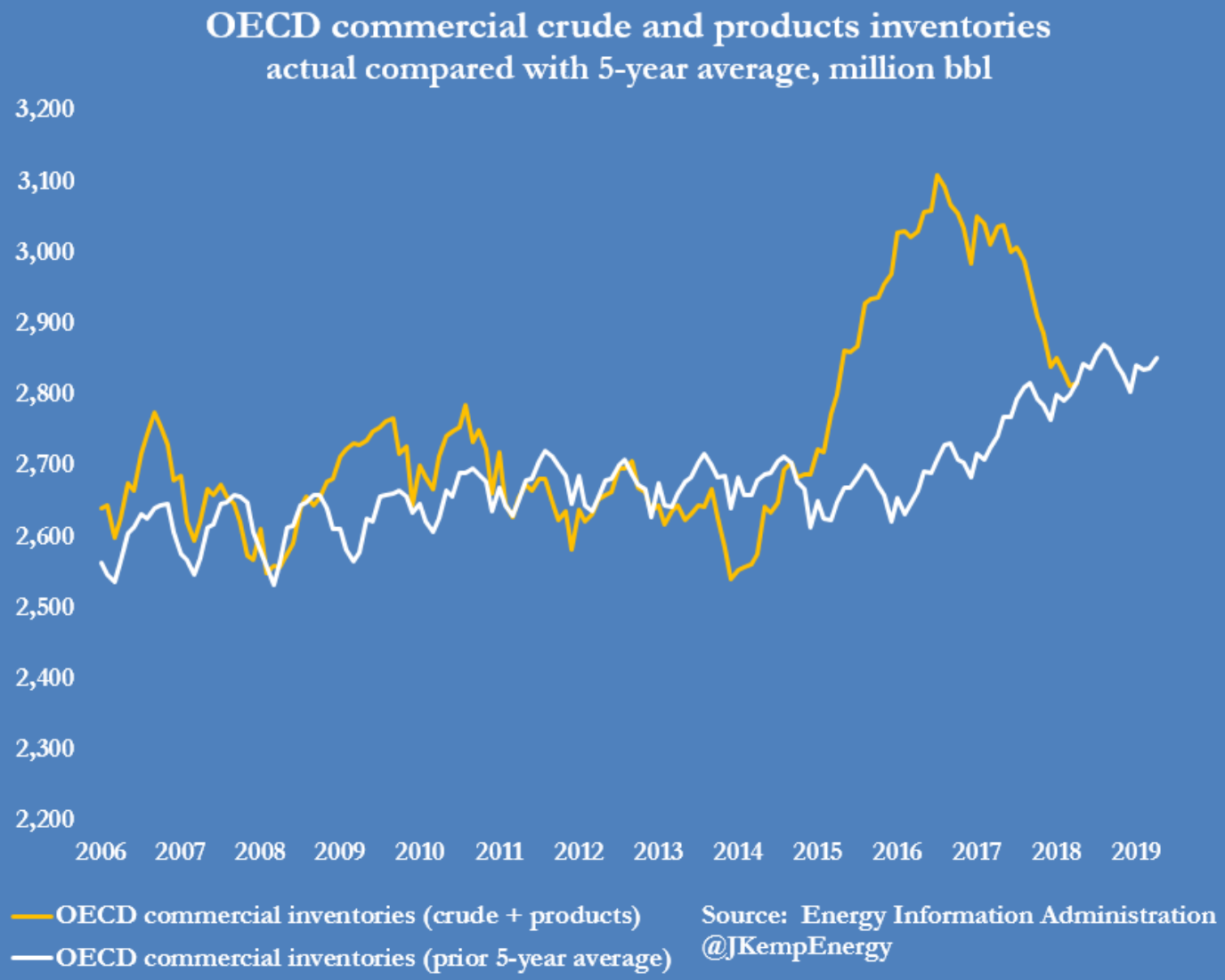
Sustainable flat price *(Yes – back to cyclical average)*

Sustainable investment *(Yes – shale growth but offshore lagging)*

Market has rebalanced on nearly all criteria
Now moving from rebalancing/recovery phase to tightening/boom

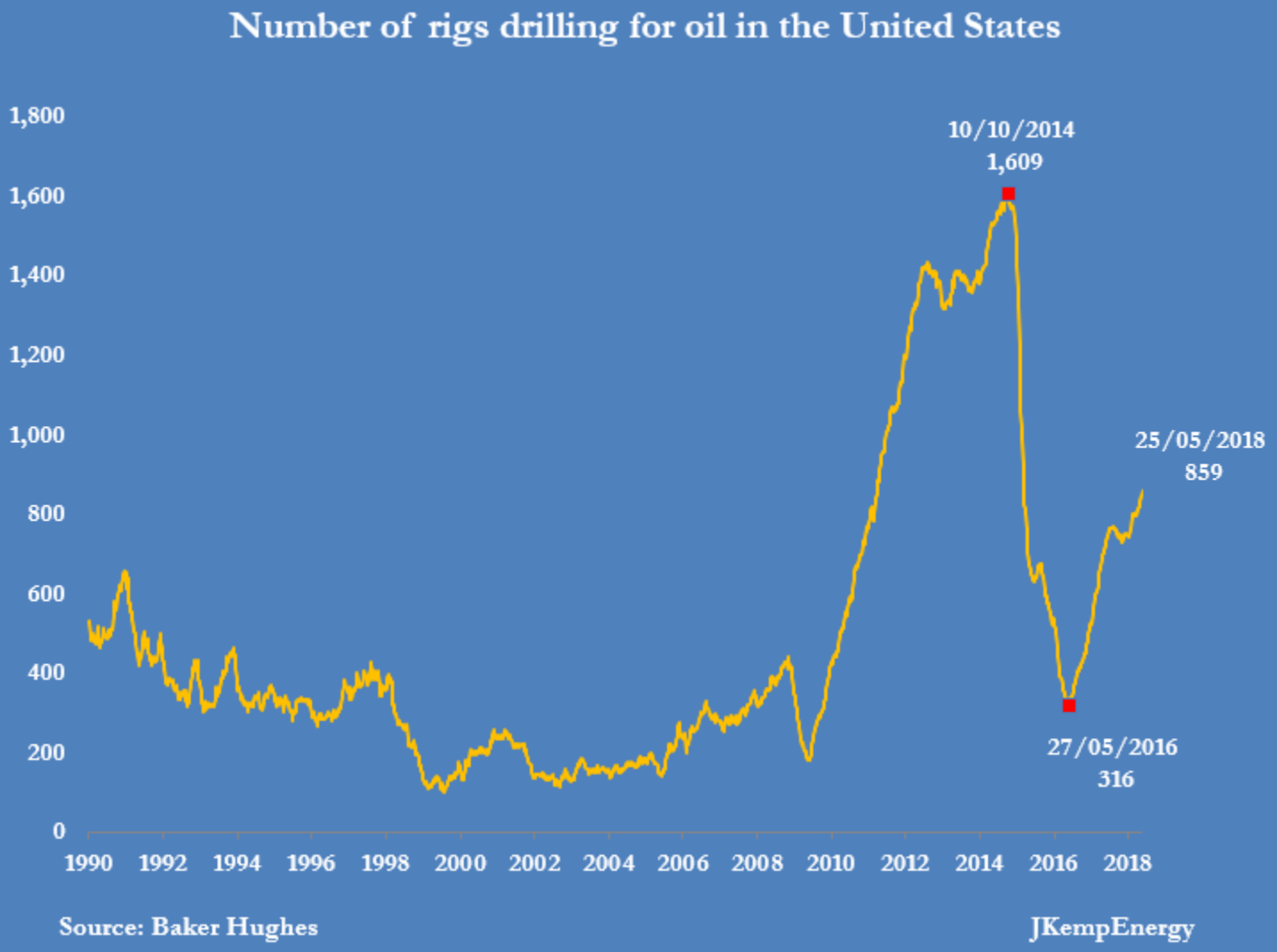
Excess oil inventories have been eliminated

