

UBS Global I/O®: Miner's Price Review

Breathing Easier

Equities

Global
Mining & Metals

Are we experiencing a seasonal or structural lift in sentiment or prices?

Seasonal tightness as expressed through restocking of inventory & elevated trade flows has underwritten a lift in sentiment & prices. For now commodity exposed miners are breathing a little easier. But for price upside to be sustained, better underlying demand is needed. There have been green-shoots in China's property market, infrastructure activity has lifted & policy makers have signalled a more pro-growth stance. But we are yet to be persuaded and await further evidence before adopting a more positive stance.

What are the key signals to watch?

For now we are not convinced the case exists for a turning point in China's commodities consumption pattern. What could make us change our view? Firstly China's property sales & construction activity sustaining the prints of Jan/Feb in Mar-May would prompt a rethink. Broad & sequential improvements in fixed asset investment & industrial production would also run counter to our view. Rapid US rate tightening if combined with better global economic growth momentum would signal solid commodities demand without a major headwind to prices from USD strength. Oil price strength and correlation to other prices is also needed to support reflation.

Our top commodity picks remain those advanced through the cycle

We continue to favour commodities that are more advanced in facing the cyclical headwinds. Enacted supply shuts may drive further tightness & price upside in zinc & alumina. Nickel is also a standout candidate for supply-cut price upside, this is yet to feature. Elsewhere beware restarts of idle capacity could cap price strength for some including Manganese & Iron Ore. We forecast a declining iron ore price & it's among our least preferred commodities. But it is also a very consensus trade. If China's property recovery were to surprise on the upside, iron ore prices are most leveraged.

UBS View: Neutral stance toward the sector

We adopt a neutral stance toward the sector pending further Chinese commodity demand evidence. UBS' top mining equity picks are laid out in our first global mining investment strategy piece, [Can a Leopard \(sentiment\) Change its Spots?](#), published concurrently with this review.

Figure 1: UBS Commodity Price forecasts – summary of changes

Commodity	2016	2017E	2018E	2019E	2020E	LT real
Copper (US\$/lb)	204(195)	210(nc)	260(nc)	300(nc)	330(nc)	295(nc)
Alum. (US\$/lb)	72(nc)	75(nc)	80(nc)	85(nc)	90(nc)	80(nc)
Nickel (US\$/lb)	4.2(4.3)	5(nc)	6(nc)	7.5(nc)	8.9(nc)	7.9(nc)
Zinc (US\$/lb)	86(85)	80(nc)	80(nc)	95(nc)	105(nc)	98(nc)
Gold (US\$/oz)	1225(nc)	1250(nc)	1300(nc)	1325(nc)	1400(nc)	1300(nc)
Platinum (US\$/oz)	985(1080)	1080(1200)	1295(1350)	1500(nc)	1600(1700)	1600(nc)
IO (fines; US\$/t cfr)	45(nc)	45(47)	52(nc)	58(nc)	62(nc)	55(nc)
Mn Ore (US\$/dmu cfr)	2.7(2.4)	3.4(nc)	3.9(nc)	4.2(nc)	4.5(nc)	4(nc)
HCC (US\$/t fob)	84(nc)	89(nc)	95(nc)	105(nc)	119(nc)	105(nc)
Thermal (US\$/t fob)	55(nc)	56(nc)	57(nc)	58(nc)	63(64)	55(nc)
AUD (US\$)	75(72)	76(72)	76(73)	75(74)	75(75)	75(nc)

Source: UBS Research; nc=nc; iron ore prices 62% Fe equ; thermal coal is spot.

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UBS Research THESIS MAP MOST FAVORED

LEAST FAVORED

Zinc, Gold, Alumina, Nickel**Manganese, Copper, Iron Ore, Mineral Sands**

PIVOTAL QUESTIONS

Q: Will better Chinese demand support prices when seasonal tightness eases?

We believe much of the recent rally in commodity prices reflects positioning ahead of peak seasonal Chinese construction in 2Q16, plus a hope that China will stimulate property and infrastructure construction to meet 2016 GDP targets of 6.5%-7%. Property data for Jan&Feb-16 was better than expected, infrastructure too. But it needs to sustain into & beyond 2Q16 to support prices.

Q: Are producers doing enough to rebalance markets in the face of weaker demand?

Recent evidence here is mixed, with more constructive reactions observed in markets more advanced through the cycle. Coal supply (trade) continues to track demand lower, iron ore too. Copper mine supply has responded dynamically to price falls late 2015 & early 2016. At the other end of the spectrum, nickel and aluminium have been agonizingly slow to respond until relatively recently.

Q: Are cost curves still deflating?

Oil reflation and US dollar weakness has eased deflationary tailwinds across the industry. Yet, intense focus remains on cutting costs and boosting productivity to defend margins. Prospects for further deflation vary by commodity, with strongest prospects in commodities less advanced in the rebalancing cycle. Copper stands out here. A relative lack of further substantive cost cutting potential limits cost downside from here in met & thermal coal, nickel, aluminium and iron ore.

UBS VIEW

Neutral commodities: We adopt a neutral stance toward the mined commodity sector pending further evidence on 1) Chinese property & infrastructure construction prospects, 2) ongoing supplier cuts, 3) strong oil price and weaker US dollar reflation pressures. We note a neutral stance represents a sequential positive step relative to underweight.

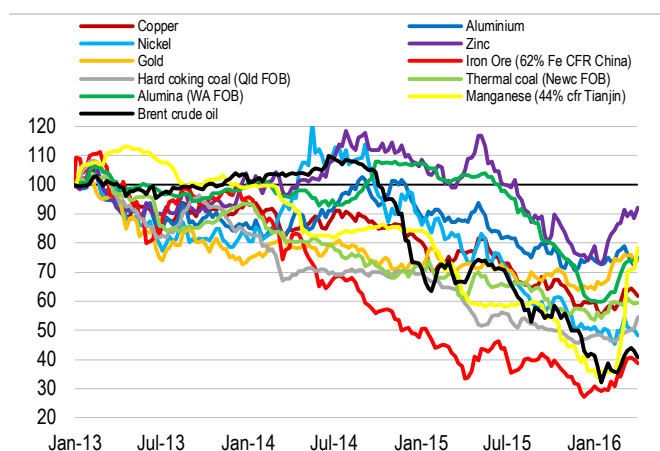
EVIDENCE

Highlighting the signals that matter on demand, supply & costs: China's property & infrastructure construction through 1H16 will be critical. So too global trade volumes, manufacturing sentiment and US Fed interest rate normalization path expectations. Ongoing producer & trade cuts are needed to rebalance many markets. Meanwhile, oil and US dollar trends are critical for costs.

WHAT'S PRICED IN?

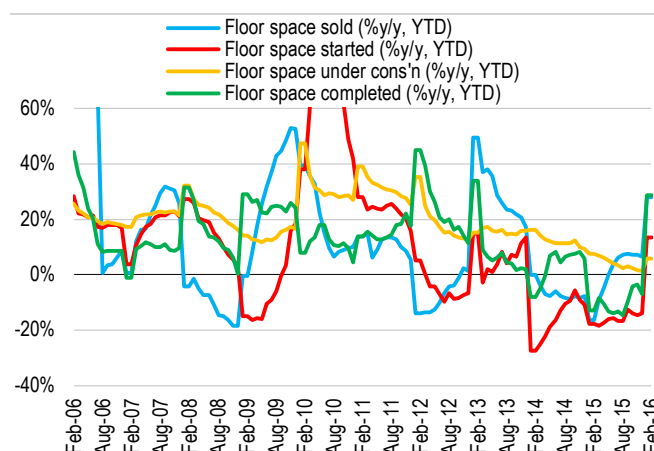
Mostly an unsustainable industry price/margin environment: Most spot commodity prices see a third to half of producers losing cash. This is not a sustainable situation for the long term. But large scale industry losses are likely to continue to be a market feature in 2016 until shuts are made to rebalance markets, or we see an unexpected lift in demand growth.

Figure 2: Commodity price performance



Source: Bloomberg, UBS Research.

Figure 3: China property signals

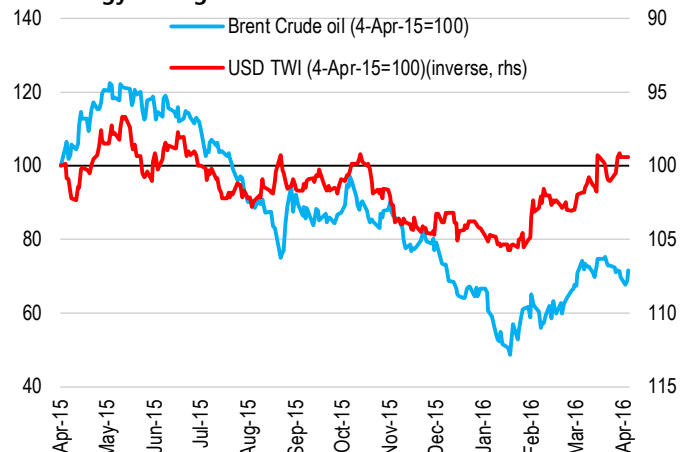


Source: CEIC, UBS Research.

OUR THESIS IN PICTURES

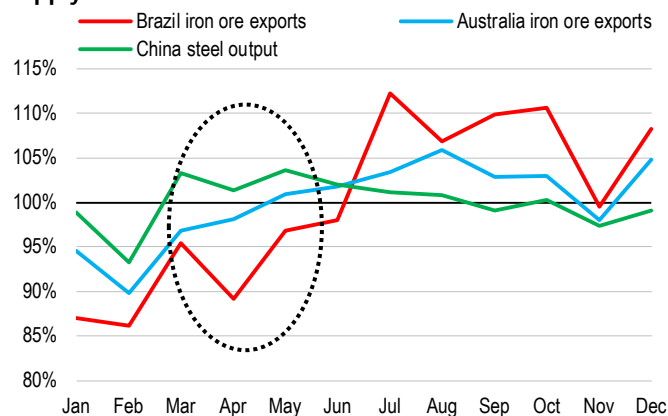
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Oil/energy strength and USD weakness => reflation



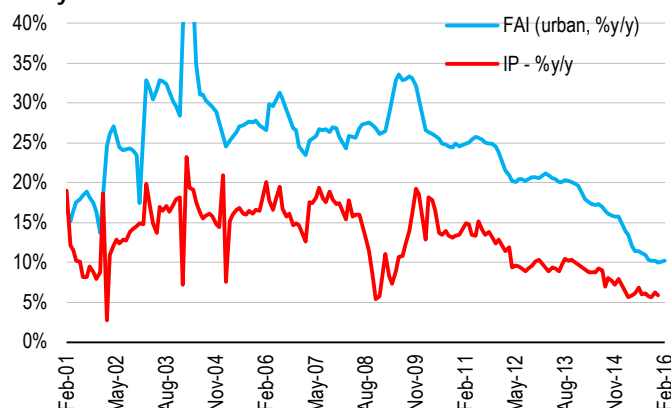
1) Rising oil prices (energy costs) and a weaker US dollar thanks to the UD Fed moderating rate normalisation path expectations are putting in place reflation pressures; cost curves are no longer deflating

Seasonal patterns in Chinese steel output and iron ore supply



2) Seasonality is unquestionably partly responsible for the recent lift in prices. Firmer underlying demand needs to pull through from 2Q16 to offset the usual seasonal unwind and sustain pricing

Speculators and prices now imply better Chinese growth this year



3) Participants have formed a more positive China growth narrative since the start of the year, resulting in short covering, long positioning and an expectation more "build" stimulus will come from China's government. We remain yet to be convinced.

Sources for exhibits above: China NBS, WSA, Platts, Metal Bulletin, Bloomberg, UBS Research

Q: Will better Chinese demand support prices when seasonal tightness eases?**UBS VIEW**

We believe much of the recent lift in commodity prices reflects a recalibration of near term views towards the Chinese economy and commodity demand in particular. Short covering ensued and various participants appear more comfortable with a neutral / more positive stance toward commodities than only three months earlier.

Usual seasonal tightness as expressed through seasonal inventory and demand flows is underwriting the lift in sentiment and prices for now. But a real lift in underlying demand will be needed through and beyond 2Q16 to support prices into 2H16. We are not convinced the case exists for this scenario at this time and adopt a neutral stance toward the sector pending further Chinese commodity demand evidence.

EVIDENCE

China's property sector has had a strong start to 2016; all of floor space construction starts & total floor space under construction are now well into positive y/y growth – partly as a result of base effects from early last year. Infrastructure spend got off to a solid start in 2015 too.

Yet we are cautious here. China's labour market remains sound. Incomes continue to grow solidly – albeit slower than in recent history. Each percentage point of GDP growth now creates 1.9 million jobs – meaning 5.5% GDP would be sufficient to meet the 10 million new urban job target for 2016. We believe additional stimulus from here is likely to be directed toward more labour intensive services and consumer sectors, rather than over indebted and over capacity heavy industry, manufacturing and property sectors.

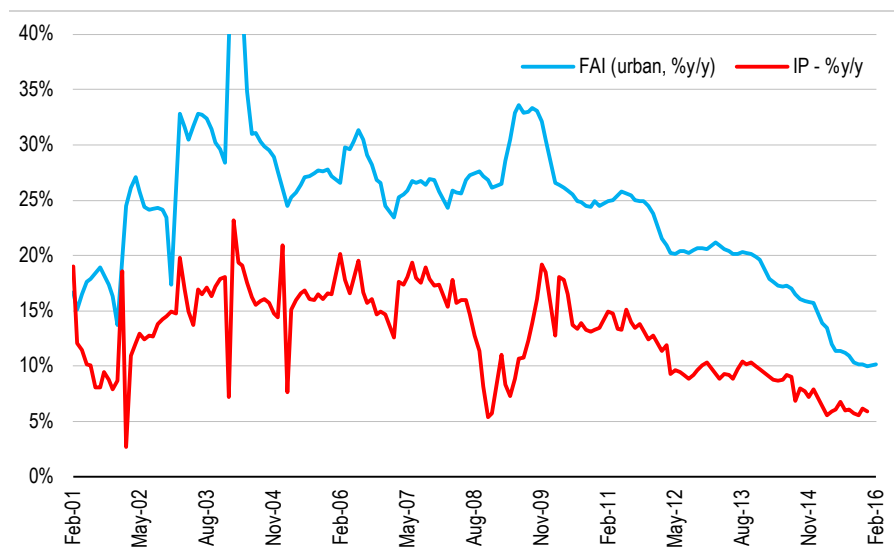
WHAT'S PRICED IN?

A pick up in infrastructure and property construction reflecting hope that i) China's government will need to stimulate the economy to reach 6.5-7% GDP growth, and ii) that a meaningful portion of new stimulus will be directed to construction.

Has China's commodity-intensive growth found a floor?

- China's commodity intensive activity, as measured by growth in fixed asset investment (FAI) and industrial production (IP) has been slowing for several years now, consistent with tail impacts of the 2009-10 stimulus and China's shift away from relatively commodity intensive investment & construction, and towards relatively commodity-light services & consumer oriented growth.

Figure 4: China fixed asset investment & industrial production - %y/y YTD

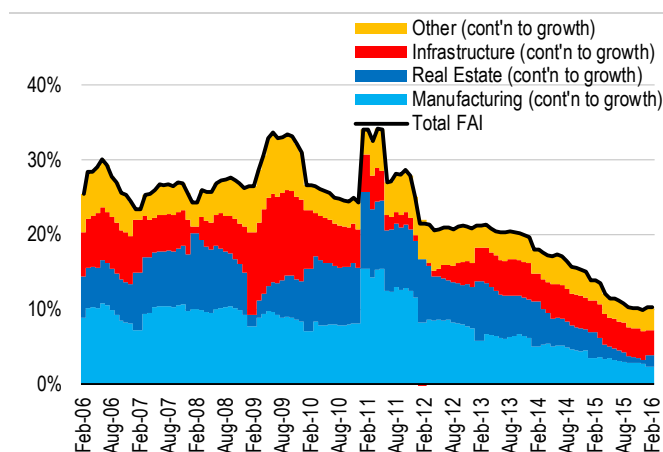


Source: China NBS, Bloomberg, UBS Research.

Fixed asset investment growth stabilises as real estate recovers

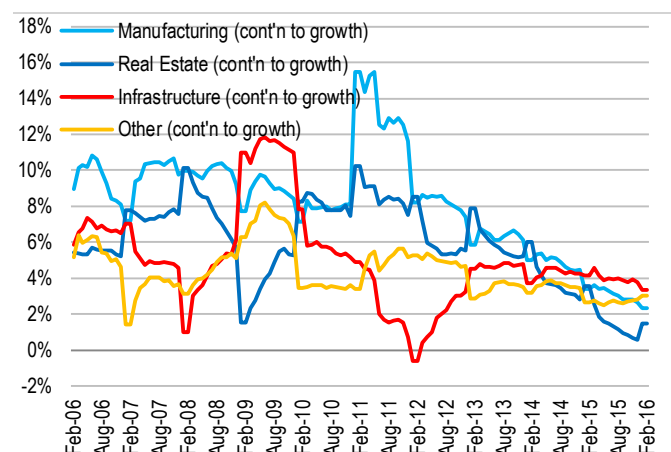
- Overall y/y growth in fixed asset investment stabilised early in 2016 as real estate FAI bounced higher from 2H15 lows as property sector activity accelerated in Jan&Feb-16. The stabilisation in overall FAI occurred despite slower growth in manufacturing and infrastructure categories, notwithstanding substantial government policy support for the latter.

Figure 5: China FAI – RMB cont'n to growth – key segment



Source: CEIC, UBS Research.

Figure 6: China FAI - %pt cont'd to growth – key segment



Source: CEIC, UBS Research.

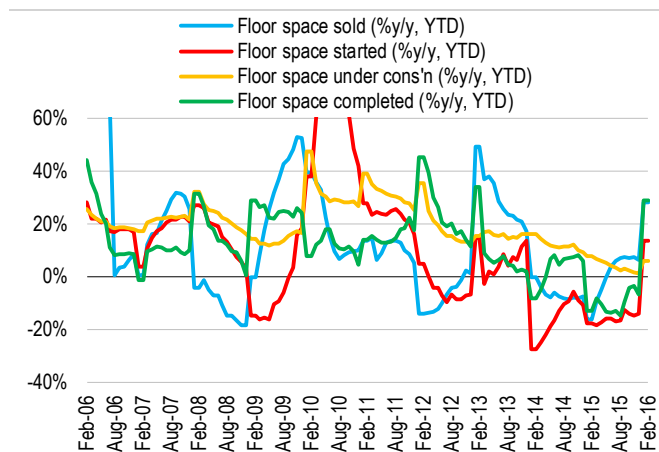
Can China's nascent property sector recovery sustain?

- Perhaps the key demand question facing investors right now is the potential for China's nascent property sector recovery to sustain into mid-2016 and beyond.
- Data for Jan&Feb-16 came in stronger than many, including UBS, were anticipating. Sales, new construction starts, total projects under construction and completions, all improved substantially in %y/y terms from retrenchment through much of 2015. The key for commodities here is the y/y lift in new

construction starts, as this most closely maps through to incremental commodity demand.

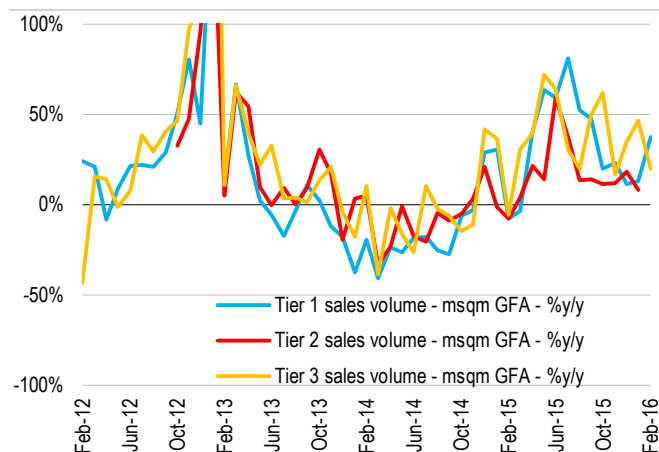
- The lift in early 2016 has been driven by Tier 1 and 2 cities. Activity in Tier 3 markets has not responded as much.

Figure 7: China property signposts lift early 2016...



Source: CEIC, UBS Research.

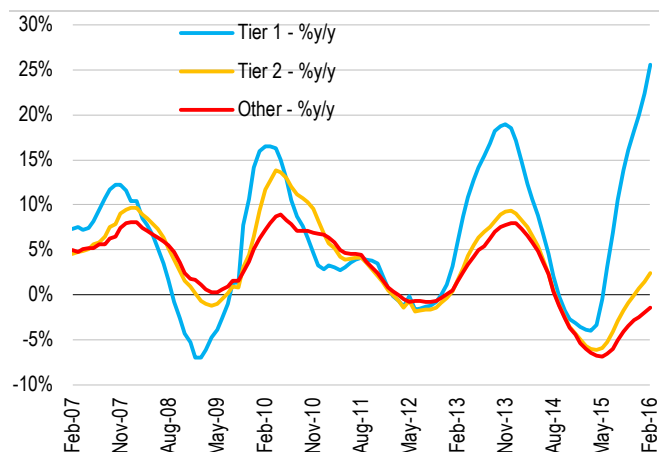
Figure 8: China property sales volumes by tier cities



Source: CREIC Bloomberg, UBS Research.

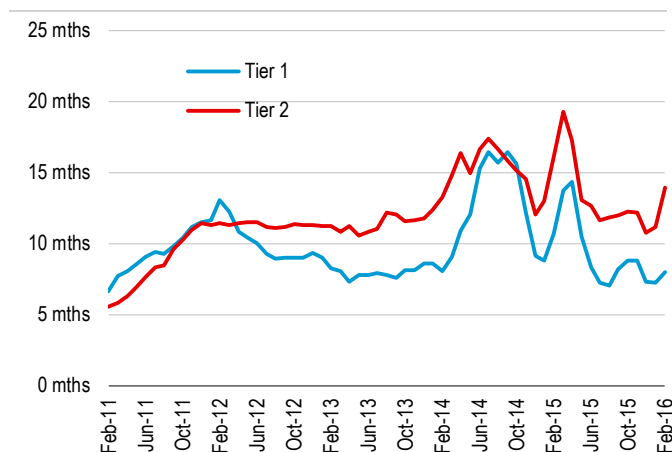
- The focus on Tier 1 and 2 markets reflects fundamentally tighter conditions, namely stronger price growth and tighter inventories.

Figure 9: China house price growth by city tiers



Source: CREIC, Bloomberg, UBS Research.

Figure 10: Inventory absorption by city tiers - months



Source: CREIC, Bloomberg, UBS Research.

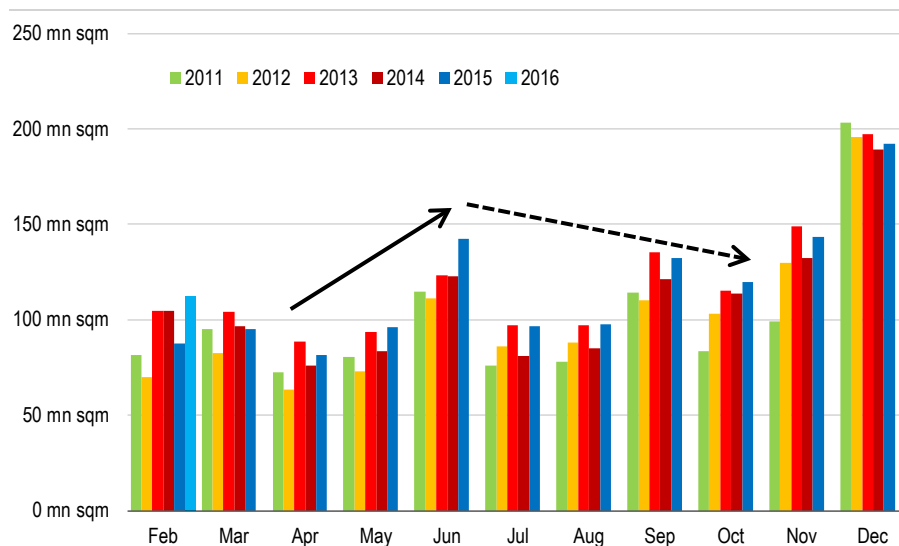
What are the key China property activity signposts to watch?

- Firstly, the next few months of China property sector data will be critical in determining the near and medium term prospects for construction and related commodity demand.
- While the start of the year has been solid, both sales and construction starts are seasonal in nature. The latter particularly dovetails into the seasonality of Chinese construction related commodity demand. As such, expect there to be a

seasonal influence to sales and construction starts this year too, and a slowing of sales and construction starts from end 2Q16.

- We have written about the seasonality of Chinese steel production before – refer [Iron Ore: Is there fundamental support?](#) for more detail here.

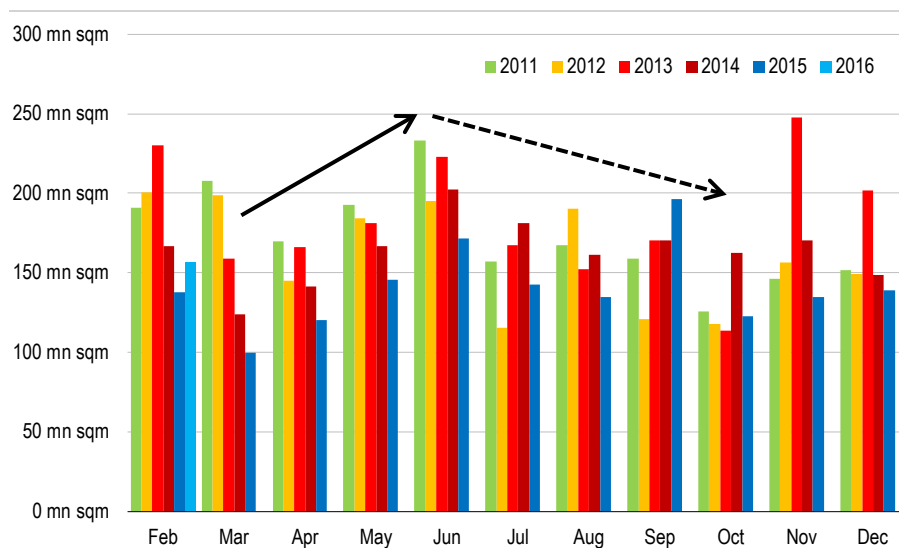
Figure 11: China floor space sales – seasonal pattern (mn sqm/mth)



Source: CEIC, UBS Research.

China floor space sales have got off to a strong start in 2016. Seasonally, sales tend to lift into mid-year before easing in 2H

Figure 12: China floor space construction starts – seasonal pattern (mn sqm/mth)



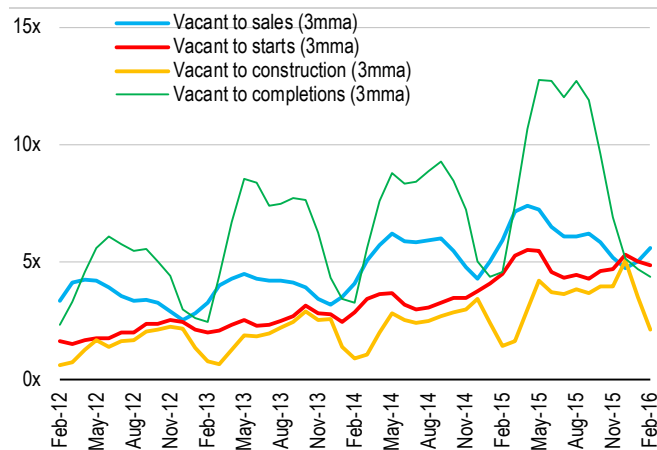
Source: CEIC, UBS Research.

China's floor space new construction starts also got off to a good start in Jan&Feb. From here, expect accelerating activity into mid-year before new starts fall through 2H

- However, the key question now is to what extent property sector activity might have commenced an earlier underlying recovery, and hence have established better 6-12 month growth prospects than previously expected.
- In broad terms, policy settings remain accommodative. We have heard very recently of some tier 1 cities reintroducing house purchase restrictions (namely Shenzhen) as a response to ripping house prices. But overall policy remains supportive for the property sector.
- One factor that remains a headwind is the level of property inventory overhang nationally. Whilst inventory has drawn down leaving tier 1 and some tier 2

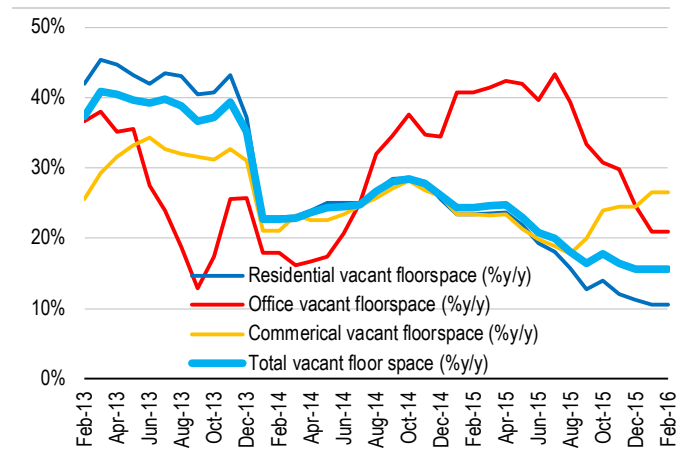
markets balanced to tight, for the most part the rump of inventory overhang across lower tier 2, tier 3 and tier 4 cities remains. Indeed, latest data in February shows floor space vacant and waiting for sale continues to grow, albeit at reduced rates compared to a few years earlier.

Figure 13: Ratio of vacant for sale floor space to sales, construction starts, under construction and completions



Source: CEIC, UBS Research.

Figure 14: Vacant for sale floor space – by type - %y/y



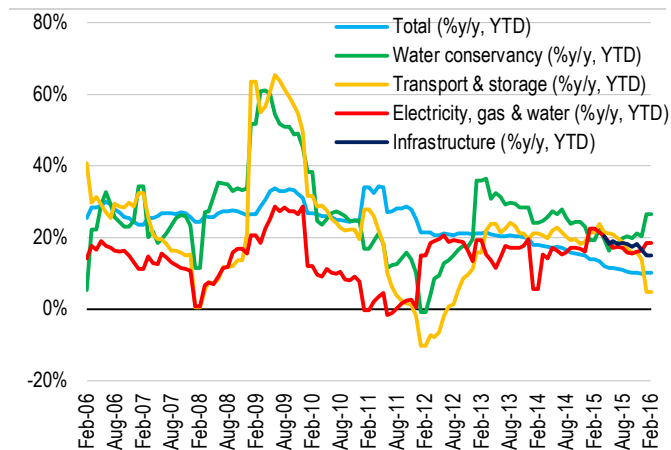
Source: CEIC, UBS Research.

- The good news is that, at a national level, because floor space sales growth outstripped vacant for sale floor space growth (in y/y terms) in Jan&Feb-16, the vacant floor space to floor space sales ratio fell for the first time in almost three years. A good deal more of sales growth outstripping vacant floor space for sale growth is needed before the property sector can normalise nationally.
- We remain of the view that the government in China will be very cognisant not to stoke the fires of another property bubble and misallocation of capital as happened in the 2010 stimulus. It is for this reason that we are wary of the likely longevity of the current property recovery. Our base case remains that once seasonal influences run their course, activity will slow, demand-supply tension will ease and prices will stabilise and drift lower toward our forecasts.

Infrastructure outlook also critical

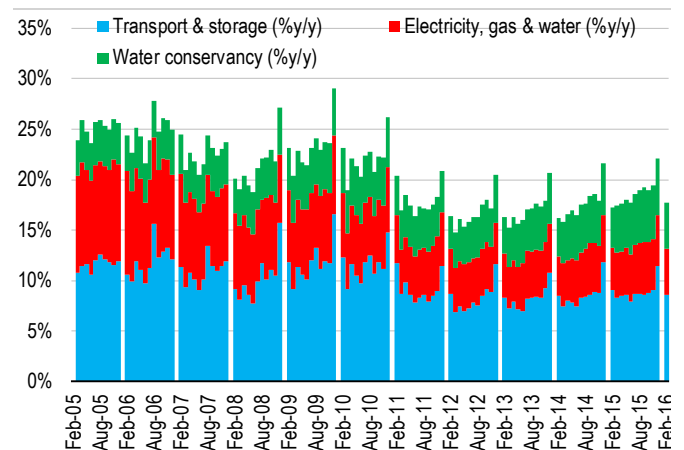
- Infrastructure spend has also lifted through much of 2015 and into early 2016, too. Future trends here will be critical; the central government has approved a huge pipeline of new projects, funding is gradually being put in place via a number of channels and the political will from Beijing is strong.
- While infrastructure is not as commodity intensive as real estate construction, it is nonetheless an important part of demand.
- Growth of spend in key infrastructure categories has been well above overall FAI growth for some time now, and by virtue of falling growth in real estate and manufacturing FAI, the contribution from infrastructure has been lifting. Yet it is still only about a fifth to a quarter of total FAI spend.

Figure 15: Total FAI and key infrastructure categories – RMB bn - %y/y



Source: CEIC, UBS Research.

Figure 16: Share of total infrastructure in key categories - % share



Source: CEIC, UBS Research.

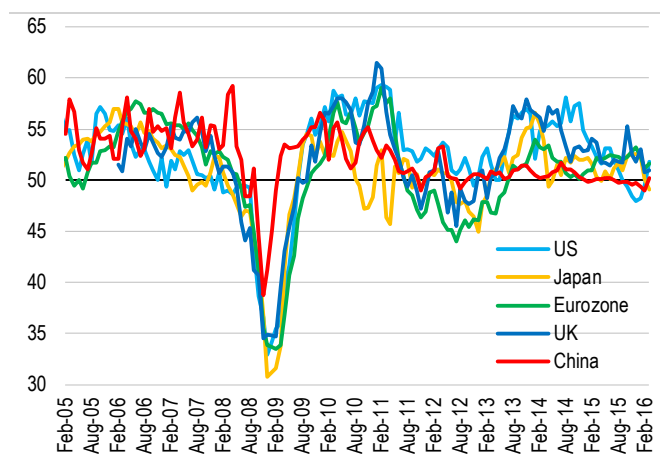
Key infrastructure signposts to watch

- A combination of official monthly FAI data plus anecdotal reports of new project commencement, surveys of order books of construction project suppliers such as excavators, steel mills, & power; will all guide the trajectory of infrastructure construction. We anticipate ongoing modest growth acceleration but do not foresee a step gap shift up in growth rates.

Global macroeconomic signposts point to better demand

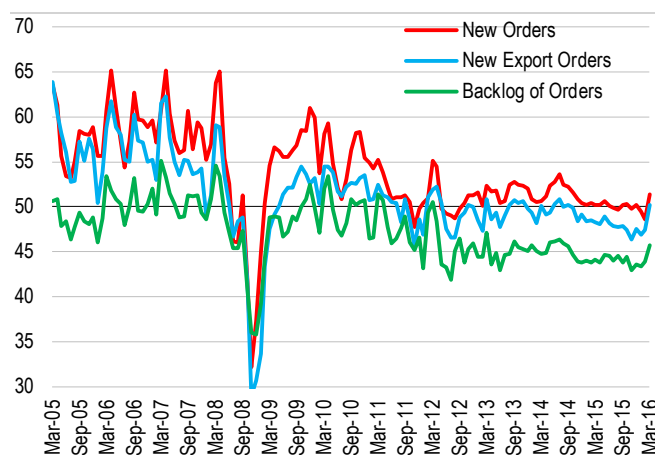
- Recent PMIs indicate better conditions in China, the US, Europe and the UK. Only Japan's manufacturing PMI was below the important 50 level separating contraction from expansion.
- Order books in the US and particularly China are looking better too, although a key question remains how much of that improvement is seasonal positioning as contrasted with real underlying demand improvement.

Figure 17: Global manufacturing PMIs



Source: Bloomberg, UBS Research.

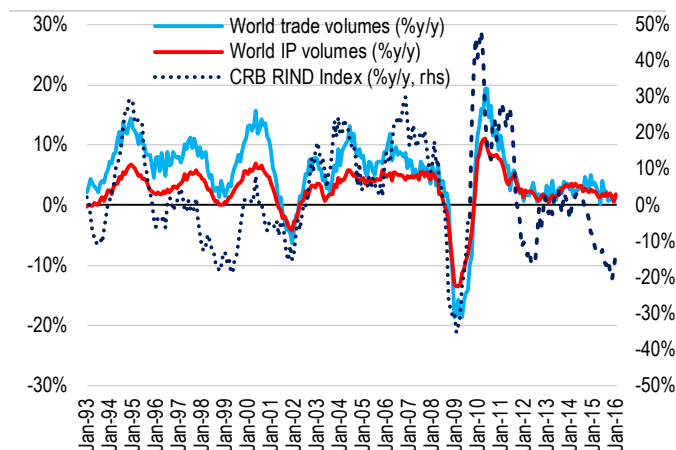
Figure 18: China PMI – new orders, new export orders and order backlog - >50=expansion



Source: China Federation of Logistics, Factset, UBS Research.

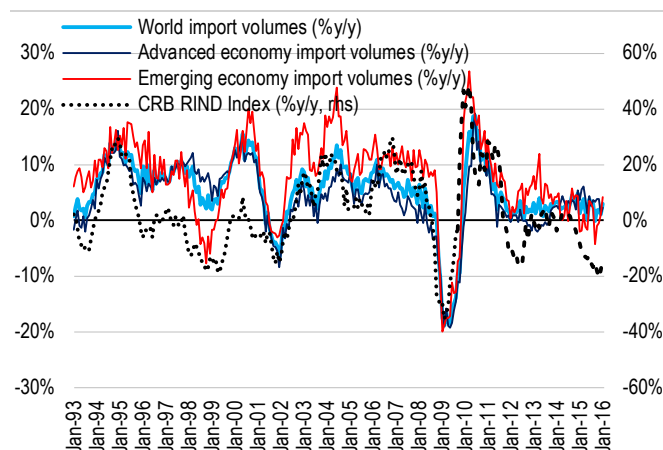
- Latest world trade and IP volumes show relatively stable real activity at the global level. But a lift in emerging economy import volume growth in recent months seems to correlate with the recent lift in commodity prices as measured by the CRB RIND index.

Figure 19: World trade, IP volumes & commodity prices - %y/y



Source: Netherlands Bureau of Policy Analysis, Bloomberg, UBS Research.

Figure 20: World, advanced & emerging economy import volumes & commodity prices - %y/y

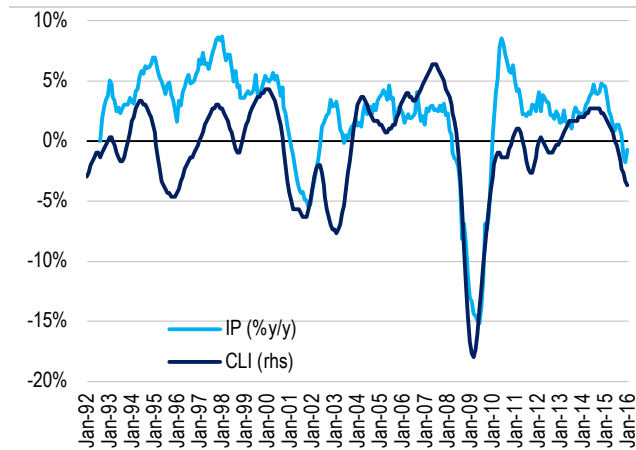


Source: Netherlands Bureau of Policy Analysis, Bloomberg, UBS Research.

Leading indicators continue to point to downside IP risks

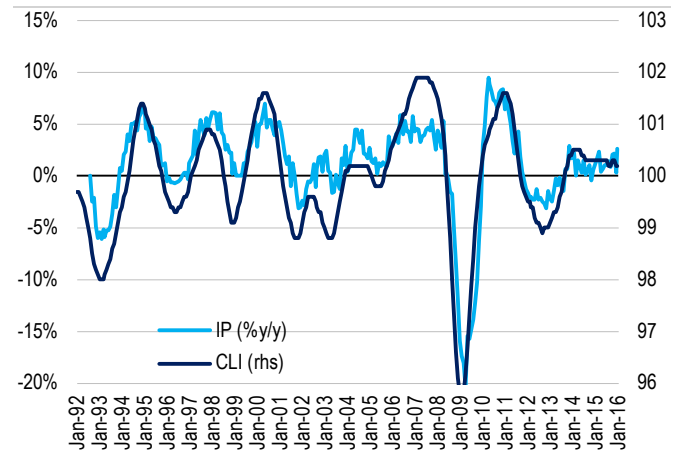
- Latest OECD Composite Leading Indicators point to downside risks to industrial production growth in China, the US and Japan. Only Europe has a (mildly) positive CLI-IP outlook.
- Leading indicators are useful signposts for the future direction of industrial output, although they are not correct all the time.

Figure 21: US – OECD leading indicator and IP - %y/y



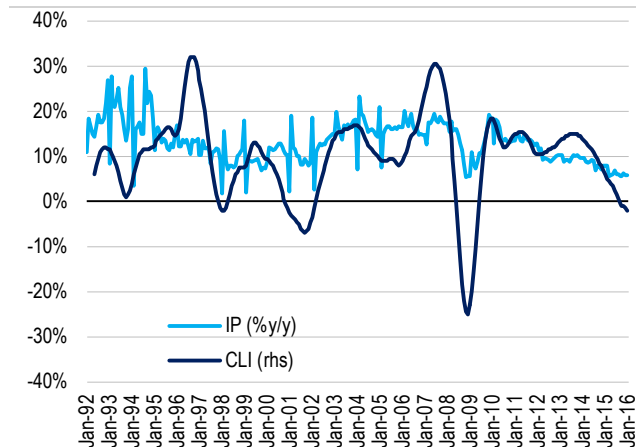
Source: OECD, Netherlands Bureau of Policy Analysis, UBS Research.

Figure 22: EU – OECD leading indicator & IP - %y/y



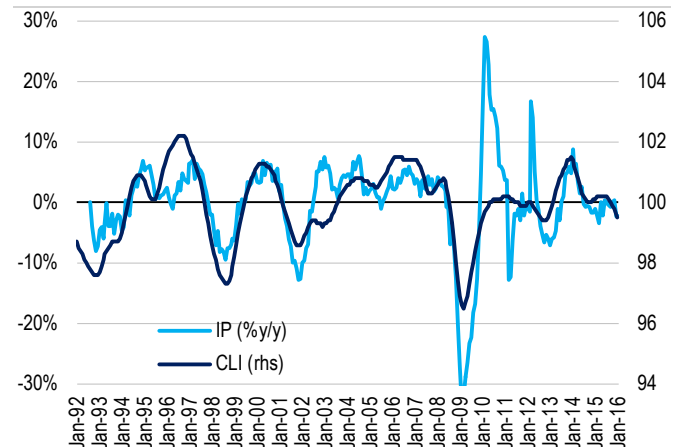
Source: OECD, Netherlands Bureau of Policy Analysis, UBS Research.

Figure 23: China – OECD leading indicator & IP - %y/y



Source: OECD, Netherlands Bureau of Policy Analysis, UBS Research.

Figure 24: Japan – OECD leading indicator & IP - %y/y



Source: OECD, Netherlands Bureau of Policy Analysis, UBS Research.

PIVOTAL QUESTIONS

[return](#) ↑**Q: Are producers doing enough to rebalance markets in the face of weaker demand?****UBS VIEW**

Recent evidence here is mixed, with more constructive reactions observed in markets more advanced through the cycle. Coal supply (trade) continues to track demand lower, iron ore too. Copper mine supply has responded dynamically to price falls late 2015 & early 2016. At the other end of the spectrum, nickel and aluminium have been agonizingly slow to respond until relatively recently.

EVIDENCE

A combination of company announcements, production reports, guidance and trade data inform on supply trends. Insights differ by commodity; coal and iron ore shuts & stalling/falling trade signifies relatively more advanced supplier rebalancing, while relatively small cuts in nickel and copper highlight a further requirement for rebalancing there.

WHAT'S PRICED IN?

Spot prices continue to trade into cost curves, implying continued excess supply and a need for rebalancing either via supply rationing or better demand.

Copper – both scrap and mine supply rebalancing, but more needed

- Producers cut output late in 2015 as prices lurched towards US\$2/lb. We total 3% output cuts announced to date. Despite this, supply is set to grow 2% this year net of these cuts. More cuts are needed in our view to balance the market (we forecast the market to be in an ~125kt surplus in 2016e).

