IRON ORE ANALYST REPORTS 62% FE

Analyst Summary- Nominal

Firm	Source	As Of	Q1 16	Q2 16	Q3 16	Q4 16	2016 FY		2017 FY	2018 FY	2019 FY
Australian BREE	Reports	12/1/2015	55	55	56	56	56		47		
Citi	Reports	12/16/2015	40	40	42	40	41		39	40	
Commerzbank AG	Bloomberg	12/22/2015	45	47	48	50	48		54		
Deutsche Bank	Reports	12/16/2015	46	46	46	46	46		52	56	60
Goldman Sachs	Reports	12/16/2015	40	38	38	36	38		35	35	
SGX Futures (based on TSI)	Futures	1/13/2016	37	34	33	32	34		31	31	31
Itau Unibanco	Bloomberg	12/3/2015	43	43	42	42	43		42	41	41
Prestige Economics	Bloomberg	12/31/2015	52	56	60	58	57		55		
Westpac Banking Corp	Bloomberg	12/8/2015	42	39	41	38	40		43	53	57
Societe Generale	Bloomberg	12/16/2015	45	45	45	45	45		45	45	45
BMI Research	Bloomberg	12/11/2015	48	48	48	48	48		49	70	80
									NOMINAL	*NOMINAL*	*NOMINAL*
Stats			**Q1 16**	**Q2 16**	**Q3 16**	**Q4 16**	**2016 FY**		**2017 FY**	**2018 FY**	**2019 FY**
Average			**45**	**45**	**45**	**45**	**45**		**45**	**46**	**52**

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Resources and Energy Quarterly

December Quarter 2015

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Further Information

For more information on data or government initiatives please access the report from the Department's website at:
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Acknowledgements

Individual commodity notes have identified authors.

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Foreword

The *Resources and Energy Quarterly* provides data on the performance of Australia's resources and energy sectors and analysis of key commodity markets. This release of the *Resources and Energy Quarterly* contains an update of short-term commodity forecasts over the December quarter and overviews of key commodity market issues.

Global commodity prices continued to decline throughout 2015. This set of forecasts was prepared after a particularly marked decline in prices during the December quarter as markets reacted to growing concerns about demand prospects and a slow supply response to them. These conditions are forecast to persist over the short term and the prospect of any significant price recovery over this time frame is limited.

On the home front, Australia's production of most commodities has continued to increase despite lower prices. The rapid increase in mining output is expected to underpin the production phase of the boom and provide some support to export earnings. However, the increase in volumes is unlikely to be sufficient to offset the effect of lower commodity prices across the board. In 2015-16, Australia's earnings from resources and energy exports is forecast to decline by 4 per cent to $166 billion.

Mark Cully
Chief Economist
Department of Industry, Innovation and Science

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Macroeconomic outlook

The global economy

In 2015 the global economy is estimated to have grown 3.1 per cent, a rate 0.3 per cent lower than in 2014 and well below the levels recorded over the last decade. In its most recent World Economic Outlook the IMF noted that economic growth prospects in the short term are stronger in advanced economies, particularly the United States and United Kingdom, than in emerging economies. As the key driver of growth in commodities use, slower economic growth in emerging economies is likely to limit consumption growth and therefore the prospect of any significant price recovery in the short term.

Prices for most commodities declined through 2015, reflecting strong growth in mining and refining capacity relative to consumption growth. The decline in prices was particularly marked in the December quarter as a result of growing concerns about demand prospects and a slow supply response. For example, iron ore and nickel spot prices declined by 11 per cent and 19 per cent relative to the September quarter, respectively.

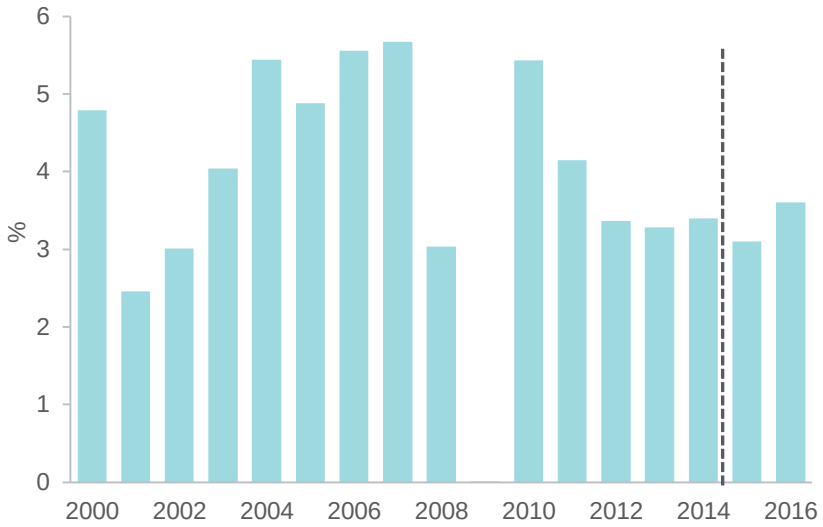
In 2016, the global economy is forecast to expand 3.6 per cent, supported by higher growth in advanced economies.

Outlook for key economies

United States

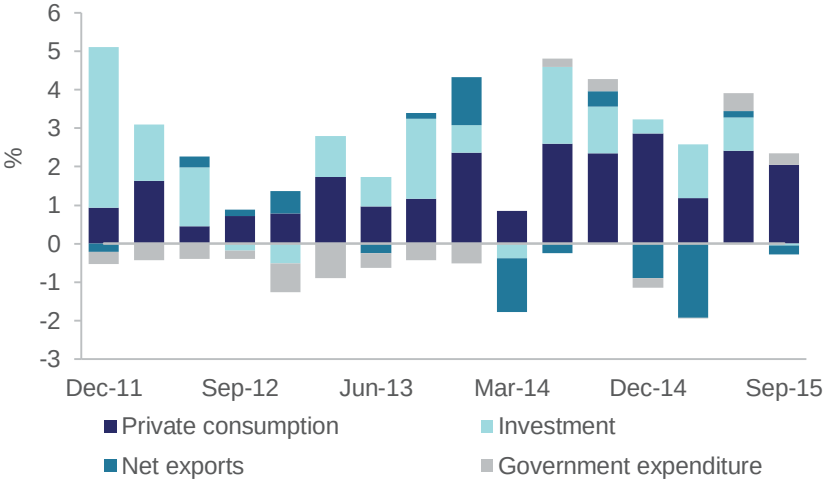
Economic activity in the US increased at an annualised rate of 2.1 per cent in the September quarter, following growth of 3.9 per cent in the previous quarter. Growth in the September quarter largely reflected stronger consumer spending and a rise in government expenditure, which offset a decline in net exports. For 2015 as a whole, the US economy is estimated to grow by 2.6 per cent.

Figure 1.1: World economic growth



Source: IMF.

Figure 1.2: Contributions to per cent change in US GDP



Source: US Bureau of Economic Analysis.

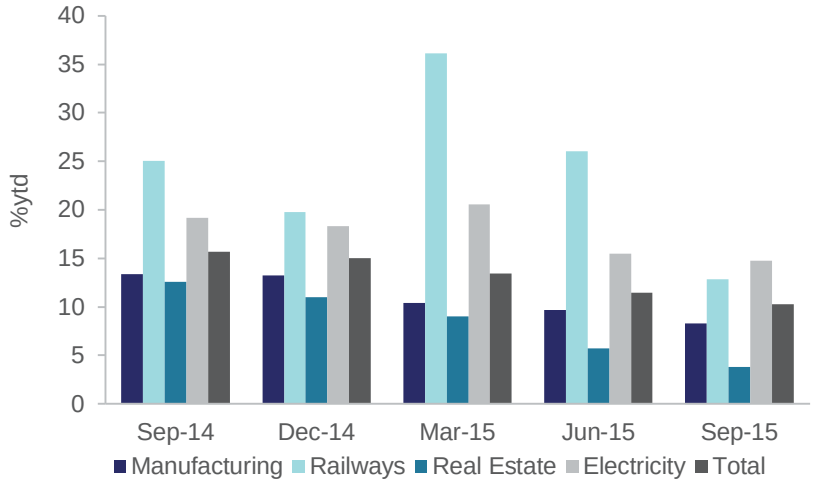
Despite an increase in the official interest rate announced in late December 2015, growth is forecast to increase in 2016, rising to 2.8 per cent in line with continued growth in consumer spending, and stronger business and residential investment.

China

In 2015, China's economy is estimated to have grown 6.8 per cent, down from 7.3 per cent in 2014 and 7.7 in 2013. China's growth has been negatively affected by persistent weakness in the property sector, declining exports and weakening industrial output. In the year to October, industrial output grew by 5.6 per cent, the slowest pace since the global financial crisis. However, fixed asset investment continued to grow, expanding 10 per cent in the first eleven months of 2015, and housing prices in Tier 1 and 3 cities stabilised.

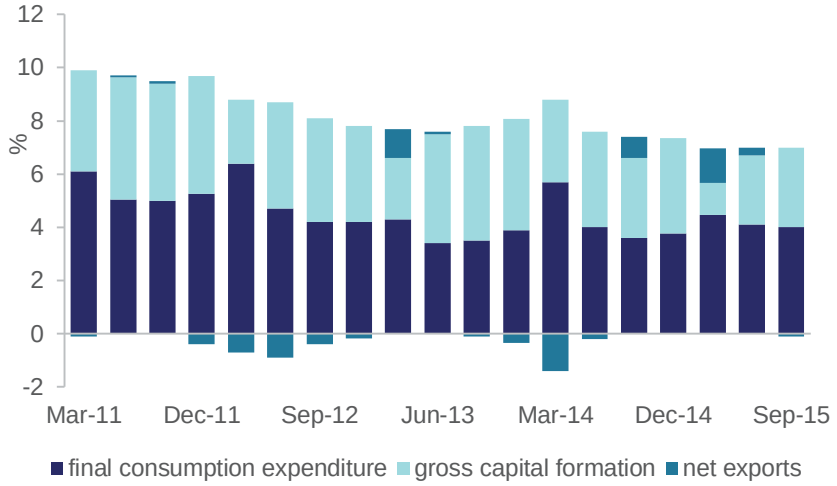
In 2016, China's economy is forecast to grow by 6.3 per cent, supported by increased consumption, lower interest rates and strong growth in infrastructure investment.

Figure 1.3: Growth in China's fixed asset investment



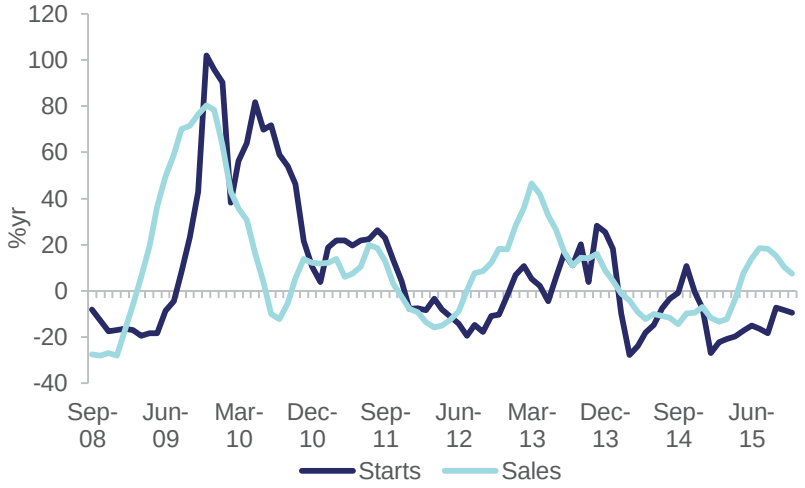
Source: CEIC.

Figure 1.4: China's quarterly contribution to GDP



Source: CEIC.

Figure 1.5: China's residential sales and starts



Data is three month moving average of monthly growth rate.
Source: CEIC.

The Chinese government has committed to a number of infrastructure programs to upgrade rail and road networks and other public infrastructure. In particular, the government has committed US$235 billion to develop infrastructure in western China and surrounding countries as part of the 'One Belt, One Road' initiative.

India

The Indian economy grew by an estimated 7.3 per cent in 2015. Growth was supported by an increase in manufacturing, services and foreign direct investment (FDI). In the first nine months of 2015, FDI into India grew by 19 per cent. Offsetting these growth areas was a contraction in the agricultural sector, caused by a poor monsoon season. In 2016, India's economy is forecast to expand by 7.5 per cent, supported by infrastructure investment and an expected expansion of the manufacturing industry. Economic reforms, including replacing individual regional sales taxes with a nationwide GST, are also expected to boost India's growth prospects.

Japan

Japan narrowly avoided a second technical recession in two years in the September 2015 quarter. GDP grew by 0.3 per cent, following a 0.1 per cent decline in the June 2015 quarter. While Japan is expected to grow in March 2016 quarter, the outlook is not particularly bright. In 2015, Japan's economy is estimated to have expanded 0.6 per cent and is forecast to grow by 1 per cent in 2016. If the government announces another stimulus package or a raft of reform measures growth may be higher than assumed.

Europe

Gross domestic product in the EU28 increased by 0.4 per cent in the September quarter, led by growth in the United Kingdom, Germany, Spain, and France. Growth was primarily the result of stronger household consumption and inventory changes, which outweighed the effect of a weaker trade balance. Economic activity in the EU 28 is estimated to increase by 1.9 per cent in 2015. Growth in the EU 28 is forecast to continue in 2016, growing by 1.9 per cent. This will be supported by stronger private consumption and an increase in investment.

Table 1.1: Key world macroeconomic assumptions

%	2014	2015 a	2016 a
Economic growth b			
OECD	1.8	2.0	2.2
United States	2.4	2.6	2.8
Japan	-0.1	0.6	1.0
European Union 28	1.5	1.9	1.9
Germany	1.6	1.5	1.6
France	0.2	1.2	1.5
United Kingdom	3.0	2.5	2.2
South Korea	3.3	2.7	3.2
New Zealand	3.6	2.2	2.4
Emerging economies	4.6	4.0	4.5
Non-OECD Asia	6.8	6.5	6.4
South East Asia d	4.6	4.6	4.9
China e	7.3	6.8	6.3
Chinese Taipei	3.8	2.2	2.6
India	7.3	7.3	7.5
Latin America	1.3	-0.3	0.8
Middle East	2.7	2.5	3.9
World c	3.4	3.1	3.6
Inflation rate b			
United States	2.2	2.3	2.3

a assumption. **b** Change from previous period. **c** Weighted using 2012 purchasing power parity (PPP) valuation of country gross domestic product by IMF. **d** Indonesia, Malaysia, the Philippines, Thailand and Vietnam. **e** Excludes Hong Kong.
Source: IMF.

Economic outlook for Australia

The combination of slowing demand growth (particularly in China), and relatively strong supply growth contributed to lower prices for most commodities in 2015.

Australia's GDP increased by 0.9 per cent in the September 2015 quarter, an improvement of 0.7 percentage points on the June quarter. Contributing to the September 2015 result were net exports (1.5 percentage points) and household consumption (0.4 percentage points) while private investment detracted from the result (0.6 percentage points).

The Australian dollar has depreciated against the US dollar over the past twelve months and has returned to levels last recorded in 2009-10. The combination of forecast lower commodity prices and relatively low interest rates are likely to result in further falls in the value of the Australian dollar over the course of 2016. For this set of forecasts the Australian dollar is assumed to average 0.71 US dollars per Australian dollar in 2015-16. However there is considerable risk that Australian dollar could fall further over the period.

Australia's resources and energy commodities, production and *exports.*

In 2015-16, Australia's export earnings from resources and energy commodities are forecast to decline by 4 per cent to $166 billion as an increase in export volumes, particularly LNG and iron ore, are more than offset by lower prices. LNG export volumes are forecast to increase by 45 per cent to 36 million tonnes following the commissioning of the Queensland Curtis LNG project and the start of production at the Gladstone LNG project.

Iron ore volumes are forecast to increase by 9 per cent to 818 million tonnes, supported by the start of production at Roy Hill. While the Australian dollar is assumed to depreciate, it is unlikely to mitigate the effect of lower prices on Australia's export earnings.

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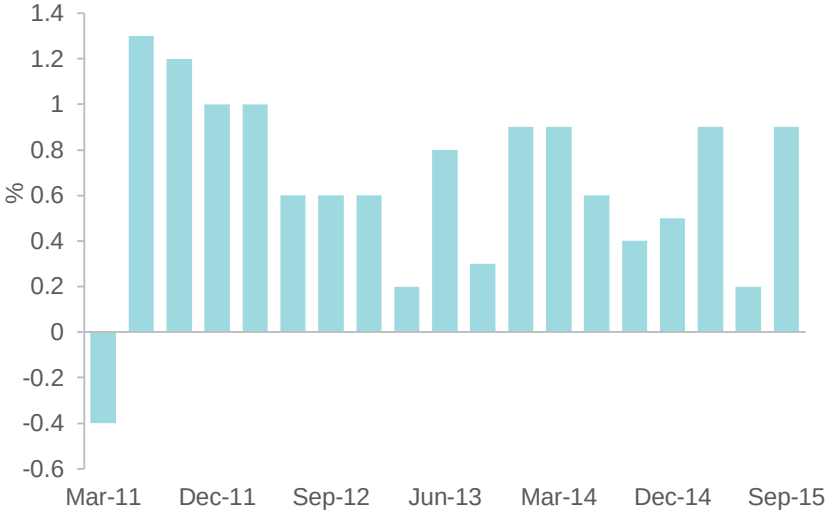
Figure 1.6: Commodity price index

Source: RBA.

Figure 1.7: Australia's economic growth, seasonally adjusted



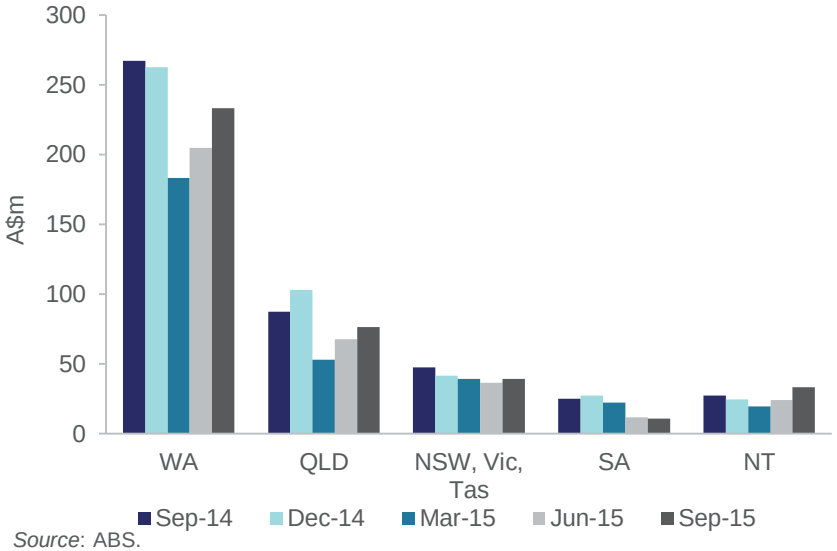
Source: ABS.

Exploration

Exploration expenditure declined 32 per cent compared with the September 2014 quarter to $977 million. The fall reflects cost cutting initiatives implemented throughout the year in response to lower commodity prices. Given generally lower prices forecast for commodities, a rebound in exploration expenditure appears unlikely in the short term.

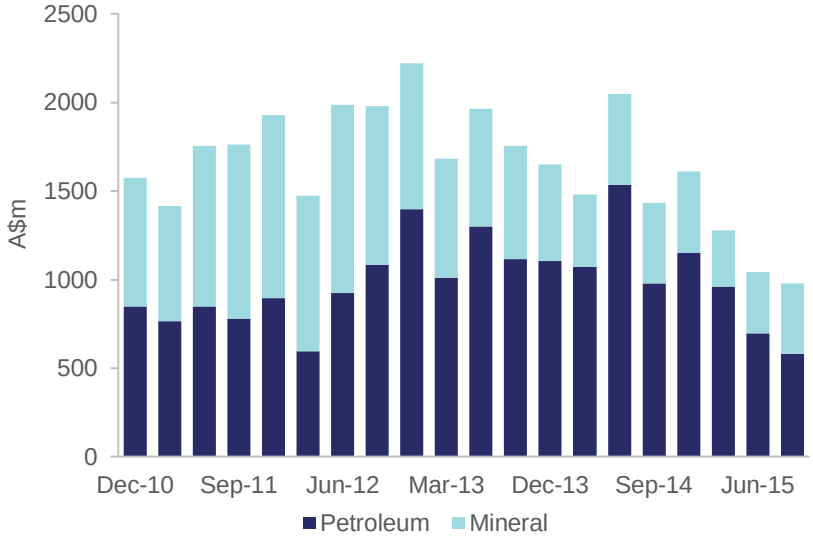
Mineral exploration at new deposits fell 11 per cent in the September 2015 quarter (year-on-year), while exploration expenditure at existing deposits fell 14 per cent (year-on-year). Exploration expenditure in Western Australia fell 13 per cent to $233 million (year-on-year). With the exception of the Northern Territory, the other states also recorded declines in exploration expenditure, with the largest decline recorded in South Australia, down 57 per cent (year-on-year).

Figure 1.9: State mineral exploration expenditure



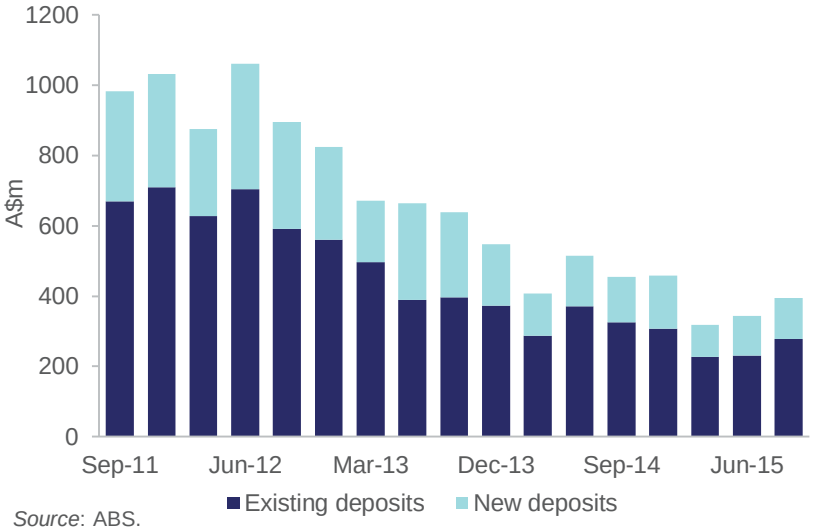
Source: ABS.

Figure 1.8: Australia's exploration expenditure



Source: ABS.

Figure 1.10: Exploration expenditure, by deposit type



Source: ABS.

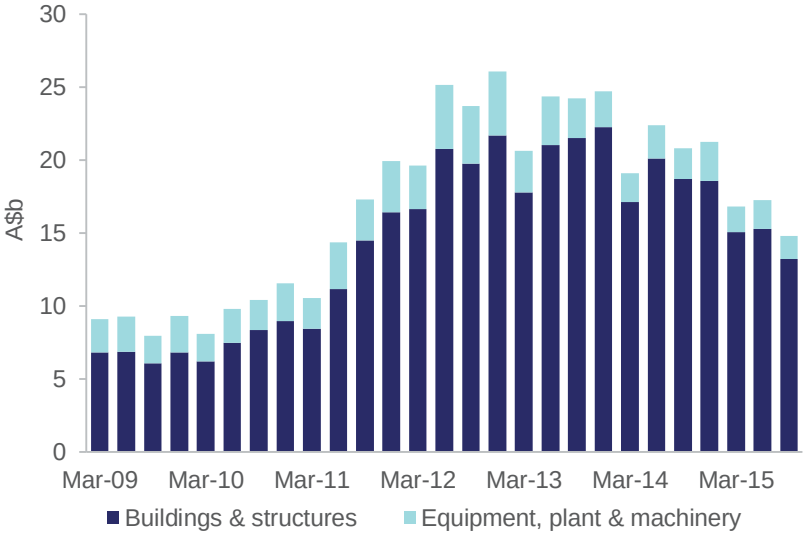
Capital expenditure

With global consumption of most commodities slowing and prices falling, mining companies have been shifting their focus from expanding production to cutting costs and improving productivity. In the September quarter 2015, mining industry capital expenditure was $15 billion, down 14 per cent on the June quarter and 29 per cent on the September 2014 quarter.

Mining sector employment

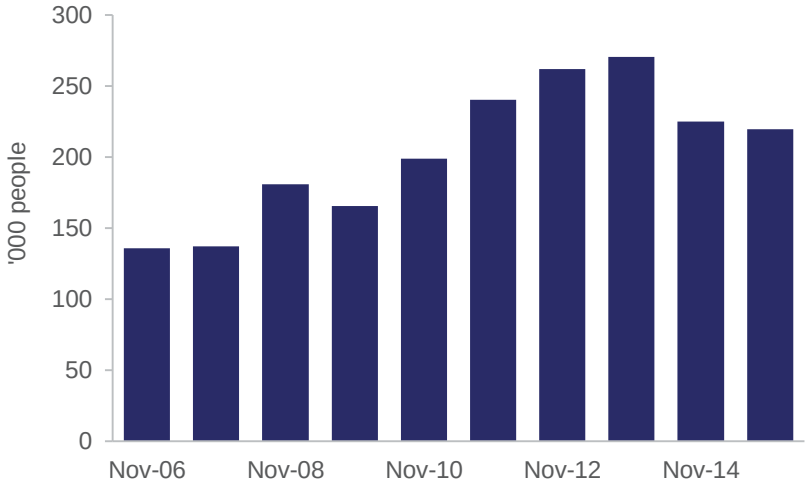
Mining sector employment was 220 000 people in November 2015, down 2 per cent compared with the same period in 2014. In order to cut costs and maximise profit margins, many producers have sought to reduce the number of employees. Mining sector employment is not expected to rebound in the short term as a fall in construction labour, associated with declining capital expenditure, is anticipated to more than offset any increases associated with increasing production.

Figure 1.11: Mining industry capital expenditure



Source: ABS.

Figure 1.12: Total mining employment



Source: ABS.

Table 1.2: Key macroeconomic assumptions for Australia

	unit	2013–14	2014–15 a	2015–16 a
Inflation rate b	%	3.0	2.7	2.5
Interest rate c	%	2.5	2.4	2.0
Exchange rate d	US$/A$	0.92	0.84	0.71

a assumption **b** Change from previous period. **c** Median RBA cash rate. **d** Average of daily rates.
Sources: ABS; RBA, Department of Industry, Innovation and Science.

Table 1.3: Outlook for Australia's resources and energy commodities

	unit	2013–14	2014–15	2015–16 f	% change
Value of exports					
Resources and energy	A$m	195 001	171 943	165 643	–3.7
– real a	A$m	204 514	176 306	165 643	–6.0
Energy	A$m	71 462	66 837	67 831	1.5
– real a	A$m	74 949	68 532	67 831	–1.0
Resources	A$m	123 538	105 107	97 812	–6.9
– real a	A$m	129 565	107 774	97 812	–9.2
Mine production					
Gross value	A$m	187 201	165 066	159 017	–3.7

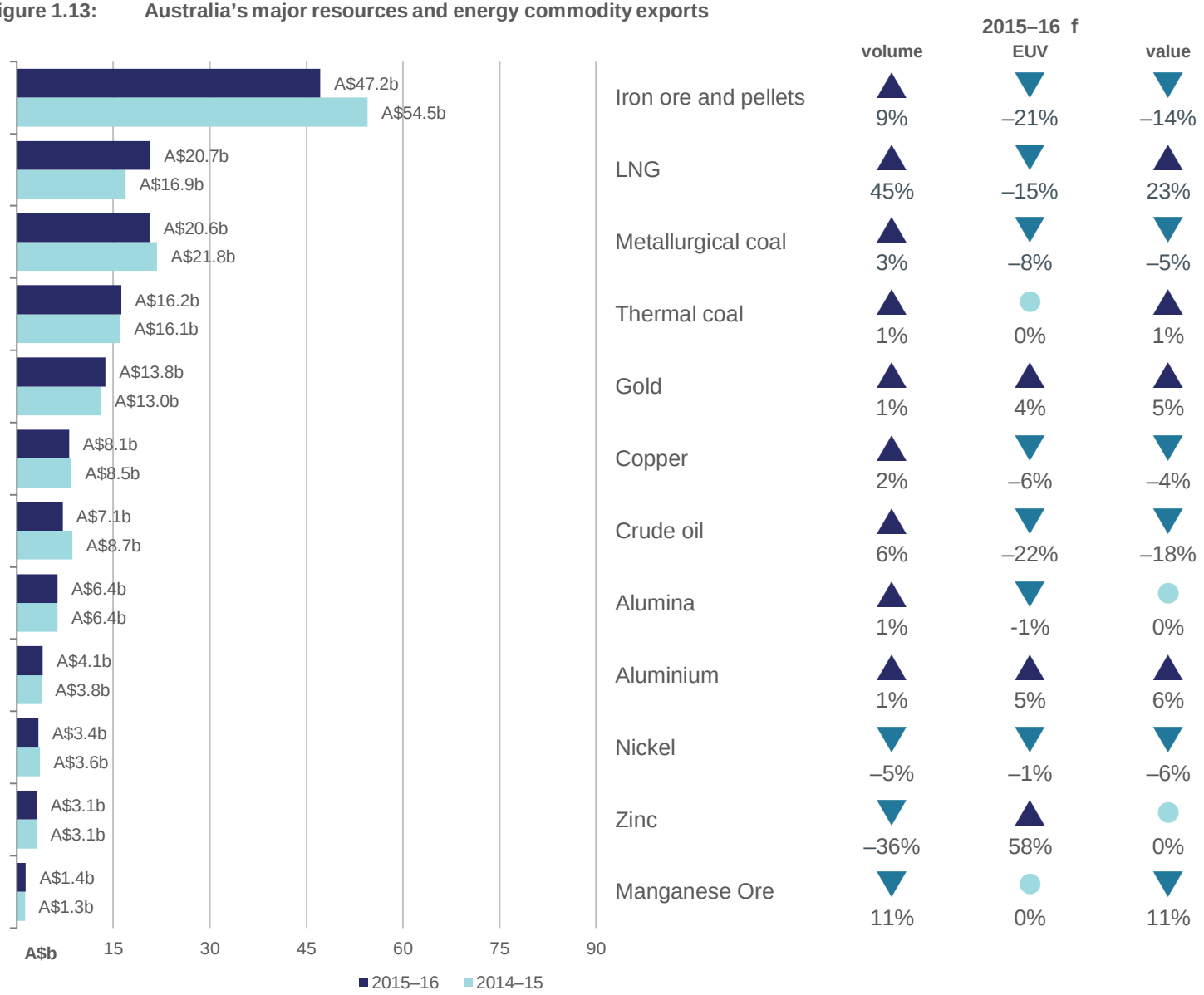
a In current financial year Australian dollars. **f** forecast.
Sources: ABS, Department of Industry, Innovation and Science.

Table 1.4: Australia's resources and energy commodity exports, by selected commodities

	Volume				Value			
	unit	2014-15	2015-16f	CAGR	unit	2014-15	2015-16f	CAGR
Alumina	kt	17 363	17 514	0.9	A$m	6 353	6 362	0.2
Aluminium	kt	1 432	1 450	1.2	A$m	3 829	4 058	6.0
Copper	kt	1 010	1 035	2.5	A$m	8 493	8 129	–4.3
Gold	t	278	282	1.2	A$m	13 049	13 757	5.4
Iron ore	Mt	748	818	9.4	A$m	54 516	47 152	–13.5
Nickel	kt	253	239	–5.5	A$m	3 583	3 354	–6.4
Zinc	kt	1 609	1 023	–36.4	A$m	3 081	3 091	0.4
LNG	Mt	25	36	44.7	A$m	16 896	20 739	22.7
Metallurgical coal	Mt	188	193	2.7	A$m	21 813	20 639	–5.4
Thermal coal	Mt	205	207	1.0	A$m	16 057	16 205	0.9
Oil	kbd	261	276	5.8	A$m	8 656	7 118	–17.8
Uranium	t	5 515	6 329	14.8	A$m	532	838	57.5

f forecast. CAGR is compound annual growth rate, in percentage terms.
Sources: ABS; Department of Industry, Innovation and Science.

Figure 1.13: Australia's major resources and energy commodity exports



f forecast
EUV is export unit value

Steel

Marco Hatt

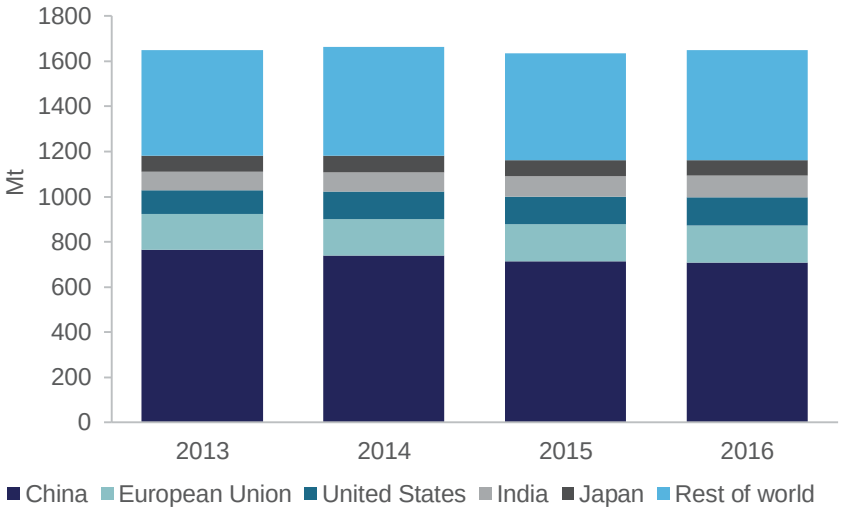
World steel consumption is estimated to have contracted in 2015, as growth in consumption in India and other emerging economies was insufficient to offset falling demand in China. Improved demand conditions in large developed economies, as well as continued growth in India and other emerging economies, are forecast to offset lower consumption in China and contribute to a slight increase in world steel consumption in 2016.

World steel overview

World steel consumption is estimated to have fallen by 1.7 per cent in 2015 to 1.6 billion tonnes, due in large part to a slowdown in investment activity in China. Increased consumption in India, the United States and other emerging economies was insufficient to offset falling demand in China and Japan. In 2016, world steel consumption is forecast to return to growth, increasing by 0.9 per cent. While China's steel consumption is forecast to decline by 1.0 per cent, this will be more than offset by higher demand from India (up by 6.0 per cent), the European Union (up by 1.2 per cent) and the United States (up by 1.5 per cent).

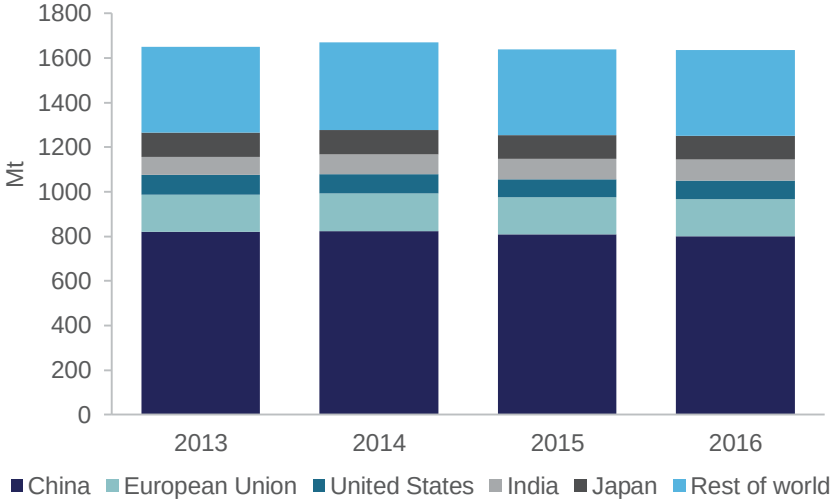
World steel production is estimated to have declined by 1.9 per cent in 2015, because of lower output in China (down by 1.8 per cent), the United States (down by 5.9 per cent) and Japan (down by 5.4 per cent). In 2016, world steel production is forecast to remain steady, with increased output in India (up by 6.0 per cent), the European Union (up by 0.2 per cent) and the United States (up by 0.5 per cent) more than offsetting continued falls in production in China (down by 1.0 per cent) and Japan (down by 1.0 per cent).

Figure 2.1: World steel consumption



Sources: Department of Industry, Innovation and Science; World Steel Association.

Figure 2.2: World steel production



Sources: Department of Industry, Innovation and Science; World Steel Association.

China

Steel prices in China declined steadily through 2015, weighed down by overcapacity and weak consumption growth. As of November, prices for most steel products had fallen by 30 per cent or more on a year earlier, with cold rolled and hot rolled sheet falling by around 40 per cent. The China Iron and Steel Association estimate that at current prices, only 4 per cent of China's steel producers are profitable. The price of steel is forecast to remain subdued through 2016 as excess capacity and low consumption growth continue to affect China's steel market.

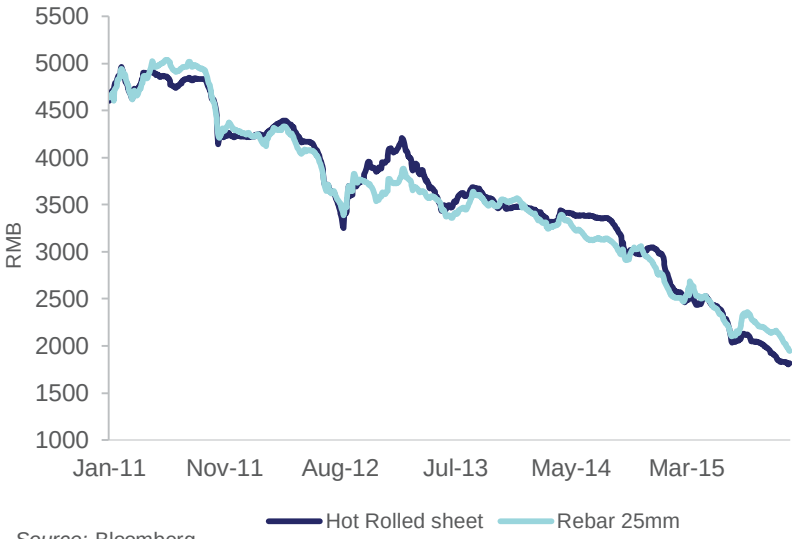
China's steel consumption is estimated to have fallen by 3.5 per cent in 2015 to 714 million tonnes, following a fall of 3.3 per cent in 2014. China's steel consumption has been heavily affected by weakness in residential construction, following a rapid increase in housing supply over the past few years. The China Academy of Social Sciences estimates there are nearly 18 million unsold apartments across China.

Given the lacklustre performance of the housing sector through 2015 and the significant amount of housing inventory still to be cleared, residential construction is not expected to be a significant driver of China's steel consumption in 2016. Reflecting this, steel use in construction, machinery and household appliances is expected to continue to fall in 2016, while demand for vehicle manufacturers is likely to rise. Overall, China's steel consumption is forecast to fall by 1.0 per cent in 2016.

As a result of falling consumption and prices, China's steel production is estimated to have fallen by 1.8 per cent to 808 million tonnes in 2015 and is forecast to fall a further 1.0 per cent in 2016. Overcapacity in China's steel industry is expected to exert downward pressure on steel prices and reduce the incentive to increase output.

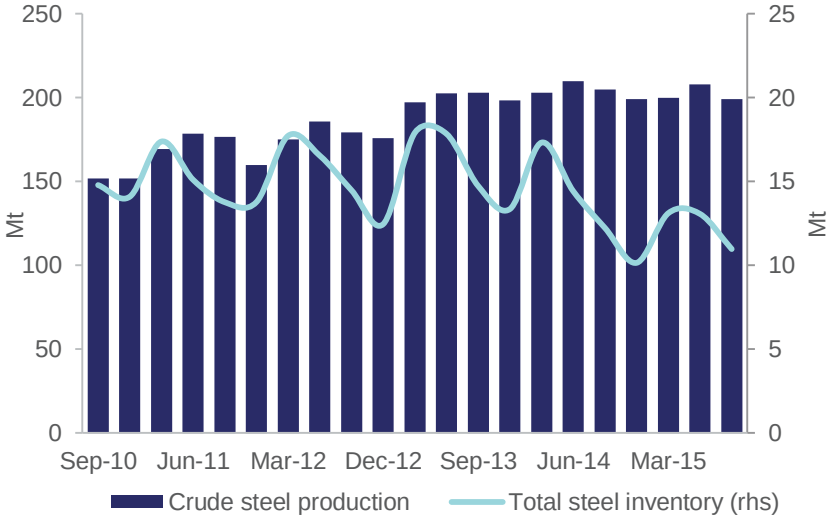
Steel exports in the first 11 months of 2015 totalled 102 million tonnes, up 22 per cent compared with 2014. Over this period China's steel exports were almost as high as Japan's estimated total steel production, 105 million tonnes, in 2015.

Figure 2.3: China benchmark steel prices



Source: Bloomberg.

Figure 2.4: China steel production and inventory



Source: Bloomberg.

Growth in China's steel exports is expected to ease in 2016 as several large consuming countries have implemented additional duties on steel imports from China. In August the Indian government imposed a 20 per cent safeguard duty on some steel products for a period of 200 days to curb low-cost imports.

India

Steel prices in India fell through 2015, driven by a rise in low-cost imports from China. While the price declines were smaller than those recorded in China, local steel mill profitability was affected and contributed to slower growth in domestic output.

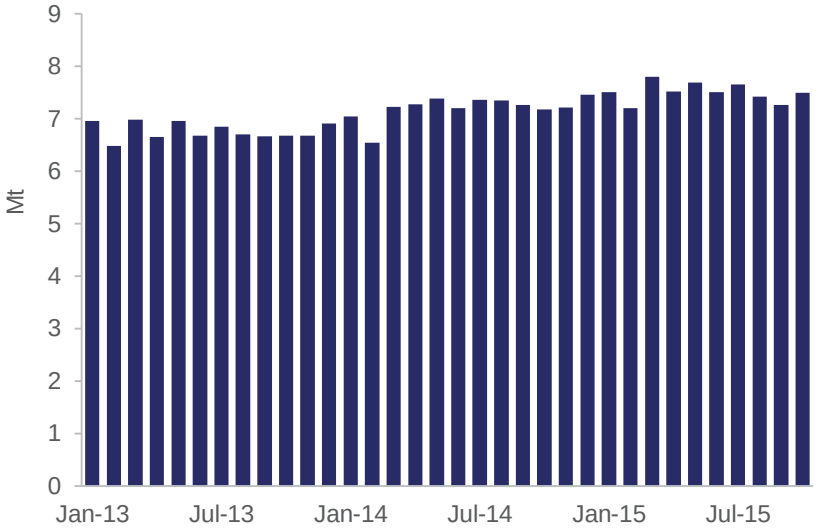
India's steel consumption is estimated to have increased by 7.1 per cent to 90 million tonnes in 2015, placing India as the world's third largest consumer of steel behind China and the United States. India's steel consumption growth was largely underpinned by increased government spending on infrastructure. In 2016, India's steel consumption is forecast to increase by a further 6.0 per cent.

India's steel production is estimated to have increased by 4.5 per cent to 91 million tonnes in 2015. In 2016, Indian producers are expected to continue to face profitability pressures because of low prices and import competition. Nonetheless, India's steel production is forecast to increase by 6.0 per cent to 97 million tonnes.

Japan

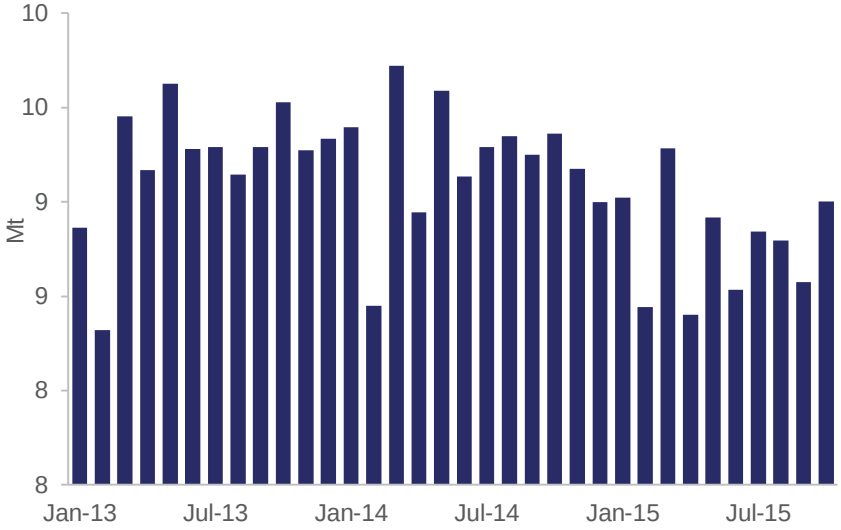
Japan's steel consumption is estimated to have fallen by 5.5 per cent to 69 million tonnes in 2015 underpinned by weaker manufacturing and construction activity. Reflecting the decline in consumption and increased import competition, Japan's steel production is estimated to have fallen by 5.1 per cent in 2015. Domestic output of steel was substituted for lower cost imports in 2015, with Japan's net exports of steel is estimated to have fallen by 4.9 per cent

Figure 2.5: India monthly steel production



Source: World Steel Association.

Figure 2.6: Japan monthly steel production



Source: World Steel Association.

United States

US steel consumption is estimated to have increased by 0.8 per cent in 2015 to 123 million tonnes, driven by an improvement in the US construction sector. US housing starts increased by 10.1 per cent year-on-year in the first ten months of 2015. In the first nine months of 2015, steel production in the United States fell 8.5 per cent to 81 million tonnes while imports of steel products fell by 5 per cent year-on-year, with steel demand being supported by destocking of inventories.

Supported by continued demand from the US construction sector, US steel consumption is forecast to increase by 1.5 per cent in 2016. US steel production is forecast to increase by 0.5 per cent in 2016.

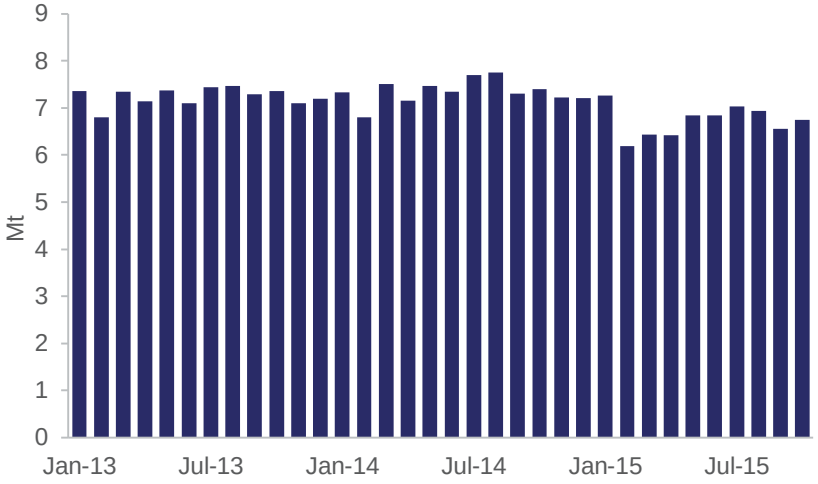
South Korea

South Korea's steel consumption is estimated to have fallen by 1.7 per cent to 57 million tonnes in 2015. The fall in demand for steel in South Korea was underpinned by slowing construction and manufacturing activity. In the first ten months of 2015, manufacturing industrial production was down 0.8 per cent year-on-year, while construction production was down 0.2 per cent. A rebound in activity is forecast for 2016, with steel consumption increasing by 2.0 per cent.

European Union

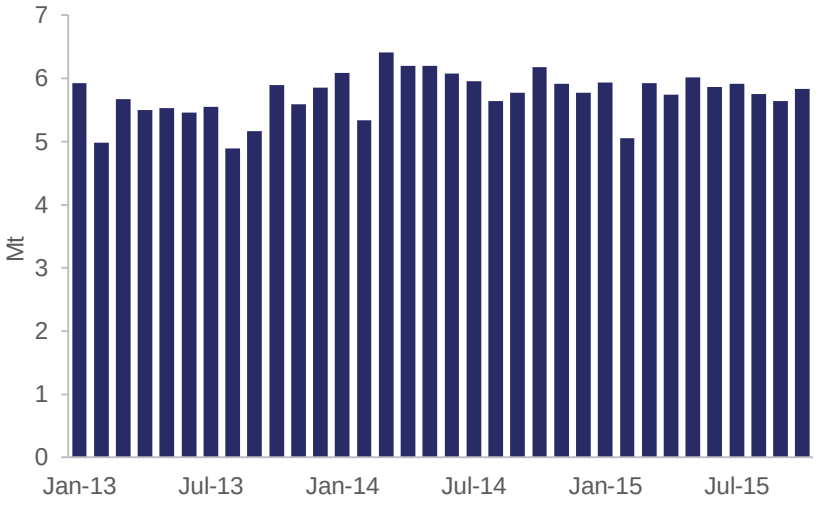
Steel consumption in the European Union is estimated to have increased by 1.2 per cent in 2015 to 164 million tonnes. This was supported by a moderate increase in construction in the first nine months of 2015. The performance of the automotive sector, which accounts for around 18 per cent of steel consumption in Europe, also improved in 2015. European vehicle registrations grew by 8.1 per cent in the first ten months of 2015 year-on-year. European Union steel consumption is forecast to increase by 1.2 per cent in 2016, reflecting continued moderate improvement in European economic conditions.