OECD oil stocks back in line with five-year average



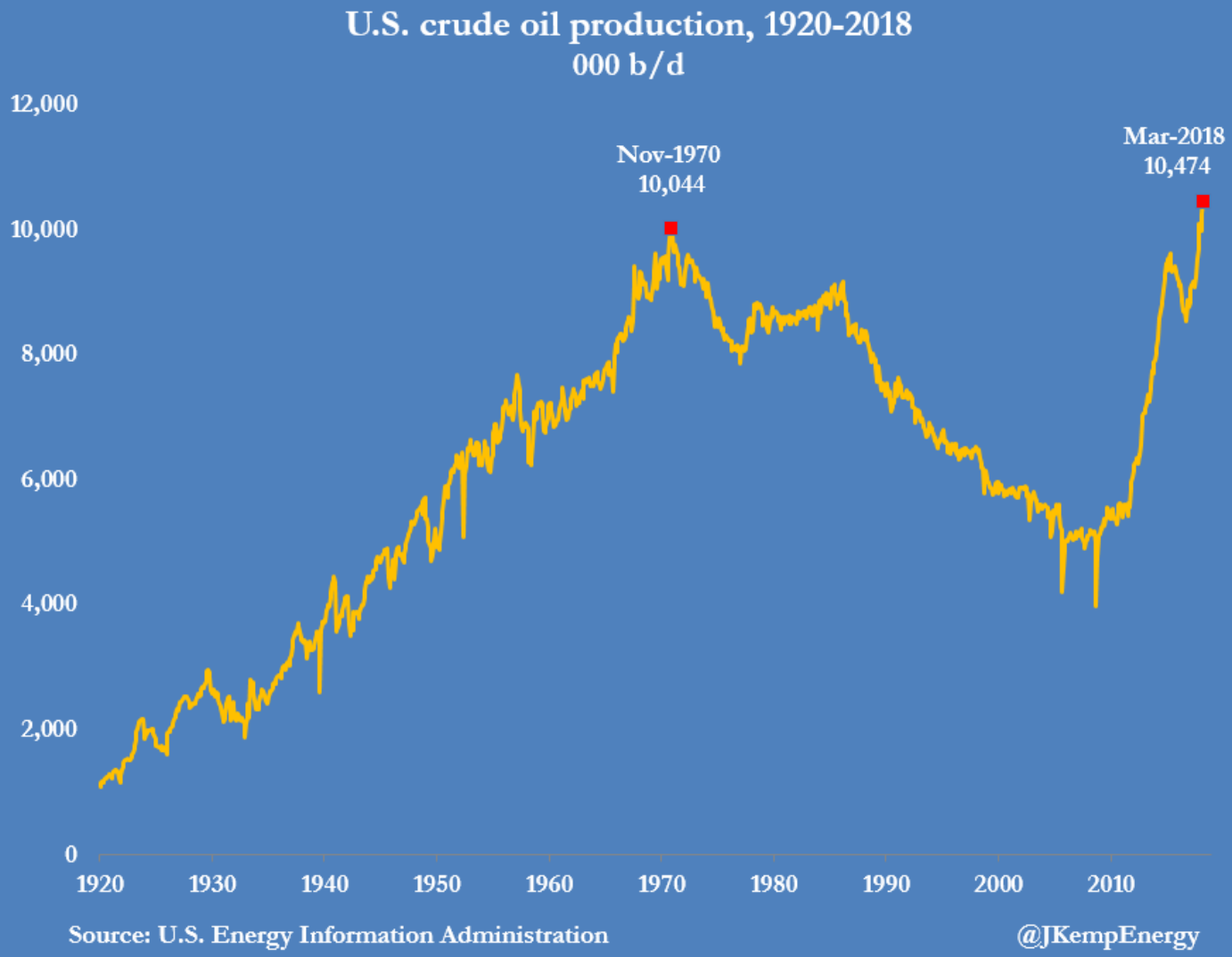
Higher oil prices have encouraged resumption of drilling

