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Commodity prices – is the bear market over?

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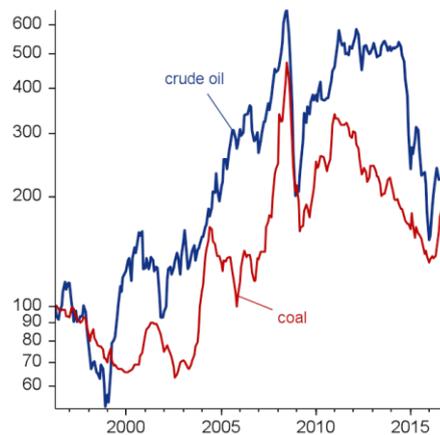
Commodity prices – is the bear market over?

SUMMARY

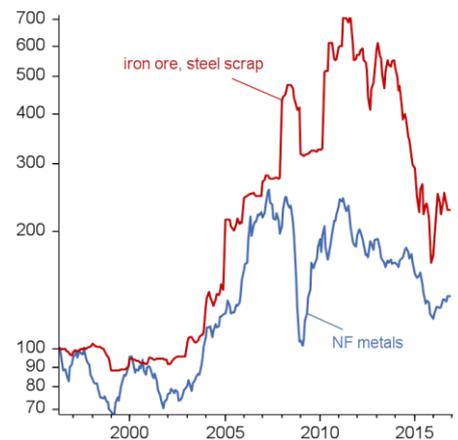
In the past few months commodity prices have bounced back on a broad front having in some cases fallen sharply in recent years. This drop is to be seen as part of a classic commodity cycle that was driven primarily by the dynamic growth in the emerging markets, especially in China. As demand and supply on the commodity markets are not very price sensitive in the short term, relatively minor fluctuations in demand can prompt sharp changes in prices. The higher prices stimulated higher investment and, with a certain delay, resulted in an expansion of supply. In the wake of the slide in prices, production has been being throttled back again and investment reined in for a while now. Ultimately the markets need prices that are low enough to stimulate demand but high enough to provide incentives for production.

Chart 1

Price indices energy commodities (USD base)
April 1996 = 100, logarithmic scale



Price indices industrial commodities (USD base)
April 1996 = 100, logarithmic scale



Sources: Thomson Reuters Datastream (HWWI), own calculations.

The oil market is continuing to adjust. Given signs of a decline in global overproduction, a renewed sharp downward correction in the oil price seems fairly unlikely. But with stocks still high, a further clear firming-up in the short term is unlikely and oil-price volatility is likely to remain elevated. The potential for a steep rise in the oil price in the medium term seems limited given that, as soon as prices are in the region of 50-65 USD/barrel, flexibly operating companies in the US unconventional oil industry will probably step up supply.

The individual markets for industrial commodities are still in various phases of correction. The aggregate price of the commodities analyzed here is likely to have bottomed out. But for the time being a marked rebound is not on the cards.

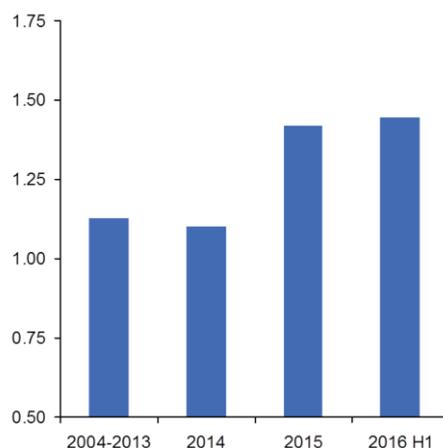
Oil market

So far this year the crude oil price has on balance firmed up, having fallen in January to an average of 31 USD/barrel (Brent), its lowest level for more than a decade. In recent months, amid sometimes erratic fluctuations, it has hovered in a range of 40-50 USD/barrel. Among other things, unscheduled production shortfalls in Venezuela (electricity outages), Nigeria (attacks on oil infrastructure) and Canada (forest fires) served to drive the price up. However, as production in Canada reverted to normal, this upward trend saw a swift and marked correction. Recurrent speculation about a shift in strategy at OPEC at times pushed prices back up to their 2015 average level (52 USD/barrel).