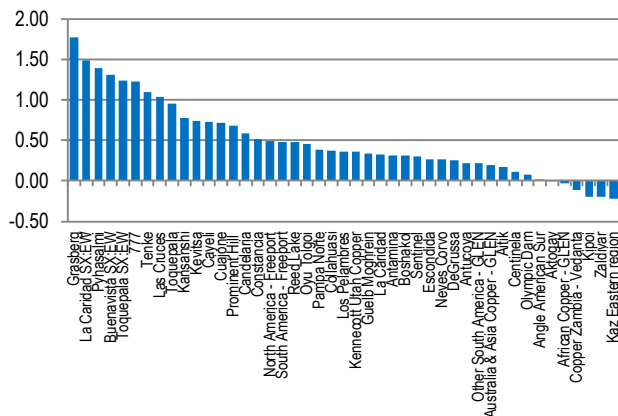
Figure 25: Summary of prominent shuts

Shut/idled production at mines					
Date	Company	Mine	Location	Annual (ktpa)	Comment
Aug-15	Freeport	El Abra, Miami & Tyrone	USA, Chile	68	A shut at Miami, a 50% cut at Tyrone; a total cut of 150mlb's
Aug-15	Grupo Mexico	Hayden concentrator	Mexico	30	
Sep-15	Glencore	Katanga & Mopani	DRC & Zambia	264	18mth closure until cost improvement projects are delivered
Sep-15	KGHM	McCreedy West	Canada	16	Care & maintenance
Sep-15	Glencore/Anglo	Collahuasi	Chile	30	Suspended SXEW circuit
Oct-15	Weatherly Interr	Otihiase	Namibia	8	Care & maintenance
Oct-15	CNMM	Luanshya & Baluba	Zambia	50	Suspended
Dec-15	Metorex	Chibuluma South	Zambia	10	Cutting staff and production by 40%
Dec-15	Freeport	Sierrita	USA	90	
Jan-16	Imperial Metals	Huckleberry	Canada	20	Suspended pit operations, stockpiles being processed
Jan-16	Capstone	Minto	Canada	20	To shut in May-16
Total				606	
Refined Copper Supply 2015				22,984	
UBSe % shut vs market size				2.6%	
Wood Mackenzie Shut estimate				760	
UBSe % shut vs market size				3.3%	

Source: Company filings, Wood Mackenzie, UBS Research.

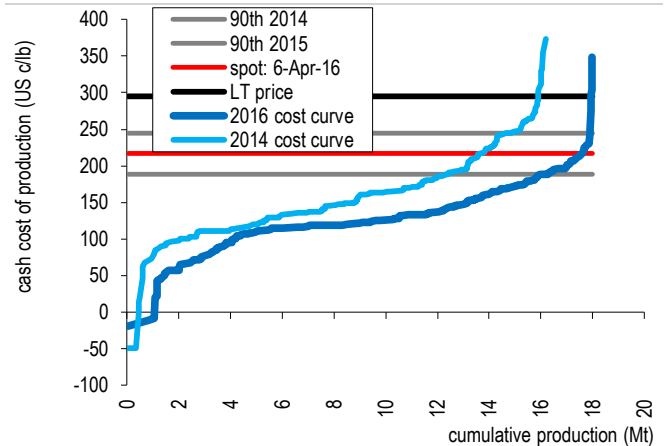
- Copper mine supply has much lower barriers to exit than other commodities. This has been evidenced by the speed at which cuts have occurred once some mines entered losses.
- Most copper mines globally are still making cash, see Figure 26-27. We think that prices of below US\$2/lb will be necessary to induce further supply side rebalancing.

Figure 26: Most copper mines are still making cash (FCF/lb)



Source: UBS estimates. FCF is based on EBITDA – sustaining capex for 2016.

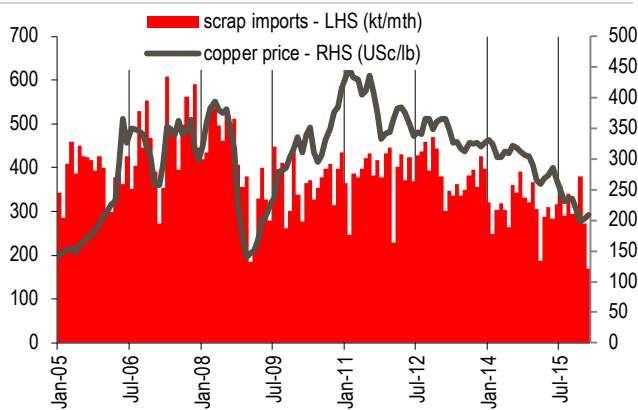
Figure 27: Copper cash cost curves (C1 basis)



Source: Wood MacKenzie, company reports, UBS Research.

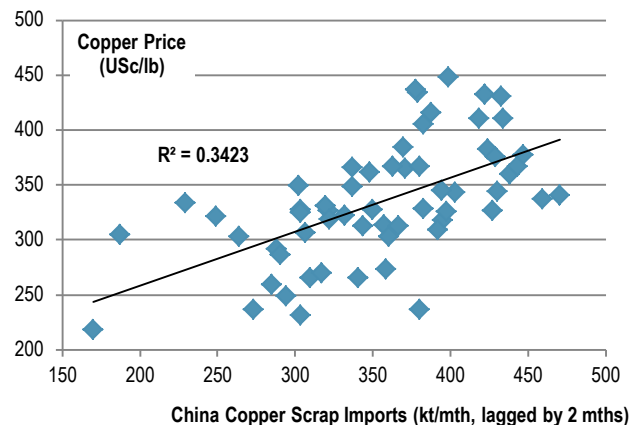
- Undoubtedly some rebalancing has been underway care of copper scrap supply. Data here is tricky to identify but partial data on Chinese scrap copper imports corroborates a view that scrap has become less available and is helping market rebalancing.

Figure 28: China scrap copper imports vs price



Source: China Customs, Bloomberg, UBS Research.

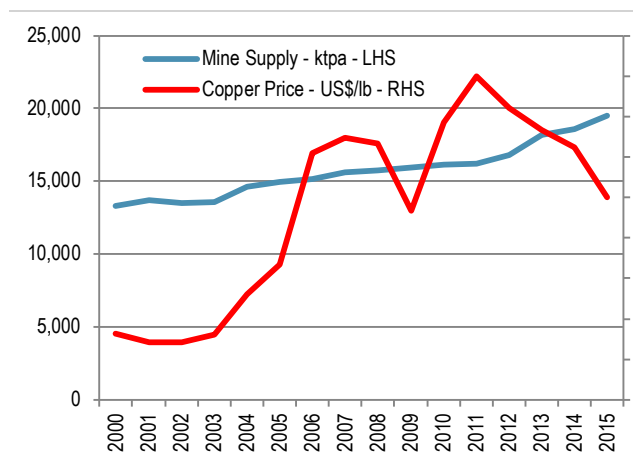
Figure 29: China scrap copper imports vs price



Source: China Customs, Bloomberg, UBS Research.

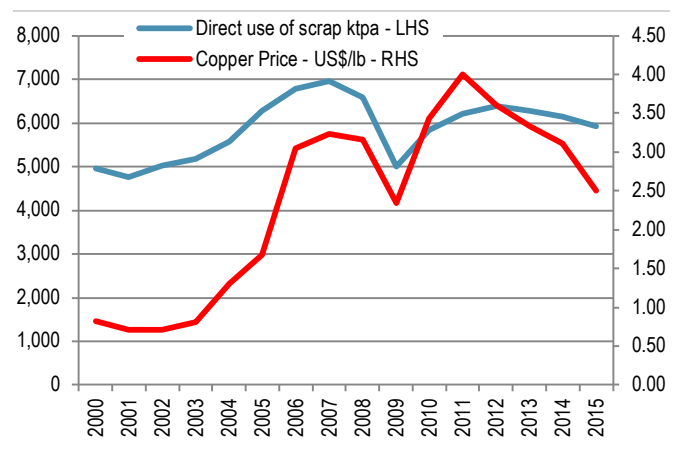
- More generally, history shows that scrap copper supply is more own-price elastic than mine supply. As such, we anticipate part of the copper market rebalancing to reflect additionally scarce copper scrap supply.

Figure 30: Copper mine supply vs copper price



Source: WoodMac, company reports, UBS Research.

Figure 31: Copper scrap supply vs copper price



Source: Wood MacKenzie, company reports, UBS Research.

Nickel – The Pain in the Game has fallen Mainly in Vain

- The nickel industry has proven considerably slower to rebalance than many had thought in recent years.
- A combination of factors including integrated operations, exorbitant closure and rehabilitation costs, single mine / commodity operations, a reluctance on the part of financiers to recognise a distressed asset / bad debt, bankruptcy protection and capital structure renegotiation, and a competitive hope to outlast competitors has resulted in considerable supply side inertia with respect to required output cuts.
- At the same time, the Chinese NPI sector has proven more innovative and margin focussed than many had assumed, resulting in their ability to remain in operation a lot longer than anticipated – both in terms of access to laterite ore feedstock's following the Indonesian export ban, but also in terms of cost cutting to preserve margins and continue operating.
- The result is that the nickel spot price has for considerable periods of time traded well into the cost curve, even against our estimate of the cost curve.
- It's only been very recently that we have started to witness hard production cuts and the commencement of supply rebalancing against weak demand. But more is needed.

Figure 32: Nickel mine shuts

Date	Mine	Country	Capacity (ktpa)	Comment
Jan-16	Niquelândia-Votorantim Metals	Brazil	25	Mine, to be suspended 1-Feb-16; downstream refinery in May-16
Nov-15	Santa Rita-Mirabela	Brazil	18	Production throttled back from 18ktpa to 12ktpa to conserve cash, then shut the remainder
Oct-15	Mincor	Australia	6	Mittel & Mariners mines scheduled to shut by 2015-end
Aug-15	Panoramic	Australia	18	Ceased mining at Savannah, Lanfranchi & Deacon mine due to seismic event & Ni prices
Total			67	
Market size			1,877	
% Shut			3.6%	

Source: Company filings & UBS estimates.

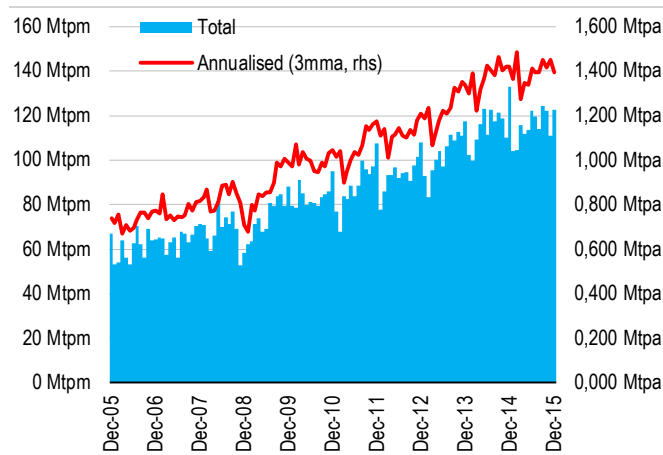
Iron ore – High cost supply has been leaving, but more is needed

- The iron ore supply side has been rebalancing as prices have come down. High cost, smaller suppliers both at the company and country level have been exiting the industry, as expansions by low cost major producers increase their market share and overall market concentration at a time of stalling demand.

Global supply has been consolidating...

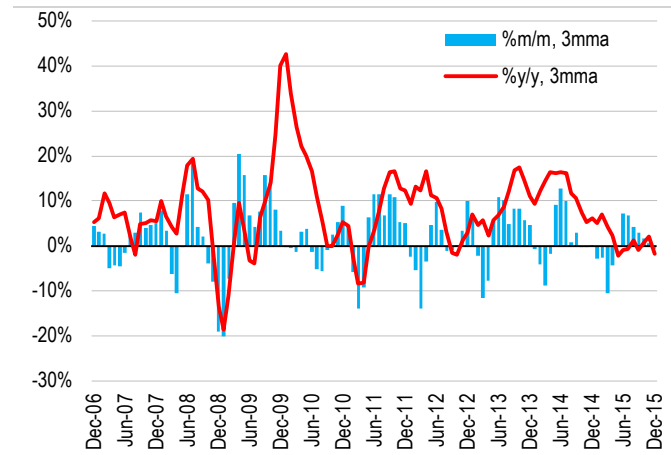
- Consistent with these factors, global iron ore exports have slowed and concentrated since prices began falling 2-3 years ago.

Figure 33: Global iron ore exports – mthly & ann'd



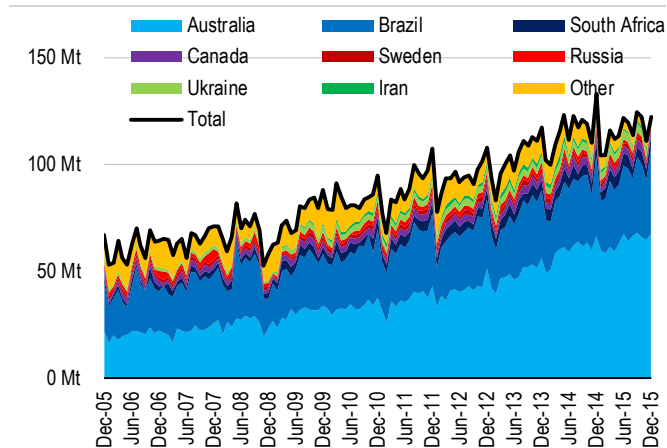
Source: ISSB, Bloomberg, UBS Research.

Figure 34: Global iron ore exports – 3mma - %m/m & %y/y



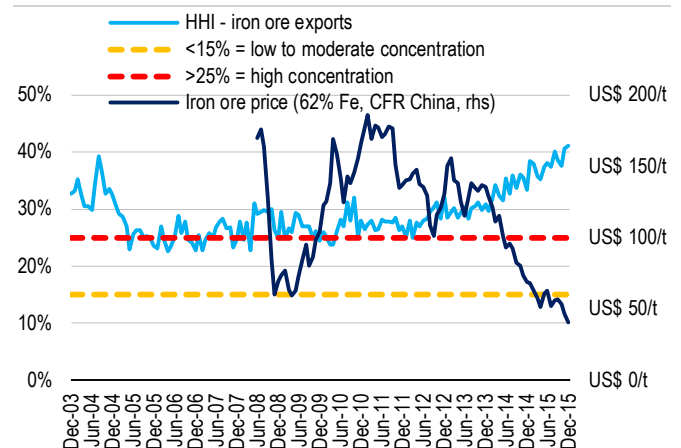
Source: ISSB, Bloomberg, UBS Research.

Figure 35: Global iron ore exports – by country



Source: ISSB, Bloomberg, UBS Research.

Figure 36: Global iron ore exports - concentration

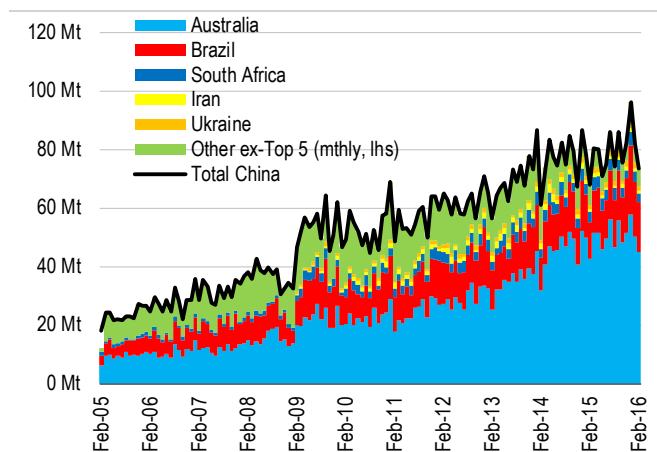


Source: ISSB, Bloomberg, UBS Research. HHI=Herfindahl Index.

...as have China's imports...

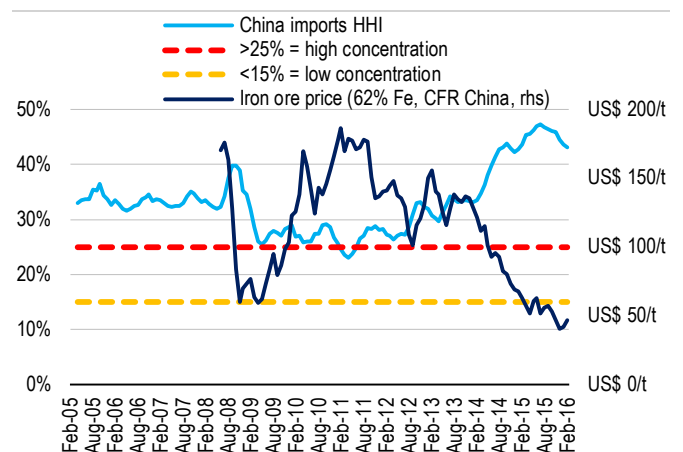
- China's imports of iron ore have flat lined for the last 12-18 months in trend terms as slowing steel output has weighed on demand. Within this overall import trend, supply from the low cost countries has continued to rise, while supply from higher cost, smaller, more marginal countries has collapsed.

Figure 37: China iron ore imports by origin - mthly



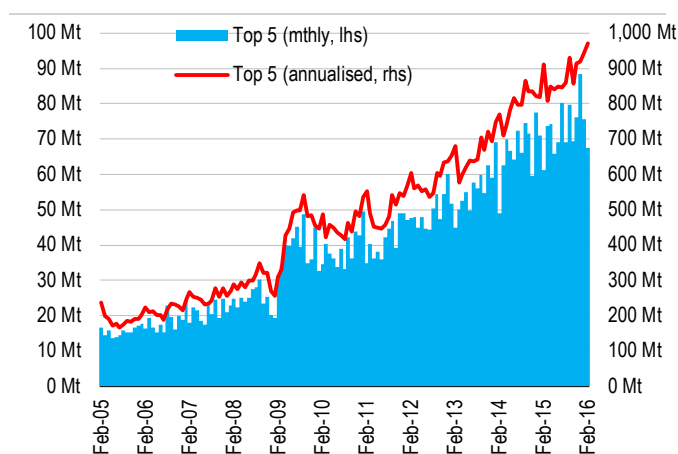
Source: China Customs, Bloomberg, UBS Research.

Figure 38: China iron ore import concentration



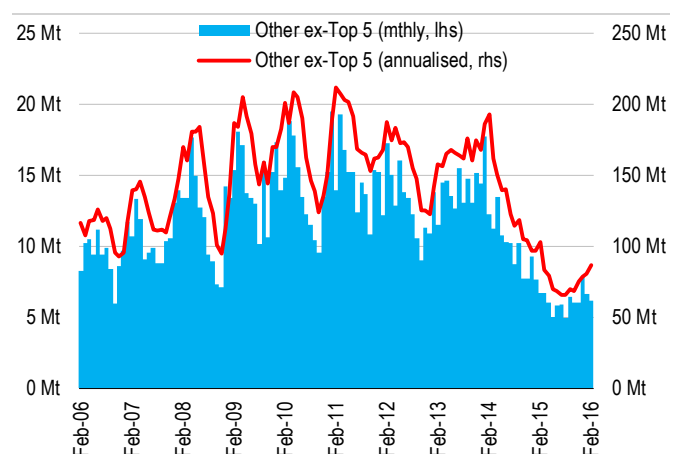
Source: China Customs, Bloomberg, UBS Research. HHI=Herfindahl Index.

Figure 39: China iron ore imports – top 5 countries



Source: China Customs, Bloomberg, UBS Research.

Figure 40: China iron ore imports – ex-Top 5 countries

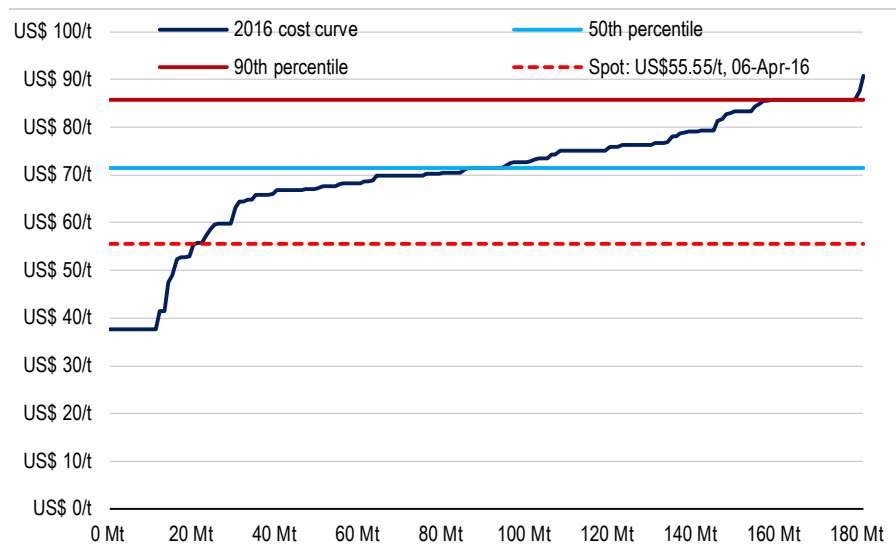


Source: China Customs, Bloomberg, UBS Research.

...and Chinese domestic supply as well

- China's domestic iron ore supply is falling as high prices have rationed large slabs of privately-owned production out of the market. At current spot prices, only about 10%-15% of our estimate of Chinese iron ore capacity in the market in 2016 is cash positive.

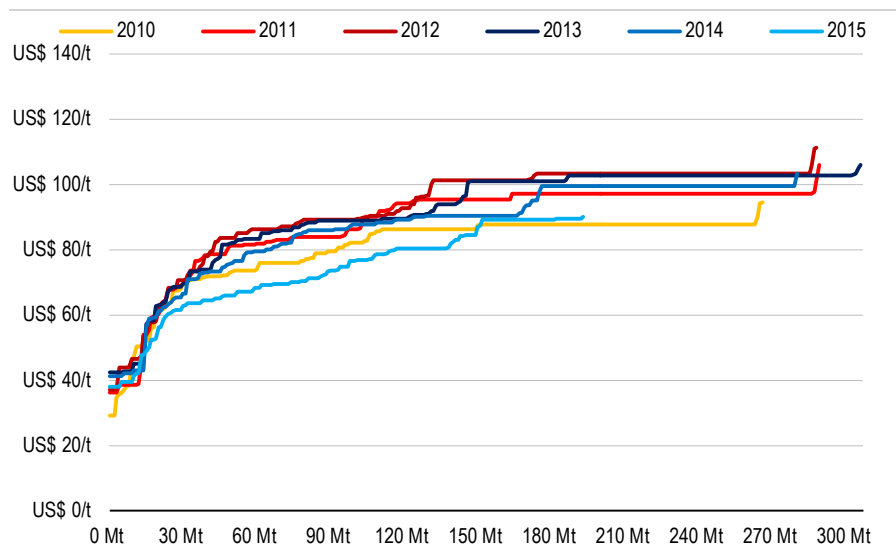
Figure 41: China domestic iron ore cost curve – 62% Fe equiv – FOB China



Source: AME Group, Platts, UBS Research.

- Reflecting relatively poor geology, geography & fragmentation, China's iron ore cost have deflated in line with oil/energy, but not as much as seaborne supply, thanks to seaborne's additional leverage to lower oil prices via sea-freight.

Figure 42: China domestic iron ore cost curve deflation – FOB China

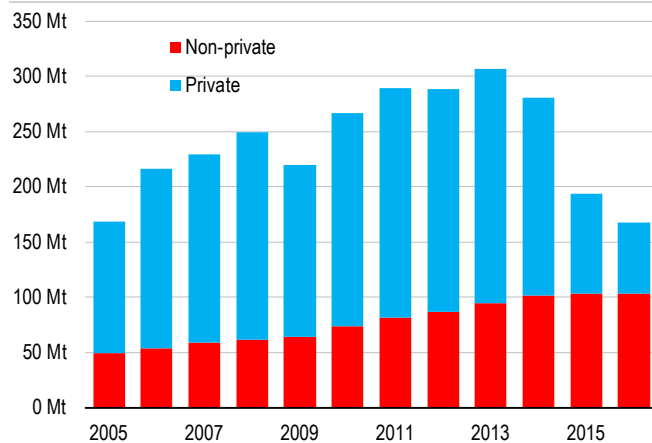


Source: AME Group, UBS Research.

- Looking at both the ownership of iron ore mines and their location, we observe that privately held mines, and those located closer to the seaboard and the effective point of contestability with seaborne imports; are those that have borne the brunt of capacity closures.

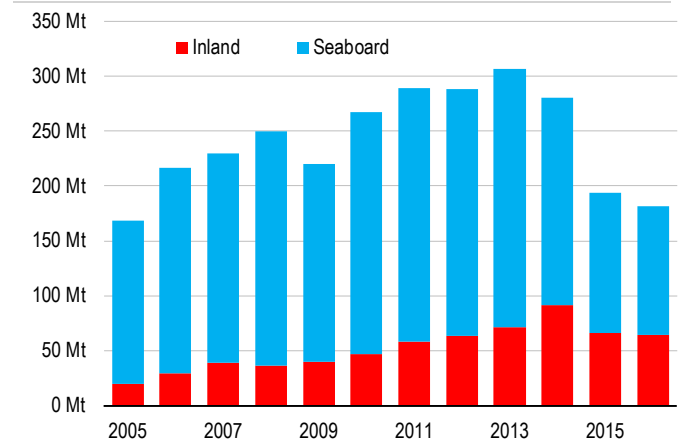
Even at current iron ore prices, only about 10%-15% of China's domestic iron ore capacity is cash flow positive

Figure 43: China domestic iron ore mines – private or SOE
(62% Fe equiv capacity)



Source: AME Group, UBS Research.

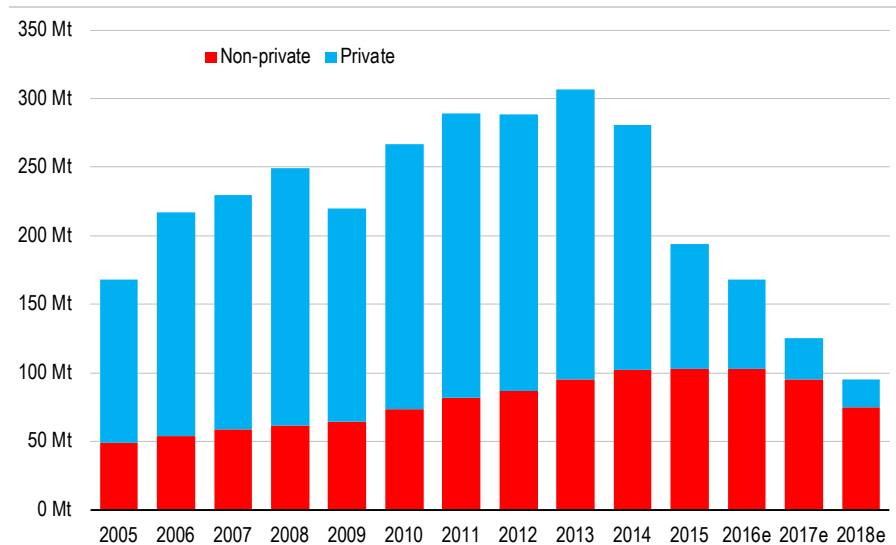
Figure 44: China domestic iron ore mines – inland or seaboard
(62% Fe equiv capacity)



Source: AME Group, UBS Research.

- We expect this process to continue, thanks to ongoing economic pressures from rising oil/energy prices, ongoing growth in new cheaper seaborne supply effective rationing out almost all of China's private domestic iron ore capacity. We also anticipate state owned and integrated capacity to start exiting as supply-side structural reforms begin to gain traction in the steel sector.
- We expect China's domestic iron ore mine supply to fall toward ~90-95Mtpa on a world 62% Fe equivalent basis by 2018. There are risks around this; namely higher prices and/or more aggressive cost deflation could see more Chinese capacity stay for longer than we expect. Also, a much slower pace of supply side structural reform in the Chinese steel sector may also hamper rationalisation of loss making domestic supply.

Figure 45: Chinese domestic iron ore supply – private & SOE – UBS forecast



Source: AME Group, Platts, UBS Research.

Under scenarios of projecting forward real Chinese domestic cost curves adjusted for UBS' forecast changes in oil prices and USD/CNY, we calculate that the proportion of mines in China that break even moves from 8.4% in 2015 to 15.6% in 2020e, while overall supply falls from 216Mt to ~90-95Mt.

PIVOTAL QUESTIONS

[return](#) ↑**Q: Are cost curves still deflating?****UBS VIEW**

The multi-year cost deflation that has been apparent across much of the industry is, we believe, set to slow or stall in 2016. This reflects oil price reflation in line with UBS' house oil price view, and US dollar weakness as the US FOMC has tempered guidance for the timing and pace of US interest rate normalisation. We still expect underlying cost cutting to continue across the industry, but uncontrollable oil and FX cost drivers that were a tailwind to cost deflation in recent years may become a headwind now.

EVIDENCE

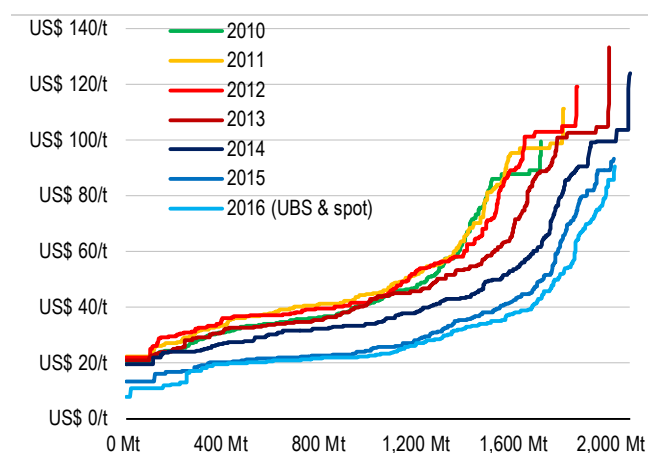
Our views here reflect recent firming of major producer currencies against the US dollar as market expectations for US interest rate normalisation have been tempered, and recent reflation of crude oil prices by ~45-50% from Dec-15 & Jan-16 lows. UBS' expects crude oil prices to continue lifting on a 12-24 month view which will, if realised, continue to pressure reflation across resource sector supply chains.

WHAT'S PRICED IN?

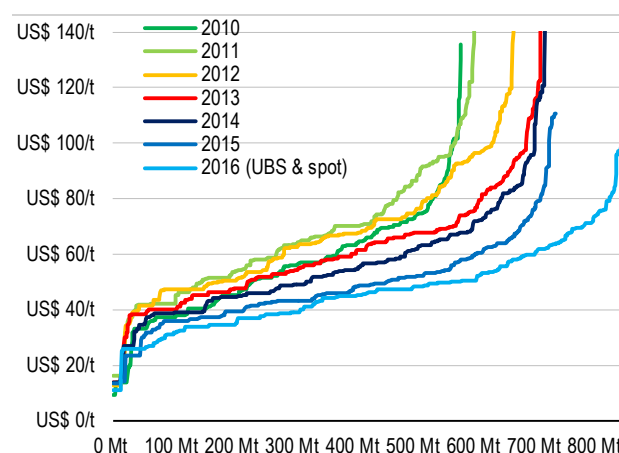
We believe the recent rally in commodity prices extends beyond just oil price and US dollar weakness reflation. Short covering has also played a part along with seasonal positioning. Yet, should the US dollar remain broadly stable against major producer currencies, and oil prices continue reflation in line with UBS' view, the pace of cost deflation will certainly slow or stall and may in fact reverse recent multi-year deflationary trends.

Multi-year cost curve deflation to slow / stall in 2016?

- Cost curves across the complex have been in a multi-year cost deflation cycle as demand growth has slowed relative to supply growth, pressuring prices lower and driving producers to cut costs to survive.

Figure 46: Iron ore cost curve deflation - FOB

Source: AME Group, UBS Research.

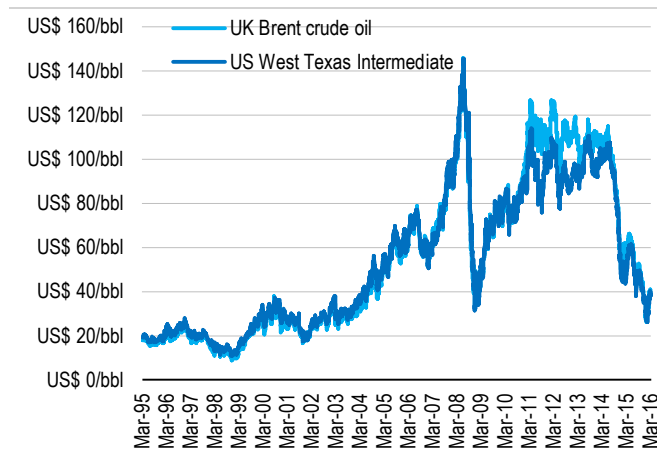
Figure 47: Seaborne thermal coal cost deflation - FOB

Source: AME Group, UBS Research.

Crude oil price reflation

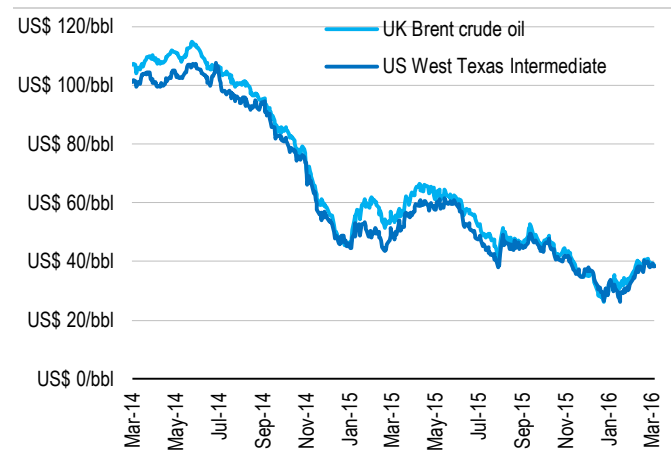
- UK Brent and US West Texas Intermediate crude oil benchmark prices have rallied 46-50% since lows in Jan-16 (Brent) and Feb-16 (WTI). Even if oil prices hold current levels, energy cost reflation will start to ripple through supply chains.

Figure 48: Crude oil prices – 21 year history



Source: Bloomberg, UBS Research.

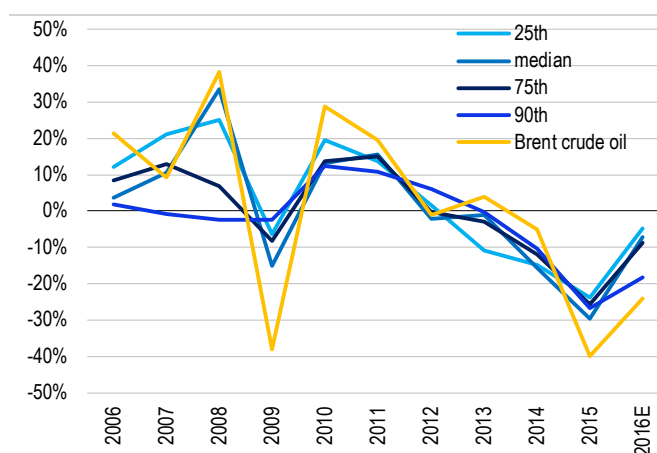
Figure 49: Crude oil prices – 2 year history



Source: Bloomberg, UBS Research.

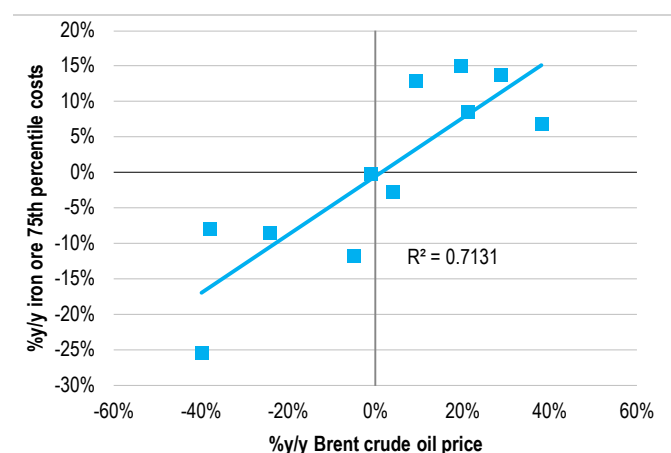
- This is because energy costs usually make up a moderate to significant portion of overall production costs. In the case of iron ore presented below, key percentile points on the iron ore cost curve tend to move in the same direction as movements in energy prices.
- While the correlation between changes in energy prices and the 75th percentile of the curve is reasonable as an R squared of 0.71, this may also reflect collinearity to some degree – for instance, if both iron ore costs and oil prices are positively correlated to world GDP growth.

Figure 50: Iron ore percentile costs & Brent crude oil - %/y



Source: AME Group, Bloomberg, UBS Research.

Figure 51: Iron ore P75 costs & Brent crude oil - %/y

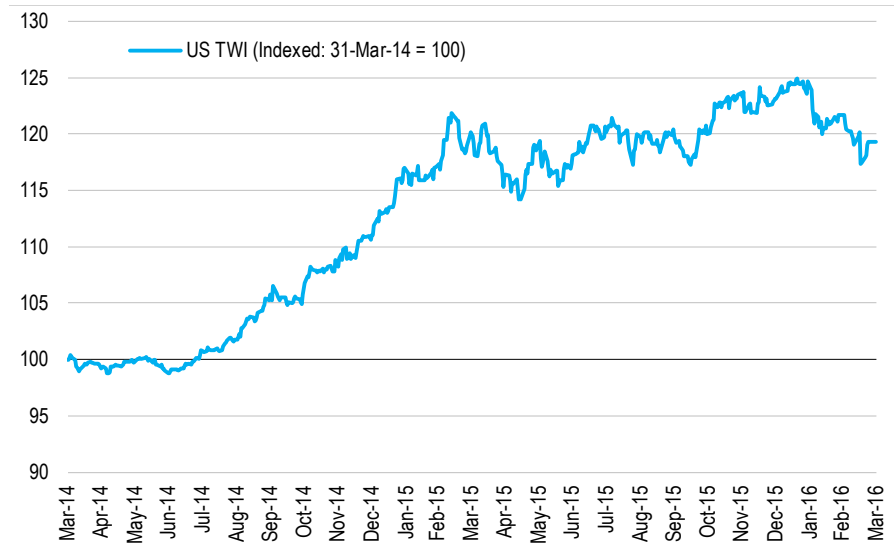


Source: AME Group, Bloomberg, UBS Research.

US dollar weakness against major producer currencies

- Since the US FOMC tempered interest rate normalisation path expectations over the last month or two, the US dollar has eased on both a trade weighted basis but also against many commodity producer currencies.

Figure 52: US dollar Trade Weighted Index (Indexed: Mar-15 = 100)

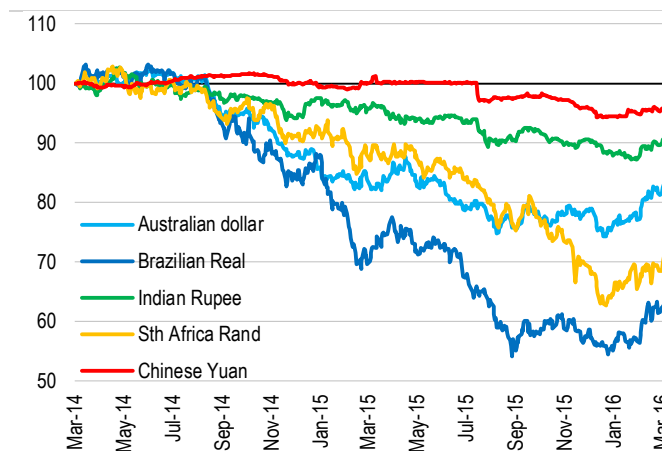


The US dollar on a trader-weighted basis has fallen 4.5% from peak levels reached on 20-Jan-16 as the US FOMC has tempered market expectations for the pace and extent of interest rate normalisation, leading to a weaker US dollar

Source: Bloomberg, UBS Research.

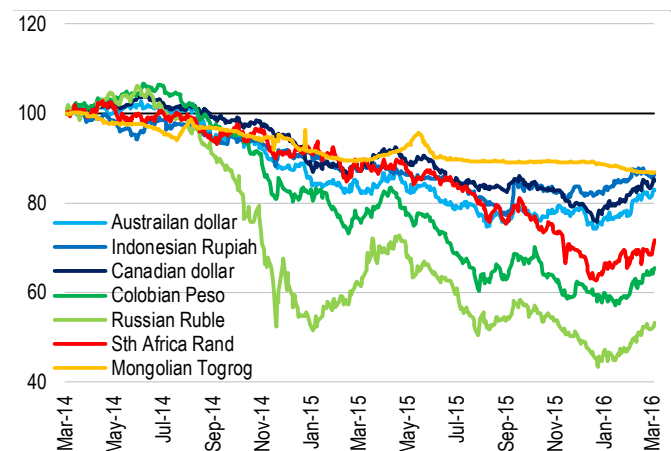
- Bulk commodity producer / exporter currencies have lifted typically by more than just the US TWI.
 - For iron ore producers, the Australian dollar, Brazilian real & South African rand have appreciated by 12%-16% against the US dollar since mid-late Jan-16.
 - Coal producer currency has lifted similarly strongly off recently lows, with the Australian dollar, Canadian dollar, Russian ruble and South African rand up 12%-22% from recent lows on the US dollar cross rates.

Figure 53: Iron ore producer USD cross rates – two year relative performance (Indexed: Mar-15 = 100)



Source: Bloomberg, UBS Research.

Figure 54: Coal producer USD cross rates – two year relative performance (Indexed: Mar-15 = 100)

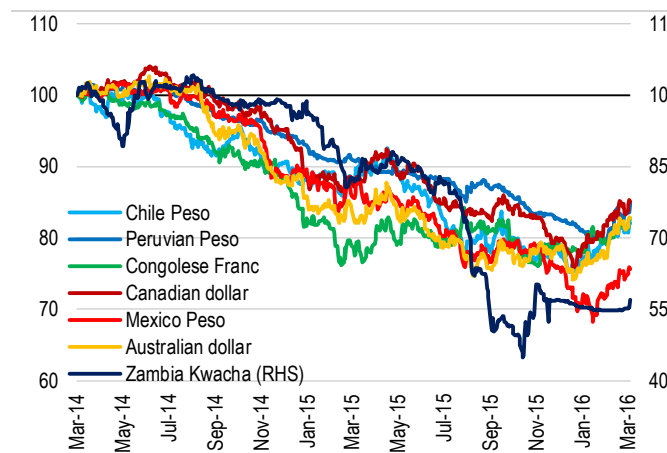


Source: Bloomberg, UBS Research.

- It's a broadly similar story for base metals. Copper producer currency cross rates against the US dollar have lifted ~7-12% since recent lows in Jan & Feb-16,

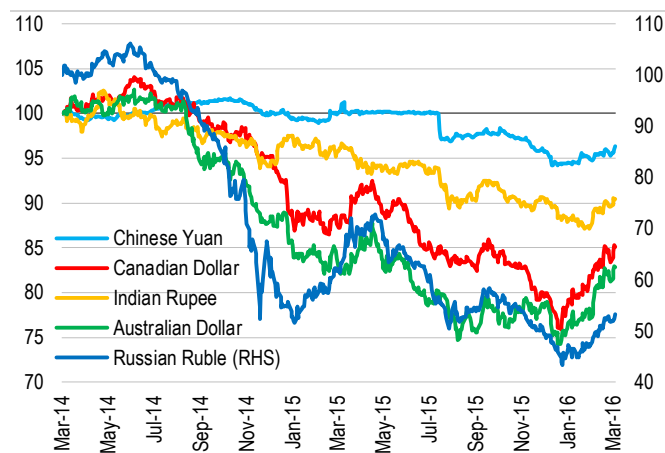
while aluminium producer currencies are up 12-22% (Russian ruble, Canadian & Australian dollars) and 2-4% (Chinese yuan and Indian rupee)

Figure 55: Copper producer USD cross rates – two year relative performance (Indexed: Mar-15=100)



Source: Bloomberg, UBS Research.

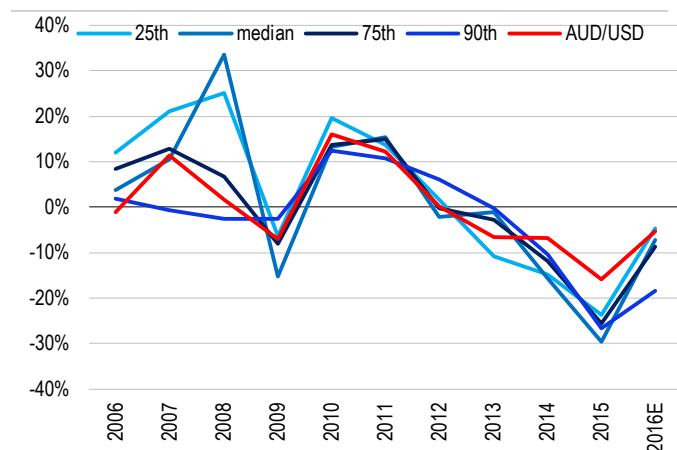
Figure 56: Aluminium producer USD cross rates – two year relative performance (Indexed: Mar-15=100)



Source: Bloomberg, UBS Research.