Figure 2.7: United States monthly steel production



Source: World Steel Association.

Figure 2.8: South Korea's monthly steel production



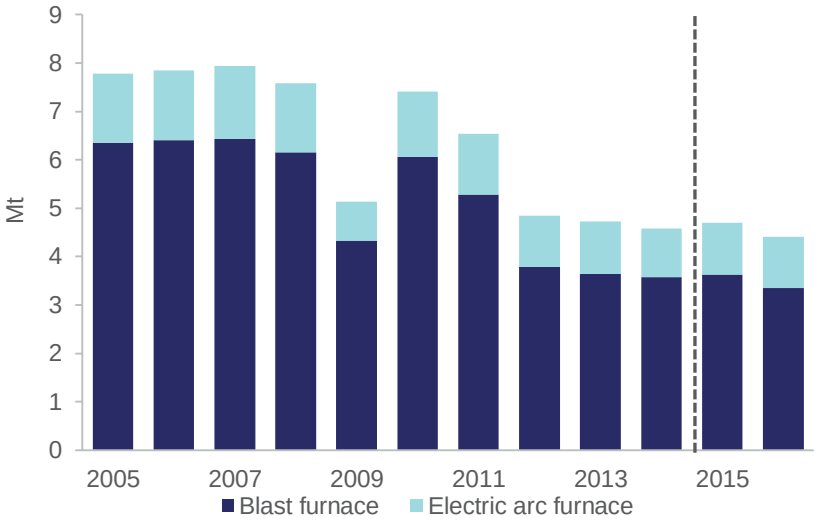
Source: World Steel Association.

Australia

Australia is estimated to have produced 4.7 million tonnes of steel in 2015, up by 2.6 per cent on a year earlier—the first increase since 2010. The increase in Australia's steel production was underpinned by an increase in electric arc furnace production (up by 6.5 per cent) and blast furnace production (up by 1.5 per cent). Despite previous warnings of the possible closure of Bluescope Steel's Port Kembla steelworks, Bluescope has committed to continuing operations. However, in 2016 Australia's steel production is forecast to fall by 6.2 per cent, reflecting international competitive pressures.

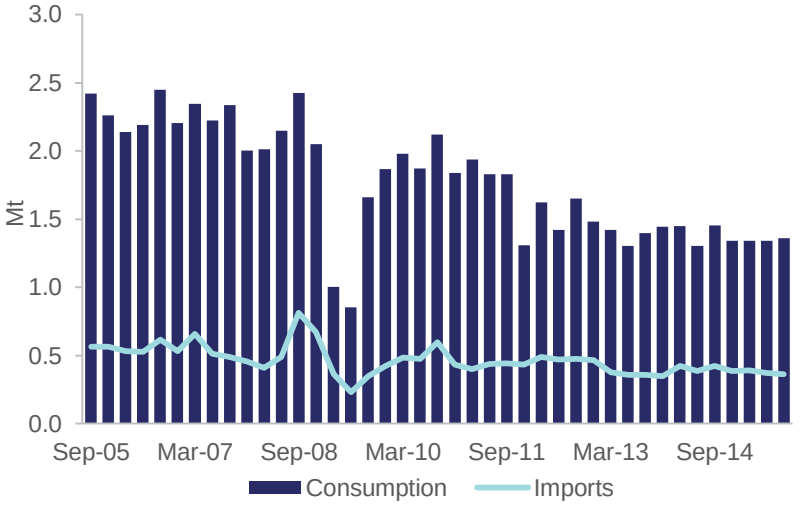
In the September quarter 2015, Australia's iron and steel consumption was 7 per cent lower than a year earlier, and 44 per cent lower than ten years earlier. The decline in iron and steel consumption was primarily at the expense of domestic production rather than imports.

Figure 2.9: Australia's annual steel production



Sources: Company reports; Department of Industry, Innovation and Science .

Chart 2.10: Australia's iron and steel consumption, quarterly



Sources: Company reports; ABS; Department of Industry, Innovation and Science.

Table 2.1: World steel consumption (Mt)

	2013	2014	2015 f	2016 f	% change
European Union 28	157	162	164	166	1.2
United States	106	122	123	125	1.5
Brazil	31	28	25	25	2.0
Russian Federation	50	49	44	44	1.0
China	766	740	714	707	-1.0
Japan	71	73	69	69	0.0
South Korea	54	58	57	58	2.0
India	81	84	90	96	6.0
World steel consumption	**1649**	**1663**	**1635**	**1649**	**0.9**

Table 2.2: Crude steel production (Mt)

	2013	2014	2015 f	2016 f	% change
European Union 28	166	169	168	168	0.2
United States	87	88	80	81	0.5
Russian Federation	69	71	71	72	1.5
China	822	823	808	800	-1.0
Japan	111	111	105	104	-1.0
South Korea	66	72	69	69	0.5
India	81	87	91	97	6.0
World steel production	**1650**	**1670**	**1638**	**1637**	**0.0**

f forecast.
Sources: Department of Industry, Innovation and Science; World Steel Association.

Iron ore

Marco Hatt

Increasing supply from Australia and Brazil is forecast to drive seaborne iron ore spot prices down in 2015 and 2016.

Prices

Declining steel production in China and a further increase in iron ore production by major producers in Australia and Brazil contributed to lower iron ore prices during 2015. The price of iron ore declined substantially during the September quarter and into the December quarter 2015. As of mid-December, the spot price was below $US35 a tonne, compared with a price of $US50 a tonne in August. As a result of the unexpected pace of the iron ore price decline, the forecast iron ore price for 2016 has been revised down to $US41.30 a tonne.

Figure 3.1: Iron ore and steel prices

Source: Bloomberg.

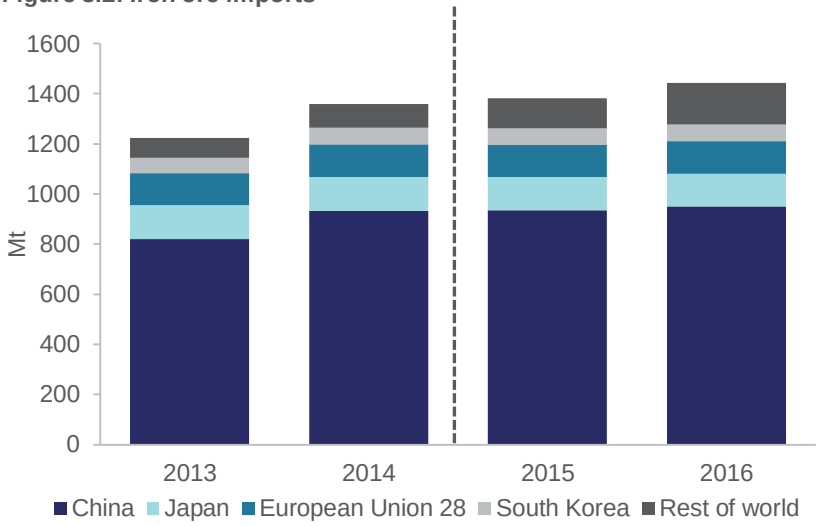
World trade in iron ore

Overview

Global trade in iron ore is estimated to have increased by 1.8 per cent in 2015 to 1.4 billion tonnes, the lowest rate of growth since 2001. Supply from Australia is estimated to have increased by 7 per cent to 767 million tonnes while China's imports are estimated to have increased by 0.3 per cent to 930 million tonnes. Imports in Japan fell by 3.5 per cent while imports in South Korea fell 0.6 per cent.

In 2016, world trade in iron ore is forecast to increase by a further 4.5 per cent. Increasing supply, particularly from Brazil and Australia, and an increase in consumption of seaborne iron ore from China are forecast to support this growth.

Figure 3.2: Iron ore imports



Sources: Department of Industry, Innovation and Science; World Steel Association.

Iron ore imports

China's domestic iron ore production fell 9 per cent year-on-year in the first nine months of 2015. As the price of seaborne iron ore fell, China's iron ore miners struggled to remain profitable. As a result, China's imports of seaborne iron ore have remained stable through the first ten months of 2015, despite lower steel production. In 2016, China's imports of iron ore are forecast to increase by 1.6 per cent, reflecting a continued decline in domestic production with consumption expected to remain relatively steady.

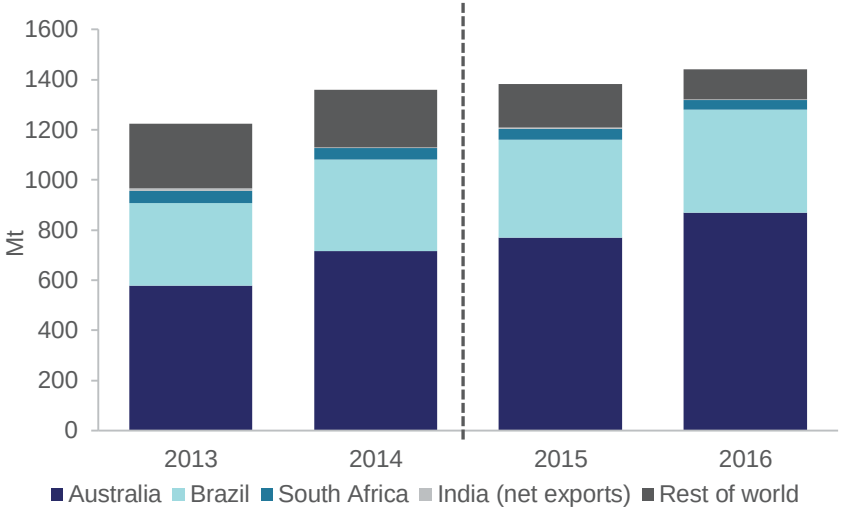
Imports of iron ore into the European Union, the world's second largest importer of iron ore, are estimated to have declined by 1.5 per cent in 2015 and are forecast to decline by a further 1.2 per cent in 2016. Japan's iron ore imports are estimated to have declined by 3.0 per cent in 2015 and are forecast to decline a further 0.9 per cent in 2016. These forecasts reflect soft demand conditions in both the European Union and Japan.

Iron ore exports

Australia's exports of iron ore are estimated to have increased by 7 per cent in 2015 to 767 million tonnes. This is primarily due to increased demand for Australian iron ore from China, with Australia's exports of iron ore to China increasing by 9 per cent year-on year in the first ten months of 2015 to 498 million tonnes. In 2016, exports of Australian iron ore are forecast to grow by a further 13 per cent, to total 868 million tonnes.

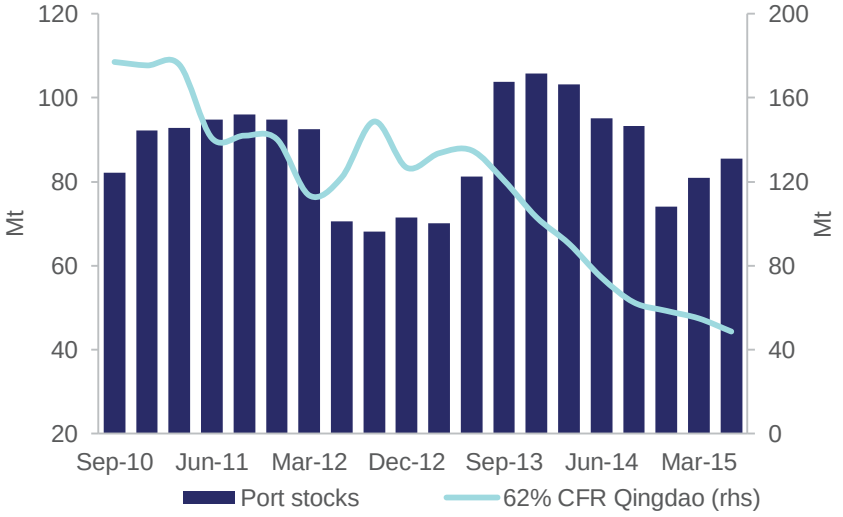
Australia's share of China's total iron ore imports increased from 60 per cent in 2014 to 64 per cent in the first ten months of 2015. The rise in Australia's share of China's imports came at the expense of smaller, high cost producers such as Iran, Ukraine, Canada and South Africa. The share of China's imports from smaller producers declined from around 30 per cent at the start of 2014 to 16 per cent in the first ten months of 2015. Brazil's share of China's imports increased slightly from 18 per cent in 2014 to 19 per cent in the first ten months of 2015.

Figure 3.3: World iron ore exports



Sources: Department of Industry, Innovation and Science; World Steel Association.

Figure 3.4: Iron ore price and China port stocks



Source: Bloomberg.

Australia

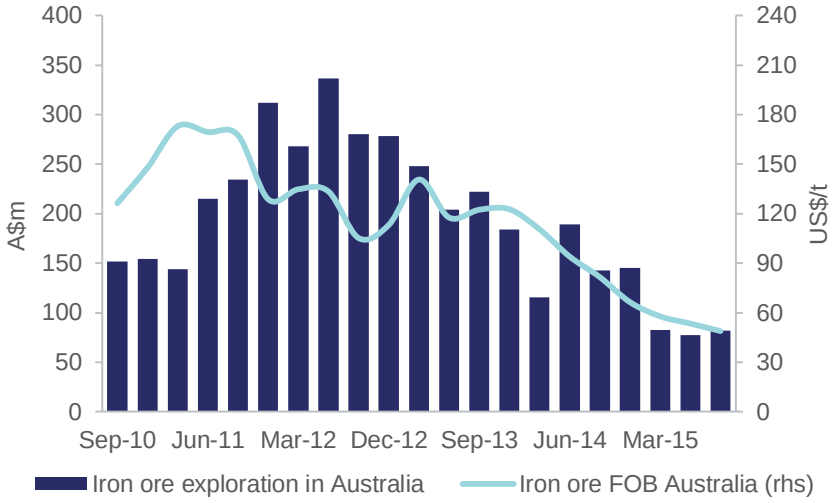
Exploration

Australia's expenditure on iron ore exploration declined 42 per cent year-on-year in the September quarter 2015 to $82 million, down from $143 million in the September quarter 2014. Lower iron ore prices have removed the incentive to undertake exploration, particularly given that producers have been cutting costs to remain profitable.

Exports

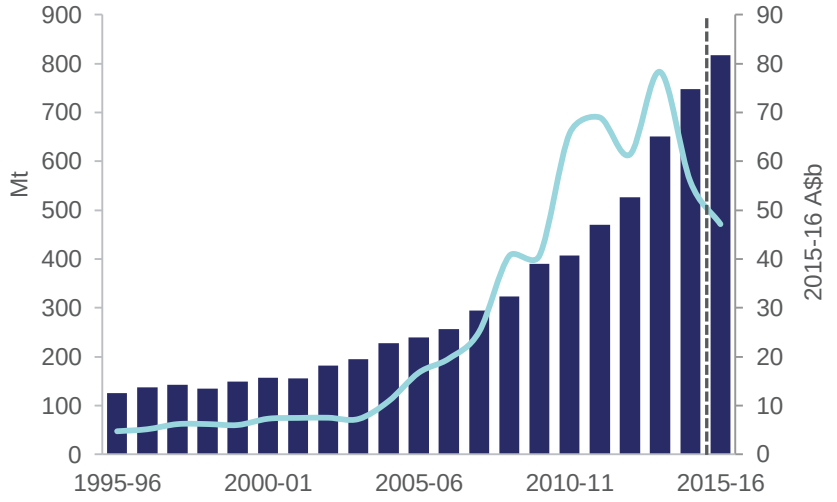
In 2015-16, Australia's iron ore export volumes are forecast to increase by 9 per cent to 818 million tonnes, supported by higher production at existing mines and the commissioning of the Roy Hill mine in December 2015. With prices forecast to be 36 per cent lower on average in 2015-16, iron ore export values are forecast to decline by 14 per cent to $47 billion.

Figure 3.5: Australia iron ore exploration



Sources: ABS; Bloomberg.

Figure 3.6: Australia's iron ore exports



Sources: ABS; Department of Industry, Innovation and Science.

Table 3.1: World iron ore imports (Mt)

	2013	2014	2015 f	2016 f	%change
European Union 28	157	158	157	155	-1.0
Japan	136	136	132	128	-2.7
China	820	933	930	951	2.2
Korea, Rep. of	63	74	74	70	-5.3

Table 3.2: World iron ore exports (Mt)

	2013	2014	2015 f	2016 f	%change
Australia	579	717	767	868	13.2
Brazil	330	344	365	392	7.5
India (net exports)	14	10	5	4	-20.0
Canada	38	40	27	25	-9.9
South Africa	63	65	43	38	-11.2
World iron ore trade	**1224**	**1359**	**1381**	**1442**	**4.5**

f forecast.
Sources: Department of Industry, Innovation and Science; World Steel Association.

Table 3.3: Iron ore outlook

	unit	2014	2015 f	2016 f	% change
World					
Prices b					
Iron ore c					
– nominal	US$/t	88.1	50.4	41.3	–18.0
– real d	US$/t	90.1	50.4	40.4	–19.9
		2013–14	**2014–15**	**2015–16 f**	
Australia					
Production					
Iron and steel gs	Mt	4.57	4.74	4.56	–3.9
Iron ore	Mt	694.9	810.0	845.3	4.4
Exports					
Iron and steel gs	Mt	0.87	0.85	0.76	–11.0
– nominal value	A$m	724	692	624	–9.8
– real value h	A$m	759	710	624	–12.1
Iron ore	Mt	651.4	747.7	817.8	9.4
– nominal value	A$m	74 671	54 516	47 152	–13.5
– real value h	A$m	78 314	55 899	47 152	–15.6

b fob Australian basis **c** Spot price, 62% iron content basis. **d** In current calendar year US dollars. **e** Contract price assessment for high-quality hard coking coal. **g** Includes all steel items in ABS, *Australian Harmonized Export Commodity Classification,* chapter 72, 'Iron and steel', excluding ferrous waste and scrap and ferroalloys. **h** In current financial year Australian dollars.
f forecast. **s**.
Sources: Department of Industry, Innovation and Science; ABS; World Steel Association.

Metallurgical coal

Ben Witteveen

Metallurgical coal prices fell through 2015, weighed down by an increase in supply and lower import demand from China. Metallurgical coal markets are forecast to remain well supplied over the short term, placing further pressure on prices.

Prices

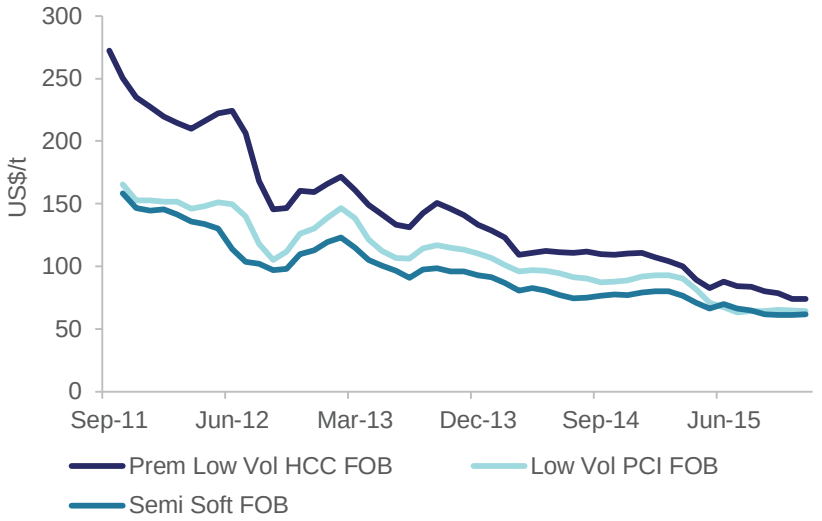
Lower steel production in China combined with an increase in supply contributed to lower metallurgical coal prices through 2015. Spot prices for low volatility hard coking coal FOB Australia averaged an estimated US$89 in 2015, down 22 per cent from the 2014 average. Contract prices for high quality hard coking coal declined 19 per cent in 2015 to average US$102.

Metallurgical coal markets are forecast to remain well supplied through 2016 and place further downward pressure on prices. Weaker growth in steel production in key producing regions, such as China and Japan, is likely to limit consumption growth. In addition, producers have been slow to respond to the falling price of metallurgical coal, principally due to cost cutting measures and a depreciation of the currencies of major producing regions relative to the US dollar. For the full year 2016, metallurgical coal contract prices are forecast to decline by 16 per cent and average US$86 a tonne.

World trade

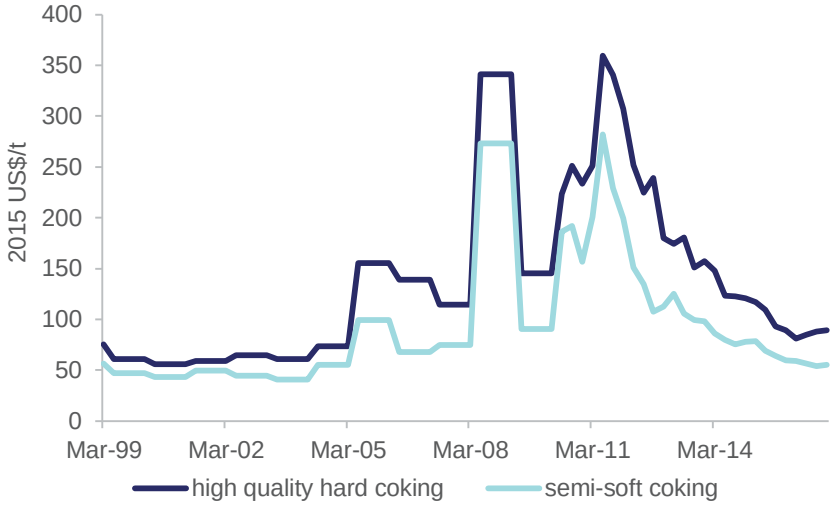
World trade in metallurgical coal is estimated to have decreased 4 per cent in 2015 to 299 million tonnes. In 2016, world trade is forecast to increase by 1 per cent to 302 million tonnes.

Figure 4.1: Metallurgical coal spot prices



Source: Platts.

Figure 4.2: Metallurgical coal benchmark prices, FOB Australia



Source: Department of Industry, Innovation and Science.

Imports

China's imports of metallurgical coal are estimated to have fallen 18 per cent to 53 million tonnes in 2015. This was driven by lower steel production and increased use of domestically-sourced coal despite the closure of some Chinese metallurgical coal capacity in response to lower prices. Although China's imports of metallurgical coal fell during 2015, Australia's share of total imports increased. In 2015 Australia's share of China's imports of metallurgical coal increased to an estimated 54 per cent, from 47 per cent in 2014.

Growth in China's residential construction sector is expected to remain weak over the short term and weigh on China's demand for steel. As a result, China's imports of metallurgical coal are forecast to remain subdued through 2016, as demand is expected to increasingly be met by domestic supply. In 2016 China's imports of metallurgical coal are forecast to contract by 6 per cent to 50 million tonnes.

India's imports of metallurgical coal are estimated to have increased 24 per cent to 57 million tonnes in 2015, driven by strong growth in steel production. India is almost completely reliant on imports of metallurgical coal. In 2016, India's imports of metallurgical coal are forecast to grow by a further 7 per cent to 61 million tonnes.

Exports

Low prices and an appreciating dollar, relative to other producing countries, contributed to a fall in the supply of metallurgical coal from the United States in 2015. These conditions led several US producers to announce they were filling for bankruptcy and many announced supply cuts. The effect of these announcements has been the removal of around 9 million tonnes of metallurgical coal mining capacity.

Reflecting this, US exports of metallurgical coal are estimated to have fallen 7 per cent to 53 million tonnes in 2015. In 2016, US exports are forecast to fall by a further 9 per cent to 48 million tonnes, weighed down by a strong currency (relative to other producing countries) and low prices.

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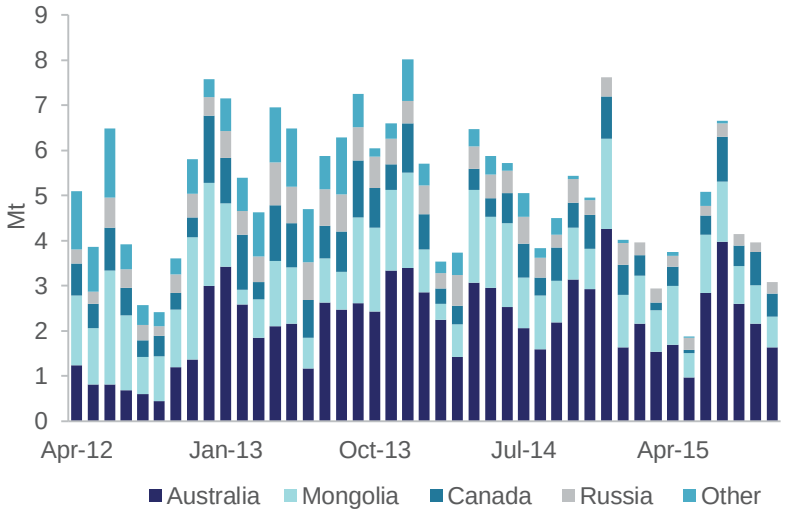
Figure 4.3: China's imports of metallurgical coal, by source



Source: IHS.

Table 4.1: Metallurgical coal trade

	2014	2015 f	2016 f
Metallurgical coal imports (Mt)			
European Union 28	50	46	47
Japan	51	51	50
China	65	53	50
South Korea	34	34	34
India	46	57	61
Metallurgical coal exports (Mt)			
Australia	186	187	193
Canada	31	25	27
United States	57	53	48
Russia	21	22	22
World trade	**310**	**299**	**302**

Exports from Canada are estimated to have decreased 19 per cent in 2015 to 25 million tonnes, as low prices led to several mine closures and capacity cuts, including mines in British Columbia and Alberta. In 2016, Canada's exports are forecast to increase slightly to 27 million tonnes, supported by improved productivity associated with cost cutting undertaken in 2015.

Australia's production and exports

Falling metallurgical coal prices through the year have forced some Australian producers to cut production or close in 2015, including the Collinsville mine. The Collinsville mine is Queensland's oldest coal mine and has been in operation for almost 100 years. The closure of the mine will remove around 3 million tonnes of metallurgical and thermal coal from Australia's supply. Despite closures and some production cuts the majority of growth in world metallurgical coal exports is expected to come from Australia in the short run.

Australia's exports of metallurgical coal are expected to be supported by production expansions and the start of production at several mines, including Maules Creek, Drake Coal and Middlemount Stage 2. Australian exports have also been supported by efficiency improvements at a number of existing operations.

Australia's exports of metallurgical coal are forecast to increase by 2.7 per cent to 193 million tonnes in 2015-16. Export values are forecast to decrease by 5 per cent to $21 billion in 2015-16, as the effect of lower prices offset the increase in export volumes and the assumed depreciation of the Australian dollar.

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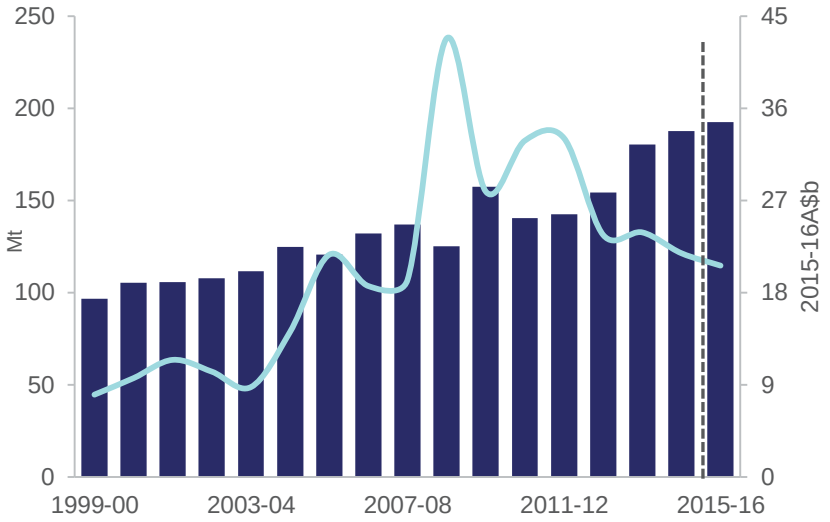
Figure 4.4: Australia's metallurgical coal exports



Sources: ABS; Department of Industry, Innovation and Science.

Table 4.2: Metallurgical coal outlook

	unit	2014	2015	2016 f	% change
World					
Contract prices bc					
– nominal	US$/t	125.5	102.1	85.8	–16.0
– real d	US$/t	128.4	102.1	83.8	–17.9
		2013–14	**2014–15**	**2015–16 f**	
Australia					
Production	Mt	183.1	192.8	194.6	0.9
Export volume	Mt	180	188	193	2.7
– nominal value	A$m	23 254	21 813	20 639	–5.4
– real value e	A$m	24 389	22 367	20 639	–7.7

b fob Australian basis **c** Contract price assessment for high-quality hard coking coal. **d** In current calendar year US dollars. **e** In current financial year Australian dollars. **f** forecast.
Source: ABS.

Thermal coal

Ben Witteveen

The thermal coal market remained well supplied in 2015, contributing to lower prices. These conditions are forecast to persist in 2016.

Prices

In 2015 thermal coal prices continued the decline that began in 2011, weighed down by excess supply capacity and weaker import demand from China. Newcastle FOB prices began 2015 at US$62 tonne and fell 16 per cent through the year to around US$52 a tonne by the end of November. For the full year 2015 the Newcastle FOB price is estimated to have averaged US$58 a tonne.

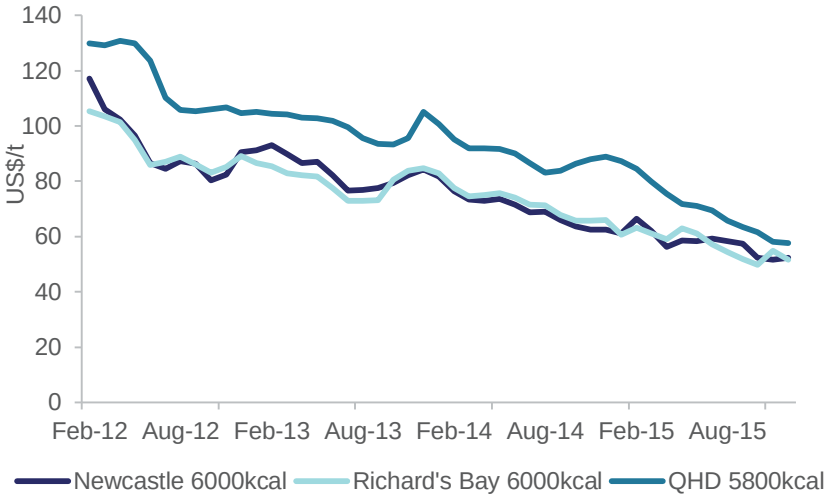
Despite cost cutting activities, lower prices have affected the profitability of producers and encouraged the closure of capacity, particularly in the US. However, the supply response has been slow because of limitations to altering infrastructure supply services and the depreciation of the currencies of major producing regions relative to the US dollar.

The combination of weak import demand and strong supply competition is forecast to place further downward pressure on prices in the short term. Benchmark prices for the Japanese Fiscal Year 2016 (JFY, April 2016 to March 2017) are forecast to settle 12 per cent lower at around US$60 a tonne.

World trade

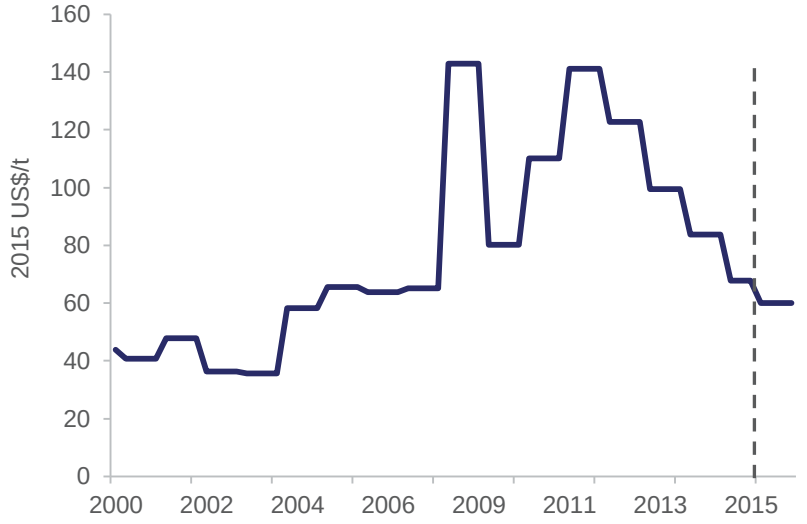
World trade in thermal coal is estimated to have declined 8 per cent to 1040 million tonnes in 2015, as lower imports into China more than offset higher imports into other countries.

Figure 5.1: Thermal coal spot prices



Source: IHS.

Figure 5.2: JFY thermal coal prices



Source: Department of Industry, Innovation and Science.

In 2016, world trade in thermal coal is forecast to increase by 2 per cent to 1059 million tonnes supported by greater imports into China and India.

Imports

China

In the first ten months of 2015 China's imports of thermal coal fell 33 per cent to around 131 million tonnes. China's consumption of thermal coal has been affected by slow growth in the energy intensive manufacturing sector (1 per cent year-on-year growth in the first nine months of 2015), increased hydropower utilisation and government policies to diversify the fuel mix. For the year as a whole, China's thermal coal imports are estimated to have declined by 31 per cent to 157 million tonnes.

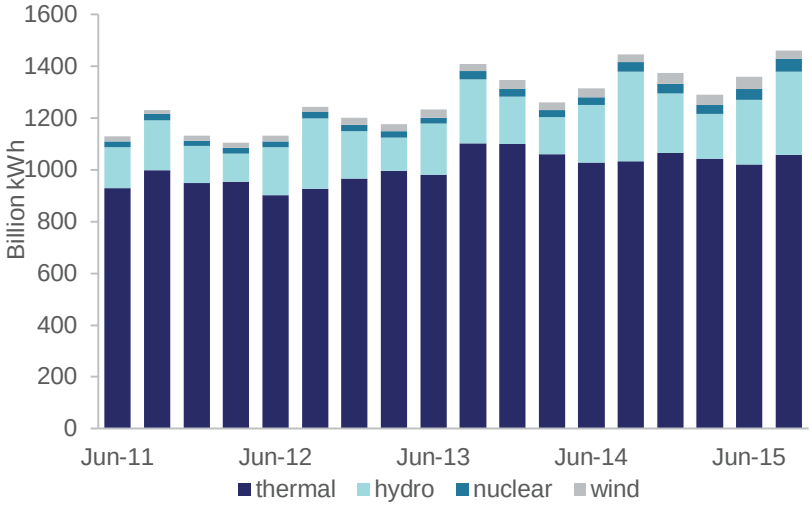
The Chinese Government's Intended Nationally Determined Contribution for COP21 indicated that coal will continue to remain an important component of its energy mix. However, there will be a greater focus on increased use of high efficiency, low emissions technologies and carbon capture and storage. These plants use less coal to produce the same amount of electricity. Once complete, the nation-wide upgrades to coal-fired technologies (scheduled for 2020) are estimated to reduce China's annual coal consumption by around 100 million tonnes (around 3 per cent of China's total consumption).

China's energy consumption is forecast to increase as its economy continues to expand. To meet this demand around 117 gigawatts of coal-fired capacity is under construction or approved. Although China is expected to meet an increasing share of its consumption with domestic-sourced coal, China's imports are forecast to increase moderately to 160 million tonnes in 2016.

India

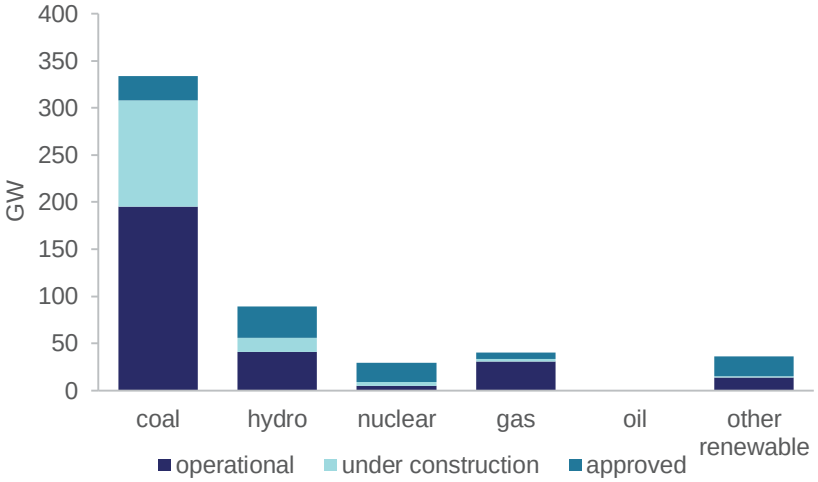
India's imports of thermal coal have increased rapidly in response to the development of new coal-fired generation capacity and relatively slow production growth.

Figure 5.3: China's quarterly electricity generation



Source: CEIC.

Figure 5.4: India's electricity generating capacity >50MW



Source: Enerdata, www.enerdata.net.

A key enabler for expanding India's manufacturing sector will be access to low-cost, reliable electricity. Almost 138 gigawatts of coal-fired power stations under construction or approved (by way of comparison India currently has around 49 gigawatts of hydro power under construction and 21 gigawatts in other renewables). For the full year 2015 India is estimated to have imported 191 million tonnes of coal. In 2015, India overtook China as the world's largest importer of thermal coal.

In 2016, India's imports of thermal coal are forecast to increase by around 7 per cent to 204 million tonnes supported by increased demand.

Japan

In 2015 Japan's thermal coal imports are estimated to have increased 5 per cent to 144 million tonnes. Although Japan's coal consumption is estimated to have decreased during 2015, imports increased as utilities appear to have taken advantage of low prices to build up stocks. In 2016, Japan's imports of thermal coal are forecast to contract to around 135 million tonnes as nuclear power plant restarts relieve some of the pressure on coal-fired plants operating at capacity.

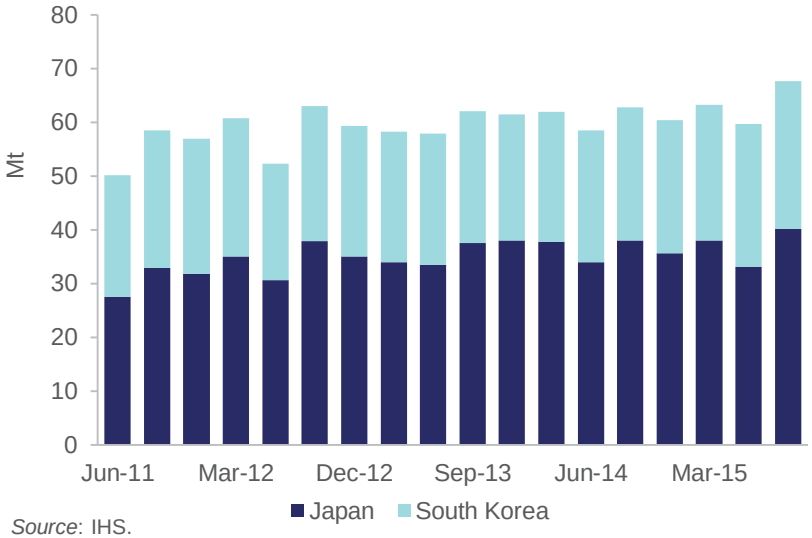
Exports

Indonesia

Indonesia's exports of thermal coal are estimated to have fallen 5 per cent to 387 million tonnes. Exports were adversely affected by lower production and reduced demand for lower quality coal from China and India.

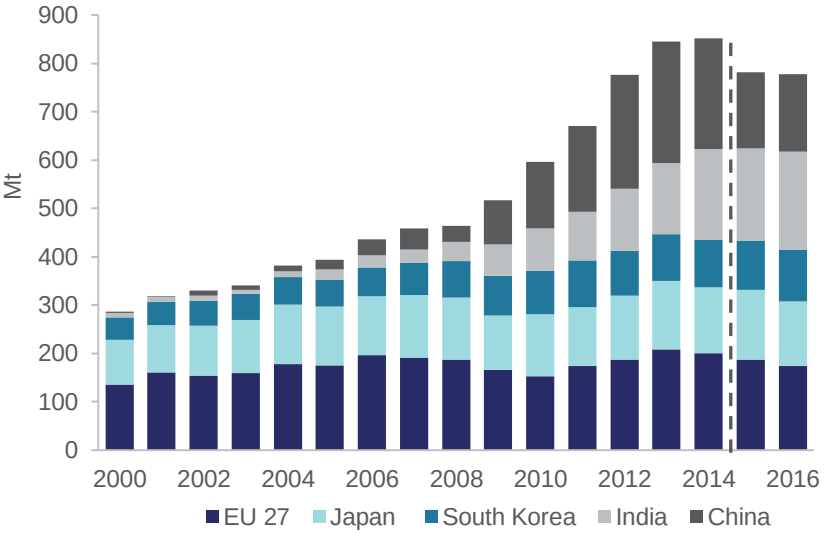
In 2016, Indonesia's exports of thermal coal are forecast to decline by a further 4 per cent to around 372 million tonnes reflecting lower production and increased domestic consumption. Some large producers have opted to reduce production and conserve resources until prices improve.

Figure 5.5: Japan and South Korea's quarterly imports



Source: IHS.

Figure 5.6: Major thermal coal importers



Sources: IEA; Department of Industry, Innovation and Science.

Further, the Government is implementing production targets to conserve resources. Around 35 gigawatts of coal-fired power is being developed for operation by 2019. As a result, Indonesia's domestic market obligation is expected to increase from 102 million tonnes in 2015 to 200 million tonnes in 2019.

Columbia

In 2015, Columbia's exports of thermal coal are estimated to have increased by 1.5 per cent to 80 million tonnes. In 2016, Columbia's exports of thermal coal are forecast to increase by a further 4 per cent to 83 million tonnes, supported by increased demand and the commissioning of some additional capacity.

Australia

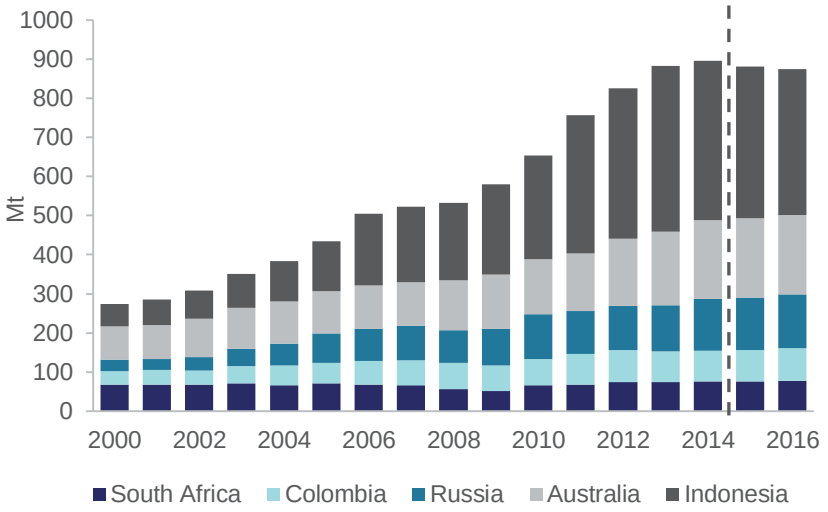
Exploration

Australia's coal exploration expenditure in the September 2015 quarter was around $56 million, 12 per cent higher than in the June quarter but 30 per cent lower compared to the September 2014 quarter. In general, lower coal prices have reduced the incentive for producers to invest in exploration, and many companies are reducing their exploration activity as part of cost cutting activities.

Production

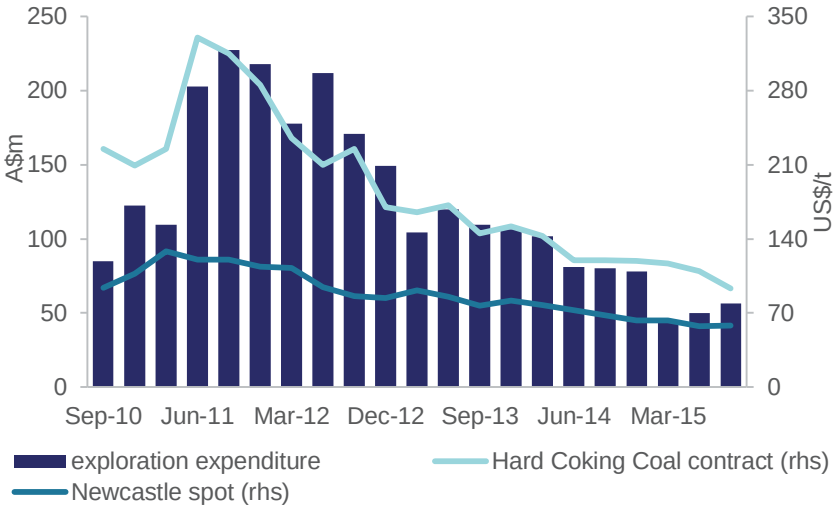
Australia's thermal coal production is forecast to increase by 1 per cent in 2015-16 to 253 million tonnes. The commencement of production at Maules Creek (capacity of 13 million tonnes of thermal and metallurgical coal a year) is expected to more than offset the effect of the expected closure of Anglo American's Drayton South, BHP Billiton's Crinum and Glencore's West Wallsend and Newland mines.

Figure 5.7: Major thermal coal exporters



Sources: IEA; Department of Industry, Innovation and Science.

Figure 5.8: Australia's coal exploration expenditure



Sources: ABS; Bloomberg; Platts.

Exports

Australia's exports of thermal coal are forecast to increase by 1 per cent to 207 million tonnes in 2015-16. Earnings from thermal coal exports are forecast to increase by 0.9 per cent to $16.2 billion as higher export volumes and the positive effects of a depreciating Australian dollar offset a forecast fall in the price.

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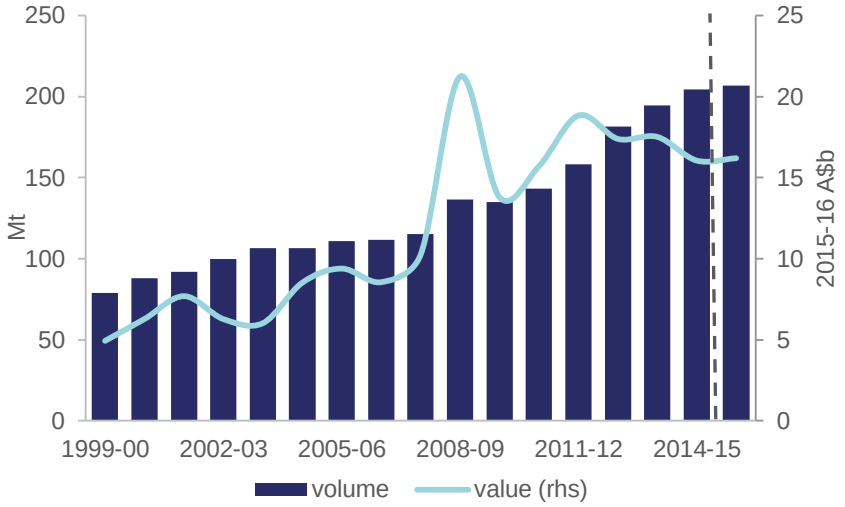
Figure 5.9: Australia's thermal coal exports



Sources: ABS; Department of Industry, Innovation and Science.

Table 5.1: Thermal coal outlook

	unit	2013	2014	2015 f	2016 f	% change
World						
Contract prices b						
– nominal	US$/t	95	82	68	60	–11.5
– real c	US$/t	99	84	68	59	–13.5
Coal trade	Mt	1 102	1 125	1 040	1 059	1.9
Imports						
Asia	Mt	767	789	736	753	2.4
China	Mt	252	229	157	160	1.7
Chinese Taipei	Mt	59	60	61	62	2.2
India	Mt	147	189	191	204	6.7
Japan	Mt	142	137	144	135	–6.3
South Korea	Mt	96	97	102	106	3.9
Europe	Mt	256	249	222	224	1.2
European Union 27	Mt	208	200	187	173	–7.5
other Europe	Mt	48	49	54	55	1.7
Exports						
Australia	Mt	188	201	202	204	1.1
Colombia	Mt	79	79	80	83	3.8
Indonesia	Mt	424	408	387	372	–3.9
Russia	Mt	117	132	135	137	1.5
South Africa	Mt	74	76	76	78	2.9
United States	Mt	47	31	25	23	–8.0
		2012–13	**2013–14**	**2014–15**	**2015–16 f**	
Australia						
Production	Mt	238.9	247.8	248.8	252.8	1.6
Export volume	Mt	181.7	194.6	204.5	206.7	1.0
– nominal value	A$m	16 169	16 705	16 057	16 205	0.9
– real value d	A$m	17 396	17 520	16 465	16 205	–1.6

b Japanese Fiscal Year (JFY), starting April 1, fob Australia basis. Australia–Japan average contract price assessment for steaming coal with a calorific value of 6700 kcal/kg gross air dried. **c** In current JFY US dollars. **d** In current financial year Australian dollars. **f** forecast.
Sources: ABS; IEA; Coal Services Pty Ltd; Queensland Department of Natural Resources and Mines, Department of Industry, Innovation and Science.