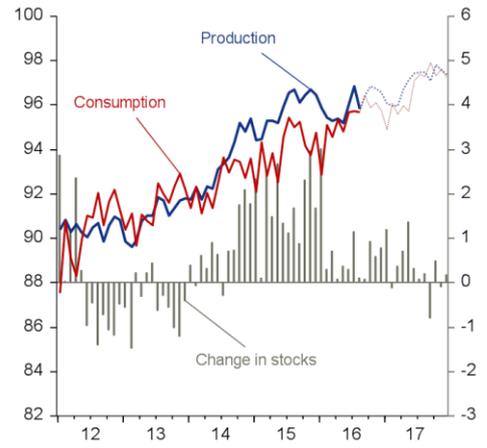
Excess supply is the hallmark of the situation on the oil market, even if overproduction is now no longer quite as high as a year ago. According to estimates by the US Energy Information Administration (EIA) global output still exceeded global consumption by around 0.75 million barrels per day (mbd) (Q2 2015: 2 mbd). As in 2015, the increase in oil demand this year is likely to top the average pace seen in 2004-2013, not least due to the fall in oil prices. Increased auto mileage and the current popularity of SUVs in the USA, for instance, point to such an effect. On the supply side OPEC, which since late 2014 has been focusing on maintaining or expanding market shares, can be expected to up output this year despite possible ongoing difficulties in Nigeria and Venezuela. Iran in particular will contribute to this addition output. Since the lifting of international sanctions the country has ratcheted up output sharply and has already made up the lion's share of the market share losses since the imposition of sanctions in mid-2012. The expansion of global oil output will nonetheless slow down as an adjustment outside of OPEC is now under way. Indeed, non-OPEC output looks set to decline this year.

Chart 2

Change in global oil demand (yoy, million barrels per day)



World oil production and consumption million barrels per day

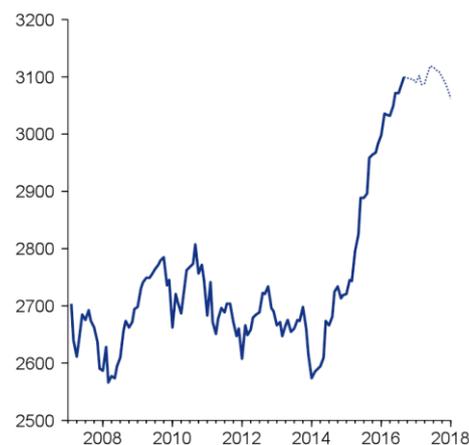
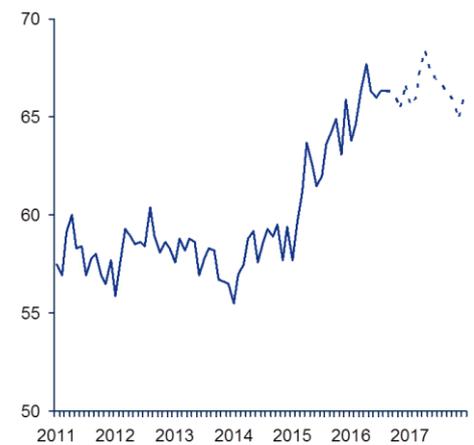


Sources: Thomson Reuters Datastream, forecasts by US Energy Information Administration (EIA), own calculations.

Chinese oil output, for instance, proves to be price responsive. The oil industry here is undergoing restructuring due to poor profitability. Sliding investment, the closure of costly oil fields and a greater focus on cheaper imports are the main hallmarks. US production has also been undergoing a marked adjustment. In August US crude oil output was an estimated 1.2 million barrels/day below the peak reached in April of last year (9.7 mbd). A deterioration in financing conditions for smaller companies has evidently contributed to output curbs.

Even if the growth in demand proves relatively robust, the demand/supply ratio is likely to improve only gradually. On top of this, very high inventories need to be reduced. In the short term high stocks are likely to limit the upward pressure on prices. According to the latest EIA projections, with an ongoing moderate expansion in supply and steady demand growth, there will be no need to resort to stocks until sometime in the course of next year. Expectations of an ongoing rundown in stocks could then trigger an accelerated increase in prices.

Chart 3

Commercial oil inventories OECD
(million barrels)Commercial oil inventories in relation
to oil consumption, OECD, (days)

Sources: Thomson Reuters Datastream, EIA, EIA forecasts.

In view of the drastic reduction in capital spending in the energy sector around the globe such an expectation is by all means on the cards. With the further cutbacks seen this year, leading oil suppliers have slashed their investment budgets by an estimated good 50% overall. At the same time it should be pointed out that the so-called “decline rate” (the reduction in output following a phase of rising output) is these days higher on average than it used to be in the 1980s for instance¹. So in the medium term supply growth could slow down appreciably, at least on the conventional oil side, with the result that, on the supply side, it will not be possible to react quickly enough to rising demand in the future.