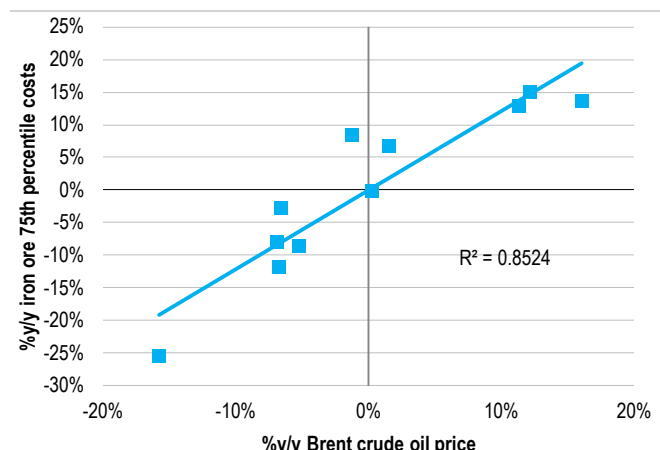
- Should producer currencies hold current cross rates against the US dollar, or indeed strengthen further against the US dollar in the period ahead, US dollar costs will be pressured higher. Again, using iron ore as the example, the iron ore cost curve tends to move with changes in key producer currencies (we have referred to the Australian dollar).
- While the correlation between %y/y changes in iron ore costs and the Australian dollar cross rate is high at an R squared of 0.85, we caution that these two factors will be significantly collinear. Nevertheless, the analysis presented here serves to highlight the importance of oil (energy) costs and producer currencies in assessing cost curve trends.

Figure 57: Iron ore percentile costs & AUD/USD - %y/y



Source: AME Group, Bloomberg, UBS Research.

Figure 58: Iron ore P75 costs & AUD/USD - %y/y



Source: AME Group, Bloomberg, UBS Research.

Summary of changes to forecasts

- For the first time in many quarters, we can say the changes to our forecasts are quite small.
- The biggest changes are to **Platinum** & **Palladium** where prices are cut between 10-20% for 2016e & 2017e.
- **Manganese** prices are lifted 9% for 2016e to include the impact of the recent surge in prices to US\$4/dmtu cfr. We don't see the magnitude of this price lift as sustainable and forecast prices of US\$2.75/dmtu for the remainder of 2016 & US\$3.40/dmtu for 2017e.
- **Copper** price forecasts are lifted to US\$2.04/lb (from US\$1.95/lb) which reflects better than expected prices in 2016Q1. Our view that prices will keep falling to US\$1.90/lb by 2016 year end is unchanged.
- While our 2016e **iron ore** price in cfr terms is unchanged, we have lowered our freight rate estimates. This results in a lift in our 2016e fob Aust price to US\$41/t from US\$38/t (+7%).
- Most other commodities in the bulk & base metals space see very minor changes, mostly mark to markets for 2016Q1, with unchanged forecasts.

Figure 59: UBS commodity price forecasts – summary of changes

Commodity	2016	2017E	2018E	2019E	2020E	LT real
Copper (US\$/lb)	204(195)	210(nc)	260(nc)	300(nc)	330(nc)	295(nc)
Alum. (US\$/lb)	72(nc)	75(nc)	80(nc)	85(nc)	90(nc)	80(nc)
Nickel (US\$/lb)	4.2(4.3)	5(nc)	6(nc)	7.5(nc)	8.9(nc)	7.9(nc)
Zinc (US\$/lb)	86(85)	80(nc)	80(nc)	95(nc)	105(nc)	98(nc)
Gold (US\$/oz)	1225(nc)	1250(nc)	1300(nc)	1325(nc)	1400(nc)	1300(nc)
Platinum (US\$/oz)	985(1080)	1080(1200)	1295(1350)	1500(nc)	1600(1700)	1600(nc)
IO (fines; US\$/t cfr)	45(nc)	45(47)	52(nc)	58(nc)	62(nc)	55(nc)
Mn Ore (US\$/dmtu cfr)	2.7(2.4)	3.4(nc)	3.9(nc)	4.2(nc)	4.5(nc)	4(nc)
HCC (US\$/t fob)	84(nc)	89(nc)	95(nc)	105(nc)	119(nc)	105(nc)
Thermal (US\$/t fob)	55(nc)	56(nc)	57(nc)	58(nc)	63(64)	55(nc)
AUD (US\$)	75(72)	76(72)	76(73)	75(74)	75(75)	75(nc)

Source: UBS Research; nc=no change; iron ore prices 62% Fe eqv; thermal coal is spot.

Biggest changes?

Platinum & Palladium: -10-20% for 2016-17e;

Mn Ore: +9% for 2016e;

UBS commodity price forecasts

Figure 60: UBS commodity price changes – base metals & uranium

Commodity	period	old	new	new vs old	Vs. Consensus	
Copper (US\$/lb)	2016E	1.95	2.04	5%	2.12	-4%
	2017E	2.10	2.10	0%	2.27	-8%
	2018E	2.60	2.60	0%	2.47	5%
	2019E	3.00	3.00	0%	2.58	16%
	2020E	3.30	3.30	0%	2.77	19%
	LT price (nom. 2021)	3.39	3.37	-1%	2.98	13%
	LT price (real 2015)	2.95	2.95	0%	2.81	5%
Aluminium (US\$/lb)	2016E	0.72	0.72	0%	0.70	3%
	2017E	0.75	0.75	0%	0.74	2%
	2018E	0.80	0.80	0%	0.79	2%
	2019E	0.85	0.85	0%	0.82	4%
	2020E	0.90	0.90	0%	0.87	4%
	LT price (nom. 2021)	0.92	0.91	-1%	1.00	-9%
	LT price (real 2015)	0.80	0.80	0%	0.89	-10%
Alumina (US\$/t)	2016E	265	255	-4%	238	7%
	2017E	290	290	0%	253	15%
	2018E	300	300	0%	266	13%
	2019E	320	320	0%	280	14%
	2020E	345	345	0%	312	10%
	LT price (nom. 2021)	350	348	-1%	373	-7%
	LT price (real 2015)	305	305	0%	338	-10%
Nickel (US\$/lb)	2016E	4.30	4.20	-2%	4.18	0%
	2017E	5.00	5.00	0%	4.98	0%
	2018E	6.00	6.00	0%	6.04	-1%
	2019E	7.50	7.50	0%	6.77	11%
	2020E	8.90	8.90	0%	7.31	22%
	LT price (nom. 2021)	9.08	9.02	-1%	8.63	5%
	LT price (real 2015)	7.90	7.90	0%	7.84	1%
Zinc (US\$/lb)	2016E	0.85	0.86	1%	0.79	10%
	2017E	0.80	0.80	0%	0.88	-10%
	2018E	0.80	0.80	0%	0.95	-16%
	2019E	0.95	0.95	0%	1.01	-6%
	2020E	1.05	1.05	0%	1.01	4%
	LT price (nom. 2021)	1.13	1.12	-1%	1.07	4%
	LT price (real 2015)	0.98	0.98	0%	0.97	1%
Lead (US\$/lb)	2016E	0.80	0.80	1%	0.78	3%
	2017E	0.80	0.80	0%	0.81	-1%
	2018E	0.85	0.85	0%	0.84	1%
	2019E	0.95	0.95	0%	0.86	11%
	2020E	1.05	1.05	0%	0.86	22%
	LT price (nom. 2021)	1.10	1.10	-1%	0.93	18%
	LT price (real 2015)	0.96	0.96	0%	0.86	12%
Uranium (US\$/lb)	2016E	40	37	-6%	38	-1%
	2017E	55	55	0%	44	26%
	2018E	60	60	0%	47	27%
	2019E	60	60	0%	51	17%
	2020E	62	62	0%	58	7%
	LT price (nom. 2021)	63	63	-1%	69	-9%
	LT price (real 2015)	55	55	0%	62	-12%

Source: UBS Research, Access Economics

Figure 61: UBS commodity price changes – precious metals, Manganese, mineral sands, exchange rate

Commodity	period	old	new	new vs old	Vs. Consensus	
Gold (US\$/oz)	2016E	1225	1225		1154	6%
	2017E	1250	1250	0%	1185	6%
	2018E	1300	1300	0%	1221	7%
	2019E	1325	1325	0%	1240	7%
	2020E	1400	1400	0%	1245	12%
	LT price (nom. 2021)	1494	1485	-1%	1237	20%
	LT price (real 2015)	1300	1300	0%	1125	16%
Silver (US\$/oz)	2016E	17.2	16.1	-6%	15.2	6%
	2017E	18.0	17.5	-3%	16.2	8%
	2018E	19.3	19.0	-2%	17.4	10%
	2019E	20.0	20.0	0%	17.9	12%
	2020E	21.0	21.0	0%	18.3	15%
	LT price (nom. 2021)	23.0	22.8	-1%	18.8	21%
	LT price (real 2015)	20.0	20.0	0%	17.6	13%
Platinum (US\$/oz)	2016E	1080	985	-9%	937	5%
	2017E	1200	1080	-10%	1033	5%
	2018E	1350	1295	-4%	1118	16%
	2019E	1500	1500	0%	1197	25%
	2020E	1700	1600	-6%	1265	26%
	LT price (nom. 2021)	1838	1827	-1%	1347	36%
	LT price (real 2015)	1600	1600	0%	1307	22%
Palladium (US\$/oz)	2016E	750	580		572	1%
	2017E	850	755	-11%	655	15%
	2018E	850	850	0%	721	18%
	2019E	900	900	0%	763	18%
	2020E	950	950	0%	764	24%
	LT price (nom. 2021)	1034	1028	-1%	702	46%
	LT price (real 2015)	900	900	0%	676	33%
Mn Ore (US\$/dmu 44% CFR)	2016E	2.44	2.66	9%	2.32	15%
	2017E	3.38	3.38	0%	2.60	30%
	2018E	3.94	3.94	0%	2.54	55%
	2019E	4.19	4.19	0%	2.79	50%
	2020E	4.50	4.50	0%	3.07	47%
	LT price (nom. 2021)	4.60	4.57	-1%	3.89	17%
	LT price (real 2015)	4.00	4.00	0%	3.67	9%
Rutile (US\$/t)	2016E	800	623	-22%	738	-16%
	2017E	875	788	-10%	789	0%
	2018E	950	950	0%	842	13%
	2019E	1075	1075	0%	902	19%
	2020E	1275	1275	0%	953	34%
	LT price (nom. 2021)	1494	1485	-1%	1062	40%
	LT price (real 2015)	1300	1300	0%	1038	25%
Zircon (US\$/t)	2016E	1030	860	-17%	960	-10%
	2017E	1075	994	-8%	1028	-3%
	2018E	1200	1200	0%	1096	9%
	2019E	1325	1325	0%	1159	14%
	2020E	1525	1525	0%	1211	26%
	LT price (nom. 2021)	1609	1599	-1%	1226	30%
	LT price (real 2015)	1400	1400	0%	1169	20%
A\$/US\$	2016E	0.720	0.751	4%	0.700	7%
	2017E	0.722	0.759	5%	0.700	8%
	2018E	0.730	0.757	4%	0.730	4%
	2019E	0.738	0.754	2%	0.760	-1%
	2020E	0.747	0.751	1%	0.790	-5%
	LT	0.750	0.750	0%	0.81	-7%

Source: UBS Research, Access Economics

Figure 62: UBS commodity price changes – iron ore, metallurgical & thermal coals (FOB)

Commodity	period	old contract		new contract		new vs old	consensus	consensus	UBS vs cons
		US\$/t fob	% chg yoy	US\$/t fob	% chg yoy	% chg	US\$/t fob	% chg yoy	% diff.
Iron ore fines (62%Fe, Pilbara fines)									
	2016E	38		41		7%	39		5%
	2017E	38	-1%	38	-8%	-1%	39	-1%	-3%
	2018E	43	13%	43	13%	0%	44	13%	-3%
	2019E	49	13%	49	13%	0%	47	6%	4%
	2020E	53	9%	53	9%	0%	54	15%	-1%
	LT price (nom. 2021)	54	2%	54	1%	-1%	57	7%	-7%
	LT price (real 2015)	47	0%	47	0%	0%	52	7%	-10%
Iron ore fines (62%Fe, landed North China)									
	2016E	45		45		0%	44		1%
	2017E	47	3%	45	-1%	-4%	45	2%	-2%
	2018E	52	11%	52	16%	0%	50	10%	4%
	2019E	58	11%	58	12%	0%	53	7%	8%
	2020E	62	8%	62	8%	0%	57	8%	9%
	LT price (nom. 2021)	63	2%	63	1%	-1%	64	12%	-2%
	LT price (real 2015)	55	0%	55	0%	0%	58	12%	-5%
Hard coking coal									
	2016E	84		84		0%	82		3%
	2017E	89	6%	89	5%	0%	85	3%	5%
	2018E	95	7%	95	7%	0%	91	8%	4%
	2019E	105	11%	105	11%	0%	98	7%	7%
	2020E	119	13%	119	13%	0%	106	8%	12%
	LT price (nom. 2021)	121	2%	120	1%	-1%	134	26%	-10%
	LT price (real 2015)	105	0%	105	0%	0%	119	-11%	-12%
Low Vol PCI									
	2016E	68		72		5%	n/a	n/a	n/a
	2017E	71	4%	71	-1%	0%	n/a	n/a	n/a
	2018E	75	6%	75	6%	0%	n/a	n/a	n/a
	2019E	82	10%	82	10%	0%	n/a	n/a	n/a
	2020E	90	9%	90	9%	0%	n/a	n/a	n/a
	LT price (nom. 2021)	92	2%	91	2%	-1%	n/a	n/a	n/a
	LT price (real 2015)	80	0%	80	0%	0%	n/a	n/a	n/a
Semi-Soft coking coal									
	2016E	64		69		7%	n/a	n/a	n/a
	2017E	67	4%	67	-3%	0%	n/a	n/a	n/a
	2018E	69	4%	69	4%	0%	n/a	n/a	n/a
	2019E	73	6%	73	6%	0%	n/a	n/a	n/a
	2020E	79	8%	79	8%	0%	n/a	n/a	n/a
	LT price (nom. 2021)	80	2%	80	1%	-1%	n/a	n/a	n/a
	LT price (real 2015)	70	0%	70	0%	0%	n/a	n/a	n/a
Thermal coal - contract									
	JFY16E	61		61		0%	n/a	n/a	n/a
	JFY17E	60	-2%	60	-2%	0%	n/a	n/a	n/a
	JFY18E	61	2%	61	2%	0%	n/a	n/a	n/a
	JFY19E	62	2%	62	2%	0%	n/a	n/a	n/a
	JFY20E	62	0%	62	0%	0%	n/a	n/a	n/a
	JFY21E	64	2%	63	2%	-1%	n/a	n/a	n/a
	LT price (real 2015)	55	0%	55	0%	0%	n/a	n/a	n/a
Thermal coal - spot									
	2016	55		55		-1%	50		9%
	2017	56	0%	56	2%	0%	50	-1%	11%
	2018	57	2%	57	2%	0%	52	4%	9%
	2019	58	3%	58	3%	0%	55	6%	6%
	2020	62	7%	62	7%	0%	58	6%	7%
	LT price (nom. 2021)	63	2%	63	1%	-1%	73	25%	-14%
	LT price (real 2015)	55	0%	55	0%	0%	65	-11%	-15%

Source: UBS Research, Access Economics

UBS commodity price forecasts: charts

Figure 63: Copper

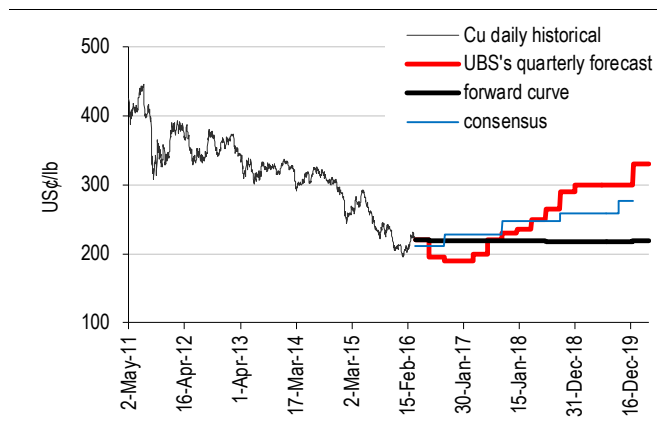


Figure 64: Aluminium

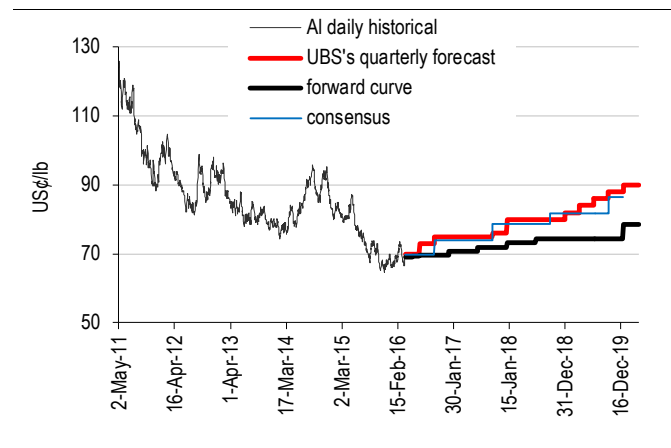


Figure 65: Nickel

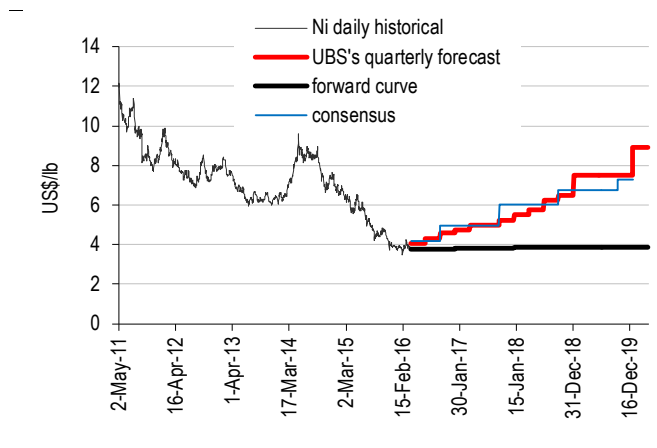


Figure 66: Zinc

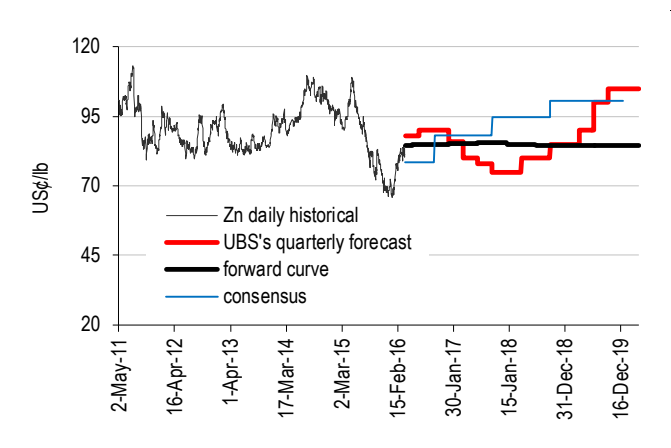


Figure 67: Lead

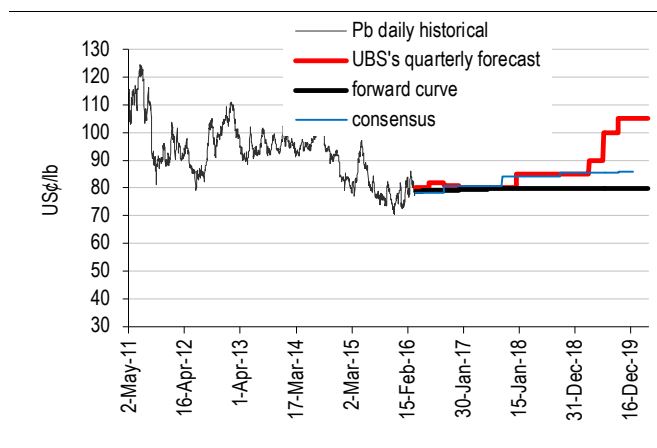
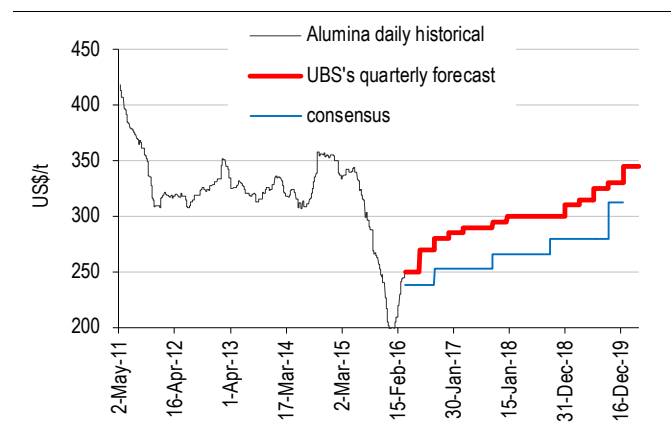


Figure 68: Alumina



Source: UBS Research, Bloomberg, company data

UBS commodity price forecasts: charts (continued...)

Figure 69: Gold

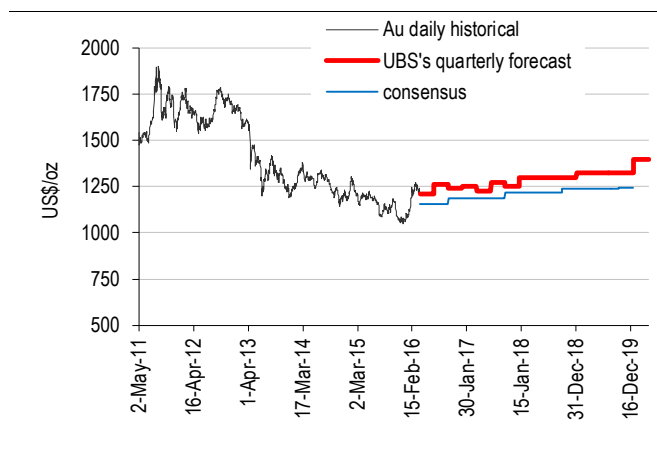


Figure 70: Crude oil

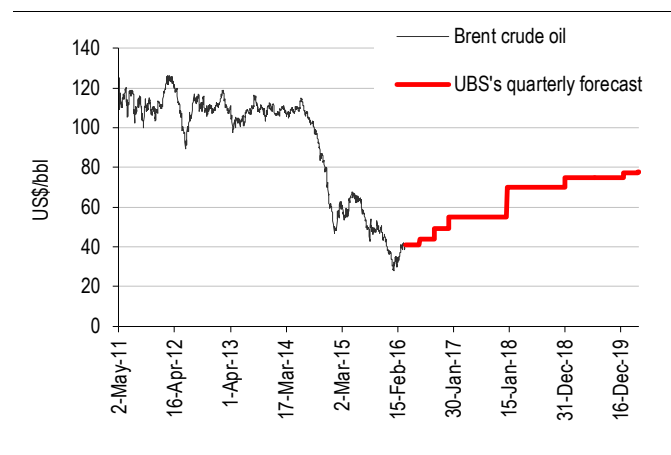


Figure 71: Thermal coal (Newcastle spot)

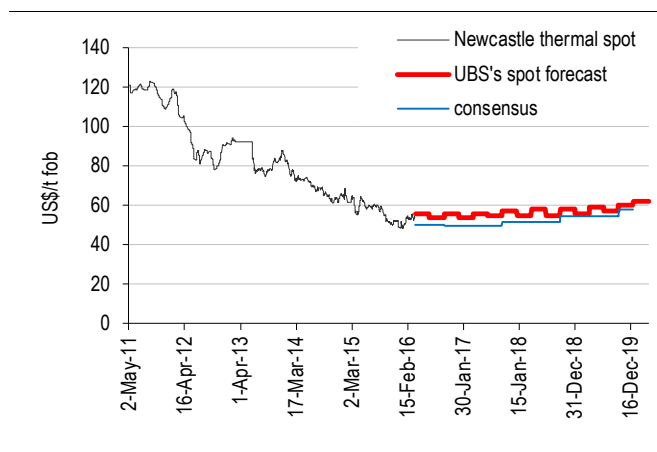


Figure 72: Uranium

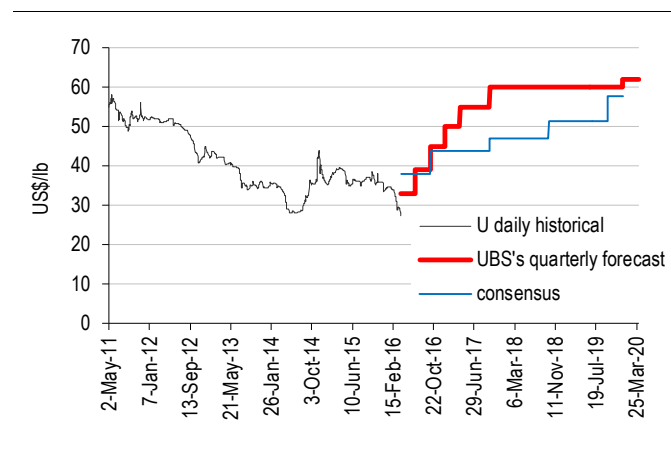


Figure 73: Hard coking coal

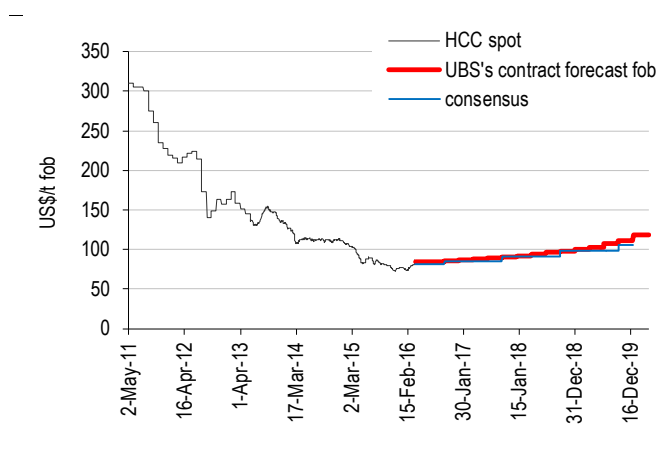
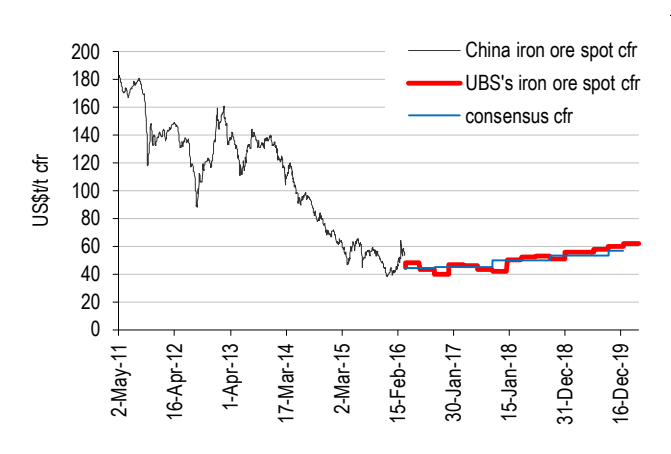


Figure 74: Iron ore (fines)



Source: UBS Research, Bloomberg, company data

UBS top commodity picks

<3-month view

- (1) **Zinc:** Mine supply is set to contract in 2016e from shuts & the end of Century material hitting the market (4% of global supply).
- (2) **Nickel:** Current spot price appears well oversold, industry shuts are needed. But if shuts are protracted then price could continue to languish.
- (3) **Alumina:** set to consolidate rapid price gains post the recent consumer liquidation event. Upside may be capped, though, from supply restarts.
- (4) **Gold:** The build-up in positioning suggests more consolidation may be needed in the near-term; however, we believe gold strength this year is valid and expect prices to be resilient and support likely to come in around \$1200.
- (5) **Silver:** Silver should continue to track gold price action – we expect the gold:silver ratio to trade around recent levels.
- (6) **Platinum:** Platinum's positive correlation with gold is likely to remain a key driver amid limited fundamental catalysts for now. Potential upside risks could come from SA as wage contracts are negotiated.
- (7) **Palladium:** Although net positioning in palladium is the leanest among its peers, recent short-covering suggests there is room for shorts to be rebuilt.
- (8) **Aluminium:** Shuts in China & a reduction in exports to see prices supported & track back around US\$0.70/lb. Government support a risk to shuts.
- (9) **Metallurgical coal:** Trade data shows supply cuts, a lift in producer FX, oil has stabilised & slightly lifted costs. Stable outlook near-term.
- (10) **Uranium:** Spot is back below the marginal cost of production; the re-fire of the 3rd reactor of Japan's nuclear fleet may support higher prices.
- (11) **Thermal coal:** Trade shows falling demand and supply cuts, but some stabilisation of cost curves, suggesting limited price downside near term.
- (12) **Copper:** Surpluses expected in 2016-17e requiring supply side shuts. Most miners making cash, so for shuts prices will need to track below US\$2/lb.
- (13) **Iron ore:** Price has lifted strongly on restocking & Q1 seasonal lift in China's steel production rates. The green shoots in China's property sector will need to be maintained into Apr-May to sustain price strength.
- (14) **Zircon:** China's property sales are positive, but discounting by Rio Tinto is settling across the industry.
- (15) **Titanium feedstock:** Ilmenite and feedstock prices also remain under pressure as pigment demand remains relatively muted notwithstanding better growth in the US and the nascent Chinese property sales recovery.
- (16) **Manganese:** Spot price has run too hard in the short term after some big supply cuts. Expect supply restarts to lower customer anxiety & prices.

>12-month view

- (1) **Nickel:** Around half of the industry in a loss making position is not sustainable, shuts are needed. Oil price lift would be positive for both demand of stainless steel & cost reflation of mine supply.
- (2) **Palladium:** Supply/demand factors are robust, suggesting inventories are being drawn down at a relatively faster rate – we expect signs of market tightness to emerge which should start to manifest in price action.
- (3) **Alumina:** Price reflation from higher oil prices expected to lift cost curve via mining & freighting bauxite as well as through oil-fired refineries.
- (4) **Thermal coal:** China (& potentially) India's withdrawal from seaborne trade caps upside even as supply rebalancing is underway as cost curves stabilise/reflate. Neutral price risks into the medium term.
- (5) **Metallurgical coal:** Trade cuts accelerating, 4½ years into down-cycle, perhaps trough pricing set in H116?
- (6) **Uranium:** Restarting Japanese nuclear power, new nuclear capacity in China, and a lack of mine investment = gradually tightening markets.
- (7) **Gold:** Expect gold strength to continue as more strategic reallocation takes place, with gold increasingly regaining its status as a credible safe haven and portfolio diversifier. Low/negative interest rate environment should underpin the market.
- (8) **Silver:** Silver is likely to struggle consistently outperforming gold this year as the key driver for strength in the latter is safe haven demand. We expect improvements in silver fundamentals to attract investor interest in the long run.
- (9) **Platinum:** Support this year is likely to come more from platinum's positive correlation with gold. We don't expect significant signs of tightening until we get closer to 2018, as the market continues to digest above-ground stocks.
- (10) **Aluminium:** Long term ROIC's in industry will be challenged by China exporting a growing domestic aluminium surplus to global markets, displacing existing capacity.
- (11) **Zinc:** The supply shock of early 2016 should start to fade from the return of idled mines & new projects.
- (12) **Copper:** While not a factor now, on a 2 year view, there is a need for significant ongoing supply investment requiring an incentive price.
- (13) **Titanium feedstock:** Greater risks are emerging from growth in new pigment capacity in China seeking low quality feed & exporting product.
- (14) **Zircon:** Stable prices still expected with major producers managing back inventory & supply to feed market growth.
- (15) **Iron ore:** Supply cuts and closures will support pricing but weak demand and falling controllable costs makes it hard for a sustained lift.
- (16) **Manganese:** Spot price has run too hard in the short term after some big supply cuts. Expect supply restarts to lower customer anxiety & prices.

UBS vs Consensus

For the first time in many quarters, our collection of price forecasts do not in general lie below consensus. Instead there is a broad mixture. Below find outlines of our forecast and variance to consensus. For 2016-17 in general;

- **Higher than consensus:** Crude Oil, Precious metals, Thermal Coal, Alumina & Manganese & Uranium
- **Inline or near consensus:** Iron ore, Aluminium, Nickel, Zinc (above for 2016, below for 2017)
- **Below consensus:** Copper & Mineral Sands

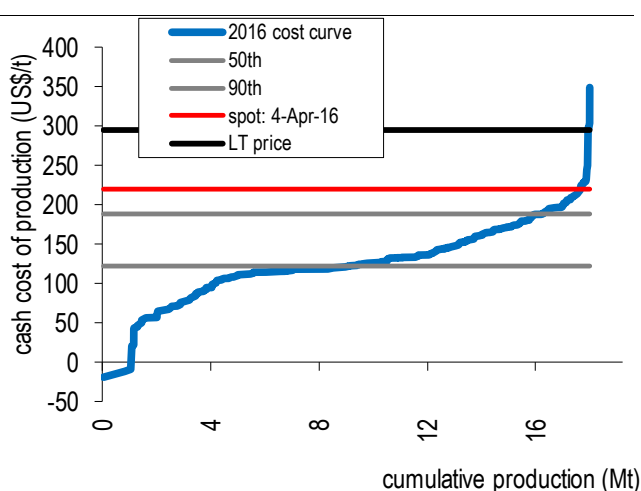
From our collection of calls, the ones we consider most different are:

- **Crude Oil:** Here UBS is forecasting US\$42/bbl for 2016e & US\$55/bbl for 2017e for Brent. This is almost 10% above consensus. The forecast lift in oil is a driver of assumed deflation over time in our cost curves & for our mined commodity price assumptions.
- **Precious Metals:** Here our price forecasts are 5-30% higher than consensus for 2016-2020e. Much of this is driven by our constructive view on gold, which we think will be a key driver for price action across the precious metals complex during the early part of the forecast period. We think gold has a valid role in investor portfolios given macro uncertainty and a low/negative interest rate environment; considerable declines in positioning over the past few years suggests there is room to rebuild gold exposure. While silver is likely to struggle to outperform gold this year, we continue to expect a downtrend in the gold:silver ratio over the long run as improvements in S/D fundamentals are likely to attract investor interest. For PGMs, substantial gains further out are driven by fundamental factors, wherein we expect market tightness to start emerging as above-ground stocks are drawn down. Price reaction is likely to be amplified given current limited interest and lack of investor positioning.
- **Copper:** Our price forecasts include copper trending to US\$1.90/lb in late 2016e. Our yearly averages forecasts are US\$2.04/lb for 2016e & US\$2.10/lb for 2017e which are 4% & 8% below consensus. We had thought a market surplus was more or less a consensus expectation for 2016e & perhaps 2017e. But consensus price expectations seem to suggest otherwise. Most copper mines are making cash or modest losses at spot of ~US\$2.20/lb. At a C1 level marginal costs are US\$1.90/lb. So we differ in consensus that copper prices need to drop below US\$2/lb to get the rebalancing needed from the supply side.
- **Alumina:** Our forecasts of US\$255/t for 2016e & US\$290/t for 2016e & 2017e, respectively sit 7-15% above consensus. Here we recognise that the rapid fall in prices in 2016Q1 was mostly a fleeting liquidation event & that prices would recover back up the cost curve. In the short term there is a risk of prices being capped by restarts in China (marginal costs are ~US\$270/t). In 2017e our above consensus view is mostly tied to our above consensus view on oil prices for which alumina is one of the more exposed commodities. Lastly we note we are different to consensus on the implied alumina-aluminium linkage, we see this lifting back towards 17% by the end of 2016e, this was an average of 18% in 2014-5.

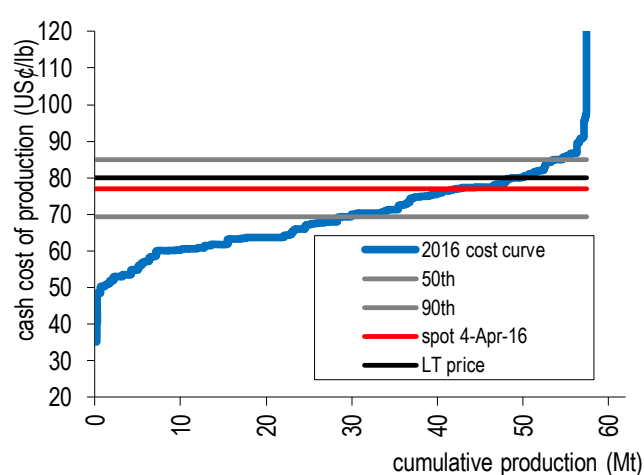
WHAT'S PRICED IN?

[return](#) ↑**Mostly an unsustainable industry price/margin environment**

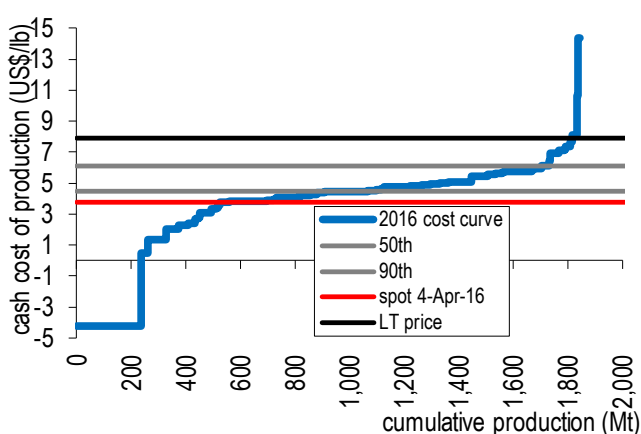
- Most spot commodity prices see between 10-50% of producers in loss making territory. This is clearly not a sustainable situation for the long term. But large scale industry losses are likely to continue to be a market feature in 2016 until shuts are made to rebalance markets, or we see an unexpected lift in demand growth.

Figure 75: Copper

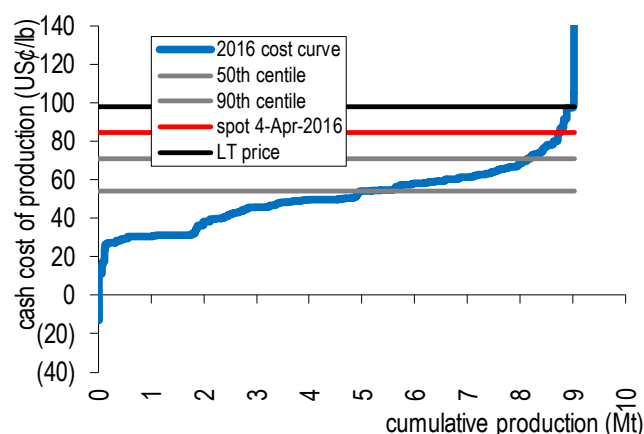
Source: Wood MacKenzie, UBS Research

Figure 76: Aluminium

Note: Spot price above includes US Midwest merchant premia (LME + premia)
 Source: Wood MacKenzie, UBS Research

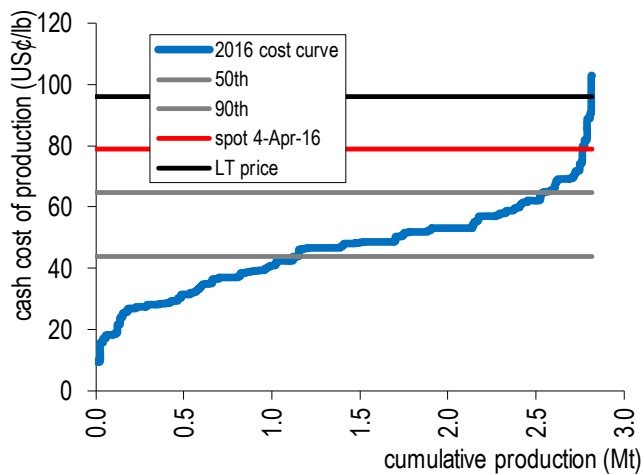
Figure 77: Nickel

Source: Wood MacKenzie, UBS Research

Figure 78: Zinc

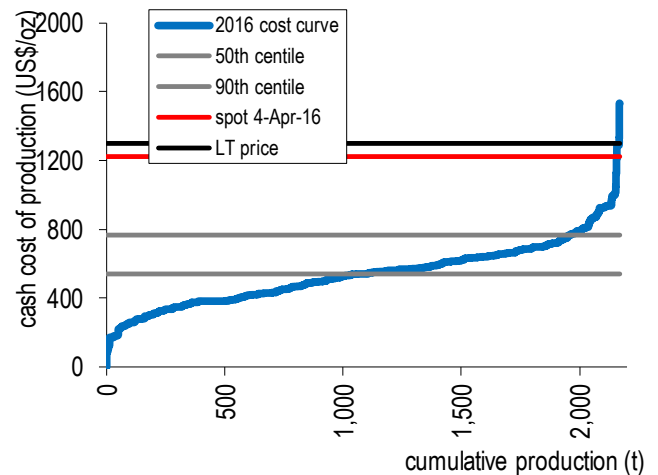
Source: Wood MacKenzie, UBS Research

Figure 79: Lead



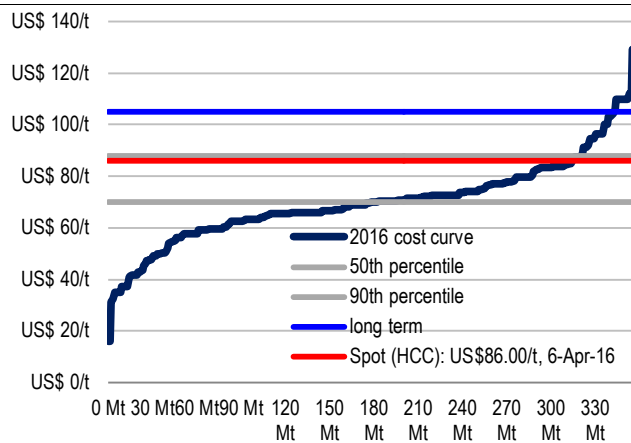
Source: Wood MacKenzie, UBS Research

Figure 80: Gold



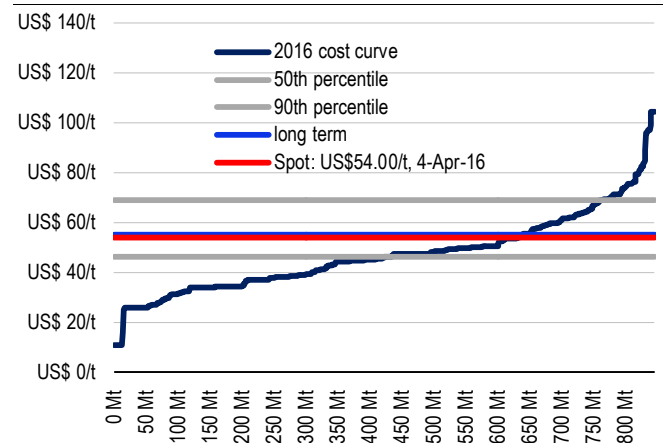
Source: Wood MacKenzie, UBS Research

Figure 81: Metallurgical coal (HCC + PCI + SSCC)



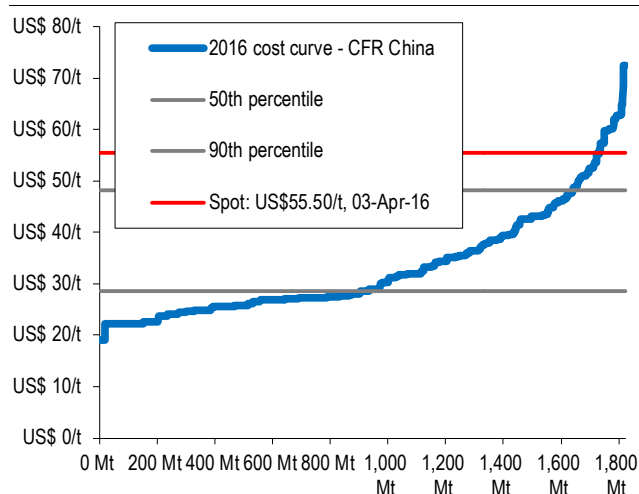
Source: AME 1Q16, Platts, UBS Research.