Gas

Gayathiri Bragatheswaran

New LNG prices are expected to remain subdued over the next year, with oil prices remaining relatively low and increased liquefaction capacity coming online. Australia's LNG exports are forecast to grow as new capacity comes online but growth in export values will be tempered by downward pressure on prices.

Prices

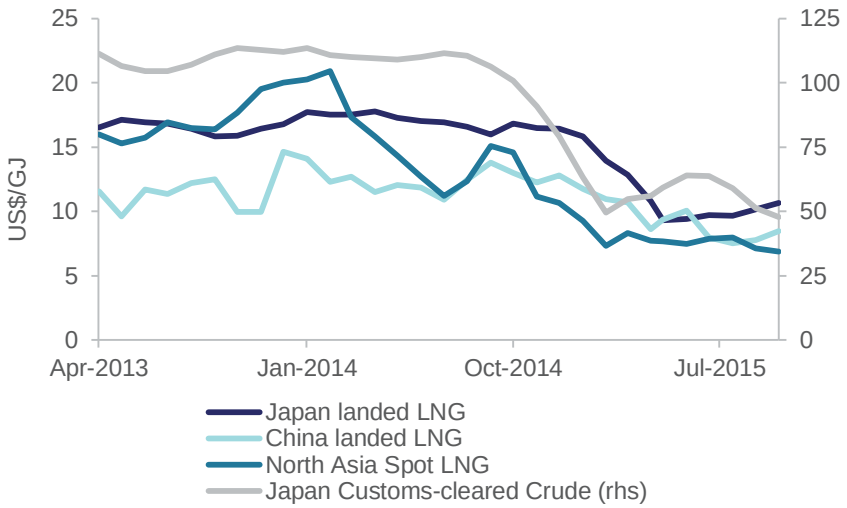
In December North East Asian LNG prices declined to $US7.26 a gigajoule, 28 per cent lower than the same period in 2014. The average landed price in Japan fell 38 per cent in October relative to the same time last year to US$10.65 a gigajoule. The price in China declined 35 per cent between October 2014 and October 2015 to US$7.60 a gigajoule and the price in South Korea declined 40 per cent over the same period to US$10.22 a gigajoule. Price drops are reflective of oil price declines over the past year, with the majority of LNG contracts in Asia linked to a 3-9 month lagged average oil price. Increased global supply availability especially in the Asian region has also weakened spot prices.

Landed LNG prices in Japan (Australia's largest LNG importer) in 2015 are estimated to be around US$10.30 a gigajoule. Prices are forecast to decline further in 2016 to around US$8 a gigajoule, as the effects of the relatively low oil prices in late 2015 flow through. Spot prices are also expected to remain subdued due to increases in global supply outweighing increases in global demand.

Global LNG developments

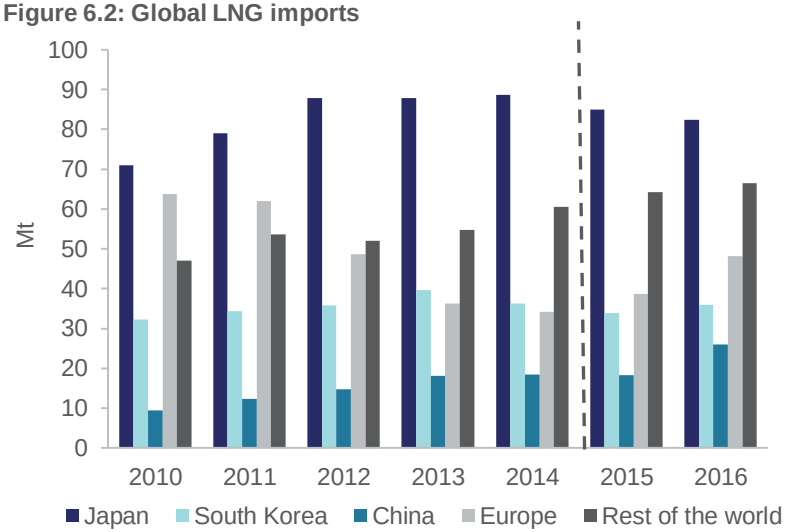
In 2015 total global LNG imports are estimated to increase from 2014 levels to 243 million tonnes. Japan's (the world's largest LNG importer) LNG imports in the September quarter increased 10 per cent relative to the previous quarter. However, Japan's total LNG

Figure 6.1: Monthly Asian LNG and oil prices



Sources: Argus and Petroleum Association of Japan.

Figure 6.2: Global LNG imports



Note: Outlook includes allowances for plant downtime and maintenance.
Sources: Nexant and IEA.

imports in 2015 are estimated to decline from 2014 levels to 85 million tonnes. This decline is linked to relatively cooler temperatures in Tokyo over the 2015 summer compared with the previous year, and a warmer winter relative to 2014 reducing demand for heating and cooling. It is also reflective of the re-start of nuclear reactors Sendai 1 and 2, in September and October, respectively. Japan's decline in LNG imports has been offset by increases in LNG imports in Europe.

Total global LNG imports are forecast to increase 8 per cent to 259 million tonnes in 2016. In 2016 Japan's LNG demand is forecast to decline from 2015 levels. This reflects the displacement of gas through increased use of coal, nuclear and renewable energy in the power generation mix. The decline in demand in Japan is expected to be offset by an increase in demand from China in particular, with a forecast 31 per cent increase in 2016 to 29 million tonnes.

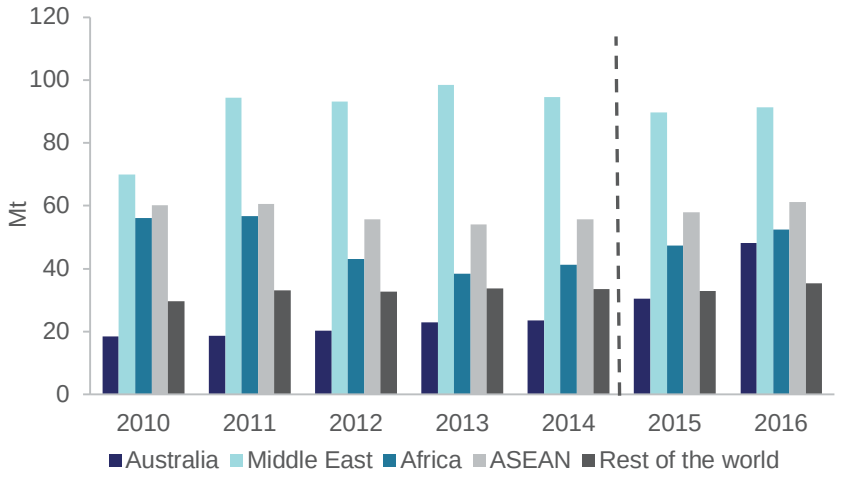
Global LNG supply

In 2015 global LNG supply capacity is expected to increase to 258 million tonnes. This increase is reflective of production that came online throughout the year from Australia and Indonesia. Indonesia's Donggi-Senoro project, with a capacity of 2 million tonnes a year made its first LNG shipment in August. In 2016 global supply capacity is forecast to increase to 289 million tonnes, a 12 per cent increase from 2015. The increase in supply capacity is expected to mainly come from Australia and the US. The US's Sabine Pass project located in Louisiana is estimated to have a capacity of 22.5 million tonnes a year at completion and start exporting from 2016. Several Australian projects will also come online in 2016.

Australia

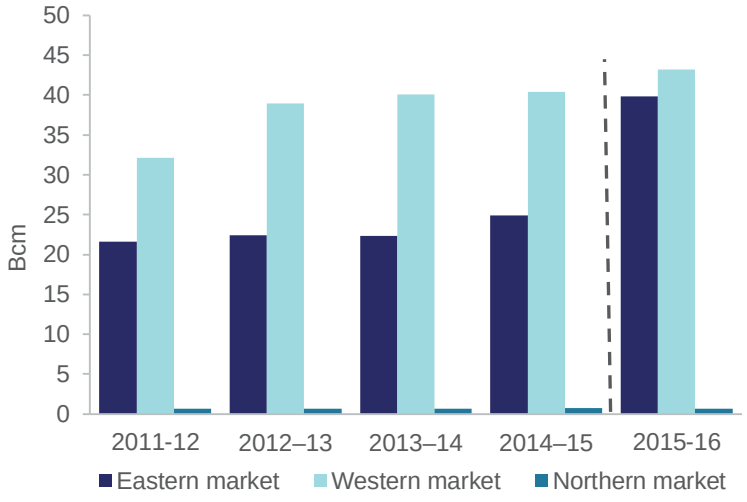
In 2015-16 Australia's gas production is forecast to increase 27 per cent to 83.6 billion cubic metres. Most of the growth in production will be in the eastern market, to support new LNG plants. Gas production in the eastern market is forecast to increase by 60 per cent in 2015-16, to 40 billion cubic metres, with most of the growth

Figure 6.3: Global LNG supply capacity



Note: Outlook includes allowances for plant downtime and maintenance.
Sources: Nexant and IEA.

Figure 6.4: Australian Gas production outlook by market



Note: Gas production associated with Darwin LNG is not included in the Northern market as it comes from the Bayu-Undan Joint Petroleum Development Area.

occurring in coal seam gas production in the Surat and Bowen basins. The GLNG project drew first LNG in September 2015 and sent its first LNG cargo to South Korea in October. The second train of the QCLNG project also started commercial operations in November 2015, with APLNG commencing LNG production in December 2015. At full capacity, these three projects will have a combined capacity of 25.3 million tonnes of LNG a year.

Gas production is also forecast to rise by around 7 per cent in the western market in 2015-16. In the first half of 2016, the Gorgon project is expected to commence production. Once fully developed and completed, Gorgon will have an annual capacity of 15 million tonnes.

Australia's LNG exports are forecast to increase 45 per cent to 36.2 million tonnes, in 2015-16. Export values are forecast to increase 23 per cent to $20.7 billion, in 2015-16, in line with the substantial increase in export volumes. However, despite an expected depreciating Australian dollar against the US dollar (LNG prices are denominated in US dollars), growth in export values will be tempered due to forecast lower LNG prices.

Figure 6.5: Australian Gas production outlook by type

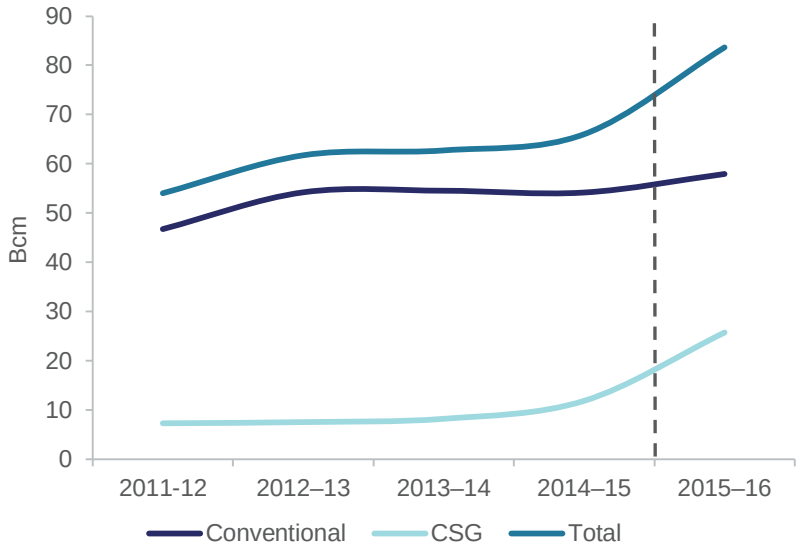
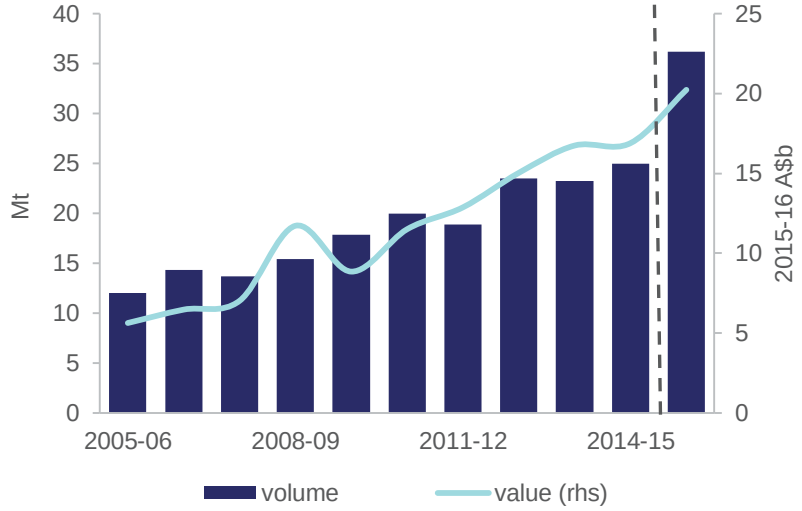


Figure 6.6: Australia's LNG exports



Sources: ABS; Department of Industry, Innovation and Science.

Table 6.1: Gas outlook

	unit	2013–14	2014–15 f	2015–16 f	% change
Australia					
Production **b**	Bcm	62.9	66	83.6	26.7
– Eastern market	Bcm	22.2	24.9	39.8	59.9
– Western market	Bcm	40.1	40.4	43.2	6.8
– Northern market	Bcm	0.7	0.7	0.7	-3.6
LNG export volume	Mt **d**	23.2	25	36.2	44.7
– nominal value	A$m	16 305	16 896	20 739	22.7
– real value **e**	A$m	16 745	17 324	20 739	19.7

b Production includes both sales gas and gas used in the production process (i.e. plant use). **d** 1 million tonnes of LNG is equivalent to approximately 1.36 billion cubic metres of gas. **e** In current financial year Australian dollars. **f** Forecast.
Sources: ABS; Company reports and World Bank; Department of Industry, Innovation and Science.

Oil

Kieran Bernie

The value of Australia's exports of crude oil and condensate will continue to fall in the near term as the effect of lower prices outweighs increasing export volumes. Prices are expected to increase modestly from recent lows as continued but slower growth in consumption outweighs relatively flat global production.

Prices

Oil prices fell in the September quarter as strong growth in OPEC supply outweighed a modest decline in non-OPEC production, reversing price increases observed earlier in the year. The price of West-Texas Intermediate (WTI) fell by 20 per cent in the third quarter, to average $US47 a barrel for the quarter, while the price of Brent declined by 19 per cent, to US$50 a barrel.

For the year as a whole, the price of WTI is estimated to average US$49 a barrel, and the price of Brent, US$53 a barrel.

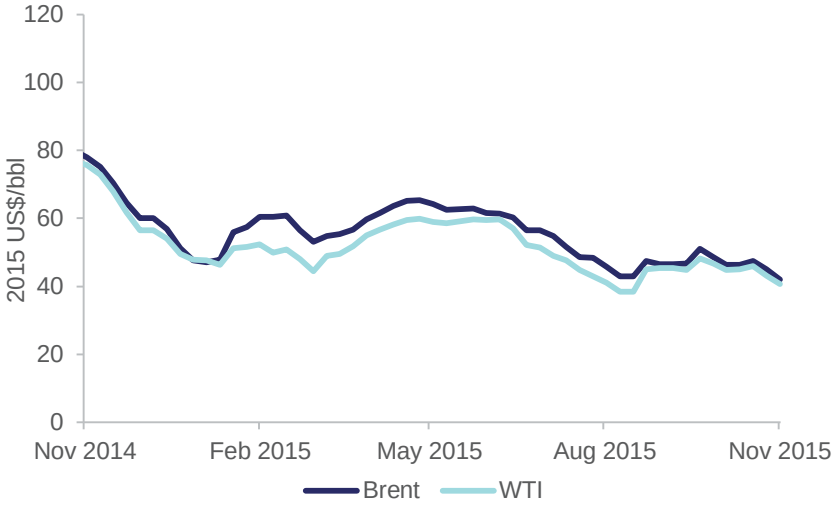
Oil prices are forecast to increase somewhat in 2016 in line with relatively flat global production and continued, albeit slower growth in consumption. The price of WTI is forecast to average US$50 a barrel in 2016, while the forecast average for Brent is US$54 a barrel.

Oil prices remain subject to a significant degree of uncertainty in the short term due to a number of factors. These include: the timing and pace of the return of Iranian supply; the responsiveness of unconventional production in the United States to any increases in the price of oil; and extent of the slowdown in global consumption growth.

World oil consumption

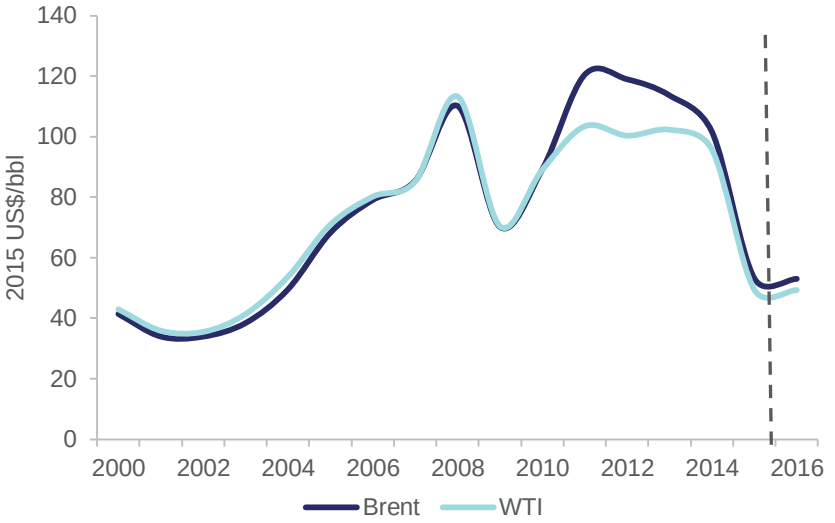
Global oil consumption is estimated to increase by 2.1 per cent in 2015 to average 94.6 million barrels a day, the highest rate of annual

Figure 7.1: Weekly oil prices



Sources: Bloomberg; US Bureau of Labor Statistics; Department of Industry, Innovation and Science

Figure 7.2: Annual oil prices



Sources: Bloomberg; Department of Industry, Innovation and Science.

growth in five years. Stronger growth is the result of increased consumption in OECD economies, particularly those in Europe, which experienced exceptionally cold weather in the first quarter of the year, leading to increased demand for heating.

Consumption by OECD economies in Europe is estimated to increase by 2.2 per cent in 2015 to reach 13.7 million barrels a day, reversing the 1.5 per cent decline observed in 2014.

World oil consumption is expected to continue to increase in 2016, but at a slower rate of 1.2 per cent, to average 95.8 million barrels a day.

Growth will be driven by increased consumption in non-OECD economies that partly offsets slowing growth in OECD consumption. Increases in non-OECD consumption will continue to be concentrated in Asian and Middle Eastern economies, which together are forecast to consume an additional 1.0 million barrels a day in 2016.

World oil production

Global oil production is estimated to grow by 2.8 per cent in 2015 to average 96.2 million barrels a day, an annual increase of 2.6 million barrels a day, the largest since 2004.

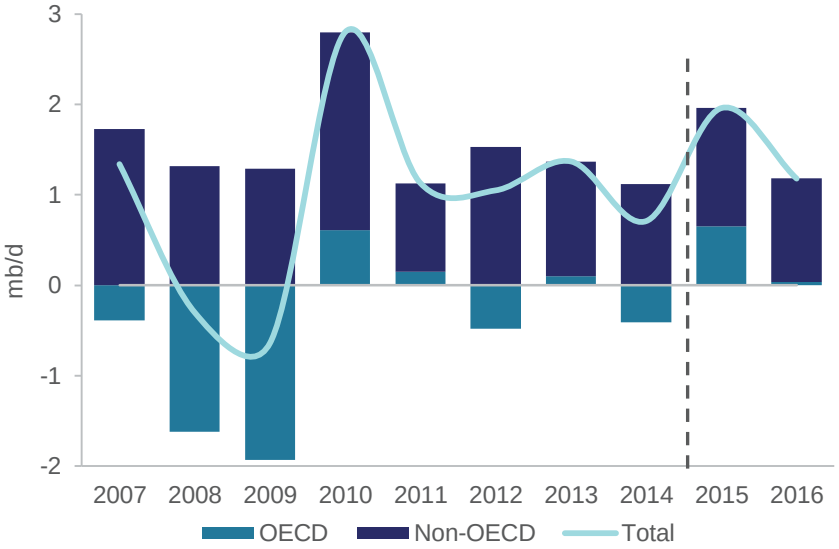
The increase in world production is largely the result of continued but slower growth in the United States in the first half of the year, and a strong increase in OPEC supply.

Output from producers in the United States is estimated to increase by 7.4 per cent in 2015 to average 12.8 million barrels a day, significantly less than the 16.2 per cent increase recorded in 2014.

OPEC production is estimated to increase by 3.2 per cent in 2015 to average 37.9 million barrels a day as a result of strong growth in supply from Iraq and Saudi Arabia.

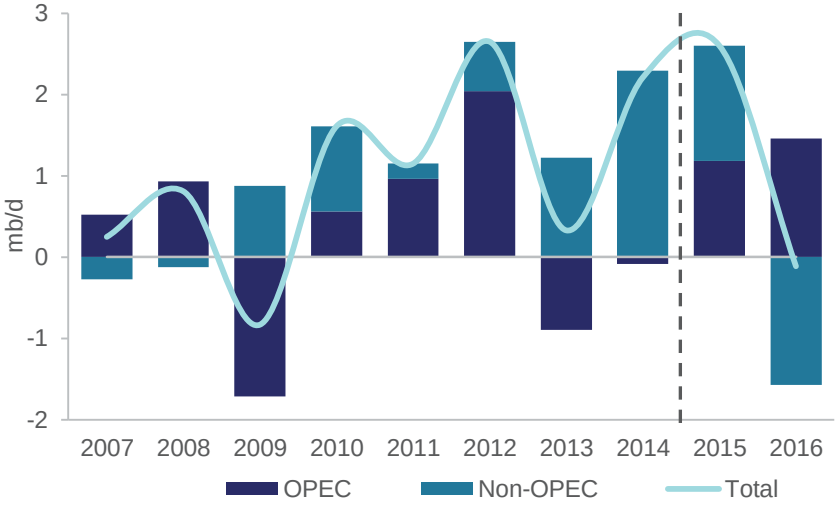
World oil production is forecast to remain relatively flat in 2016, falling by just 0.1 per cent to 96.1 million barrels a day as contracting non-OPEC supply caused by declining unconventional production in the US just outweighs continued growth in OPEC production.

Figure 7.3: Change in world oil consumption



Sources: IEA; Department of Industry. Innovation and Science.

Figure 7.4: Change in world oil production



Note: OPEC production includes Indonesian output from 2016 onwards
Sources: IEA; Department of Industry, Innovation and Science.

Australian production and exports

Australia produced 356 thousand barrels of crude oil and condensate a day in the September quarter, down 1.4 per cent on a year-on-year basis. The slight decline was largely the result of lower condensate production from the North-West-Shelf, which offset a small increase in crude oil production.

Expenditure on petroleum exploration and development also declined in the September quarter, falling to $583 million as firms continued to adjust to the new price environment. Exploration and development expenditure is now 52 per cent lower than the average for the two years to June 2014.

Despite this, production is forecast to increase by 7.5 per cent in 2015-16 to average 352 thousand barrels a day as additional output from new Coniston and Balnaves projects outweighs declining production from mature fields.

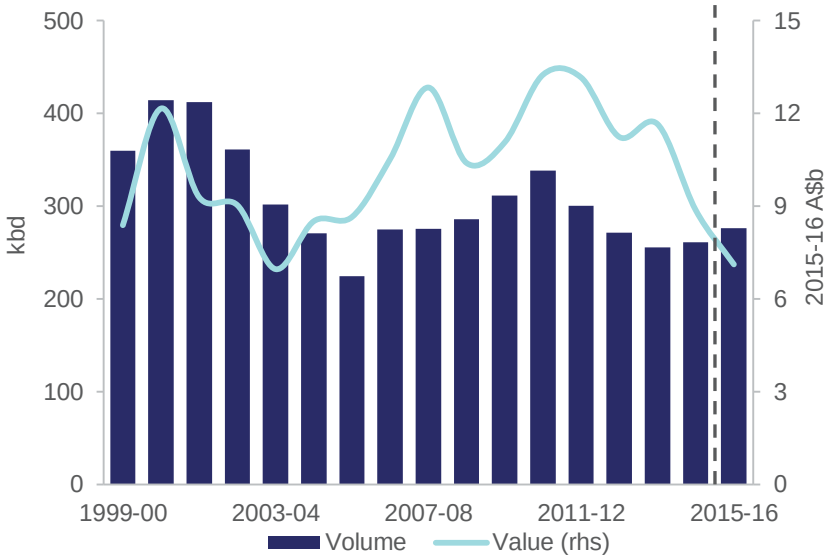
Exports of crude oil and condensate are expected to increase in line with production in 2015-16, growing by 5.8 per cent to average 276 thousand barrels a day.

Despite higher export volumes, the value of Australia's exports of crude oil and condensate are expected to continue to fall over the outlook period. In real terms, export earnings are forecast to decline by 20 per cent in 2015-16, falling to $7.1 billion as markedly lower prices outweigh higher volumes and the effect of a weaker Australian dollar.

Production of refined products is also expected to continue to decline in 2015-16. Output is forecast to decline by 24 per cent, to average 403 thousand barrels day in line with the recent cessation of refining activities at the Kurnell and Bulwer Island facilities.

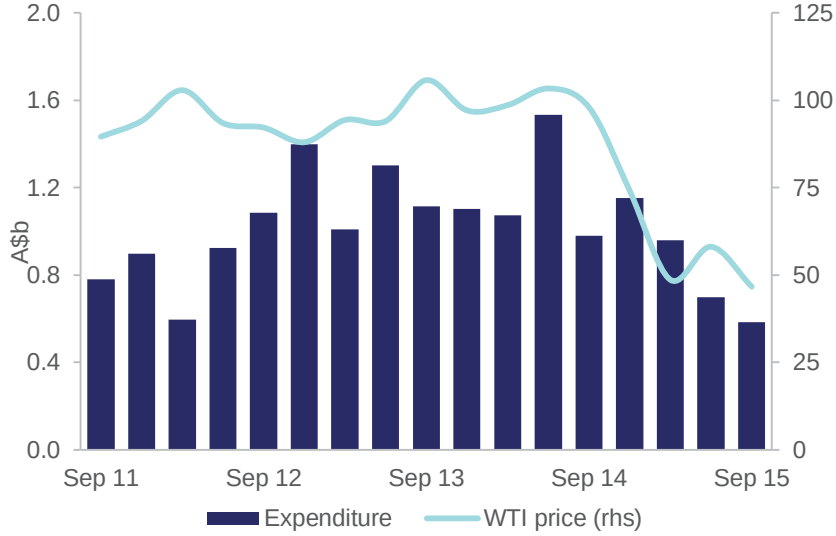
As a result, the volume of imported refined products is projected to continue to grow over the outlook period, increasing from 480 thousand barrels a day in 2014-15 to 615 thousand barrels a day in 2015-16.

Figure 7.5: Australia's crude oil and condensate exports



Sources: ABS; Department of Industry, Innovation and Science.

Figure 7.6: Australian petroleum exploration expenditure



Sources: ABS; Bloomberg.

Table 7.1: Oil outlook

	unit	2013	2014	2015 f	2016 f	% change
World						
Production b	Mbd	91.4	93.6	96.2	96.1	–0.1
Consumption b	Mbd	91.9	92.6	94.6	95.8	1.2
WTI crude oil price						
– nominal	US$/bbl	97.8	93.5	49.4	50.4	2.1
– real c	US$/bbl	102.3	95.7	49.4	49.3	–0.2
Brent crude oil price						
– nominal	US$/bbl	108.7	99.3	53.1	54.2	2.1
– real c	US$/bbl	113.6	101.6	53.1	53.0	–0.2
		2012–13	**2013–14**	**2014–15**	**2015–16 f**	**% change**
Australia						
Crude oil and condensate						
Production b	kbd	366	352	328	352	7.5
Export volume b	kbd	272	255	261	276	5.8
– nominal value	A$m	10 447	11 115	8 656	7 118	–17.8
– real value d	A$m	11 239	11 657	8 876	7 118	–19.8
Imports b	kbd	516	488	426	316	–25.9
LPG						
Production be	kbd	59	64	57	59	2.3
Export volume b	kbd	41	42	36	39	7.8
– nominal value	A$m	1 088	1 265	811	732	–9.8
– real value d	A$m	1 171	1 327	832	732	–12.0
Petroleum products						
Refinery production b	kbd	636	589	527	403	–23.5
Exports bg	kbd	16	11	12	10	–17.4
Imports b	kbd	408	423	480	615	28.1
Consumption bh	kbd	945	923	914	945	3.4

b Number of days in a year is assumed to be exactly 365. A barrel of oil equals 158.987 litres. c In current calendar year US dollars. d In current financial year Australian dollars. e Primary products sold as LPG. g Excludes LPG. h Domestic sales of marketable products.
f Forecast.
Sources: Department of Industry, Innovation and Science; ABS; IEA; Energy Information Administration (US Department of Energy); Geoscience Australia.

Gold

Gayathiri Bragatheswaran

Gold prices in 2015 are estimated to decline to a four year low of US$1160 per ounce. The factors driving prices lower towards the end of 2015 are expected to persist into the new year, fuelling demand for fabricated gold especially in the world's largest consumers, India and China.

Prices

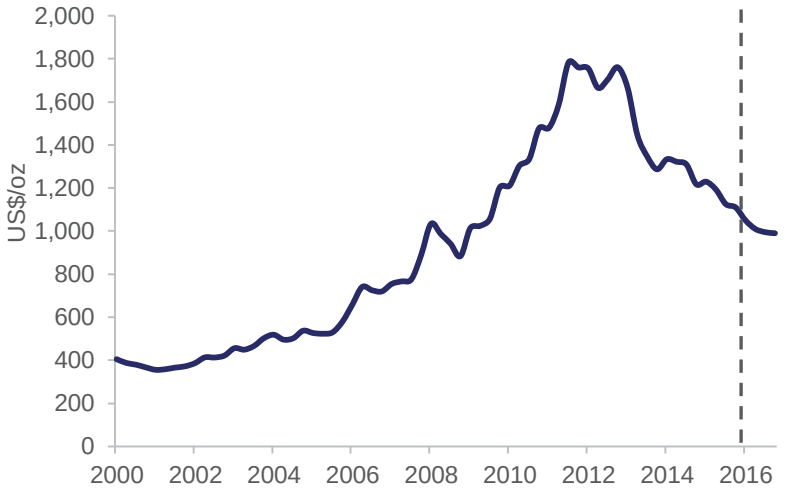
Gold prices are estimated to decrease 8 per cent in 2015 relative to 2014 and average US$1160 per ounce. LBMA gold prices declined substantially in the second half of 2015, falling as low as US$1054 per ounce in early December—the lowest price recorded since 2009. The fall in prices largely reflected the expectation that the US Federal Reserve would increase interest rates, which they did when they met on 16 December. An increase in US interest rates provides a positive signal about the health of the US economy to investors, and encourages investment in US dollar denominated bonds and stocks instead of gold.

Prices are forecast to decline a further 13 per cent in 2016 to average US$1011 per ounce, reflecting expectations of further US interest rate increases in 2016. Increases in physical demand for gold fuelled by lower prices especially in the form of jewellery purchases in large and emerging markets such as India and China are unlikely to be sufficient to offset reduced investment demand and limit price declines over the short term.

Consumption

In 2015 gold purchases are estimated to decline 2.5 per cent to 2738 tonnes, largely because of the reduced appeal of gold as an investment asset. According to the World Gold Council, physical consumption of gold increased considerably in the September quarter 2015 in response to lower prices. However, the increase was insufficient to offset the decline in demand in the first half of 2015.

Figure 9.1: Quarterly gold prices



Sources: LBMA; Department of Industry, Innovation and Science.

In 2016 gold consumption is forecast to increase 1 per cent to 2761 tonnes. Despite an expected appreciation of the US dollar, forecast lower prices are likely to encourage increased physical consumption. This consumption is expected to be largely driven by jewellery purchases from the world's two largest gold consumers China and India. However, expected subdued economic growth in China (world's largest gold consumer) is expected to limit increases in purchases. As a result, world gold consumption is unlikely to return to the levels observed in 2013.

Production

World gold mine production in 2015 is estimated to have remained steady at 3057 tonnes. New capacity commissioned during the year included Goldfields' Guyana based Aurora mine which achieved first gold in August. The project is one of the few developments in

Guyana and has expected annual production of194 000 tonnes over its 17 year operating life.

In 2016, gold production is forecast to increase 1.4 per cent to 3100 tonnes. Despite the forecast decline in gold prices, planned projects are expected to proceed given the large investments made and efficiency and cost savings achieved more broadly. Production from Chesapeake Gold's Metates mine in Mexico (one of the world's largest undeveloped gold and silver projects) is expected to come online in 2016. The mine is estimated to produce around 659 000 tonnes a year for 25 years.

Australia's production and exports

Exploration

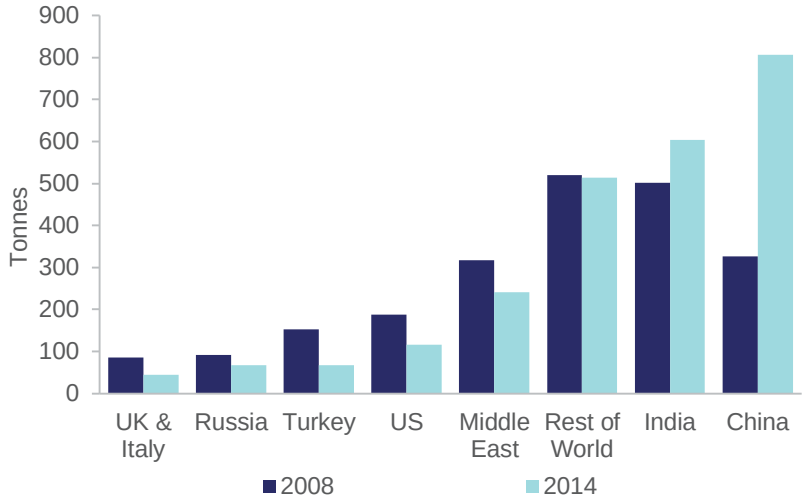
Despite lower gold prices, expenditure on gold exploration increased 19 per cent to $133.7 million in the September quarter relative to the June quarter. Expenditure was also 49 per cent higher than the September quarter 2014. This reflects the positive effect of the depreciating Australian dollar against the US dollar on Australian denominated gold prices.

Production

In 2015-16 Australia's gold production is forecast to increase 3 per cent to 282 tonnes. The forecast increase is expected to be aided by record production achieved at Aurelia Gold's Hera mine and Millennium Minerals' Nullagine Gold project in the September quarter 2015; improved operational efficiency and the commissioning of new capacity.

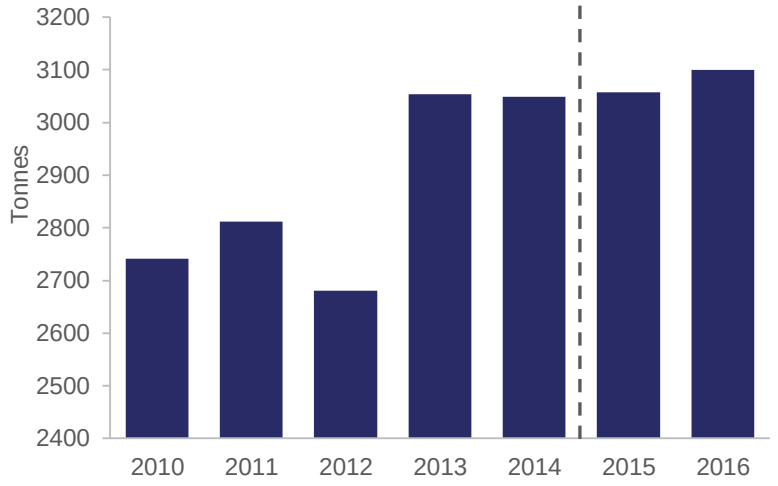
The forecast depreciation of the Australian dollar against the US dollar is expected to offset some of the effects of declining gold prices on Australian producers. As such planned projects are expected to proceed. These include Stage 1 of Saracen Minerals' Thunderbox project (3.7 tonnes a year) and Doray Minerals' Deflector project (4.4 tonnes a year).

Figure 9.2: Gold Jewelry purchases



Source: World Gold Council.

Figure 9.3: World gold production

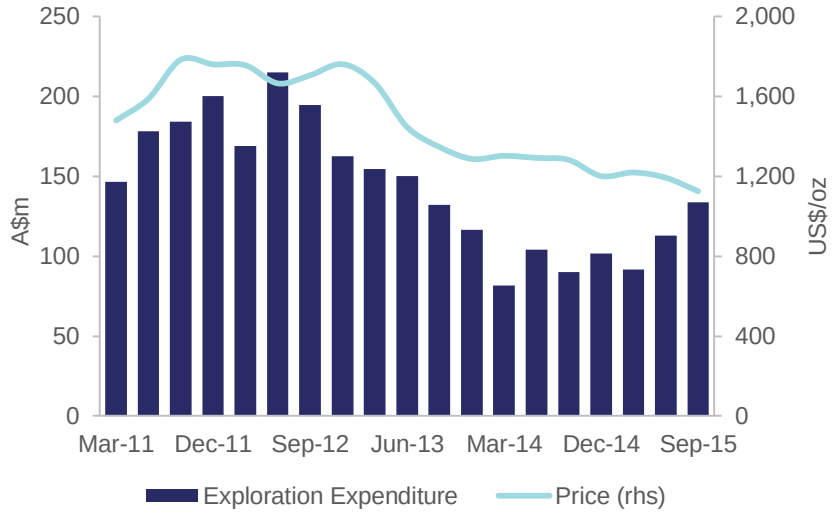


Source: World Gold Council.

Exports

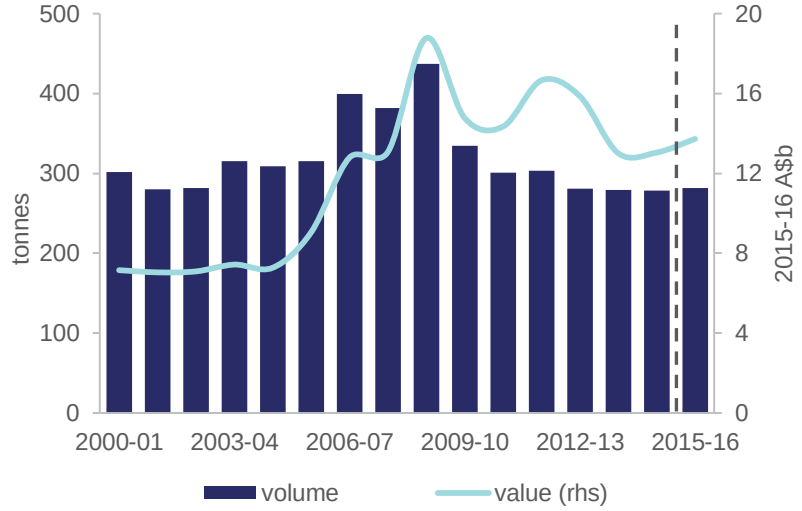
In 2015-16 Australia's gold exports are forecast to increase 1.2 per cent to 282 tonnes, reflecting higher production. Gold export values are forecast to increase 5 per cent to $13.8 billion, supported by an assumed depreciation of the Australian dollar.

Figure 9.4: Australia's gold exploration



Sources: Bloomberg; ABS.

Figure 9.5: Australia's gold Exports



Sources: ABS; Department of Industry, Innovation and Science.

Table 9.1: Gold outlook

	unit	2014	2015 f	2016 f	% change
World					
Fabrication consumption b	t	2 808	2 738	2 761	0.8
Mine production	t	3 049	3 057	3 100	1.4
Price c					
– nominal	US$/oz	1 266	1 160	1 011	–12.8
– real d	US$/oz	1 295	1 160	989	–14.8
		2013–14	**2014–15**	**2015–16 f**	
Australia					
Mine production	t	274	275	282	2.6
Export volume	t	279	278	282	1.2
– nominal value	A$m	13 010	13 049	13 757	5.4
– real value e	A$m	13 645	13 380	13 757	2.8
Price					
– nominal	A$/oz	1 410	1 468	1 581	7.7
– real e	A$/oz	1 479	1 506	1 581	5.0

b Includes jewellery consumption and industrial applications. **c** London Bullion Market Association AM price. **d** In current calendar year US dollars. **e** In current financial year Australian dollars. **f** forecast.
Sources: ABS; London Bullion Market Association; World Gold Council; Department of Industry, Innovation and Science.

Aluminium

Thuong Nguyen

Excess aluminium capacity continued to put downward pressure on prices in 2015. Prices are not expected to recover in 2016 as continued additions to capacity, particularly in China, contribute to a build-up of stocks.

Prices

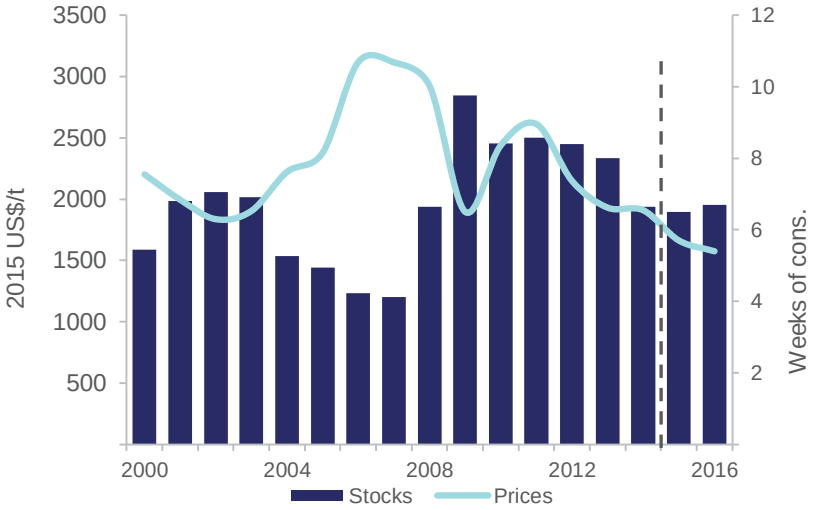
Aluminium spot prices are estimated to have decreased by more than 10 per cent to average US$1663 a tonne in 2015 as excess capacity and subdued global demand contributed to a build-up in stocks. Global aluminium stocks are estimated to have increased by 12 per cent in 2015 to 6.5 weeks of consumption.

The profitability of many smelters has been reduced at current prices, which may force the closure of some capacity in high-cost regions. However, this is expected to be more than offset by the addition of new low-cost capacity in China. The pace of new additions has been faster than expected and is unlikely to slow in 2016 with substantial new capacity planned. As a result, the aluminium price is forecast to average US$1575 a tonne in 2016, a decrease of 5 per cent relative to 2015. However, the price decline is expected to be less than in 2015, as demand is forecast to be supported by increased use of aluminium in automobile manufacturing to reduce vehicle weights and meet fuel-efficiency requirements.

World consumption

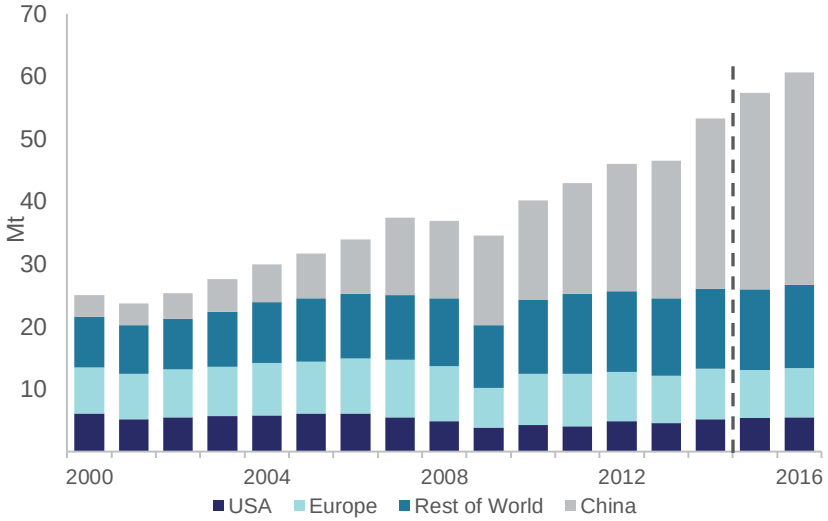
World aluminium consumption is estimated to have grown by 8 per cent in 2015 to 57.4 million tonnes, supported by strong consumption growth in emerging economies, particularly China, and a recovery in the US automotive sector.

Figure 10.1: Annual aluminium prices and stocks



Sources: Bloomberg; Department of Industry, Innovation and Science.

Figure 10.2: World aluminium consumption



Source: WBMS; Department of Industry, Innovation and Science.

China's aluminium consumption is estimated to have increased by 15 per cent to 31.4 million tonnes in 2015. The rise was lower than in 2014 as manufacturing output eased in response to slower economic activity. In 2016 China's consumption growth is forecast to increase by 8 per cent to 33.9 million tonnes as government infrastructure spending and power-grid construction offset the effect of weakness in the residential and manufacturing sectors.

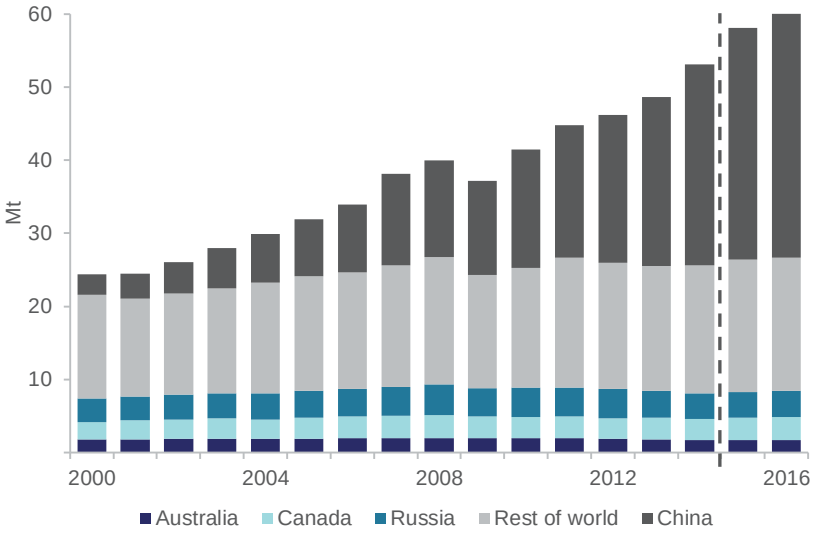
In 2015 India's aluminium consumption is estimated to have contracted by 6 per cent to 1.43 million tonnes. The Indian Government is investing in developing its electricity network to improve reliability and electricity access. In addition, the 'Make in India' initiative plans to turn India into a manufacturing hub. Both these programs are expected to provide support to India's aluminium consumption from 2016. As a result, India's consumption is forecast to increase by 8 per cent in 2016 to 1.54 million tonnes.

The US Corporate Average Fuel Economy Standards (CAFE) for vehicles has encouraged increased use of aluminium in vehicles to reduce weight and meet energy-efficiency requirements. Vehicle frames are the fastest growing application for aluminium auto sheets and aluminium alloys have also been used to produce lighter and more fuel-efficient vehicles. Reflecting the expected resurgence in US automotive production, aluminium consumption in the US is estimated to increase by 3.2 per cent in 2015 to 5.4 million tonnes and forecast to increase by a further 2 per cent in 2016 to 5.5 million tonnes.

World production

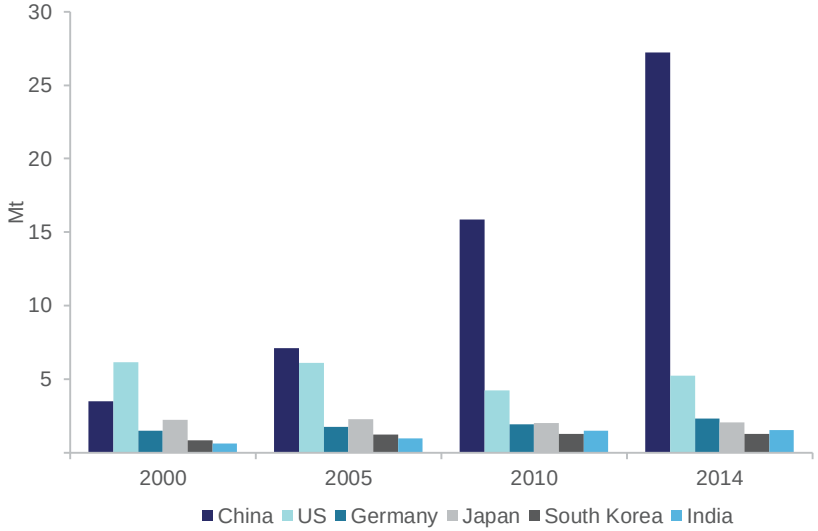
World aluminium production is estimated to have increased by 9 per cent in 2015 to 58.1 million tonnes, driven by increased production from new capacity in China. It is estimated that China commissioned 3.9 million tonnes of capacity during 2015. Half of this capacity was developed in north-western provinces such as Xinjiang and Inner Mongolia, where captive power plants enable access to low-cost electricity.