U.S. oil rig count has almost tripled since May 2016



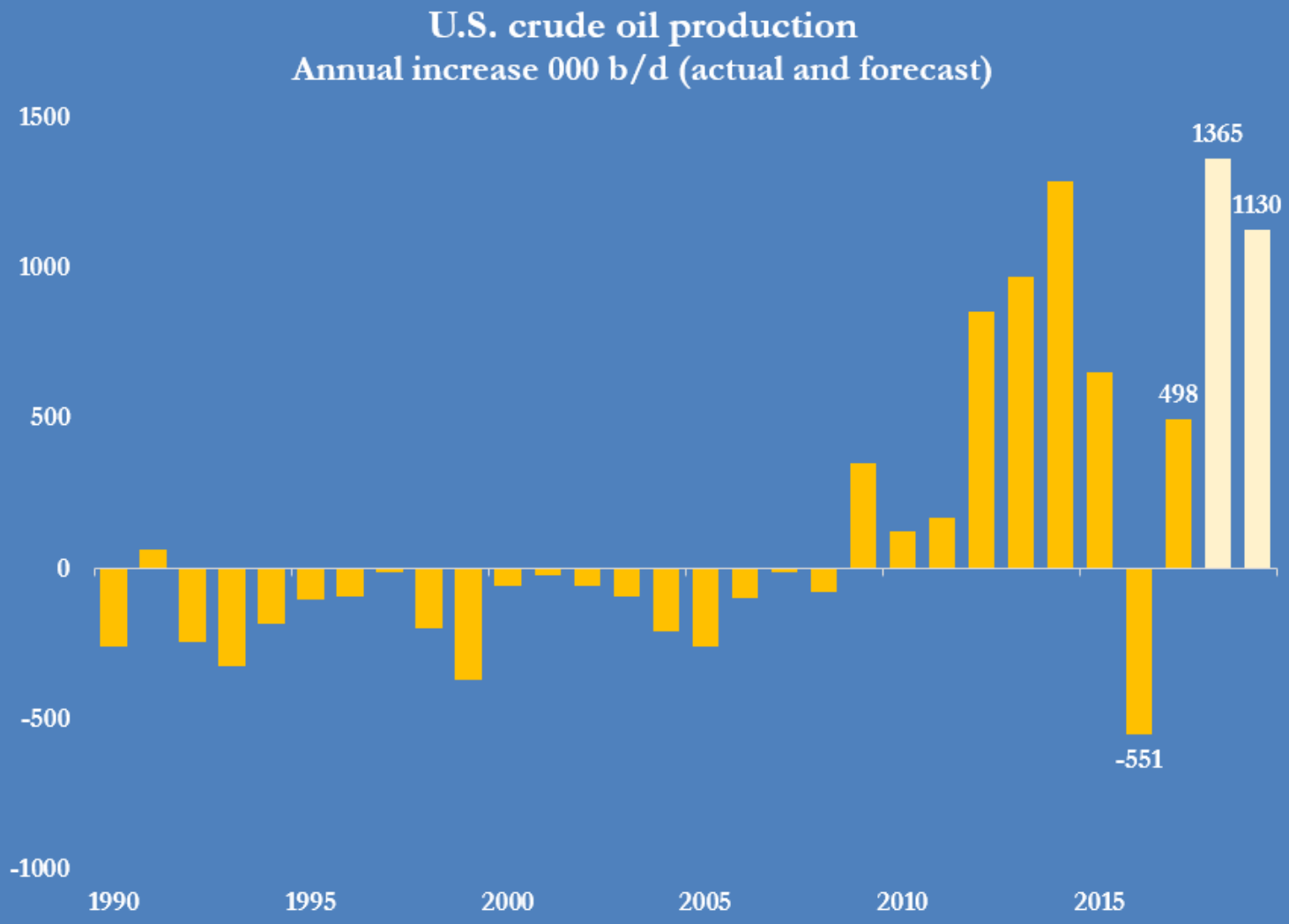
Rising rig count has brought a big increase in production

U.S. output up +1.3 million b/d year-on-year to record 10.5 million b/d in Mar



U.S. crude output forecast to rise almost +1.4 million b/d in 2018

And another +1.1 million b/d in 2019



Source: U.S. Energy Information Administration

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Synchronised global growth has boosted oil consumption

World trade volumes rising at fastest rate since 2011

Source: Netherlands Bureau for Economic Policy Analysis, *World Trade Monitor* @JKempEnergy

Rising oil prices are a signal

Rebalancing in 2018/19 will mean precisely the opposite of 2016/17

More production from OPEC+

More production from U.S. shale

More production from non-OPEC non-shale

Slower growth in oil consumption

Next steps in the price cycle

Familiar from previous cycles

Rising output from U.S. shale producers

Relaxation of OPEC output curbs

Rising non-OPEC non-shale output

Renewed interest in fuel-efficient transport

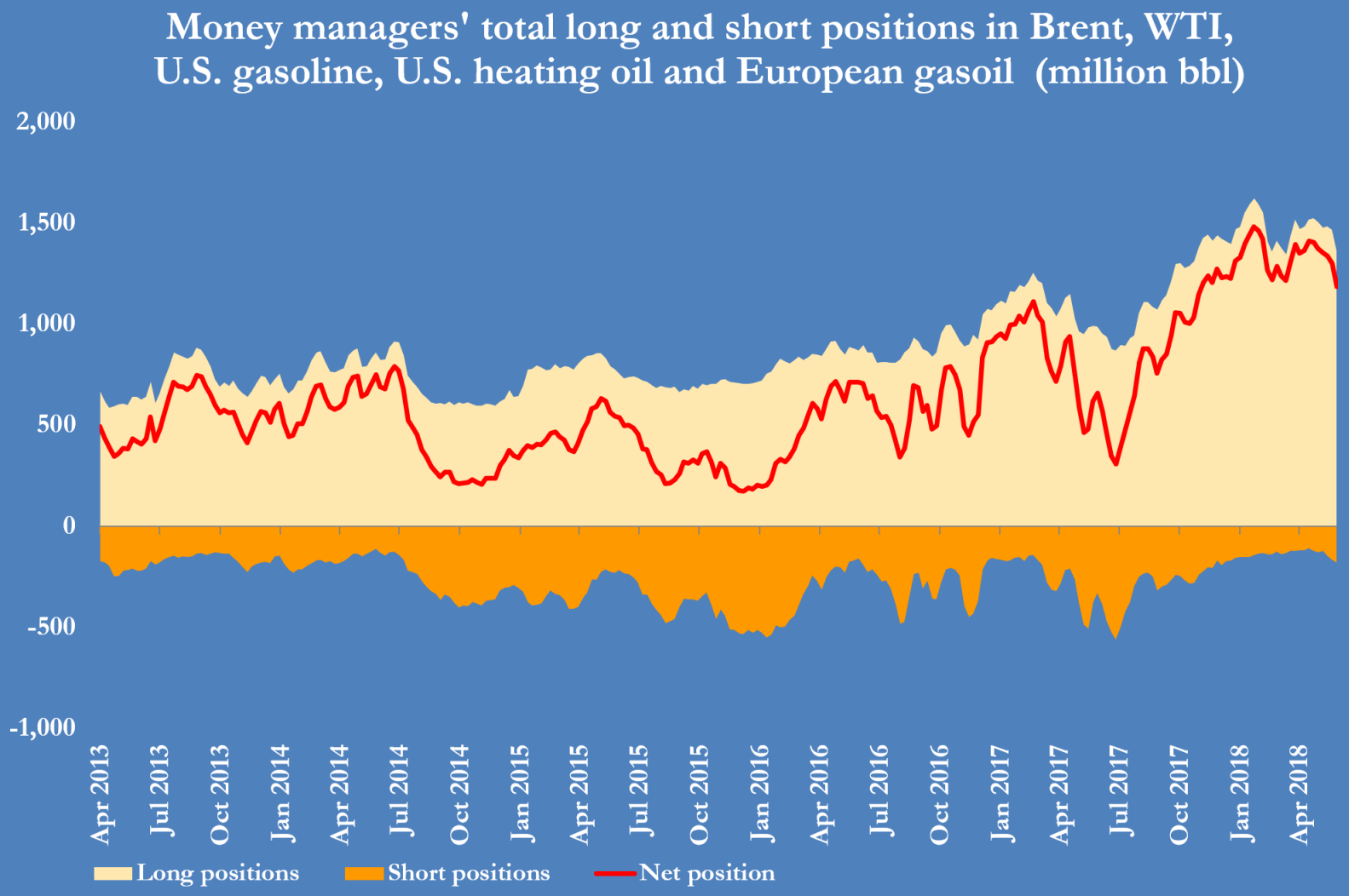
Behaviour changes to cut fuel consumption