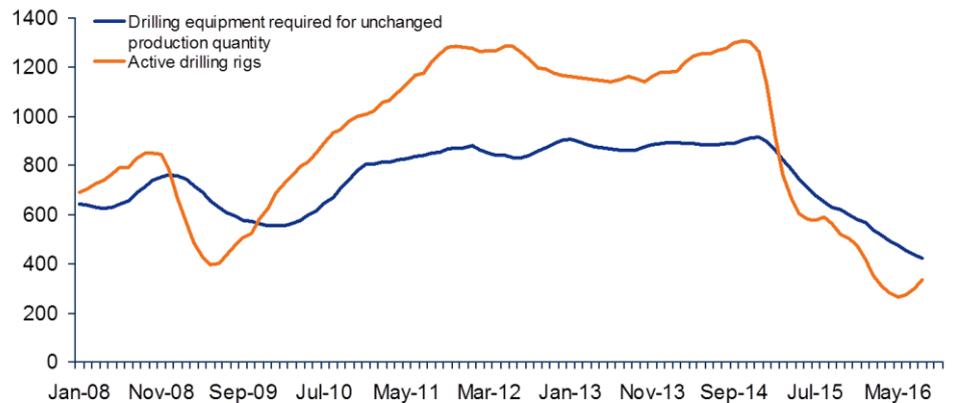
In order to rekindle higher investment, prices would presumably have to rise high enough to match the long-term break-even prices of tight oil output in particular in the USA where investment cycles are deemed to be substantially shorter². However, it has to date proved difficult to determine the break-even prices precisely enough. In the recent past in the USA considerable productivity gains in the extraction of unconventional oil have been made – thanks to technological refinements, output per rig has risen substantially. In addition, costs have been cut across the board. The recent rise in the number of active US rigs following the firming up of oil prices, which is not yet sufficient to keep output stable in the main production areas, suggests that the prices needed for profitable drilling is possibly no longer substantially above the prices seen in the past few months.

¹ Cf. Büyüksahin, B., Ellwanger, R., Mo, K., & Zmitrowicz, K. (2016). *Low for Longer? Why the Global Oil Market in 2014 is Not Like 1986*. Bank of Canada Staff Analytical Note 2016-11, July 2016.

² For unconventional oil extraction in the USA the delay between final investment decision and production launch is put at only around seven months compared with 3-4 years for conventional investment projects.- Also see Fattouh, B. (2016). *Adjustment in the Oil Market: Structural, Cyclical or Both?* Oxford Energy Comment, May 2016 (The Oxford Institute for Energy Studies).

Chart 4

USA: Active rigs vs required rigs for stable production*



* Figures refer to regions: Bakken, Niobrara, Permian, Eagle Ford, Haynesville, Utica, Marcellus. From 2011-2014 92% of increase in oil production was accounted for by these seven regions.

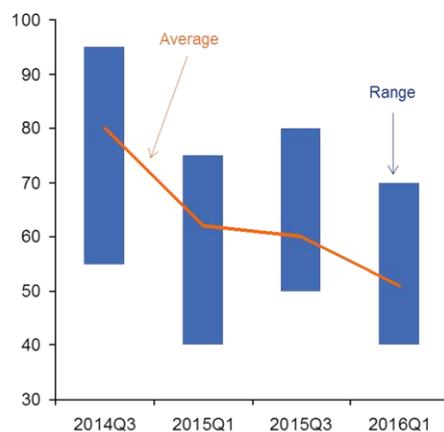
Sources: EIA Drilling Productivity Report (September 2016), own calculations.

One pointer for break-even oil prices is provided by the quarterly survey carried out by the Federal Reserve Bank of Kansas City (Energy Survey) of the oil firms operating in its administrative area. Every second quarter companies are asked what oil price is needed for drilling to be profitable. The figures since late 2014 clearly illustrate that the necessary oil price (WTI) has tended downwards and the range of figures has also narrowed (Chart 5, Page 6, left side). In the first quarter of this year the simple average of the companies³ questioned produced a price of 51 USD/barrel.

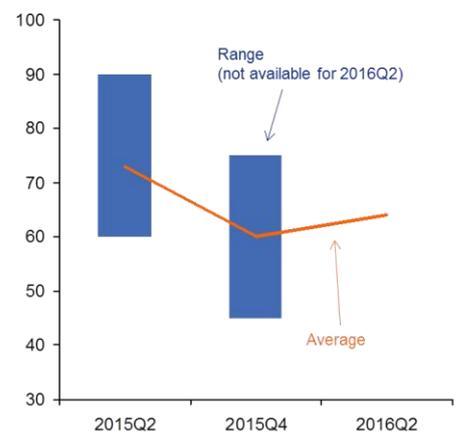
However, with these survey results two aspects in particular need to be taken into account. Firstly, the figures are not fully representative of overall US production. They relate primarily to oil production in the Niobrara region, which is less important than in the drilling areas Permian, Eagle Ford and Bakken. In addition, the question evidently relates to the profitability of the respective current production. With the slide in prices, companies have focused on the most productive rigs. In the event of a significant

Chart 5

Energy Survey: Break-even price for drilling (USD/barrel)



Energy Survey: Required price for substantial expansion in drilling activity (USD/barrel)



Source: Federal Reserve Bank of Kansas City, Energy Survey.

³ The survey does not provide output-weighted figures.