Figure 82: Thermal coal



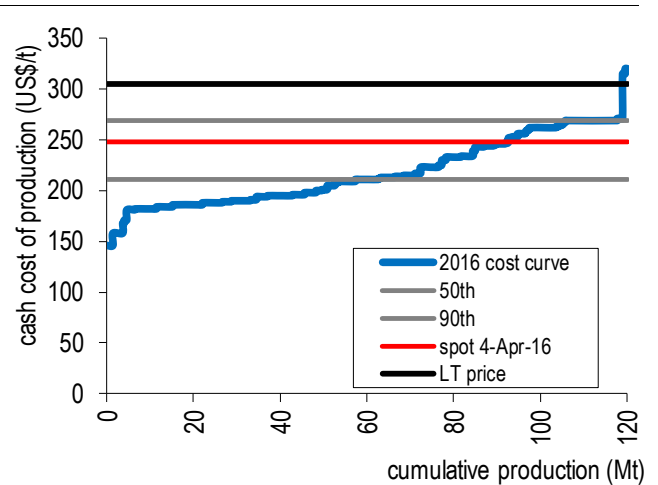
Source: AME 3Q15, Platts, UBS Research.

Figure 83: Iron ore (fines, lump, pellets) – by operation



Source: UBS Research, Metalystics, WM-BH, Bloomberg, company reports

Figure 84: Alumina



Source: Wood MacKenzie, UBS Research.

UPSIDE / DOWNSIDE SPECTRUM

[return](#) ↑

- Our base case forecasts carry asymmetric risks between the upside & downside.

Upside Scenario

- An unexpected shift towards synchronous global economic growth above trend. In China infrastructure spend lifts while property construction enters positive growth in 2016H1. Global trade lifts & with it activity in emerging market economies (SE Asia, India, Brazil). On the supply side, the mining industry is not ready for the shift with some supply shuts tightening supply.
- 2016Q1 proves to be the bottom in commodities & exposed equities.

Figure 85: Upside case vs UBS base case

Commodity	2016E	2017E	2018E	2019E	2020E	LT real
Copper (US\$/lb)	234(204)	260(210)	275(260)	300(nc)	330(nc)	295(nc)
Alum. (US\$/lb)	75(72)	80(75)	80(nc)	85(nc)	90(nc)	80(nc)
Nickel (US\$/lb)	4.3(4.2)	5.3(5)	6(nc)	7.5(nc)	8.9(nc)	7.9(nc)
Zinc (US\$/lb)	90(85)	93(80)	85(80)	95(nc)	105(nc)	98(nc)
Gold (US\$/oz)	1350(1225)	1250(nc)	1300(nc)	1325(nc)	1400(nc)	1300(nc)
Platinum (US\$/oz)	1050(985)	1080(nc)	1295(nc)	1500(nc)	1600(nc)	1600(nc)
IO (fines; US\$/t cfr)	50(45)	52(45)	55(52)	58(nc)	62(nc)	55(nc)
HCC (US\$/t fob)	88(84)	94(89)	96(95)	105(nc)	119(nc)	105(nc)
Thermal (US\$/t fob)	58(55)	61(56)	61(57)	61(58)	63(63)	55(nc)
AUD (US\$)	75(75)	78(76)	77(76)	76(75)	75(75)	75(nc)

Source: UBS Research; nc=no change; iron ore prices 62% Fe eqv; thermal coal is spot.

Downside Scenario

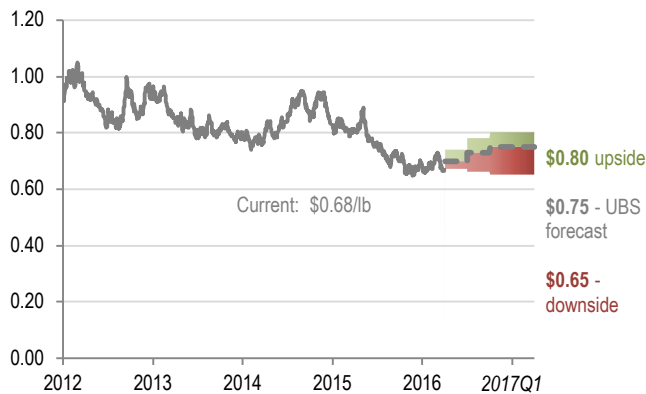
- Lower demand growth is driven by a further moderation in the pace of growth in China, with a lack of a lift in actual infrastructure activity & property construction activity remaining in negative territory until late 2017e. On the supply side, there is greater deflation of costs than we have factored while supply shuts that are needed are more protracted.
- We have the commodity price cycle bottoming in 2017e & lifting from here to lower long term prices.

Figure 86: Downside case vs UBS base case

Commodity	2016E	2017E	2018E	2019E	2020E	LT real
Copper (US\$/lb)	184(204)	170(210)	260(nc)	300(nc)	330(nc)	295(nc)
Alum. (US\$/lb)	67(72)	71(75)	80(nc)	85(nc)	90(nc)	80(nc)
Nickel (US\$/lb)	3.7(4.2)	4.3(5)	6(nc)	7.5(nc)	8.9(nc)	7.9(nc)
Zinc (US\$/lb)	82(86)	76(80)	80(nc)	95(nc)	105(nc)	98(nc)
Gold (US\$/oz)	1150(1225)	1250(nc)	1300(nc)	1325(nc)	1400(nc)	1300(nc)
Platinum (US\$/oz)	850(985)	1080(nc)	1295(nc)	1500(nc)	1600(nc)	1600(nc)
IO (fines; US\$/t cfr)	42(45)	40(45)	44(52)	46(58)	54(62)	55(nc)
HCC (US\$/t fob)	79(84)	79(89)	86(95)	95(105)	116(119)	105(nc)
Thermal (US\$/t fob)	49(55)	45(56)	50(57)	55(58)	63(63)	55(nc)
AUD (US\$)	73(75)	73(76)	74(76)	74(75)	75(75)	75(nc)

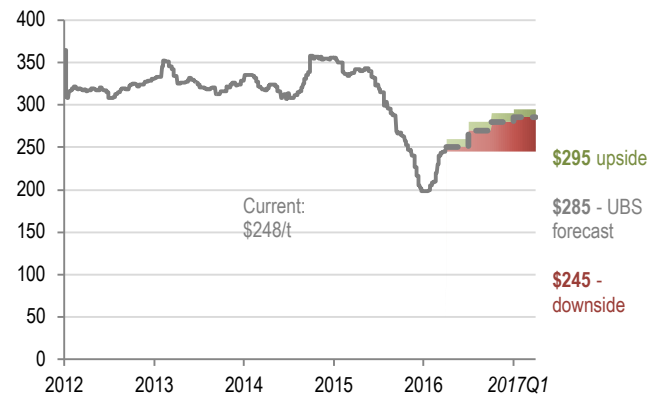
Source: UBS Research; nc=no change; iron ore prices 62% Fe eqv; thermal coal is spot.

Figure 87: Aluminium (US\$/lb)



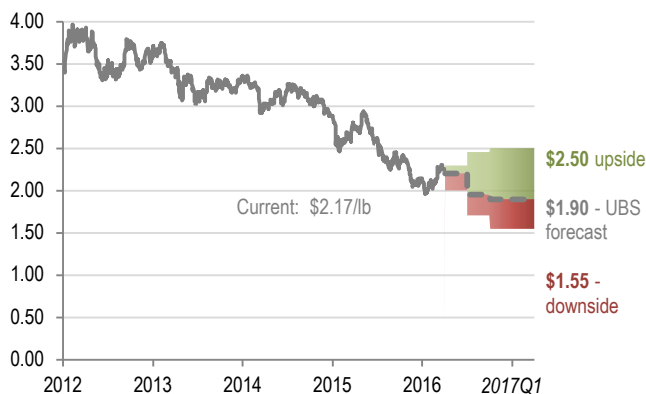
Source: Bloomberg & UBS estimates.

Figure 88: Alumina (US\$/t)



Source: Metal Bulletin & UBS estimates.

Figure 89: Copper (US\$/lb)



Source: Bloomberg & UBS estimates.

Figure 90: Nickel (US\$/lb)



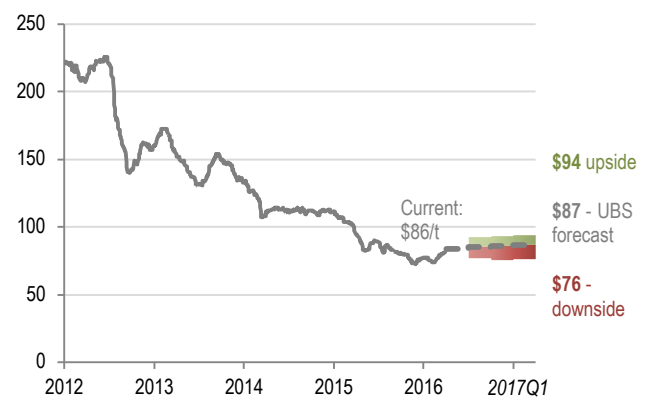
Source: Bloomberg & UBS estimates.

Figure 91: Iron Ore (US\$/t cfr)



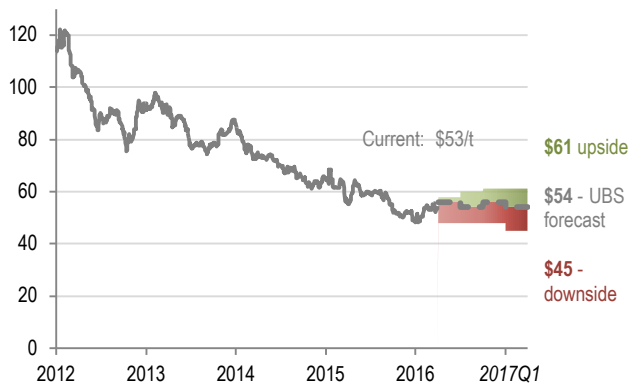
Source: Bloomberg & UBS estimates.

Figure 92: Met Coal (US\$/t)



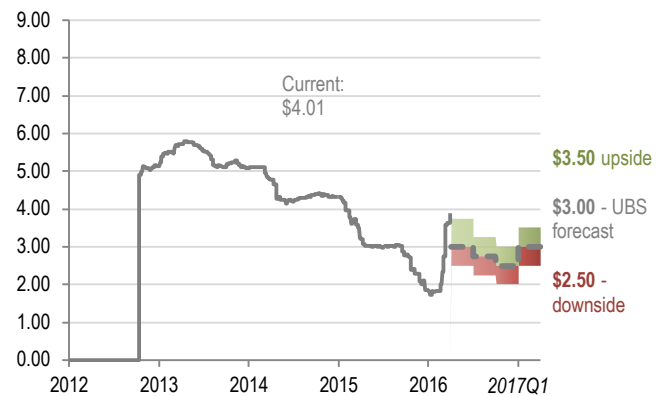
Source: Bloomberg & UBS estimates.

Figure 93: Thermal Coal (US\$/t)



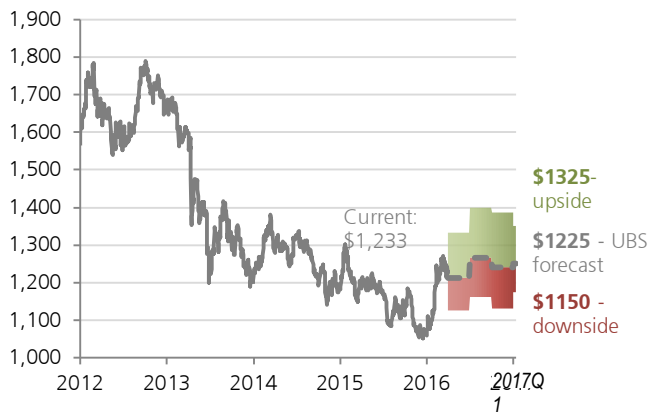
Source: Platts & UBS estimates.

Figure 94: Manganese Ore (US\$/dmu cfr)



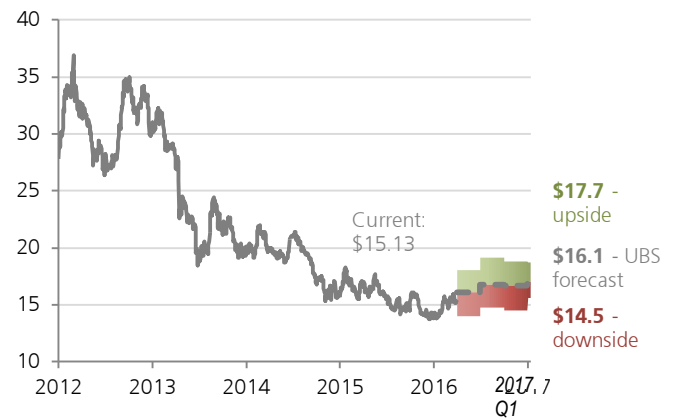
Source: Metal Bulletin & UBS estimates.

Figure 95: Gold (US\$/oz)



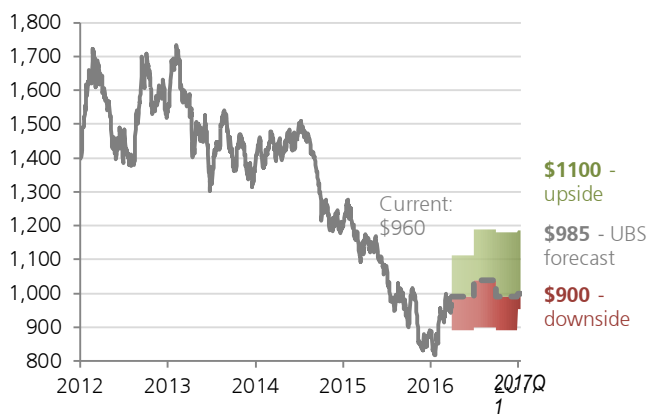
Source: Bloomberg & UBS estimates.

Figure 96: Silver (US\$/oz)



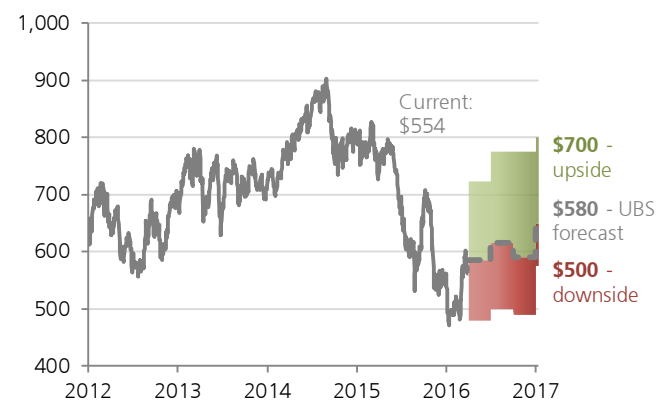
Source: Bloomberg & UBS estimates.

Figure 97: Platinum (US\$/oz)



Source: Bloomberg & UBS estimates.

Figure 98: Palladium (US\$/oz)



Source: Bloomberg & UBS estimates.

Commodity reviews

Base Metals

Copper

PIVOTAL QUESTIONS

Q: Can the key drivers of China's copper demand consume the copper surplus?

Our copper model reports a surplus of ~125kt in 2016e, modest vs global refined consumption of 23.9Mt & China's demand of 11.9Mt (+4.1%/y). To consume our surplus, we would need China copper demand to run at 5.2%/y. While this is possible, we think the key factors of demand, i.e. property & grid investment make this run rate difficult to achieve. Upside risk is most likely from grid spending lifting above budget. Property strength in early 2016 could also support upside if sustained.

Q: Can mine and scrap supply rebalance the market?

Announced shuts account for 3.3% of global supply, but net of these we have 2.4% supply growth in 2016 & an overall surplus of ~125kt. We also assessed our global equity coverage and operations for free cashflow and conclude that most mines at spot are making cash or modest losses. For shuts to rebalance the market a copper price below US\$2/lb would be needed in our view. High cost scrap is clearly exiting the trade & offering price support rather than a floor. The low barriers to exit of mine supply & the exit of some scrap supply is a clear differentiator to other commodities. This also means copper prices are unlikely to decline too deeply into the cost curve (but beware deflation).

Q: Are cost curves still deflating?

While cost curves are still deflating it is difficult to assess levels of price support or pinch-points where supply is likely to cut. Collectively the copper industry has moved from a growth or volume footing in 2012-14 towards a value or cost out focus now. We think there is an ongoing focus from companies to reduce headcount, squeeze suppliers, lift efficiencies which are going to continue to drive cost curve deflation in 2016. Oil & producer currency moves have been an important deflation driver too. Here the UBS house view is for costs to lift with Brent prices to average US\$42.5/bbl in 2016e & US\$55/bbl in 2017e. Were this to occur this would contribute to a stabilisation of cost deflation.

UBS VIEW

Copper price downside in 2016: We believe the copper spot price is vulnerable of modest downside. Demand growth would need to run at >5% in China to consume the market surplus. Supply could rebalance the trade, but most operations are still making cash & cost curves are still deflating. We forecast a price of US\$2.04/lb in 2016e in our base case (bottoming at US\$1.90/lb in Q4), but also highlight asymmetric downside risk, with a downside scenario of US\$1.55/lb & upside of US\$2.50/lb.

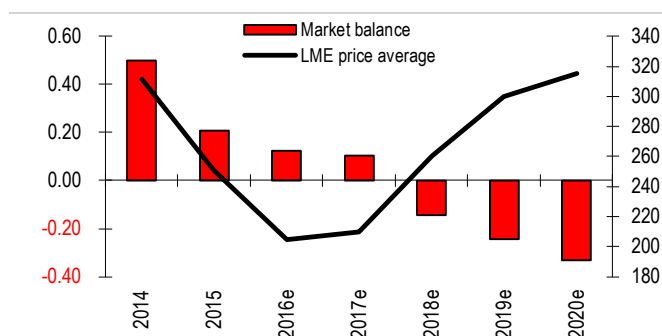
EVIDENCE

The signals that matter on demand & supply: To test our thesis we will be watching a number of key signals, 1) China grid spending, 2) property sales in China 3) appliances production trends, 4) trade flows from key exporters & importers, 5) key supply lifts in 2016 & 6) supply shuts.

WHAT'S PRICED IN?

A balanced outlook near term: The current spot price of ~US\$2.20/lb sits above the 90th percentile of the global C1 cash cost curve. Here copper is a comparative outlier against other mined commodities (C1 losses of 20-80%). But we do not think spot factors in an incentive price for new supply, which will be needed longer term. We currently factor in US\$2.95/lb for this (estimated Jan-14); and explored downside risk to this number of ~US\$2.40/lb in our note [China Panda Bear](#).

Figure 99: Price & supply/demand balance (Mt & US\$/lb)



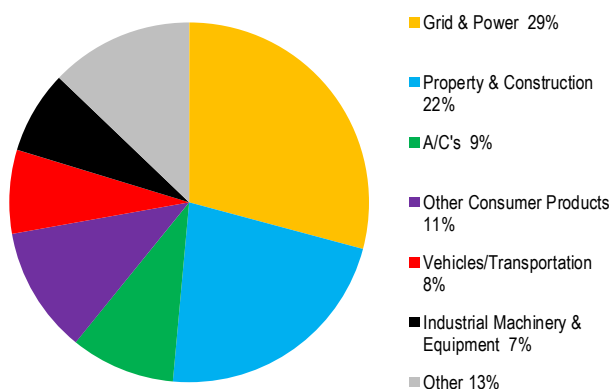
Source: UBS Research.

Figure 100: Upside/Downside



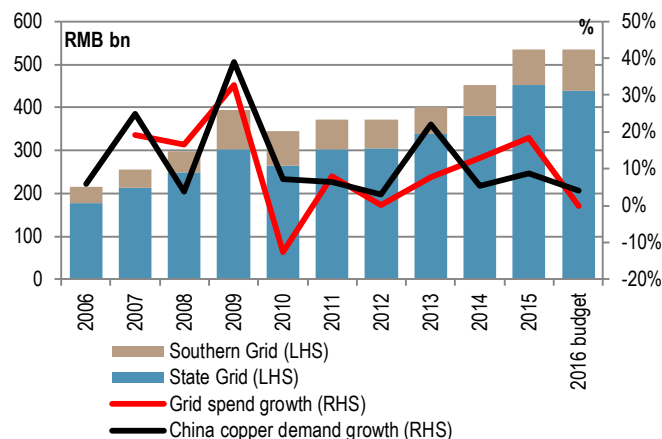
Source: UBS & Bloomberg.

Figure 101: China demand driven by property & grid



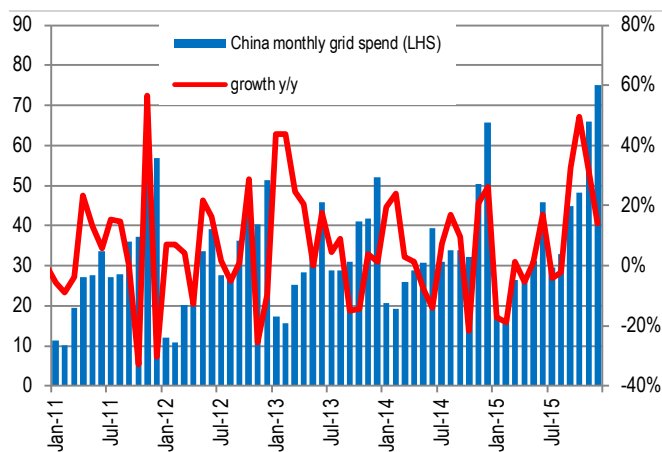
Source: Wood Mackenzie, WBMS, UBS

Figure 102: Grid spending budgeted flat y/y



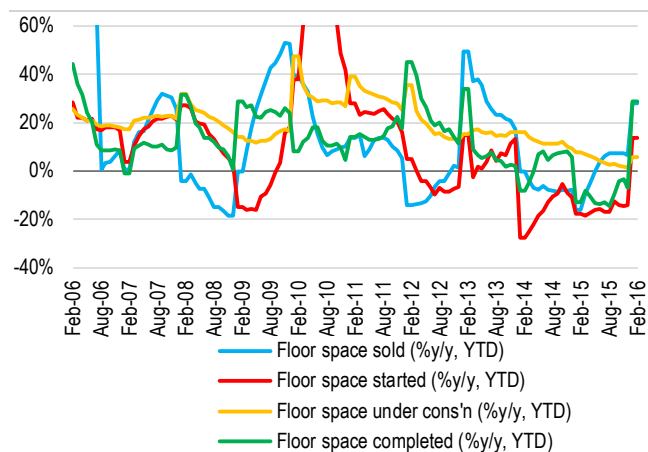
Source: Company filings and UBS estimates.

Figure 103: 2015 Grid spend implies a good start to 2016



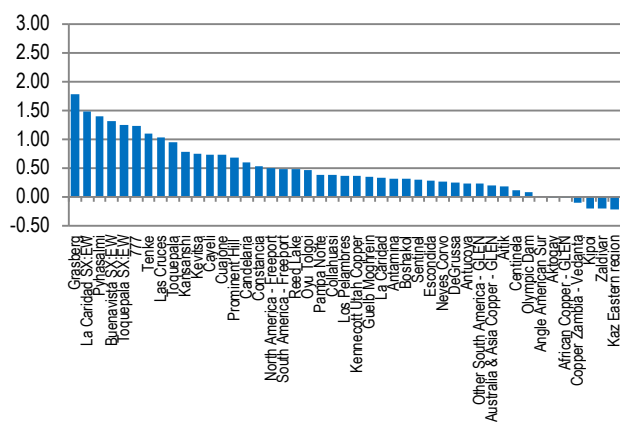
Source: NBS & Bloomberg.

Figure 104: Property sales have surprised so far in 2016



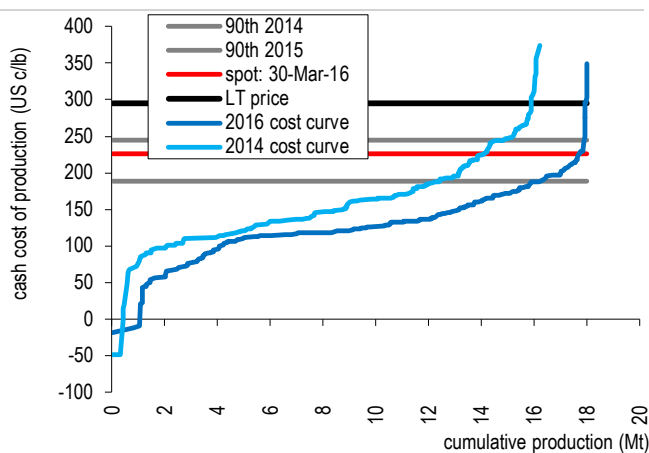
Source: CEIC and UBS estimates.

Figure 105: Most copper mines are still making cash (FCF/lb)



Source: UBS estimates. FCF is based on EBITDA – sustaining capex for 2016 under UBS commodity price assumptions.

Figure 106: Cost Curves are still deflating



Source: Wood Mackenzie & UBS estimates.

Aluminium

PIVOTAL QUESTIONS

Q: Could stronger demand growth consume the structural market surplus?

Aluminium demand growth has been among the most robust in our commodity coverage at 8% CAGR in 2010-15. We forecast a lower but still strong 2.5% CAGR globally to 2020e from global economic growth & aluminium winning market share from steel & other materials. Clearly, demand growth could be higher than forecast. But we see supply growth as ample & unconstrained to meet this. China's refining & smelting industry is expanding from low capital costs, low cost of capital & low opex from exploiting abundant coal deposits. Aluminium rarely historically trades for any length of time above marginal cost of production which is currently ~US\$0.85/lb.

Q: Are supply shuts likely to rebalance the trade?

Prices languishing around US\$0.65-0.70/lb late in 2015/early 2016 prompted a number of smelters to curb production, including in China. China's metal exports eased during this time. Aluminium prices & premia responded with a slight lift in supply anxiety detected. But Mar-15 has seen some shuts delayed & restarts in China indicating that at prevailing prices of US\$0.70-0.75/lb the China production & export valve can act as a price cap in the near term.

Q: Are inventory levels still elevated enough to prevent prices from lifting?

Inventory in visible exchanges has declined from a peak of 5.8Mt in 2013 to around 3.2Mt now, or around 20 days of consumption. So optically inventory does not seem elevated. But a number of trade contacts see non-visible inventory as much higher, with numbers of >10Mt mentioned in non-registered warehouses, a hang-over from the carry-trade. These fears are difficult to confirm or disprove. Numerous trade signals such as merchant premia indicate that metal is available.

UBS VIEW

Aluminium downside limited but upside capped by China: Spot prices implying around a third of the industry is loss making, not a sustainable footing longer term. Demand growth & shuts should see some prices improvement over time. We forecast US\$0.72/lb in 2016e & US\$0.75/lb in 2017e. But aluminium remains a structurally challenged industry because supply will expand in lock-step or even exceed demand growth. The massive & expanding low-cost China production entering particularly from Xinjiang means ongoing surpluses there that will be exported to the world. Here the combination of low capital costs, low cost of capital, & low opex caps the longer term outlook for aluminium prices, margins & ROIC's. See [Aluminium: China capacity eating the World](#).

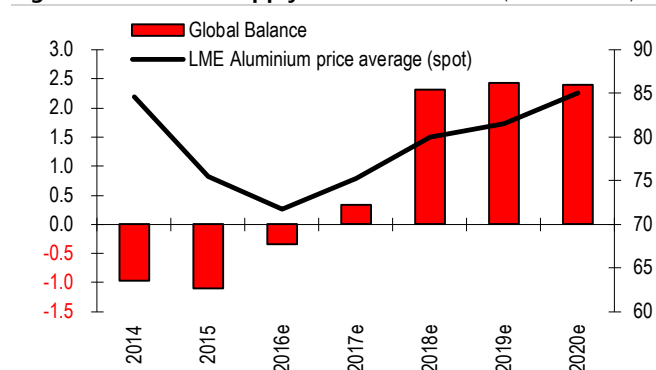
EVIDENCE

China trade flows key: China's aluminium exports should be monitored closely as they may signal a reduction in the domestic metal surplus from a lift in demand growth or shuts there. Production & net exports have declined for the past few months easing pressure on markets. China's exports declining to a neutral-position would be more bullish than our view of maintained/expanding at 500kt/mth.

WHAT'S PRICED IN?

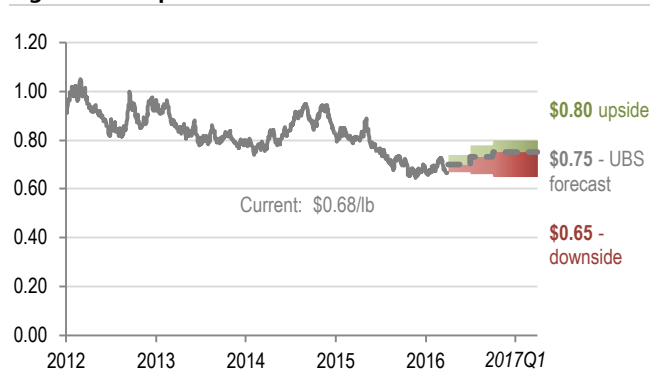
A third of industry loss-making: Taking into account merchant premia, the spot aluminium price of US\$0.69/lb is around the 67th percentile of the global cost curve, which we don't think is a sustainable footing for the industry longer term. Aluminium demand globally has not peaked so there is an ongoing need for supply growth & an incentive price. We estimate this incentive price to be US\$0.80/lb real as new smelters enter the trade at Q1-Q2 on the global cost curve & are likely to deflate the marginal cost position over time. We currently estimate marginal cost to be around US\$0.85/lb.

Figure 107: Price & supply/demand balance (Mt & US\$/lb)



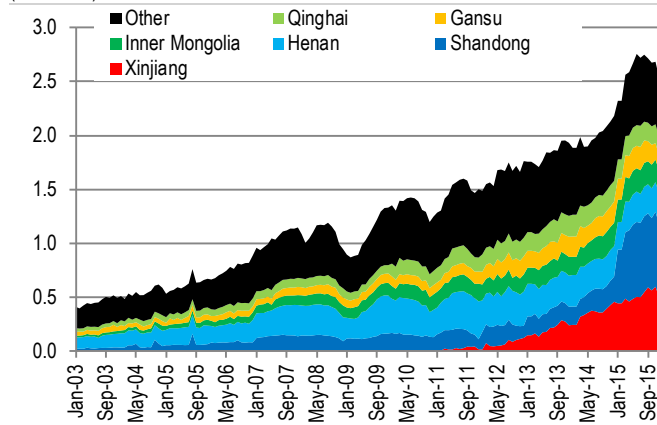
Source: UBS Research.

Figure 108: Upside/Downside



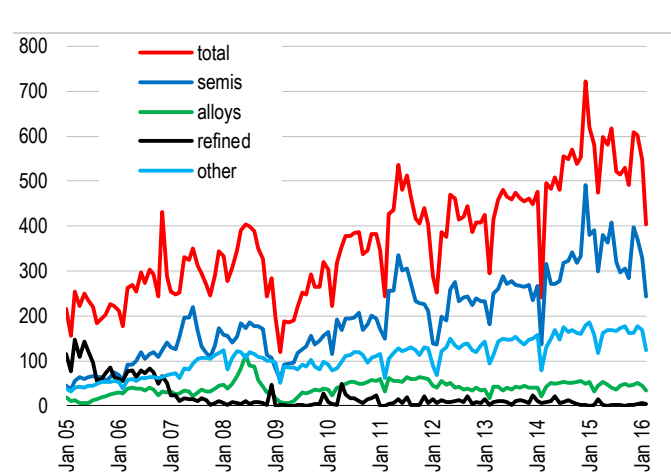
Source: UBS & Bloomberg.

Figure 109: China's aluminium production growth
(Mt/mth)



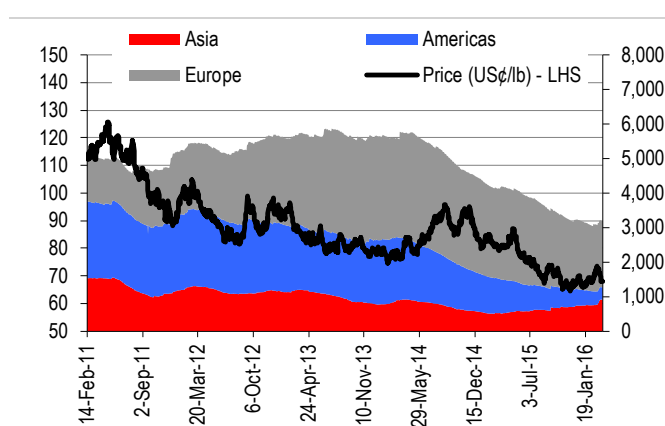
Source: China Customs, Antaika.

Figure 110: China aluminium exports (kt/mth)



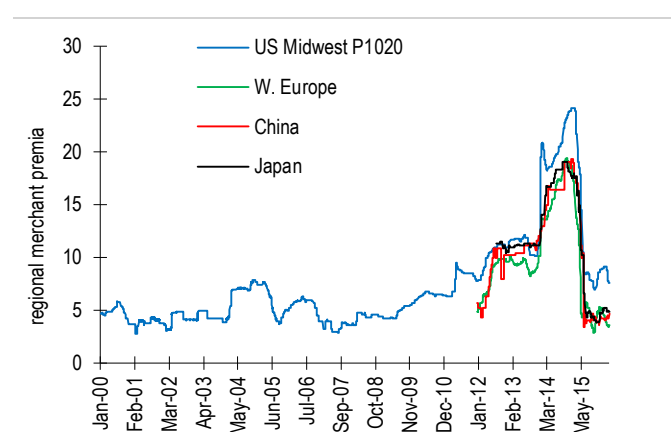
Source: China Customs, Antaika.

Figure 111: Aluminium exchange inv. & price (kt, US\$/b)



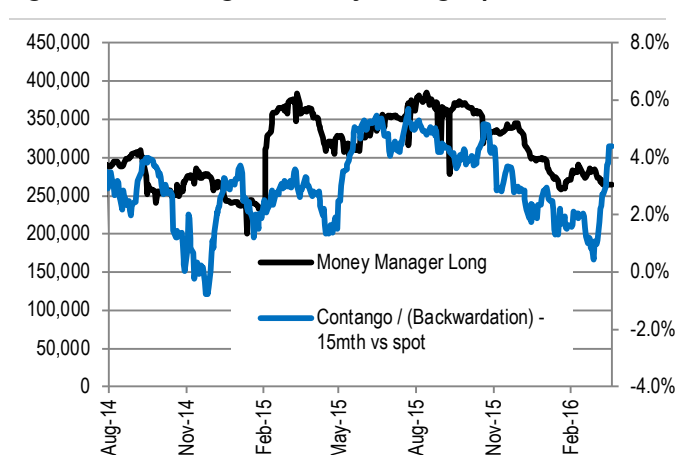
Source: LME, SHFE, Bloomberg.

Figure 112: Aluminium merchant premia (US\$/b)



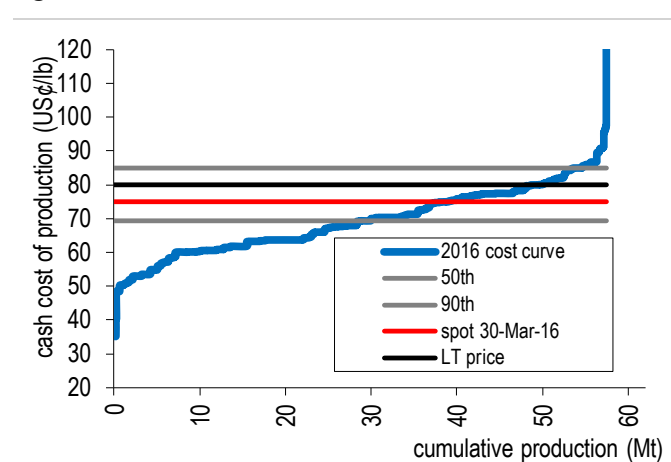
Source: Metal Bulletin, Bloomberg.

Figure 113: Contango vs Money Manager positions



Source: LME & Bloomberg.

Figure 114: Price vs Global cost curve (US\$/b)



Source: WoodMackenzie, UBS estimates.

Alumina

PIVOTAL QUESTIONS

Q: Are potential aluminium shutdowns a risk to alumina demand

In our view yes. The aluminium industry is under pressure with around 1/3 of the industry losing money. Smelter shutdowns were announced in late 2015 early 2016 in both China & elsewhere which led to an oversupply of alumina. Under pressure refineries in China liquidated alumina stocks which led to prices crashing to around US\$300/t. While, this event seems to have now passed, it highlights the risk to alumina markets from downstream shuts.

Q: Is Bauxite feed a constraint on China's robust alumina supply growth?

Expectations of a bauxite shortage following Indonesia's export ban of Jan-14 have been hit by an expansion of domestic bauxite production & new sources of bauxite such as Malaysia. Bauxite is one of the most abundant mineral ores on earth & easy to mine, so it is unlikely bauxite will be a constraint on China's alumina refinery growth long term.

Q: Is the alumina cost curve still deflating?

The marginal cost of production has fallen from around US\$340/t in 2014 to US\$270/t now. Drivers have included greater bauxite availability, lower oil prices (on freighting bauxite & oil fired refineries), lower energy costs & devaluation of currencies including the Yuan. From here we expect the RMB to continue to devalue (to 7 from 6.5 by 2017-end). This impact is expected to be more than offset by oil price appreciation. UBS forecasts Brent to lift to US\$55/bbl in 2017e & US\$70/bbl in 2018e.

UBS VIEW

Alumina price nears a restart cap short term: Spot alumina prices have bounced hard off their liquidation event driven lows of US\$200/t back to around US\$250/t. Beyond the recovery from the fleeting stockpile sell-off, some of the lift has been driven by refinery shuts in China. The spot price is likely to tempt some producers to restart capacity which is likely to be a cap to prices short term. We forecast prices of US\$255/t in 2016e. Beyond this, we forecast prices of US\$290/t in 2017e driven higher by cost reflation from a lift in oil prices.

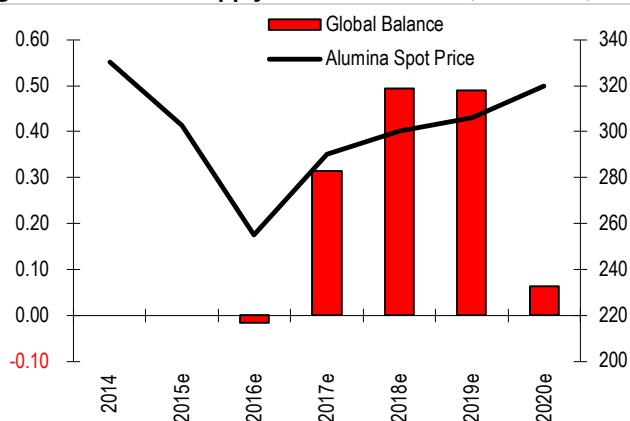
EVIDENCE

Watch China's various alumina signals: Bauxite import trade demonstrates alternatives have been found to the loss of Indonesian ore & therefore bauxite supply has not proven to be a constraint on alumina supply there. A smaller & volatile alumina import trade also demonstrates this is an arbitrage rather than a trade reliance for China's domestic smelters. On the demand side, China's aluminium production has been moderating in recent months, peaking in mid-2015. We expect this to lift again in March based on some restart announcements.

WHAT'S PRICED IN?

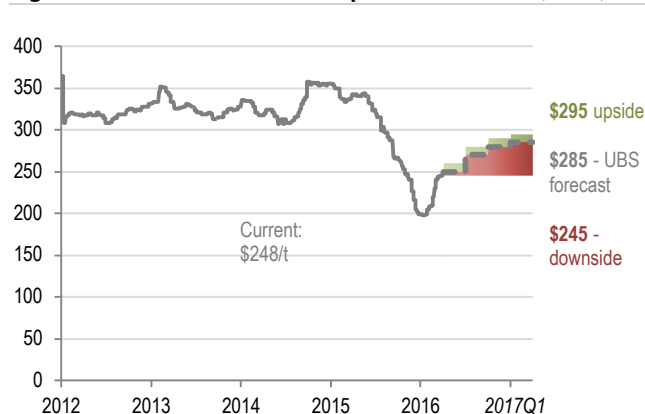
Around 25% of refineries loss making: The spot alumina price of ~US\$250/t is around the 76th percentile of the global cost curve, which we don't think is a sustainable footing for the industry longer term. Current marginal cost is around US\$270/t. Aluminium demand globally has not peaked so there is an ongoing need for supply growth & an incentive price longer term. We estimate this incentive price to be US\$305/t real.

Figure 115: Price & supply/demand balance (Mt & US\$/t)



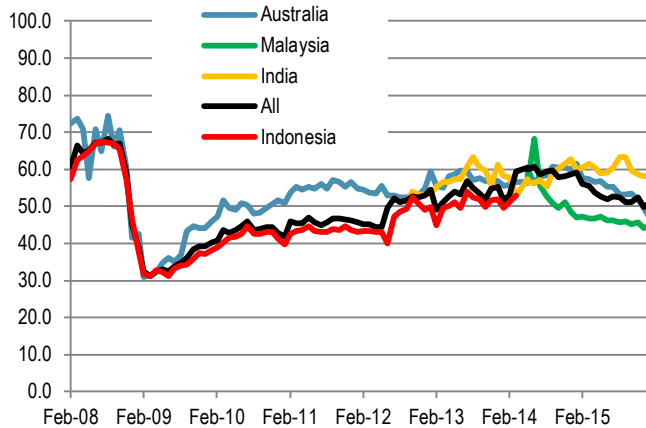
Source: UBS Research.

Figure 116: Price forecasts & Upside/Downside (US\$/t)



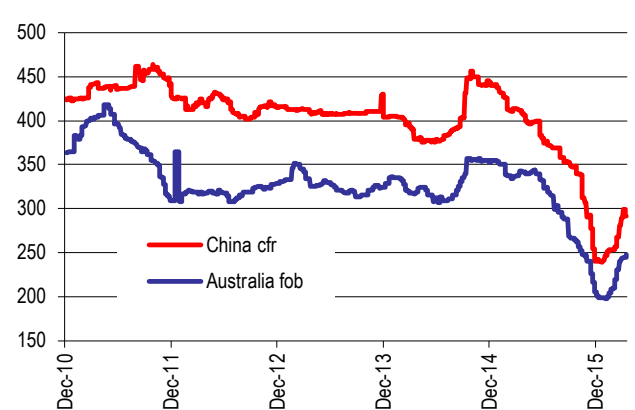
Source: UBS & Bloomberg.

Figure 117: China bauxite prices (US\$/t cfr)



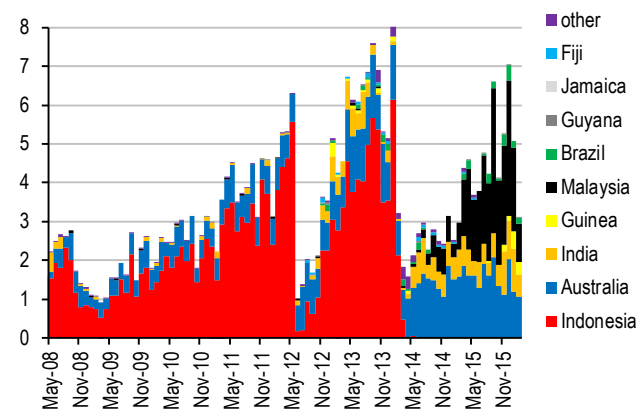
Source: China Customs, Bloomberg.

Figure 118: Alumina spot prices (US\$/t)



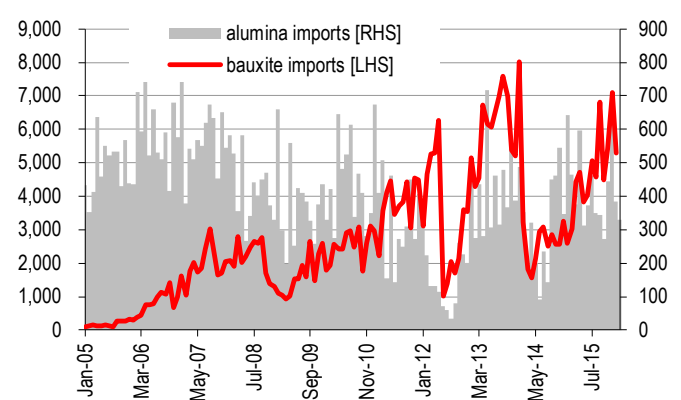
Source: Bloomberg.