Growing interest in electric vehicles

Renewed interest in alternative fuels e.g. LNG/CNG

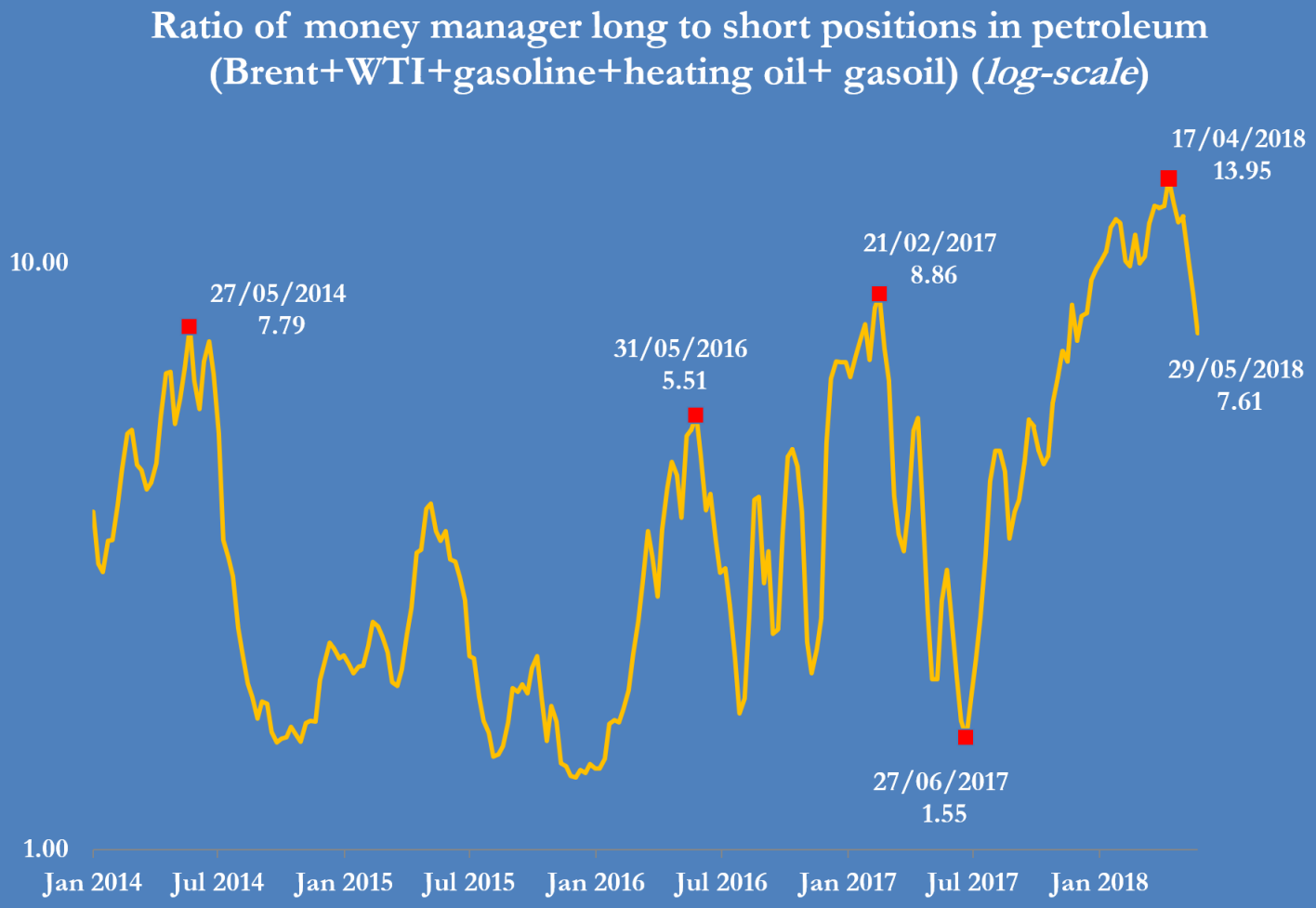
Hedge funds anticipated and accelerated rise in prices