(re)expansion in output, companies would have to revert to “non-core-areas” again. This would tend to reduce efficiency and push up costs⁴.

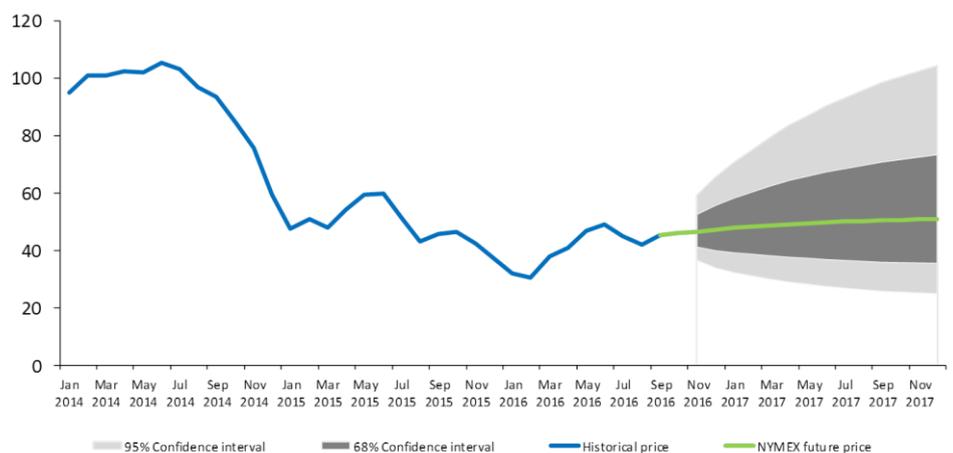
A pointer to the prices needed then could be provided by the question also posed every other quarter in the “Energy Survey”: What price of oil is needed for a substantial increase in drilling to occur? The survey for the second quarter 2016 produced an average price of 64 USD/barrel. Overall therefore there is much to suggest that the oil price level needed for profitable US drilling is above the average price seen so far this year, but that prices above 50 USD/Barrel already push notable sections of US production back in to the profit zone. Pinpointing the US supply curve exactly is nonetheless difficult. In view of the importance now attached to US suppliers as swing producers on the oil market, considerable uncertainty thus hangs over the outlook for oil prices.

This can also be seen by looking at the values of futures and options contracts, as observed in early September. Taking the prices for oil futures for delivery at various dates and the implicit volatility of options on these contracts, confidence intervals can be constructed as a measure of price uncertainty (Chart 6, page 7)⁵. A wide gap in the interval limits over time at a confidence level of 95% implies that the market was expecting prices to move in a range of around 25 USD/barrel to 104 USD/barrel at the end of 2017.

To gain a somewhat more differentiated view of price distribution, we can look at the implied probabilities deduced on the basis of option prices for a price listing below a set figure. With reference to the price of around 30 USD/barrel at the start of this year, the

Chart 6

Crude oil price (West Texas Intermediate) with confidence intervals*, in USD



* Calculations are based on option contracts(100% Moneyness) in the last 5 trading days prior to 1. September 2016.

Sources: EIA, Thomson Reuters Datastream, own calculations.

probability for a price below this reference value of around 0.5% for a due date in December 2106 climbs to around 10% for a due date in December 2017. Despite this increase, however, the bulk of the probability mass remains beyond the floor of 30 USD/barrel.

⁴ Also see Fattouh, B. (2016). a.a.0.

⁵ For the theoretical concept see: Short-Term Energy Outlook Supplement. *Energy Price Volatility and Forecast Uncertainty*. US Energy Information Administration. October 2009.

To sum up, here is our assessment of the outlook for oil prices:

- Given the signs of a decline in global overproduction, the potential for a renewed pronounced downward correction in the oil price towards its recent low has clearly lessened.
- Still high inventories represent an obstacle to any further firming up of oil prices and are likely to contribute to substantial oil price volatility for a while yet.
- Against the backdrop of marked cutbacks in energy sector investment, upward pressure on prices is likely to intensify once stocks need to be raided. This will probably not be the case until sometime in the course of next year.
- However, the potential for a steep rise in the oil price over the medium term appears limited since, as soon as prices approach 50-65 USD/barrel, flexibly operating unconventional producers in the US will probably step up supply.
- The uncertainties about future developments are not confined to supply-side factors alone, including for instance potential shifts in OPEC strategy. Ongoing innovations to boost energy efficiency as well as environmental regulations could serve to keep a lid on demand permanently. For instance, we might see substitution effects resulting from growing sales of electric vehicles in the years ahead. This would dampen demand for liquid fuels for road transport – one of the most important end uses for crude oil.