Figure 119: China bauxite imports (Mt/mth)



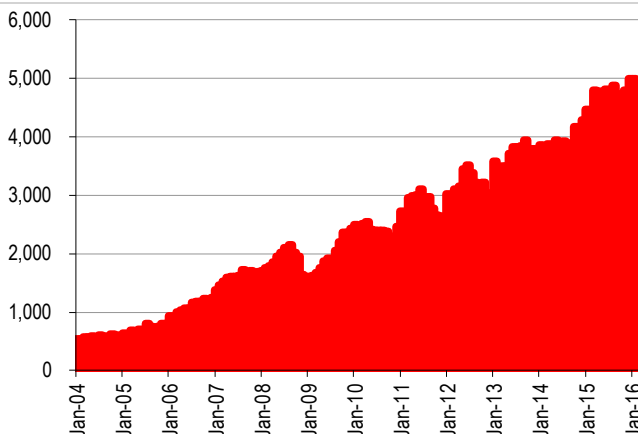
Source: China Customs, Bloomberg.

Figure 120: China alumina imports (kt/mth)



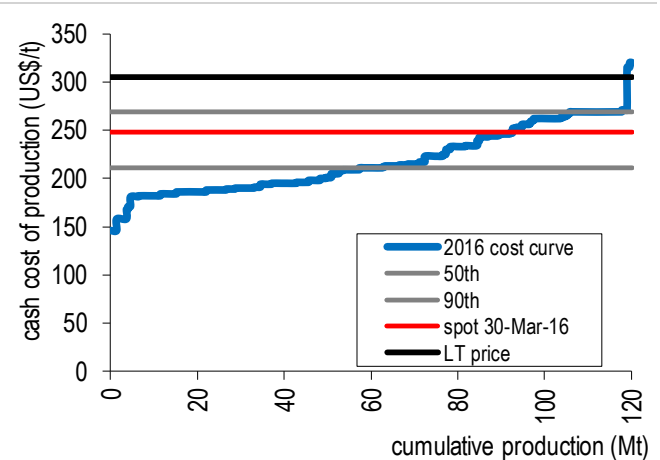
Source: China Customs, Antaika.

Figure 121: China alumina production (kt/mth)



Source: China Customs, Antaika.

Figure 122: Price vs Global cost curve (US\$/b)



Source: WoodMackenzie, UBS estimates.

Nickel

PIVOTAL QUESTIONS

Q: When will we see stainless steel markets return to volume growth?

Stainless Steel production (70% of global nickel consumption) has flat-lined at 10Mt/qr since 2014Q1. This flattish stainless production has driven a poor demand backdrop for Nickel. Contributing has been a reduction in capex in the oil & gas industry which utilises stainless steel & other nickel alloys. This is an important component of the process industry which accounts for 33% of stainless use. A broader improvement in global economic growth momentum is needed for catering utensils, property/construction & automotive demand which accounts for 33%, 18% & 11% of stainless use, respectively. We forecast 1.7% stainless melt growth in 2016e.

Q: When is the mining industry going to shut ~10% of mine supply?

Among the best performing commodities during 2016Q1 were alumina & manganese where the price was deep into the industry cost curve & >10% of supply went offline in response. We think around half of nickel mines globally are loss making, yet the industry has been one of the slowest to respond by idling capacity. Only around 3% of mine supply has shut. We think closer to 10% will be needed to lift supply anxiety due to the visible inventory pile of ~500kt (~100 days use). Shuts will come, but we believe this will be slow, see [Nickel: The pain in the game falls mainly in vain](#).

Q: Who is the effective marginal cost producer in longer term?

The widely held consensus thinking has been that the marginal cost producer is a Nickel Pig Iron (NPI) process in China. We think this view may be challenged by deflating costs in China (energy, coke, thermal coal, ore supply & RMB). Or work to date in this area suggests that production costs have declined to ~US\$4.30-5.30/lb (metal equiv.), which also gels with views from Shanghai Metals Market (who survey NPI firms). See [Nickel: Finally a sizeable cut to mine supply](#). This work may mean that some High Pressure Acid Leach (HPAL) producers may be the marginal supply. Costs for some of these appear to be around US\$5/lb based on public filings from Feb-16 reporting season. Perhaps broader recognition of the lifting competitiveness of China's NPI sector might bring some cuts from HPALs.

UBS VIEW

Lacking a catalyst but Nickel can move quickly: Nickel is yet another commodity where much of the industry is loss making. Shuts are the most obvious catalyst for a change, perhaps another 100-150ktpa are needed to generate supply anxiety. We think this will come but more likely in the latter stages of 2016 or in 2017. Oil prices are also a potential catalyst on the demand side (stainless use) & supply (cost curve inflation). We forecast prices of US\$4.20/lb in 2016e & US\$5.00/lb in 2017e.

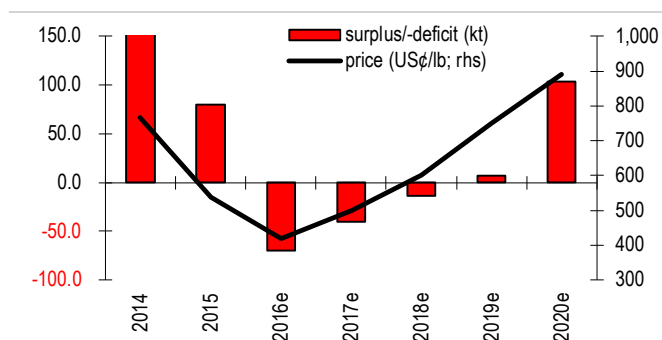
EVIDENCE

Watch stainless production & supply shuts: Stainless steel production globally (released quarterly) & Chinese production (monthly) confirm flattish demand for nickel. Shanghai Metal Market survey of stainless producers do not suggest a major change here for Jan-Feb. We are monitoring mine supply shuts, the largest one recently being the Niquelândia mine in Brazil (~25ktpa).

WHAT'S PRICED IN?

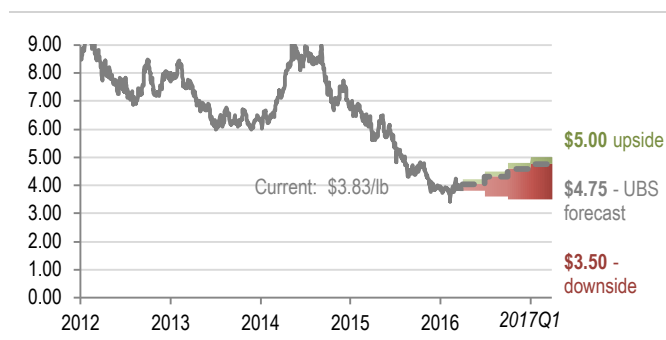
Around half the mining industry loss-making: Published cost curves suggest at current spot of US\$3.76/lb is at the 34th percentile of the global cost curve (adj for currency & oil). This is optically one of the most extreme positions of the commodities we cover. But we think a real position is closer to half to account for up to the minute cost deflation in NPI & elsewhere. Either way a large portion of the industry is burning cash.

Figure 123: Price & supply/demand balance



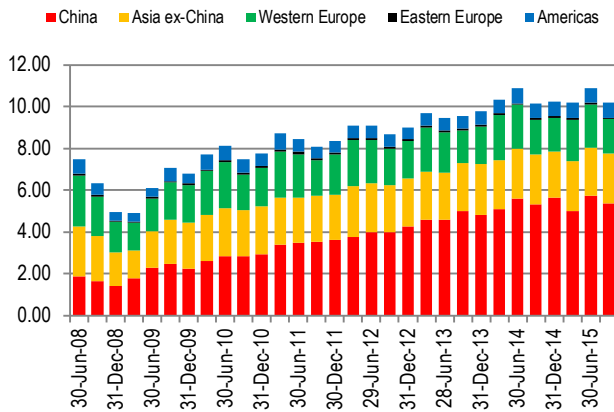
Source: UBS Research.

Figure 124: Price forecasts & Upside/Downside (US\$/lb)



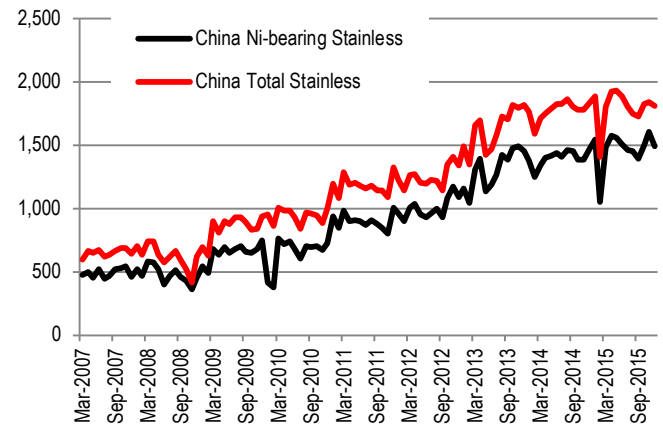
Source: UBS & Bloomberg.

Figure 125: Quarterly stainless steel production (Mt/qtr)



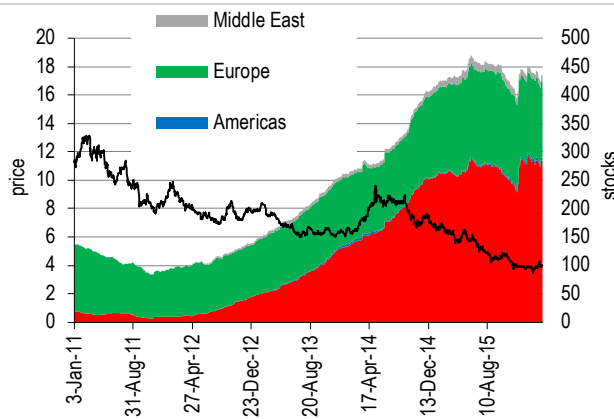
Source: ISSF & Bloomberg.

Figure 126: China monthly stainless production (Mt/mth)



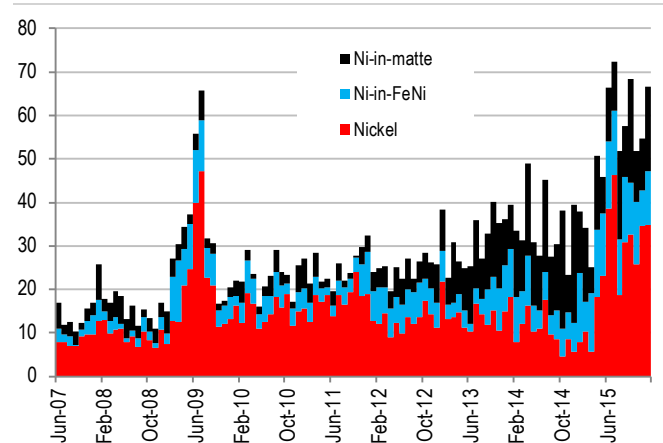
Source: NBS & Bloomberg.

Figure 127: Ni exchange inventories vs. price (kt; US\$/lb)



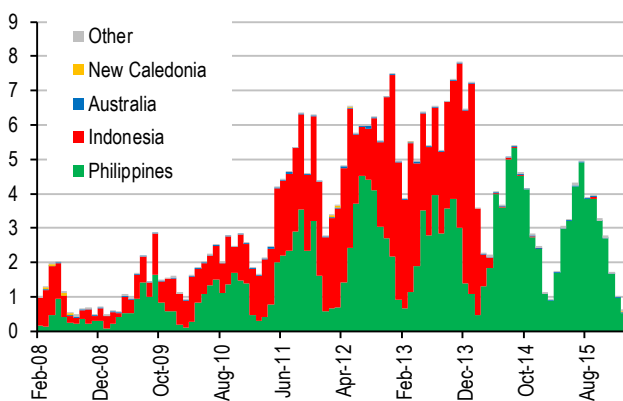
Source: LME, SHFE & Bloomberg.

Figure 128: China's Contained Ni imports (kt/mth)



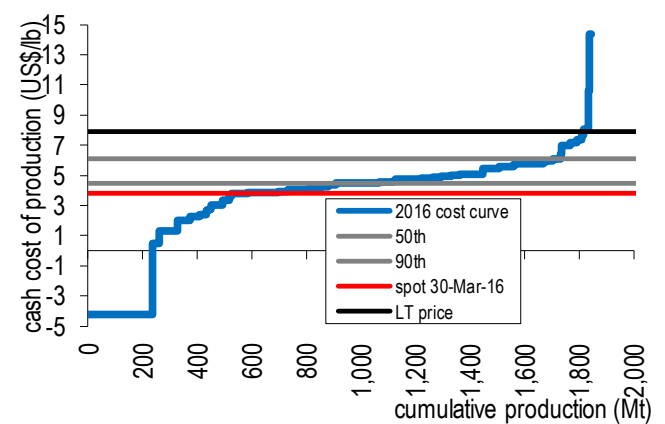
Source: China Customs & Antaike.

Figure 129: China Nickel ore trade (Mt/mth)



Source: China Customs & Bloomberg.

Figure 130: Ni price vs Global cost curve (US\$/lb)



Source: WoodMackenzie, UBS estimates.

Zinc

PIVOTAL QUESTIONS

Q: Is mine supply set to decline in 2016 from some high profile closures?

Zinc among base metals has witnessed the largest shut to supply these past 12 months, much of it potentially yet to have hit the physical trade due to working capital-lags. Some is discretionary, such as Glencore & Nyrstar which announced production cuts (5% of mine supply) in response to low-prices in late 2015. Major mines Century & Lisheen (another 5% of mine supply) both shipped last concentrate (end of mine lives) in Jan-16. We forecast mine supply of 13.2Mt in 2016e, a 0.5% reduction y/y. We assume idled mines return to production in 2017e driving mine supply growth to 14.4Mt.

Q: Could China's property green shoots & infrastructure spend lift zinc demand growth

Zinc use is dominated by construction (50%), infrastructure (16%) & transport/autos (21%). The green shoots in China's property market & robust infrastructure spend in 2016Q1 is an upside risk that is worth monitoring. We factor in 2.0% demand growth for both China & the world as a whole in 2016e. China's demand growth was 6.7%y/y in 2015 & global demand was +2.1%. With a deficit in 2015 & a small decline in mine supply, a stable demand outlook is all that is needed for market tightness.

Q: Are Zinc mine costs still deflating?

The Zinc cost curve has deflated significantly since 2014. The biggest drivers have been falling oil prices, depreciating commodity currencies & industry cost cutting. Discretionary mine shuts (~5% of global capacity) have also effectively reduced the marginal cost of production. A slight offset has been the impact of by-product credits. Here weakness in the price for lead, silver & copper (all things being equal) inflates the curve. For 2016-17e we expect costs to stabilise. We forecast oil prices to lift, stable lead prices & a return of high-cost mines to production.

UBS VIEW

Tight market but price could be capped by restarts: The zinc market appears tight from closures and modest demand growth. A deficit of 260kt is forecast for 2016, we expect inventories to continue their trend decline driving a lift in supply anxiety & prices. Prices have already responded & have rallied back toward the top of the global mine cost curve. There will be a temptation to restart production from idled mines which may cap prices. We forecast prices lifting to US\$0.90/lb by 2016 year end, but easing from supply growth back to US\$0.80/lb for 2017e.

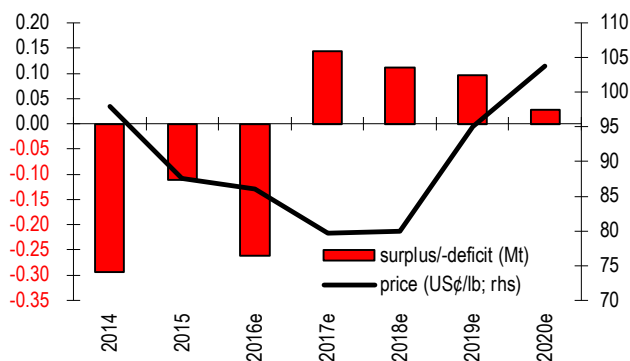
EVIDENCE

Several signals point to supply anxiety: The concentrate market is starting to reflect looming supply tightness, with smelters discounting treatment charges. Spot treatment charges in Mar-16 moved were US\$130/t (vs US\$190/t in Nov-15). Visible inventory has declined from 1.3Mt at the beginning of 2013 to ~700kt now. Interestingly tightness has not led to a lift in merchant premia which have been easing a tad in Europe & China.

WHAT'S PRICED IN?

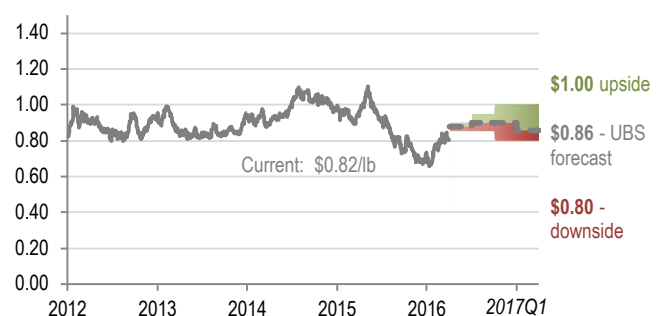
Around half the mining industry loss-making: Published cost curves suggest current spot of US\$0.85/lb is at the 97th percentile of the global cost curve (adj for currency & oil) at the C1 level. This suggests that most Zinc mines are making cash or modest losses. We think this supports a view that mine restarts could be a cap on prices despite a tight market outlook. Restart would likely occur on Q4 of the global cost curve so would lift the marginal cost of production (90th percentile) from its present level of US\$0.71/lb.

Figure 131: Price & supply/demand balance



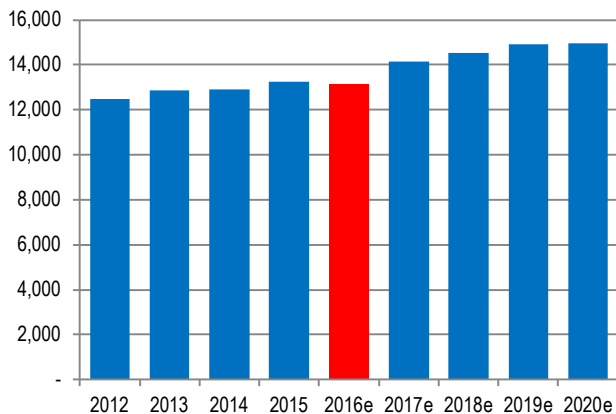
Source: UBS Research.

Figure 132: Price forecasts & Upside/Downside (US\$/lb)



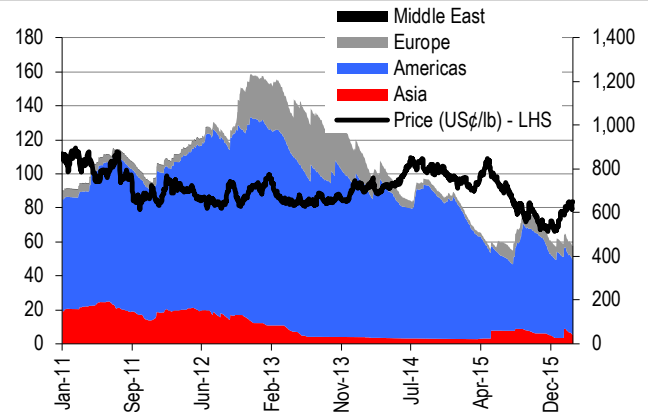
Source: UBS & Bloomberg.

Figure 133: Zinc Mine Supply Set to fall in 2016 (ktpa)



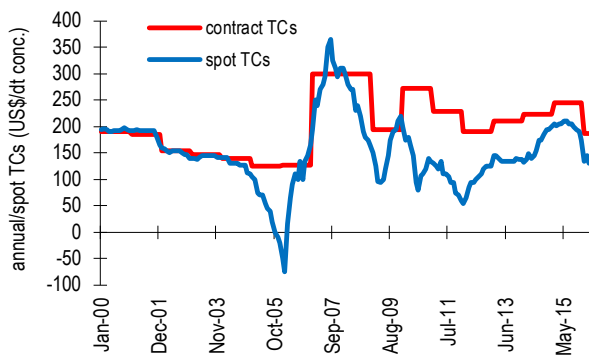
Source: Wood Mackenzie, WBMS, Company Filings, UBS Research.

Figure 134: Zinc inventories vs LME price (kt, US\$/lb)



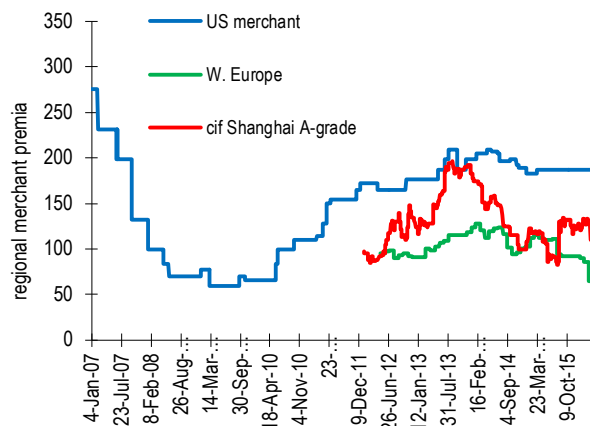
Source: Bloomberg, LME

Figure 135: Zinc TC/RC's (US\$/t)



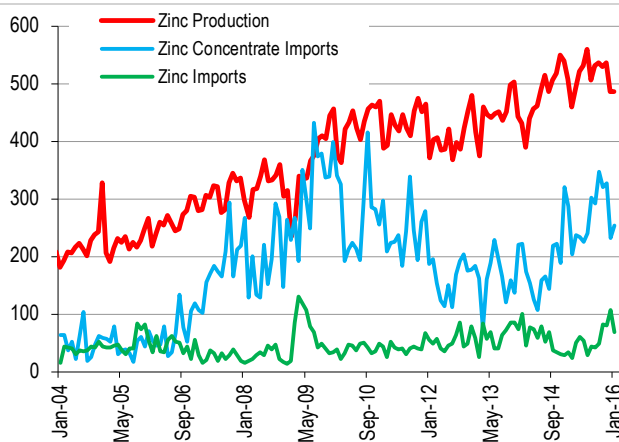
Source: Wood Mackenzie.

Figure 136: Merchant Premia (US\$/t)



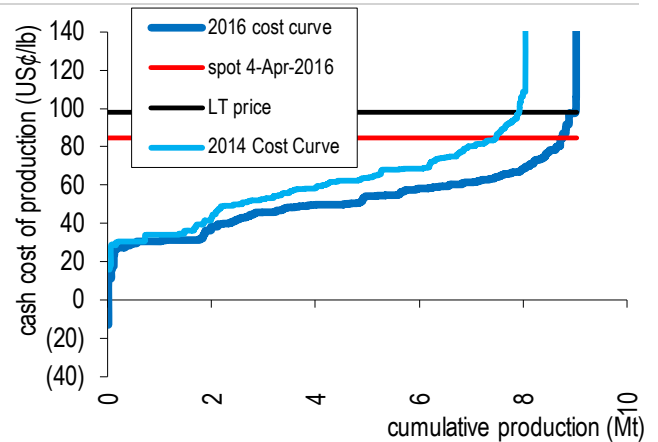
Source:

Figure 137: China's zinc material flows (kt/mth)



Source: China Customs.

Figure 138: Zn price vs Global cost curve (US\$/lb)



Source: Wood Mackenzie, UBS estimates.

Precious Metals

Gold

PIVOTAL QUESTIONS

Q: Is gold strength justified given current broader market conditions?

Yes, the macro picture has deteriorated and gold is rightly reflecting the reassessment of investor outlooks and sentiment. Gold has a role in investor portfolios this year – given risks to the global macro environment, it makes sense to have some allocation to gold as a diversifier and hedge against tail risks. That positioning in gold has been reduced significantly over the past few years suggests that there is ample room to rebuild exposures.

Q: Are investors becoming more positive on gold?

Yes, but the change is gradual. There are signs that conviction is growing and that positions are more strategic than they have been in recent years. Longs have more endurance and there is appetite to buy dips – pullbacks have been relatively shallow and short-lived so far this year. However, despite gold's achievements, there are still those who remain reluctant and are waiting for further confirmation of underlying strength. Participants in China seem to be relatively indifferent towards gold for now, preferring to trade the range and more likely to buy more convincingly into further momentum.

Q: Are there any potential risks to gold's supply/demand fundamentals?

Yes, concerns have been raised given subdued physical demand, higher scrap supply, and the potential for hedging to return. Overall, we think that gold fundamentals are broadly stable. Physical demand is currently subdued due to seasonal factors, but the longer-term trend is more resilient. Higher gold prices have encouraged scrap sales, but unlike 2009/2010, there is no distress selling and a lot of near feedstock has already been scrapped. There has been some hedging activity particularly in regions where considerable currency moves occurred, but there is still no appetite to hedge from major producers and our base case is that this will remain in place.

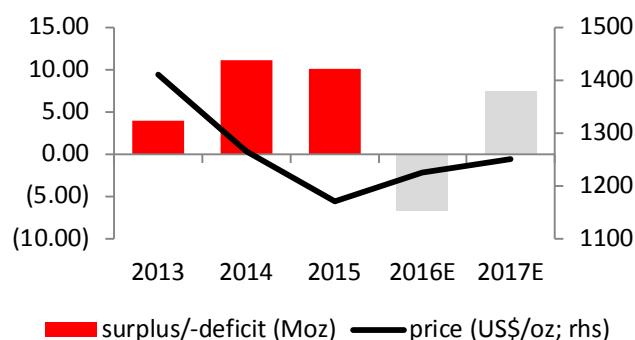
UBS VIEW

We maintain our average gold forecast of \$1225 this year, highlighting our view that a reallocation into gold is warranted given macro risks, but not to call for a fresh bull run. An environment of low and negative interest rates narrows the gap between holding gold vs other assets making the re-allocation to gold an even more attractive proposition this year amid uncertainty on the global macro picture. Lingering scepticism should fade as gold continues to perform and historical correlations, particularly with risk and the dollar, hold.

EVIDENCE

Significant reduction in gold exposures in recent years suggests that there is room for gold to react to shifts in the macro environment: UBS economists have downgraded US and global GDP growth. The probability of a US recession this year has ticked higher to 23% vs 16.5% and while a 2017 recession is not the base case, this could become a risk should threats of CNY devaluation, lower oil prices and tight financial conditions prevail this year. It's not that investors think a recession is likely, but it's the increase in risks that gold is reacting to. Gold positions were cut or exited in anticipation of stronger global growth and Fed tightening and investors have not really looked back until recently. The market started 2016 from a very low base and this has contributed to the forcefulness of the move. That the interest has come from a wide variety of market participants is encouraging.

Figure 139: Price & supply/demand balance



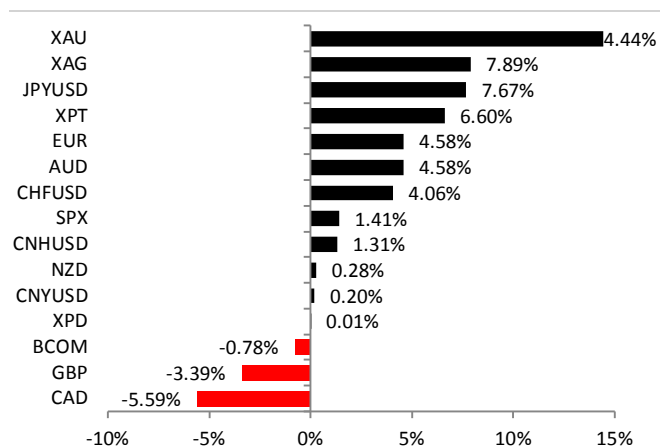
Source: Thomson Reuters GFMS, WGC, UBS

Figure 140: Upside/downside (US\$/oz)



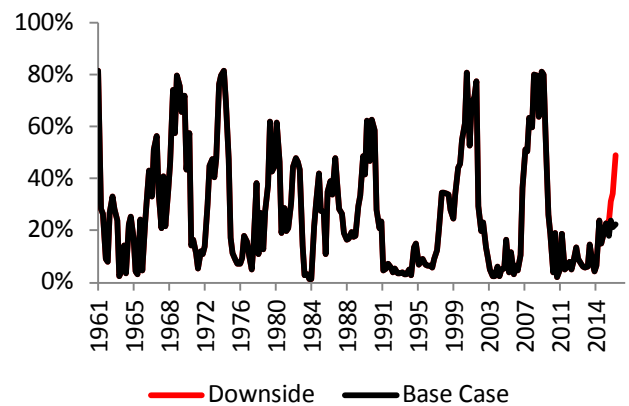
Source: Bloomberg, UBS

Figure 141: Gold YTD performance vs other assets



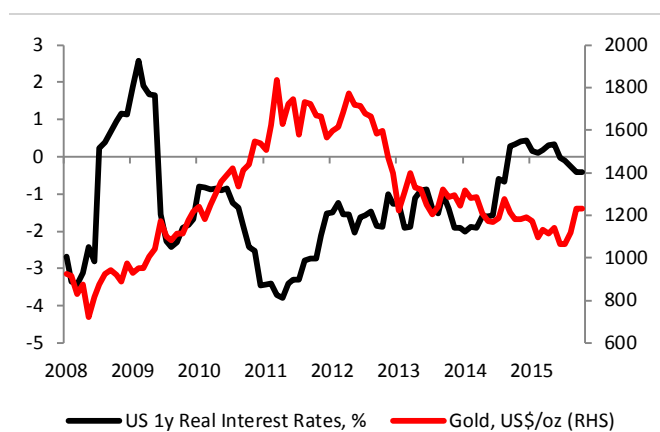
Source: Bloomberg, UBS

Figure 142: US recession probability



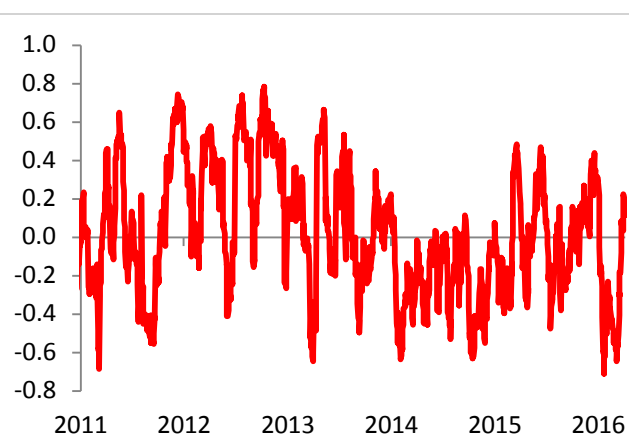
Source: UBS

Figure 143: Gold vs US 1y real interest rates



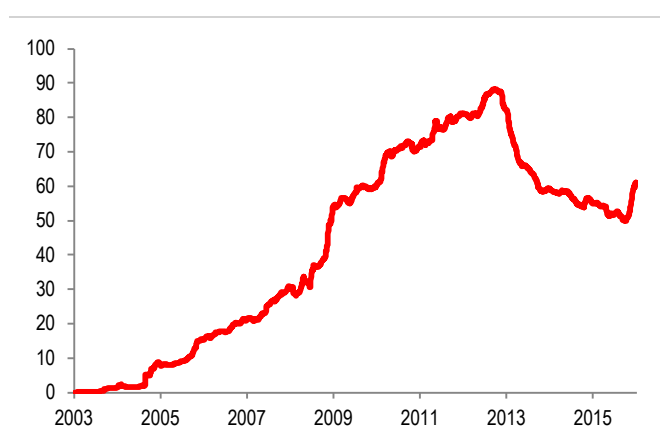
Source: Bloomberg, UBS

Figure 144: Gold and SPX 20-day rolling correlation



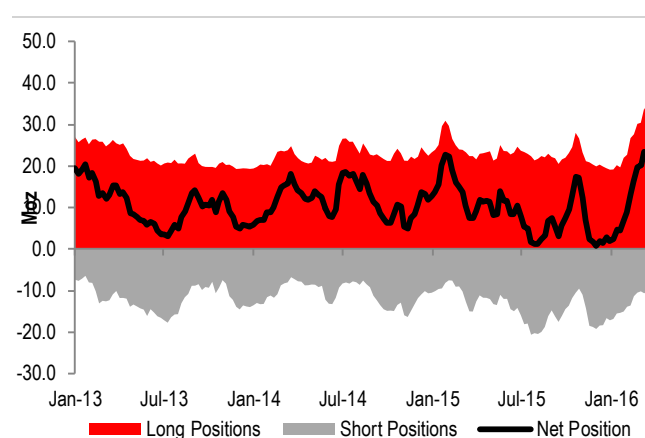
Source: Bloomberg, UBS

Figure 145: Gold ETFs



Source: Various ETFs, UBS

Figure 146: Gold speculative positions on Comex



Source: Bloomberg, CFTC, UBS

Silver

PIVOTAL QUESTIONS

Q: Is silver likely to outperform gold this year?

We expect silver to struggle to consistently outperform gold as long as the driver for gold strength is driven by concerns about the macro picture. Silver does not tend to benefit as much from safe haven buying given its high price volatility and its closer link to the level of economic activity. Industrial demand for silver accounts for more than half of total demand, making the market vulnerable to risks to global economic growth.

Q: Has investor participation increased or is it likely to increase?

ETF inflows have been strong YTD, but there is little else that indicates investor interest in silver has increased materially as yet. Silver's price volatility has discouraged many market participants and this is keeping them relatively disengaged. Most of the interest is limited to short-term range trading. Silver needs a significant fundamental catalyst to encourage a return of more sustainable investor interest.

Q: Is the silver market moving closer to balance?

Yes, we expect the surplus to decline over the forecast period, although we don't anticipate that it to be eliminated. Slower GDP growth in China is likely to weigh on industrial demand and uncertainty in the broader macro picture creates additional downside risks. That 69% of silver supply comes from secondary mine production suggests that the silver market is fundamentally oversupplied.

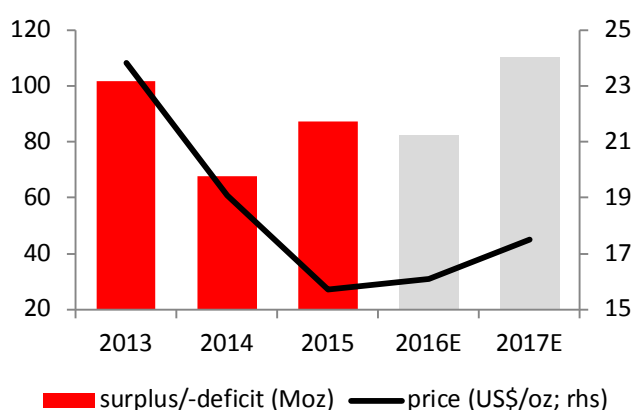
UBS VIEW

We expect silver to track gold higher this year amid a continued lack of inherent drivers, but relative performance is likely to be choppy. While we still see the gold:silver ratio coming down from the multi-year highs printed early in 2016, it's likely to settle slightly higher than the average of 74 in 2015. During periods when the ratio becomes extreme, investors are likely to get attracted and silver should be able to catch-up with gold in the short-term. But short-term trading interest would prevent silver from fully benefitting from gold strength. Nevertheless, we continue to expect the ratio to move in silver's favour in the long run.

EVIDENCE

Year-to-date changes in positioning and trading volumes suggest that silver is not attracting as much attention as gold. Silver positioning on Comex has increased at a considerably slower pace than that of gold. Although there have been sizeable ETF inflows in March, year-to-date buying is still slower versus inflows into gold counterparts. This suggests that investors are turning to gold more as a safe haven. Silver's price volatility typically attracts participants in China, but mostly for short-term range-trading and even there participation has not returned to the levels seen five years ago.

Figure 147: Price & supply/demand balance



Source: Thomson Reuters GFMS, Silver Institute, UBS

Figure 148: Upside/downside (US\$/oz)



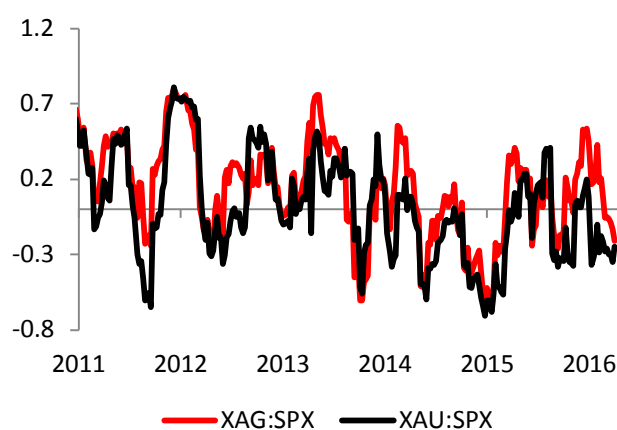
Source: Bloomberg, UBS

Figure 149: Gold:silver ratio



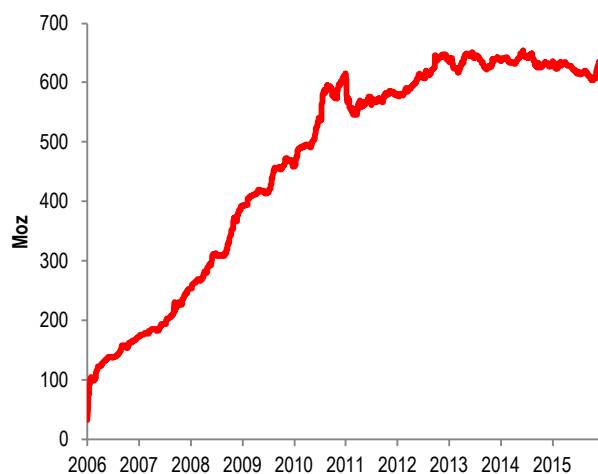
Source: Bloomberg, UBS

Figure 150: Silver correlation with equities



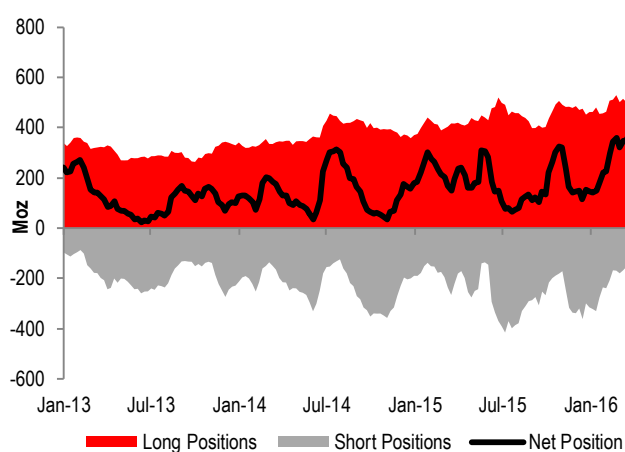
Source: Bloomberg, UBS

Figure 151: Silver ETF's



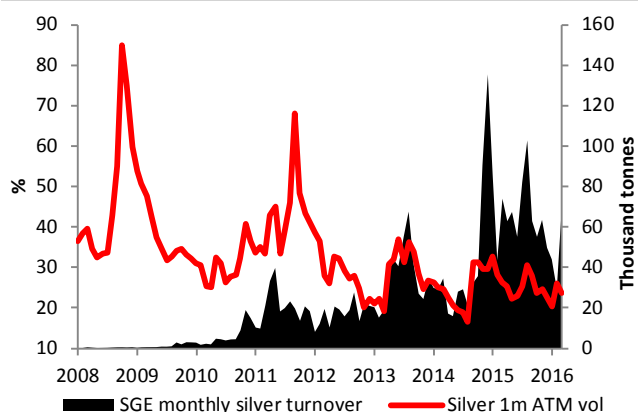
Source: Various ETFs, UBS

Figure 152: Silver speculative positions on Comex



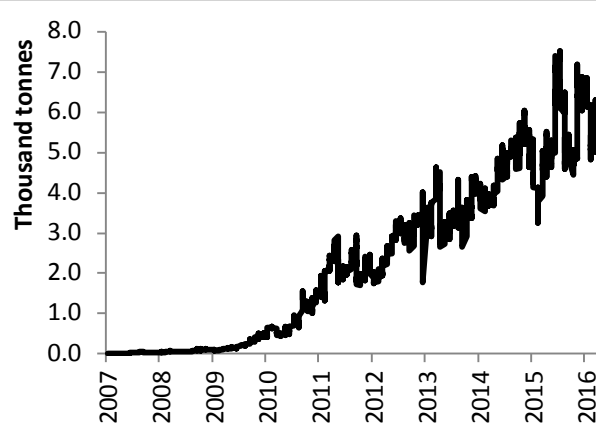
Source: Bloomberg, CFTC, UBS

Figure 153: Silver 1m volatility and SGE volumes



Source: Bloomberg, SGE, UBS

Figure 154: Silver open interest on SGE



Source: Bloomberg, SGE, UBS

Platinum

PIVOTAL QUESTIONS

Q: Given the current state of the market are we likely to see mine supply cuts in the near future?

No, there are high barriers to exit South Africa's platinum sector given strong pushback from labour unions and the government. In addition, shutting down operations also involves considerable costs. Despite weak platinum prices, SA mine supply has been resilient amid ZAR depreciation, lower energy prices and cost-reduction efforts by producers. Much of these benefits have likely already occurred, but as long as producers keep costs contained and ZAR outlook remains weak, it is difficult to identify a catalyst for a substantial cut to mine production for now.

Q: Is demand growth likely to outpace supply growth over the forecast period and what do these expectations mean for market estimates of aboveground stocks?

We expect demand growth to outpace supply over the next few years. Estimated market deficits suggest that the decline in above-ground stocks should accelerate up ahead, and market tightness should start to emerge by 2018 based on industry estimates for inventories.

Q: Are supply/demand fundamentals going to return as a driver of platinum prices in the near term?

No, platinum's positive correlation with gold has held up well and we think that gold price action will remain the key driver for platinum this year. Concrete evidence of market tightness is needed to alter this significantly and we don't expect this to occur over the next 12-18 months.

UBS VIEW

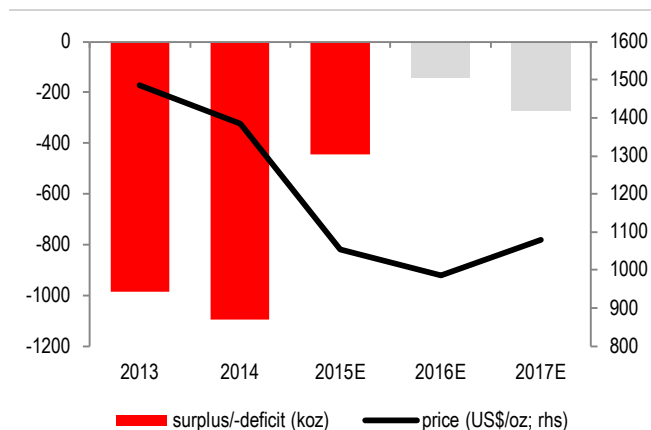
We are neutral to modestly positive on platinum – support this year more likely to come from its positive correlation with gold than from any significant fundamental catalyst. Platinum has a strong positive correlation with gold and we expect this to continue exerting a greater influence on platinum prices this year. It will take a material fundamental catalyst to alter underlying weak investor sentiment. Given our supply and demand forecasts and industry-estimated above-ground stocks should decline at a faster rate up ahead. But it would take a couple more years before clearer evidence of market tightness materialises. We expect platinum prices to rise ahead of this, but the positive response to fundamental factors is likely to be more concentrated in 2018.

EVIDENCE

Investor disappointment with platinum's performance is reflected in the decline in net positions on Nymex, particularly the dominance of shorts, and outflows in ETF holdings:

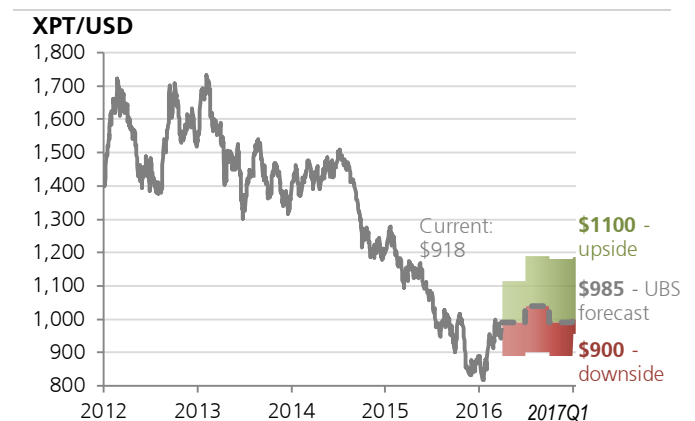
Downward pressure on the platinum:gold ratio implies that underlying investor sentiment towards platinum remains challenged. For now, gold price action is likely going to be the key driver for the platinum market – platinum's correlation with risk has declined considerably suggesting that its relationship with gold is currently the dominant factor.