Record bullish position helped push prices higher but presents liquidation risk



Hedge funds were never before so overwhelmingly bullish

Crowded trade risks sharp reversal if/when funds try to realise profits



Source: U.S. Commodity Futures Trading Commission, ICE Futures Europe

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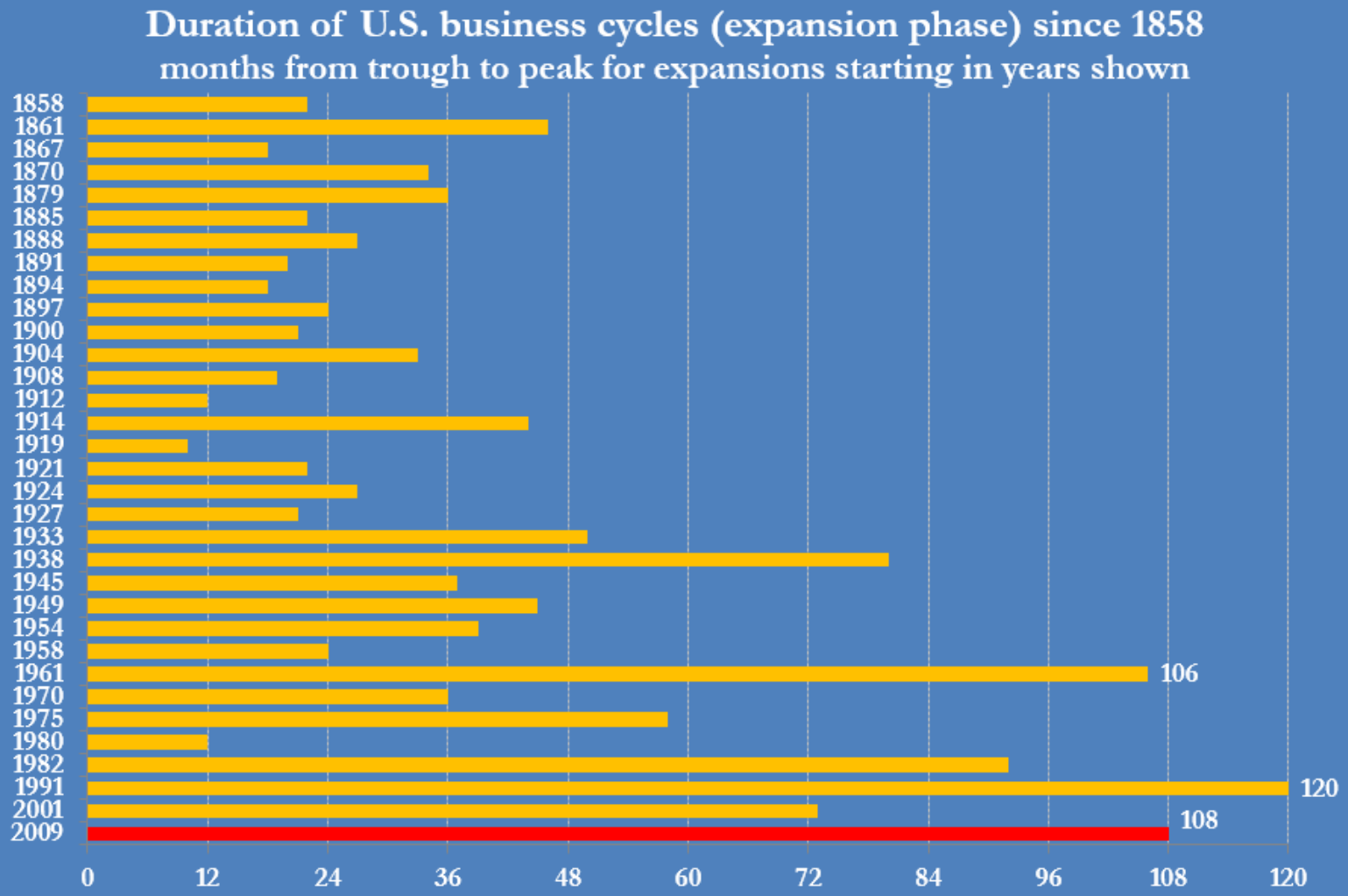
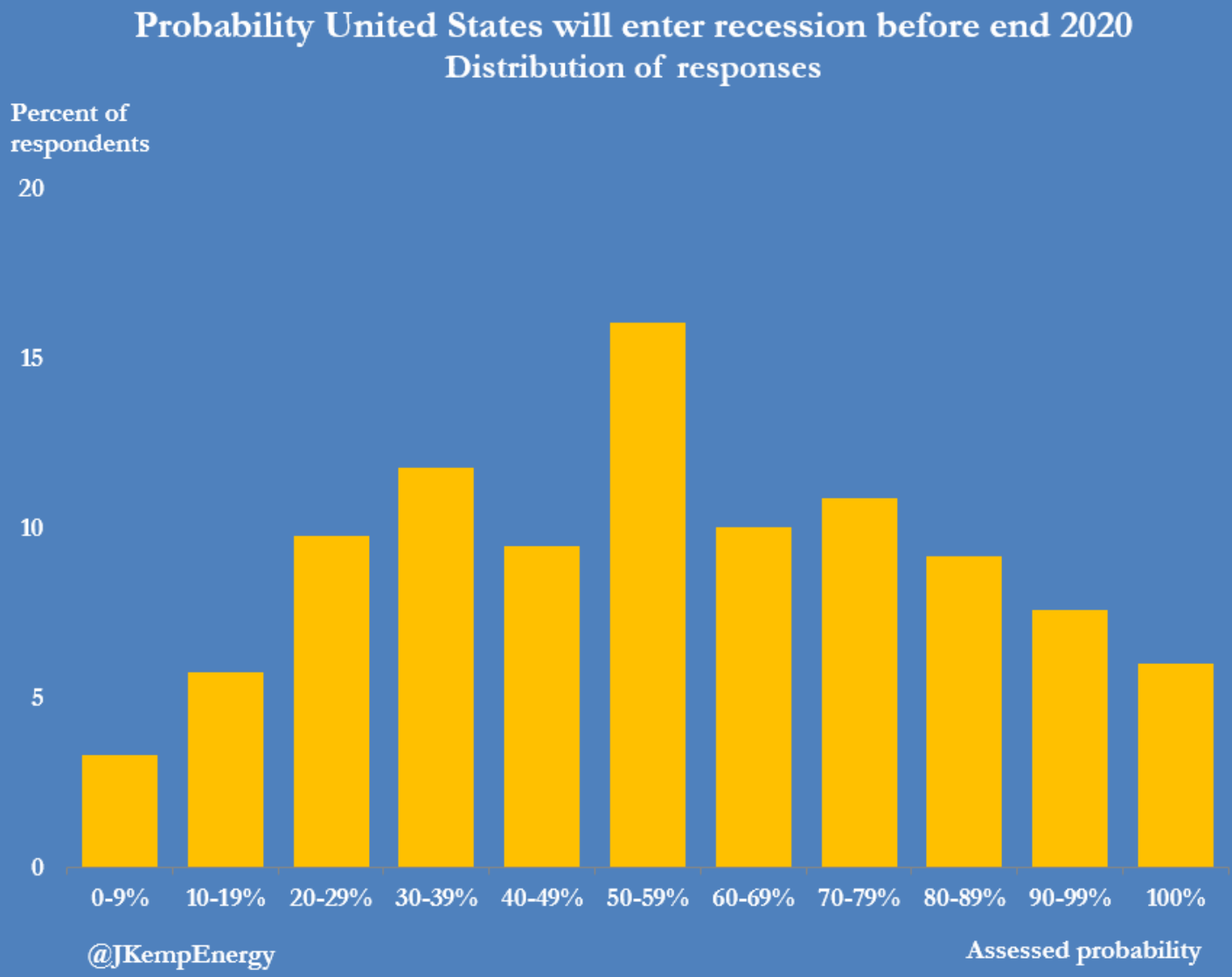
U.S. macroeconomy now at relatively late stage in cycle

Economic downturn in the advanced economies is key risk for oil in 2019-2021



Half of energy professionals expect recession before end 2020

Based on a survey conducted at the start of Apr



Warning from Rex

Predictions notoriously unreliable, better to focus on coping strategies

Former Exxon Mobil Chief Executive Rex Tillerson (2 March 2016):

"We've never been any good at predicting these [price] cycles, neither when they occur nor their duration. We don't spend a lot of time even trying.

"How the future is going to look, we take no particular view on it, other than to recognize that whatever it is today it will be different sometime in the future, and after that it will be different again.