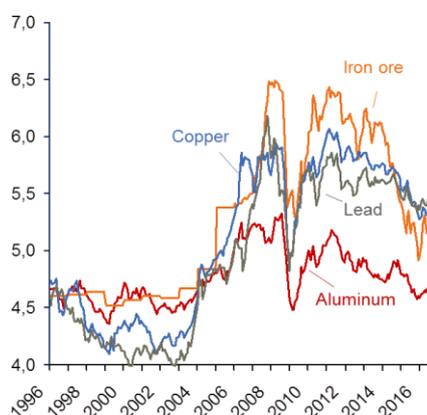
Non-ferrous metals and iron ore

Unlike in the case of crude oil, the correction in most industrial commodities already started in 2011.

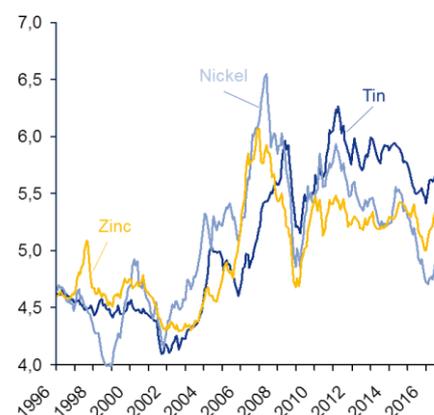
Chart 7

World market prices for metals and minerals

Monthly indices (1996=100)
logarithmized



Monthly indices (1996=100)
logarithmized



Sources: World Bank, own calculations.

We have compiled the World Bank's price data for non-ferrous metals and iron ore into one index in which the individual commodities are weighted equally and geometrically. In the first eight months of this year the weighted price of this commodity grouping was still a good 7% down on the 2015 average. Since 2011 the overall decline comes in at

around 44%. By way of comparison: The World Bank's "Metals and Minerals" index, in which the weighting of the listed commodities is based on the corresponding shares in exports of economies with low and middle income levels in the years 2002-2004, shows a similarly steep slide of just under 47% over the same period.

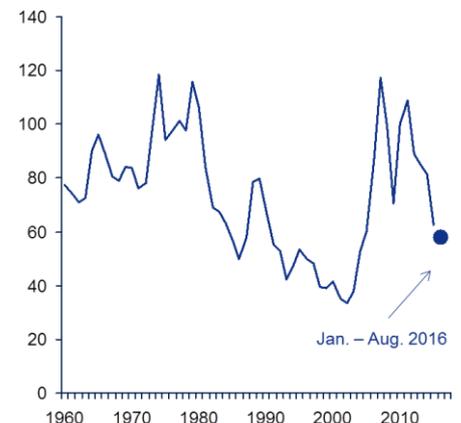
Chart 8

Price index metals & minerals*
annual data, index (2010=100), logarithmized



* The individual commodities (aluminum, copper, zinc, tin, nickel, lead, iron ore) are weighted equally in the index.

Price index metals & minerals, real**
annual data, (2010 =100)



** Commodity prices related to US consumer price index.

Sources: World Bank, own calculations.

Viewed over longer periods, the prices of many commodities tend to follow the general inflation trend, depicted here by the US consumer price index. In real terms (Chart 8, Page 8, right-hand side) it can be seen that the upswing in non-ferrous metals and iron ore came in the wake of an historic low.

The question as to the underlying trend in real commodity prices over the long term has long been controversial. In his comprehensive analysis of the long-term development of commodity prices, which covers a total of 40 commodities, Jacks⁶ reaches the following conclusions:

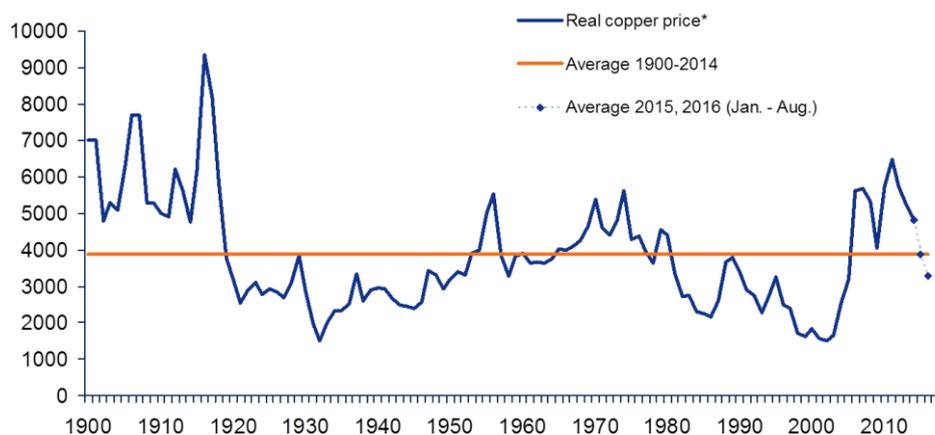
- The perception of the trajectory of real commodity prices over time is vitally influenced by how long a period is being considered and by how particular commodities are weighted when constructing commodity price indices: applying weights drawn from the value of production in 1975, the index based on 40 commodities shows a modest upward trend since 1900.
- A differentiation according to commodity categories makes sense here. The prices of so-called "commodities to be grown" tend not to keep up with the general trend in prices whereas "commodities in the ground" show a positive trend over the long term. However, this is largely due to the development in energy commodities.
- Pronounced commodity price cycles can be identified in which there are extended positive or negative deviations from these long-term trends.