Figure 10.3: World aluminium production



Source: WBMS; Department of Industry, Innovation and Science

Figure 10.4: Key aluminium consumers



Source: WBMS.

In 2016 world aluminium production is forecast to increase by a further 5 per cent to 61.3 million tonnes. China is expected to continue to add to its capacity.

As part of measures to curb oversupply in key industries, China's Ministry of Industry and Information Technology released a list of companies that comply with national standards on production, environmental protection, energy efficiency and safety. Those not on the list are to be closed. Major aluminium producers such as Chalco, China Hongqiao, Xinfa and East Hope are among the largest producers on the qualified list.

Australia's production and exports

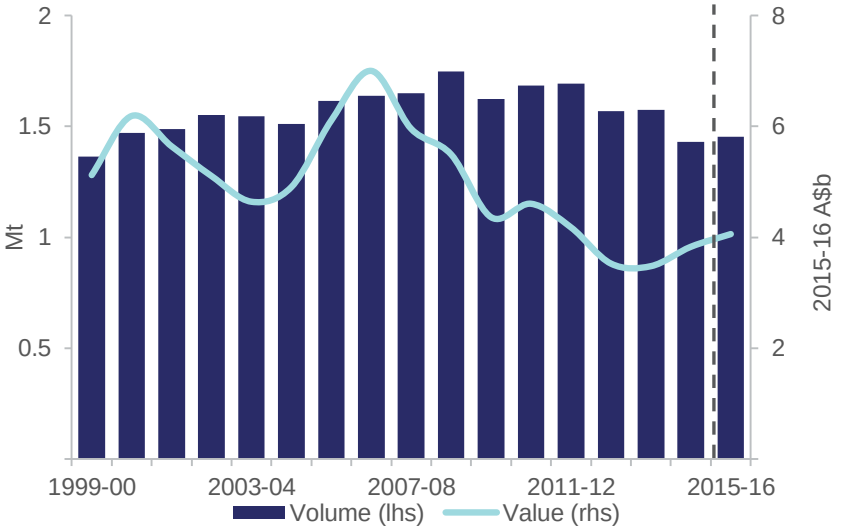
In 2015-16, Australia's aluminium production is forecast to remain steady at 1.6 million tonnes. Export volume and earnings are forecast to increase by 1.2 per cent and 5 per cent respectively, exporting 1.5 million tonnes and earning more than $4 billion, driven by the assumed depreciation of the Australian dollar.

Alumina

Prices

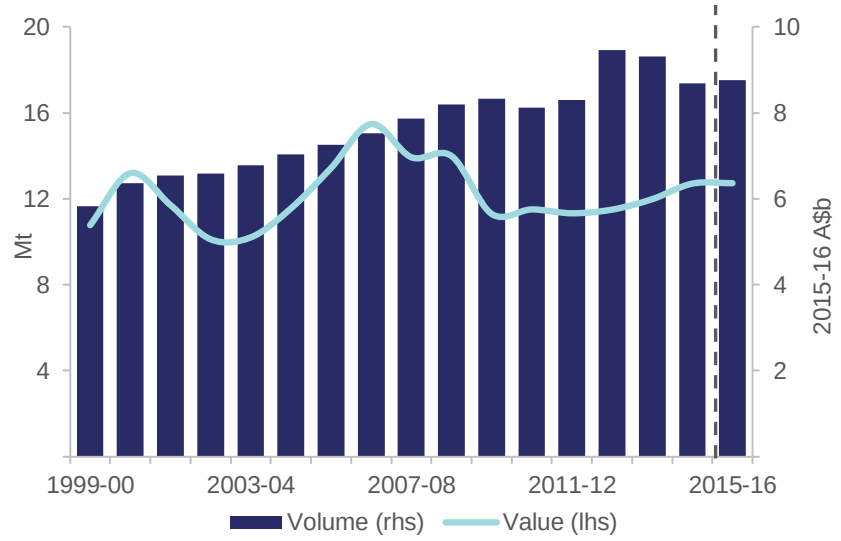
In 2015 alumina prices are estimated to have decreased by around 8 per cent to average US$305 a tonne (FOB), driven by weaker demand growth and a slow supply response. In 2016, prices are forecast to decline by 18 per cent to average US$251 a tonne, underpinned by higher domestic output in China. China's alumina production for the first nine months of 2015 increased 11 per cent to 42.6 million tonnes, and is forecast to continue to increase as new capacity is commissioned and suspended plants resume operation.

Figure 10.5: Australia's aluminium exports



Source: ABS; Department of Industry, Innovation and Science

Figure 10.6: Australia's alumina exports



Source: ABS; Department of Industry, Innovation and Science

Australia's production and exports

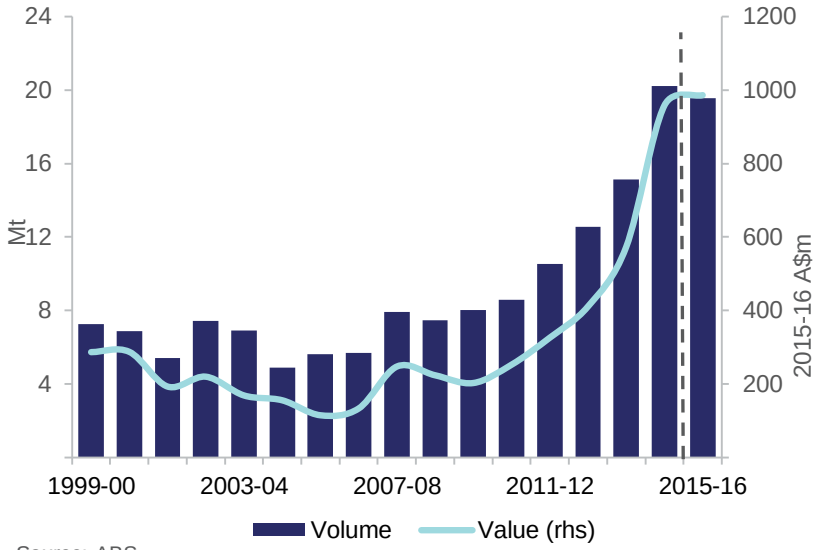
While Australia's alumina refineries face intense pressure from lower prices and excess capacity, alumina production is forecast to increase slightly in 2015-16 to 20.2 million tonnes, driven by higher production at Rio Tinto's Queensland Alumina and Yarwun refineries and refinery efficiency improvements. Alumina export volumes and values for 2015-16 are forecast to remain at the same levels as 2014-15, exporting more than 17 million tonnes and earning $6.4 billion, supported by a weaker Australian dollar.

Bauxite

Australia's bauxite production is forecast to increase by 1 per cent in 2015-16 to 81 million tonnes, driven by higher output at Rio Tinto's Weipa and Gove mines. Following the Indonesian export ban in early 2014, Australia's bauxite producers have stepped up production for export markets to China. Prior to the ban, Indonesia supplied 68 per cent of China's bauxite imports. Moreover the depreciation of the Australian dollar has provided a stimulus for increased production.

Despite facing strong competition from Malaysia and higher domestic production in China, Australia's bauxite exports to China increased 33 per cent in 2014-15 to 20.2 million tonnes. Export earnings rose 71 per cent to $934 million. China's smelters have responded to Indonesia's ban on bauxite exports by building refineries overseas. Plants in Indonesia and Guinea are expected to ship output to China before the end of 2015. Despite this, Australia's exports are forecast to be lower in 2015-16, down by around 1.2 per cent to 20 million tonnes. However, earnings from these exports are forecast to increase 8 per cent to $1 billion, resulting from the depreciation of the Australian dollar.

Figure 10.7: Australia's bauxite exports



Source: ABS.

Table 10.1: Aluminium, alumina and bauxite outlook

	unit	2014	2015	2016 f	% change
World					
Primary aluminium					
Production	kt	53 167	58 133	61 270	5.4
Consumption	kt	53 289	57 367	60 615	5.7
Closing stocks b	kt	6 428	7 194	7 848	9.1
– weeks of consumption		6.3	6.5	6.7	3.3
Prices					
World aluminium c					
– nominal	US$/t	1 866	1 663	1 575	-5.3
– real d	US$/t	1 909	1 663	1 540	-7.4
Alumina spot					
– nominal	US$/t	331	305	251	-17.7
– real d	US$/t	338	305	245	-19.6
		2013–14	**2014–15**	**2015–16 f**	
Australia					
Production					
Primary aluminium	kt	1 773	1 647	1 647	0.0
Alumina	kt	21 532	19 895	20 152	1.3
Bauxite	Mt	80	80	81	0.9
Consumption					
Primary aluminium	kt	197	214	192	-10.4
Exports					
Primary aluminium	kt	1 576	1 432	1 455	1.6
– nominal value	A$m	3 479	3 829	4 058	6.0
– real value e	A$m	3 649	3 926	4 058	3.4
Alumina	kt	18 614	17 363	17 514	0.9
– nominal value	A$m	5 711	6 353	6 362	0.1
– real value e	A$m	5 990	6 514	6 362	-2.3
Bauxite	kt	15 146	20 204	19 964	-1.2
– nominal value	A$m	546	934	1 007	7.8
– real value e	A$m	573	958	1 007	5.2
Total value					
– nominal	A$m	9 737	11 115	11 427	2.8
– real e	A$m	10 212	11 397	11 427	0.3

b Producer and LME stocks. **c** LME cash prices for primary aluminium. **d** In current calendar year US dollars. **e** In current financial year Australian dollars. **f** forecast.
Sources: ABS; LME; World Bureau of Metal Statistics; Department of Industry, Innovation and Science.

Copper

Kate Penney

Moderating consumption growth, particularly in China, and a slow supply response to lower prices is expected contribute to higher stocks and put downward pressure on copper prices in 2016.

Prices

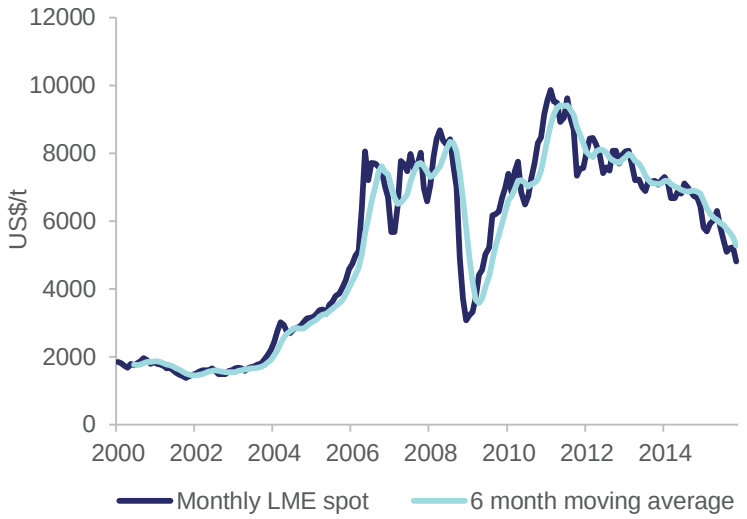
In 2015 the LME copper price is estimated to average around US$5680 a tonne, 17 per cent lower than 2014. Despite supply disruptions in large copper producing regions such as Chile, growth in production outpaced growth in consumption and contributed to a build-up in stocks to an estimated 2.7 weeks of consumption at the end of 2015. Consumption growth in China, the world's largest copper consumer, is estimated to have declined for the first time since 2006 because of slower economic growth.

Average LME copper prices are forecast to decline by a further 16 per cent to US$4786 a tonne in 2016. A forecast continued moderation in China's consumption growth combined with a slow supply response to low prices at high cost operations is expected to result in a further increase in stocks to 2.9 weeks of consumption. However, there remains an ongoing risk of supply disruptions such as labour disputes and natural disasters in key producing regions.

Consumption

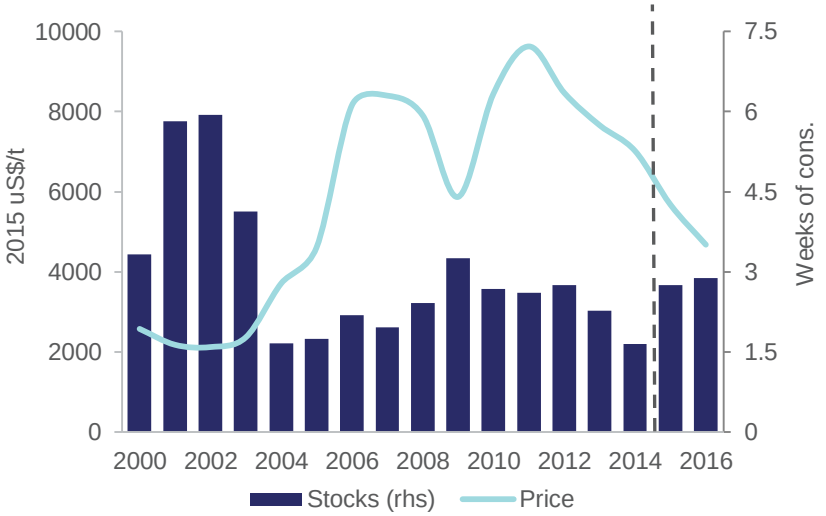
World copper consumption is estimated to have decreased by around 2 per cent to 22.4 million tonnes in 2015. Slowing economic activity in China contributed to an estimated 3 per cent contraction in China's copper consumption. Consumption in more developed markets across Europe was also lower, consistent with more subdued economic conditions.

Figure 11.1: Monthly LME copper price



Sources: LME; Bloomberg.

Figure 11.2: Annual copper prices and stocks



Sources: Bloomberg; Department of Industry, Innovation and Science.

In 2016, world copper consumption is forecast to increase by 3.5 per cent to 23.4 million tonnes. This will be underpinned by growth in copper use in emerging economies, particularly India. The Indian Government is investing extensively in its electricity network as part of its plans to ensure universal electricity access and reliable supply within the next five years. Moderating economic growth in China is expected to continue to weigh on its copper consumption. However, plans to invest in electricity networks announced by the National Energy Administration during 2015 will provide some support to growth in China's copper use in 2016.

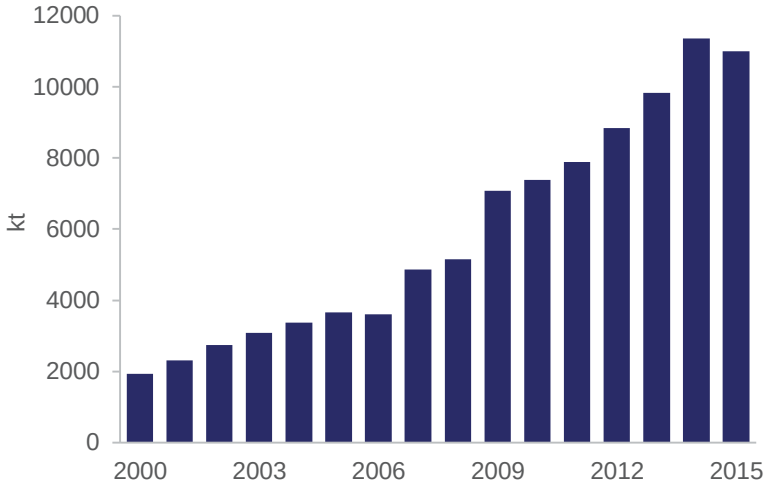
Production

Mined

World copper mine production is estimated to have been 18.9 million tonnes in 2015, 2 per cent higher than 2014. The rise in production was underpinned by higher output at large operations including BHP Billiton's and Rio Tinto's Escondida mine. Although prices have declined, cuts to supply capacity have been limited to date. The slow supply response reflects cost cutting efforts and the depreciation in the currencies of major producing countries relative to the US dollar, which have both reduced the effect of lower prices on profitability.

In 2016 copper mine production is forecast to increase by a further 2.6 per cent to 19.4 million tonnes, supported by the commissioning of MMG Limited's Las Bambas mine in Peru (capacity of 250 thousand tonnes a year). Further capacity additions are expected from the Bozshakol mine in Kazakhstan (115 thousand tonnes a year) and the Sierra Gorda mine in Chile (119 thousand tonnes). Although the development of new mines will underpin growth in mined copper output, continued disruptions may prevent world supply reaching full capacity.

Figure 11.3: China's copper consumption



Source: World Bureau of Metal Statistics.

Refined production

In 2015 world refined copper production is estimated to have declined slightly to 22.8 million tonnes. Despite higher treatment and refining charges that increased the profitability of refiners, production was relatively flat across most regions.

World refined copper production is forecast to increase by 2 per cent to 23.2 million tonnes in 2016. China and India are forecast to be the main drivers of higher refined copper production, but at lower growth rates. Ten smelters in China have announced plans to cut production in 2016 in response to lower prices.

Australia's production and exports

Exploration

Australia's copper exploration expenditure in the September quarter 2015 was $30.2 million. This was 7 per cent higher relative to the June quarter, but down 32 per cent compared with the September quarter 2014.

Mined

Australia's copper mine production is forecast to increase by 3 per cent to around 980 thousand tonnes in 2015-16. This is largely attributable to forecast increased production at BHP Billiton's Olympic Dam. Production at the mine in 2014-15 was adversely affected by an electrical failure that forced the closure of a processing mill for six months. Small productivity gains are expected at several other operations.

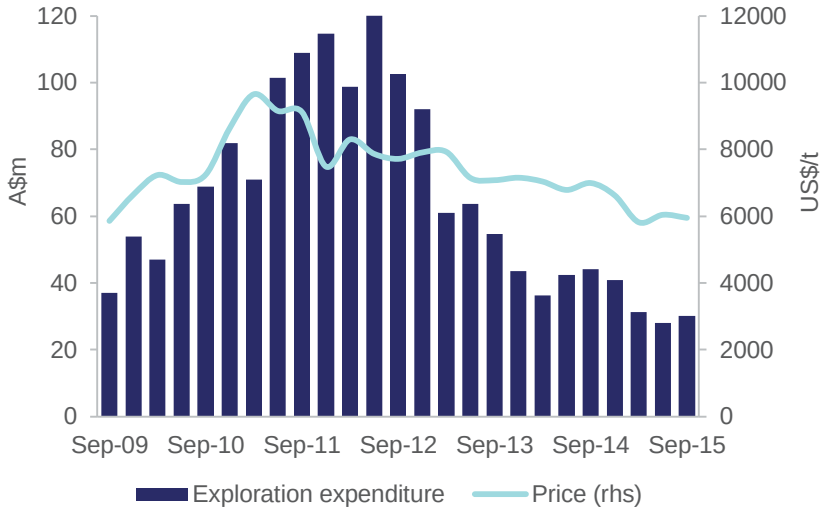
Refined

Australia's production of refined copper is forecast to increase by 10 per cent to 502 thousand tonnes, largely supported by higher output at Olympic Dam as the resumption of mining activity increases feedstock availability.

Exports

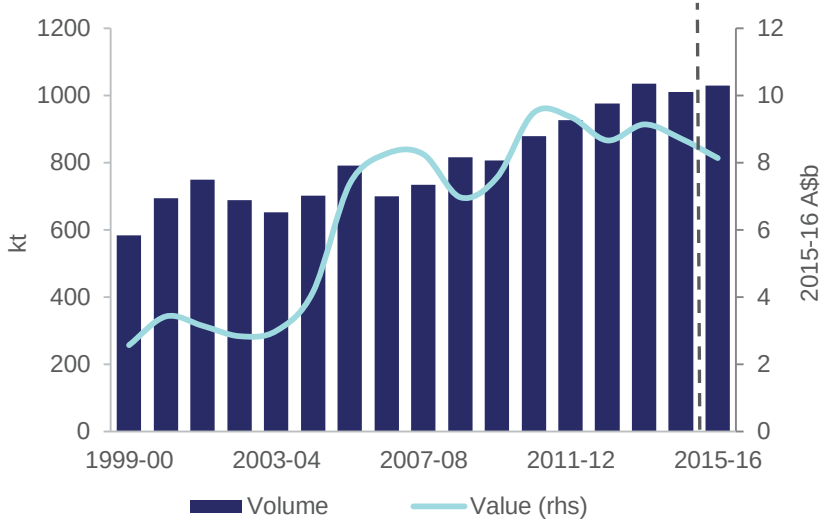
In 2015-16, Australia's exports of copper (total metal content) are forecast to increase by 3 per cent to 1.04 million tonnes, underpinned by increased production. The value of these exports is forecast to be $8.1 billion, 4 per cent lower than 2014-15 as forecast lower prices more than offset the effect of higher volumes and an assumed depreciation of the Australian dollar.

Figure 11.4: Australia's copper exploration



Sources: Bloomberg; Department of Industry, Innovation and Science.

Figure 11.5: Australia's copper exports



Sources: Bloomberg; Department of Industry, Innovation and Science.

Table 11.1: Copper outlook

	unit	2014	2015 f	2016 f	% change
World					
Production					
– mine	kt	18 484	18 920	19 405	2.6
– refined	kt	22 984	22 817	23 241	1.9
Consumption	kt	22 774	22 361	23 137	3.5
Closing stocks	kt	725	1 181	1 284	8.7
– weeks of consumption		1.7	2.7	2.9	5.1
Price LME					
– nominal	US$/t	6 861	5 678	4 786	–15.7
	USc/lb	311	258	217	–15.7
– real b	US$/t	7 018	5 678	4 679	–17.6
	USc/lb	318	258	212	–17.6
		2013–14	**2014–15**	**2015–16 f**	
Australia					
Mine output	kt	988	953	980	2.8
Refined output	kt	500	458	502	9.5
Exports					
– ores and conc. c	kt	2 122	2 059	1 995	–3.1
– refined	kt	456	423	463	9.6
Export value					
– nominal	A$m	8 707	8 493	8 129	–4.3
– real d	A$m	9 131	8 709	8 129	–6.7

b In current calendar year US dollars. **c** Quantities refer to gross weight of all ores and concentrates. **d** In current financial year Australian dollars. **f** forecast.
Sources: ABS; International Copper Study Group; LME; World Bureau of Metal Statistics; Department of Industry, Innovation and Science.

Nickel

Monica Philalay

Persistently high LME stocks, weak consumption growth and a relatively slow supply-side response to low prices contributed to a steady decline in nickel prices throughout 2015. The recent drawdown in stocks is expected to continue in 2016, and prices are forecast to stabilise and then recover to reflect the closure of high-cost capacity in response to historically low prices.

Nickel prices and stocks

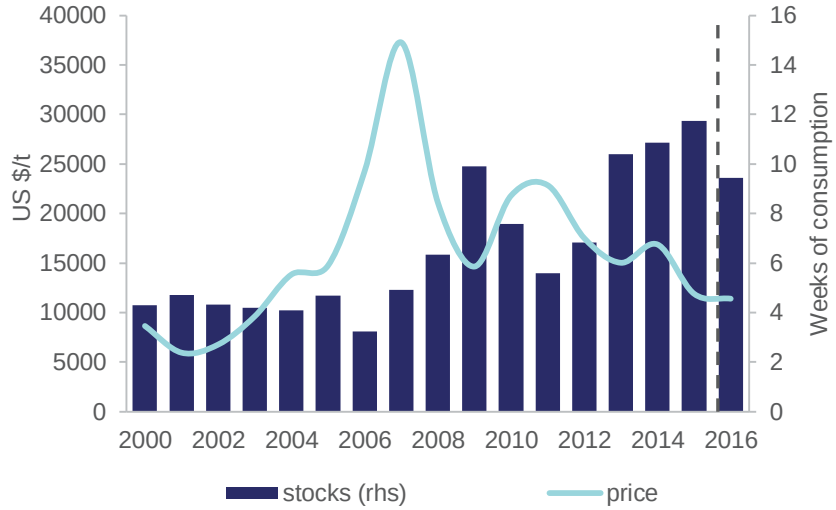
Nickel spot prices declined steadily throughout 2015, reaching a 12 year low of US$8160 in November, reflecting record high LME stocks and low consumption growth. For 2015 as a whole, the nickel price is estimated to have averaged US$11 894 a tonne, 30 per cent lower than 2014. LME stocks increased steadily in the first half of the year to a peak of 470 thousand tonnes (around 13 weeks consumption) in June, a 14 per cent increase from the start of the year. Towards the end of the year, supply growth slowed following a fall in China's nickel pig iron and ferronickel production. As a result, the first substantial decline in LME closing stocks since 2011 was observed from August to November. China's port stocks declined steadily throughout the year, down 28 per cent since the start of 2015.

In 2016, nickel prices are forecast to stabilise and recover, driven by modest growth in consumption and a draw down in stocks as producers reduce capacity in response to poor profitability. LME nickel spot prices are forecast to decrease 4 per cent to average US$11 400 a tonne in 2016.

Figure 12.1: Nickel daily price

Source: Bloomberg.

Figure 12.2: Annual nickel prices and stocks



Sources: LME; Department of Industry, Innovation and Science.

World consumption

In 2015, world nickel consumption is estimated to have increased 0.7 per cent to 1.89 million tonnes. The lower rate of growth in consumption compared with the last five years was driven by slower industrial activity in China. In 2016, consumption is forecast to grow 3 per cent to 1.95 million tonnes. Growth in stainless steel and nickel consumption is expected to be supported by increased infrastructure investment, and the production of automobiles and manufactured goods in China, India, and the US.

World Production

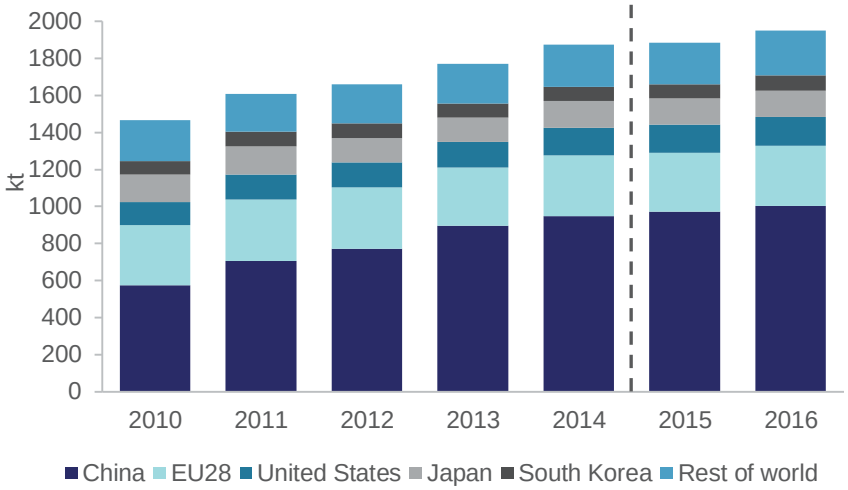
Mine production

In 2015, world mine production is estimated to have increased 2 per cent to 2.08 million tonnes, supported by growth in output in the Philippines and New Caledonia. In 2016, world mine production is forecast to increase 1 per cent to 2.1 million tonnes. Decreases in production from the closure of loss-making capacity are not expected to be offset by increases in production from the resumption of mining in Indonesia following the raw material export ban and higher output at existing mines in New Caledonia, Russia and the Philippines.

Refined production

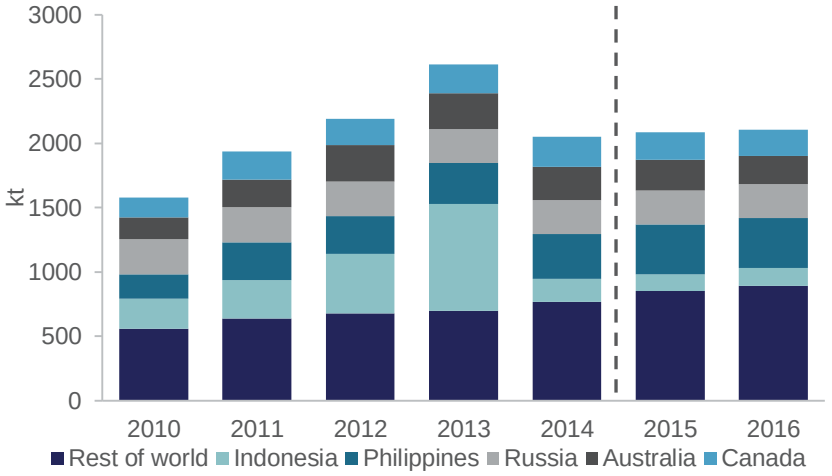
World refined nickel production is estimated to increase 0.6 per cent to 1.92 million tonnes in 2015. The increase in refined production was supported by growth in output in Indonesia, where first production from smelters developed in response to government policy to increase value-added activities was achieved. In 2016, production is forecast to decrease 2 per cent to 1.88 million tonnes. While refined production is expected to increase in Indonesia and New Caledonia, some high cost producers are forecast to reduce capacity in 2016 in response to low prices, particularly in China.

Figure 12.3 World nickel consumption



Sources: International Nickel Study Group; Department of Industry, Innovation and Science.

Figure 12.4 World nickel mine production



Sources: International Nickel Study Group; Department of Industry, Innovation and Science.

Australia

Exploration

Australia's expenditure on nickel and cobalt exploration in the September quarter declined 40 per cent year on year to $14.7 million, in response to low nickel prices and the subsequent drive to reduce costs. In 2014-15, Australia's nickel and cobalt exploration expenditure was $82.7 million, 17 per cent lower than 2013-14.

Mine production

In 2015-16, Australia's nickel mine production is forecast to decrease by 1 per cent to 219 thousand tonnes. The ramp up of production at Ravensthorpe towards capacity, after being cut in late 2014 following a chemical spill, is expected to be outweighed by falling output at existing mines, including at BHP's Nickel West, Panoramic's Lafranchi and Mincor's Mariners and Miitel operations, and price related delays to the resumption of production at Poseidon's mines at Lake Johnston, Black Swan and Windarra.

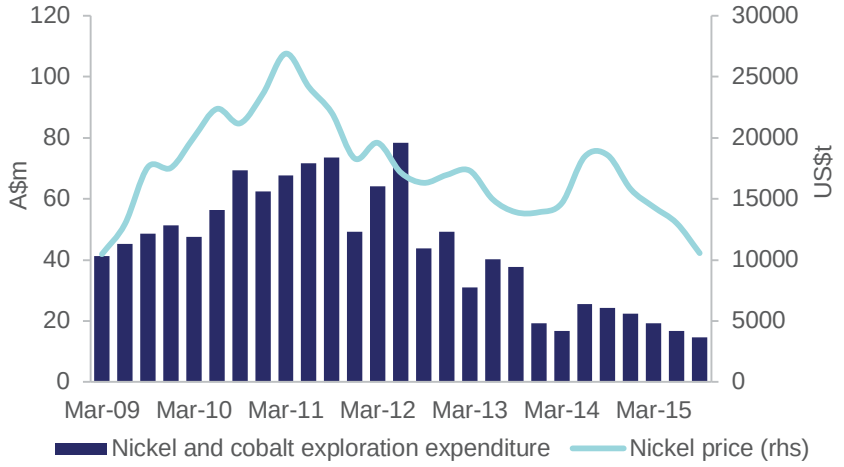
Refined production

Australia's refined production is forecast to decrease by 1 per cent in 2015-16 to 109 thousand tonnes, driven by falling production at Nickel West. Given the uncertainty around the future of Queensland Nickel due to financial difficulties, refined production in Australia could further decrease.

Exports

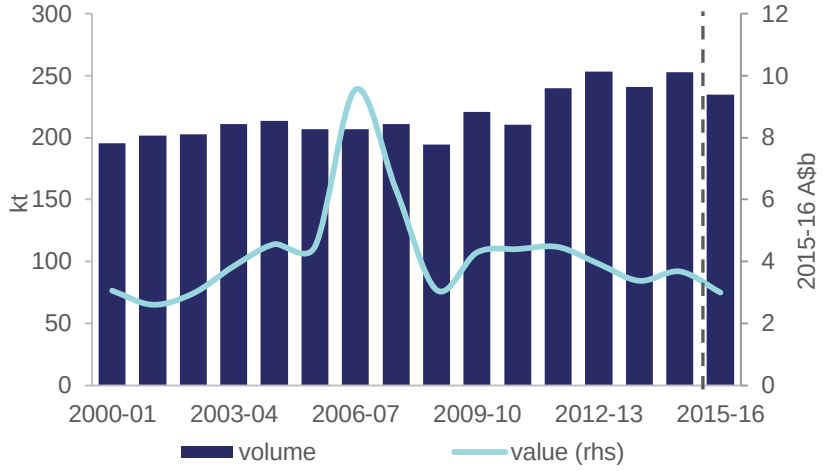
In 2015-16, Australia's nickel exports (by metal content) are forecast to decrease by 5 per cent to 239 thousand tonnes, driven by a decrease in production. Despite an assumed depreciation of the Australian dollar, export earnings are forecast to decrease by 6 per cent year on year to $3.4 billion, driven by a decrease in production and a lower forecast average price.

Figure 12.5: Australia's nickel and cobalt exploration



Sources: ABS; LME

Figure 12.6: Australia's nickel exports



Sources: ABS; LME; Department of Industry, Innovation and Science.

Table 12.1: Nickel outlook

	unit	2013	2014	2015 f	2016 f	% change
World						
Production						
– mine	kt	2 613	2 049	2 084	2 103	0.9
– refined	kt	1 941	1 910	1 921	1 878	–2.2
Consumption	kt	1 772	1 873	1 886	1 950	3.4
Stocks	kt	353	390	424	352	–17.0
– weeks of consumption		10.4	10.8	11.7	9.4	–19.7
Price LME						
– nominal	US$/t	15 025	16 872	11 896	11 400	–4.2
	Usc/lb	682	765	540	517	–4.2
– real b	US$/t	15 709	17 260	11 896	11 144	–6.3
	Usc/lb	713	783	540	505	–6.3
		2012–13	**2013–14**	**2014–15**	**2015–16 f**	
Australia						
Production						
– mine cs	kt	283	261	220	219	–0.8
– refined	kt	131	130	110	109	–0.9
– intermediate	kt	61	72	86	84	–2.2
Export volume ds	kt	253	241	253	239	–5.5
– nominal value s	A$m	3 642	3 216	3 583	3 354	–6.4
– real value es	A$m	3 919	3 373	3 674	3 354	–8.7

b In current calendar year US dollars. **c** Nickel content of domestic mine production. **d** Includes metal content of ores and concentrates, intermediate products and nickel metal. **e** In current financial year Australian dollars. **f** forecast. **s** estimate.
Sources: ABS; International Nickel Study Group; LME; World Bureau of Metal Statistics; Department of Industry, Innovation and Science.

Zinc

Monica Philalay

Despite a steady start to the year, zinc followed the bearish trends affecting other commodities in 2015, with prices decreasing steadily in the second half of the year in response to relatively high stocks and low consumption growth. Prices are forecast to recover in 2016, supported by a substantial reduction in production and growth in consumption.

Zinc prices and stocks

After remaining relatively steady at around US$2081 a tonne during the March quarter 2015, the LME zinc spot price increased to a high of US$2405 a tonne in May before commencing a relatively steady decline over the remainder of the year in response to slower consumption growth in China and a subsequent increase in stocks held at LME and SHFE warehouses. In October, the spot price increased 10 per cent overnight as the market reacted to news of Glencore plans to reduce concentrate production. However the downward trend in prices quickly resumed, reaching a six year low of US$1487 a tonne in November. For the year as a whole, the average zinc spot price is estimated to have decreased 11 per cent to US$1933 a tonne. At the end of 2015, world zinc stocks are estimated to decline by 15 per cent to 1.3 million tonnes, around 5 weeks of consumption.

In 2016, the average zinc spot price is forecast to decrease by 4 per cent to $US1865 a tonne. Prices are expected to stabilise and then recover, supported by tightening supply as several large producers reduce output in response to lower prices and some assets reach the end of their operating lives. World zinc stocks are forecast to decrease by 39 per cent in 2016 to 3 weeks of consumption.

Figure 13.1: Zinc daily price

Source: Bloomberg

Figure 13.2: Annual zinc prices and stocks

Sources: LME; Department of Industry, Innovation and Science.

World consumption

In 2015, world zinc consumption is estimated to be almost 14 million tonnes, 3 per cent higher than 2014. The lower rate of growth compared with the previous two years is largely due to weaker economic conditions affecting construction and automobile sales in China. In 2016, zinc consumption is forecast to increase 4 per cent to 14.5 million tonnes. The higher rate of consumption growth will be supported by a forecast increase in galvanised steel consumption in the automotive, manufacturing and construction sectors, underpinned by expanding middle classes in Asia and stronger economic conditions in the US and Europe.

World Production

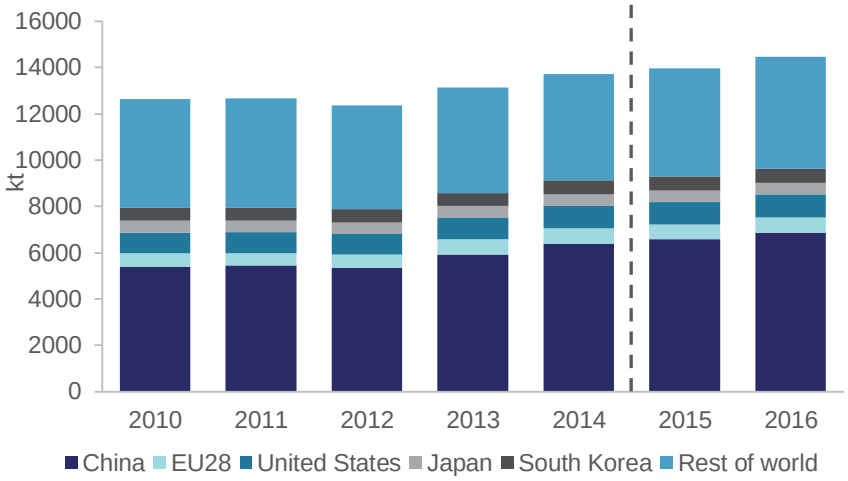
Mine production

World mine production is estimated to increase 1 per cent to 13.4 million tonnes in 2015. Higher production in India from Vedanta's operations and the expansion of Hindustan Zinc's Rampura Agucha mine more than offset by the closure of MMG's Century mine in Australia and Vedanta's Lisheen mine in Ireland. In 2016, world mine production is forecast to decrease 2 per cent to 13.1 million tonnes, driven largely by reductions in production at Glencore's operations in Australia, South America and Kazakhstan and Nyrstar's US operations due to low prices.

Refined production

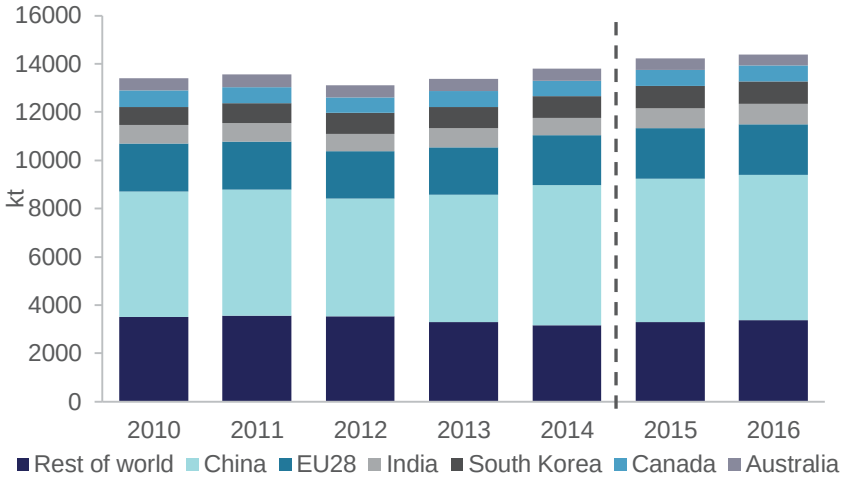
In 2015, world refined production is estimated to have increased 3 per cent to almost 13.7 million tonnes, supported by increases in production from China, India, Canada and South Korea. In 2016, production is forecast to increase 1.5 per cent to 13.9 million tonnes, driven by reductions in production from China's major zinc smelters, in response to low prices and oversupply from the industry.

Figure 13.3 World zinc consumption



Sources: International Lead and Zinc Study Group; Department of Industry, Innovation and Science.

Figure 13.4 World refined zinc production



Sources: International Lead and Zinc Study Group; Department of Industry, Innovation and Science.

Australia's production and exports

Exploration

Unlike other commodities, Australia's zinc exploration expenditure has increased driven by expectations of higher prices. Expenditure on silver, lead and zinc exploration increased 24 per cent in the September quarter, relative to the June quarter, to $16.4 million. In 2014-15, expenditure was $52 million, 13 per cent higher than 2013-14.

Mine production

In 2015-16, Australia's zinc mine production is forecast to decrease 43 per cent to 965 thousand tonnes (metal content). The substantial reduction in production is primarily driven by the suspension of operations at Glencore's Lady Loretta mine and reductions in production at the George Fisher and McArthur River operations, commencing in the December quarter of 2015. In addition, final processing of ores at MMG's Century mine is also scheduled for the December quarter of 2015.

Refined production

Australia's refined zinc production is forecast to decrease by 1.4 per cent to 478 thousand tonnes. Production at Nystar's Port Pirie smelter is expected to recommence following the completion of redevelopment activities in the second half of 2016.

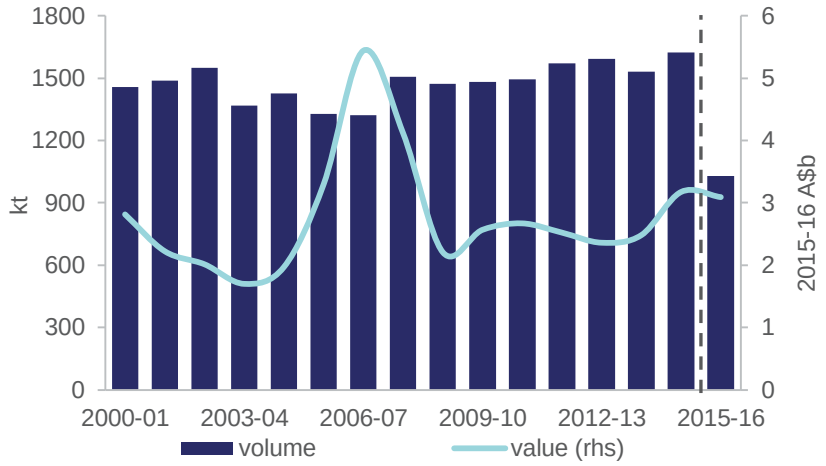
Exports

Australia's zinc exports (total metal content) are forecast to decrease by 36 per cent to 1.02 million tonnes in 2015-16, driven by a substantial reduction in Australia's production. Zinc export earnings are forecast to remain steady at $3.1 billion.

Figure 13.5: Australia's zinc exploration expenditure

Sources: ABS; LME.

Figure 13.6: Volume and value of Australia's zinc exports



Sources: ABS; Department of Industry, Innovation and Science.

Table 13.1: Zinc outlook

	unit	2014	2015 f	2016 f	% change
World					
Production					
– mine	kt	13 319	13 373	13 084	–2.2
– refined	kt	13 303	13 746	13 946	1.5
Consumption	kt	13 519	13 979	14 472	3.5
Closing stocks	kt	1 570	1 337	811	–39.3
– weeks of consumption		6.0	5.0	2.9	–41.4
Price					
– nominal	US$/t	2 159	1 933	1 865	–3.5
	USc/lb	98	88	85	–3.5
– real b	US$/t	2 209	1 933	1 823	–5.7
	USc/lb	100	88	83	–5.7
		2013–14	**2014–15**	**2015–16 f**	
Australia					
Mine output	kt	1 499	1 691	965	–43.0
Refined output	kt	492	485	478	–1.4
Export volume					
– ore and conc. c	kt	2 329	2 933	1 329	–54.7
– refined	kt	438	329	407	23.9
– total metallic content	kt	1 532	1 609	1 023	–36.4
Export value					
– nominal	A$m	2 366	3 081	3 091	0.4
– real d	A$m	2 482	3 159	3 091	–2.1

b In current calendar year US dollars. **c** Quantities refer to gross weight of all ores and concentrates. **d** In current financial year Australian dollars. **f** forecast.
Sources: ABS; International Lead Zinc Study group; Department of Industry, Innovation and Science.