Figure 155: Price & supply/demand balance



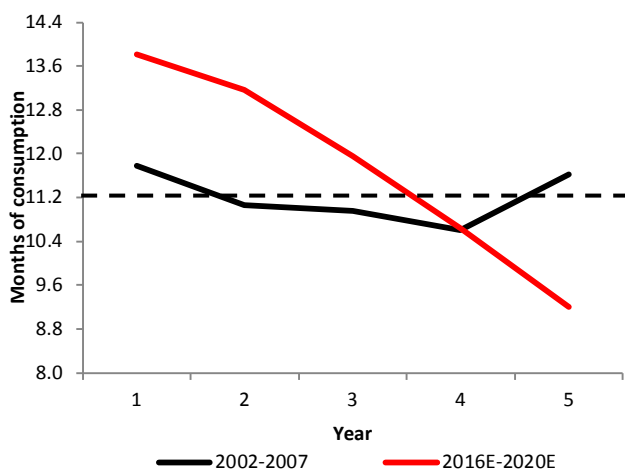
Source: Johnson Matthey, UBS

Figure 156: Upside/downside (US\$/oz)



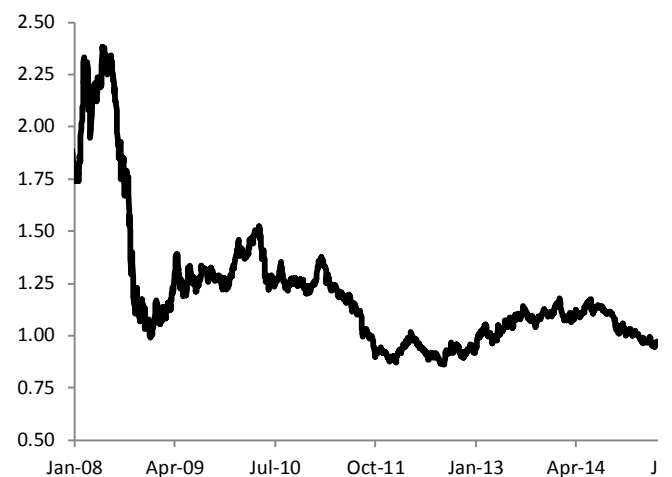
Source: Bloomberg, UBS

Figure 157: Platinum inventories



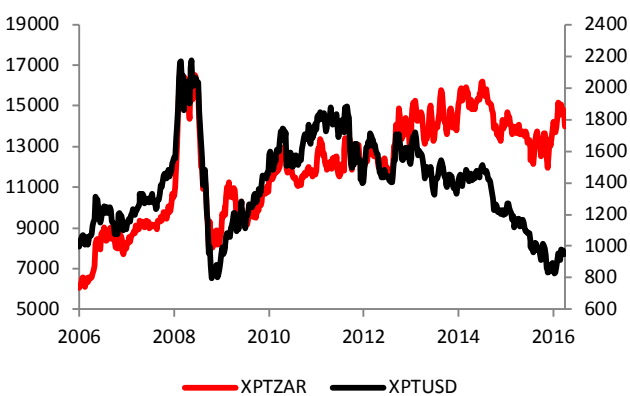
Source: GFMS, Metals Focus, Johnson Matthey, UBS estimates

Figure 158: Platinum:gold ratio



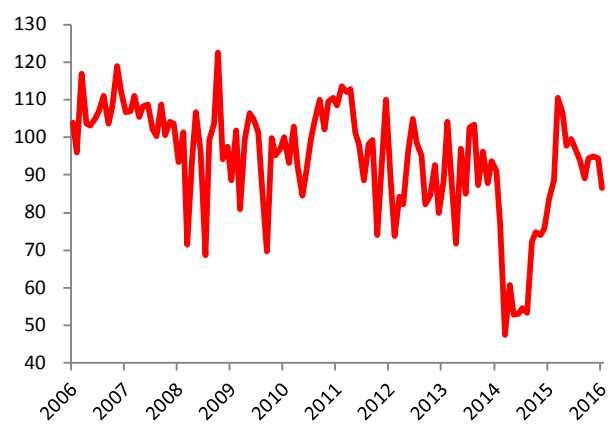
Source: Bloomberg, UBS

Figure 159: Platinum in ZAR vs USD



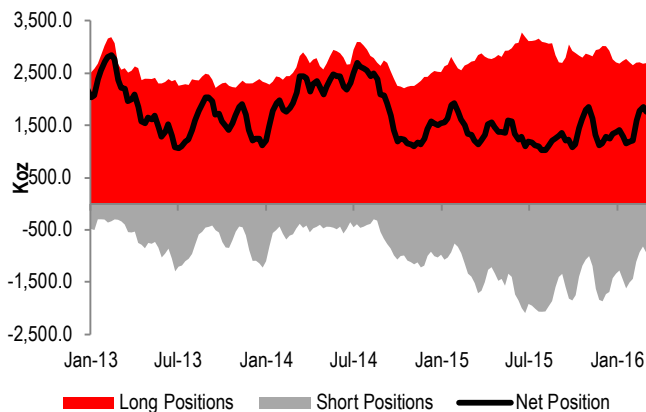
Source: Bloomberg, UBS

Figure 160: SA PGM production volume index, 2010=100



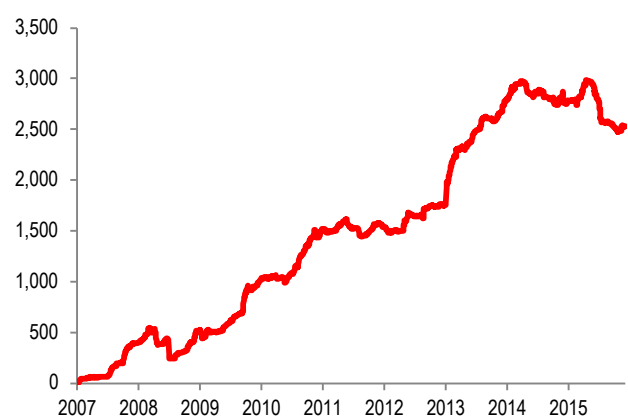
Source: Bloomberg, UBS

Figure 161: Platinum speculative positions on Nymex



Source: Bloomberg, CFTC, UBS

Figure 162: Platinum ETFs



Source: Various ETFs, UBS

Palladium

PIVOTAL QUESTIONS

Q: Is the market expected to be in deficit and what does the balance mean for market estimates of aboveground stocks?

We estimate that the palladium market would be in a deficit over the forecast period. Larger estimated deficits vs platinum suggests that palladium above-ground inventories would be drawn down at a relatively faster rate.

Q: Are signs of market tightness emerging?

Not at the moment. Signs of market tightness – whether expressed through sponge premium or the forwards market – have yet to emerge. However, given our larger estimated deficits for palladium and industry estimates of above-ground stocks, the palladium market should tighten earlier vs platinum and signs should start to emerge either towards the end of this year or by 2017.

Q: Is palladium likely to respond to fundamental catalysts or are there other factors affecting prices?

We think external forces are exerting more influence on palladium prices at the moment. Palladium is vulnerable to changes in investor risk sentiment and this is highlighted by its high correlation with equities. That this correlation has remained in place implies that overall risk appetite is a strong driver for palladium prices at the moment. Consequently, while market tightness is expected to start emerging towards the end of 2016, prices are unlikely to move to anticipate this as long as risk sentiment remains challenged. Barring a material fundamental catalyst arising, we expect palladium prices to respond more to fundamental factors in 2017 rather than this year.

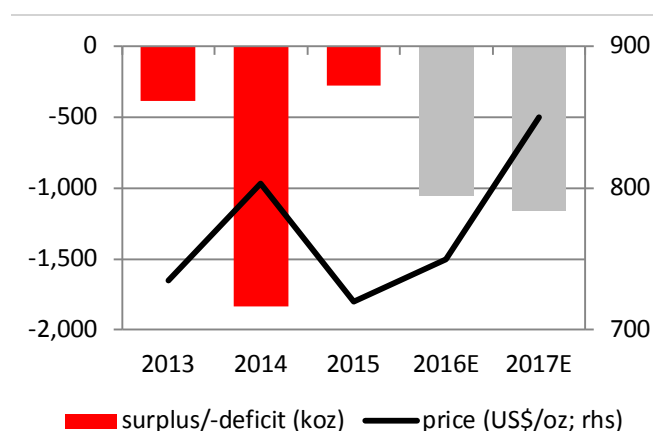
UBS VIEW

Challenges to broader risk sentiment are likely to weigh on palladium this year, albeit stronger gold prices should provide support. We are neutral to modestly constructive on palladium this year and forecast an average of \$580. We expect prices to find a base and for the market to start to recover towards the end of 2016 as fundamental factors slowly come back into focus. We anticipate a strong price recovery next year as more concrete signs of market tightness emerge.

EVIDENCE

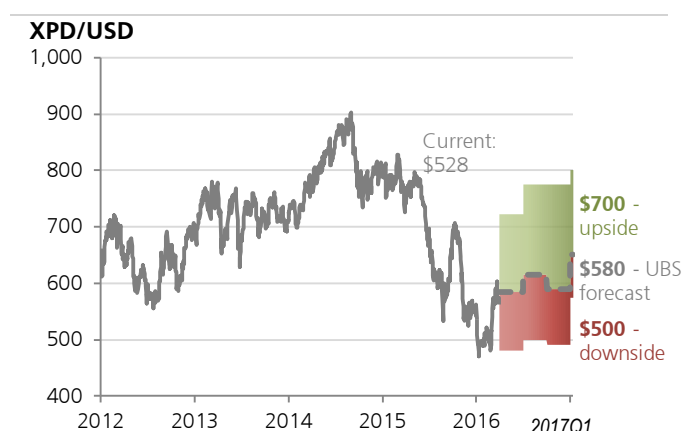
The availability of above-ground stocks has contributed to weak palladium prices over the past year despite supply and demand fundamentals implying a tight market. This has caused disappointment among investors, highlighted by the sizeable declines in Nymex positioning and global ETF holdings. But while signs of market tightness have been lacking, large estimated deficits imply that the drawdown in inventories has been accelerating. And given latest industry estimates of above-ground stock and our own assumptions for the supply/demand balance, market tightness should start to emerge over the next 12 months and trigger a recovery in prices.

Figure 163: Price & supply/demand balance



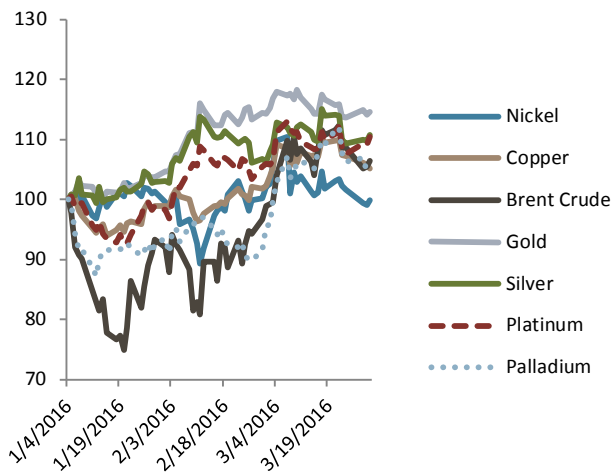
Source: Johnson Matthey, UBS

Figure 164: Upside/downside (US\$/oz)



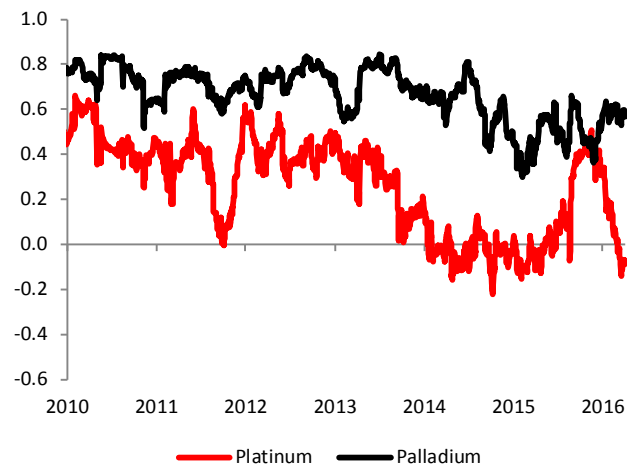
Source: Bloomberg, UBS

Figure 165: Precious metals price index, 100=Jan 2016



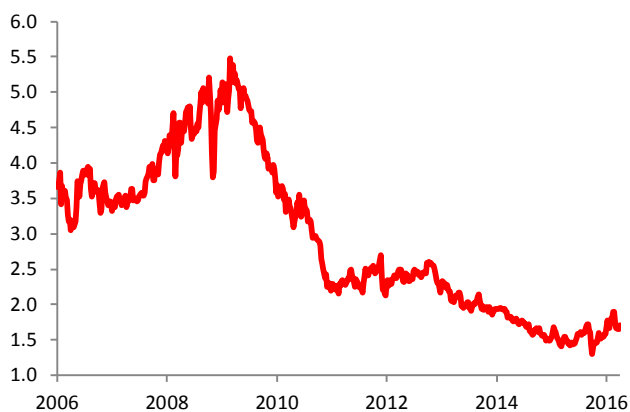
Source: Bloomberg, UBS

Figure 166: PGMs 60-day rolling correlation with equities



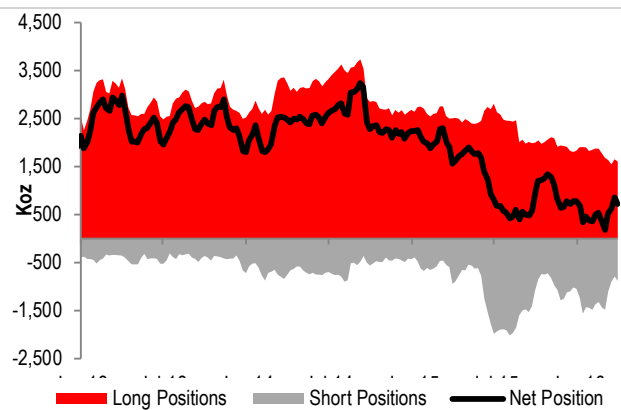
Source: Bloomberg, UBS

Figure 167: Platinum:palladium ratio



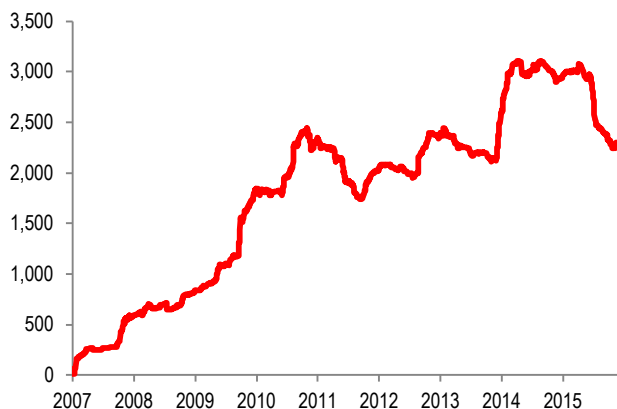
Source: Bloomberg, UBS

Figure 168: Palladium speculative positions on Nymex



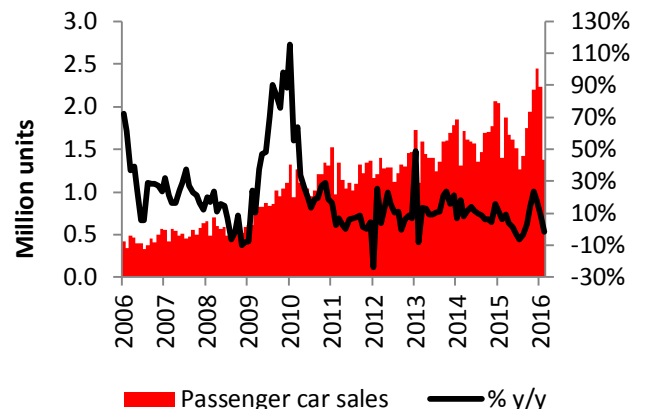
Source: Bloomberg, CFTC, UBS

Figure 169: Palladium ETFs



Source: Various ETFs, UBS

Figure 170: China car sales



Source: Bloomberg, UBS

Bulk Commodities & Energy

Steel

PIVOTAL QUESTIONS

Q: Has China's steel consumption hit the bottom?

No, even though there is a risk of a small positive from the recent Chinese stimulus program, longer-term we still see significant downside to domestic demand.

Q: Will global steel demand recover in the short- to mid-term?

Unlikely, we estimate the negative growth of global steel consumption to continue until 2019 with China being the major pullback factor. While the world ex-China grows, it's not enough overall.

Q: Are Anti-Dumping measures effective to force excess steel capacity to be closed globally?

No, but it mitigates the negative impacts of over capacity for the time the anti-dumping measures are in place. Those countries protected will benefit.

UBS VIEW

Margins in the global steel industry hit bottom in December 2015: However, the recent recovery of steel share prices is on shaky ground. Monetary easing, temporary production cuts, and seasonal inventory built-up spurred the steel rally, in our view. Short-term we see the risk of a pullback, including lower steel prices. Those are likely to remain volatile as we expect China's steel demand to trend downward until 2019. Globally, we forecast crude steel production to decline by 0.5% CAGR until 2019. In particular, we estimate China's crude steel production to drop by 4.1%. Additionally, around 26m t of Chinese exports (c20% of China's total exports) are at risk, should those destinations, which have filed trade cases be successful. That would intensify China's overcapacity issue and force China's government to re-think whether the addressed 100-150m t capacity reduction will be enough to get the market re-balanced. US, Europe and India are likely to be the beneficiaries from protectionism, in our view.

EVIDENCE

Short term demand doubtful, structural issues to weigh in long term: Despite the market warming up for a recovery of China's commercial real estate sector (33% of the domestic steel demand), we struggle to see clear indications of a sustainable improvement. With no support demand wise, it will take time to reduce supply, in our view. By addressing 100-150m t overcapacity the Chinese government acknowledges the issue but jumps too short as the economy has to cut 300-350m t/y in the long-term, on our calculation. We noticed China's first steel companies to default on debt repayments (Dongbei Special Steel, Bohei Steel, etc.) but doubt this would accelerate closures in the short-term.

UPSIDE / DOWNSIDE

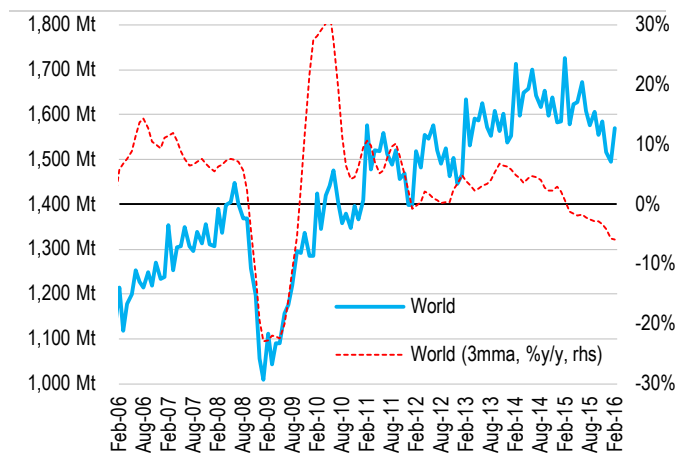
Should we be wrong in our view of a sustained overcapacity scenario and the global economic recovery accelerates, we estimate global crude steel production to grow by 2.1% CAGR till 2019. In a downside scenario, we estimate -3.2% CAGR to 2019.

Figure 171: UBS Global steel indicator estimates

Unit: mn tonne	2016E		2017E		2018E	
	New	Old	New	Old	New	Old
World crude steel output	1,617	1,659	1,608	1,662	1,600	1,662
YoY growth	-0.8%	2.1%	-0.5%	0.2%	-0.6%	0.2%
China crude steel output	775	812	742	793	712	793
YoY growth	-3.6%	0.7%	-4.3%	-2.3%	-4.0%	-2.3%
World capacity utilization	68%	70%	68%	71%	68%	71%
EU HRC price (US\$/metric tonne)	420	462	459	486	473	504
Iron ore price (US\$/metric tonne)	45	45	45	47	52	52

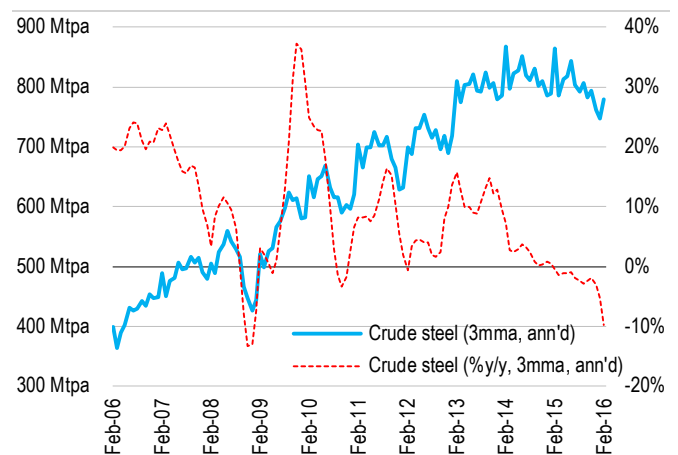
Source: WSA, UBS Research.

Figure 172: World crude steel output – ann'd & %y/y



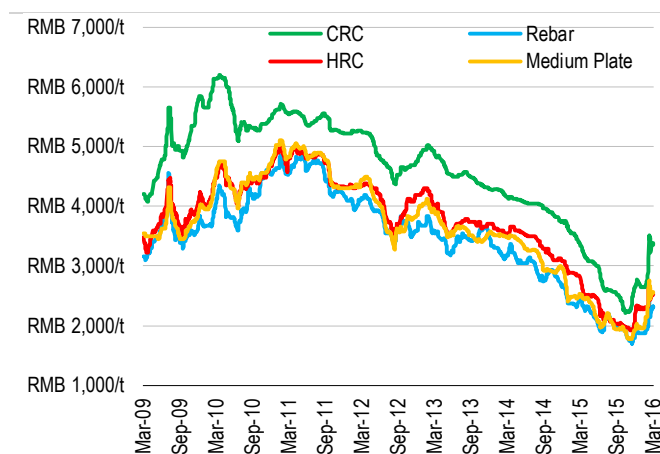
Source: WSA, Bloomberg, UBS Research.

Figure 173: Chinese crude steel output – ann'd & %y/y



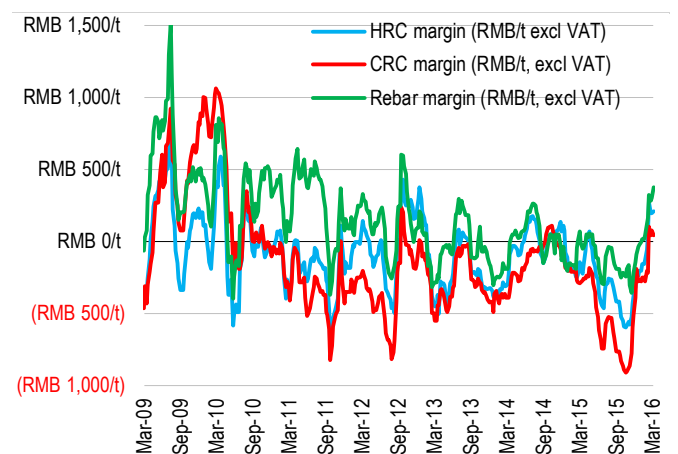
Source: China NBS, Bloomberg, UBS Research.

Figure 174: China steel prices ripped higher...



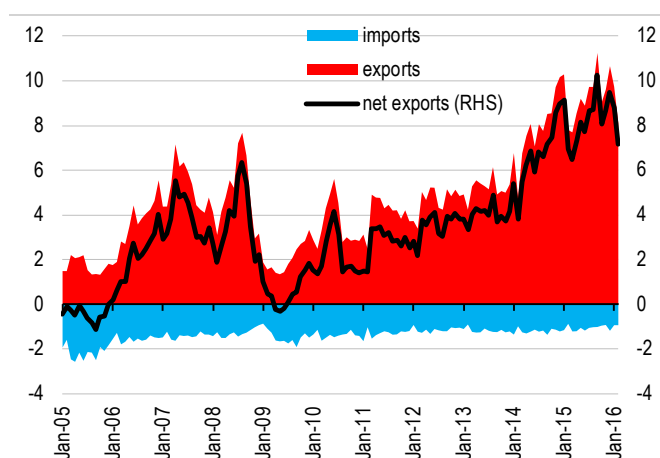
Source: Mysteel, Custeel, UBS Research.

Figure 175: China steel mill margins up strongly...



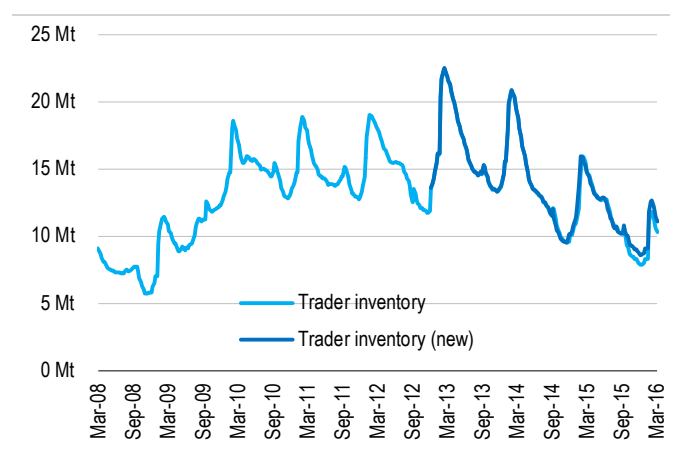
Source: Mysteel, Custeel, UBS Research.

Figure 176: China net steel exports remain high



Source: China Customs, UBS Research.

Figure 177: Trader steel inventories falling...



Source: Mysteel, CISA, UBS Research.

Iron Ore

PIVOTAL QUESTIONS

Q: Will underlying demand lift in time to offset seasonally weaker demand in 2H16?

The iron ore price has been buoyed by higher Chinese steel prices & mill margins ahead of peak construction activity (hence steel demand) in 2Q16. Much of this has been premised on seasonal inventory tightness and hope that China's authorities will stimulate infrastructure and property build.

Q: Will supply factors support a goldilocks price?

Even as seaborne supply is set to grow in 2016 again, it remains the case that over four-fifths of seaborne iron ore supply is controlled by the big 4 companies, and together with a restructuring Chinese domestic iron ore industry, we expect 'value over volume' to prevail and prevent prices from averaging low to mid US\$30/t for any reasonable length of time.

Q: Will cost deflation continue to erode price support?

Iron ore costs have fallen dramatically in recent years, partly due to falling oil prices and producer currencies, and partly due to underlying cost cutting as operators focussed on productivity and margin preservation to survive. While forward views on currency have limited conviction, a solid consensus exists that crude oil prices are headed higher on a 12-24 month view. Indeed, oil prices have lifted considerably since December lows. Taking the UBS view for an oil price recovery and stable FX, we believe the recent run of cost curve deflation may stall or reverse a tad, providing a degree of support for market rebalancing at higher prices than might otherwise have been expected 6-12 months earlier.

UBS VIEW

A Goldilocks price of US\$45/t CFR China for 2016E & 2017E: Current spot prices are discounting demand growth that we don't believe is warranted. Yet, we don't see producers sitting idly by and failing to react if over-supply threatens trough cycle, margin destroying prices for an extended period of time. Instead, we feel supply will respond in a rational manner that preserves value of volume at marginal pricing of US\$45/t CFR China in 2016E & US\$46/t in 2017E.

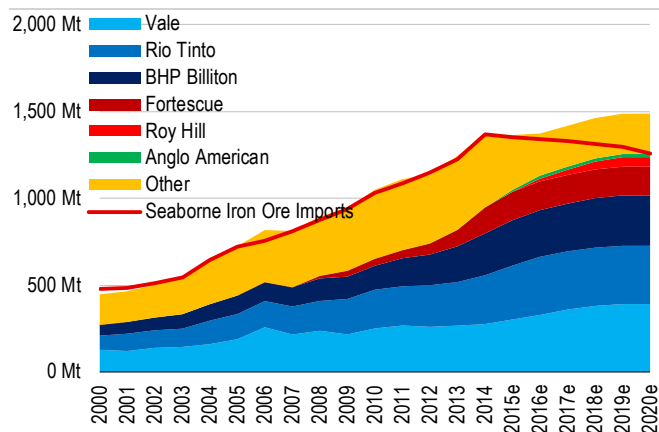
EVIDENCE

Chinese property & infrastructure construction: Property construction starts surprised with strength in Jan&Feb-16; watching the property sector for trends in both prices and volume activity in coming months is key. So too is fixed investment in infrastructure construction, with a large pipeline of projects awaiting i) financing and ii) execution to drive higher steel demand. And while we acknowledge the well understood seasonality of Chinese building activity (and steel demand) through 2Q, steel mill and trader inventories of both iron ore and steel will be important watchpoints too.

WHAT'S PRICED IN?

Demand acceleration not yet apparent in underlying data: Current spot prices trade around the 90-95th percentile of the cost curve, levels usually consistent with balanced to slightly in deficit markets. These prices are discounting better underlying steel demand to emerge from additional Chinese property and infrastructure stimulus. Should this not come through as anticipated, iron ore prices will weaken in tandem with steel prices as seasonal activity slows from around mid-2Q16 and into 3Q16.

Figure 178: Price & supply/demand balance



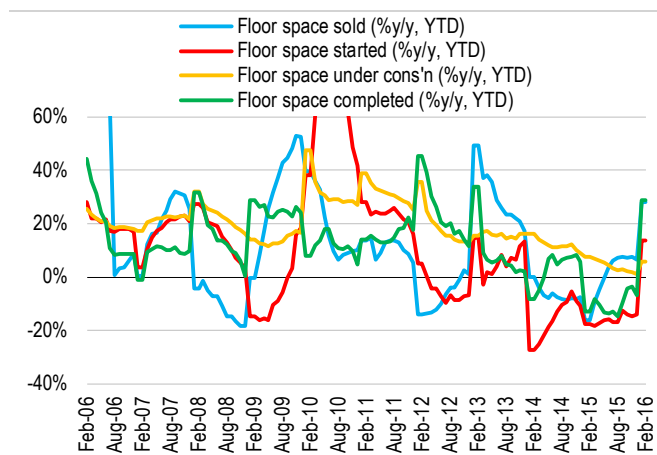
Source: UBS Research.

Figure 179: Upside/Downside



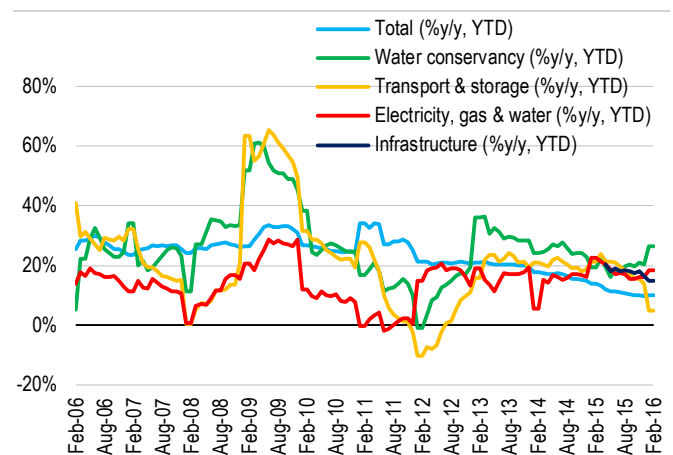
Source: UBS & Bloomberg.

Figure 180: China property bounce in early 2016...



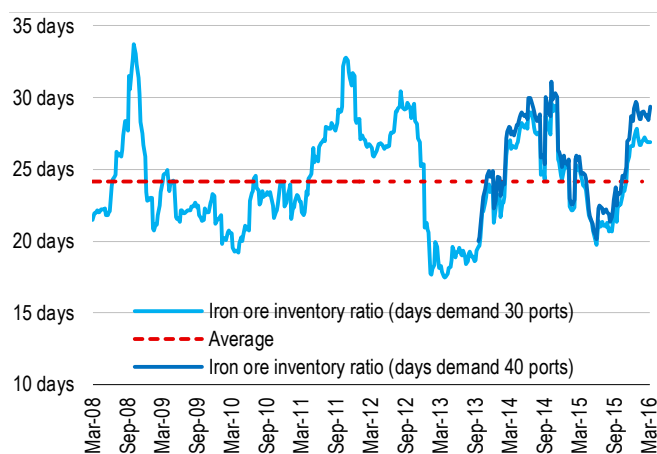
Source: CEIC, UBS Research.

Figure 181: Infrastructure fixed asset investment too...



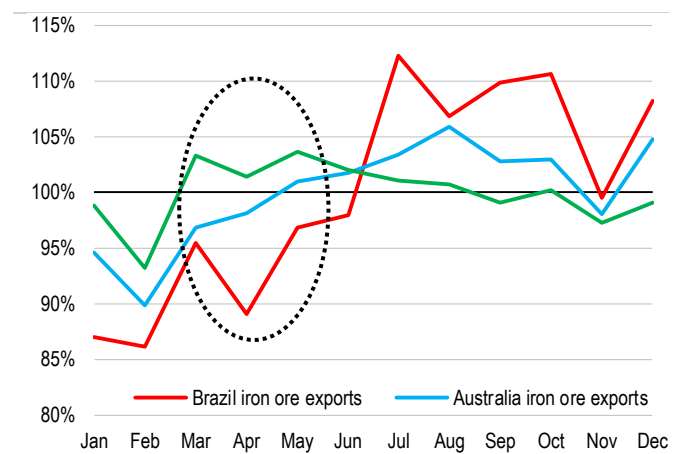
Source: CEIC, UBS Research.

Figure 182: Iron ore port stocks – days of supply



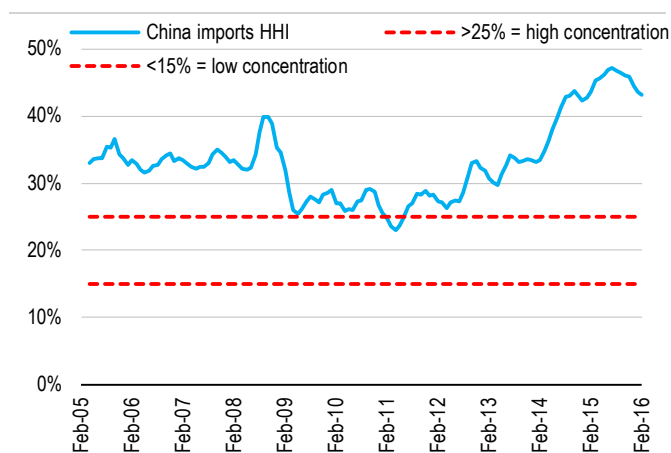
Source: Mysteel, China NBS, China Customs, Bloomberg, UBS Research.

Figure 183: Iron ore supply & demand seasonality



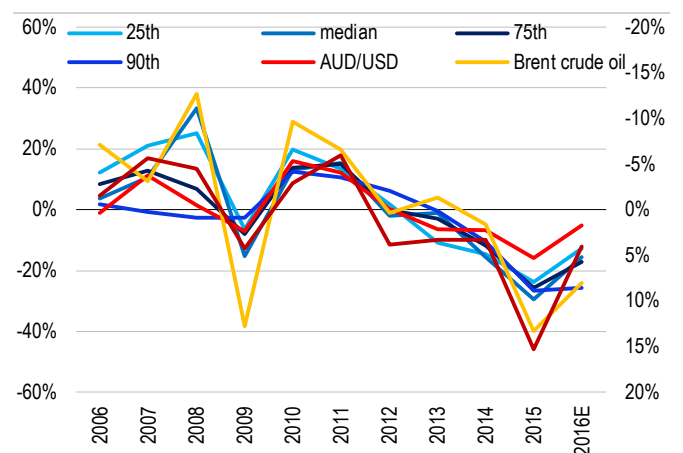
Source: ABS, WSA, China NBS, Bloomberg, UBS Research. * average variation from trend-cycle; 10-20 year history.

Figure 184: China iron ore import concentration - HHI



Source: China Customs, Bloomberg, UBS Research.

Figure 185: Iron ore costs vs oil & FX (%y/y)



Source: AME, Bloomberg, UBS Research.

Metallurgical Coal

PIVOTAL QUESTIONS

Q: Will seaborne met coal demand recover in 2016 and beyond?

Seaborne met coal demand fell from ~315Mt in 2014 to 297Mt in 2015, -5.7%y/y. We anticipate a further decline of 1.1% to 293Mt in 2016e before growing slowly toward 302Mt in 2020e. So while we do see a shallow recovery later this decade, for the medium term outlook, seaborne met coal demand has peaked. Risks to this centre on China's net import swinging more decidedly toward net balance or even net export.

Q: Have suppliers done enough to rebalance the market?

A combination of large falls in US, Canadian and Russian exports appear to be broadly balancing against seaborne demand under pressure from slow global & Chinese steel production. Met coal import demand has fallen ~16% from peak run rates into the 260-280Mtpa range. Supply is now roughly balancing in 16e. But new capacity expected in Queensland, Russia's east and Mozambique will sustain over-supply forces over coming years, pressuring higher cost producers to exit.

Q: Is cost curve deflation over?

To a significant degree, Yes, we believe. While further underlying cost cuts might be achieved, the coal industry is already 5+ years into a price-cost down cycle – further gains from here are likely limited. And now oil/energy prices, plus producer FX, are headwinds for costs. We do feel that cost curve deflation is at least pausing for now and may indeed be reverting to inflation. In this way, rallying prices overlaid upon static or rising costs leaves margins stable.

UBS VIEW

Margin floor?: Coal is most advanced through the downwards price-cost cutting cycle, in our view. The recent lift in JQ16 met coal contracts (HCC US\$84/t, up \$3/t; PCI US\$73/t, up \$4/t; SSCC US\$70/t, up \$3/t) reflect acknowledgement of firmer producer FX, higher oil prices and a degree of tightness due to markets rebalancing and to a lesser extent, Queensland flooding in Feb-16. From here we expect ongoing gradual price rises in line with UBS' rising oil price profile and more balanced markets.

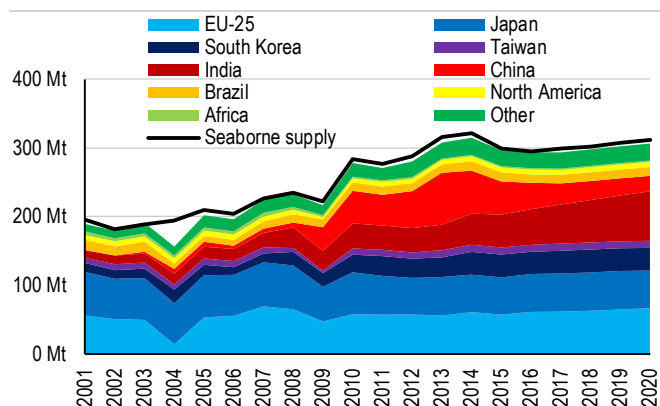
EVIDENCE

Chinese steel demand; domestic supply support critical: In addition to the usual signposts for steel demand (Chinese property starts, sales; infrastructure fixed investment), we highlight the importance of Chinese domestic supply. The government continues to support the domestic coal sector in broad terms, via lower rail freight tariffs announced in recent weeks and a large fund designed to help re-deploy redundant workers from zombie coal mine capacity.

WHAT'S PRICED IN?

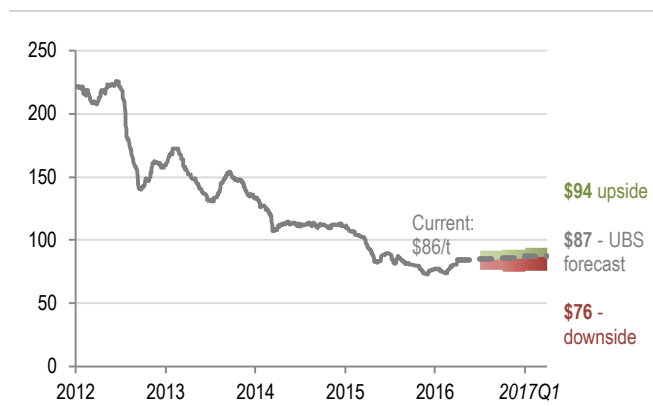
A halt to cost deflation and better demand: The recent lift in met coal prices reflects a degree of tightness from floods in Queensland in Feb-16 (which we think we reverse). Firmer oil/energy prices and a weaker US dollar against major producer FX is consistent with this year's spot price lift. But better underlying demand will be needed to drive prices much higher from here.

Figure 186: Supply/demand balance



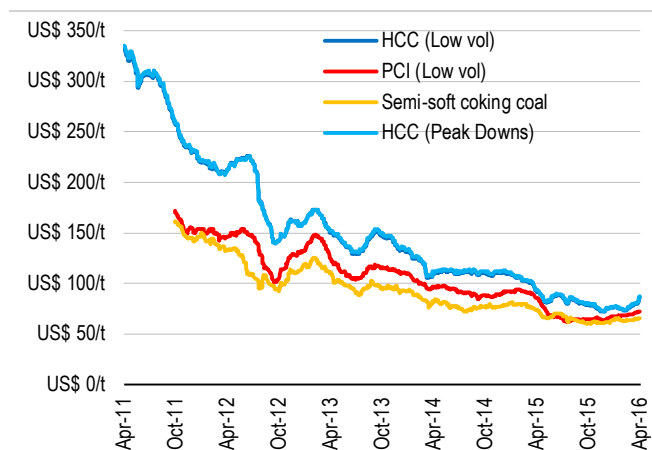
Source: IHS McCloskey, ABS, TEX Report, UBS Research.

Figure 187: Upside/Downside



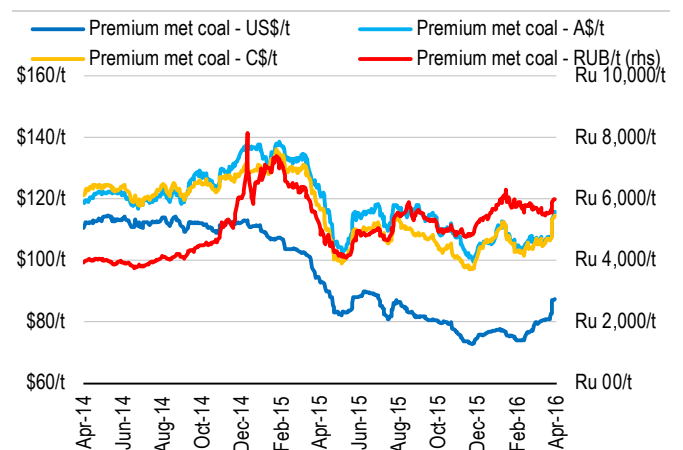
Source: UBS & Bloomberg.

Figure 188: Met coal spot prices (US\$/t FOB)



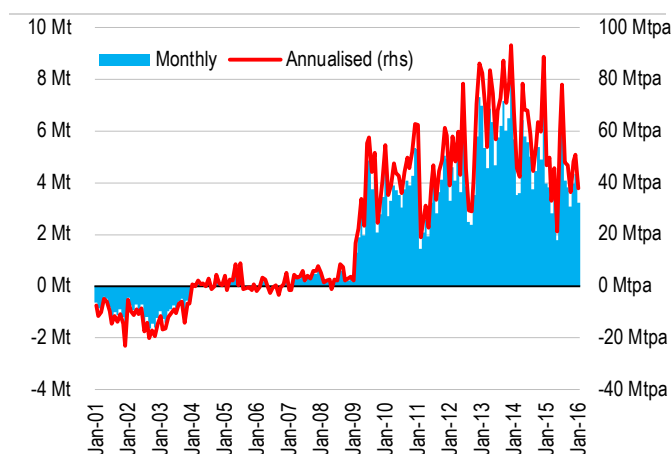
Source: Platts, UBS Research.

Figure 189: Met coal prices in prod'r currencies



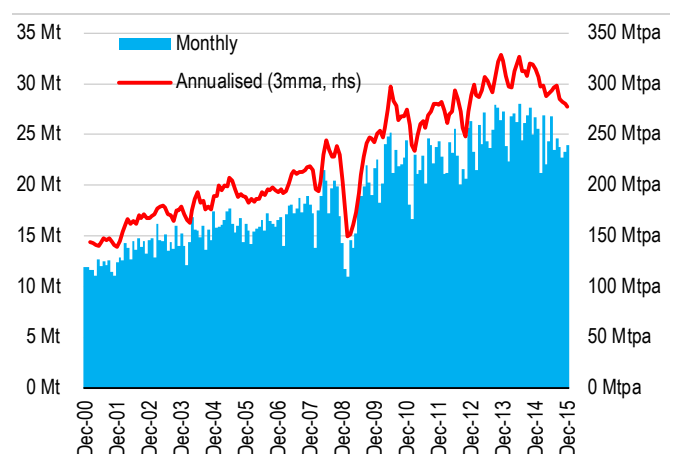
Source: Platts, Bloomberg, UBS Research.