"In my nearly 41 years [with Exxon], that's been my experience. I didn't learn anything about my ability to foresee that. I learned a lot about how you deal with it"

Oil industry through 2050

Long-term trends beyond the cycle of boom and bust

Projections are not forecasts

Long-term projections are very sensitive to small changes in assumptions

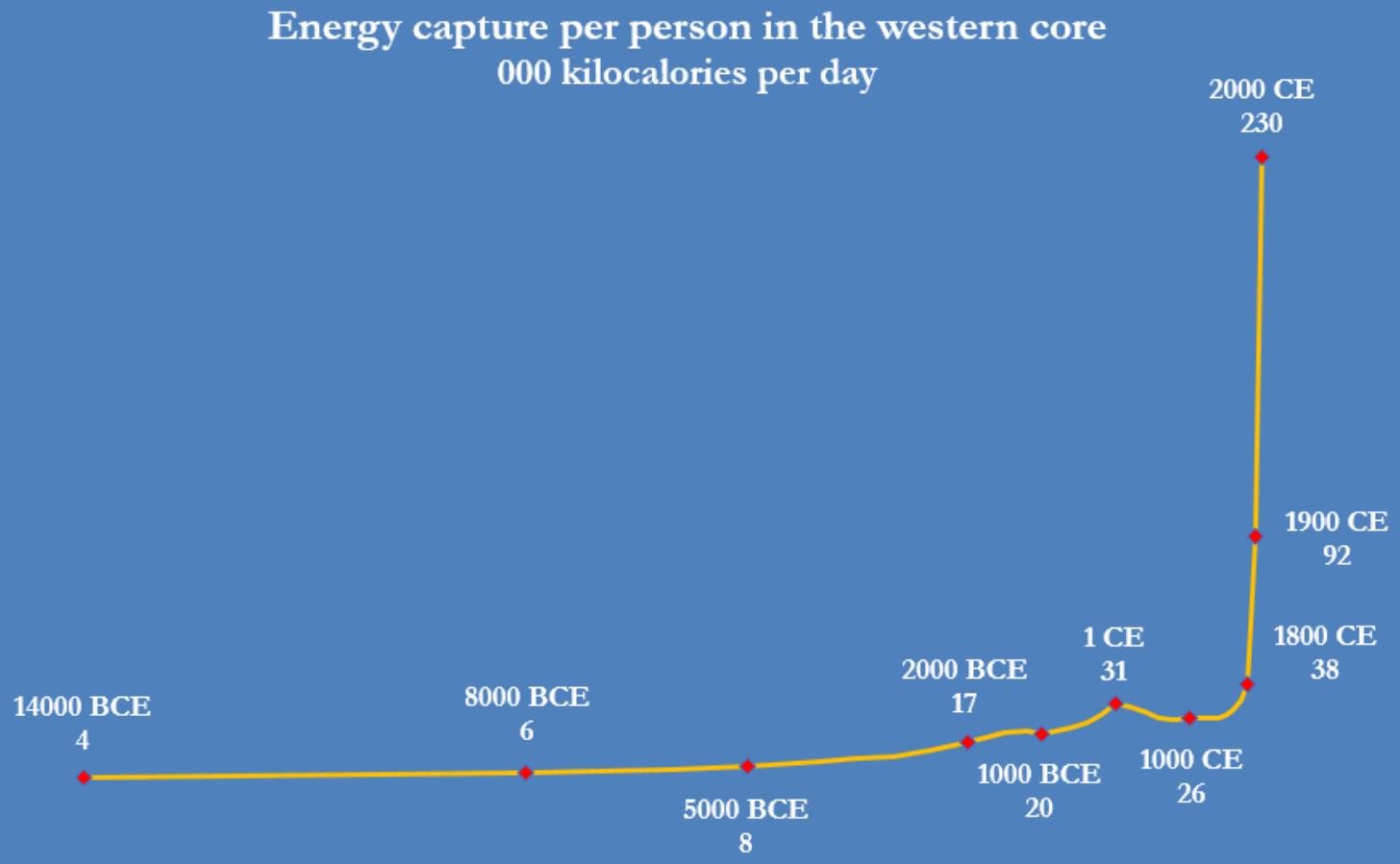
Need to avoid confusing cyclical position with long-term trends

We should be very humble about our ability to predict the future

What can we really say about the long-term outlook for the oil industry?

Growing energy use has been critical to social development

Social opportunities depend on harnessing large amounts of energy



Energy capture includes energy used for food, animal feed, in the home, commerce, agriculture, industry and transport. Humans need a minimum of around 2,000 kcal per day just to survive