Trade Summary Charts and Tables

Figure 13.1: Contribution to GDP, 2014-15 dollars

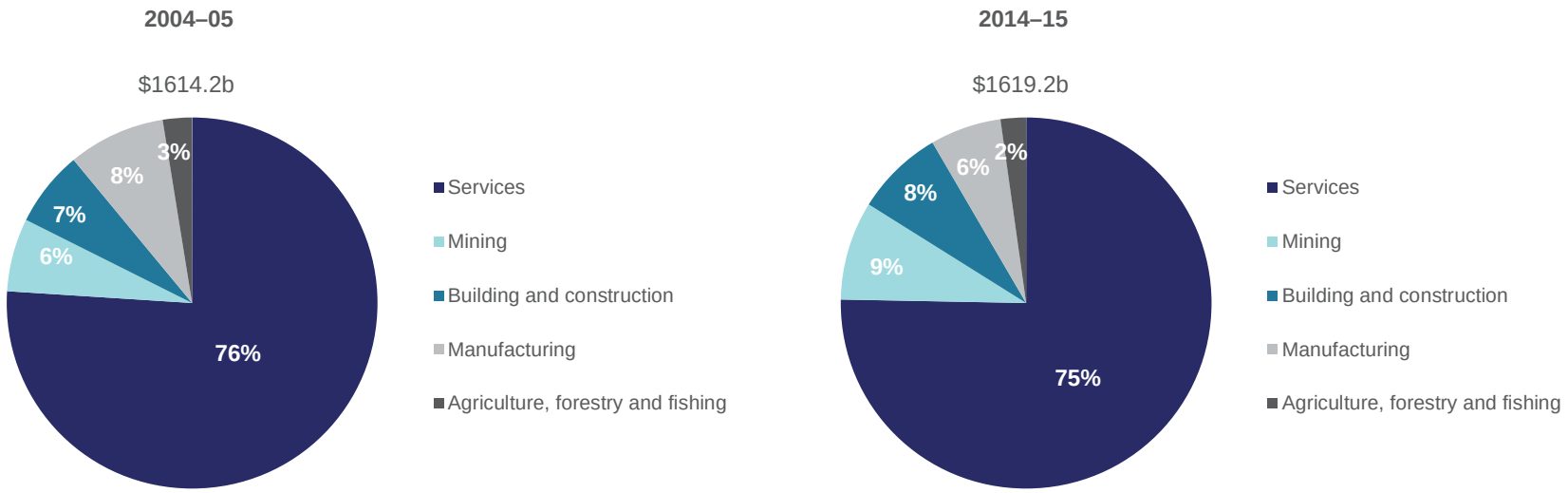


Figure 13.2: Principal markets for Australia's total imports
2014-15 dollars

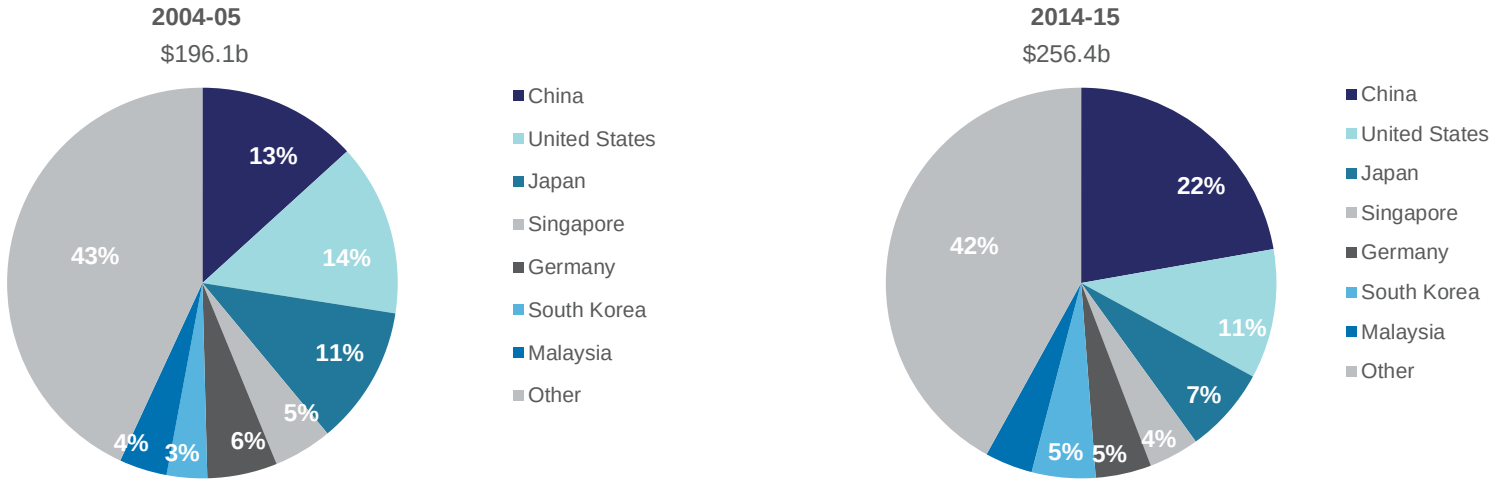


Figure 13.3: Principal markets for Australia's resources and energy imports, 2014-15 dollars

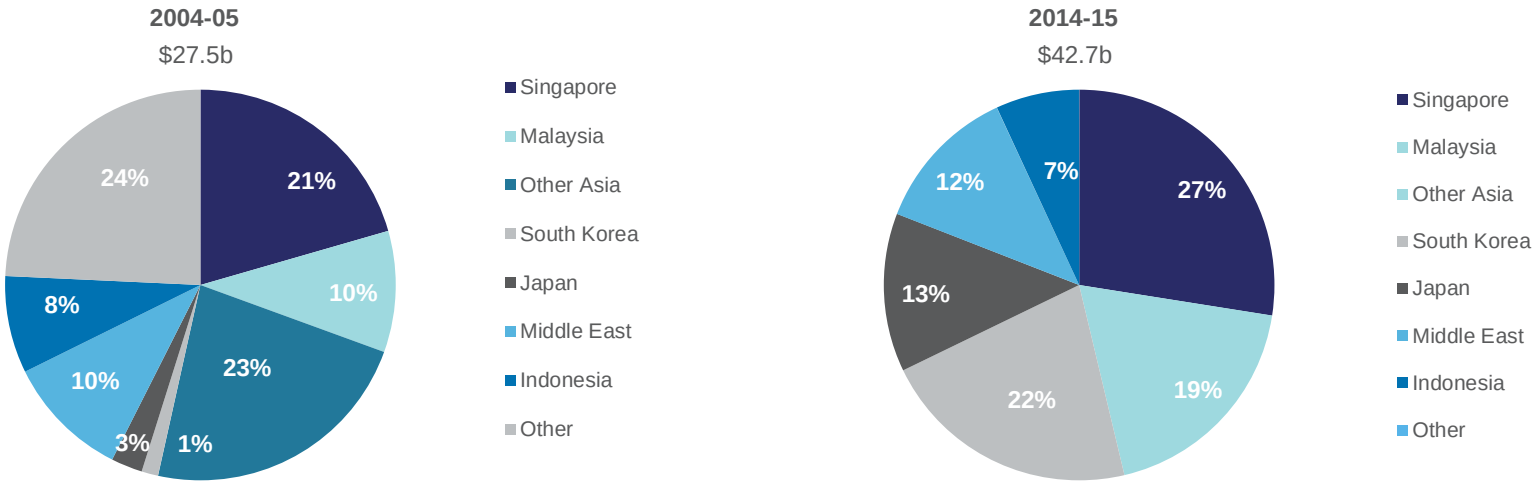


Figure 13.4: Principal markets for Australia's total exports 2014-15 dollars

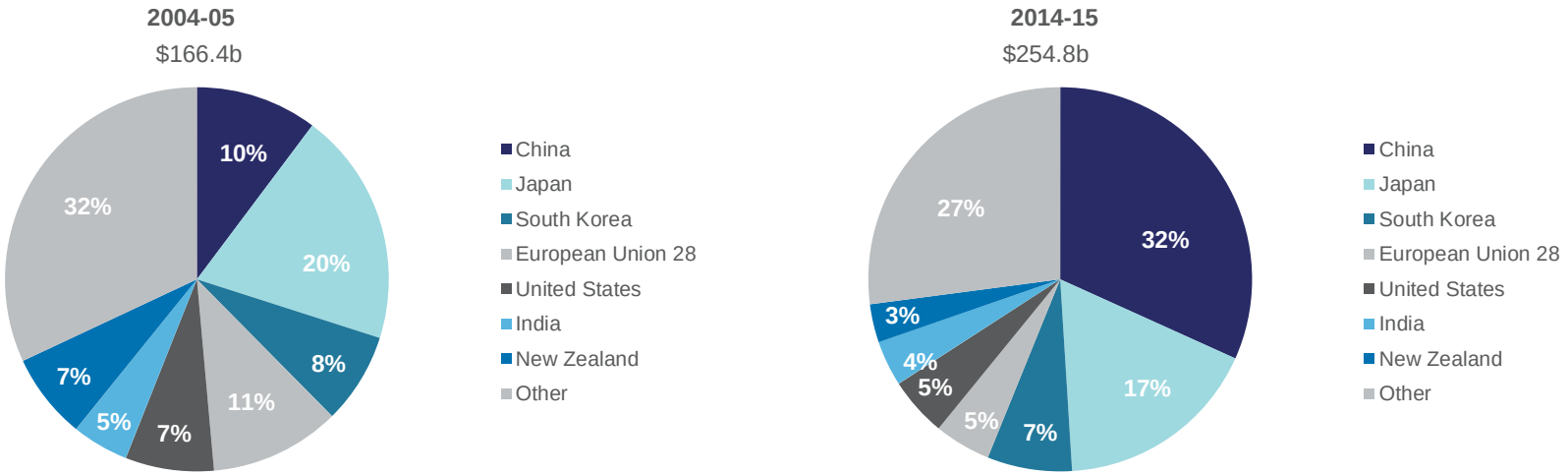


Figure 13.5: Principal markets for Australia's resources exports, 2014-15 dollars

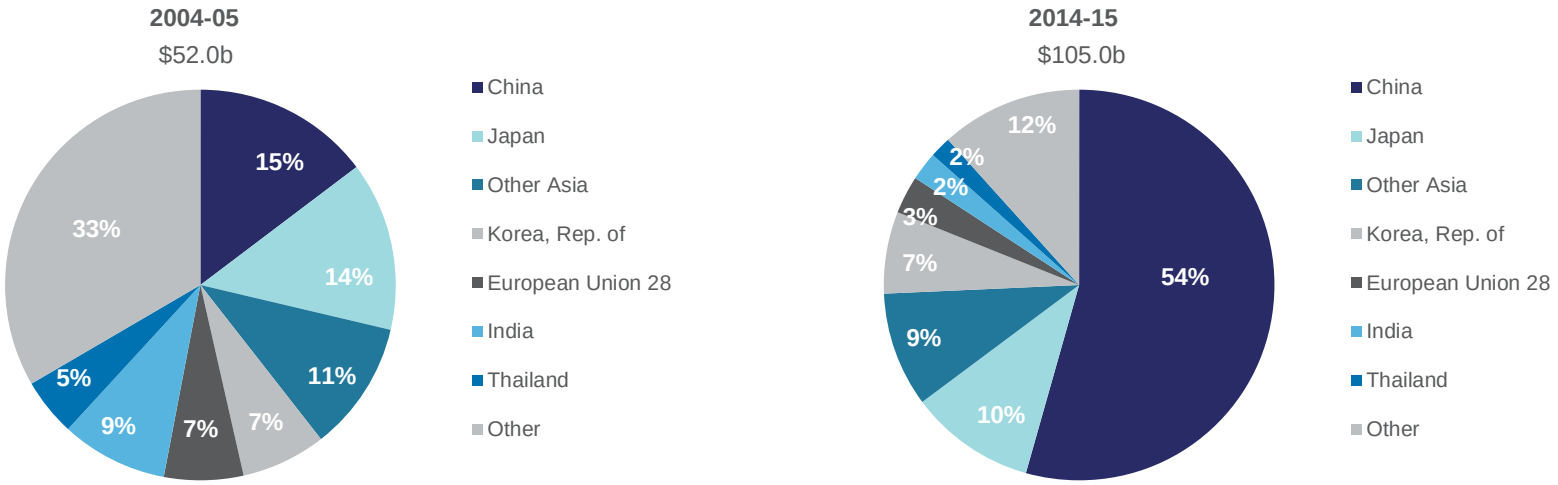


Figure 13.6: Principal markets for Australia's energy exports, 2013-14 dollars

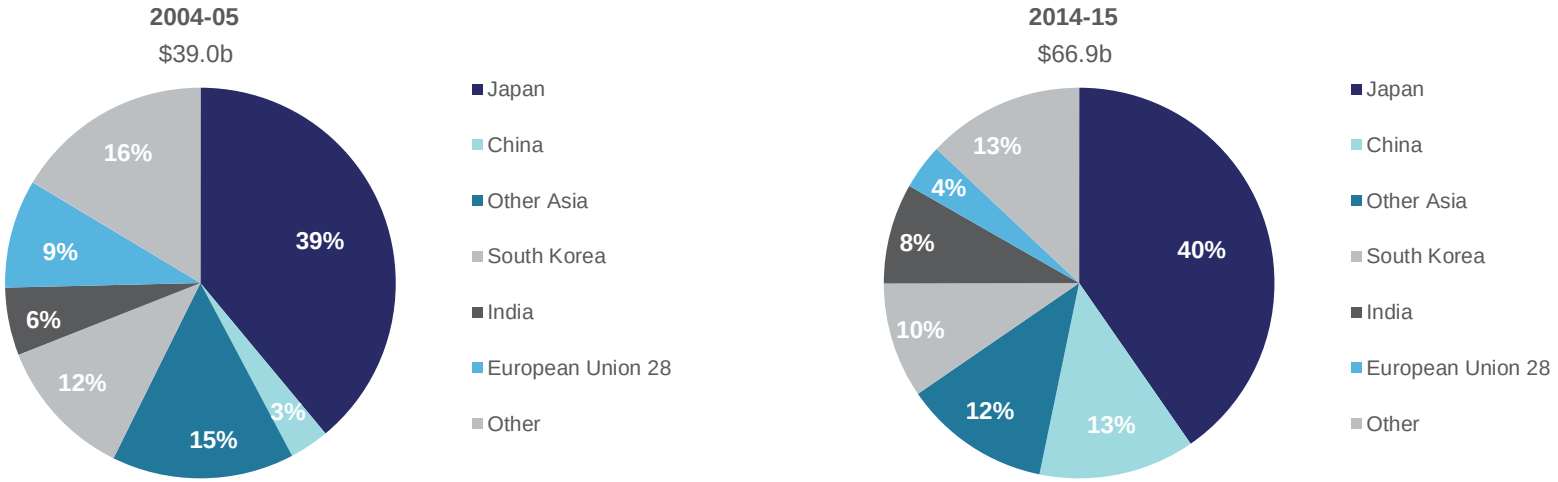
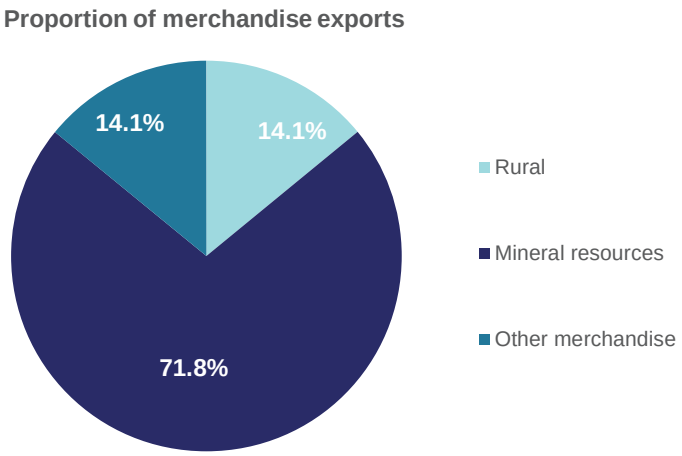


Figure 13.7: Contribution to exports by sector, 2011-12



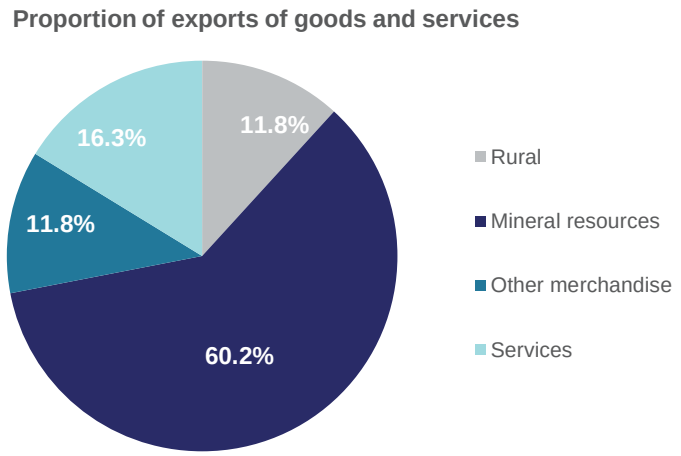
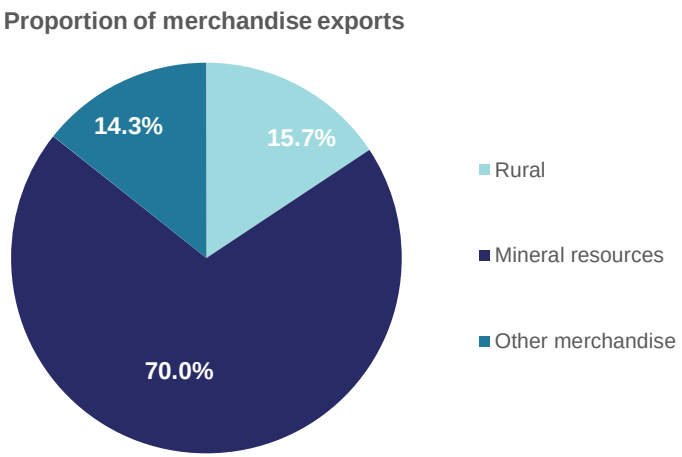


Figure 13.8: Contribution to exports by sector, 2012-13



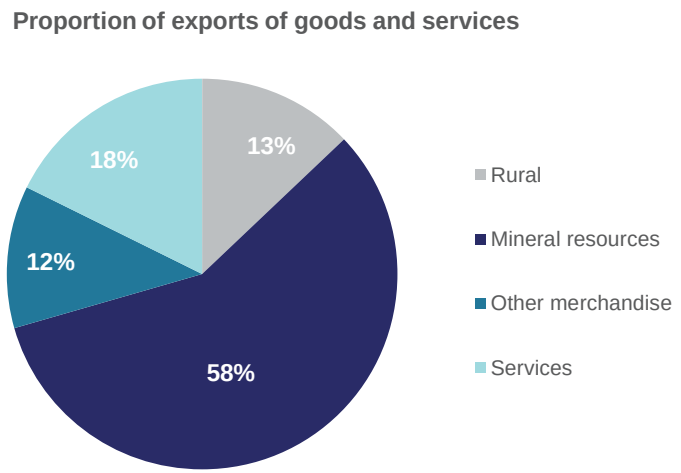
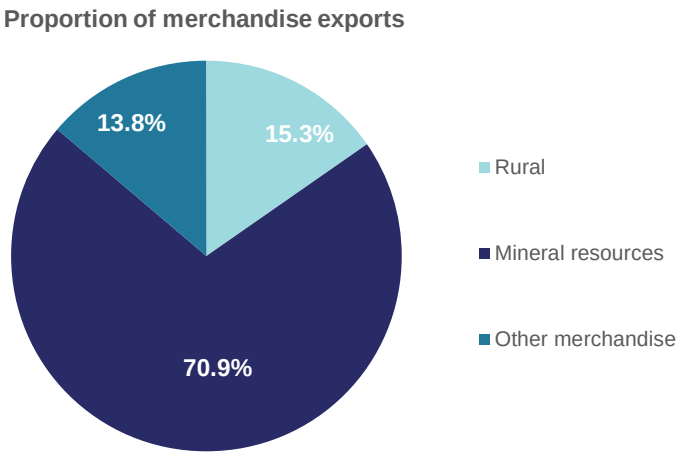


Figure 13.9: Contribution to exports by sector, 2013-14



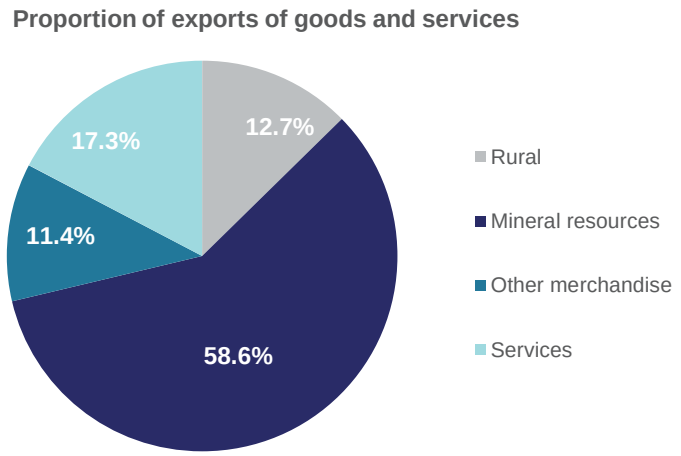
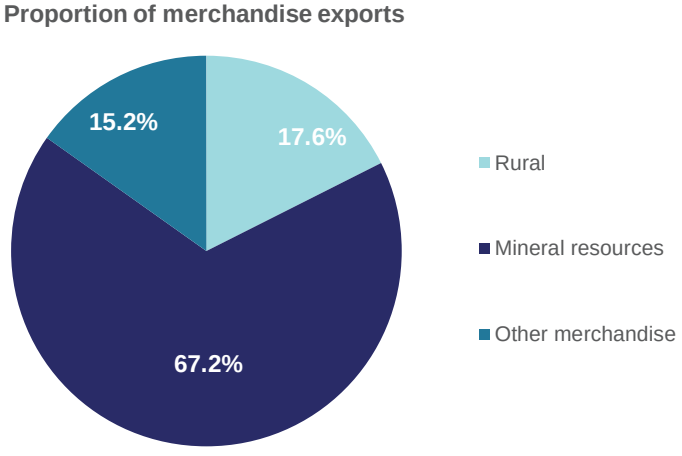
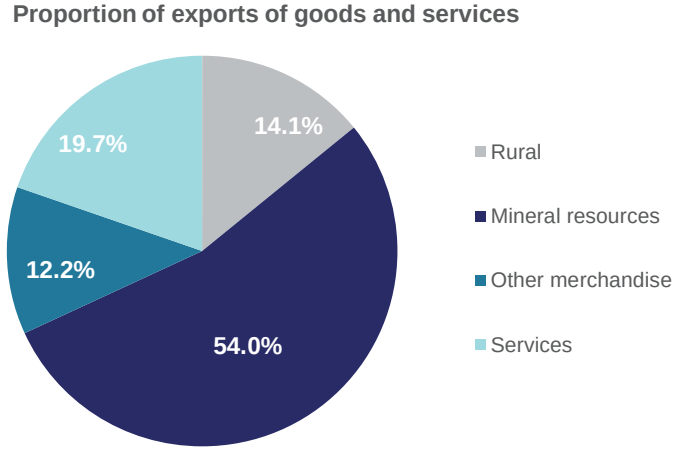


Figure 13.10: Contribution to exports by sector, 2014-15





Principal markets for Australia's thermal coal exports, 2014-15 dollars

		2010-11	2011-12	2012-13	2013-14	2014-15
Japan	A$m	7 574	8 816	8 115	7 845	7 100
China	A$m	1 741	2 916	2 999	3 533	2 737
South Korea	A$m	2 809	3 134	2 838	2 822	2 657
Chinese Taipei	A$m	2 008	1 950	1 746	1 689	1 768
Malaysia	A$m	346	382	285	352	584
Thailand	A$m	207	183	248	295	273
Total	A$m	15 321	18 370	16 966	17 087	16 057

Principal markets for Australia's metallurgical coal exports, 2014-15 dollars

		2010-11	2011-12	2012-13	2013-14	2014-15
China	A$m	3 090	3 845	4 832	5 990	4 774
Japan	A$m	9 384	9 466	6 249	5 625	4 614
India	A$m	7 771	6 934	4 813	4 921	5 016
South Korea	A$m	4 101	4 111	2 549	2 514	2 381
Chinese Taipei	A$m	1 853	1 972	1 211	1 191	1 142
Netherlands	A$m	1 045	1 360	1 020	1 027	832
Total	A$m	32 707	32 945	23 539	23 785	21 847

Principal markets for Australia's oil and gas exports, 2014-15 dollars

		2010-11	2011-12	2012-13	2013-14	2014-15
Japan	A$m	11 569	13 840	15 141	16 271	15 391
China	A$m	3 275	3 896	2 844	1 853	1 980
South Korea	A$m	2 880	1 870	2 276	1 422	1 857
Singapore	A$m	2 063	2 928	2 823	2 350	2 153
Thailand	A$m	1 926	1 048	863	1 679	1 267
India	A$m	1 010	317	185	256	194
Total	A$m	25 966	27 635	27 764	29 895	26 894

Principal markets for Australia's gold exports, 2014-15 dollars

		2010-11	2011-12	2012-13	2013-14	2014-15
China	A$m	694	4 574	6 280	8 269	6 954
Singapore	A$m	1 224	1 204	991	2 325	3 114
United Kingdom	A$m	3 843	4 853	2 745	655	583
Turkey	A$m	0	69	490	550	157
Thailand	A$m	2 598	1 725	1 334	455	897
Switzerland	A$m	9	36	300	352	15
Total	A$m	14 289	16 593	15 798	13 307	13 049

Principal markets for Australia's iron ore exports, 2014-15 dollars

		2010-11	2011-12	2012-13	2013-14	2014-15
China	A$m	43 867	46 643	44 003	58 331	42 101
Japan	A$m	11 351	11 671	9 040	9 885	6 696
South Korea	A$m	6 643	6 940	5 170	6 237	4 047
Chinese Taipei	A$m	2 126	1 926	1 570	1 749	1 297
Indonesia	A$m	0	0	0	113	213
India	A$m	0	0	50	42	109
Total	A$m	64 099	67 280	59 885	76 376	54 516

Principal markets for Australia's aluminium exports, 2014-15 dollars

		2010-11	2011-12	2012-13	2013-14	2014-15
Japan	A$m	1 541	1 419	1 053	1 140	1 457
South Korea	A$m	954	628	711	697	767
Chinese Taipei	A$m	571	399	478	454	493
Thailand	A$m	356	351	382	310	286
China	A$m	151	203	157	238	50
Indonesia	A$m	286	324	261	200	137
Total	A$m	4 587	4 074	3 438	3 558	3 829

Principal markets for Australia's copper exports, 2014-15 dollars

		2010-11	2011-12	2012-13	2013-14	2014-15
China	A$m	2 698	2 679	3 186	4 028	3 651
Japan	A$m	1 500	1 594	1 694	1 661	1 990
India	A$m	1 479	1 557	1 164	967	820
Malaysia	A$m	712	753	710	625	527
South Korea	A$m	1 108	924	460	598	365
Philippines	A$m	201	21	148	291	257
Total	A$m	9 245	9 123	8 440	8 905	8 493

Principal markets for Australia's iron and steel exports, 2014-15 dollars

		2010-11	2011-12	2012-13	2013-14	2014-15
United States	A$m	294	176	135	107	223
New Zealand	A$m	97	91	83	97	107
Thailand	A$m	156	119	105	37	60
Indonesia	A$m	57	53	46	37	19
Philippines	A$m	2	2	3	20	3
Brazil	A$m	40	89	17	18	0
Total	A$m	1 430	1 055	861	740	692

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Mulled Mine 2016

- **2015 A year to forget** — It has been a brutal year for commodity prices and commodity equities in 2015. The UK mining sector has underperformed the FTSE100 index by >40% YTD. 2015 is shaping up to be worse than 2008. The major driver of the underperformance has been falling earnings, driven largely by lower commodity prices. Total shareholder returns (TSR) have been significantly negative with -43% YTD TSR for the FTSE 350 mining index. Glencore and Anglo have been hit the most among the diversified majors with TSRs of -65% YTD which have been coupled by dividend cuts.

- **2016 macro outlook still looks challenged** — From a top down macro driven view of the world, the weakness in EM/China and associated tail risks of a global growth recession suggest risks to industrial commodity demand are skewed to the downside. Historic episodes where global growth slows to <2% y/y almost always see significant weakness in the asset class. The balancing effect is coming down to supply, with the delta favouring base metals (price induced cuts and incrementally limited supply) versus the bulk commodities (limited price induced cuts and incrementally more supply).

- **The inflection point for 2016** — The inflection point for the sector in 2016, in our view, could come down to two drivers, firstly the majors need to cut iron ore supply and secondly we need synchronized global growth in US$ (which appears more unlikely). BHPB and RIO are not the low cost producers. BHPB and Rio have long espoused that they will run flat out and maintain a progressive dividend policy, However if we look at ALL IN COSTS to the company; operational costs, interest, taxation AND dividend (which adds $25-30/t for BHP and $15-20/t for RIO above spot iron ore) they are in fact the high cost producers and therefore face a tough decision in 2016 to either cut the dividend or cut volumes.

- **On a stock basis** — Our preferred exposure amongst the large diversified are the self-help stories in Rio and Glencore, our comparison with other trading companies (Commodity Traders: Common Ground, Individual Challenges) suggests that Glencore has been unfairly penalized. Our least preferred are Anglo and BHPB on a lack of near-term catalysts and our assessment on the ability to execute on stated strategies. We remain buyers of Randgold in the Precious Metals space, and, KAZ, Lundin, NHY and Boliden in the base metals space. In Steels, our key pick is Aperam, while the sector laggards are VLLP and VOE given their outsized energy exposure.

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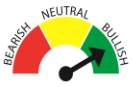
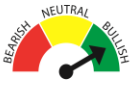
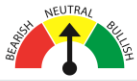
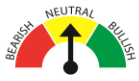
See Appendix A-1 for Analyst Certification, Important Disclosures and non-US research analyst disclosures.

Sector Top Picks - 2016

Figure 1. Top Picks

Exposure	Overall Stance	Equities	RIC	CCY	Price 15/12/15	PT	Rating/Risk	1Y ETR	Analyst
Diversified	**Overweight**	Leader(s)							
		Rio Tinto PLC	RIO.L	GBP	18.48	25.00	Buy	44%	Heath R Jansen
		Glencore PLC	GLEN.L	GBP	0.80	1.30	Buy	63%	Heath R Jansen
		Laggard(s)							
		BHP Billiton PLC	BLT.L	GBP	6.69	8.50	Neutral	39%	Heath R Jansen
		Anglo American PLC	AAL.L	GBP	2.81	4.00	Neutral/High	42%	Heath R Jansen
Base Metals	**Overweight**	Leader(s)							
		KAZ Minerals Plc	KAZ.L	GBP	0.90	1.60	Buy	77%	Michael E Flitton
		Lundin Mining	LUMIsdb.ST	SEK	21.16	31.00	Buy	47%	Jatinder Goel, CFA
		Norsk Hydro ASA	NHY.OL	NOK	29.58	40.00	Buy	39%	Jatinder Goel, CFA
		Boliden AB	BOL.ST	SEK	140.10	175.00	Buy	28%	Jatinder Goel, CFA
Precious Metals	**Neutral**	Leader(s)							
		Randgold Resources Lt	RRS.L	GBP	40.42	49.96	Buy	25%	Jon H Bergtheil
		Laggard(s)							
		Petropavlovsk PLC	POG.L	GBP	0.07	0.05	Sell/High	-29%	Jon H Bergtheil
Steels	**Neutral**	Leader(s)							
		Aperam	APAM.AS	EUR	29.18	45.00	Buy	58%	Michael E Flitton
		Laggard(s)							
		voestalpine AG	VOES.VI	EUR	26.82	28.00	Sell	6%	Michael E Flitton
		Vallourec	VLLP.PA	EUR	8.10	7.00	Sell	-7%	Michael E Flitton

Source: Powered by dataCentral.

Diversified miners: survival of the fittest

Our preferred exposure amongst the large diversified are the self-help stories in Rio and Glencore. While our least preferred are Anglo and BHPB on a lack of near-term catalysts and our assessment on the ability to execute on stated strategies. The sector has faced negative mark-to-market earnings momentum, which has strongly coupled to share price performance. EBITDA and earnings momentum have showed some signs of bottoming out for Glencore and Rio but remains on a downward trajectory for BHPB and Anglo.

Mid-tier Mining : Base metal producers with non US$ cost base better placed

Base metal equities had a mixed year where Scandinavian names outperformed, helped by local currency reporting/listing and strong balance sheets. We remain comfortable with Boliden (Buy) and Norsk Hydro (Norsk Hydro ASA (NHY.OL) - NOK2.9bn Improvements Target with Clear Pathway) (Buy) into 2016 as well supported by better demand supply fundamentals of base metals, strong balance sheets, currency benefit, payout based dividend policies, and conservative managements. We have a Buy rating on Lundin mining as well but the absence of dividends, high nickel exposure in the portfolio, and US$ reporting make it relatively less attractive against BOL and NHY. We remain Buyers of KAZ as well as we think the group continues to position well, doing the right things and focusing on operational performance, however given the de minimus level of current risk appetite, it is unlikely the market will attribute full value to these gains until we see the copper outlook materially improve, which we expect in 2016. We remain cautious on Ferrexpo (Sell/High Risk) due to geopolitical uncertainty still surrounding coupled with weak iron ore outlook which can deteriorate further if pellet premiums also weaken. We remain Neutral/High Risk on First Quantum as despite depressed longer cycle valuation, substantially weaker earnings combined with existing balance sheet weakness can no longer justify a Buy.

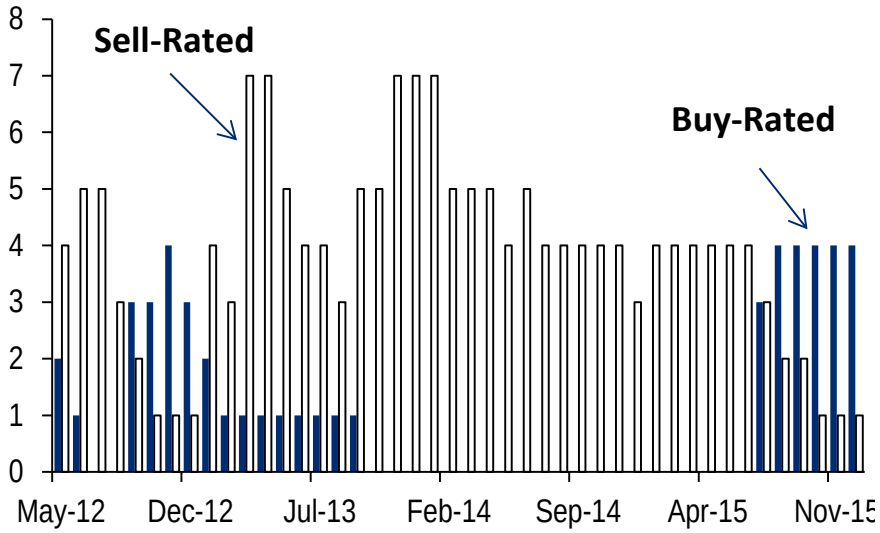
Smelting : Treatment and Refining Charges (TC/RCs)

Copper concentrate market should be relatively well supplied during 2016 implying continued strength in copper TC/RCs but we do expect YoY weakness in benchmark settlements to $100/t and 10c/lb from $107/10c in 2015 to reflect supply disruptions encountered during 2015. Some early settlements for 2016 have been at $97.35/9.375 but that has not yet been established as a benchmark. Zinc production cuts by Glencore could have resulted in significant headline weakness in 2016 benchmark zinc TCs but the subsequent reduction in Chinese zinc metal production will provide a high degree of offset. Still we expect that end of Century mine life during 2015 should impact the balance in concentrate market and will reflect into reduced 2016 zinc TCs. We forecast $220/t on a base zinc price of $1,800/t vs. $245/t on a base of $2,000/t in 2015. We maintain our Neutral/High Risk rating on Nyrstar due to a number of outstanding issues highlighted in our recent publication (Another mine on care & maintenance).

Gold and Silver Shares

Our view on the nine UK gold and silver shares under our coverage changed sharply in Q3 2015, as illustrated in the diagram below. After having no Buy-Rated shares since mid-2013 (and only one in the year before that), we increased this to four Buy-rated shares in Q3 2015. While four Buy-rated shares out of 9 (44% of our coverage) is not yet a sign of high-confidence of the bull-case in the sector, we do feel that we are close to a long term bottom in the metal.

Figure 2. History of Recommendations on Nine UK Gold and Silver Shares



Source: Citi Research

Citi commodity analysts believe that gold will reach the bottom of a very long cycle at the level of $980/ounce during 2016. Clearly, if that were to transpire, then there is likely to be further downside to gold equities. However, our key selections are shares like Randgold and Centamin which are in a net cash position and Fresnillo which has net debt at 3% of market cap. and are favourably placed on the cost curve. Should we still have 11% of the bear market to complete (which is what is implied by the $95/oz downside to $980/oz, having peaked at $1850/oz) then these shares are likely to perform better than their more geared peers. Indeed, these net-

cash groups are beginning to offer a balance-sheet advantage which cannot be found amongst the large-cap diversified miners (where average debt is above 100% of market cap for the Big Four) and is a big advantage during a very difficult stage of the commodity cycle.

Platinum Shares

Our commodity team believes that the platinum price will rise by 60% from current levels over the next two years. If it were not for that outlook, we would be far more bearish on Lonmin. It is a group struggling on many fronts at current low platinum prices and if those price remained here for another two years then Lonmin would likely have consumed much of its recently-raised rights issue cash and would be in danger of returning right back to square one. It does not help that last year's five-month industry strike caused a big withdrawal of interest from UK fund managers in this London-listed entity. It is likely to take some time for that interest to return and the slack has had to be taken up by South African based fund managers in the interim (who can invest in the local listing) and who at least benefit from the weakening domestic currency and for whom regular strikes are a fact of life.

Diamond Shares

The diamond market turned out to be far weaker in 2015 than we had anticipated at the beginning of the year. The outlook for inadequate supply after 2017 remains, due to a shortage of new projects, but the near term demand outlook still looks weak.

Countering this, Petra Diamonds is rapidly approaching the completion of its major investment program in its Cullinan and Finsch mines which will release it from the 2015 straight -jacket of having to mine poor grades and values in the diluted mature areas of those mines. The impact of mining those mature areas in 2015 was also more than we anticipated, but, as is the case for the unchanged positive medium-term outlook for diamonds, so Petra's medium term outlook continues to look bright and we continue to rate Petra as 'Buy'.

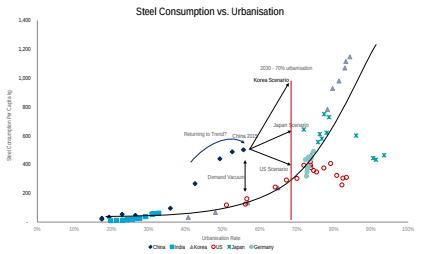
Steel in 2016

As set out in our recent global report, How Far to Go and Who Takes the Pain?, the industry may be facing a prolonged down cycle for prices. Despite spot prices dropping >20% YTD our analysis of post-peak Russia in the 1990s points to a further 30% downside alongside 15% demand decline. However on balance headwinds in this cycle appear to be worse:

- The market in the 1987-01 cycle was ultimately cleared through a massive demand uplift driven by the emergence of China on the world stage (equivalent to 500mt today). Conversely we calculate that China may face a demand vacuum of c500mt having pulled through consumption meaning 60-510mt supply cuts.
- We expect only a piecemeal capacity response out of China. While marginal producers have fully depleted cash reserves and are now debt dependent it is unlikely lenders will pull the plug.

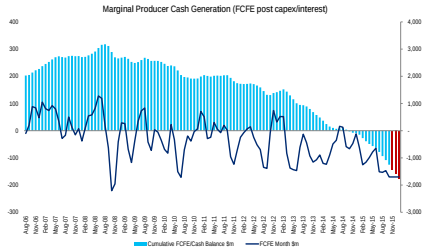
This implies that the pace of closures is likely to be appreciably slower than in past cycles pointing towards a prolonged downturn for prices. Capacity ex-China is likely to face increasing pressure to rationalise; Europe and NAFTA appear the most vulnerable. Company financial health is likely to be an increasing investor focus.

Figure 3. China has pulled through demand



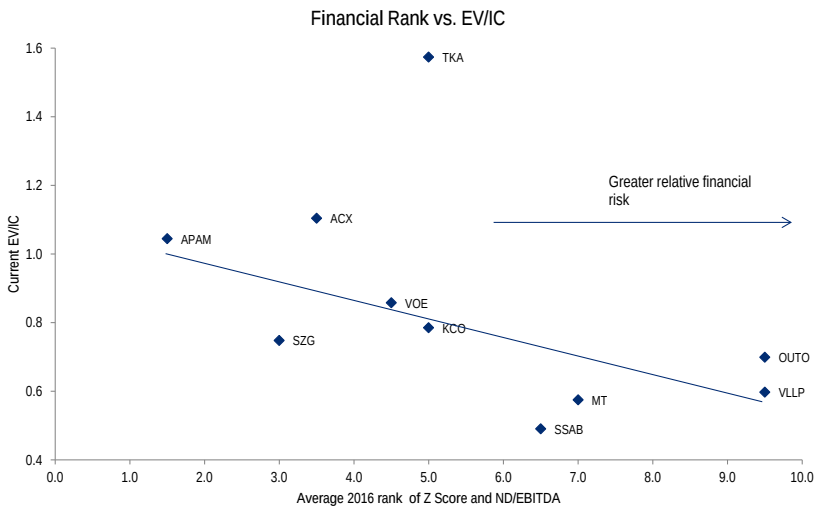
Source: Citi Research

Figure 4. Mills have burned through cash



Source: Citi Research

Figure 5. OUTO/VLLP are considerably weaker than peers while APAM screens the strongest



Source: Citi Research, Company Reports

Stock and sector preferences

Given the headwinds described above we prefer stainless steel exposure over carbon. As set out in our sector initiation (Link) trough nickel prices and European tariffs should also help support the stainless names. Within this context Aperam is our top sector pick given its strong balance sheet, cash generation and defensive business model. Within carbon steel our only Buy is SZG, again based on its balance sheet, which is net cash. Sector laggards are VLLP and VOE given their outsized energy exposure.

Figure 6. European Steel Coverage Comp Sheet

		Price			EV/EBITDA (x)			Div yield			FCF yield			ROCE			Analyst
		Mkt Cap, US$	Ccy	Current	Rating	2015E	2016E	2017E	2015E	2016E	2017E	2015E	2016E	2017E	2015E	2016E	2017E	
ACX.ES	Acerinox	2,702	EUR	9.26	Neutral	9.1	7.1	5.9	1%	3%	4%	-5%	2%	5%	4%	6%	8%	Michael Flitton
APAM.LU	Aperam	2,680	EUR	31.38	Buy	6.1	5.5	5.1	4%	3%	6%	8%	11%	12%	8%	11%	12%	Michael Flitton
OUT1V.FI	Outokumpu	1,226	EUR	2.69	Buy/H	25.7	7.4	5.6	0%	0%	0%	-16%	-2%	11%	-4%	4%	6%	Michael Flitton
	Stainless average					**13.7**	**6.6**	**5.5**	**2%**	**2%**	**3%**	**-4%**	**4%**	**9%**	**3%**	**7%**	**9%**	
ISPA.LU	ArcelorMittal	7,024	EUR	3.86	Neutral	5.6	5.8	5.1	0%	5%	12%	-8%	7%	12%	2%	2%	4%	Michael Flitton
TKAG.DE	ThyssenKrupp	11,046	EUR	17.84	Neutral	7.8	7.1	6.4	1%	1%	4%	0%	5%	8%	5%	8%	9%	Michael Flitton
VOES.AT	Voestalpine	5,468	EUR	28.57	Sell	4.9	6.1	6.1	4%	3%	3%	1%	0%	5%	8%	7%	7%	Michael Flitton
SZGG.DE	Salzgitter	1,482	EUR	22.55	Buy	9.2	6.5	5.9	0%	1%	2%	17%	4%	9%	1%	5%	5%	Michael Flitton
KCOGn.DE	Klockner	869	EUR	7.97	Neutral	19.3	9.6	7.4	3%	3%	2%	3%	0%	6%	-2%	4%	5%	Nitesh Agarwal
SSABa.SE	SSAB	921	SEK	25.79	Neutral	7.3	6.2	5.1	0%	2%	4%	-9%	7%	20%	2%	2%	4%	Nitesh Agarwal
VLLP.FR	Vallourec	1,282	EUR	8.77	Sell	-38.7	-27.3	21.7	9%	6%	6%	19%	1%	-12%	-4%	-6%	-2%	Michael Flitton
	Carbon average					**9.0**	**6.9**	**6.0**	**1%**	**2%**	**4%**	**1%**	**4%**	**10%**	**3%**	**5%**	**6%**	

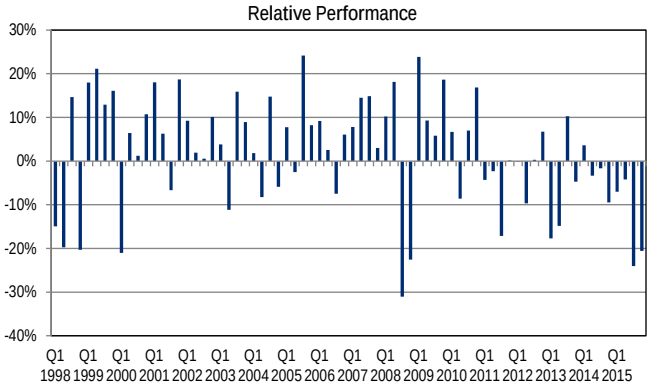
Source: Citi Research

The Year That Was and the Year That Will Be

2015 - The year that was

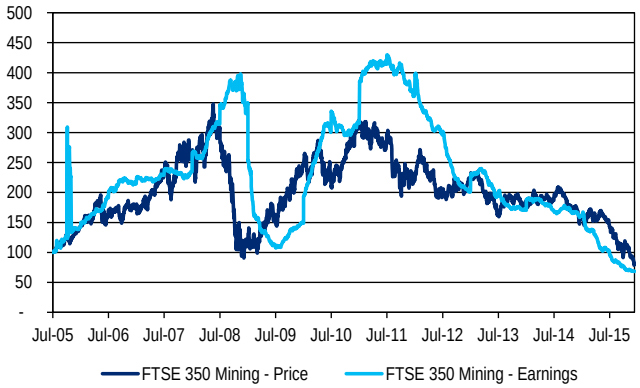
- It has been a brutal year for commodity prices and commodity equities in 2015. The UK mining sector has underperformed the FTSE100 index by >40%% YTD. 2015 is shaping up to be worse than 2008.
- In our view, the major driver of the underperformance has been falling earnings, driven largely by lower commodity prices.

Figure 7. QTR performance – UK mining sector versus the FTSE 100



Source: Datastream, Citi Research

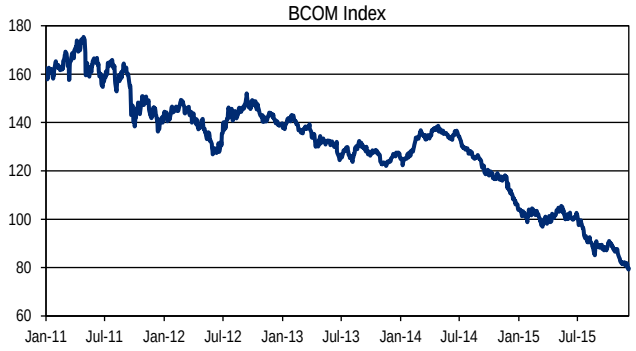
Figure 8. FTSE 350 Mining index price and earnings indexed



Source: Bloomberg, Citi Research

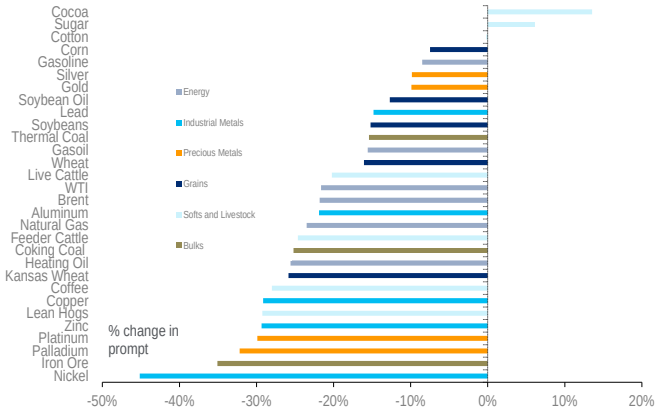
- Negative commodity price drivers - Most major commodities are down 15-30% this year, with Bloomberg commodity price index falling 24% YTD.

Figure 9. Nominal commodity price returns (Super Cycle Sunset)



Source: Bloomberg, Citi Research

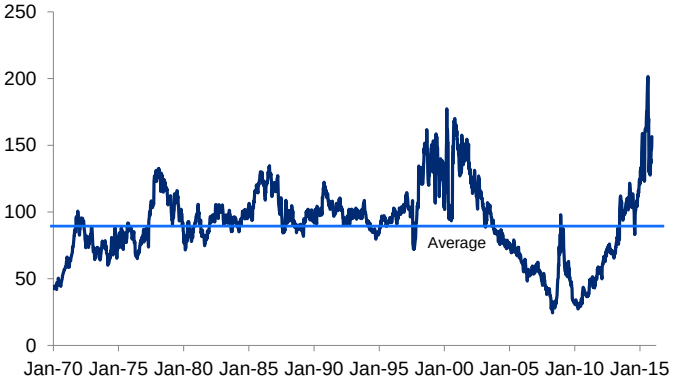
Figure 10. Commodities Price Changes YTD* 2015



Source: Bloomberg, Citi Research, *as of mid-to-late November 2015

- The market continues to grapple with how to value the sector — The miners continue to struggle to deliver economic value add (EVA) in the current commodity price environment. Market valuations suggest the miners are not generating sufficient returns to defend current yields and are pricing in dividend cuts. We think yield sustainability will hold in low cost companies like BHPB and Rio but the rest of the sector will be challenged.
- Mining sector weight in FTSE 100 index has fallen, with current weight at just 4%.

Figure 11. UK mining dividend yield relative to the UK market



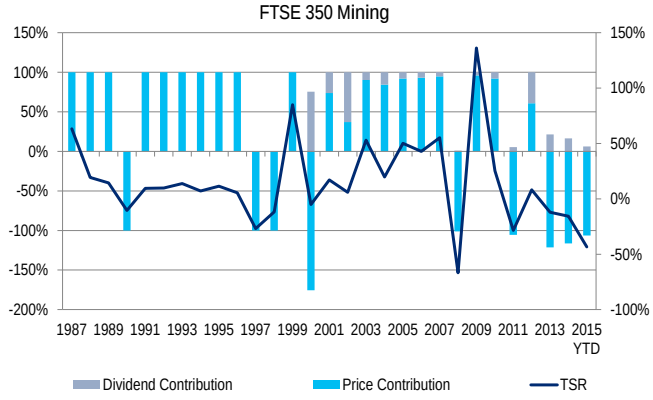
Source: Datastream, Citi Research

Figure 12. Mining weight in FTSE 100 Index

Source: Datastream, Citi Research

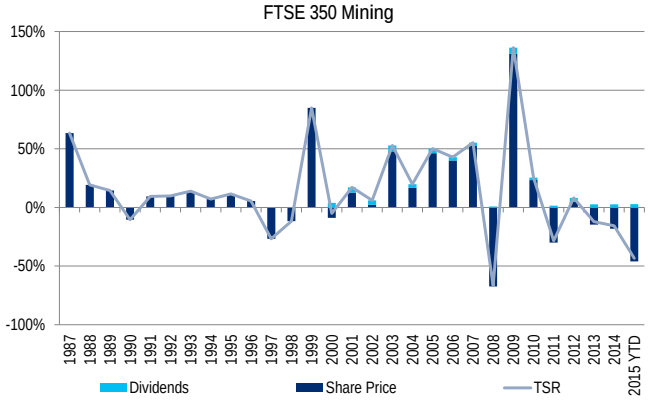
- Total shareholder returns (TSR) have been significantly negative, with -43% YTD TSR for the FTSE 350 mining index. Glencore and Anglo have been hit the most among the diversified majors with TSRs of -65% YTD.

Figure 13. Total Shareholder Returns contribution over time



Source: Citi Research, Bloomberg; YTD through to Nov 15

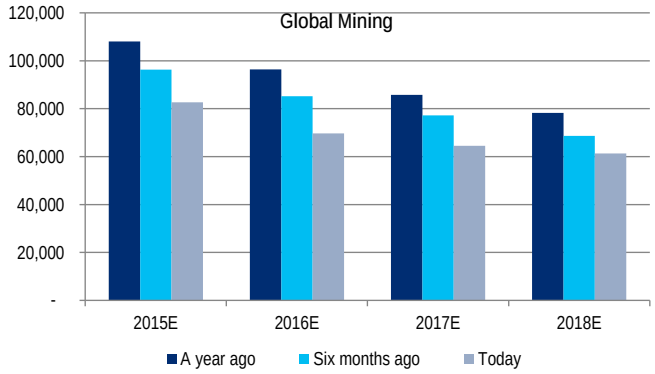
Figure 14. Total Shareholder Returns over time



Source: Citi Research, Bloomberg; YTD through to Nov 15

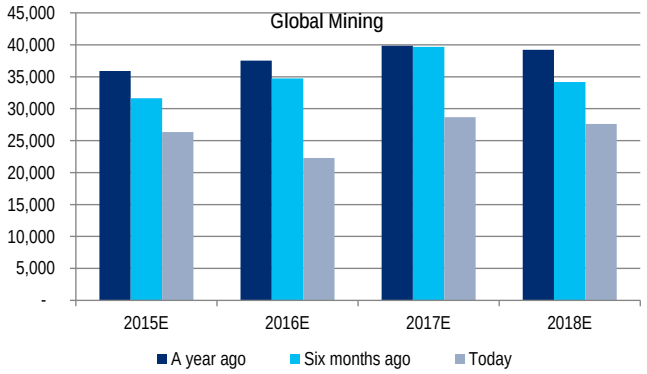
- The sector has cut capex and dividends in an attempt to strengthen the balance sheets amid declining commodity prices. The balance sheets remain stretched for most miners.