⁶ Jacks, D. S. (2014). *From Boom to Bust: A Typology of Real Commodity Prices in the Long Run*. <http://viessmanncentre.ca/wp-content/uploads/2014/05/Jacks-neu.pdf>

A number of these aspects also apply to copper. The commodity enjoys a high weighting in almost all standard indices for industrial commodities. We turn to figures from the US Geological Survey (USGS), which provides data in real terms as well for the period 1900 to 2014.

Chart 9

Copper (USD/ton)



* Copper price related to US consumer price index. Reference year 1998.

Sources: US Geological Survey, World Bank, own calculations.

Over long time horizons the real copper price shows mean-reversion effects. This can be confirmed using a standard unit-root test (augmented Dickey-Fuller test). The long-term average of the real copper price thus provides a reference point for its longer-term trend.

- We extrapolated the development of copper prices from 2014 using figures from the World Bank (unlike partially with other non-ferrous metals and iron ore, notable discrepancies over the reference period from 1960 are not evident). In the first eight months of this year the real copper price was some 15% below its long-term average – so the adjustment seen since 2011 can be viewed as well advanced.
- The development from 1900 shows three protracted boom phases (followed by longer subdued phases). The boom phases are widely viewed as demand-led and linked to industrialization at the end of the 19th century, the reconstruction phase following the Second World War as well as the industrialization and urbanization of the Chinese economy since the 1990s. In addition, shorter cycles lasting 10-15 years are evident.

There is indeed plenty of evidence showing that, following the turn of the millennium, the commodity markets received a major fillip from the buoyant economic momentum in China⁷. Thanks to strong average growth of 10.6% a year in the period 2002 to 2011, the Chinese economy played the key role in pushing up global demand for commodities, particularly as commodity intensity proved to be relatively high given the country's level of development⁸. The surge in demand for metals was particularly pronounced. China's

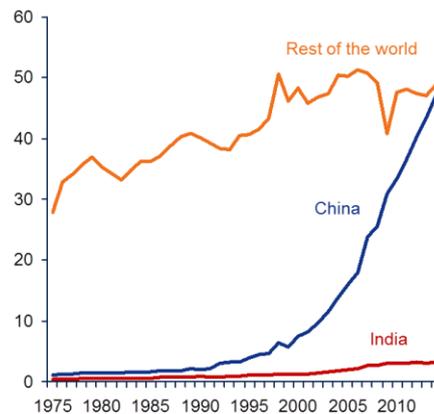
⁷ See e.g. Deutsche Bundesbank. *Zur Wachstumsverlangsamung in den Schwellenländern*. Monatsbericht, Juli 2015, S.15-32. – Gauvin, L., & Rebillard, C. (2013). *Towards Recoupling? Assessing the global impact of a Chinese hard landing through trade and commodity price channels*. Document de travail, No. 562, Banque de France, July 2015.

⁸ See Kruger, M., Mo, K., & Sawatzky, B. (2016). *The Evolution of the Chinese Housing Market and Its Impact on Base Metal Prices*. Bank of Canada.

share in global consumption of non-ferrous metals climbed from around 10% in the late 1990s to some 50% in recent years. These metals were deployed especially in the construction of infrastructure and in the building industry. By contrast, China's share in global oil consumption amounts to only 12%.

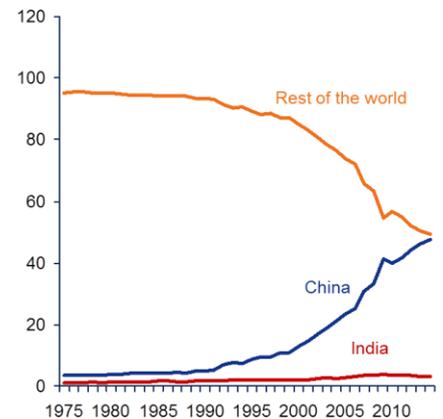
Chart 10

Consumption of NF metals* (1975-2014, in mill. tons)



* Included: Aluminum, copper, lead, nickel, tinn and zinc.

Share in global consumption of NF metals (%)



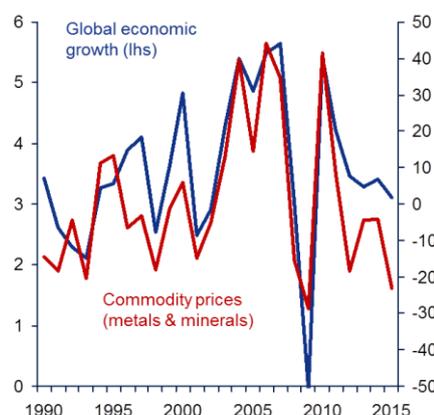
Sources: World Bank, own calculations..