Figure 190: China met coal net imports (Mt/mth)



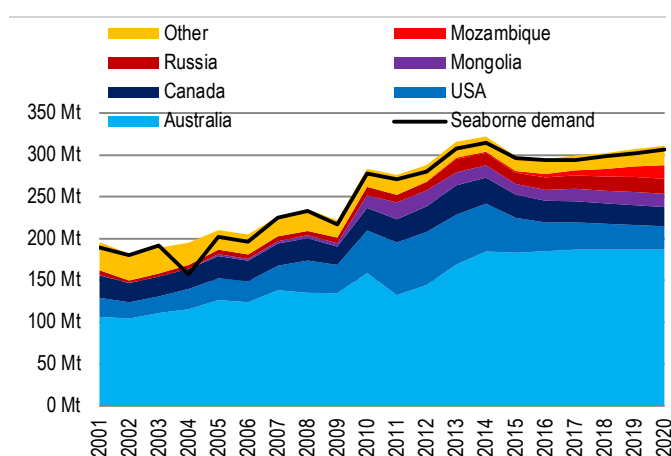
Source: IHS McCloskey, UBS Research.

Figure 191: World met coal imports (mthly & 3mma ann'd)



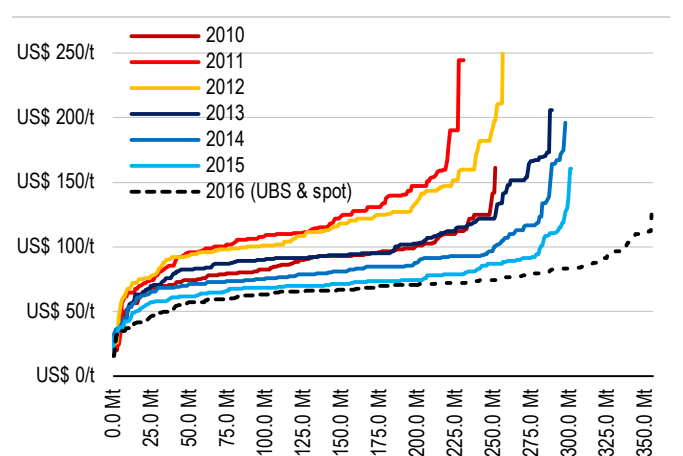
Source: IHS McCloskey, ABS, UBS Research.

Figure 192: Met coal exports & seaborne demand



Source: AME, TEX Report, IHS McCloskey, UBS Research.

Figure 193: Met coal cost curve deflation



Source: AME Group, UBS Research.

Manganese

PIVOTAL QUESTIONS

Q: Does global steel output trends justify the recent price spike?

No, in our view. Output YTD has been weak to negative y/y, both in China and elsewhere. Most recent data from mid-March did show somewhat of a lift in Chinese output, but we are wary to what extent this is a response to seasonality rather than improved underlying demand. A sustained lift in global steel output is required to justify spot prices that now sit above industry production costs.

Q: Have suppliers cut output enough to sustainably rebalance the market?

Global manganese ore output has been cut by ~18% according to South32 over the last 3-6 months. Coming at the same time as a seasonal / speculative lift in steel sentiment, pricing and margins, inventories have been restocked at customers and drawn down at Chinese ports. The market has certainly tightened. Yet global and Chinese steel output has been weak YTD. At this stage, suppliers have certainly done enough to effect better pricing ahead of peak Chinese steel demand in 2Q16.

Q: Are cost curves still deflating?

Ore production costs in South Africa, Australia, Brazil, China & Russia had benefited from the dual tailwinds of lower energy/oil prices, and weaker home currencies against the US dollar. But these forces have now reversed, suggesting at minimum a stabilisation of cost curve deflation. If oil reflation and US\$ weakness continues, cost curves may edge higher in coming months.

UBS VIEW

Current spot prices not representative of underlying demand: The recent jump in 44% Mn ore prices from US\$1.7/dmtu to ~US\$4/dmtu is, we believe, mostly a result of effective rationing of global supply coupled with a seasonal lift in demand & inventory rebuild. Chinese port stocks have halved since start of 2016. Yet, Chinese and Global steel production trends are weak. This rebalancing looks to be supply side driven and as such we would expect previously idled mines to restart production the longer current spot prices endure.

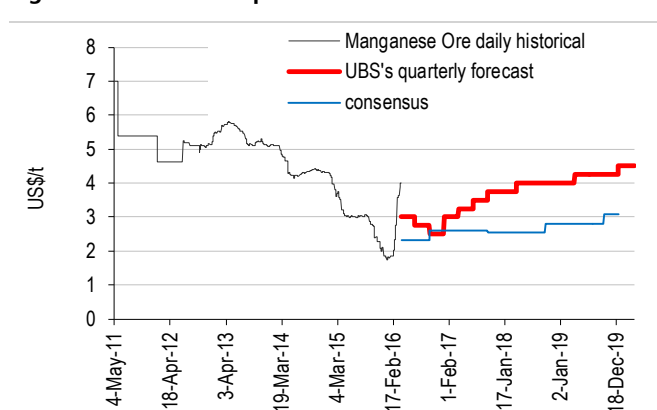
EVIDENCE

Global steel / Mn output, trade & inventories: Steel production drives manganese demand, so trends here are crucial (refer Steel section earlier). Chinese Mn ore imports and port stocks will determine the longevity of the current price spike. We also anticipate curtailed producers to restart production should spot prices remain well-bid in the short term.

WHAT'S PRICED IN?

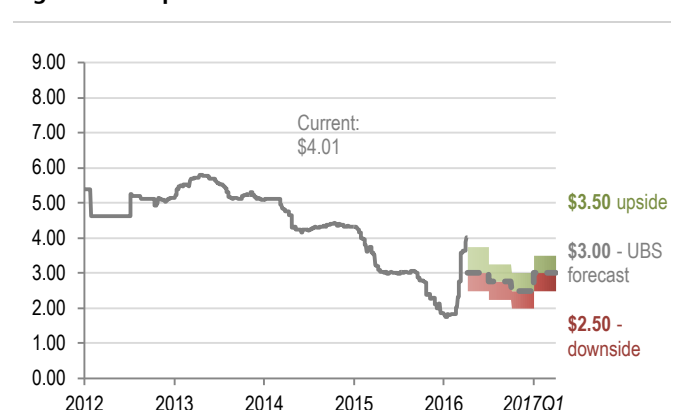
Permanently lower supply, structurally stronger demand: Spot prices ~US\$4/dmtu now sit above the Mn ore cost curve, implying excess demand. We caution against the longevity of this implication. Recent production cuts could conceivably be reversed with relative ease. Meanwhile, evidence is not yet sufficient to suggest Chinese and global steel demand will remain strong beyond 2Q16.

Figure 194: Historical prices vs UBS & consensus



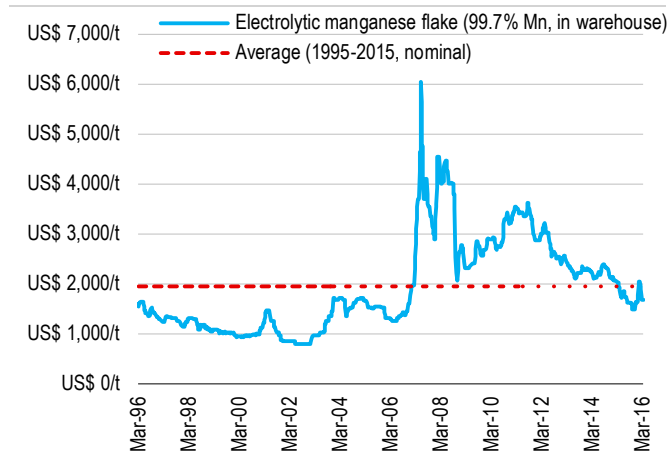
Source: UBS Research.

Figure 195: Upside/Downside



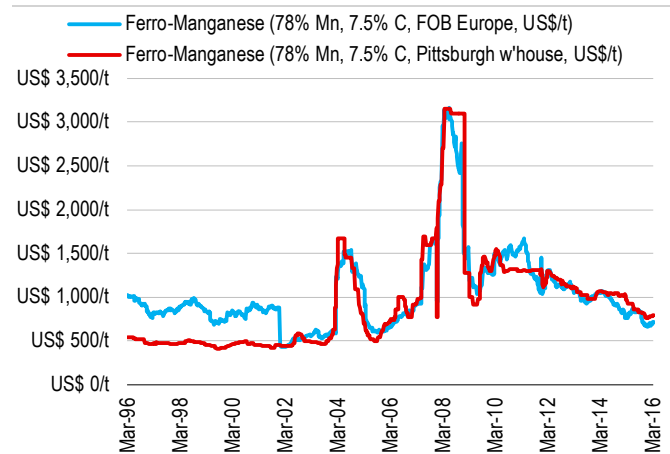
Source: UBS & Bloomberg.

Figure 196: Electrolytic manganese price



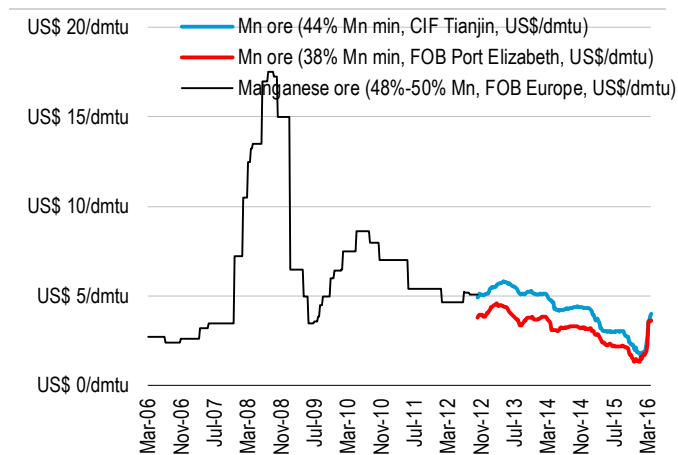
Source: Metal Bulletin, Bloomberg, UBS Research

Figure 197: Ferro-manganese prices



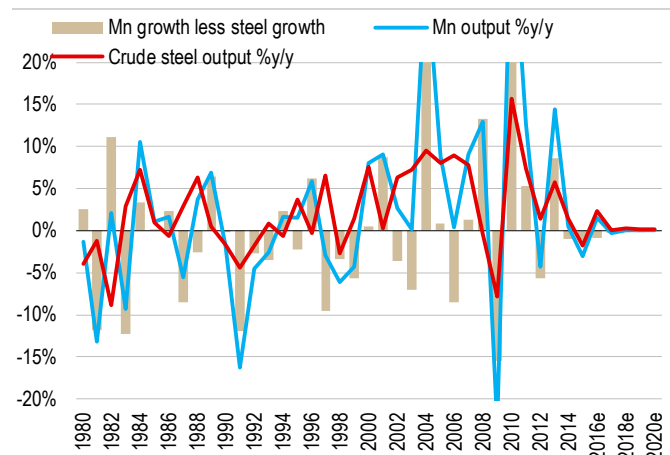
Source: Metal Bulletin, Bloomberg, UBS Research.

Figure 198: Manganese ore prices – long history



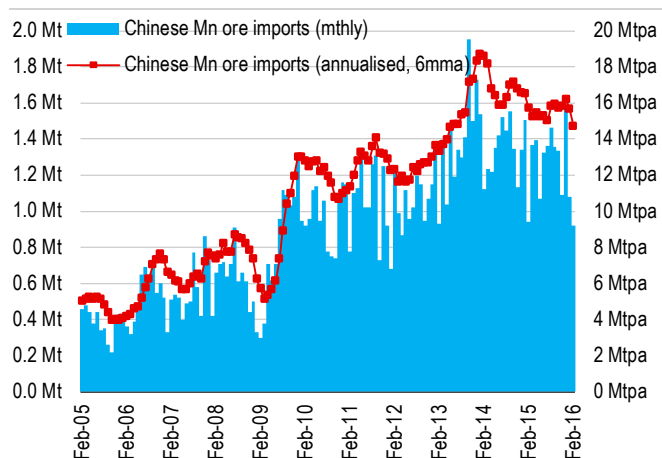
Source: Metal Bulletin, Bloomberg, UBS Research.

Figure 199: Crude steel & Mn ore output (%y/y)



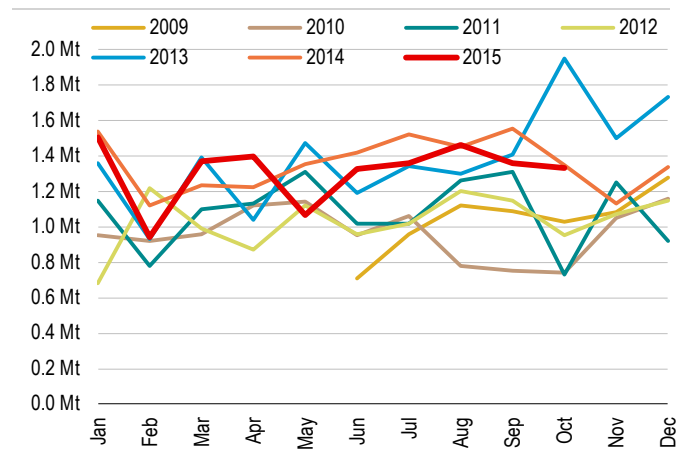
Source: Metal Bulletin, WSA, Bloomberg, UBS Research.

Figure 200: China Mn ore imports - annualised



Source: China Customs, Bloomberg, UBS Research.

Figure 201: China Mn ore imports – seasonal pattern



Source: China Customs, Bloomberg, UBS Estimates

Thermal Coal

PIVOTAL QUESTIONS

Q: Will China's net import turn to net exports?

Seaborne thermal coal trade has peaked and is trending lower, led by falling Chinese net imports & slowing Indian imports. China's coal demand is forecast to fall again this year, according to National Energy Administration 2016 energy plan. China's government is balancing the desire to cut up to 500Mt of excess / zombie capacity over the next 5 years against the reality of supporting a heavily indebted, labour intensive, important industry in many provinces. China Shenhua is canvassing large increases in exports this year and beyond. China's net imports are expected to fall toward balance for the remainder of the decade.

Q: How are suppliers positioning ahead of a potential margin squeeze?

Spot thermal coal prices have responded to higher oil prices and producer FX by less than other commodities, implying margin compression. Producers continue to cut costs, including in China, where a weakening CNY and recent internal rail freight tariff cuts will keep more Chinese domestic capacity operating – hence pressuring imports lower still. Without a lift in spot prices to recover higher oil and producer FX costs, we expect supply cuts to continue rebalancing trade volumes lower still.

Q: Is cost curve deflation over?

In the short term at least, yes. At a minimum the pace of cost curve deflation has slowed dramatically as oil prices and producer FX have lifted. Underlying cost cutting continues. But for now we see cost curves stabilising or perhaps even reflatting slightly.

UBS VIEW

Seaborne thermal coal in terminal decline; prices to flatline in real terms: China's coal demand is flat to falling and net imports falling quickly; India's thermal demand is rising but so too is domestic supply, leaving uncertainty hanging over India's thermal coal import prospects. Meanwhile, ongoing falls in levelised costs of electricity of myriad alternate sources of power, including thrifting; combined with coal's high carbon intensity combine to weigh on demand and trade. Refer [Coal: Is seaborne trade in terminal decline?](#) But higher oil and producer FX have not reported as directly to the spot price as in other commodities, pointing to heightened margin pressure if unchecked.

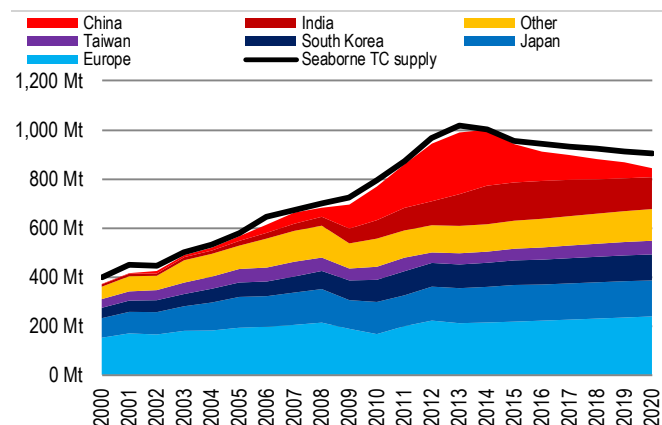
EVIDENCE

Trade continues to retreat, led by China; yet prices rally: Global trade data continue to fall; China's net imports particularly so. Exports from there this year will be a critical signpost given Shenhua's guidance to as much as quadruple exports to up to 10Mt this year.

WHAT'S PRICED IN?

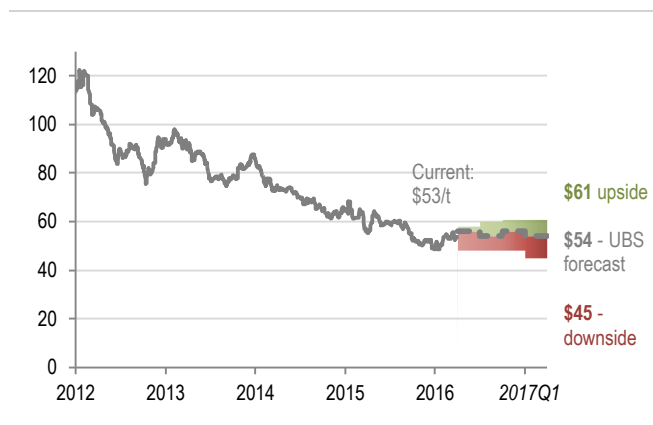
Margin compression: In a relative sense, spot seaborne thermal coal prices have not lifted to the same extent as other commodities and in correlation with firmer oil and stronger producer currencies. Unchecked, this will compress supplier margins and accelerate supplier response decision tipping points. We are sympathetic to this view given retreating trade volumes.

Figure 202: Supply/demand balance



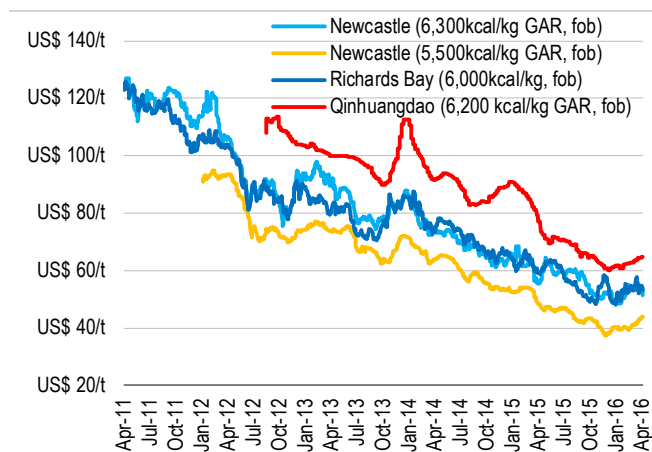
Source: UBS Research.

Figure 203: Upside/Downside



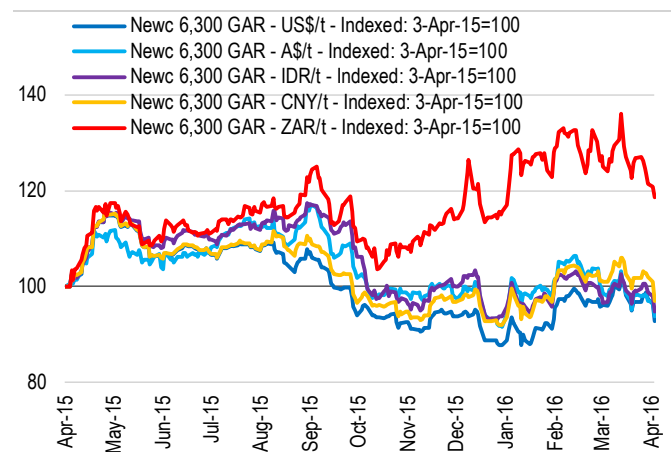
Source: UBS & Bloomberg.

Figure 204: Thermal coal spot prices (US\$/t)



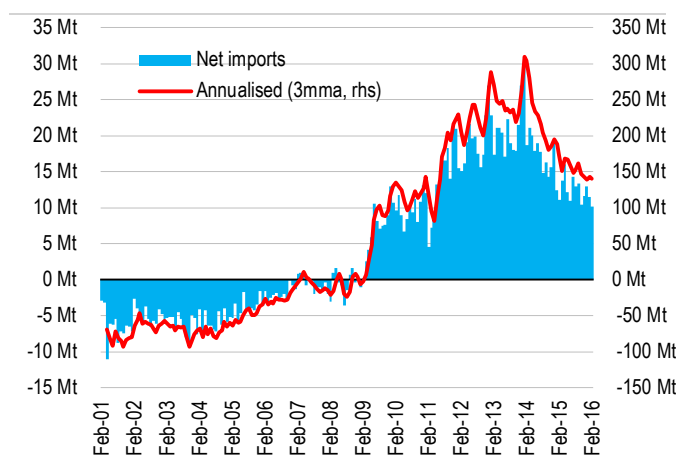
Source: Platts, UBS Research.

Figure 205: Thermal coal prices in prod'r currencies



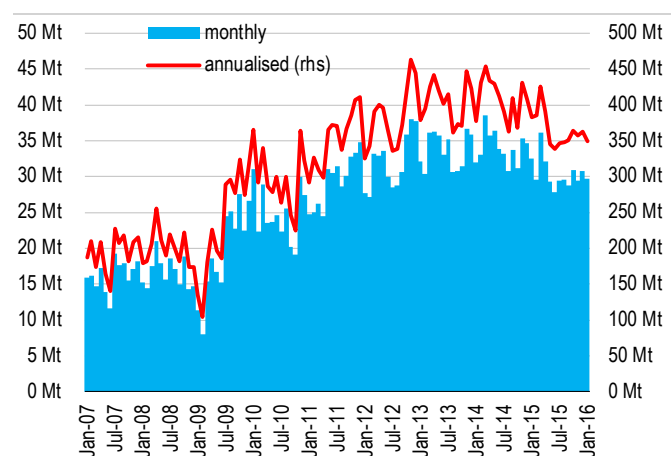
Source: Platts, Bloomberg, UBS Research.

Figure 206: China net thermal coal imports (mthly)



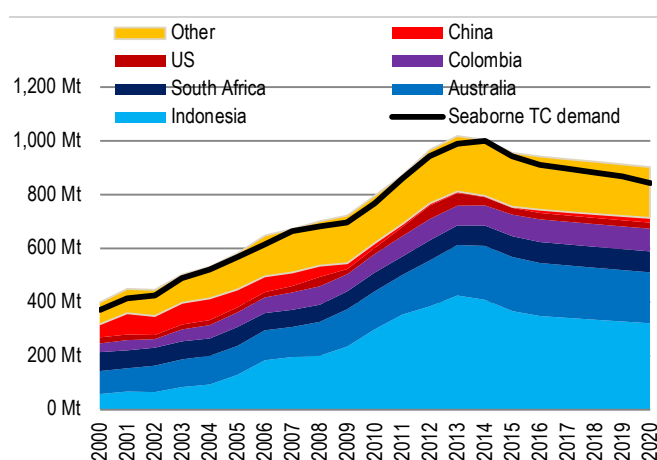
Source: IHS McCloskey, UBS Research.

Figure 207: Indonesia thermal coal exports (mthly)



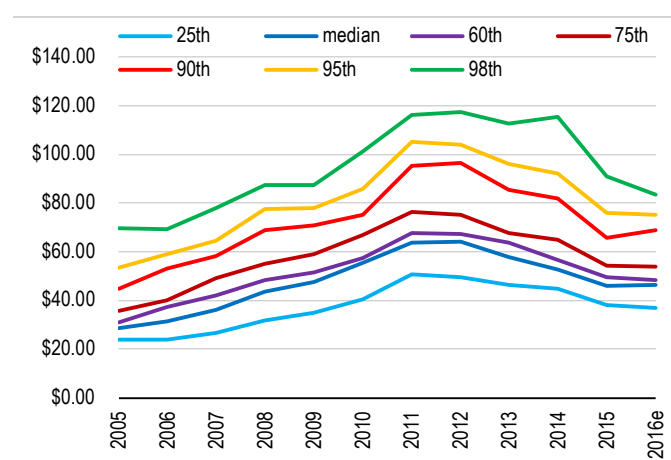
Source: HDR Salva, UBS Research.

Figure 208: Thermal coal exports vs. seaborne demand



Source: AME Group, IHS McCloskey, TEX Report, UBS Research.

Figure 209: Thermal coal cost curve percentile trends



Source: AME Group, UBS Research.

Mineral Sands

PIVOTAL QUESTIONS

Q: When will titanium and zircon demand growth recover?

Titanium demand is leveraged to global demand for consumer durables, manufactures and renovation/decoration uses. Zircon is mainly used in manufacture of ceramics, particularly tiles, bathroom & laundry equipment. Consumer sentiment, retail sales, house purchase and renovation all drive demand here. While there are tentative signs of a property sales recovery in China and a broader recovery in the US, the permanent 40% down shift in zircon intensity of use in 2012-13 presents a challenging demand gap to fill – one which we think will take 1-2 more years from here at least.

Q: Are suppliers doing enough to rebalance markets?

Suppliers, mostly the big 3 of Iluka, Rio Tinto & Tronox, have responded aggressively to aid rebalancing. But as evidenced by continued falling prices, supply cuts have not been enough to rebalance these markets against weak demand and deflationary FX & energy costs. Iluka's decision to halt output at Jacinth-Ambrosia will accelerate supply side rebalancing via inventory drawdown and relative production tightness. This should aid a cautious price recovery on a 12-18 month view.

Q: What is happening to cost curves?

Mineral sands cost curves are caught in an ebb-and-flow of underlying cost cutting and productivity initiatives allowing further mine-site cost deflation, against rising oil/energy costs and weakness of the US dollar against key producer currencies such as the Rand and the Australian dollar. Cost curves would be stable to inflating slightly now, pressuring margins and driving producer reactions to rebalance the market, as evidenced by Iluka's decision to curtail mining at Jacinth-Ambrosia.

UBS VIEW

Prices revised lower as demand recovery absent: The \$100/t fall in zircon transaction prices to \$770-\$830/t for standard-to-high grade product late last month, led by Rio Tinto material we understand, appears now to be settling across the industry. As another sign of lacklustre demand-supply tension following Iluka's decision to idle Jacinth-Ambrosia for 18-24 months, we assess a lack of demand-supply tension currently and hence revise prices lower across the zircon and titanium complex.

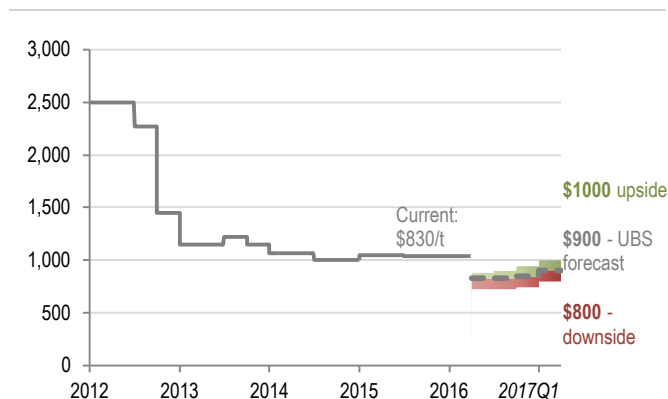
EVIDENCE

Trade transaction prices; China property sales & US/EU growth: Supplier reaction in this opaque market is critical to read underlying demand-supply tension. Here, recent price cuts illustrate poor fundamentals. Transaction price and supply discipline critical here. Meanwhile, pigment demand prospects depend on recovering US & Eurozone growth, and China's property recovery.

WHAT'S PRICED IN?

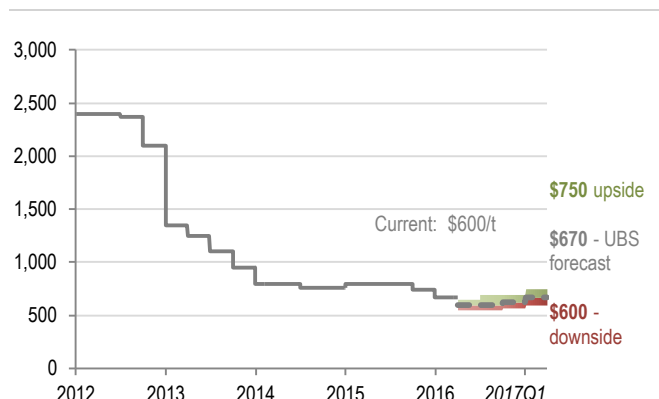
Anaemic demand: Despite supplier discipline, upstream inventory build & production curtailments, prices remain under pressure as demonstrated by the latest step-down in the zircon price. Ilmenite and feedstock prices also remain under pressure as pigment demand remains relatively muted notwithstanding better growth in the US and the nascent Chinese property sales recovery.

Figure 210: Zircon Upside/Downside



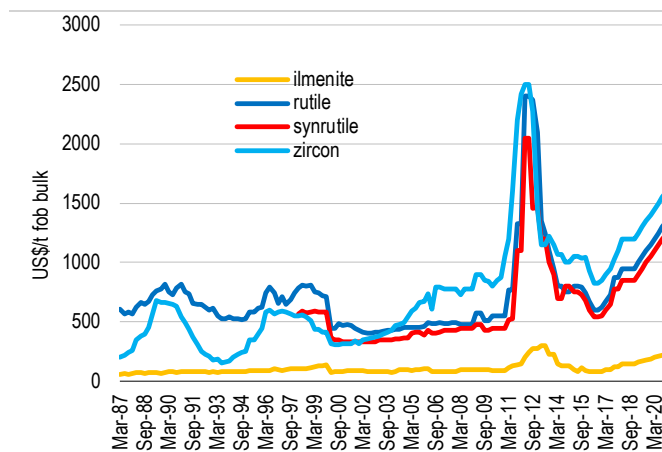
Source: UBS Research.

Figure 211: Rutile Upside/Downside



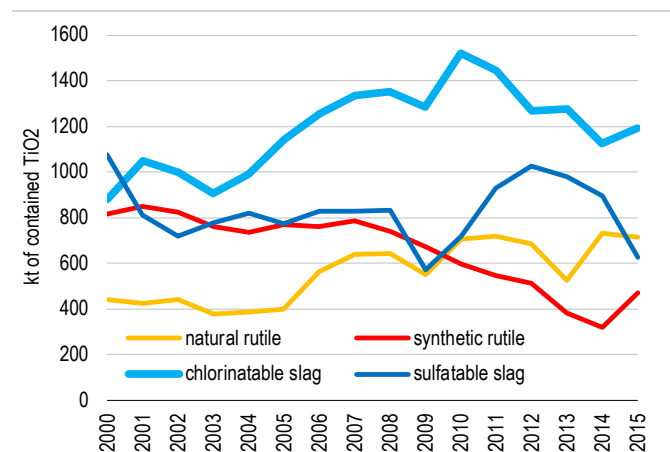
Source: UBS & Bloomberg.

Figure 212: Mineral sands prices (qtrly, history & f'cast)



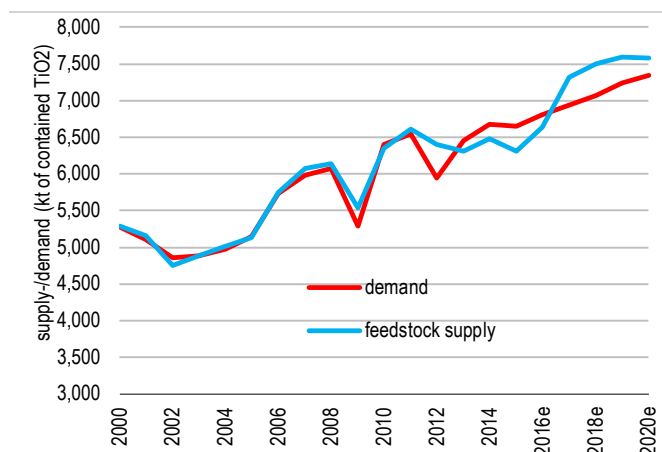
Source: TZMI, UBS Research. Note quarterly averages.

Figure 213: Key global TiO₂ feedstock supply



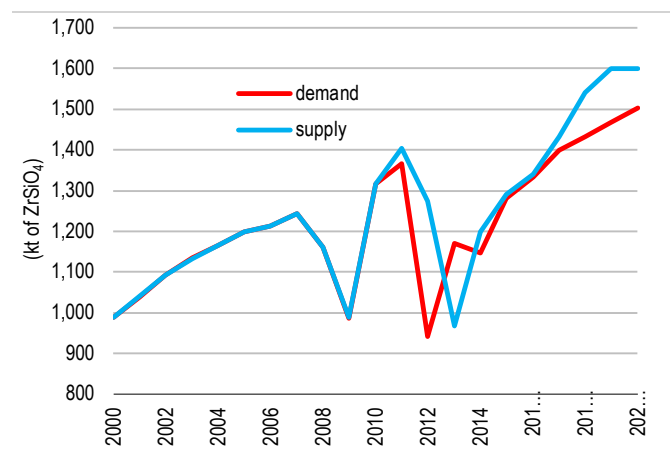
Source: TZMI, UBS Research.

Figure 214: Global TiO₂ feedstock supply vs. demand



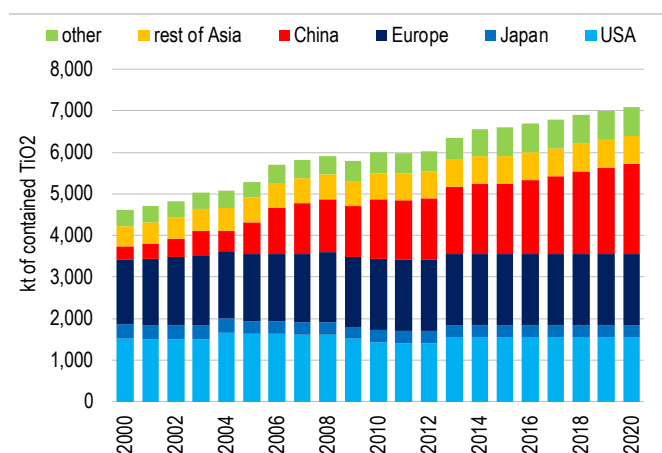
Source: TZMI, UBS Research.

Figure 215: Zircon supply vs. demand



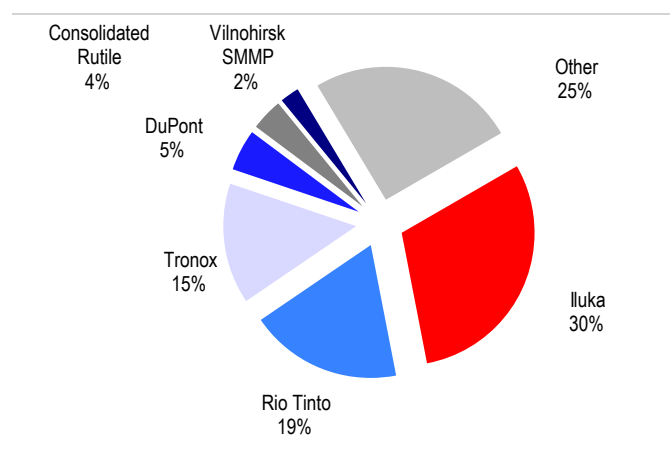
Source: TZMI, UBS Research.

Figure 216: Global TiO₂ pigment capacity



Source: TZMI, UBS Research.

Figure 217: Zircon producers & capacities – 2015 share



Source: TZMI, UBS Research.

Uranium

PIVOTAL QUESTIONS

Q: What is the scale & speed of Japan's reactor restarts?

The restart of Japan's Nuclear fleet is progressing slowly, & consistently slower than our forecasts for the past couple of years. Currently 42 reactors are operable and potentially able to restart, 24 of which are in the process of gaining the necessary approvals. To date only 2 have restarted, in Aug-15 & Oct-15, respectively. The next reactor (Ikata 3) is expected to restart in Aug-16. Many of the remaining reactors remained mired in regulatory approvals or court actions. We project a steady pace of restarts, but this view remains subject to significant downside risk.

Q: Is China's nuclear build programme on track?

China now has 32 operating reactors, with another 22 under construction & 42 in the planning stage. Beyond that there is another 170 proposed. This could see installed capacity that is currently 29GWe almost double to 58GWe by 2020-21 & then up to 150GWe by 2030. This compares to the current global installed fleet of 440 reactors & 384GWe. The large driver here is China's efforts to improve air-quality around cities. China's build programme is a very bullish long term driver for uranium demand, but it is also an important near term demand support.

Q: Does a lack of investment in mine supply matter?

The bear cycle in uranium pricing post Fukushima has resulted in a spate of mine shuts & postponement of major projects. But investment decisions made years ago mean there is still mine supply growth coming from Canada (mainly Cameco) & Africa (mainly Husab & Trekkopje). Cameco's Cigar Lake performed well in 2015, growing production to 11.3Mlb's (+11Mlb's y/y) account for most of global supply growth. Cameco plans to produce 16Mlb's in 2016 & 18Mlb's by 2018. Most production growth is in the hands of just a few players.

UBS VIEW

China's large scale reactor build & lack of investment drive favourable long term fundamentals: On a 5-year view, the uranium industry fundamentals remain very positive. China's massive nuclear-fleet building programme & a lack of investment in mine supply combine to drive a market deficit. The near term picture is less clear, Japan's restarts have been slow & mine supply growth is still being delivered from major projects such as Cigar Lake. We see clear long term price upside, but there catalysts are lacking near term which could see prices languish in US\$30's/lb. These near term risks are captured by the asymmetric upside/downside price scenario (see Figure 219).

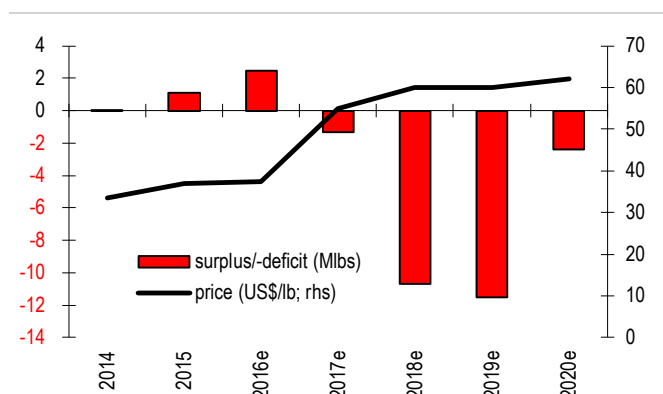
EVIDENCE

Watch Japan restarts, China fleet build & Cameco behaviour: Newsflow regarding Japan's restarts are the most obvious catalyst to watch. Here we are watching individual reactor approvals as well as the court actions that have delayed some. Much of the supply growth potential for 2016-17e is controlled by Cameco, which with as the largest global miner may look to manage supply to market. We have seen moves from other producers such as Areva delay projects.

WHAT'S PRICED IN?

A well supplied market: The Spot price of US\$28/lb compares to industry marginal costs of US\$35-40/lb & is well below an incentive price to bring on new mine capacity.

Figure 218: Price & supply/demand balance



Source: UBS Research.

Figure 219: Upside/Downside



Source: UBS & Bloomberg.

Figure 220: Uranium spot price (US\$/lb U3O8)



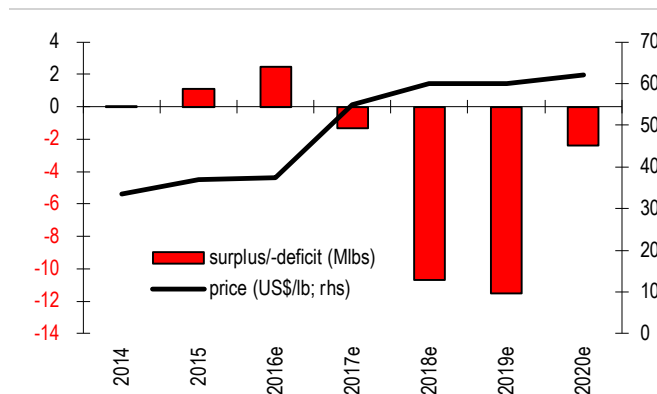
Source: Tradetech.

Figure 221: Uranium price: long term history (US\$/lb)



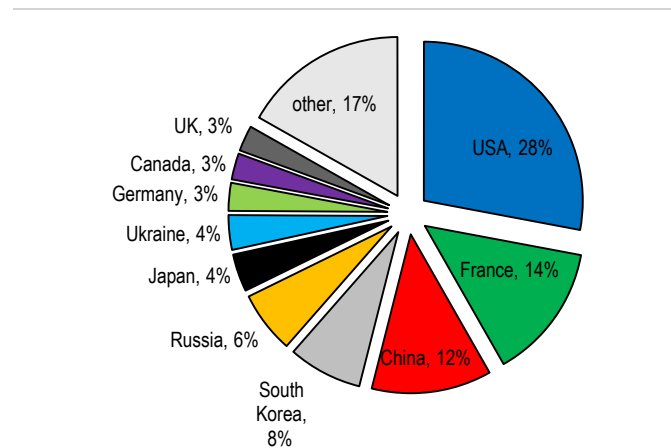
Source: Tradetech.

Figure 222: Price & supply/demand balance



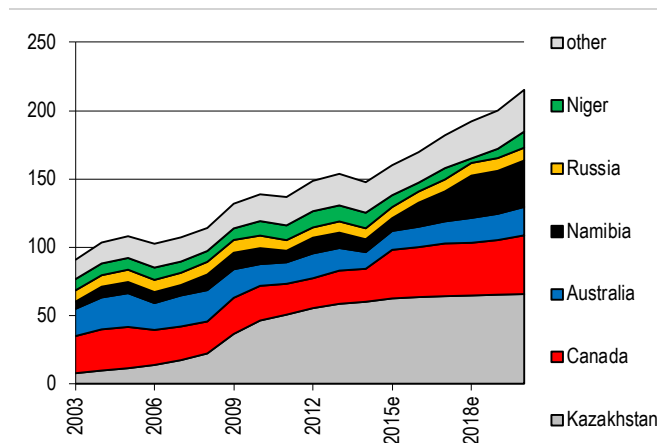
Source: UBS Research; World Nuclear Association.

Figure 223: Uranium demand by country, 2015



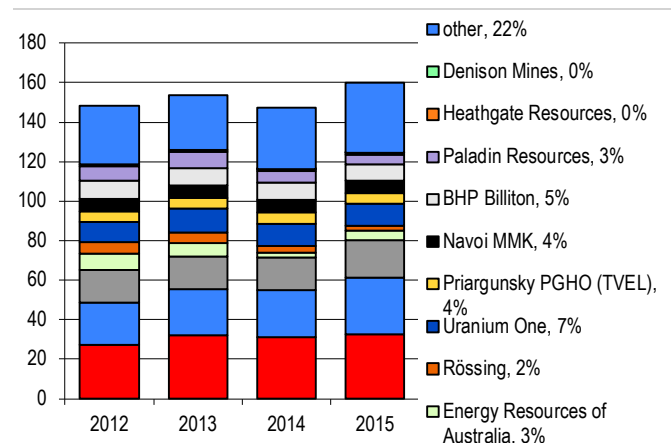
Source: UBS Research; World Nuclear Association.

Figure 224: Uranium mine production, by country (Mlbs/yr)



Source: UBS Research; World Nuclear Association, Company Filings.

Figure 225: Top uranium producers (Mlbs; % mine supply)



Source: UBS Research; World Nuclear Association.