Figure 15. Sector capex cuts at the global level over the last 6 months and 1 year



Source: Citi Research Estimates

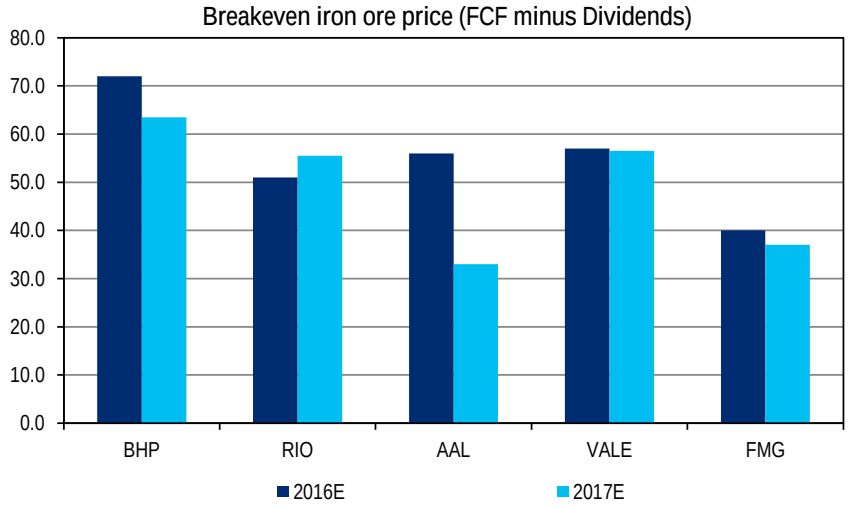
Figure 16. Sector dividend cuts at the global level over the last 6 months and 1 year



Source: Citi Research Estimates

- **BHPB and RIO are not the low cost producers.** BHPB and Rio have long espoused that they will run flat out and maintain a progressive dividend policy, However if we look at **ALL IN COSTS** to the company; operational costs, interest, taxation AND dividend (which adds $25-30/t for BHP and $15-20/t for RIO above spot iron ore) they are in fact the high cost producers and therefore face a tough decision in 2016 to either cut the dividend or cut volumes. Anglo is benefitting from a weak spot rand and suspension of dividends while FMG benefits from a suspension of dividends.

Figure 17. Iron ore price needed for FCF to cover up dividends



Source: Citi Research, Datastream

- On our estimates BHP would find it difficult to cover up dividends even under a bullish +15% commodity prices and fx scenario while RIO is likely to be able to cover up under bullish scenarios. However at spot commodity prices and fx both these companies are likely to burn cash.

Figure 18. BHP FCF minus Dividend under varying price assumptions

2016E FCF minus Dividend	Fx +15%	Fx +10%	Fx +5%	Spot	Fx -5%	Fx -10%	Fx -15%
Metals -15%	(6,705)	(6,987)	(7,296)	(7,636)	(8,012)	(8,429)	(8,896)
Metals -10%	(5,812)	(6,094)	(6,403)	(6,743)	(7,119)	(7,536)	(8,003)
Metals -5%	(5,008)	(5,292)	(5,604)	(5,914)	(6,292)	(6,713)	(7,184)
Spot	(4,146)	(4,430)	(4,742)	(5,085)	(5,464)	(5,884)	(6,322)
Metals +5%	(3,253)	(3,538)	(3,849)	(4,192)	(4,571)	(4,991)	(5,462)
Metals +10%	(2,361)	(2,645)	(2,956)	(3,299)	(3,678)	(4,098)	(4,569)
Metals +15%	(1,468)	(1,752)	(2,064)	(2,406)	(2,785)	(3,205)	(3,676)

Source: Citi Research

Figure 19. RIO FCF minus Dividend under varying price assumptions

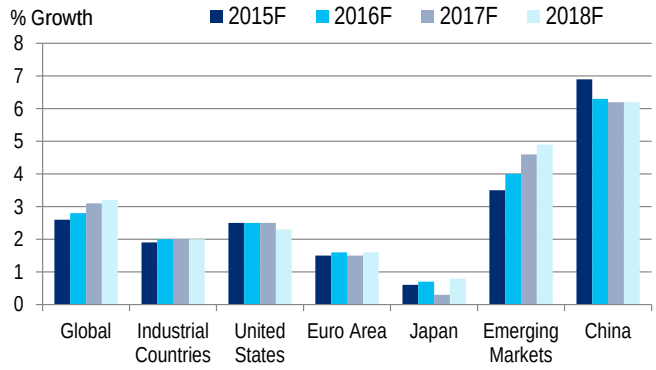
2016E FCF minus Dividend	Fx +15%	Fx +10%	Fx +5%	Spot	Fx -5%	Fx -10%	Fx -15%
Metals -15%	(3,449)	(3,901)	(4,396)	(4,940)	(5,542)	(6,211)	(6,959)
Metals -10%	(2,521)	(2,973)	(3,468)	(4,013)	(4,615)	(5,285)	(6,033)
Metals -5%	(1,592)	(2,045)	(2,540)	(3,086)	(3,688)	(4,358)	(5,107)
Spot	(714)	(1,165)	(1,661)	(2,207)	(2,810)	(3,480)	(4,229)
Metals +5%	242	(195)	(689)	(1,256)	(1,859)	(2,529)	(3,278)
Metals +10%	1,087	667	208	(308)	(933)	(1,602)	(2,352)
Metals +15%	1,932	1,512	1,052	546	(13)	(654)	(1,426)

Source: Citi Research

2016 – The year that will be

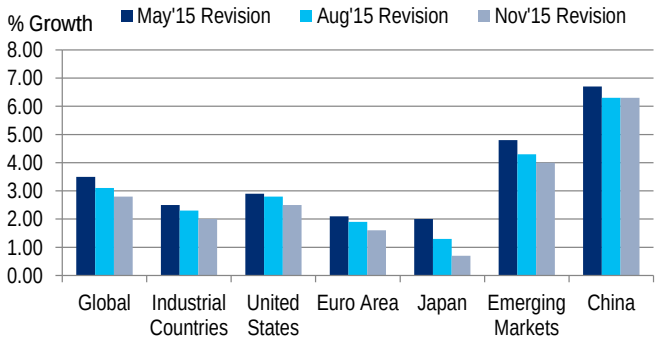
- Citi's economists expect 2016 will be another year of modest global growth — well below the longrun norm of roughly 3% YoY — continuing the trend of 2012-15. Our base case is for global GDP growth (at current exchange rates) of 2.8% in 2016, which amounts to roughly 2½% YoY adjusted for the probable mis-measurement of China's GDP data. We do not expect a significant pickup in growth for 2016-17 for advanced economies or China, although there may be a technical bounce in EM growth as some of the weakest economies level off during 2016. Risks to our global forecasts probably still lie to the downside, especially for EMs. Growth for many AEs will probably be a little above potential in 2016, but subpar growth at a global level is likely to cap inflation in many countries.

Figure 20. Citi Economics' Forecasts for Selected Countries and Regions



Source: Citi Research

Figure 21. Citi Economics Forecast Revisions for Selected Countries and Regions (2016)



Source: Citi Research

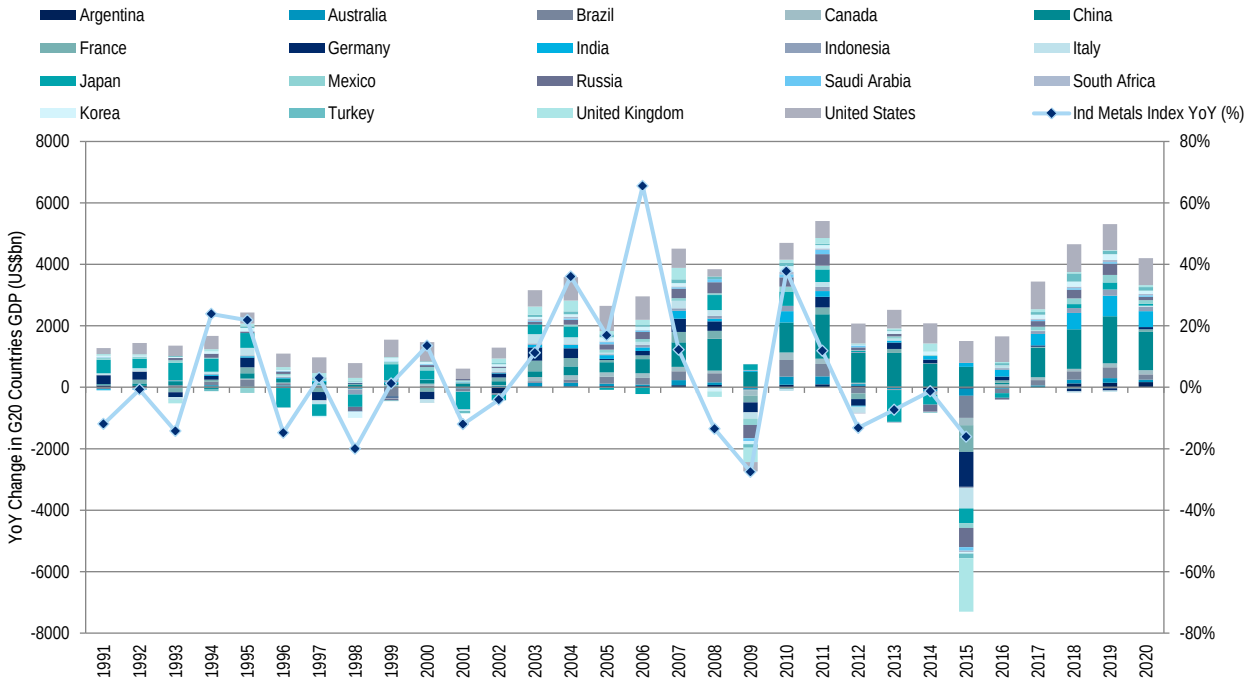
- Our Global commodities team expect to see dollar appreciation moderate, easing pressure on commodity prices and creating a pathway for modest recovery in base metals and PGMs (Commodities 2016 Annual Outlook - Down but not out – on the road to modest recovery).

- We think 2016 could show some improvements from current levels, but any upside appears to be driven by balance sheets and cash flows.

- Without commodity prices moving up we see limited levers to pull — the sector is still facing negative mark-to-market earnings momentum and declining free cash flow, which is constraining balance sheets. The miners are at risk of debt downgrades which is unlikely to impact them in the near term but could push up borrowing costs in the longer term, especially in a rising interest rate environment. Asset sales look challenging given the lack of buyers and funding.

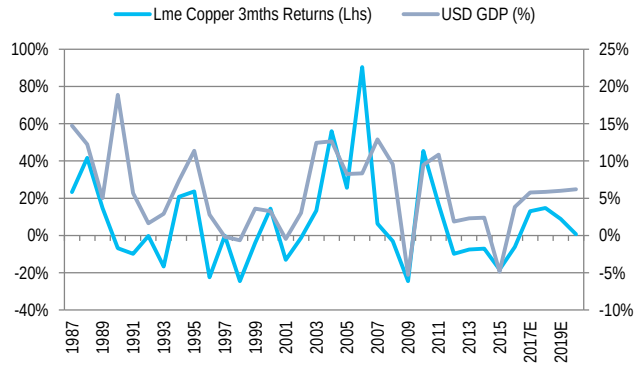
- A key inflection point for commodity prices and the sector will be on world growth in 2016 in US$ terms. As commodities are priced in dollars, we have seen dramatic erosion in purchasing power in 2015 from fx moves. In the following charts we have taken nominal GDP in local currencies and then converted to US$ at the prevailing exchange rate, what it shows is a strong correlation over the past thirty years and it also shows for commodity prices to run we ideally need synchronised global growth in US$. What will then be critical in 2016 is at least modest growth coupled with FX stability

Figure 22. YoY Change in G20 GDP converted in US$ at the prevailing exchange rates plotted against S&P GS Industrial Index – commodities have generally performed well in a $ growth environment and more importantly synchronized global growth



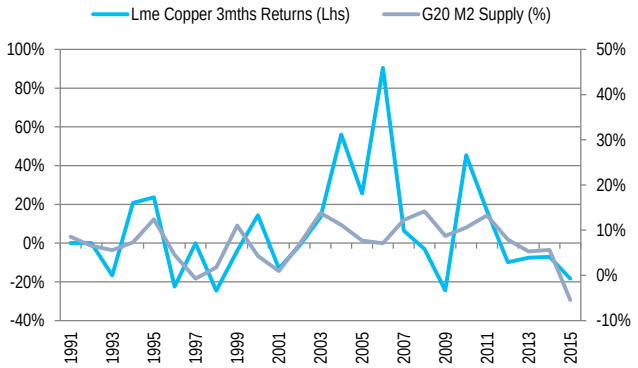
Source: Citi Research, Bloomberg, IMF

Figure 23. Copper 3m returns vs US$ Global Nominal GDP growth



Source: Citi Research , Bloomberg, IMF

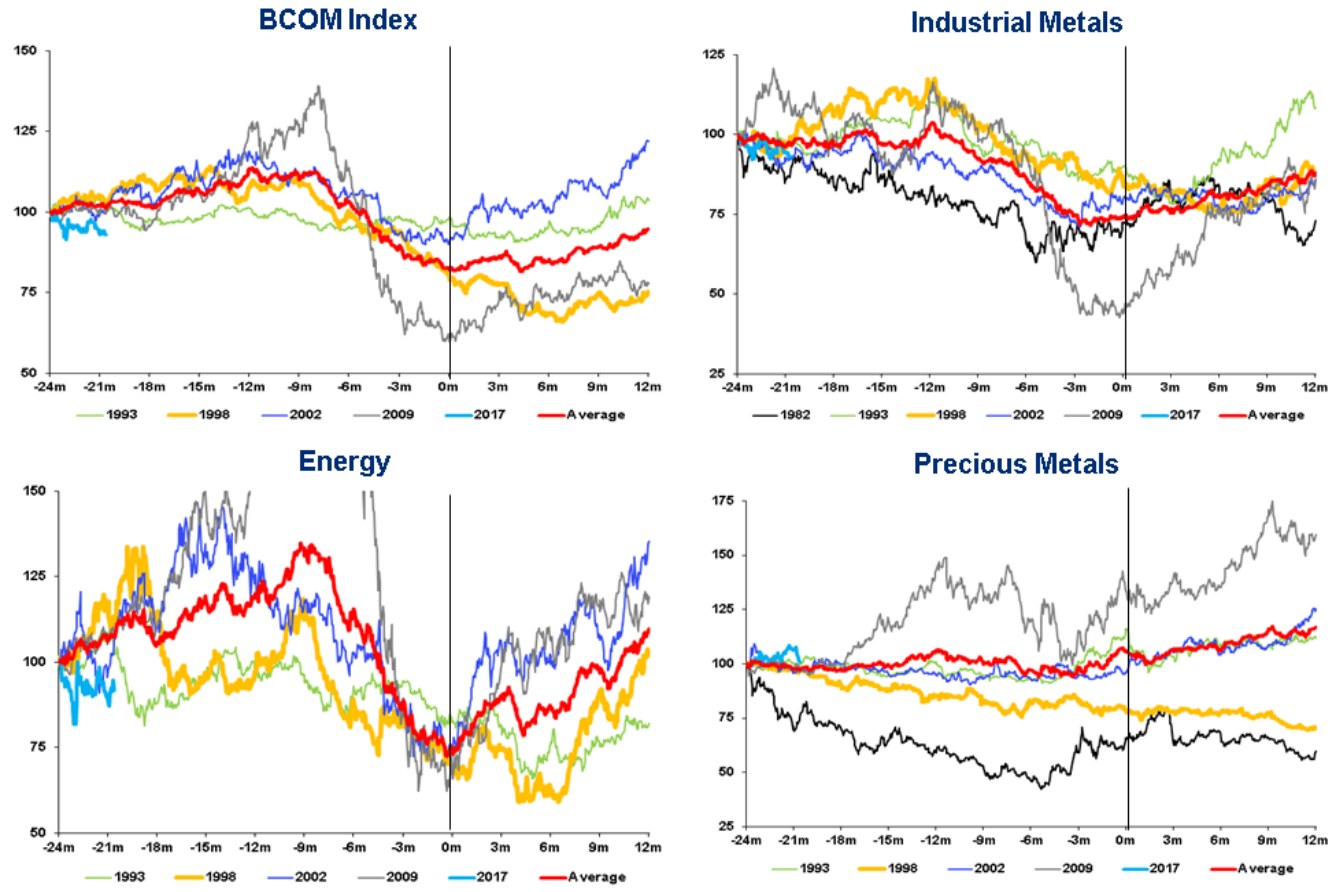
Figure 24. Copper 3m returns vs G20 Annual Avg M2 Supply growth



Source: Citi Research , Bloomberg, IMF

From a top down macro driven view of the world, the weakness in EM/China and associated tail risks of a global growth recession (see above discussion) surely mean risks to commodity demand are skewed to the downside. Indeed, as Figure 25 demonstrates, historic episodes where global growth slows to <2% y/y almost always see significant weakness in the asset class. For more details on where we see sector under overall asset allocation universe please read - Global Asset Allocation - Citi House Views for 2016.

Figure 25. Commodity Prices During Previous Recessions

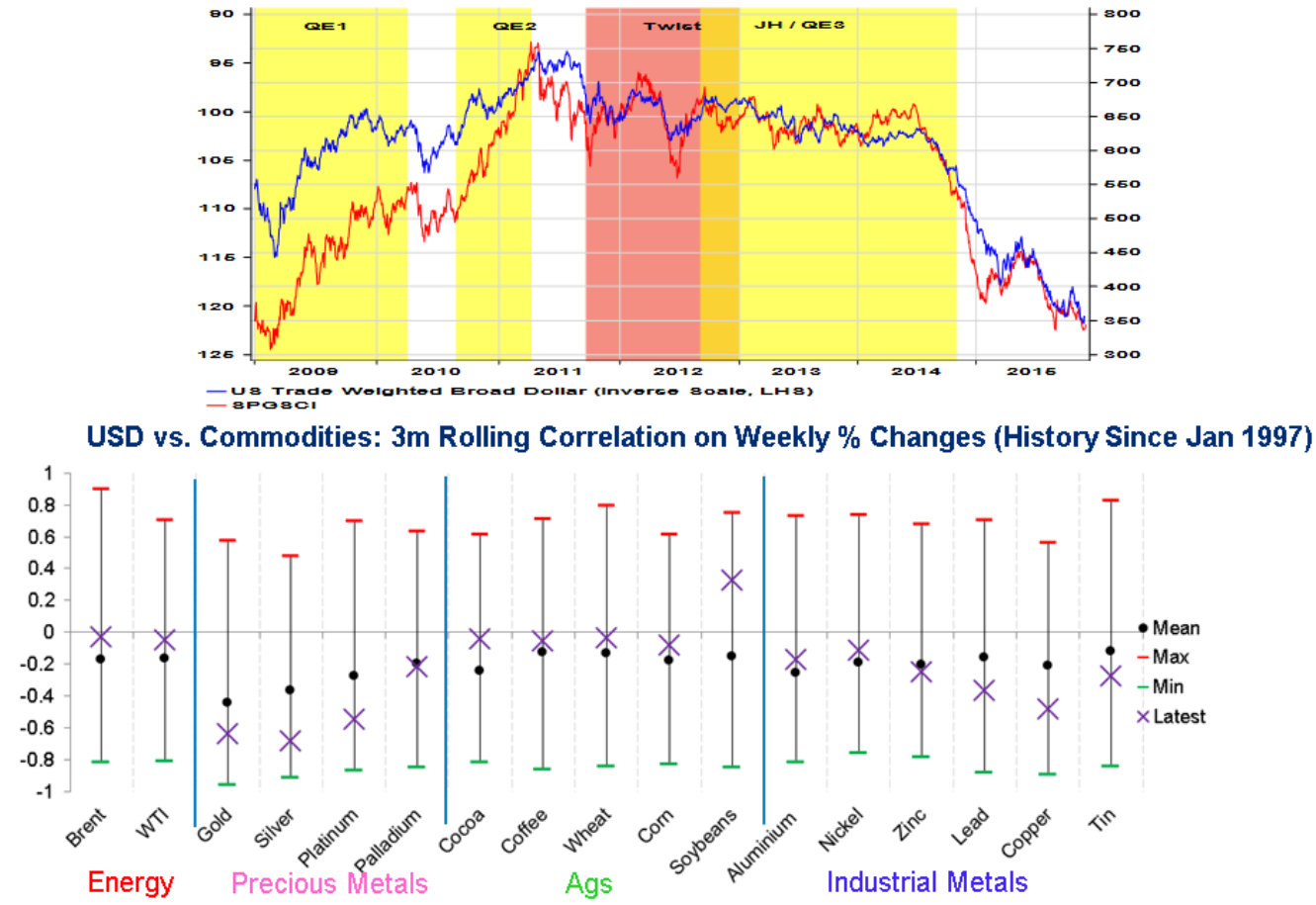


Sources: Bloomberg and Citi Research

Add to this the strong negative correlation commodities exhibit to the USD (Figure 26) in an environment where we expect further greenback strength.

But there are caveats to the resulting bearish inclination. For one, commodity prices have already fallen extensively, so historic guidance may need to be taken with a pinch of salt. Second, supply of course also enters the balance, and here we see mixed backdrops. Some commodities, oil for example, still exhibit strong oversupply whereas others, copper for example, are forecast to see supply curtailments - see Commodities 2016 Annual Outlook.

Figure 26. Commodities and the USD



Sources: Macrobond, Bloomberg and Citi Research

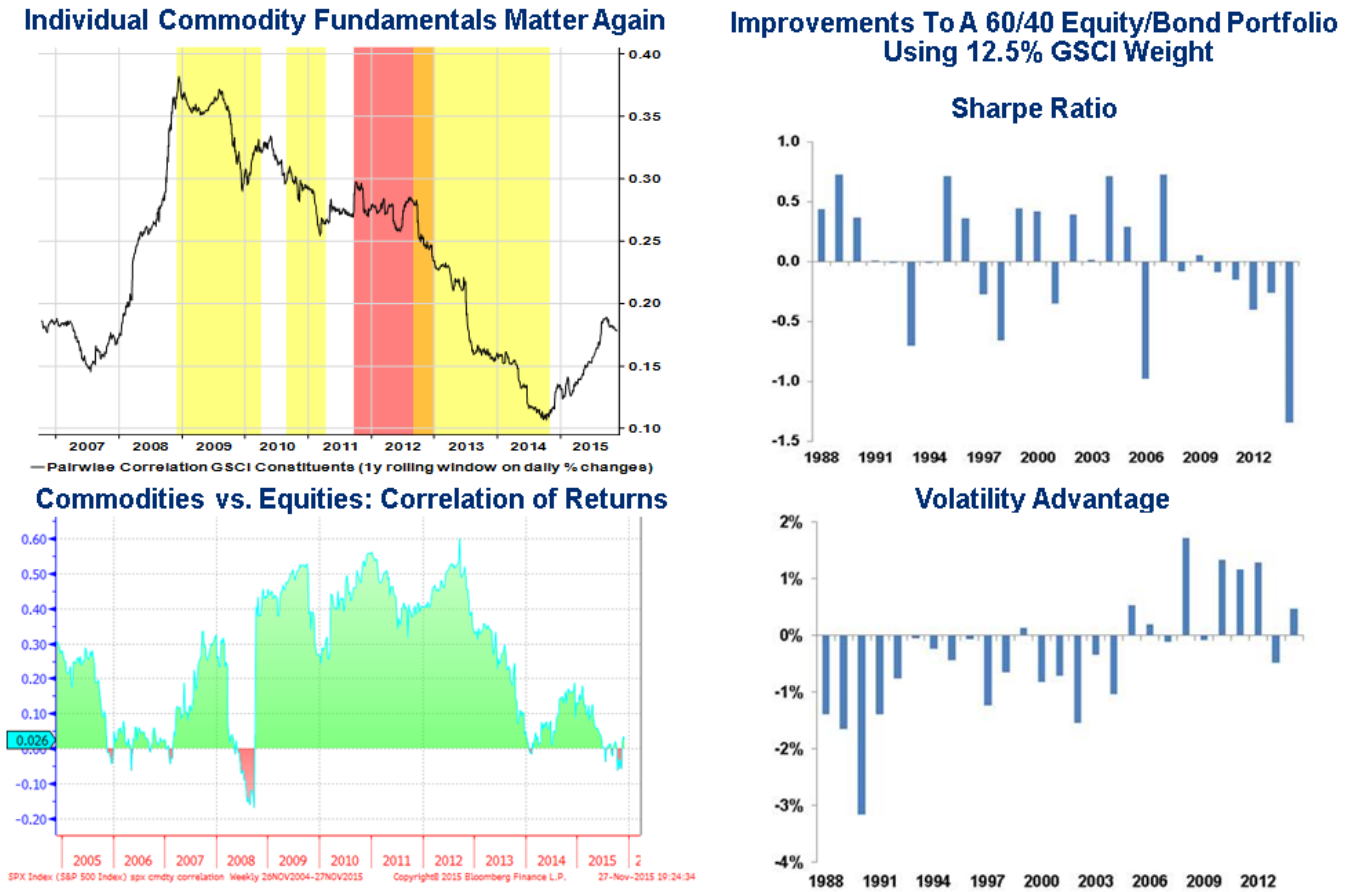
As a broad asset class, commodities are thus more of a story of idiosyncrasies, and indeed pairwise correlations within the GSCI index prove that individual supply and demand factors matter again, in contrast to the previously RORO/QE driven equity-like behavior of hard assets (Figure 27, top LHS). This has two implications. Firstly, this should be an environment were trading individual commodities on the back of fundamentals views makes sense.

The second implication of idiosyncratic supply and demand factors taking hold of commodities, is that correlations to risk assets such as stocks should remain low (Figure 27, bottom LHS). Indeed, after the extremely strong co-movements between the two asset classes in the immediate years post GFC, we have already witnessed dwindling correlations. As we have said before (see Global Macro Strategy Focus - Oil Shocks, Commodities and Portfolio Diversification Benefits), after large price falls and low correlations, asset allocators should also be able to benefit from diversification benefits. Our previously published historic analysis of adding commodities to a simple 60/40 equity/bond portfolio did show that, excluding the years immediately post GFC, portfolio volatility often falls when adding commodities (Figure 27, RHS).

But to be frank, 2014 and 2015 have not been kind to this view, as commodities have exhibited large losses and high volatility. So the diversification kicker has not set in, in contrast, it actually deteriorated aggregate portfolio statistics.

Timing when to start using the asset class as a diversifier is quite tricky to be frank. And whilst we do feel we are in an environment where this might make sense, for now we have continued to allocate to commodities based on our fundamental views.

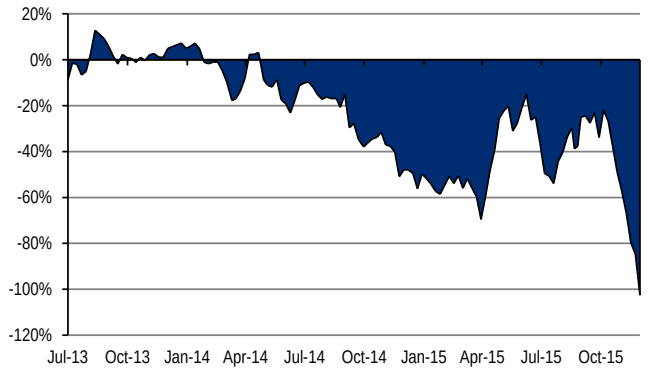
Figure 27. Commodities: Unstable Beta With Equities = Diversification?



Sources: Macrobond, Bloomberg and Citi Research

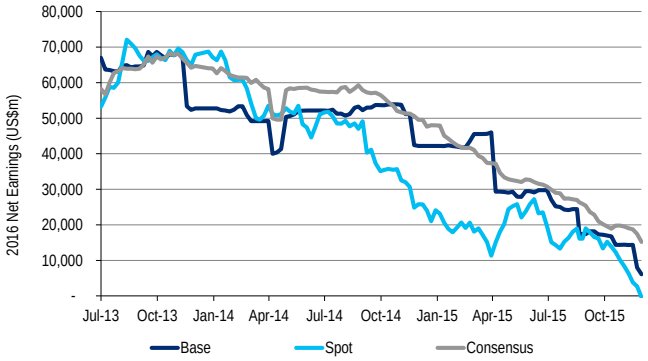
- The sector is still facing negative mark-to-market earnings momentum and declining free cash flow, which is constraining balance sheets. Sector spot earnings have turned negative.

Figure 28. Earnings revisions spot vs. consensus (%)



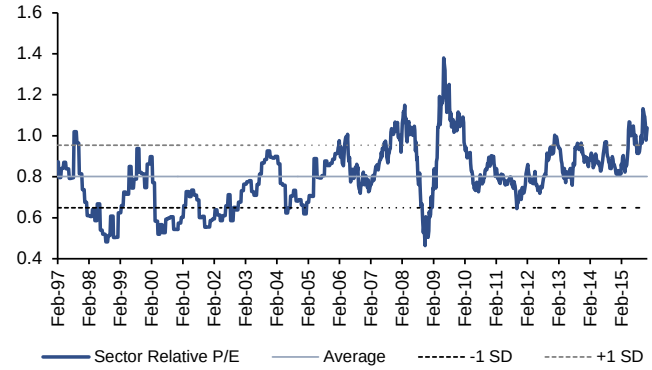
Source: Citi Research, IBES, Datastream

Figure 29. 2016E Net Earnings (US$m)



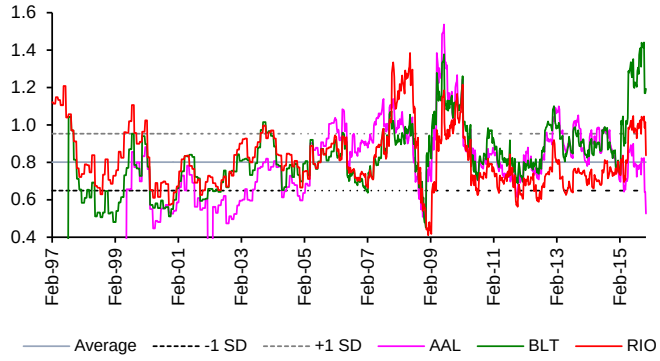
Source: Citi Research, IBES, Datastream

Figure 30.PE relative to UK market



Source: Citi Research, Datastream

Figure 31. PE relative large miners



Source: Citi Research, Datastream

Our preferred exposure amongst the large diversified are the self-help stories in Rio and Glencore, our comparison with other trading companies (Commodity Traders: Common Ground, Individual Challenges) suggests that Glencore has been unfairly penalized. While our least preferred are Anglo and BHPB on a lack of near-term catalysts and our assessment on the ability to execute on stated strategies. We remain buyers of Randgold in the Precious Metals space, and, KAZ, Lundin, NHY and Boliden in the base metals space. In Steels, our key pick is Aperam while sector laggards are VLLP and VOE given their outsized energy exposure.

Commodity update and 2016 Outlook

There's Increasing Value in Commodities in 2016

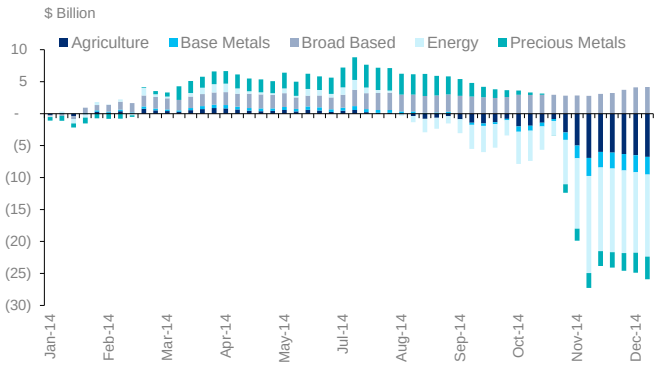
- **Given the sharp underperformance of commodities in 2015, and especially in 2H, it's tempting to look for a bottom; that looks fine for a number of sectors, but should not work across the complex.** Citi's outlook for end-2016 projects higher prices for US natural gas, crude oil, all base metals but especially copper and nickel as well as platinum and palladium, but weak to very weak across the bulks. In short, a modest recovery

- **Significant headwinds remain in the near term including persistent oversupply, expected continued US dollar appreciation, potential further China weakness and continuing negative sentiment toward commodities.** The oversupply and resulting negative sentiment step from the robust and somewhat exuberant capex spend in the last decade unleashing a wave of new commodity supplies just as the global economy turned and Chinese growth rates plunged. Global growth pessimism and FX could be a further drag. But to what extent is this already 'priced-in'?

- **2016 is shaping up to be a critical transitional year for commodities, a year of volatile and ongoing 'W-shaped' price adjustments, as the market grapples with conflicting signals of whether and how rapidly supply/demand fundamentals are shifting to balance for many commodities. This transition predicates a more persistent price recovery by 2017 for oil and base metals.** The damping of economic growth in China combined with a structural shift in the Chinese economy to less commodity-intensive growth plus the slowdown in growth in other emerging markets is the core of the problem confronting commodities. But the accelerated postponement of new investments and the shutting in of plants that are marginally or negatively profitable are serving to bring forward the time when balances will turn negative.

- **We expect inflows into energy to resume late next year, particularly if investors begin to see signs of price stabilization or modest recovery later in the year.** This should also buttress passive index investment flows which are dominated by the energy sector with ~40-60% of major indices allocated to energy commodities. Conversely, ETF flows could see weakness next year given Citi's expectations for gold price weakness, as bullion represents 80-85% of the ETF market.

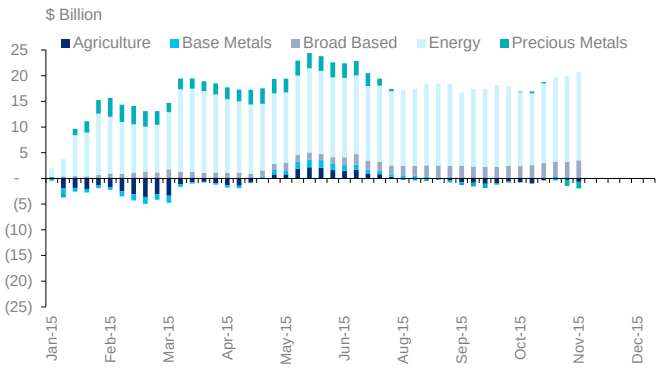
Figure 32. 2014 Cumulative Commodity Investment by Sector*



*subject to revision; passive index and exchange traded products

Source: Citi Research, *please refer to Commodities Flows publications on www.citivelocity.com for regular commentary on these market factors

Figure 33. 2015 YTD Cumulative Commodity Investment by Sector**



**as of mid-November

Source: Citi Research

- Dollar strength is expected to continue as the Fed begins tightening. Though previous hiking cycles have often been met with a depreciating dollar, there are many differences this time around that should keep USD rising in the short term. However, the YoY appreciation in 2016 is likely to be significantly less than was seen in 2015.

Figure 34. Citi Forecasts of G10 Currencies

		Market data*			Forecasts			Returns***		WERM
		spot	3m Fwd	12m Fwd	0-3 mos	6-12 mos	long-term	3 mos rtn	12 mos rtn	2015 Q2
G10										
Euro	EURUSD	1.07	1.07	1.08	1.05	1.00	1.05	-2.0%	-7.6%	1.45
Japanese yen	USDJPY	123	123	121	124	128	130	1.2%	5.5%	83
British Pound	GBPUSD	1.52	1.52	1.53	1.50	1.47	1.50	-1.6%	-3.7%	1.79
Swiss Franc	USDCHF	1.02	1.01	0.99	1.02	1.06	1.05	0.9%	6.7%	0.90
Australian Dollar	AUDUSD	0.72	0.72	0.71	0.70	0.66	0.70	-2.5%	-7.0%	0.86
New Zealand Dollar	NZDUSD	0.66	0.65	0.64	0.62	0.58	0.60	-4.9%	-9.7%	0.70
Canadian Dollar	USDCAD	1.33	1.33	1.33	1.36	1.38	1.30	2.1%	3.7%	0.99
Dollar Index**	DXY	99.29	99.10	98.27	100.92	104.95	101.14	1.8%	6.8%	73.7
G10 Crosses										
Japanese yen	EURJPY	131	131	131	130	128	137	-0.8%	-2.5%	121
Swiss Franc	EURCHF	1.08	1.08	1.07	1.07	1.06	1.10	-1.2%	-1.4%	1.31
British Pound	EURGBP	0.70	0.70	0.71	0.70	0.68	0.70	-0.4%	-4.1%	0.81
Swedish Krona	EURSEK	9.28	9.28	9.27	9.30	9.20	9.05	0.2%	-0.8%	8.11
Norwegian Krone	EURNOK	9.21	9.24	9.32	9.00	8.50	8.30	-2.6%	-8.8%	7.22
Norwegian Krone	NOKSEK	1.01	1.00	0.99	1.03	1.08	1.09	2.9%	8.8%	1.12
Australian Dollar	AUDNZD	1.10	1.10	1.11	1.13	1.14	1.17	2.5%	3.0%	1.23
Australian Dollar	AUDJPY	89	88	86	87	84	91	-1.3%	-1.9%	72

Source: Citi Research

- The pace of dollar strengthening should be slower and more moderated next year. This would ease some of the downward FX pressure on commodity prices, though to be sure, continued dollar strength should still limit upside for the complex.

Global trade is now entering a new normal of slower growth

- **Rising concerns about emerging market economic growth, and especially the decline in China's growth rate**, combined with plummeting commodity prices in 2015 have put a spotlight on declining global trade growth this year.

- **But the slowdown in global trade is not a new phenomenon.** The fact is that the trend of global trade growth that was established in the first decade of this century never recovered after the 2008-2009 crisis. Post crisis 2009-2011 saw a further decline in trade, followed by a continued drop through 2015 YTD.

- **In short, global trade growth has been declining over the last decade and in the last three years has been consistently below world GDP growth.** Strong trade growth earlier came from a combination of very high growth in China, which along with rapid globalization provided the main momentum

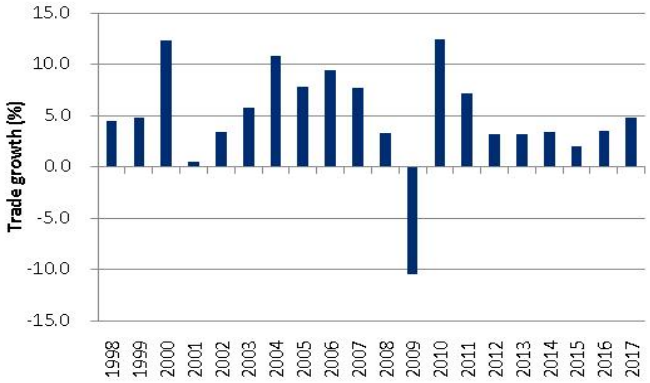
- **The OECD expects global trade growth to recover somewhat**, though well below the growth levels seen in most years since 1998.

- It would be extremely difficult for global trade to rebound without a significant increase in both the underlying prices of commodities as well as the volumes of commodities traded. Neither is likely to rebound too sharply in the next few years

Figure 35. Global trade growth has slowed

Source: OECD, Haver, CPB, Citi Research

Figure 36. The OECD is forecasting trade growth to recover a bit, though well below the last 15 years

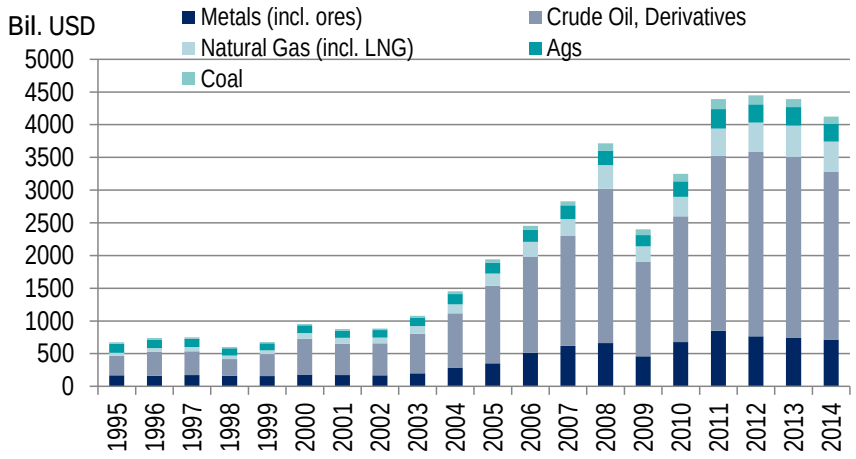


Source: OECD, Haver, CPB, Citi Research

- Commodity prices saw a **harsh cyclical bust this year after a decade of high prices** spurred overinvestment in production across the complex. Falling commodity prices have led to declining global trade as commodity export values fell sharply.

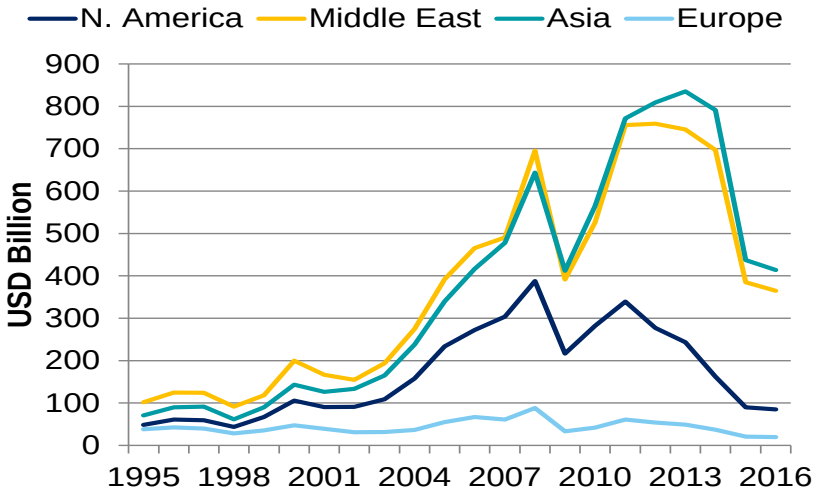
- **Trade volumes have also declined this year as lower commodity prices hit commodity-exporting EM countries, exacerbating a cyclical slowdown** in global growth led by structural changes in China. GDP growth turned negative in 2015 in several large commodity-exporting EMs, including Brazil and Russia, as significant reductions in export revenues weighed on their domestic economies. In a negative feedback loop, falling EM growth prospects and China concerns has led to even weaker commodity prices in 3Q, further weakening commodity trade valuations.

Figure 37. Annual global commodity exports: started to fall in 2013



Source: CPB, Haver, Citi Research

Figure 38. The *indicative** trade value has also fallen, leaving 2015/2016 trade potentially lower than 2009

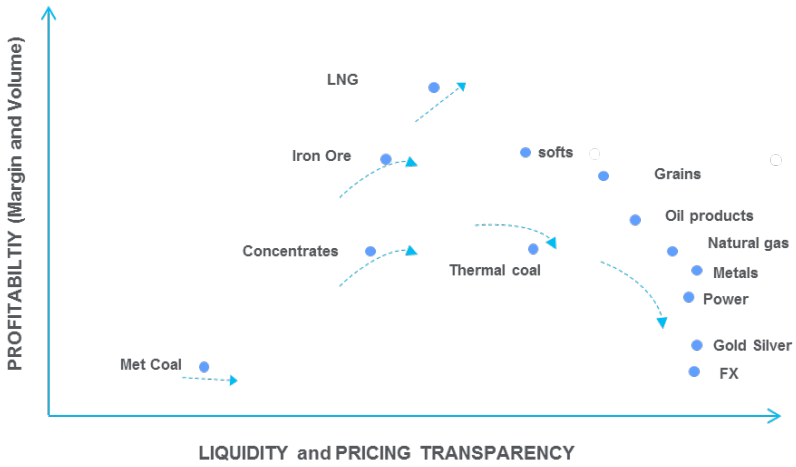


Source: BP Statistical Review, Citi Research

*Indicative trade value implied by regional net export positions multiplied by traded prices as proxy

- The business model of trading companies is evolving; as liquidity and transparency in commodity markets increases, trading companies have moved upstream into production, resulting in lower margins and returns.

Figure 39. Liquidity and transparency has improved, decreasing trading attractiveness for many commodities.



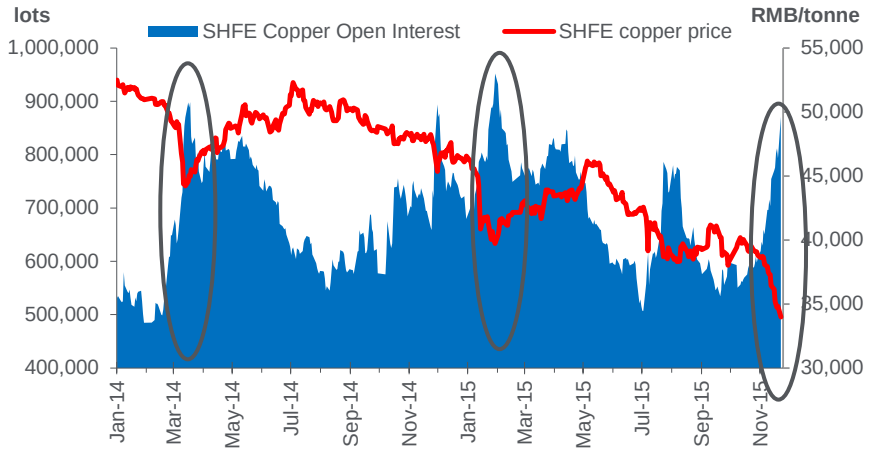
Source: DataStream, Bloomberg, Citi Research

Chinese demand trends, weak but little evidence of being negative

2015 has been a landmark year for China pessimism, as disappointing macroeconomic data weighed on the entire base metals complex. Chinese demand has waned in response to its transitioning economy. However, slowing growth does not imply negative growth. We believe the flurry of Chinese CTA selling in November was overdone. Positive H2 demand from renewable energy and power sectors, plus consumer goods points to positive copper consumption.

Chinese funds have been in the driver's seat in terms of metals price trajectory in 4Q'15. Through 1H'15 such fund activity was largely limited to copper, but end October saw a surge in selling activity across all SHFE metals. Previous waves of this technically driven copper selling in March/April 2014 and January 2015 have preceded sustained short-covering rallies, which occurred in the face of USD strength and ongoing China macro concerns. Despite threat of further short-term systematic selling, there is clear scope for price support into 2016.

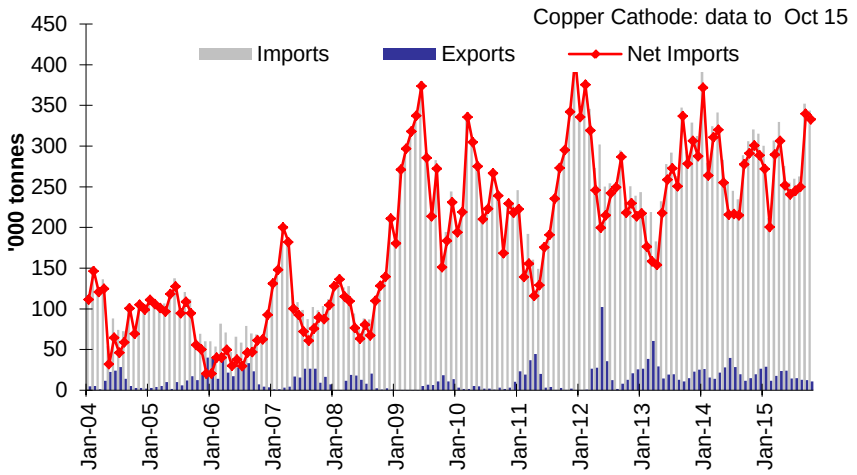
Figure 40. SHFE copper OI breached 850k-lots in mid November



Source: SHFE, Bloomberg, Citi Research

- **Copper consumption has significant consumer-centric end-use exposure in China** — Copper bears point to the slowdown in construction activity as key to driving Chinese copper consumption growth into negative territory this year. End-use survey data collated by the International Copper Association appears to refute this notion, pointing to **total construction demand for copper (including localized power connectivity) accounting for c24% of Chinese demand**, important but not substantial enough to drive negative growth. With minimum second home down payments cut 3 times this year, plus borrowing costs falling on interest rate cuts, we expect the strong housing sales seen this year, up 18% YoY in October compared to -9% last year, to continue in 2016, helping stabilize housing start trends.