The slowdown in Chinese economic growth since 2012 – coupled with the marked expansion in supply capacity on the corresponding markets – is likely to have been a key factor behind the slide in commodity prices in recent years. Economic developments in China are thus of major significance when estimating trends in commodity demand.

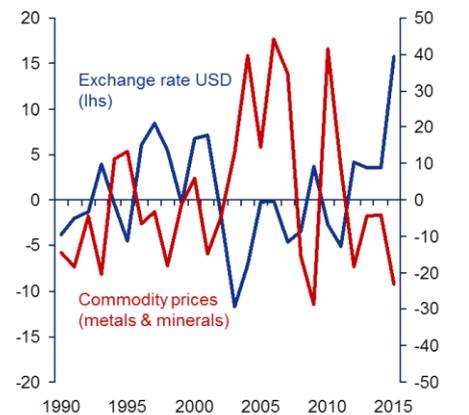
Nonetheless, the basic trends in the annual rates of change in the real commodity price index for non-ferrous metals and iron ore we constructed can be captured with the aid of global economic growth and the US dollar exchange rate.

Chart 11

Global economic growth* & commodity prices (% , yoy)



USD real effective exchange rate** & commodity prices (% , yoy)



* based on purchasing power parity.
** against major currencies

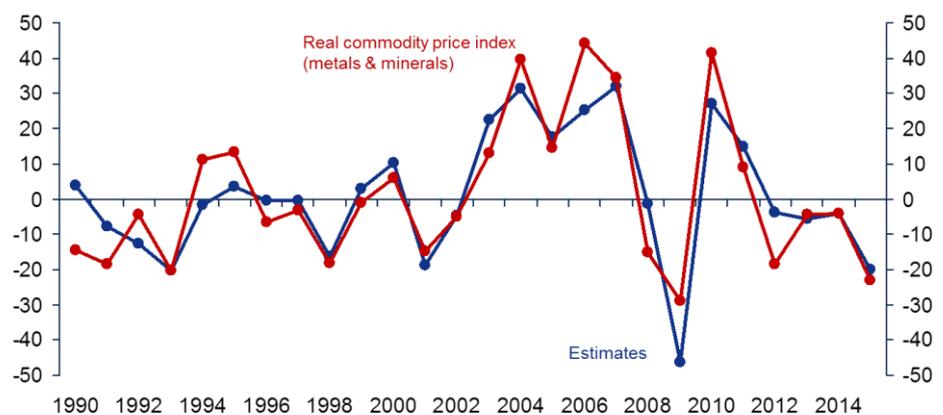
Sources: Thomson Reuters Datastream, own calculations.

Following Klitgaard und Wheeler⁹ we take as a yardstick for the rate of change in global output, which is said to reflect the fluctuating demand for intermediates in the form of non-ferrous metals and iron ore in the business cycle, global economic growth calculated using purchasing power exchange rates. This method of weighting lends greater importance to the emerging markets – i.e. also including China – than weightings based on market exchange rates. Moreover, the real effective exchange rate of the US dollar against currencies which (also) circulate widely outside their own currency zone (“major currencies index”) is taken into account. The striking negative relationship between the US dollar and commodity prices evident in the chart can be attributable to various factors. Among other things, it should be borne in mind that changes in the US dollar can induce shifts in demand and supply since many commodities are priced in US dollars. An appreciation of the dollar would make commodities in other currencies more expensive and hence restrain demand in these countries. At the same time, given higher export proceeds in their domestic currency, foreign commodity suppliers would have an incentive to increase supply. Together, this could contribute to a lower USD price for commodities¹⁰.

Overall, using this simple approach, a good 75% of the fluctuations in the annual rates of change in the real commodity price index for the period since 1990 can be captured. Although the start of the downswing phase in 2012 is understated, the scale of the slide in prices for 2013-2015 is captured fairly well. This is also true if we use the estimated coefficients for the period 1990-2011, i.e. compile an ex-post forecast of commodity price changes. According to our approach, the steep rise in the external value of the USD was the main factor behind the sharp drop in prices of this commodity category.

Chart 12

Real commodity prices (% , yoy)



Sources: Thomson Reuters Datastream, World Bank, own estimates.

On the basis of the estimated coefficients, with prospective global economic growth of 3%-3.1% (weighted by purchasing power parity) and a practically stable real effective USD exchange rate – from January to August it averaged a mere 0.5% above the average level for 2015 – a drop in the (real) commodity price index in the region of 4%-6% is on the cards.