Source: *Why the West Rules -- For Now*, Morris, 2011

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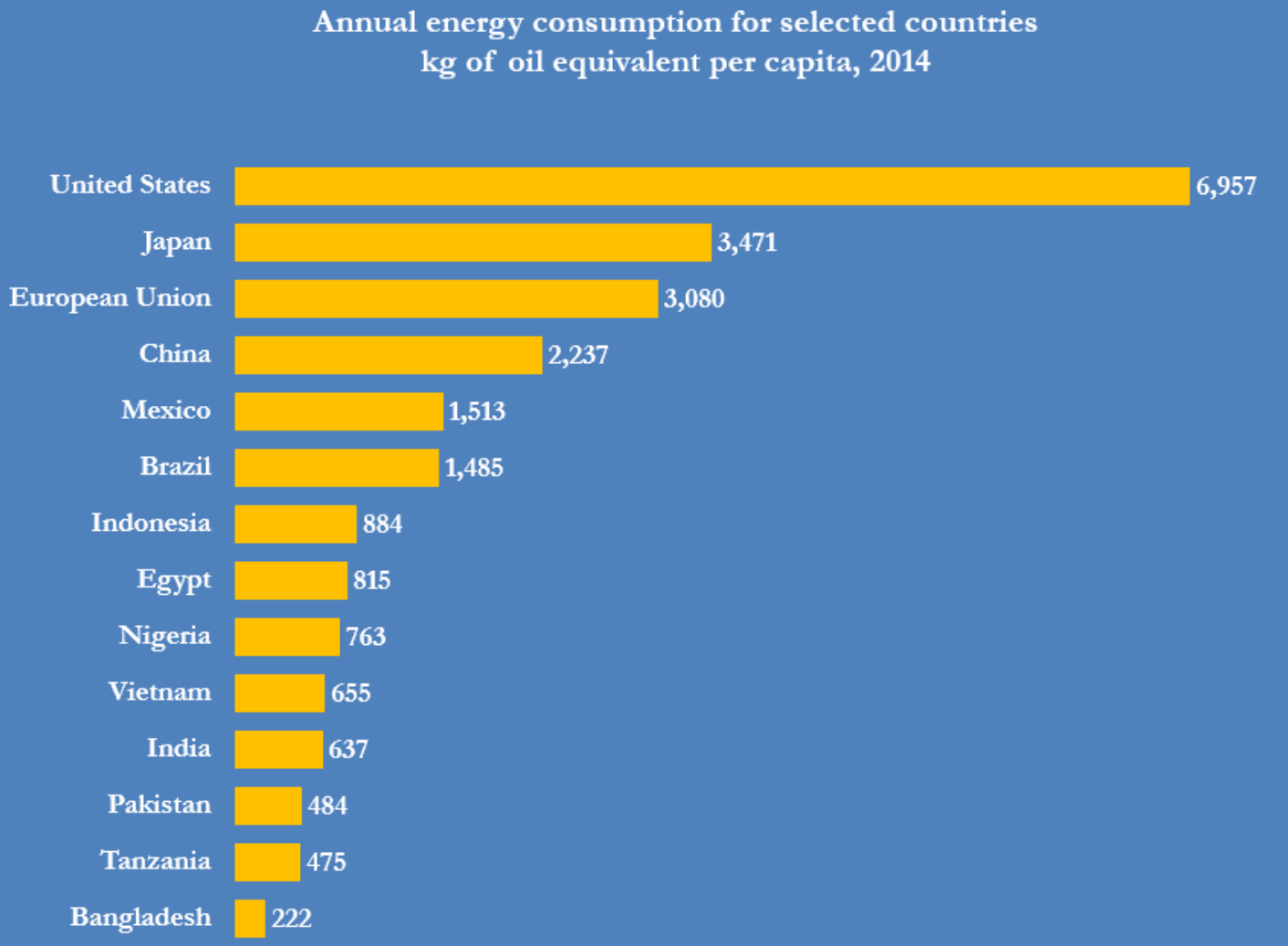
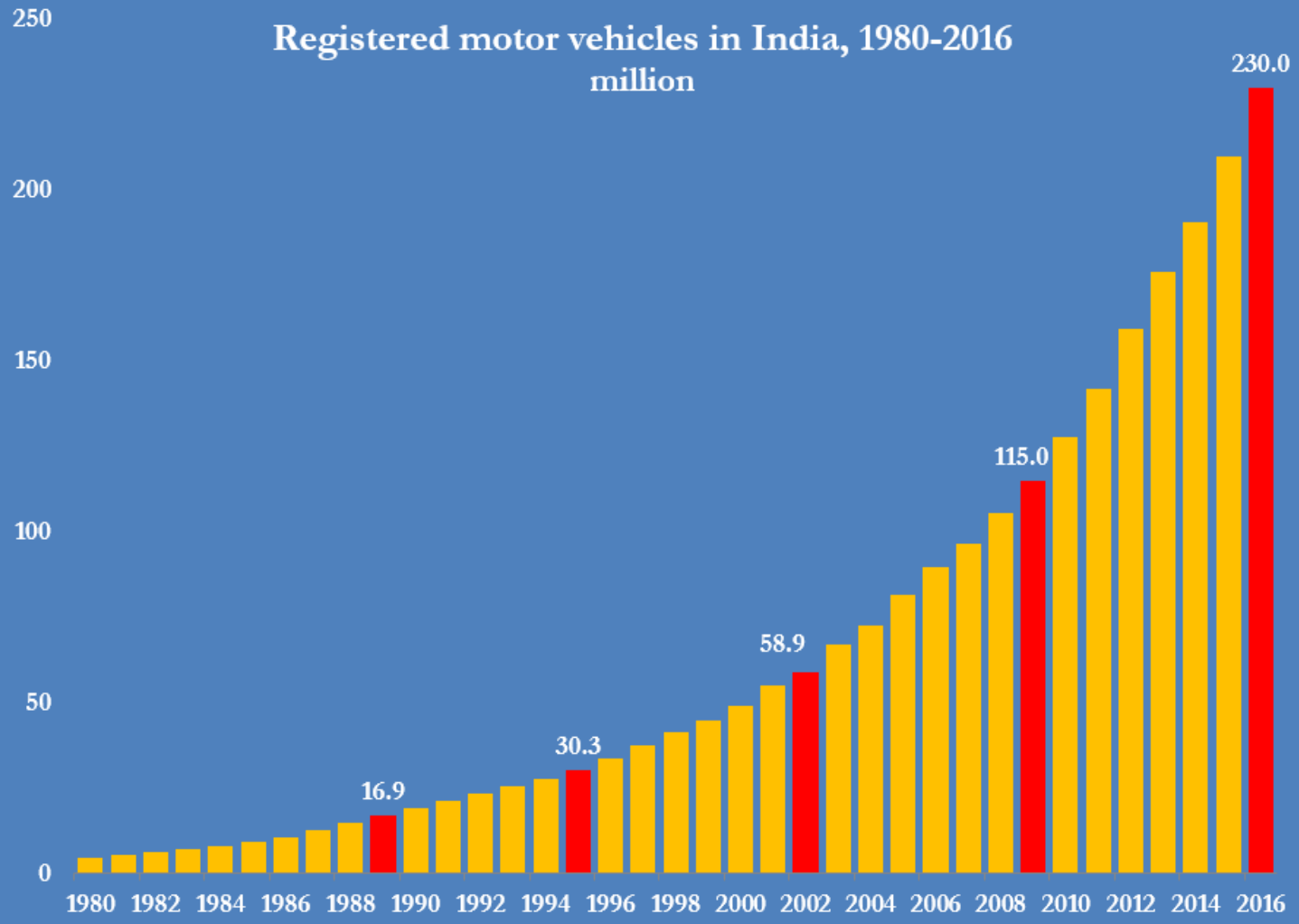
Enormous unmet energy demand in developing economies