Figure 41. Chinese imports robust in H2 15, against expectations



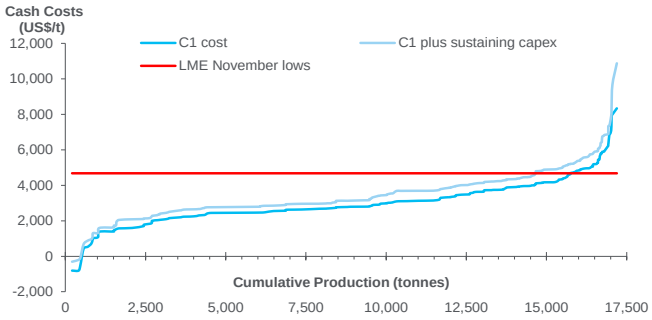
Source: IWCC/ICA, Bloomberg, NBS, Wood Mackenzie, Citi Research

- Supply disruptions have hit a near-term YTD record, pointing to sluggish full year growth — We estimate c1.65mmt of mine supply has been lost so far this year, a loss rate of c9%. Losses have been driven by technical outages (27% of losses) and market-related closures (28%). Both factors will have higher influence in 2016, with technical losses elevated as sustaining capex budget come under pressure, while we expect market/economic related closures to accelerate into 2016 given the current price environment. We expect supply losses to remain elevated at c9% in 2016.

- **Isn't USD strength supposed to be providing margin protection for copper miners in the current weak price environment?** — At current LME prices of c$4,500/t only 9% of operating non-Chinese mine capacity is facing negative margins, yet we have seen significant cut announcements. In previous pricing cycles, the key cost metric under which shut down decisions have been made, according to analysts Wood Mackenzie, has been C1 plus sustaining capex (SC).

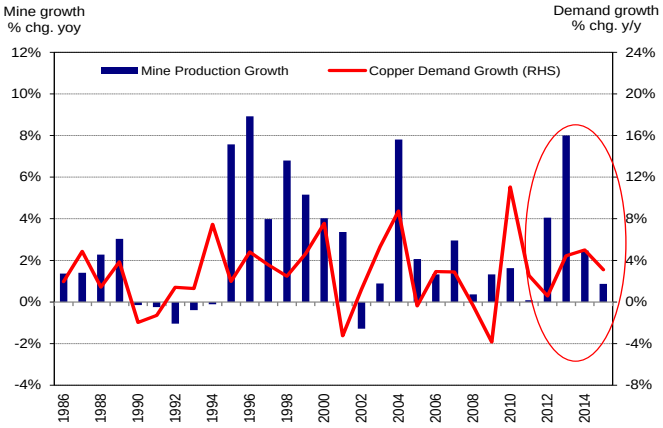
- **Looking at C1 + SC suggests that 16% of operating non-Chinese capacity is failing to break even**— This is a factor we believe is key to understanding cuts in rising cost regions such as North America, the African Copper Belt and Chile. When sustaining capex is taken into account, local currency mine site exposure falls to c18-30% in Chile for example compared to 45-50% under Wood Mackenzie's C1 analysis, suggesting FX-driven cost deflation is being over exaggerated. ROW marginal costs including SC are currently c5,150/t.

Figure 42. Prices cutting deeply into cash cost curve



Source: Antaike, Bloomberg, NBS, Wood Mackenzie, Citi Research

Figure 43. Mine supply is decelerating faster than demand



Source: Antaike, Bloomberg, NBS, Wood Mackenzie, Citi Research

Key Commodities Price Outlook – Investor "bottom-picking" in commodity markets could continue next year

Figure 44. Benchmark Commodities Price Outlook*

		Point Prices												Annuals					
		0-3M	6-12M		Q4 2015E	Q1 2016E	Q2 2016E	Q3 2016E	Q4 2016E	Q1 2017E	Q2 2017E	Q3 2017E	Q4 2017E	2013	2014	2015E	2016E	2017E	2018E
Energy				5Y Cyclical															
NYMEX WTI	USD/bbl	42.0	48.0	70.0	42.0	40.0	44.0	52.0	55.0	58.0	57.0	61.0	61.0	98.0	93.0	48.0	48.0	59.0	66.0
ICE Brent	USD/bbl	45.0	51.0	75.0	45.0	43.0	46.0	55.0	60.0	63.0	61.0	65.0	66.0	108.7	100.0	53.0	51.0	64.0	70.0
Henry Hub Natural Gas	USD/MMBtu	2.40	3.00	3.50	2.40	2.60	2.90	3.00	3.20	3.30	3.40	3.50	3.50	3.73	4.40	2.70	3.00	3.50	3.50
Base Metals				LT Price															
LME Aluminum	USD/MT	1,480	1,520	2,200	1,495	1,480	1,510	1,520	1,530	1,550	1,580	1,600	1,620	1,888	1,893	1,680	1,510	1,590	1,670
LME Copper	USD/MT	4,950	5,400	6,200	4,930	4,850	5,250	5,300	5,550	5,700	5,800	6,000	6,200	7,352	6,829	5,505	5,240	5,925	6,800
LME Lead	USD/MT	1,650	1,720	2,200	1,640	1,620	1,700	1,720	1,730	1,760	1,780	1,850	1,870	2,158	2,113	1,785	1,695	1,815	2,060
LME Nickel	USD/MT	9,600	12,000	21,000	9,600	9,500	10,500	11,000	12,500	12,900	13,200	13,400	13,600	15,105	16,950	11,915	10,875	13,275	16,000
LME Tin	USD/MT	15,000	15,450	20,000	15,070	15,000	15,200	15,400	15,500	15,600	15,700	15,900	16,000	22,340	21,902	16,055	15,275	15,800	16,500
LME Zinc	USD/MT	1,790	1,830	2,100	1,620	1,650	1,750	1,800	1,830	1,900	1,950	2,000	2,030	1,940	2,165	1,940	1,760	1,970	2,100
Precious Metals				LT Price															
COMEX Gold	USD/T. oz	1,050	1,030	1,050	1,075	1030.0	1000.0	980.0	960.0	1000.0	1020.0	1030.0	1050.0	1,416	1,266	1,155	995	1,025	1,200
Silver	USD/T. oz	14.7	14.5	16.5	14.7	14.5	14.3	14.1	14.0	14.1	14.4	14.5	14.6	24.0	19.1	15.7	14.3	14.4	15.8
Platinum	USD/T. oz	990	1,100	1,763	910	900.0	1020.0	1030.0	1050.0	1080.0	1120.0	1150.0	1250.0	1,490	1,387	1,060	1,000	1,150	1,300
Palladium	USD/T. oz	620	680	780	600	600.0	655.0	670.0	690.0	690.0	700.0	700.0	710.0	728	803	690	655	700	800
Bulk Commodities				5Y Cyclical															
Hard Coking Coal (Spot)	USD/MT	70	70	125	75	70	68	70	70	70	70	70	70	148	115	88	70	70	85
Thermal Coal Asia (NEWC)	USD/MT	50	45	80	53	51	49	47	45	45	45	45	45	84	71	59	48	45	50
Iron Ore Spot (TSI)	USD/MT	40	40	55	48	40	40	42	40	40	38	39	40	135	97	55	41	39	40
Agriculture																			
CBOT Corn	USd/bu	370	415	N/A	370	395	405	415	400	425	440	475	450	578	415	382	405	450	475
CBOT Soybeans	USd/bu	880	875	N/A	880	885	900	875	900	980	1040	1100	1050	1,406	1,245	950	890	1,040	1,100
CBOT Wheat	USd/bu	490	510	N/A	490	500	515	510	525	550	550	550	550	684	588	508	510	550	575
NYB-ICE Cotton	USd/lb	63.0	63.0	N/A	63.0	63.0	63.0	63.0	63.0	65.0	65.0	65.0	65.0	84.0	76.2	64.0	63.0	65.0	N/A
ICE Coffee	USd/lb	120	135	N/A	120	130	130	135	135	140	145	145	150	126	178	135	135	145	N/A
ICE Cocoa	USD/MT	3,200	3,300	N/A	3,200	3175	3225	3300	3200	3100	3100	3150	3000	2,405	3,010	3,055	3,225	3090	N/A

Source: Citi Research, *subject to revision

Figure 45. Citi 3-6M Winter Commodities Market Outlook (November 2015)*

	Bullish	Neutral	Bearish
Energy		HH Natural Gas	NYMEX WTI, ICE Brent
Base Metals	Copper, Zinc	Nickel, Tin	Aluminium
Precious Metals		Palladium, Platinum	Gold, Silver
Bulks			Iron Ore, Thermal Coal, Met Coal
Agriculture	Coffee, Corn, Sugar	Cotton, Ethanol, Soybeans, Wheat	Cocoa

Source: Source: Citi Commodities Team, *subject to revision, as of mid-November 2015 spot/curve

Figure 46. Companies Mentioned

Company	Ticker	Ccy	Current Price	Target Price	Rating	Citi EPS Rpt Ccy	Citi EPS 2015	Citi EPS 2016	Consensus EPS 2015	Consensus EPS 2016
Acerinox	ACX.MC	€	8.94	10.30	2	€	0.28	0.51	0.25	0.60
Anglo American	AAL.L	£	2.86	4.00	2H	US$	0.70	-0.37	0.80	0.50
Aperam	APAM.AS	€	29.58	45.00	1	US$	2.35	3.78	2.12	3.07
ArcelorMittal	ISPA.AS	€	3.52	5.00	2	US$	-0.87	-0.26	-0.60	0.40
BHP Billiton	BHP.AX	A$	16.27	19.00	2	US$	0.70	0.30	0.90	0.70
BHP Billiton	BLT.L	£	6.88	8.50	2	US$	0.70	0.30	0.90	0.60
Boliden	BOL.ST	SKr	140.10	175.00	1	SKr	11.42	11.99	11.31	13.35
Centamin Egypt	CEY.L	£	0.61	0.72	1	US$	0.10	0.00	0.10	0.10
Ferrexpo	FXPO.L	£	0.20	0.23	3H	US$	0.24	0.02	0.20	0.07
FST Quantum Minerals	FQM.L	£	2.00	3.00	2H	US$	-0.76	0.80	0.14	0.58
Fortescue Metals	FMG.AX	A$	1.81	1.70	3	US$	0.06	-0.04	0.13	0.12
Fresnillo	FRES.L	£	6.64	8.32	1	US$	0.15	0.12	0.19	0.32
Glencore	GLEN.L	£	0.83	1.30	1	US$	0.09	-0.04	0.08	0.10
KAZ Minerals	KAZ.L	£	0.91	1.60	1	US$	0.08	0.43	-0.06	-0.13
Klöckner & Co	KCOGn.DE	€	7.63	8.00	2	€	-0.88	0.49	-1.76	0.17
Lonmin	LMI.L	£	0.01	0.01	2H	US$	0.00	0.00	0.00	0.00
Lundin Mining	LUMIsdb.ST	SKr	21.16	31.00	1	US$	0.01	-0.09	0.07	0.00
Norsk Hydro	NHY.OL	NKr	29.58	40.00	1	NKr	2.73	1.63	2.72	1.92
Nyrstar	NYR.BR	€	1.28	1.70	2H	€	-0.05	-0.07	-0.96	0.01
Outokumpu	OUT1V.HE	€	2.51	4.50	1H	€	-0.73	0.14	-0.62	0.12
Petra Diamonds	PDL.L	£	0.66	0.91	1	US$	0.12	0.18	0.09	0.15
Petropavlovsk	POG.L	£	0.07	0.05	3H	US$	0.02	0.00	0.00	-0.01
Randgold Resourc	RRS.L	£	39.76	49.96	1	US$	1.96	1.26	2.09	2.41
Rio Tinto	RIO.AX	A$	41.76	51.00	1	US$	2.80	1.70	2.60	2.30
Rio Tinto	RIO.L	£	18.83	25.00	1	US$	2.80	1.70	2.60	2.20
Salzgitter	SZGG.DE	€	20.64	30.00	1	€	0.58	2.76	0.28	1.80
SSAB	SSABa.ST	SKr	24.25	35.00	2	SKr	0.88	1.88	0.28	1.43
ThyssenKrupp	TKAG.DE	€	16.83	21.00	2	€	0.98	1.84	1.54	1.44
Vale	VALE.N	US$	3.20	3.50	3	US$	-0.70	-0.24	-0.58	0.11
Vallourec	VLLP.PA	€	8.13	7.00	3	€	-3.35	-2.89	-3.93	-2.33
voestalpine	VOES.VI	€	26.82	28.00	3	€	2.75	2.50	3.16	3.03

Source: Citi Research, and dataCentral. Financials and ratios are calendar year basis. (15 Dec 2015)

Appendix A-1

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Markets Research

Europe
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Metals & Mining

Industry
2016 Outlook

Date
16 December 2015

Recommendation Change

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Breaking the cycle - Management performance to the fore

In a final painful flurry to 2015, many commodity prices have plunged through cost support levels and we are seeing multiple asset closures across commodities. The fall has been larger than expected: our commodity team has downgraded its expectations for most of the industrial commodity prices but expects them to bottom in 2016. Meanwhile balance sheet positioning has been a key differentiator for the equities. While this will continue into 2016, we view strategy execution will become increasingly important. Sector M&A will then be a driver into the second half. For now, we view strong balance sheets and strategy execution is the preference. Rio Tinto remains our top pick.

Commodities through the pain threshold and producers are reacting

Despite commodities continuing to underperform the other asset classes such as equities and bonds, price weakness has continued and most commodities are now trading below long-term real average prices. This has prompted many investors to question whether commodities remain a valid asset class. Our response: "we may be in the sin bin, but we are not out of the game." We think it is too early to call the bottom, but supply cuts are gaining momentum, especially in oil, and we believe the end is in sight for the vicious commodity – fx downward spiral. We think 2016 will bring a flurry of corporate activity including bankruptcies, raising of equity capital, asset sales and M&A, all signs that the commodity cycle is getting closer to finding a floor.

Escaping the correlation habit

The extreme commodity shortage created when China's industrialization met 25 years of underinvestment in the mining industry drove significant price uncertainty and volatility (heightened by a zeroing of global interest rates). A confused market moved to macro investing and asset correlation soared (commodity, currency and equity). We are now seeing the breaking of these correlations as commodity prices hit fundamental, cost-supported levels and we are also seeing more stock selectivity with performance spreads at a four-year high. We have adjusted our target setting framework to favour strong balance sheets and effective strategies. Actions speak louder than words.

We have downgraded Lonmin to Sell

Our commodity team has lowered its pricing expectations post the recent rout. It has trimmed copper, aluminium and iron ore expectations by ~10%, but cut nickel and zinc expectations by ~30%. PGM expectations have lowered 20-30% in response to the weaker Rand. As a result of the changes to commodities and valuations, we have made six recommendation changes: we downgrade Lonmin and Vedanta to Sell, Anglo American and Norsk Hydro to Hold and Acacia and we have upgraded Boliden to Buy.

This report changes recommendations, price targets and estimates for several companies under our coverage. Please see page 11 for details.

Key Changes

Company	Target Price	Rating
AAL.L	1,070.00 to 300.00(GBP)	Buy to Hold
ACAA.L	200.00 to 250.00(GBP)	Hold to Buy
ANTO.L	610.00 to 530.00(GBP)	-
BLT.L	1,300.00 to 935.00(GBP)	-
BOL.ST	175.00 to 170.00(SEK)	Hold to Buy
FRES.L	705.00 to 570.00(GBP)	-
FXPO.L	140.00 to 120.00(GBP)	-
GLEN.L	200.00 to 125.00(GBP)	-
KAZ.L	240.00 to 197.00(GBP)	-
LMI.L	280,00 to 75.00 (GBP)	Buy to Sell
NHY.OL	38.00 to 34.00(NOK)	Buy to Hold
NORDNq.L	3.40 to 2.70(USD)	-
NYR.BR	3.10 to 2.20(EUR)	-
POLYP.L	540.00 to 460.00(GBP)	-
RIO.L	3,500.00 to 3,300.00(GBP)	-
RRS.L	5,050.00 to 4,600.00(GBP)	-
S32.L	90.00 to 68.00(GBP)	-
VED.L	500.00 to 200.00(GBP)	Hold to Sell

Source: Deutsche Bank

Deutsche Bank AG/London

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Another year bites the dust

Was there any special FX?

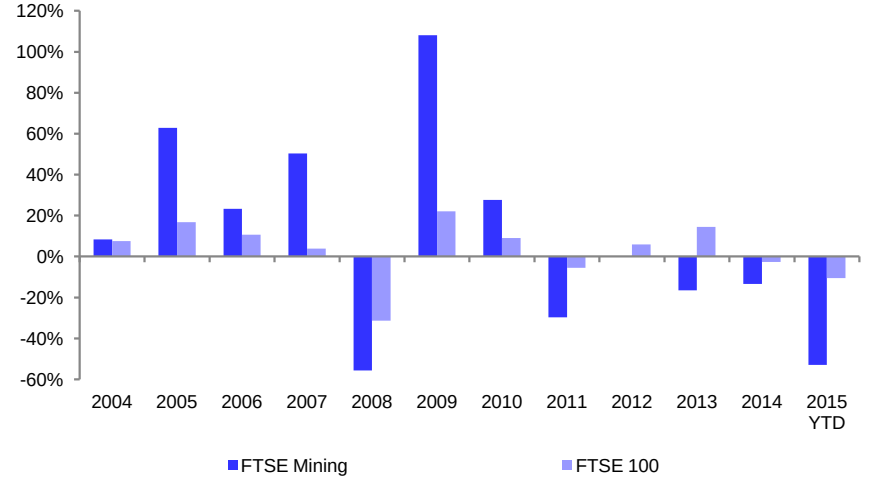
When we looked into 2015, we expected ongoing strengthening of the USD and that, while this would have a negative impact on market sentiment, the cost benefit for the miners would come through and help support the equities. Our thesis was borne out in part at the start of 2015 when we saw the miners generally beat on cost performance, with a healthy helping hand from exchange rates. The equities, however, continued to struggle with a couple of notable exceptions: the Nordic markets took particular note of their weakening currencies relative to the USD and we saw strong performances from Boliden and Norsk Hydro.

Despite better than expected cost performance, the geopolitical uncertainty rendered cyclical investments unappealing – commodities and the mining equities both fell. With speculative positioning on the decline, prices below the marginal cost of production and a US rate rise likely to take out residual investment, 2016 looks set to be the year when physical supply and demand reassert their control of commodity prices.

5 years of underperformance

2015 marked yet another year of underperformance for the UK miners vs the broader UK market. As shown below this now strings together 5 years of underperformance. While the cause is ostensibly the slowing Chinese demand meeting the tail end of capital projects resulting in lower commodity prices; in reality we find ourselves in a directionless market post the China boom period. The certainty provided by highly correlated markets (commodity, currency and equity) has left and the market is yet to find a replacement.

Figure 1: FTSE mining relative to the FTSE 100.



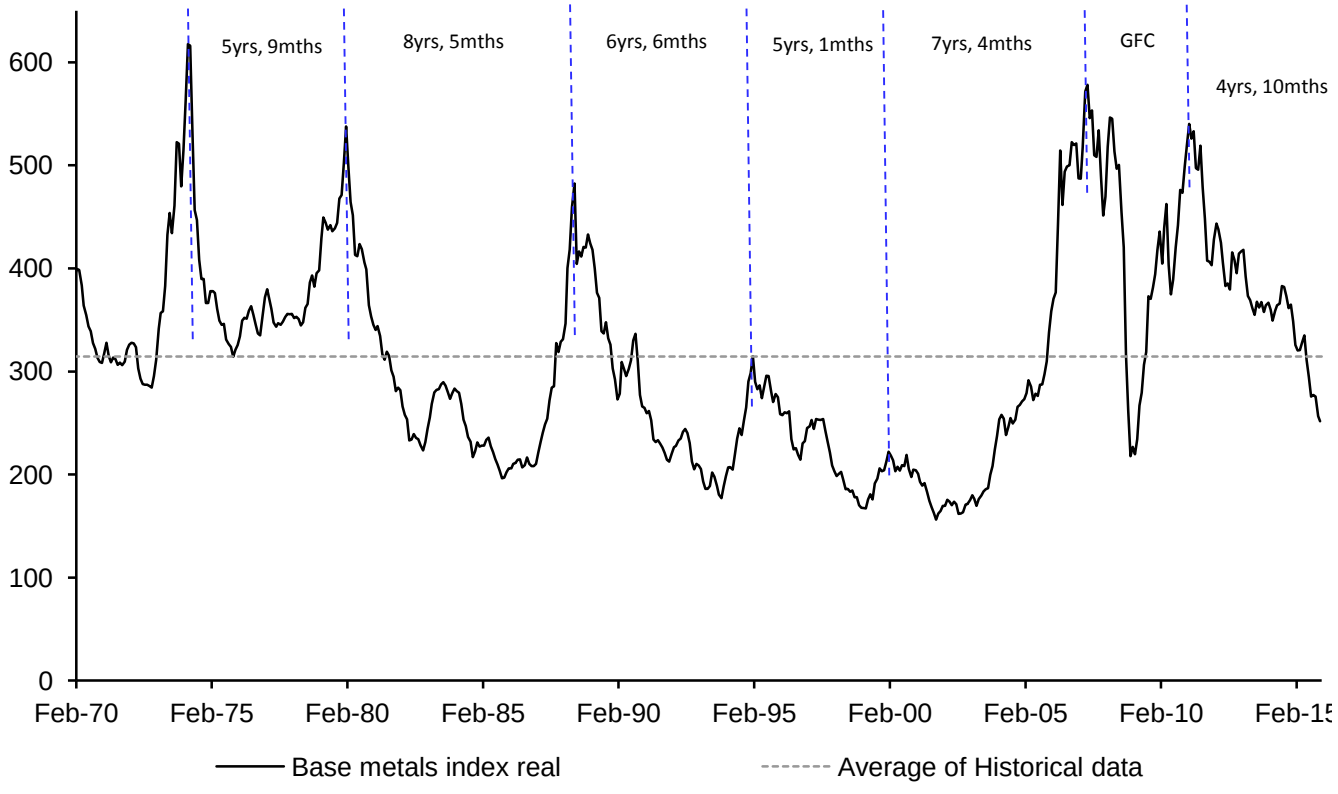
Source: Deutsche Bank

While we expect a number of the correlations to decouple, the bottom will be found when the market is convinced that commodity prices have stopped falling. 2016 is that year in our view. We also expect an increasing level of M&A in the sector as the buy vs. build argument remains attractive.

The 7 year cycle?

The number 7 appears often in behavioral investing discussions and the commodity market is no exception, with the "seven year" cycle cited as a reason for us having some years to go before we see another commodity peak. As shown in the chart below, the shorter term cycles in the base metal prices range between 5 and 9 years. The most recent peak was interrupted by the GFC and would likely have continued for another year or so had the failure of the trust system in global banks not brought an abrupt pause to global trade for a period. While the majority of discussions surrounding this most recent commodity price run are focused on Chinese demand, the shorter term (5-8 year) cycles are driven by the supply side.

Figure 2: Base metal index (Real)



Source: Deutsche Bank, DataStream.

The large upfront capital requirement for mine development usually means the mine developers will need to see prices high enough for long enough in order to maximize the potential IRR of the project. These thresholds are often similar for many projects hence multiple projects are usually stimulated in the event of a commodity price run and will ultimately lead to surplus and price declines once the projects hit the market. It will then take some years for global growth and declining mine production to erode the surplus – once a deficit is achieved,

inventories decline, high cost mines close and ultimately the commodity price recovers and the cycle starts again.

Nearly 5 years since the prices started declining, we are now seeing increasing closures across the full range of commodities in response to the lowered prices. While cost cutting and weaker operating currencies kept many mines afloat, these have nearly run their course (or have certainly decelerated significantly) and we are now in the final run down to the bottom of this most recent cycle. Handling valuations is proving to be difficult, however.

The hump habit

This most recent commodity price spike was characterized by two very significant events:

- A major urbanization event met a world suffering decades of underinvestment in primary industries;
- The rise/peak was interrupted and postponed by a major global banking crisis that impacted the performance of global trade.

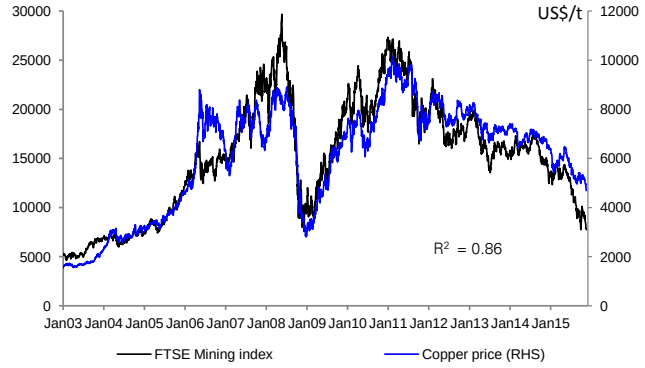
These two events drove a very prolonged and unpredictable commodity price hump. This price hump was further distorted by the introduction of non-natural consumers as the low interest rates emanating from central banks in response to the crisis dis-incentivised investors to keep their principle in cash and commodities were one of the targets of this reallocation of capital. The volatility of the market was extremely unpredictable and consequently many investment vehicles started coincidently reacting to the same macro data releases – the upshot was a significant correlation in performance of asset classes including commodities, fx and equities.

As supply has met demand and commodity prices have retreated to cost support levels (albeit fluid), we expect these correlations to break as investors make more discriminating approaches to asset classes and individual asset performances. However, the learned behavior over the last 8 years will be slow to reverse in some cases. In this environment the leadership performance of the miners will be scrutinized.

Breaking the correlations

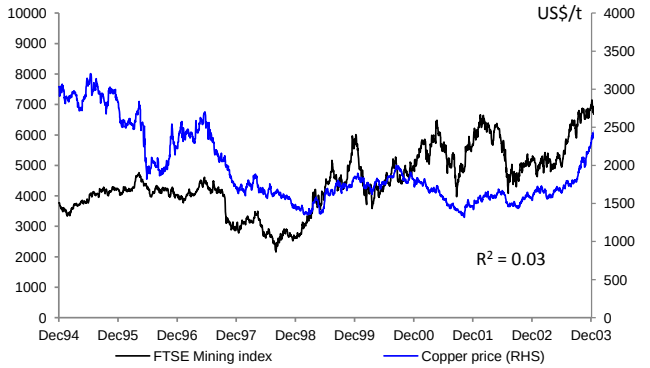
The chart on the left overleaf clearly illustrates this correlation phenomenon with a 0.9 R-squared correlation between the copper price and the FTSE Mining index. The chart on the right however shows the series, but in the period before China: the correlation is close to zero. It is not that the copper price was not important to the earnings of the miners, just that it was relatively predictable and individual company strategies were more important to earnings and company performance and returns. We expect that this will again become the norm as the correlations continue to breakdown.

Figure 3: Copper price and the mining index



Source: Deutsche Bank, DataStream

Figure 4: Copper price and the mining index before China

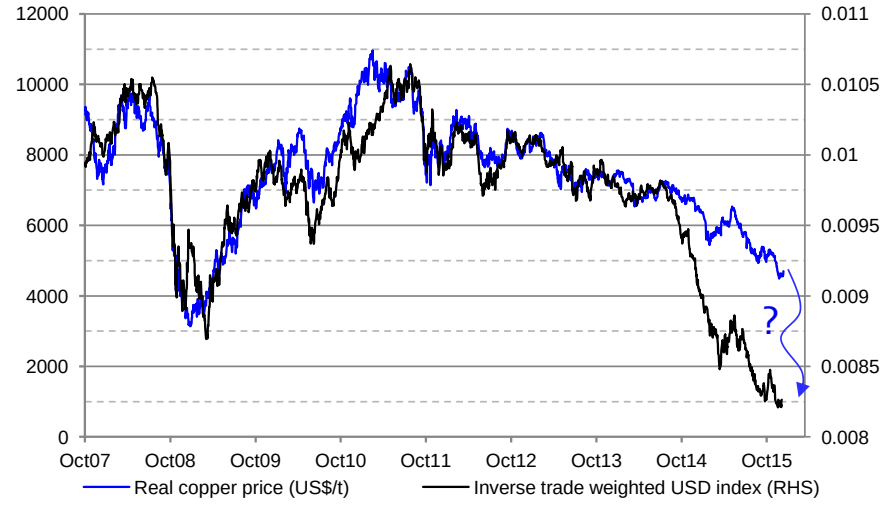


Source: Deutsche Bank, DataStream

Where is the breakdown evidence? Copper and the USD

The most obvious sign of the break in correlation is the copper price and the USD (inverse USD to be accurate). The chart below shows the last 8 years performance of the copper price and the inverse trade-weighted USD. Until late 2014, the performance of the two was closely aligned. Indeed a number of global strategists are suggesting that the copper price will reassert this relationship and fall further (if this is correct then US$1000/t is suggested by the current level of the USD). Copper, or "Doctor Copper" as it used to be known, was a useful indicator of global health, until high Chinese demand and a low interest rate environment obscured its message. This break in the correlation is a reassertion of the copper price reacting to fundamental support in our view and will continue. The longer it continues, the more comfortable the market will be in the new performance regime.

Figure 5: Copper and USD

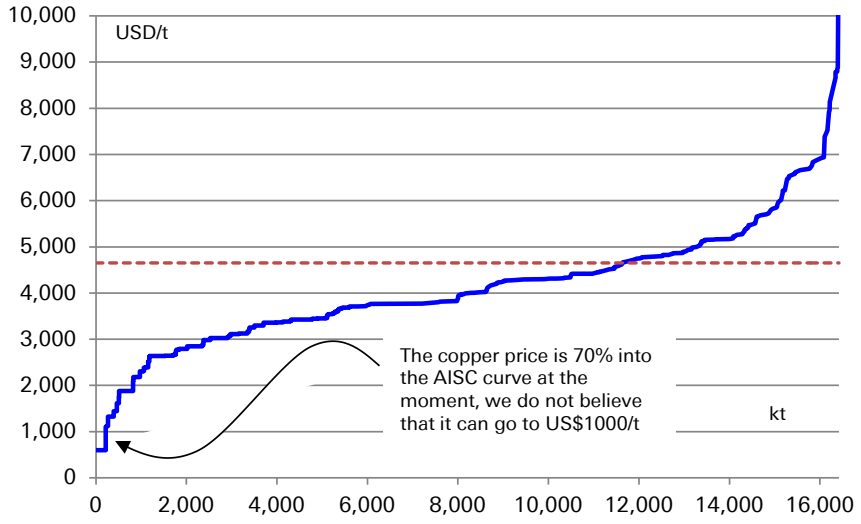


Source: Deutsche Bank, DataStream

What has triggered the breakdown? In our view it is simply that the USD strengthened much faster than other mining costs were retreating and the copper price hit cost support levels, as has been evidenced by a number of mines curtailing production. The chart below shows the current all-in-sustaining-cost (AISC) curve. Note that the spot price is now sitting at the 70%

level of the curve indicating that 30% of global copper production is cash loss making on a sustained basis at the moment. Note also that if the copper price were to fall to US$1000/t, as the USD correlation suggests, then only 4% of global copper supply would be cash generating.

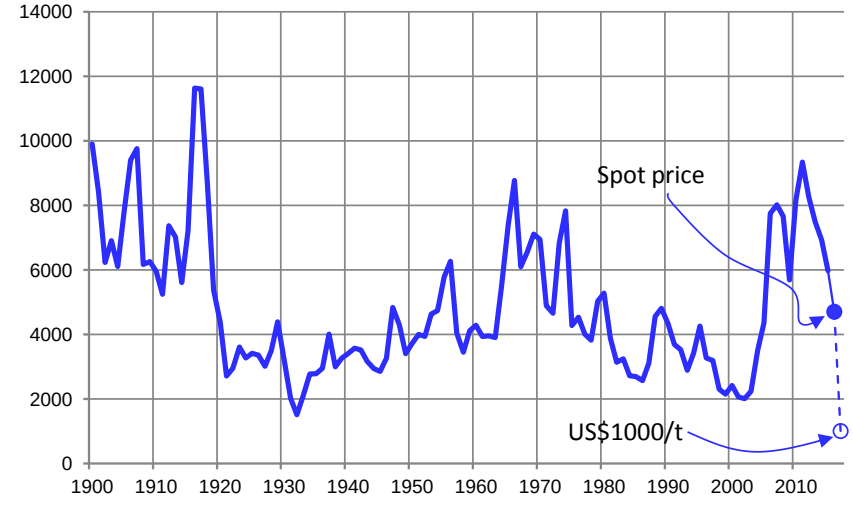
Figure 6: Copper cost curve



Source: Deutsche Bank

US$1000/t would also take us to a century-low level (at least) in real terms with the next lowest point occurring just before World War Two. We are not predicting global recession at DB and don't expect copper to plumb these levels, hence our view that the correlations are breaking down.

Figure 7: US$100/t would be a century low price in real terms



Source: Deutsche Bank

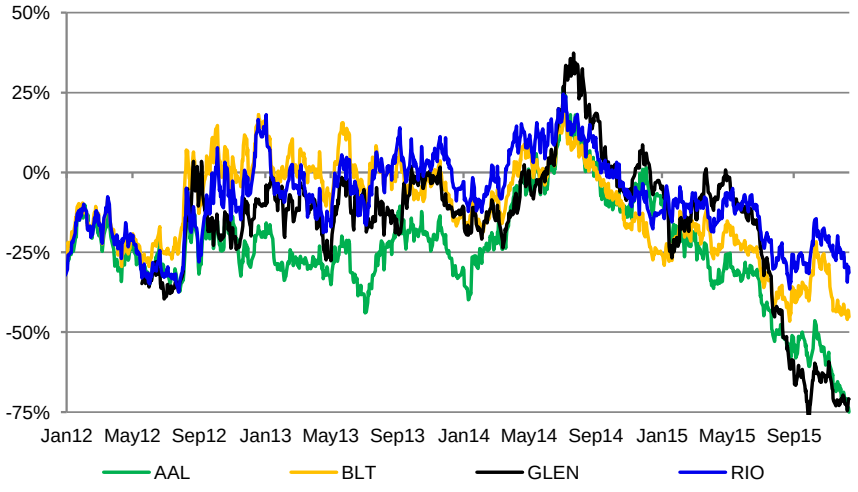
Framing the investment strategy in 2016

Stability first half, M&A second

As we progressed through the back half of 2015, one performance differential was very clear – those miners with better balance sheets outperformed those with stretched balance sheets. In line with the breaking down of correlations, we are also starting to see a second theme emerge, with the outperformance of those companies with well articulated and effective strategies.

Some of this discrimination is evident in the performance of the four UK diversified miners shown in the chart below. It shows the rolling 12 month share price performance – BHP and Rio Tinto with the more robust balance sheets have significantly outperformed. Of note, the best performer is Rio Tinto with its simple, well articulated and executed strategy.

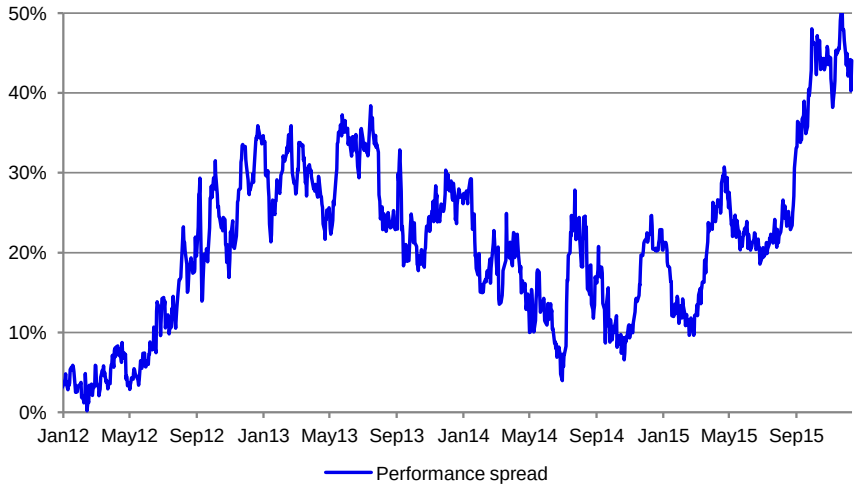
Figure 8: Rolling 12 month performance of the 4 UK diversifieds.



Source: Deutsche Bank, DataStream

The chart below shows the spread in performance between the best and worst performers of the four diversified miners. It is at the largest level seen in the last four years and reflective of a market now willing to differentiate individual company characteristics.

Figure 9: Performance spread between the best and worst performance of the four diversified miners



Source: Deutsche Bank, DataStream

We believe that these two company differentiators will continue to play out in the first half of 2016.

Simplistically, if we split the sector into those companies with strong balance sheets and those with stretched balance sheets, and then also separate the companies by strategic clarity and performance, we have a simple matrix as shown in the figure below. We think those companies in the top right of the matrix are more likely to trade in line with their fundamental valuations.

Figure 10: 1H16 performance framework:

	Stretched Balance sheet	Strong Balance sheet
Clear strategy	Glencore Ferrexpo Nyrstar Kaz Minerals Polymetal Nordgold	Rio Tinto Boliden Randgold Acacia Mining
Unclear or ineffective strategy	Anglo American Vedanta	Antofagasta Hydro BHP South 32 Lonmin Fresnillo Aquarius

Source: Deutsche Bank

While the above framework is conceptual, we have applied a more specific template to our stocks and valuations to set our price targets. Over time, the miners trade in a range between 0.5x and 1.2x NPV and we have applied this range across our stocks based on a ranking measured by balance sheet and performance measures. Specifically, we ranked the companies under our coverage by the following measures:

- Absolute debt levels as measured by end 2015 balance sheet gearing (net debt to net debt plus equity). When the M&A cycle kicks off, this measure will be less relevant, but is important at the moment.
- Improving debt levels as measured by the change in net debt in 2016 as a percentage of shareholders equity. This is also really a free cash flow measure.
- 2016 earnings level as measured by the forecast 2016 PE
- 2016 earnings growth.
- Company strategy performance. This is a binary measure with a forced deviation from the stated dividend policy or a forced equity raising indicating a failure or lack of robustness of the corporate strategy.

The table below shows the outcomes of these for our stock coverage and the resulting modifier to our NPVs for price setting purposes.

Figure 11: Performance modifiers to NPV for price target setting

	2015 Gearing (ND/(ND+ Eq))	Change in debt in 16 as a %of equity	2016 PE	2016 earnings growth	Forced Dividend policy change or rights issue	Combined ranking	P/NPV for TP
Boliden	14%	-10%	10.3	39.7%	No	1	1.20
Acacia Mining	-7%	1%	29.4	11.9%	No	2	1.16
Rio Tinto	22%	-2%	13.0	-21.5%	No	3	1.12
Antofagasta	1%	3%	49.8	41.2%	No	4	1.08
Ferrexpo	79%	-20%	4.7	-53.0%	No	5	1.04
Randgold	-6%	-1%	53.9	-35.2%	No	5	1.04
Aquarius	-24%	1%	-ve	-40.7%	No	7	0.97
Norsk Hydro	-3%	5%	19.8	-51.2%	No	8	0.93
Polymetal	62%	-5%	17.2	-32.7%	No	8	0.93
BHP Billiton	27%	4%	22.2	-26.3%	No	10	0.85
Fresnillo	14%	6%	52.4	23.3%	No	10	0.85
KAZ Minerals	53%	21%	15.3	34.6%	No	12	0.77
Nyrstar	53%	14%	4.6	1236.5%	Yes	13	0.73
Glencore	35%	-11%	21.8	-44.0%	Yes	14	0.69
South32	1%	-3%	-ve	-91.3%	No	15	0.66
Lonmin	11%	-14%	-ve	-98.6%	Yes	16	0.62
Vedanta	37%	-7%	-ve	8.0%	Yes	17	0.58
Anglo American	36%	4%	47.4	-90.5%	Yes	18	0.54
Nordgold	28%	43%	-ve	-114.6%	No	19	0.50

Source: Deutsche Bank estimates/forecasts

Into the second half of 2016, we expect corporate actions and M&A to become an increasing driver of the sector.

Earnings changes

Figure 12: European miner financial year earnings estimates and target price revisions

			Rec	Target	2014	2015E	2016E	2017E
Acacia Mining	(US¢)	Prev	Hold	200	22	9	15	20
		New	Buy	250	22	8	9	25
		% change	Rating Changed	25.0%	0.0%	-9.2%	-39.8%	26.9%
Antofagasta	(US¢)	Prev	Hold	610	47	12	10	27
		New	Hold	530	47	9	13	38
		% change		-13.1%	0.0%	-21.0%	35.0%	42.4%
Anglo American	(US¢)	Prev	Buy	1070	173	82	45	101
		New	Hold	300	173	73	8	72
		% change	Rating Changed	-72.0%	0.0%	-11.0%	-82.2%	-28.7%
Aquarius	(US¢)	Prev	Buy	13	-1	-3	-1	0.7
		New	Buy	13	-1	-3	-2	-1.2
		% change		0.0%	0.0%	0.0%	-76.4%	-268.4%
BHP Billiton	(US¢)	Prev	Hold	1300	247	162	41	61
		New	Hold	935	247	161	37	66
		% change		-28.1%	0.0%	-0.2%	-8.9%	8.3%
Boliden	(SEK)	Prev	Hold	175	6.9	11.6	16.0	21.6
		New	Buy	170	6.9	9.8	13.7	20.5
		% change	Rating Changed	-2.9%	0.0%	-15.4%	-14.4%	-4.8%
Ferrexpo	(US¢)	Prev	Buy	140	49	16	9	9
		New	Buy	120	49	16	7	7
		% change		-14.3%	0.0%	-5.1%	-17.0%	-15.6%
Fresnillo	(US¢)	Prev	Hold	705	7	16	29	39
		New	Hold	570	7	16	20	41
		% change		-19.1%	0.0%	-3.3%	-32.1%	5.1%
Glencore	(US¢)	Prev	Buy	200.0	32.6	12.2	10.9	13.1
		New	Buy	125.0	32.6	10.7	6.0	7.7
		% change		-37.5%	0.0%	-12.5%	-45.0%	-41.1%
Kaz Minerals	(US¢)	Prev	Buy	240	19	8	8	28
		New	Buy	197	19	7	9	34
		% change		-17.9%	0.0%	-14.5%	15.7%	22.9%
Lonmin	(US¢)	Prev	Buy	2.8	0.1	-16	0.0	25
		New	Sell	0.8	0.1	-16	-0.2	0.0
		% change	Rating Changed	-71.4%	0.0%	0.0%	-177.2%	-100.1%
Nordgold	(US¢)	Prev	Hold	3.40	25.8	51.9	-0.9	5.1
		New	Hold	2.70	25.8	51.0	-7.4	14.3
		% change		-20.6%	0.0%	-1.8%	-730.8%	178.9%
Norsk Hydro	(NOK)	Prev	Buy	38.0	1.8	3.19	1.86	2.41
		New	Hold	34.0	1.8	3.12	1.52	3.17
		% change	Rating Changed	-10.5%	0.0%	-2.3%	-18.2%	31.9%
Nyrstar	(€)	Prev	Hold	3.10	-0.27	0.07	0.56	0.88
		New	Hold	2.20	-0.27	0.02	0.28	0.53
		% change		-29.0%	0.0%	-69.7%	-51.2%	-40.0%
Polymetal	(US¢)	Prev	Hold	540.0	-0.6	0.68	0.66	0.47
		New	Hold	460.0	-0.6	0.66	0.45	0.57
		% change		-14.8%	0.0%	-1.9%	-32.1%	21.5%
Randgold	(US¢)	Prev	Buy	5050	252	186	140	189
		New	Buy	4600	252	180	117	261
		% change		-8.9%	0.0%	-3.3%	-16.8%	37.7%
Rio Tinto	(US¢)	Prev	Buy	3500	502	307	265	381
		New	Buy	3300	502	281	220	351
		% change		-5.7%	0.0%	-8.7%	-16.9%	-7.7%
South32	(US¢)	Prev	Buy	90	8	11	5	7
		New	Buy	68	8	11	0	3
		% change		-24.4%	0.0%	0.0%	-99.2%	-57.2%
Vedanta	(US¢)	Prev	Hold	500	14	-14	-124	-132
		New	Sell	200	14	-14	-137	-148
		% change	Rating Changed	-60.0%	0.0%	0.0%	-10.4%	-12.1%

Source: Company data, Deutsche Bank

The UK sector valuation comparisons are shown in the table below:

Figure 13: European metals & mining valuation table (Calendar year)

				MCap	P/E			EV/EBITDA			P/CFPS			Div Yld	P/NPV
Company	**Rec**	**Price**	**Target**	**US$mn**	**2014**	**2015E**	**2016E**	**2014**	**2015E**	**2016E**	**2014**	**2015E**	**2016E**	**2015E**	**Current**
Acacia Mining plc	Buy	160	250	1,000	17.4	29.5	26.4	5.7	4.6	4.9	5.4	4.9	6.0	1.7	0.69
Anglo American PLC	Hold	281	300	5,501	13.8	5.9	62.8	17.6	4.3	7.4	5.6	1.6	2.5	7.5	0.36
Antofagasta PLC	Hold	412	530	6,182	27.9	67.2	47.6	7.7	10.6	11.4	7.1	6.1	13.1	0.5	0.73
Aquarius Platinum Ltd	Buy	11	12.9	246	nm	nm	nm	19.8	nm	nm	23.8	24.9	24.7	0.0	2.04
BHP Billiton	Hold	669	935	59,943	14.0	21.5	21.3	7.5	7.4	5.8	6.7	5.4	3.9	8.6	0.62
Boliden AB	Buy	140.1	170.0	4,517	15.4	14.3	10.3	6.0	6.1	4.7	5.0	5.9	5.5	2.1	0.99
Ferrexpo Plc	Buy	21	120	185	4.3	2.0	4.3	3.6	3.6	4.7	4.2	1.3	1.8	10.5	0.17
Fresnillo PLC	Hold	665	570	7,453	186.9	63.2	51.3	19.0	13.0	12.7	83.0	10.1	15.2	0.8	1.02
Glencore	Buy	80	125	16,140	16.7	11.3	20.3	9.1	5.3	5.4	8.7	1.2	2.5	5.0	0.44
KAZ Minerals PLC	Buy	90	197	614	22.1	19.4	14.4	5.7	9.8	10.3	9.0	nm	4.3	0.0	0.34
Lonmin Plc	Sell	0.84	0.75	350	nm	nm	nm	nm	nm	2.3	nm	nm	nm	0.0	1.00
Nordgold N.V.	Hold	2.75	2.70	1,030	6.2	5.4	nm	2.4	2.9	6.7	1.8	2.5	7.2	5.6	0.77
Norsk Hydro ASA	Hold	29.58	34.0	6,938	18.6	9.5	19.5	5.9	3.4	3.8	11.6	4.5	9.8	4.2	0.81
Nyrstar NV	Hold	1.27	2.20	455	nm	61.7	4.5	4.2	4.7	3.2	1.7	7.1	1.1	0.0	0.42
Polymetal International	Hold	539	460	3,459	nm	12.2	18.2	6.9	6.7	8.4	7.1	7.4	6.8	6.1	1.91
Randgold Resources	Buy	4042	4600	5,731	29.7	34.0	52.4	16.6	18.8	17.5	21.9	17.1	15.2	1.0	0.88
Rio Tinto PLC	Buy	1848	3300	50,712	10.5	10.0	12.7	6.3	5.4	5.9	6.8	5.0	5.8	7.7	0.63
South32	Buy	47	68	3,806	nm	15.1	nm	nm	4.2	3.1	nm	4.0	3.3	0.0	0.69
Vedanta Resources PLC	Sell	276	200	1,159	nm	nm	nm	6.3	8.4	7.9	1.7	1.8	0.9	1.2	0.82
Weighted Average				**177,650**	**20.9**	**18.9**	**21.8**	**8.0**	**6.8**	**6.6**	**10.5**	**5.3**	**5.8**	**6.4**	**0.67**

Source: Deutsche Bank, Company data, Priced 14 DEC 2015

Commodity review

The changes to our commodity and FX assumptions are summarised in the tables below:

Figure 14: New price estimates – Base metals & Precious metals

	Unit	4Q15	1Q16	2Q16	3Q16	4Q16	2015	2016	2017	2018	2019	2020
Base Metals												
Aluminium	USc/lb	67	66.0	67.6	69.4	71.7	75.3	68.7	72.4	77.1	81.9	86.7
Copper	USc/lb	221	208.7	217.8	204.2	199.6	249.8	207.6	214.4	242.0	269.5	297.1
Lead	USc/lb	75	76.2	77.1	78.0	79.4	80.7	77.7	82.0	87.9	93.9	99.8
Nickel	USc/lb	428	408.3	431.0	453.7	476.4	538.1	442.4	533.1	590.2	647.3	704.4
Tin	USc/lb	689	680.6	680.6	680.6	680.6	729.9	680.6	726.0	749.4	772.9	796.4
Zinc	USc/lb	73	73.5	76.2	77.1	78.0	87.6	76.2	80.0	86.9	93.9	100.9
Base Metals												
Aluminium	USD/t	1478	1455	1490	1530	1580	1660	1514	1595	1700	1806	1911
Copper	USD/t	4866	4600	4800	4500	4400	5505	4575	4725	5333	5940	6548
Lead	USD/t	1651	1680	1700	1720	1750	1779	1713	1808	1938	2069	2199
Nickel	USD/t	9425	9000	9500	10000	10500	11861	9750	11750	13008	14267	15525
Tin	USD/t	15194	15000	15000	15000	15000	16087	15000	16000	16518	17035	17553
Zinc	USD/t	1612	1620	1680	1700	1720	1931	1680	1763	1916	2070	2224
Precious metals												
Gold	USD/oz	1103	1100	1050	1000	980	1160	1033	1100	1150	1233	1317
Silver	USD/oz	14.8	14.8	14.6	14.0	13.6	15.7	14.3	15.3	16.5	17.5	18.5
Platinum	USD/oz	899	880	900	1000	950	1053	933	948	1150	1250	1390
Palladium	USD/oz	605	580	620	650	660	692	628	670	850	900	920
Rhodium	USD/oz	750	730	780	840	800	958	788	775	850	850	900
Ruthenium	USD/oz	48	55	55	55	55	50	55	60	80	100	100