Supply-Demand Balances

Copper

Figure 226: Global Copper Market

		2014	2015	2016e	2017e	2018e	2019e	2020e
Demand Summary								
China	Mt	10.54	11.45	11.92	12.16	12.40	12.66	12.86
growth	%	5.5%	8.7%	4.1%	2.0%	2.0%	2.1%	1.6%
Europe	Mt	4.28	4.19	4.23	4.28	4.36	4.43	4.50
growth	%	1.6%	-2.1%	1.0%	1.2%	1.9%	1.6%	1.6%
US	Mt	1.82	1.84	1.86	1.88	1.91	1.94	1.97
growth	%	1.3%	1.2%	1.2%	1.1%	1.5%	1.5%	1.5%
Japan	Mt	1.05	1.03	1.04	1.05	1.06	1.07	1.08
growth	%	6.5%	-2.0%	1.0%	0.7%	1.0%	1.0%	1.0%
RoW	Mt	4.65	4.75	4.86	5.00	5.17	5.32	5.46
growth	%	2.8%	2.2%	2.2%	2.9%	3.4%	3.0%	2.7%
Global refined copper demand	Mt	22.3	23.3	23.9	24.4	24.9	25.4	25.9
Growth in copper demand	Mt	0.8	0.9	0.6	0.5	0.5	0.5	0.5
Growth in copper demand	%	3.9%	4.1%	2.8%	1.9%	2.2%	2.1%	1.8%
Mine production (ex SX-EW)								
growth in mine conc production	%	2.2%	4.9%	1.5%	1.8%	2.1%	1.9%	1.3%
Smelting capacity	Mt	20.4	22.5	22.8	22.5	23.2	24.0	25.0
utilisation rate	%	89%	83%	84%	86%	85%	84%	83%
Smelter production	Mt	18.1	18.6	19.1	19.4	19.7	20.1	20.7
Refined production	Mt	19.1	19.7	20.4	20.8	21.0	21.6	22.2
SXEW production	Mt	3.7	3.8	3.7	3.7	3.7	3.6	3.4
Total copper supply	Mt	22.8	23.5	24.0	24.5	24.8	25.2	25.5
growth in supply	%	8.1%	2.8%	2.4%	1.8%	1.2%	1.7%	1.5%
Market balance	Mt	0.499	0.206	0.124	0.102	-0.145	-0.245	-0.331
Days Total Inventory	days	45	46	47	48	44	40	35
LME price average	US¢/lb	311	251	205	210	260	300	315
LME price average	US\$/t	6,864	5,526	4,519	4,630	5,732	6,614	6,945
LME price change y/y	%	-6.4%	-19.5%	-18.2%	2.4%	23.8%	15.4%	5.0%

Source: UBS Research

Aluminium

Figure 227: Global Aluminium Market

		2014	2015	2016e	2017e	2018e	2019e	2020e
Global Alumina Supply (Met grade)	Mt	100.0	109.8	118.7	124.3	132.7	136.2	137.7
Global Alumina Demand	Mt	100.0	109.8	118.8	124.0	132.2	135.8	137.7
Alumina Market Balance	Mt	-	-	-0.02	0.31	0.49	0.49	0.06
Primary Smelter Supply								
China	Mt	23.9	31.3	33.0	34.4	36.8	37.6	37.7
Europe (ex Russia)	Mt	4.2	4.4	4.5	4.7	4.9	4.9	4.9
Russia	Mt	3.5	3.5	3.6	3.7	4.3	4.9	5.1
United States	Mt	1.7	1.6	1.0	1.0	1.0	1.0	1.0
Australia	Mt	1.7	1.6	1.7	1.7	1.7	1.7	1.7
Canada	Mt	2.9	2.9	3.2	3.2	3.2	3.2	3.2
Middle East	Mt	5.2	5.4	5.5	5.5	5.6	5.7	6.2
Other	Mt	6.6	6.8	7.4	8.0	8.6	8.9	9.0
Global Aluminium Supply	Mt	49.7	57.7	60.0	62.3	66.1	67.9	68.8
growth in supply	%	4.3%	16.1%	4.0%	3.9%	6.1%	2.7%	1.4%
Primary Demand								
China	Mt	23.6	30.9	31.3	31.9	32.7	33.6	33.7
Europe	Mt	9.5	9.7	10.0	10.4	10.6	10.8	10.9
United States	Mt	5.2	5.4	5.6	5.8	6.0	6.2	6.4
Japan	Mt	2.1	2.1	2.2	2.2	2.3	2.3	2.4
India	Mt	1.8	1.8	1.9	2.0	2.1	2.2	2.3
Other	Mt	8.5	8.8	9.3	9.7	10.1	10.3	10.7
Global Aluminium Demand	Mt	50.6	58.8	60.3	62.0	63.8	65.4	66.4
growth in demand	%	6.2%	16.1%	2.7%	2.7%	2.9%	2.6%	1.5%
Aluminium Market Balance	Mt	-0.97	-1.11	-0.34	0.33	2.32	2.44	2.40
Year End Stock	Mt	6.3	5.2	4.9	5.2	7.5	10.0	12.4
Days Consumption	days	45	32	29	31	43	56	68
LME Aluminium price average (spot)	US\$/lb	84.6	75.5	71.8	75.3	80.0	81.5	85.0
LME Aluminium price average (3 mth)	US\$/lb	85.8	76.3	74.8	78.3	83.0	84.5	88.0
LME Aluminium 3 mth price change y/y	%	0.2%	-11.1%	-2.1%	4.7%	6.1%	1.8%	4.1%
Alumina contract price average	US\$/t	274.4	244.0	239.0	250.1	265.3	270.1	281.3
Alumina spot price average	US\$/t	330.4	302.8	255.0	290.0	300.0	306.3	320.0
Alumina spot price change y/y	%	0.9%	-8.4%	-15.8%	13.7%	3.4%	2.1%	4.5%

Source: UBS Research

Alumina

Figure 228: Global Alumina Market

		2014	2015e	2016e	2017e	2018e	2019e	2020e
Supply								
Australia	Mt	20.6	20.4	21.0	21.0	21.0	21.0	21.0
Brazil	Mt	10.2	10.2	10.4	10.4	11.2	12.2	12.7
Canada	Mt	1.6	1.6	1.6	1.6	1.6	1.6	1.6
China	Mt	47.1	56.4	64.1	67.0	71.4	72.9	73.2
Indonesia	Mt	-	-	0.5	1.2	2.3	2.8	2.8
India	Mt	5.5	5.8	7.0	7.2	7.4	8.1	8.7
Russia	Mt	2.6	2.6	2.7	2.9	3.1	3.1	3.1
United States	Mt	5.0	5.0	4.1	4.4	5.6	5.6	5.5
Other	Mt	15.0	16.2	16.4	18.0	19.2	19.3	19.5
Global Production	Mt	107.6	118.1	127.7	133.7	142.7	146.5	148.1
Non-metallurgical grade alumina	Mt	-7.5	-8.3	-8.9	-9.4	-10.0	-10.3	-10.4
Met-grade alumina supply	Mt	100.0	109.8	118.7	124.3	132.7	136.2	137.7
change	%	3.2%	9.8%	8.1%	4.7%	6.8%	2.7%	1.1%
Alumina Demand	Mt	100.0	109.8	118.8	124.0	132.2	135.8	137.7
change	%	3.2%	9.8%	8.2%	4.4%	6.6%	2.7%	1.4%
Global Balance	Mt	-	-	-0.02	0.31	0.49	0.49	0.06
Alumina Contract Price	US\$/t	274	244	239	250	265	270	281
Alumina Spot Price	US\$/t	330	303	255	290	300	306	320

Source: UBS Research

Nickel

Figure 229: Global Nickel Market

		2014	2015	2016e	2017e	2018e	2019e	2020e
Global Stainless melt output	Mt	42.1	42.1	42.8	43.6	44.5	45.4	46.3
Growth	%	6%	0%	2%	2%	2%	2%	2%
Austenitic ratio	%	75%	77%	76%	76%	76%	76%	76%
Ni bearing stainless production	Mt	31.6	32.5	32.5	33.2	33.9	34.6	35.3
Average overall Nickel Content in SS	%	6%	7%	7%	6%	6%	6%	6%
Refined Primary Ni demand by first use								
Stainless Steel	kt	1,320	1,304	1,303	1,303	1,313	1,324	1,335
Alloy Steel	kt	88	87	89	93	93	93	96
Non-Ferrous Alloys	kt	201	208	215	220	223	225	229
Plating	kt	136	143	146	149	152	154	158
Foundry	kt	68	64	65	65	67	69	69
Other	kt	120	131	128	130	135	137	142
Refined Demand	kt	1,933	1,937	1,946	1,960	1,983	2,003	2,029
YoY growth	%	5.7%	0.2%	0.5%	0.7%	1.2%	1.0%	1.3%
Refined Supply	kt	2,087	2,017	1,877	1,920	1,970	2,010	2,133
YoY growth	%	6.9%	-3.4%	-7.0%	2.3%	2.6%	2.0%	6.1%
Market Balance	kt	154	80	-70	-40	-13	7	103
Total Inventory	kt	439	519	449	409	396	403	507
Days inventory	kt	83	98	84	76	73	73	91
China's Nickel Market								
Refined Demand	kt	970	1,010	1,006	1,001	1,009	1,017	1,026
YoY growth	%	6.3%	4.1%	-0.4%	-0.5%	0.8%	0.8%	0.9%
Refined Supply	kt	703	574	505	551	575	650	650
YoY growth	%	-0.6%	-18.4%	-11.9%	8.9%	4.5%	13.0%	0.0%
Market Balance	kt	-267	-436	-500	-450	-434	-367	-376
Price	US\$/lb	766	538	420	500	600	750	890
YoY growth	%	12.3%	-29.8%	-21.9%	19.0%	20.0%	25.0%	18.7%
Price	US\$/t	16,887	11,859	9,266	11,023	13,228	16,535	19,621

Source: UBS Research

Zinc

Figure 230: Global Zinc Market

		2014	2015	2016e	2017e	2018e	2019e	2020e
Mine production (contained zn in conc)	Mt	12.9	13.3	13.2	14.2	14.5	14.9	15.0
Smelter capacity	Mt	16.2	16.5	16.6	16.6	16.6	16.6	16.6
Smelter production	Mt	13.4	13.9	14.0	14.8	15.0	15.3	15.5
Secondary supplies	Mt	1.2	1.2	1.2	1.3	1.3	1.3	1.4
Processing Losses	Mt	0.7	0.8	0.8	0.8	0.8	0.8	0.8
Zinc Conc. Requirement	Mt	13.0	13.4	13.6	14.3	14.5	14.8	15.0
Zinc Conc. Market Balance	Mt	-0.1	-0.2	-0.4	-0.1	0.0	0.2	-0.0
Refined zinc production	Mt	13.4	13.9	14.0	14.8	15.0	15.3	15.5
Refined zinc demand	Mt	13.7	14.0	14.3	14.6	14.9	15.2	15.5
Refined Zinc Market Balance	Mt	-0.29	-0.11	-0.26	0.14	0.11	0.10	0.03
Total inventories	Mt	1.18	1.07	0.81	0.95	1.06	1.16	1.19
Weeks' consumption		4.5	4.0	2.9	3.4	3.7	4.0	4.0
LME price average	US\$/lb	98	88	86	80	80	95	104
LME price average	US\$/t	2161	1931	1897	1758	1764	2094	2287
LME price change y/y	%	0.1	-0.1	0.0	-0.1	0.0	0.2	0.1
Surplus/Deficit as % of total demand	%	-2.1%	-0.8%	-1.8%	1.0%	0.8%	0.6%	0.2%
China's Zinc Market								
Mine production (contained zn in conc)	Mt	4.7	5.0	5.3	5.7	6.0	6.3	6.4
Smelter capacity	Mt	7.7	8.0	8.2	8.2	8.2	8.2	8.2
Smelter production	Mt	5.8	6.2	6.2	6.8	6.9	7.1	7.3
Secondary supplies	Mt	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Processing Losses	Mt	0.8	0.7	0.7	0.7	0.7	0.7	0.7
Zinc Conc. Demand	Mt	6.5	6.8	6.8	7.3	7.5	7.7	7.9
Zinc Conc. Market Balance	Mt	-1.7	-1.8	-1.5	-1.7	-1.5	-1.4	-1.5
Surplus/Deficit as % of total demand	%	-26.8%	-26.7%	-21.8%	-22.6%	-19.5%	-18.6%	-19.4%
Refined zinc production	Mt	5.8	6.2	6.2	6.8	6.9	7.1	7.3
Refined zinc demand	Mt	6.3	6.8	6.9	7.1	7.3	7.4	7.6
growth in zinc demand	%	4.0	6.7	2.0	3.0	2.5	2.0	2.0
Refined Zinc Market Balance	Mt	-0.5	-0.6	-0.7	-0.3	-0.4	-0.3	-0.3
Surplus/Deficit as % of total demand	%	-8.7%	-8.2%	-9.6%	-4.8%	-5.1%	-4.3%	-3.5%

Source: UBS Research

Gold

Figure 231: Global Gold Market

Moz	2013	2014	2015	2016e	2017e	2018e	2019e	2020e
Supply								
Mine Production	97.8	100.7	101.5	102.0	102.5	102.5	102.0	101.0
% change		3%	1%	0%	0%	0%	-1%	-1%
Scrap	41.9	37.2	37.7	37.9	35.4	35.4	35.4	35.4
Net Official Sales	-	-	-	-	-	-	-	-
Net Hedging	-	3.3	-	0.5	0.5	0.5	0.5	0.5
total supply	139.7	141.2	139.2	140.5	138.4	138.4	137.9	136.9
% change y-o-y	-5%	1%	-1%	1%	-1%	0%	0%	-1%
Demand								
Fabrication (including scrap)	13.4	12.8	11.6	12.0	12.4	12.9	12.9	12.9
Jewellery	79.4	72.1	69.6	70.3	71.0	71.0	71.0	71.0
Official Coin Sales	12.3	8.1	8.5	8.9	9.1	9.2	9.2	9.2
Other								
total fabrication	105.1	93.0	89.7	91.2	92.5	93.2	93.2	93.2
% change y-o-y		-12%	-4%	2%	1%	1%	0%	0%
Identified Bar Hoarding	45.3	27.4	27.4	28.7	28.7	28.7	28.7	28.7
Net ETF Purchases	-29.0	-5.2	-4.2	16.1	1.6	0.6	0.6	0.6
Net Official Purchases	13.1	15.0	15.5	11.3	8.0	8.0	6.4	6.4
Net De-hedging	1.3	-	0.8	-	-	-	-	-
total demand	135.8	130.1	129.2	147.2	130.9	130.6	129.0	129.0
% change y-o-y		-4%	-1%	14%	-11%	0%	-1%	0%
Balance (implied investment)	3.9	11.1	10.1	-6.8	7.5	7.8	8.9	7.9
Price (US\$/oz)	1,412	1,266	1,160	1,225	1,250	1,300	1,325	1,400
% change y-o-y		-10%	-8%	6%	2%	4%	2%	6%

Source: Thomson Reuters GFMS 2011-2013, UBS Research

Silver

Figure 232: Global Silver Market

Moz	2013	2014	2015	2016e	2017e	2018e	2019e	2020e
Supply								
Mine Production	832	865	867	915	940	930	930	930
% change	6%	4%	0%	5%	3%	-1%	0%	0%
Net Official Sector Sales	8	-	-	-	-	-	-	-
Old Silver Scrap	193	169	150	153	156	159	162	166
Net Producer Hedging	-	16	10	10	10	10	10	10
Net ETF Sales	1	-	9	-	-	-	-	-
total supply	1,034	1,049	1,036	1,078	1,106	1,099	1,103	1,106
% change y-o-y	-2%	1%	-1%	4%	3%	-1%	0%	0%
Demand								
Industrial Applications	475	549	527	538	554	576	588	599
Photography	50	46	41	39	39	39	39	39
Jewellery	199	215	211	216	218	218	218	218
Silverware	50	61	60	61	61	62	63	63
Coins & Medals	116	108	110	112	113	114	115	116
Net Producer De-hedging	41	-	-	-	-	-	-	-
Net ETF Purchases	-	3	-	30	10	10	10	10
total demand	932	982	949	995	995	1,019	1,032	1,046
% change y-o-y	-1%	5%	-3%	5%	0%	2%	1%	1%
Balance (implied investment)	102	68	87	83	110	80	70	60
Price (US\$/oz)	23.9	19.1	15.7	16.1	17.5	19.0	20.0	21.0
% change y-o-y		-20%	-18%	3%	9%	9%	5%	5%

Source: Thomson Reuters GFMS 2011-2013, UBS Research

Platinum

Figure 233: Global Platinum Market

000oz	2013	2014	2015	2016e	2017e	2018e	2019e	2020e
Supply								
South Africa	4,205	3,547	4,295	4,294	4,240	4,235	4,205	4,287
North America	318	339	331	297	296	286	286	322
Russia	758	715	699	696	733	749	750	760
Others	480	540	516	592	598	597	596	596
total supply	5,761	5,141	5,841	5,878	5,867	5,866	5,836	5,964
% change y-o-y	-12%	1%	-11%	14%	1%	0%	0%	-1%
Demand								
Autocatalyst (gross)	3,146	3,354	3,468	3,692	3,744	3,788	3,831	3,874
Autocatalyst recycling	1,192	1,286	1,156	1,609	1,785	1,878	1,924	1,898
Autocatalyst (net)	1,954	2,068	2,312	2,083	1,959	1,910	1,908	1,976
Chemical	547	606	566	594	624	655	655	655
Electrical	221	232	243	258	273	289	289	289
Glass	129	142	243	255	268	281	281	281
Investment	871	272	160	60	60	80	100	100
Jewellery (net)	2,238	2,140	2,025	1,987	2,131	2,283	2,422	2,557
Petroleum	184	159	121	127	133	140	140	140
Other	603	618	616	654	690	727	729	715
total demand	6,747	6,237	6,286	6,018	6,138	6,367	6,525	6,714
% change y-o-y		-8%	1%	-4%	2%	4%	2%	3%
Balance	-986	-1,096	-445	-140	-271	-501	-688	-750
Price (US\$/oz)	1,489	1,389	1,057	985	1,080	1,295	1,500	1,600
% change y-o-y		-7%	-24%	-7%	10%	20%	16%	7%

Source: Johnson Matthey 2010-2011, Thomson Reuters GFMS, UBS Research

Palladium

Figure 234: Palladium Global Market

000oz	2013	2014	2015	2016e	2017e	2018e	2019e	2020e
Supply								
South Africa	2,469	2,125	2,547	2,443	2,426	2,441	2,405	2,558
North America	967	898	873	796	775	624	624	780
Russia	2,580	2,628	2,603	2,611	2,764	2,829	2,833	2,874
Others	466	453	427	509	509	508	507	507
mine supply	6,482	6,104	6,450	6,360	6,474	6,402	6,370	6,719
Autocats Recycling	1,910	2,195	1,980	2,435	2,640	3,170	3,344	3,567
Jewellery	157	89	60	123	107	104	100	97
Other (Electrical)	458	466	477	387	335	330	326	320
DLA Sales	-	-	-	-	-	-	-	-
total supply	9,007	8,854	8,967	9,305	9,556	10,006	10,140	10,704
% change y-o-y	-3%	-2%	1%	4%	3%	5%	1%	6%
Demand								
Autocatalyst (gross)	6,958	7,351	7,495	7,957	8,193	8,440	8,673	8,952
Chemical	561	474	454	465	477	489	501	501
Electrical	1,062	1,078	1,039	1,060	1,081	1,103	1,125	1,147
Glass	457	466	452	475	498	523	539	555
Investment	357	279	242	266	293	322	354	390
Jewellery	-8	936	-550	30	60	100	100	100
Petroleum	104	107	112	112	112	112	112	112
Other	-	-	-	-	-	-	-	-
total demand	9,491	10,691	9,244	10,365	10,714	11,089	11,404	11,757
% change y-o-y		13%	-14%	12%	3%	3%	3%	3%
Balance	-484	-1,837	-277	-1,060	-1,159	-1,083	-1,264	-1,053
Price (US\$/oz)	727	809	694	580	755	850	900	950
% change y-o-y		11%	-14%	-16%	30%	13%	6%	6%

Source: Johnson Matthey 2009-2011, Thomson Reuters GFMS, UBS Research

Steel

Figure 235: Global crude steel production

Mt	2013	2014	2015	2016e	2017e	2018e	2019e	2020e
EU (27)	166	169	166	173	174	177	181	184
y/y (%)	-2.0%	1.9%	-1.8%	4.0%	0.9%	1.5%	2.1%	2.1%
Other Europe	40	33	34	35	36	37	38	39
y/y (%)	4.9%	-16.2%	2.2%	2.5%	3.0%	3.0%	3.0%	2.9%
Russia/CIS	108	106	101	99	100	103	105	106
y/y (%)	-2.7%	-2.1%	-4.3%	-2.0%	1.0%	2.4%	2.4%	0.9%
North America	119	121	111	114	122	126	126	131
y/y (%)	-2.5%	1.9%	-8.6%	2.6%	7.1%	3.9%	0.0%	3.4%
South America	46	45	44	41	42	43	45	45
y/y (%)	-2.3%	-1.7%	-2.5%	-6.9%	2.9%	2.9%	2.9%	0.5%
China	822	823	804	775	742	712	698	673
y/y (%)	12.4%	0.1%	-2.3%	-3.6%	-4.3%	-4.0%	-2.0%	-3.5%
India	81	87	90	94	100	105	111	117
y/y (%)	4.4%	7.5%	3.0%	4.8%	6.0%	5.5%	5.3%	5.4%
Japan	111	111	105	106	107	108	109	110
y/y (%)	3.1%	0.1%	-5.0%	0.8%	0.9%	0.9%	0.9%	0.9%
Asia (excl. CN, JP, IND)	109	122	121	126	130	131	131	133
y/y (%)	-0.9%	12.1%	-1.4%	4.0%	3.2%	0.9%	0.1%	2.0%
RoW	48	56	55	55	57	58	59	60
y/y (%)	3.9%	16.6%	-1.7%	0.7%	2.3%	1.9%	1.6%	1.6%
World total	1,649	1,673	1,630	1,617	1,608	1,600	1,602	1,598
y/y (%)	5.8%	1.5%	-2.6%	-0.8%	-0.5%	-0.6%	0.1%	-0.2%
World ex China	827	851	827	842	867	888	904	925
y/y (%)	-0.1%	2.8%	-2.8%	1.9%	2.9%	2.4%	1.8%	2.3%

Source: UBS Research

Iron ore

Figure 236: Global & Seaborne Iron Ore Markets

		2013	2014	2015	2016e	2017e	2018e	2019e	2020e
Global crude steel production	Mt	1,649	1,673	1,630	1,617	1,608	1,600	1,602	1,598
YoY growth	%	5.8%	1.5%	-2.6%	-0.8%	-0.5%	-0.6%	0.1%	-0.2%
Global iron ore demand	Mt	1,981	2,043	1,967	1,927	1,895	1,869	1,864	1,841
Global iron ore supply	Mt	2,041	2,089	1,986	1,975	1,978	2,010	2,050	2,060
Global Balance	Mt	59.6	46.0	19.6	48.0	83.3	140.4	186.0	218.7
Total seaborne iron ore demand	Mt	1,223	1,367	1,353	1,339	1,330	1,313	1,295	1,256
YoY growth	%	6.8%	11.7%	-1.0%	-1.0%	-0.7%	-1.3%	-1.4%	-3.0%
China iron ore import requirements	Mt	820	933	953	922	907	886	862	819
China as % of seaborne market	%	67%	68%	70%	69%	68%	67%	67%	65%
Total seaborne iron ore supply	Mt	1,244	1,371	1,364	1,373	1,417	1,461	1,486	1,487
YoY growth	%	9.7%	10.2%	-0.5%	0.7%	3.2%	3.1%	1.7%	0.1%
Seaborne Balance	Mt	20.8	4.0	10.7	33.8	87.3	148.6	191.6	231.7

Exports

Australia	Mt	614	742	800	825	828	841	854	854
Brazil	Mt	330	344	366	368	408	438	448	448
India	Mt	14	10	4	8	8	8	8	8
Price CY fines cfr	US\$/t (62% Fe)	135	97	56	45	45	52	58	63
Price CY fines cfr	US\$/mtu	217	157	90	72	72	83	93	101
Price CY lump cfr	US\$/t	145	109	56	51	54	58	64	66
lump/fine differential	US\$/t	10.5	11.5	0.0	6.3	9.3	6.7	6.4	3.6
Price change fines CY-o-CY	%	4%	-28%	-43%	-19%	-1%	16%	12%	9%
Price change lump CY-o-CY	%	6%	-25%	-49%	-8%	5%	8%	10%	4%

China's Iron Ore Market

Crude steel production	822	823	804	775	742	712	698	673
YoY growth	12%	0%	-2%	-4%	-4%	-4%	-2%	-3%
Pig iron production	703	706	689	659	623	592	577	551
- Fe from scrap	157	155	152	152	152	152	152	152
Fe in pig iron	661	664	648	619	586	557	542	518
- Iron ore import equiv. needed incl. losses	1169	1215	1156	1086	1028	976	952	909
Domestic iron ore production	1451	1514	1381	898	449	269	242	242
- Implied iron grade of domestic ore	14%	10%	9%	11%	16%	20%	22%	22%
- Import Fe equivalent (est'd)	351	284	216	165	121	91	90	90
Supply from iron ore inventory chg.	-15	-12	2	0	0	0	0	0
Net iron ore imports	820	933	953	922	907	886	862	819
YoY growth								
Estimated grade of imported ore	60%	58%	59%	60%	60%	60%	60%	60%
import growth	10%	14%	2%	-3%	-2%	-2%	-3%	-5%
Imported iron units % of total	71%	78%	82%	85%	88%	91%	91%	90%

Source: UBS Research

Metallurgical coal

Figure 237: Global Metallurgical Coal Market

		2012	2013	2014	2015	2016e	2017e	2018e	2019e
Global crude steel production	Mt	1,559	1,649	1,673	1,630	1,617	1,608	1,600	1,602
<i>growth</i>	%	1.4%	5.8%	1.5%	-2.6%	-0.8%	-0.5%	-0.6%	0.1%
Total traded met-coal demand	Mt	280	308	315	297	293	293	298	302
<i>YoY growth</i>	%	3.5%	9.7%	2.3%	-5.7%	-1.1%	0.0%	1.5%	1.5%
Japan imports	Mt	53	56	54	54	55	55	56	56
<i>YoY growth</i>	%	-5.7%	5.3%	-2.9%	-0.7%	1.9%	0.6%	0.5%	0.4%
Europe net imports	Mt	53	45	51	48	50	50	51	52
<i>YoY growth</i>	%	6.5%	-15.9%	14.2%	-6.2%	4.5%	-0.3%	1.5%	2.3%
India imports	Mt	35	37	45	48	52	57	62	67
<i>YoY growth</i>	%	0.4%	4.8%	21.6%	6.1%	8.0%	9.7%	8.6%	8.1%
Brazil net import trend	Mt	12	12	14	13	12	12	13	13
<i>YoY growth</i>	%	-3.4%	4.9%	12.2%	-3.1%	-9.4%	2.9%	2.9%	1.0%
China net import trend	Mt	52	74	62	47	37	28	24	20
<i>growth</i>	%	27%	42%	-17%	-24%	-22%	-23%	-14%	-17%
Total traded met-coal supply	Mt	288	316	322	298	295	299	302	307
<i>YoY growth</i>	%	4.2%	9.7%	2.0%	-7.3%	-1.3%	1.6%	0.9%	1.6%
Australia exports	Mt	144	169	184	183	185	187	187	187
Canada exports	Mt	31	35	31	28	26	25	24	24
US exports	Mt	63	59	57	42	34	33	31	29
Balance	Mt	7.4	8.1	7.2	1.8	1.1	5.8	4.2	4.7
Market's product split: HCC	%	67%	69%	69%	65%	63%	62%	61%	60%
Market's product split: LV-PCI	%	14%	13%	13%	15%	16%	17%	18%	18%
Market's product split: SSCC	%	20%	18%	18%	20%	21%	21%	22%	22%
Hard coking coal price (CY, JBM)	US\$/t	209.0	158.5	125.5	102.1	84.0	88.5	95.0	105.3
LV-PCI price (CY, JBM)	US\$/t	152.8	125.4	103.8	83.8	71.5	70.5	74.8	82.3
<i>premium HCC vs. PCI</i>	%	37%	26%	21%	22%	17%	26%	27%	28%
Semi-soft coking coal price (CY, JBM)	US\$/t	131.3	112.9	92.4	77.8	68.5	66.5	69.0	73.3
<i>premium HCC vs. SSCC</i>	%	59%	40%	36%	31%	23%	33%	38%	44%

China's Metallurgical Coal Market

		2012	2013e	2014e	2015e	2016e	2017e	2018e	2019e
Steel Production									
China	Mt	731	822	823	804	775	742	712	698
Global ex-China	Mt	828	827	851	827	842	867	888	904
China's trade									
Imports	Mt	54	75	62	48	38	31	28	25
<i>Mongolia</i>	Mt	19	15	15	13	13	15	15	16
<i>seaborne</i>	Mt	34	60	48	35	25	16	13	9
Exports	Mt	1	1	1	1	2	3	4	5
Net imports	Mt	52	74	62	47	37	28	24	20
Global trade, ex-China									
Supply	Mt	235	241	260	251	258	271	278	287
Demand	Mt	228	233	253	250	257	265	274	282
Balance	Mt	7.4	8.1	7.2	1.8	1.1	5.8	4.2	4.7
Net export growth									
China	Mt	-52	-74	-62	-47	-37	-28	-24	-20
Global ex-China	Mt	158	166	177	174	177	189	194	201
<i>YoY growth</i>	%	-2%	5%	7%	-2%	2%	7%	3%	4%

Source: UBS Research; note: HCC = Hard Coking Coal; SSCC = Semi-Soft Coking Coal; PCI = Pulverised Coal Injection

Thermal coal

Figure 238: Global Thermal Coal Market

		2012	2013	2014	2015	2016e	2017e	2018e	2019e
Global Power Generation	TWhr	21,532	21,954	22,671	23,038	23,631	24,155	24,707	25,388
YoY growth	%	2%	2%	3%	2%	3%	2%	2%	3%
Coal-fired power (global)	%	39%	40%	40%	40%	39%	39%	38%	38%
Weighted average efficiency	t/MWhr	0.515	0.516	0.517	0.515	0.520	0.520	0.521	0.521
Total traded thermal coal demand	Mt	944	989	1,001	942	911	897	881	868
YoY growth	%	9.9%	4.8%	1.2%	-5.9%	-3.2%	-1.5%	-1.9%	-1.5%
Japan imports	Mt	139	143	145	150	147	148	148	148
India imports	Mt	98	129	157	156	154	148	140	134
EU imports	Mt	65	49	42	47	54	61	68	76
US imports	Mt	7	7	9	9	9	9	9	9
Total traded thermal coal supply	Mt	966	1018	1004	955	942	932	923	912
YoY growth	%	10.9%	5.3%	-1.4%	-4.8%	-1.4%	-1.1%	-1.0%	-1.1%
Indonesia exports	Mt	384	424	408	366	348	341	334	327
Australia exports	Mt	171	188	201	201	197	195	194	192
South Africa	Mt	75	73	76	77	78	78	78	78
Colombia	Mt	79	74	75	81	85	85	85	85
EU exports (incl. Russia)	Mt	157	162	172	171	167	164	161	158
US exports	Mt	50	46	31	25	24	23	23	23
China net exports	Mt	-227	-246	-224	-152	-108	-88	-68	-49
Balance	Mt	22	29	3	14	30	34	42	45
US total utility year-end inventories	Mt	217	179	184	182	183	182	183	183
Export thermal coal JFY contract price	US\$/t	118.8	100.0	85.1	71.3	62.7	60.3	60.8	61.8
Newcastle spot (CY avg)	US\$/t	94.6	84.1	70.4	59.2	55.3	55.5	56.5	58.0
Richards Bay spot (CY avg)	US\$/t	93.1	80.5	72.6	58.5	55.3	55.5	56.5	58.0

China Thermal Coal Market

		2012	2013	2014	2015e	2016e	2017e	2018e	2019e
Power Production									
China	TWhr	4,768	4,997	5,375	5,387	5,647	5,814	6,003	6,300
Global ex-China	TWhr	16,763	16,957	17,296	17,652	17,983	18,342	18,704	19,088
China's trade									
Imports	Mt	235.2	251.8	228.7	156.1	119.7	101.3	82.7	65.3
Exports	Mt	7.8	6.2	4.8	4.0	12.0	13.2	14.5	16.0
Net imports	Mt	227.4	245.6	224.0	152.1	107.7	88.1	68.2	49.3
Global trade, ex-China									
Supply	Mt	958.5	1,011.7	998.9	951.2	929.8	918.5	908.1	896.4
Demand	Mt	708.8	737.6	772.2	785.5	791.6	796.1	798.0	802.5
Balance	Mt	249.7	274.1	226.7	165.7	138.2	122.4	110.0	93.9
Net export growth									
China	Mt	-227.4	-245.6	-224.0	-152.1	-107.7	-88.1	-68.2	-49.3
Global ex-China	Mt	505.6	549.8	553.9	573.6	600.4	605.5	611.9	616.0
YoY growth	%	3%	9%	1%	4%	5%	1%	1%	1%

Source: UBS Research

Titanium feedstock

Figure 239: Global Feedstock Market

	2012	2013	2014	2015	2016e	2017e	2018e	2019e
Titanium Feedstock (thousands of tonnes, contained TiO₂)								
Demand (TiO₂ contained in feedstock)								
for TiO ₂ pigment	5,274	5,680	5,833	5,719	5,776	5,829	5,885	5,946
for Ti metal	270	310	339	364	387	404	418	448
for other	398	458	501	570	641	710	768	841
Total Ti - feedstock Demand	5,942	6,448	6,673	6,654	6,804	6,942	7,071	7,235
YoY % chg	-9%	9%	3%	0%	2%	2%	2%	2%
Supply (TiO₂ contained in feedstock)								
Sulphate grade	2,797	2,792	2,917	2,613	2,641	2,801	2,929	2,929
Chloride grade	3,605	3,523	3,570	3,702	3,995	4,520	4,574	4,660
Total Ti - feedstock Supply	6,402	6,316	6,486	6,315	6,635	7,321	7,502	7,588
YoY % chg	-3%	-1%	3%	-3%	5%	10%	2%	1%
sulphatable:chlorinatable ratio	44%	44%	45%	41%	40%	38%	39%	39%
Balance	461	-132	-187	-339	-168	379	431	353
Industry's implied titanium inventory	2,222	1,958	1,771	1,431	1,263	1,642	2,073	2,426
Titanium Mineral Production, by product (thousands of tonnes, contained TiO₂)								
ilmenite for pigment [FeTiO ₃ ; 53% TiO ₂]	2,856	3,101	3,361	3,257	3,679	3,841	3,734	3,734
leucosene [oxidised rutile/anatase; 80% TiO ₂]	54	53	55	54	54	85	116	116
natural rutile [100% TiO ₂]	685	524	732	714	648	701	744	761
synthetic rutile [>90% TiO ₂]	511	384	319	469	501	574	592	592
slag [>90% TiO ₂]	2,296	2,254	2,020	1,821	1,754	2,120	2,317	2,386
Total	6,402	6,316	6,486	6,315	6,635	7,321	7,502	7,588
Titanium Pigment (thousands of tonnes, contained TiO₂)								
Demand								
actual consumption & forecast demand for TiO ₂	4,820	5,302	5,541	5,375	5,557	5,745	5,940	6,141
	-13%	10%	4%	-3%	3%	3%	3%	3%
Supply								
TiO ₂ pigment production	4,706	5,396	5,697	5,608	5,693	5,846	6,070	6,158
YoY % chg	-15%	15%	6%	-2%	2%	3%	4%	1%
TiO ₂ pigment production capacity	6,033	6,348	6,548	6,598	6,698	6,798	6,898	6,998
Pigment production capacity utilisation rate	78%	85%	87%	85%	85%	86%	88%	88%
	0%	0%	0%	0%	0%	0%	0%	0%
Balance	-115	93	156	234	136	101	131	17
balance, as % of demand	-2%	2%	3%	4%	2%	2%	2%	0%

Source: UBS Research

Zircon

Figure 240: Global Zircon Market

	2012	2013	2014	2015	2016e	2017e	2018e	2019e
Demand								
Europe	118	153	143	157	180	216	220	223
North America	93	116	118	120	122	124	126	127
Japan	38	45	45	46	46	47	48	49
China	488	610	620	731	753	776	799	823
other	206	247	222	226	231	236	240	245
Total Demand	942	1,171	1,147	1,281	1,333	1,399	1,433	1,467
YoY % chg	-31%	24%	-2%	12%	4%	5%	2%	2%
Supply								
Australia	504	461	548	566	569	599	689	739
Brazil	25	25	25	25	25	25	25	25
India	26	38	38	38	38	38	38	38
Kenya	0	0	15	20	25	25	25	25
Mozambique	47	31	45	48	50	55	55	55
S.Africa	453	203	323	380	448	488	498	508
Ukraine	30	30	30	30	30	30	30	30
USA	114	105	90	102	65	65	65	65
Vietnam	25	25	25	25	25	25	25	25
other	51	51	60	56	66	81	91	91
Total Supply	1,275	969	1,199	1,291	1,341	1,431	1,541	1,601
YoY % chg	-9%	-24%	24%	8%	4%	7%	8%	4%
Balance	333	-203	51	10	8	32	108	133
Mineral Sands - Prices (US\$/t bulk)								
ilmenite	250	265	135	97	83	111	150	175
rutile	2,316	1,163	778	785	623	788	950	1,075
synrutile	1,756	1,075	750	726	558	700	850	975
zircon	2,180	1,169	1,035	1,044	860	994	1,200	1,325

Source: UBS Research

Uranium

Figure 241: Global Uranium Market

		2013	2014	2015	2016e	2017e	2018e	2019e	2020e
Power utility demand		163,185	171,455	173,984	182,026	197,723	216,801	225,602	231,894
% change y-o-y		-7%	5%	1%	5%	9%	10%	4%	3%
Power utility inventories (change)		8,159	8,573	8,699	9,101	9,886	10,840	11,280	11,595
% change y-o-y		-7%	5%	1%	5%	9%	10%	4%	3%
Physically-backed funds inventories (change)		3,000	1,000	5,000	5,000	5,000	5,000	5,000	5,000
% change y-o-y		-70%	-67%	400%	0%	0%	0%	0%	0%
Demand	klbs U3O8	174,344	181,028	187,683	196,127	212,609	232,642	241,882	248,488
% change y-o-y		-10%	4%	4%	4%	8%	9%	4%	3%
Mine Supply (klbs U3O8)									
Africa		27,348	22,958	19,260	25,322	32,592	38,902	43,402	53,402
Australia		16,543	12,231	13,835	14,913	16,183	18,226	19,226	20,822
Canada		24,340	24,140	35,600	36,600	38,600	38,600	40,000	43,000
Kazakhstan		58,500	60,003	62,451	63,432	64,108	64,596	65,200	65,661
Russia		8,200	8,055	8,111	8,167	8,723	9,281	9,338	9,397
Ukraine		3,400	4,100	5,410	5,410	5,410	5,410	5,410	5,410
United States		5,466	6,100	5,250	5,550	6,100	6,600	6,600	6,600
Uzbekistan		6,300	6,360	6,420	6,480	6,540	6,610	6,680	6,750
Other		3,592	3,632	3,695	3,695	3,695	3,895	4,195	4,195
Total mine production	klbs U3O8	153,689	147,579	160,031	169,568	181,952	192,120	200,052	215,237
% change y-o-y		3%	-4%	8%	6%	7%	6%	4%	8%
Secondary Supply (klbs U3O8)									
EUP/LEU (change)		1,000	1,000	990	980	970	960	950	940
Highly enriched uranium (change)		5,700	10,200	10,500	10,500	10,500	10,500	10,500	10,500
Tails (change)		8,987	14,750	9,250	9,558	9,875	10,204	10,553	10,915
Mixed Oxides & Reprocessed Uranium (change)		5,165	7,500	8,000	8,000	8,000	8,160	8,323	8,490
Total secondary supply	klbs U3O8	20,852	33,450	28,740	29,038	29,345	29,824	30,327	30,845
		-55%	60%	-14%	1%	1%	2%	2%	2%
Total Supply	klbs U3O8	174,541	181,029	188,771	198,606	211,297	221,944	230,378	246,081
% change y-o-y		-10%	4%	4%	5%	6%	5%	4%	7%
Balance	klbs U3O8	196.3	1	1,089	2,479	-1,312	-10,698	-11,504	-2,407
surplus/(deficit) % of total		0%	0%	1%	1%	-1%	-5%	-5%	-1%
Spot Price		38.63	33.53	36.87	37.41	55.00	60.00	60.00	62.00

Source: UBS Research

Summary of UBS price forecasts

Figure 242: UBS Commodity Price Forecasts (as at 7-Apr-16)

Base Metals, Ferroalloys, Oil		units	2015	1Q16	2Q16	3Q16	4Q16	2016E	1H17	2H17	2017E	2018E	2019E	2020E	2021E	LT real
Aluminium	US\$/lb		0.76	0.69	0.70	0.73	0.75	0.72	0.75	0.76	0.75	0.80	0.85	0.90	0.91	0.80
Alumina	US\$/t		303	219	250	270	280	255	288	293	290	300	320	345	348	305
Copper	US\$/lb		2.50	2.13	2.20	1.95	1.90	2.04	1.95	2.25	2.10	2.60	3.00	3.30	3.37	2.95
Lead	US\$/lb		0.81	0.79	0.80	0.82	0.81	0.80	0.80	0.80	0.80	0.85	0.95	1.05	1.10	0.96
Nickel	US\$/lb		5.38	3.86	4.05	4.30	4.60	4.20	4.88	5.13	5.00	6.00	7.50	8.90	9.02	7.90
Zinc	US\$/lb		0.88	0.76	0.88	0.90	0.90	0.86	0.83	0.77	0.80	0.80	0.95	1.05	1.12	0.98
Cobalt	US\$/lb		13.2	10.8	11.0	11.0	11.0	11.0	12.0	13.0	12.5	13.0	13.0	13.0	13.1	11.5
Molybdenum	US\$/lb		6.6	5.0	5.0	5.0	5.0	5.0	5.5	6.0	5.8	7.5	8.5	9.0	9.1	8.0
Manganese ore	US\$/dry tonne		3.03	2.38	3.00	2.75	2.50	2.66	3.13	3.63	3.38	3.94	4.19	4.50	4.57	4.00
Uranium	US\$/lb		36.9	32.7	33.0	39.0	45.0	37.4	52.5	57.5	55.0	60.0	60.0	62.0	62.8	55.0
Crude oil (WTI)	US\$/bbl		48.7	33.4	38.0	41.0	46.0	39.6	52.0	52.0	52.0	67.0	72.0	75.0	74.2	65.0
Precious Metals																
Gold	US\$/oz		1,160	1,183	1,212	1,265	1,240	1,225	1,238	1,263	1,250	1,300	1,325	1,400	1,485	1,300
Palladium	US\$/oz		694	528	585	615	590	580	700	810	755	850	900	950	1,028	900
Platinum	US\$/oz		1,057	919	990	1,040	990	985	1,010	1,150	1,080	1,295	1,500	1,600	1,827	1,600
Rhodium	US\$/oz		953	673	760	800	765	750	788	893	840	980	1,140	1,220	1,473	1,290
Silver	US\$/oz		15.7	14.8	16.1	16.8	16.7	16.1	17.0	18.1	17.5	19.0	20.0	21.0	22.8	20.0
A\$/US\$			0.753	0.723	0.760	0.760	0.760	0.751	0.760	0.759	0.759	0.757	0.754	0.751	0.750	0.750
Bulk Commodities																
Iron Ore - lump (62%)	US\$/mtu cfr		1.046	0.888	0.874	0.794	0.745	0.825	0.880	0.855	0.868	1.031	1.127	1.200	1.241	1.087
	US\$/t cfr		64.9	55.0	54.2	49.2	46.2	51.2	54.6	53.0	53.8	63.9	69.9	74.4	77.0	67.4
	% chg yoy							-21.1%			5.2%	18.8%	9.4%	6.4%	3.5%	-12.4%
Iron Ore - fines (62%)	US\$/mtu cfr		0.897	0.778	0.774	0.694	0.645	0.723	0.750	0.685	0.718	0.831	0.927	1.000	1.013	0.887
	US\$/t cfr		55.6	48.2	48.0	43.0	40.0	44.8	46.5	42.5	44.5	51.5	57.5	62.0	62.8	55.0
	% chg yoy							-19.4%			-0.7%	15.7%	11.7%	7.8%	1.3%	-12.4%
Hard Coking Coal	US\$/t fob		102.1	81.0	84.0	85.0	86.0	84.0	87.5	89.5	88.5	95.0	105.3	118.5	119.9	105.0
	% chg yoy							-18%			5%	7%	11%	13%	1%	-12%
Low Volatile PCI	US\$/t fob		83.8	69.0	73.0	73.0	71.0	71.5	69.5	71.5	70.5	74.8	82.3	90.0	91.4	80.0
	% chg yoy							-15%			-1%	6%	10%	9%	2%	-12%
Semi Soft	US\$/t fob		77.8	66.0	70.0	70.0	68.0	68.5	66.0	67.0	66.5	69.0	73.3	79.0	79.9	70.0
	% chg yoy							-12%			-3%	4%	6%	8%	1%	-12%
Thermal Coal - spot	US\$/t fob		58.1	52.6	56.0	54.0	56.0	54.6	55.0	56.0	55.5	56.5	58.0	62.0	62.8	55.0
			JFY16E					JFY17E			JFY18E	JFY19E	JFY20E	JFY21E	JFY22E	LT real
Thermal Coal contract	US\$/t fob		61.0					60.0			61.0	62.0	62.1	63.2	64.8	55.0
	% chg yoy		0.0%					-2%			2%	2%	0%	2%	3%	-15%

Source: UBS Research

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Sell	FSR is > 6% below the MRA.	12%	22%
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Buy	Stock price expected to rise within three months from the time the rating was assigned because of a specific catalyst or event.	<1%	<1%
Sell	Stock price expected to fall within three months from the time the rating was assigned because of a specific catalyst or event.	<1%	<1%

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