⁹ Klitgaard, T., Wheeler, H. (2016). *What Tracks Commodity Prices?* Liberty Street Economics, March 21, 2016 (Federal Reserve Bank of New York).

¹⁰ In more detail: Akram, Q.F. (2009). *Commodity prices, interest rates and the dollar*. Working Paper 2008/12, Norges Bank.

Table 1

Commodity price changes on alternative combinations of global economic growth and real effective exchange rate of USD

		Economic growth (ppp weighted)									
		2.8	2.9	3	3.1	3.2	3.3	3.4	3.5	3.6	3.7
Real effective exchange rate (yoy, %) "major currencies"	-5	-2.6	-1.4	-0.2	1.0	2.3	3.5	4.7	5.9	7.2	8.4
	-4	-3.6	-2.4	-1.2	0.0	1.2	2.5	3.7	4.9	6.1	7.4
	-3	-4.7	-3.4	-2.2	-1.0	0.2	1.4	2.7	3.9	5.1	6.3
	-2	-5.7	-4.5	-3.2	-2.0	-0.8	0.4	1.7	2.9	4.1	5.3
	-1	-6.7	-5.5	-4.3	-3.0	-1.8	-0.6	0.6	1.9	3.1	4.3
	0	-7.7	-6.5	-5.3	-4.1	-2.8	-1.6	-0.4	0.8	2.1	3.3
	1	-8.7	-7.5	-6.3	-5.1	-3.8	-2.6	-1.4	-0.2	1.0	2.3
	2	-9.8	-8.5	-7.3	-6.1	-4.9	-3.6	-2.4	-1.2	0.0	1.2
	3	-10.8	-9.6	-8.3	-7.1	-5.9	-4.7	-3.4	-2.2	-1.0	0.2
	4	-11.8	-10.6	-9.4	-8.1	-6.9	-5.7	-4.5	-3.2	-2.0	-0.8
	5	-12.8	-11.6	-10.4	-9.1	-7.9	-6.7	-5.5	-4.3	-3.0	-1.8

* The blue area marks combinations of economic growth and the real effective exchange that lead to practically no change in the real commodity price index.

With growth firming up towards 3.3% to 3.4% and the US dollar exchange rate unchanged real commodity prices should be more or less stable and rise somewhat in nominal terms next year. Although the further normalization of monetary policy in the US could add wind to the sails of the US dollar again, the Fed, with an eye on the impact on inflation and overall economic activity, is likely to tighten only cautiously in order to avoid an unwanted strengthening of the dollar. Moreover, international investors are likely to grow more wary of the ballooning US current account deficit.

Overall, the downward potential for the batch of commodities reviewed here now looks limited. However, the individual markets are all in different stages of adjustment. For instance, the on balance significant rebound in iron ore prices seen so far this year is unlikely to be maintained. Despite the cutbacks in sectors with high production costs, the overall supply of iron ore is likely to increase further, thus exerting renewed downward pressure on prices¹¹. By contrast, numerous mine closures have supported the recovery in zinc prices. Supply-side developments, which have buoyed the turnaround seen in nickel and tin prices, are also the upshot of government intervention in the Philippines and in Indonesia¹².

¹¹ Cf. Reserve Bank of Australia, *Statement on Monetary Policy*, August 2016.

¹² Government intervention in the Philippines entails measures to ensure adherence to stricter environmental directives by the nickel mining industry (see: Resources and Energy Quarterly June 2016. Australian Government, Department of Industry Innovation and Science.). In Indonesia, the leading exporter of tin, the government is clamping down on illegally operated mines and limiting the issue of new export permits.

These assessments are, as always, subject to the disclaimer provided below.

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The statements contained herein may include prospects, statements of future expectations and other forward-looking statements that are based on management's current views and assumptions and involve known and unknown risks and uncertainties. Actual results, performance or events may differ materially from those expressed or implied in such forward-looking statements.

Such deviations may arise due to, without limitation, (i) changes of the general economic conditions and competitive situation, particularly in the Allianz Group's core business and core markets, (ii) performance of financial markets (particularly market volatility, liquidity and credit events), (iii) frequency and severity of insured loss events, including from natural catastrophes, and the development of loss expenses, (iv) mortality and morbidity levels and trends, (v) persistency levels, (vi) particularly in the banking business, the extent of credit defaults, (vii) interest rate levels, (viii) currency exchange rates including the euro/US-dollar exchange rate, (ix) changes in laws and regulations, including tax regulations, (x) the impact of acquisitions, including related integration issues, and reorganization measures, and (xi) general competitive factors, in each case on a local, regional, national and/or global basis. Many of these factors may be more likely to occur, or more pronounced, as a result of terrorist activities and their consequences.

NO DUTY TO UPDATE

The company assumes no obligation to update any information or forward-looking statement contained herein, save for any information required to be disclosed by law.