World energy consumption will grow strongly through 2050



Growing middle class in emerging economies

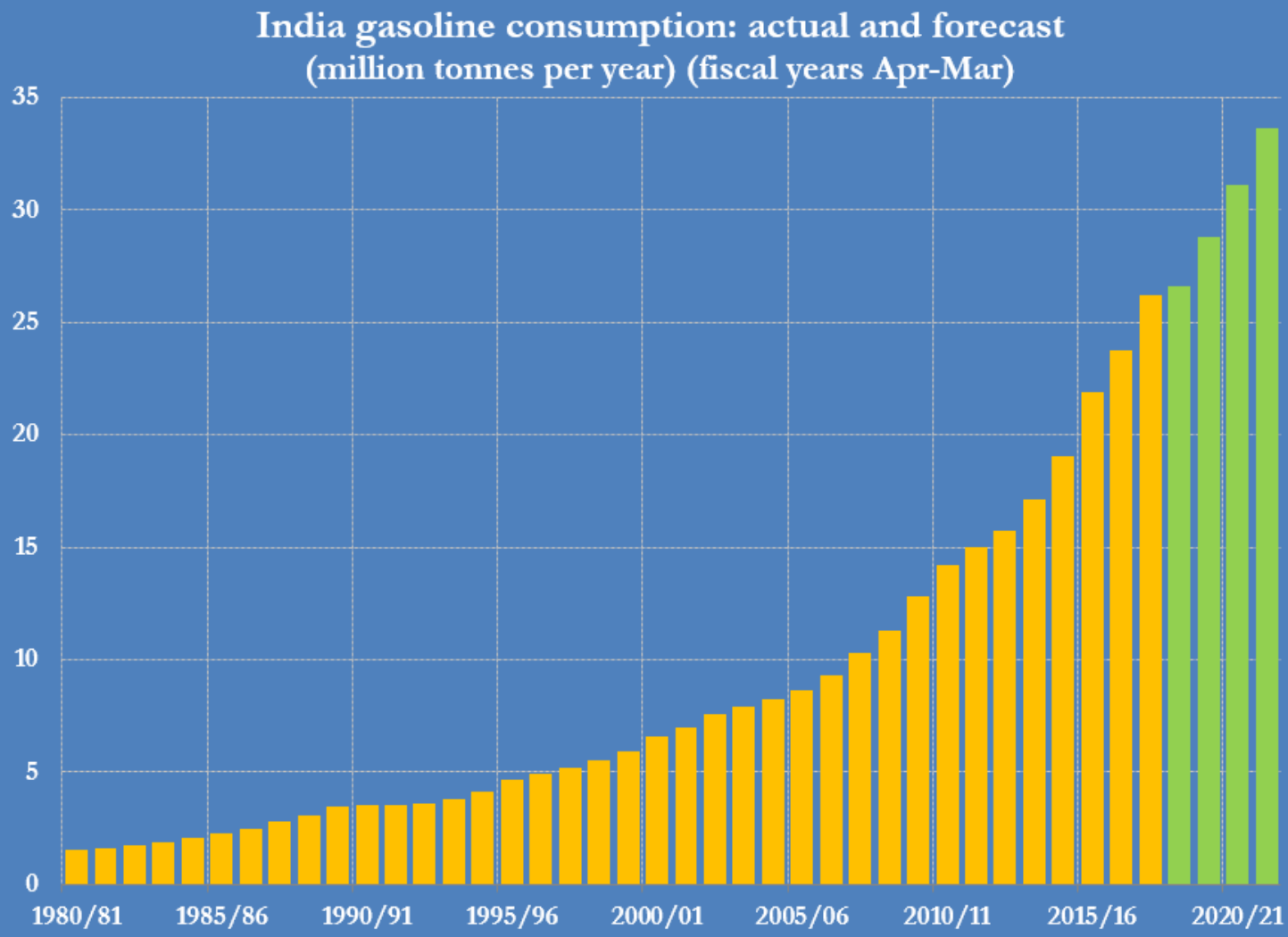
Consumers want same modern conveniences as their counterparts in OECD



Source: *Road Transport Yearbook (2015-16)*, Ministry of Road Transport and Highways, Government of India; @JKempEnergy

Economic development is unleashing enormous energy demand

Consumers want motorcycles, cars, refrigerators, airconditioners etc

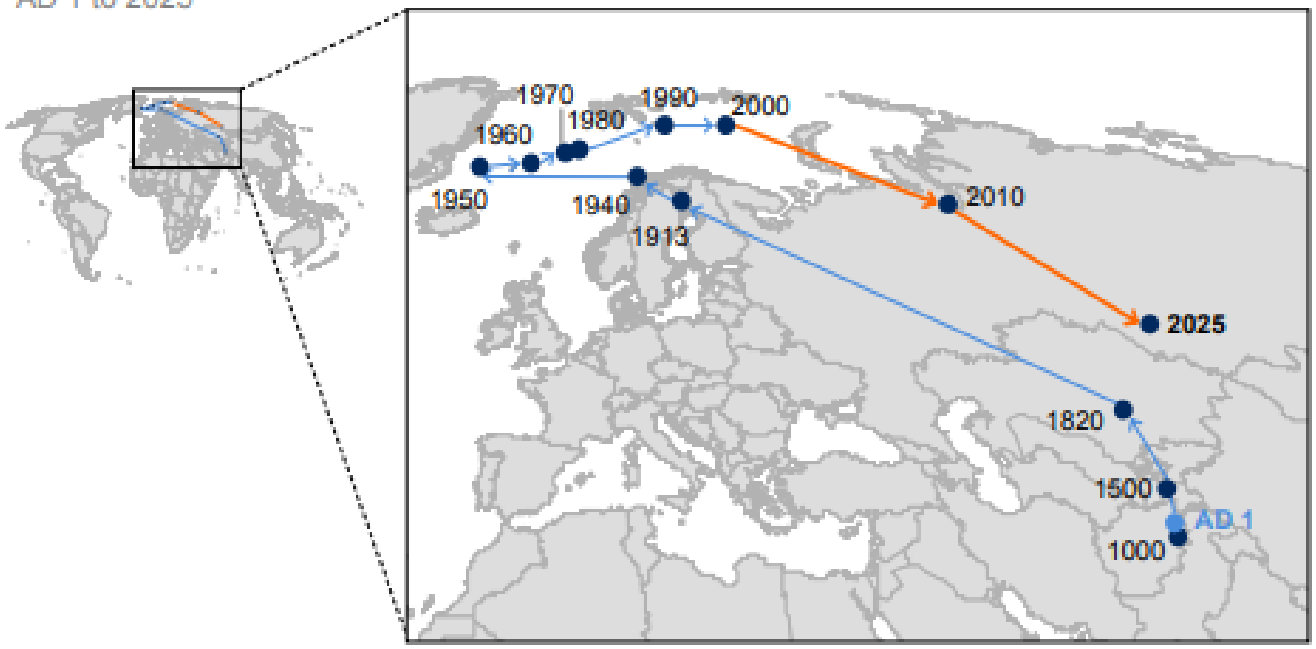


Centre of gravity in global economy is moving east to Asia

Centre of energy consumption will also move east

By far the most rapid shift in the world's economic center of gravity happened in 2000–10, reversing previous decades of development

Evolution of the earth's economic center of gravity[1]
AD 1 to 2025



1 Economic center of gravity is calculated by weighting locations by GDP in three dimensions and projected to the nearest point on the earth's surface. The surface projection of the center of gravity shifts north over the course of the century, reflecting the fact that in three-dimensional space America and Asia are not only "next" to each other, but also "across" from each other.

SOURCE: McKinsey Global Institute analysis using data from Angus Maddison; University of Groningen

Oil and the grand energy transition

Energy sources have become more convenient

Energy transitions:

Muscles
Wood/biomass
Coal
Oil
(Nuclear)
Natural gas
Renewables
Electrification

Transitions favour increased convenience

Cheaper
More efficient
More accessible
More secure

Transitions take a long time (50 years +) due to inertia in energy systems
Old energy sources tend to linger even as new ones emerge
Oil consumption set to remain very high through at least 2050
If renewables and electrification are to gradually replace oil they will have to compete on convenience

Some concluding thoughts

Offered with appropriate humility

Oil is a cyclical industry and no reason to think future will be different

Current cycle is at or beyond the half-way point

Focus will now shift to production growth and consumption restraint

Current rise in oil prices will create conditions for next slump

Biggest short term risk is crowded hedge fund positioning

Biggest medium run risk is U.S./global slowdown

Enormous unmet demand to support oil consumption in coming decades

Centre of oil consumption is moving east and south

Transition to other forms of energy will happen only if they offer greater convenience