Source: Deutsche Bank

Figure 15: New price estimates – Steel making raw materials

	Unit	4Q15	1Q16	2Q16	3Q16	4Q16	2015	2016	2017	2018	2019	2020
Iron ore												
CIF China fine ore	USD/t	48.1	50.0	42.0	45.0	48.0	56.0	46.3	51.5	55.6	59.8	63.9
Coking Coal												
Premium hard coking	USD/t	89.0	83.0	82.0	85.0	85.0	102.3	83.8	89.5	99.4	109.2	119.1
Standard hard coking	USD/t	77.8	72.6	71.7	74.3	74.3	89.4	73.2	78.2	86.9	95.5	104.1
Semi soft coking	USD/t	66.8	62.3	61.5	63.8	63.8	75.9	62.8	67.1	74.5	81.9	89.3
Other Bulks												
Chrome Ore	USD/t	225.0	230.00	230.00	230.00	230.00	225.00	230.0	230.0	230.0	230.0	205.5
Ferro-chrome	USc/lb	125.0	125.0	125.0	125.0	125.0	125.0	125.0	120.0	115.0	110.0	98.3
Manganese ore	USc/dmtu	3.0	3.0	3.0	3.0	3.0	3.2	3.0	3.1	3.2	3.3	3.7
Ferro-manganese	USD/t	950	964	964	979	979	950	971	1,001	1,037	1,026	1,012

Source: Deutsche Bank

Figure 16: New price estimates – Minor metals, Energy & Fx

	Unit	4Q15	1Q16	2Q16	3Q16	4Q16	2015	2016	2017	2018	2019	2020
Minor metals												
Cobalt (99.3%)	USD/lb	13.0	13.0	13.0	12.5	12.0	13.2	12.6	12.0	13.0	11.8	10.6
Molybdenum	USD/lb	5.90	5.50	6.00	6.00	6.00	7.54	5.88	6.50	7.00	7.43	7.85
Energy												
Oil West Tex	USD/bbl	43.6	45.0	50.0	50.0	50.0	49.2	48.8	55.0	65.0	65.0	66.0
Japanese thermal coal	USD/t	67.8	67.8	58.0	58.0	58.0	71.4	60.5	53.5	54.0	55.6	57.2
Uranium (U3O8)	USD/lb	55.00	55.00	58.00	58.00	58.00	52.74	57.25	59.49	62.05	64.22	64.54
Foreign Exchange												
Euro	USD/EUR	1.09	1.03	0.97	0.94	0.92	1.11	0.96	0.88	0.93	1.05	1.10
Australia	USD/AUD	0.721	0.694	0.670	0.670	0.640	0.754	0.668	0.603	0.625	0.700	0.750
South Africa	ZAR/USD	14.05	14.48	14.76	15.03	15.31	12.80	14.90	15.57	14.34	12.97	13.08

Source: Deutsche Bank

Figure 17: Changes from previous forecast

	4Q15	1Q16	2Q16	3Q16	4Q16	2015	2016	2017	2018	2019	2020
Base Metals											
Aluminium	-10.42%	-10.19%	-6.88%	-3.16%	-4.24%	-2.60%	-6.12%	-5.06%	-5.54%	-11.40%	-16.03%
Copper	-11.53%	-8.00%	0.00%	0.00%	2.33%	-2.05%	-1.61%	-1.56%	-6.76%	-10.52%	-13.37%
Lead	-8.77%	-5.62%	-5.56%	-1.71%	-3.85%	-2.27%	-4.20%	-2.30%	0.42%	-1.95%	-3.95%
Nickel	-15.85%	-30.77%	-38.71%	-31.03%	-22.22%	-3.71%	-30.97%	-26.56%	-29.16%	-22.88%	-25.59%
Tin	-5.04%	-9.09%	-9.09%	-9.09%	-9.09%	-1.19%	-9.09%	-10.11%	-13.24%	-15.98%	-18.40%
Zinc	-17.32%	-26.36%	-25.33%	-26.09%	-26.81%	-4.47%	-26.15%	-28.06%	-29.03%	-25.50%	-22.17%
Precious metals											
Gold	-2.0%	-1.3%	-4.5%	-9.1%	-9.7%	-0.5%	-6.1%	0.0%	0.0%	-3.9%	-7.14%
Silver	-4.1%	-6.3%	-9.9%	-15.7%	-20.0%	-1.0%	-13.1%	-11.3%	-8.3%	-12.3%	-15.60%
Platinum	-8.3%	-16.2%	-25.0%	-20.0%	-23.4%	-2.1%	-21.3%	-26.6%	-14.8%	-13.8%	-7.33%
Palladium	-4.0%	-17.1%	-24.4%	-22.2%	-8.3%	-0.9%	-18.4%	-18.3%	0.0%	0.0%	0.00%
Rhodium	-11.8%	-18.9%	-32.2%	-27.0%	-20.0%	-3.2%	-25.0%	-35.4%	-37.0%	-45.3%	-47.06%
Ruthenium	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.00%
Steel making raw materials											
Iron ore											
CIF China fine ore	-3.8%	0.0%	-6.7%	0.0%	-11.1%	-0.9%	-4.6%	-8.0%	-9.8%	-11.3%	-12.59%
Coking Coal											
Premium hard coking	0.0%	-4.6%	-3.5%	-5.6%	-7.6%	0.0%	-5.4%	-5.8%	-7.7%	-9.2%	-10.36%
Standard hard coking	0.0%	-4.6%	-3.5%	-5.6%	-7.6%	0.0%	-5.4%	-5.8%	-7.7%	-9.2%	-10.36%
Semi soft coking	0.0%	-4.6%	-3.5%	-5.6%	-7.6%	0.0%	-5.4%	-5.8%	-7.7%	-9.2%	-10.36%
Other Bulks											
Chrome Ore	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-11.11%
Ferro-chrome	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-11.11%
Manganese ore	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.00%
Ferro-manganese	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.00%
Minor metals											
Cobalt (99.3%)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-5.32%	-11.11%
Molybdenum	0.00%	0.00%	0.00%	-7.69%	-7.69%	0.00%	-4.08%	-7.14%	-6.67%	-20.44%	-29.69%
Energy											
Oil West Tex	-9.23%	-10.00%	0.00%	-7.41%	-7.41%	-2.20%	-6.25%	-5.17%	0.00%	-2.91%	-4.33%
Japanese thermal coal	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.93%	0.00%	-0.61%	-1.17%
Uranium (U3O8)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Foreign Exchange											
Euro (USD/EUR)	2.27%	4.31%	0.00%	0.00%	0.00%	0.55%	1.12%	0.14%	0.00%	0.00%	0.00%
Australia (USD/AUD)	1.68%	-0.18%	-2.19%	0.00%	-2.29%	0.40%	-1.15%	0.42%	-3.85%	-6.67%	0.00%
South Africa (ZAR/USD)	7.38%	10.70%	11.74%	12.75%	13.75%	2.66%	12.24%	16.39%	9.14%	0.45%	3.17%

Source: Deutsche Bank

Figure 18: Changes from previous period

	4Q15	1Q16	2Q16	3Q16	4Q16	2015	2016	2017	2018	2019	2020
Base Metals											
Aluminium	-7.3%	-1.6%	2.4%	2.7%	3.3%	-12.3%	-8.8%	5.4%	6.6%	6.2%	5.8%
Copper	-7.7%	-5.5%	4.3%	-6.2%	-2.2%	-19.6%	-16.9%	3.3%	12.9%	11.4%	10.2%
Lead	-3.9%	1.7%	1.2%	1.2%	1.7%	-15.7%	-3.8%	5.5%	7.2%	6.7%	6.3%
Nickel	-11.1%	-4.5%	5.6%	5.3%	5.0%	-30.0%	-17.8%	20.5%	10.7%	9.7%	8.8%
Tin	-0.2%	-1.3%	0.0%	0.0%	0.0%	-26.5%	-6.8%	6.7%	3.2%	3.1%	3.0%
Zinc	-12.7%	0.5%	3.7%	1.2%	1.2%	-10.8%	-13.0%	4.9%	8.7%	8.0%	7.4%
Precious metals											
Gold	-2.0%	-0.2%	-4.5%	-4.8%	-2.0%	-8.4%	-11.0%	6.5%	4.5%	7.3%	6.8%
Silver	-1.1%	0.2%	-1.4%	-4.1%	-2.9%	-17.7%	-9.3%	7.0%	8.2%	6.1%	5.7%
Platinum	-9.3%	-2.1%	2.3%	11.1%	-5.0%	-24.0%	-11.5%	1.6%	21.4%	8.7%	11.2%
Palladium	-1.9%	-4.1%	6.9%	4.8%	1.5%	-13.9%	-9.3%	6.8%	26.9%	5.9%	2.2%
Rhodium	-9.1%	-2.7%	6.8%	7.7%	-4.8%	-18.2%	-17.8%	-1.6%	9.7%	0.0%	5.9%
Ruthenium	0.0%	14.6%	0.0%	0.0%	0.0%	-23.6%	11.1%	9.1%	33.3%	25.0%	0.0%
Steel making raw materials											
Iron ore											
CIF China fine ore	-12.3%	4.0%	-16.0%	7.1%	6.7%	-42.3%	-17.4%	11.4%	8.0%	7.4%	6.9%
Coking Coal											
Premium hard coking	-4.3%	-6.7%	-1.2%	3.7%	0.0%	-18.5%	-18.1%	6.9%	11.0%	9.9%	9.0%
Standard hard coking	-4.3%	-6.7%	-1.2%	3.7%	0.0%	-18.5%	-18.1%	6.9%	11.0%	9.9%	9.0%
Semi soft coking	-4.3%	-6.7%	-1.2%	3.7%	0.0%	-14.7%	-17.2%	6.9%	11.0%	9.9%	9.0%
Other Bulks											
Chrome Ore	0.0%	2.2%	0.0%	0.0%	0.0%	11.8%	2.2%	0.0%	0.0%	0.0%	-10.6%
Ferro-chrome	0.0%	0.0%	0.0%	0.0%	0.0%	12.4%	0.0%	-4.0%	-4.2%	-4.3%	-10.6%
Manganese ore	3.4%	-0.2%	0.0%	1.5%	0.0%	-37.0%	-4.2%	3.0%	3.4%	2.6%	11.4%
Ferro-manganese	0.0%	1.5%	0.0%	1.5%	0.0%	-16.5%	2.3%	3.0%	3.6%	-1.0%	-1.4%
Minor metals											
Cobalt (99.3%)	0.0%	0.0%	0.0%	-3.8%	-4.0%	-5.6%	-4.4%	-5.0%	8.3%	-9.2%	-10.1%
Molybdenum	-25.3%	-6.8%	9.1%	0.0%	0.0%	-35.2%	-22.1%	10.6%	7.7%	6.1%	5.7%
Energy											
Oil West Tex	-6.6%	3.3%	11.1%	0.0%	0.0%	-47.1%	-0.9%	12.8%	18.2%	0.0%	1.5%
Japanese thermal coal	0.0%	0.0%	-14.5%	0.0%	0.0%	-16.3%	-15.3%	-11.5%	0.9%	3.0%	2.9%
Uranium (U3O8)	5.8%	0.0%	5.5%	0.0%	0.0%	7.9%	8.6%	3.9%	4.3%	3.5%	0.5%
Foreign Exchange											
Euro (USD/EUR)	-1.9%	-5.5%	-6.5%	-2.6%	-2.7%	-16.3%	-13.4%	-9.0%	5.6%	13.5%	4.8%
Australia (USD/AUD)	-0.8%	-3.8%	-3.4%	0.0%	-4.5%	-16.5%	-11.3%	-9.9%	3.7%	12.0%	7.1%
South Africa (ZAR/USD)	5.7%	3.1%	1.9%	1.9%	1.8%	17.8%	16.4%	4.5%	-7.9%	-9.6%	0.9%

Source: Deutsche Bank

Industrial metals

Supply rebalancing gains momentum

The barriers to exit in many metals markets are high. These barriers range from the need to cover high fixed cost bases, take-or-pay supply contracts; pressure and incentives from governments to maintain employment and balance current accounts to a struggle for survival. 2015 did however mark the start of the supply curtailments in response to low and falling prices. There are some differences between the oil and the metals markets however. In the case of oil, demand was reasonably robust, and the oversupply was driven by a supply glut. In metals, the industry still has to adjust to structurally lower Chinese demand while long gestation projects continue to add tonnes to the market.

We think the critical mass in this adjustment process will come in the latter half of 2016 for oil, but not so for the industrial metals. In the industrial metal complex, it was only toward the end of 2015 that any significant capacity cuts have been announced. Glencore has taken the industry lead in the base metals, with cuts of 500kt in mined zinc (c.3.5% of the market) and copper (c.2% of the market). In aluminium Alcoa announced cuts of 500kt (1% of global supply), but we think more cuts from China is needed to be truly effective. More recently, Chinese smelters (copper ~200kt, zinc ~500kt and nickel ~120kt) announced a raft of cuts. These are partly in response to cuts by the miners in our view however. The magnitude of these cuts is not sufficient to support prices, except for potentially the Nickel market. In comparing the supply response during the global financial crisis, it was only when the cuts exceeded 10% of the market that prices started to find a floor. We see supply cuts gathering momentum in 2016, but the market will be wary of producers reversing their decision at the first sign of a price recovery. The adjustment process this time round will be much slower than during the GFC, and we only expect a price stabilisation in 2017, when the markets start to look more balanced.

The demand outlook for oil remains healthier than that of the industrial metals. This statement deserves some clarification. In absolute terms the demand growth in many metals is likely to be higher than that of oil, however the rate of growth in many metals is likely to be half the rate seen over the past five years. Oil demand is likely to be only marginally lower over the next five years due to the more price elastic response and the fact that, oil demand growth is much less sensitive to the Chinese economic slowdown. The net result is that although we forecast metal demand growth to remain positive, producer and indeed market expectations are still too high in our view. The slowdown in Chinese metal demand is structural in our view, with over 60% of Chinese demand related to; infrastructure, property and industrial manufacturing. The remaining 40% is related to consumer demand.

The following section on base metals and bulks has been contributed by our commodities analyst:

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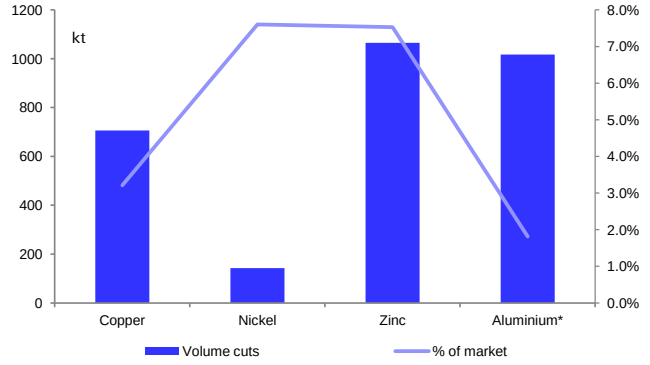
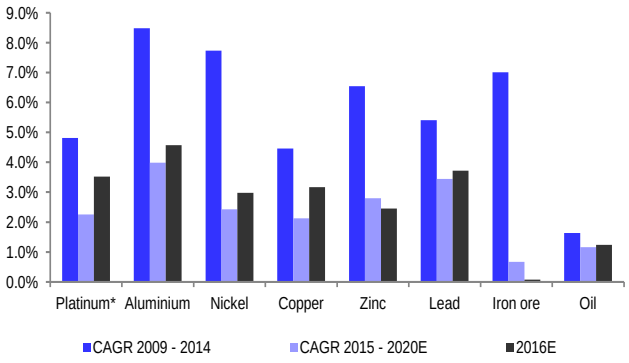
Figure 19: Base metal production cuts as a percentage of the market



*Source: Deutsche Bank, Company Reports, *excluding Chinese capacity cuts as net additions far outweigh closures*

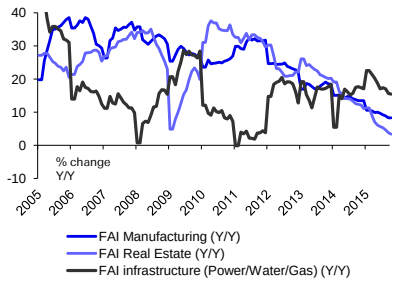
Figure 20: Metal and oil demand growth forecasts



*Source: Deutsche Bank, Wood Mackenzie, *excludes investment demand*

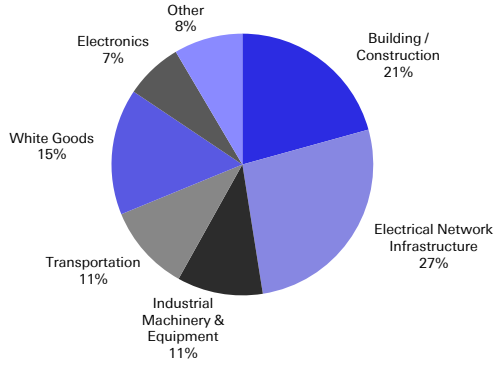
Unfavourable demographics with an ageing working population is the main driver for slower metals demand in property related demand sectors. We forecast demand growth from the property sector to be essentially flat with lower "new" demand being offset by replacement demand as lower quality buildings are upgraded. Metal demand from infrastructure is also likely to be low single digits, with many of the tier 1 and tier 2 cities close to being fully developed in our view. Infrastructure build in the lower tier cities offers some upside as does the upgrading of some early infrastructure builds. However, the jury is still out as to whether the more limited employment and social benefits will entice the general population to relocate to these tier 3 cities. The over-capacity in many basic industrial sectors such as mining, metal refining and processing, ship-building has led to a significant decline in capex. Basic industry is unlikely to be a driver of metals demand until the over capacity is squeezed out of the market. Industries further down the value chain tend to be more knowledge driven and less metal intensive, and any growth in these sectors is unlikely to offset the weakness in the basic industries. Demand growth in Auto's and white goods remains the bright spot for Chinese metals demand. We forecast mid single digit demand growth with rising metals intensity per unit as higher specification models are purchased. The net result is flat to falling demand growth in steel and low single digit demand growth in the base metals.

Figure 21: Falling Chinese FAI



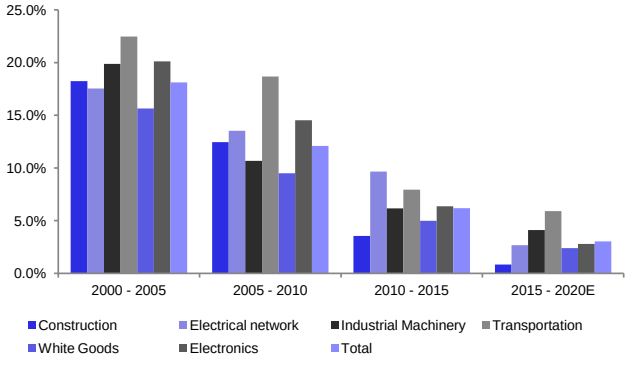
Source: Deutsche Bank, Wind

Figure 22: Chinese copper demand by sector: demand is weighted towards FAI



Source: Deutsche Bank

Figure 23: Chinese copper demand growth by sector: Demand growth remains positive, but structurally lower

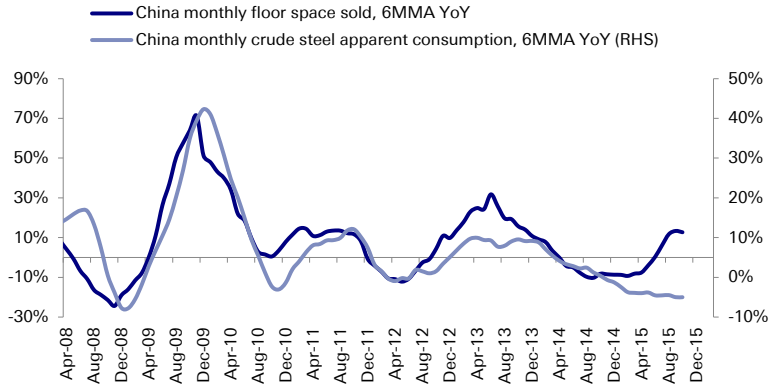


Source: Deutsche Bank

A cyclical rebound in off a low base

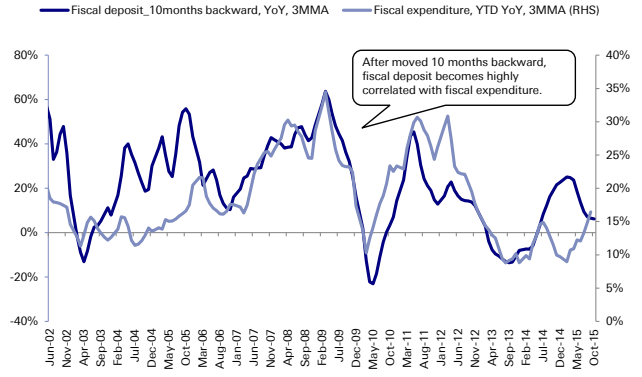
Although we think that much of the metal demand slowdown in China is structural, the cyclical weakness in the property market, weak land sales and continued anti-corruption investigations into some of the higher profile state infrastructure companies has exacerbated the structural slowdown. We think that there is a reasonable probability of a modest cyclical rebound in demand for 2016. Property sales have improved off a low base, but as yet there has not been a sustained pick-up in new starts. Land sales have improved, again off a low base, and this has resulted in a topping up of state coffers, which has allowed a re-acceleration in infrastructure spending. The end of anti-corruption investigations will also allow some more freedom of action, especially at the local government level. Declining investment into manufacturing capacity will continue to be a drag on the sector, as over capacity results in falling capex.

Figure 24: Apparent crude steel consumption versus floor space sold



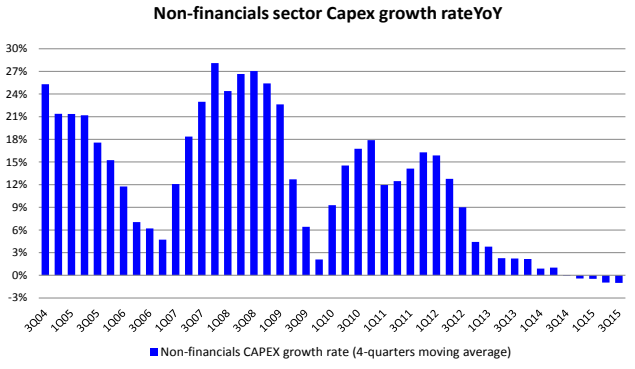
Source: Deutsche Bank, WSA, CEIC

Figure 25: Chinese Fiscal deposits versus fiscal expenditure



Source: Deutsche Bank, NBS

Figure 26: Non-financial sector capex growth rate Y/Y

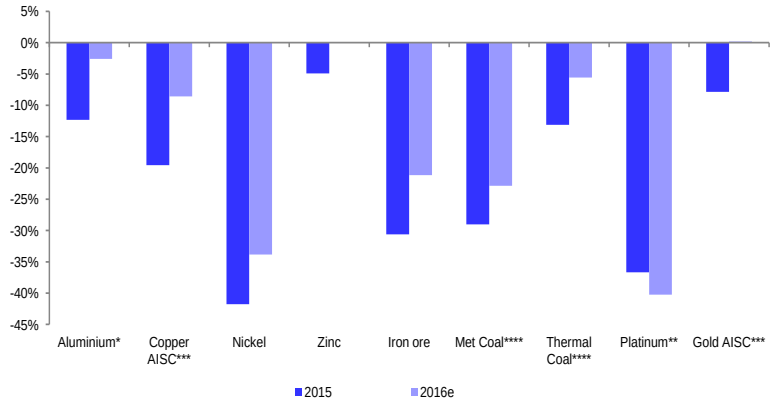


Source: Deutsche Bank, Wind

A crescendo of corporate activity

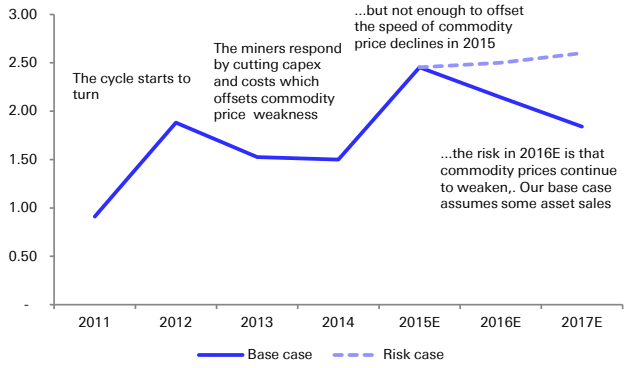
The mining sector is under severe stress, which we think will culminate in a flurry of corporate activity in 2016. The producers have continued to cut capex and operating costs, with the help of falling producer currencies trying to outpace the fall in prices. We continue to see further capex declines and cost cutting, but we believe the ability to cut much more is now limited. Cashflows and balance sheets remain under pressure. Dividends in all but a select few companies will be cut, asset sales are likely to accelerate and we expect to see a rise in M&A. At the opposite end of the spectrum, we expect to see a few companies in administration and the number of rights issues increasing over the course of the year, as companies look to repair balance sheets. The first wave of rights issues were seen in 2015 with the under pressure PGM producers Lonmin and Impala first out of the starting blocks. The crescendo of activity in the sector is likely to mark the bottom, and as long as the balance sheet repair process is accompanied by supply discipline, the outlook for the sector should improve towards the end of 2016.

Figure 27: Spot metal prices versus marginal cost



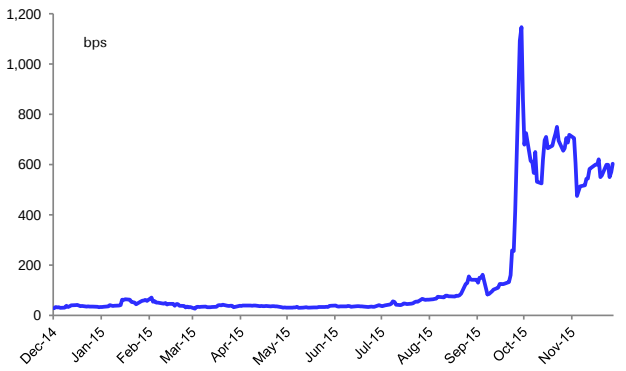
*Source: Deutsche Bank, wood Mackenzie, *incl US MidWest premium, **at spot Pd, Rh and Rand, ***incl sustaining capex, ****Seaborne market*

Figure 28: Large cap* miner net debt to EBITDA



*Source: Deutsche Bank, Company reports, *Mkt cap weighted BHPB, Rio, Barrick, Freeport, Alcoa, Norilsk, Alcoa, Glencore, Southern Copper, Anglo American and Vale*

Figure 29: Glencore 1Y CDS spread



Source: Deutsche Bank, Bloomberg Finance LP

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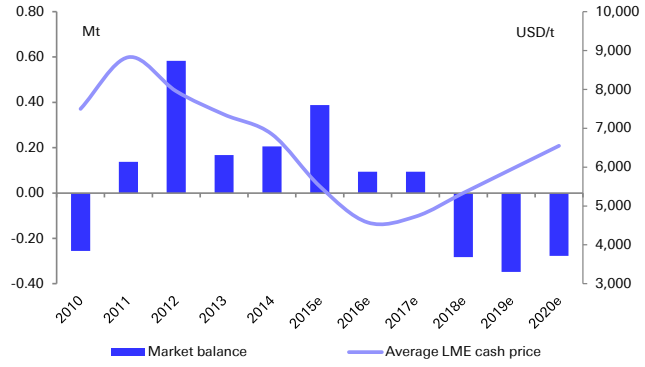
Copper: Trouble at the Top

- Even post the c.600kt of mined capacity cuts announced so far, we still forecast a balanced market at best in 2016 and 2017E. Given our view that Chinese and ergo global copper demand growth will remain lower than the past five year trend, we expect the copper price to remain under pressure. On the upside, we see improving grid spend and falling inventory which suggests a pick-up in apparent demand. A recovery in grid spend in China and some pull through from the property sector leads to our improving demand forecast for 2016E. On the downside, we still see further deflation in the industry and hence cost curve support will also be lower once more. If the 90 the percentile on the C1 cost curve holds as the support level (we think it will), the copper price could trade down to USD4,000/t. Our average forecast for 2016E is USD4,575/t and USD4,725/t in 2017E.
- We think a bearish view on copper is now well entrenched in the market, and during the course of 2016, we think the focus in the market will move beyond the 2016/17 time horizon, when the outlook for copper looks much more favourable. In our note, we focus on the four biggest copper miners, who in turn own 8 of the 10 biggest copper mines. All of the big four miners, BHP Billiton, Glencore, Freeport and Codelco have technical challenges with their existing mine portfolio. Whilst these are not insurmountable, maintaining the current output will require significant ongoing investment. Against this backdrop, at least three of the four miners have concerns on their debt levels, which may constrain the necessary investment. Any capex delay may result in a more acute deficit toward the end of the decade.

2016 is a watershed year for how the copper market unfolds

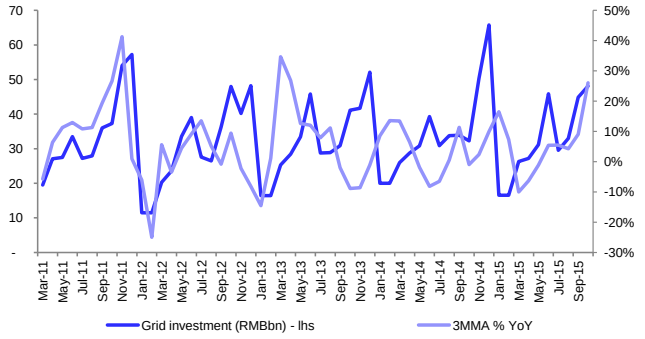
There is no doubt that the copper market will remain challenging in 2016. The recovery in Chinese demand remains elusive, and macro signals remain mixed at best, especially for the metals intensive parts of the economy. 2016 should be the final year of mined supply additions from the previous wave of industry investment. Ramp-up schedules may disappoint and there is always the possibility that delays may defer the last wave of copper into 2017. Despite our forecasts of a 1% increase in Chinese copper demand to 3% (some catch-up in grid spending and the property sales eventually leading to new starts); the Glencore cut of c.350 – 400kt; and our healthy 1Mt disruption allowance, we still think the market will be balanced at best for 2016.

Figure 30: Copper supply – demand balance



Source: Deutsche Bank, Wood Mackenzie

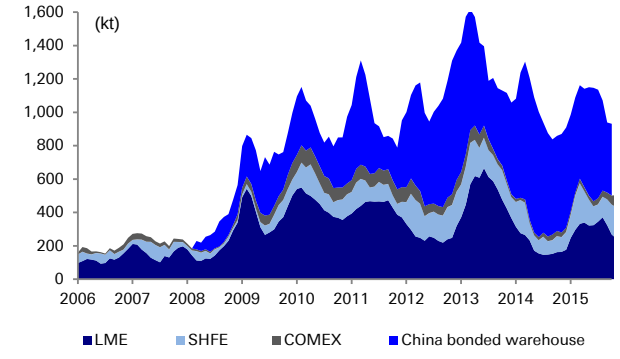
Figure 31: Grid investment recovers over the past two months



Source: Deutsche Bank, WIND

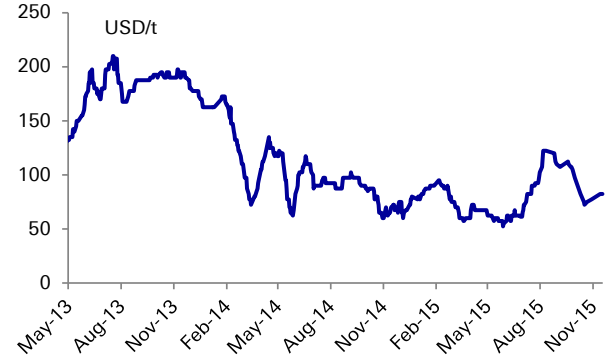
Inventory levels have been falling and Chinese premia have recovered modestly indicating that although demand remains weak it is still positive. We maintain our view that there is some downside risk to prices, but the degree of the likely surpluses even should Chinese demand surprise on the downside, is relatively small. Hence we see the downside risk as limited.

Figure 32: Inventory has been falling once more



Source: Deutsche Bank, Bloomberg Finance LP

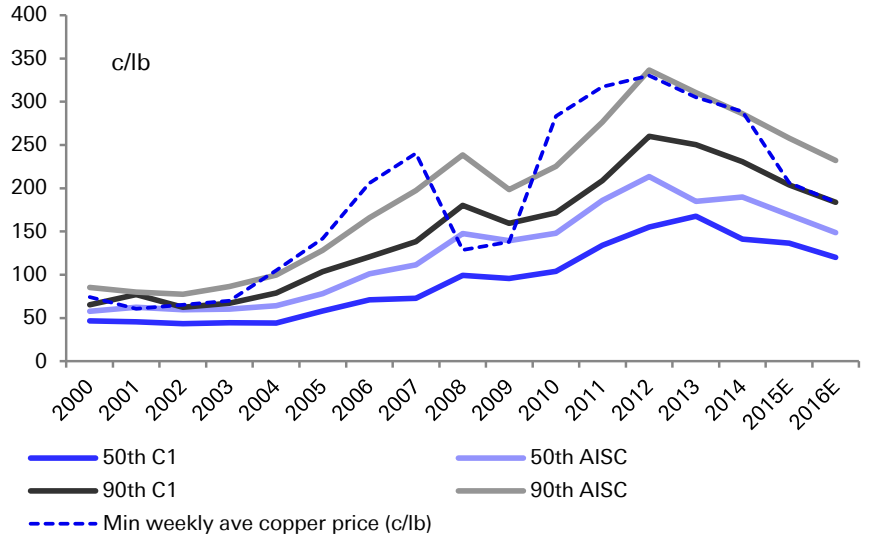
Figure 33: Yangshan copper bonded premiums rising slightly



Source: Deutsche Bank, Bloomberg Finance LP

Costs are likely to fall further in 2016 in our view. We maintain a bullish house view on the USD, and by extension a bearish view on emerging market and producer currencies. Commodity price linked costs are also a likely source of deflation along with concerted management action. However, the cost-out potential is more limited in 2016 in our view. We think a further 10% unit cash cost decline across the curve is possible, and if the minimum copper price trades at the 90th percentile of the C1 cost curve which it has done in 2015, then the bottom of the trading range is c.USD4,000/t or 180c/lb.

Figure 34: Copper cost curve progression since 2000



Source: Deutsche Bank, Wood Mackenzie

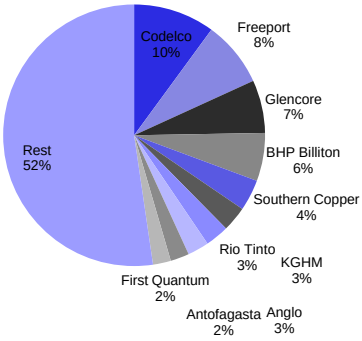
A bearish view on copper is now fairly consensual in our view, so we think the two aspects that will be the focal points in the market are:

- Will the Chinese smelters follow through with their recently announced capacity cuts, and will this actually impact the market? Our view is that these capacity cuts are simply to mirror the cuts announced by Glencore and is simply an attempt to stabilize copper TC/RC's.
- The strategy of the big four copper producers, and how they manage cashflow constraints will be a key focal point for 2016. Codelco, Freeport and to a lesser extent BHP Billiton have balance sheet / cashflow – funding issues. How these are managed and resolved over the next 12 – 24 months will have a significant impact on the copper market over the medium term.

The big four producers all have their challenges

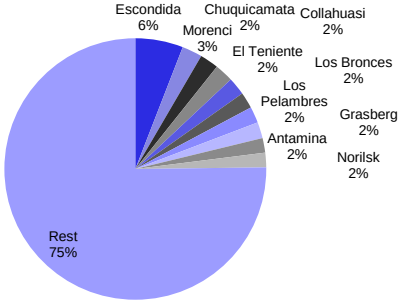
The four largest copper producers Codelco, Freeport, Glencore and BHP Billiton will produce c.7Mt of copper in concentrate (controlled basis). The companies also control or have a stake in nine of the ten largest copper mines; Escondida, Grasberg and Chuquicamata, and have a stake in a further 3.

Figure 35: Global mined copper market share by company (equity basis) 2015E



Source: Wood Mackenzie, Deutsche Bank

Figure 36: The top 10 mines in the world in 2015E

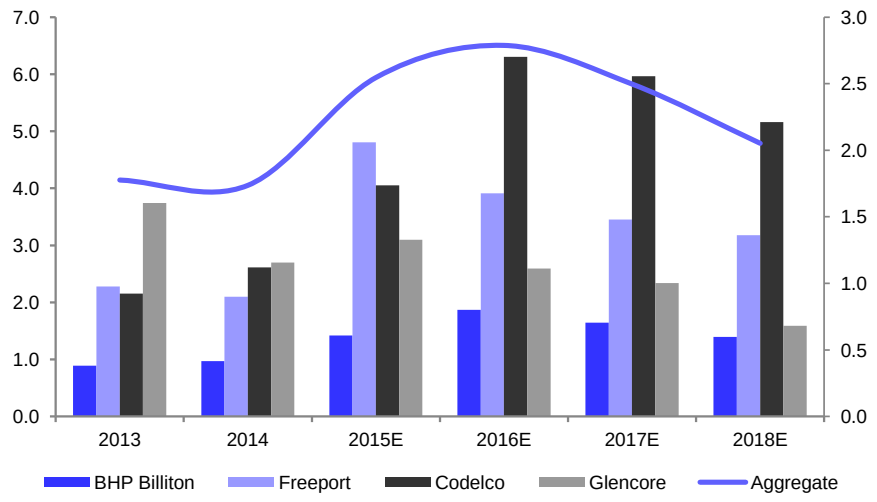


Source: Wood Mackenzie, Deutsche Bank

All four producers have significant challenges with either their balance sheets or their assets. At the prevailing copper price, Codelco is unable to fund the necessary capex to sustain production at current levels, let alone fund growth projects. The Chilean state will have to be a net funder to Codelco which in turn will put a strain on the domestic budget. The next stage of Chuquicamata's life is an underground block cave, which in itself poses technical challenges. BHPB's Escondida mine is well positioned to maintain output, but this is only due to the early investment into desalinated water and processing capacity expansions to fight grade decline. Potential Samarco liabilities may prompt the company to do some soul searching on future dividends, but we think it is unlikely that the required investment needed for its copper portfolio will be compromised. Freeport is in a tough balance sheet position, and will most likely have to sell assets and spin off the oil business to ensure that the company can maintain sufficient cashflows for future funding. The company also remains in a challenging position with respect to its Indonesian mine Grasberg. The mine's Contract of Work (COW) is due for renewal in 2021. However in the meantime, the mine requires c.USD5bn in capex to transition to an underground operation. Technical risks notwithstanding, the company will want some certainty on the renewal and indeed the terms of the contract renewal before committing the capex. Although a recent letter of assurance from the Indonesian minister of Energy and Mines would go some way to allay concerns, it falls short of a full extension of the contract. At this stage the Indonesian government is unwilling to sign the new contract, which may stall the development of the mine. Glencore's balance sheet issues are well documented, and although we think these are manageable, it does limit the company's freedom in terms of capex spend. The closure of the Mopani copper operations in Zambia and the Katanga operations in the DRC simply reflect the missed window of opportunity that the African copperbelt operators had to recapitalize the assets in a period of high copper prices. Given the constant flux in tax regimes, and the inherent political risk the preferred funding route for the copperbelt assets was to use cashflows to fund the necessary capex. The low copper price, combined with power reliability issues mean that self-funding is no longer an option.

All of the technical challenges need to be met against the backdrop of tough balance sheet conditions. We estimate gearing levels of the big four copper producers will peak in 2016E at 2.8x, which to us is an uncomfortable level. Freeport and Codelco are in the most challenging position, but Freeport arguably has some room to maneuver in reducing its net debt through the spin-off of the oil division.

Figure 37: Aggregate net debt to EBITDA of the big four copper producers



Source: Deutsche Bank, Company reports

The focus on debt reduction limits the ability to spend on capex

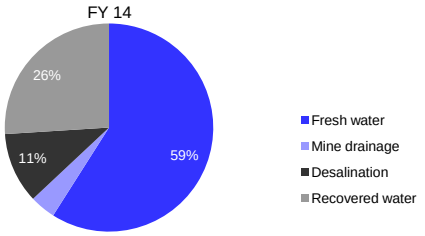
BHP Billiton: Limited growth options, but well positioned to maintain output

Escondida is the world's largest copper mine, accounting for around 6% and 20% of global and Chilean copper respectively. The complex consists of two pits (Escondida and Norte), three concentrator plants, a sulphide leach and an oxide leach, two SX and one EW plant, and a 170km concentrate pipeline to the Port of Coloso.

BHP has guided for the overall head grade to drop to an average 0.9% from FY16 to FY25 but aims to keep production at an average 1.2Mtpa (DBe 1.15Mt) through its three concentrator strategy. It will aim to ramp-up to 375ktpd throughput from its Laguna Seca plant (130ktpd), Los Colorados (100ktpd) and the newly commissioned OGP1 plant (currently ramping up to 145ktpd). Originally, Los Colorados was to be dismantled in order to push back the main pit to access higher grade ore. BHP will now seek approval for the US$200m Los Colorados Extension (LCE) project to refurb the plant (in CY16) and keep all three concentrators running until FY30. The pit pushback will take place on a smaller scale, still accessing higher grade ore which has been firmed up through extra drilling.

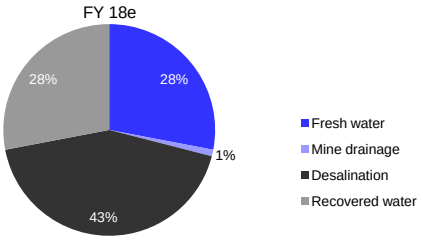
Along with current supply to the mine, the new EWS de-sal plant will mean there is more than enough water to run the three plants at full capacity until Dec 2019. Thereafter, BHP is considering three options: reduce usage from the current 0.6m3/t; extend the aquifer permits beyond that point; increase the footprint of EWS. We think the latter is most likely given the pipeline capacity of 4,000l/s.

Figure 38: The progression of Escondida's water consumption by source



Source: BHP Billiton Investor presentation 2015

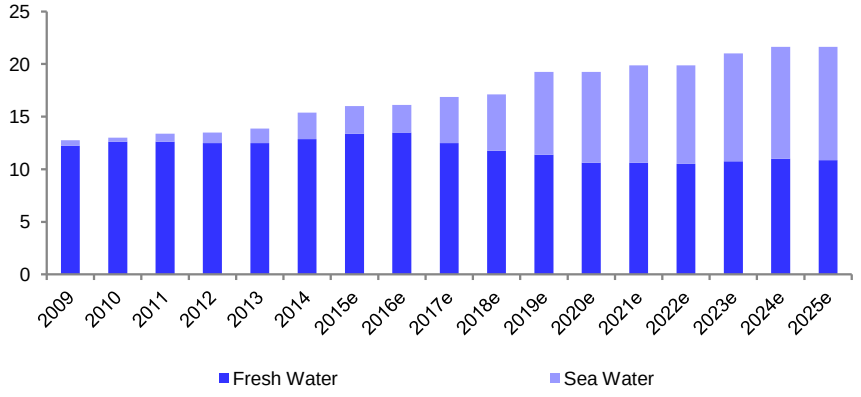
Figure 39: …much more reliant on sea-water in the future



Source: BHP Billiton Investor presentation 2015

BHP believes it has a differentiated water and power solution for its Chilean copper mines, which enable its delivery of more tonnes for low capital cost. For water, management believes that the use of de-salinated water will become the norm across the Chilean copper industry. The EWS project is on track for CY17 completion. This is the largest seawater reverse osmosis plant in the western world. The plant nameplate capacity is 2,500 litres per second, but with the two pipes up to the mine able to take 2,000 l/s each, the overall potential plant footprint is 4,000 l/s – as commented by BHP "more than enough for OPG2". Overall, management commented that it has all its water requirements covered to run its three Escondida concentrators at full capacity until December 2019.

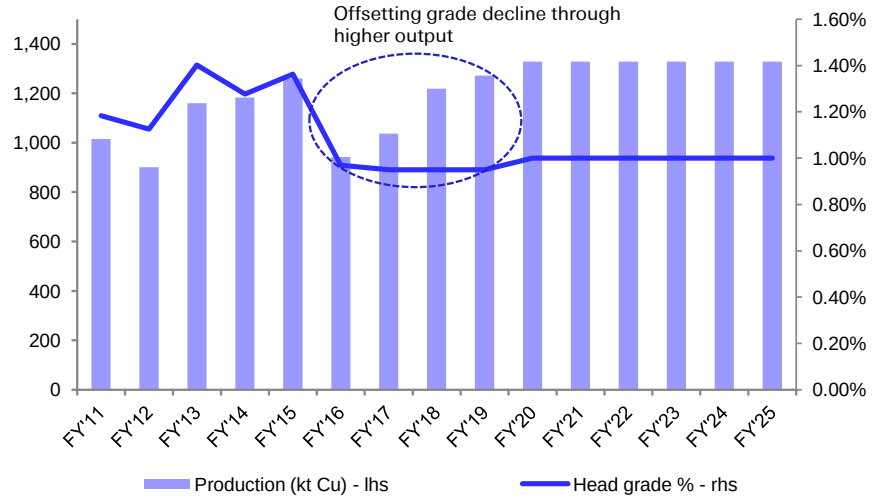
Figure 40: The likely trajectory of water use in Chile's mining industry



Source: BHP Billiton Investor presentation 2015

Given that Escondida is the world's largest copper mine, a small variation in head grade can have quite a marked impact on the copper market. A 0.1% head grade is equivalent to 120kt of copper. The mine highlights the constant battle to offset grade decline and the shortage of water. We think BHP Billiton are well positioned to the end of 2019 to manage both, and even post this time horizon, we expect the company to expand the de-sal plant. We think there is however little chance of squeezing more tonnes out of the mine.

Figure 41: Escondida's grade and output profile



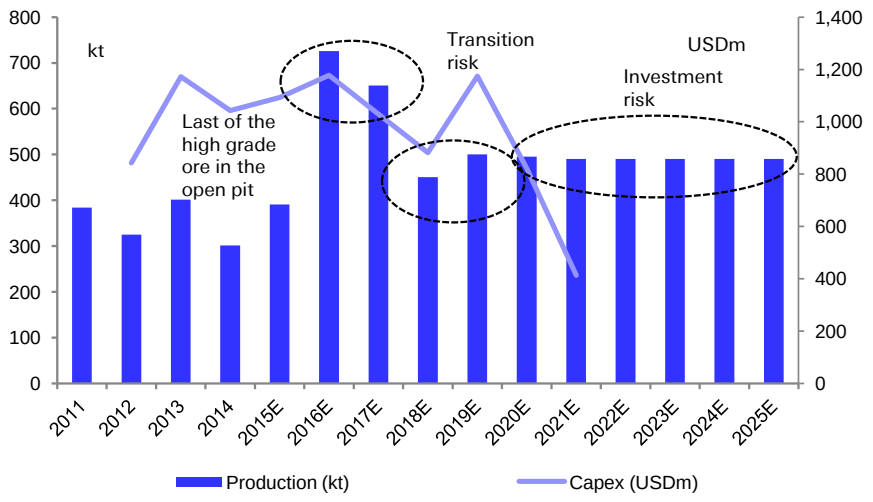
Source: Deutsche Bank, BHP Billiton presentation

Freeport: Grasberg transition, balance sheet constraints

Current ore production at Grasberg is from the open pit (expected to deplete in 2017), Deep Ore Zone (DOZ) underground block cave mine (expected to deplete in 2020) and the Big Gossan underground mine. PT Freeport Indonesia is conducting an on-going investment programme to convert ore extraction to underground-only production once the open pit is depleted. During 2015, development on two new block cave mines continued. An area beneath the existing DOZ mine known as the Deep Mill Level Zone (DMLZ) with design rate of 80kt/d is forecast to start producing in late 2015 and an area below the existing open pit known as the Grasberg Block Cave is due to come on line in 2018 with a design production rate of 160kt/d ultimately being targeted. The total capital costs for the Grasberg Block Cave is estimated at USD5.7 billion and DMLZ estimated at USD2.7bn, with USD3.5bn already invested Kucing Liar, an additional underground mine to be developed in the medium term is also included in the profile, with a capex of USD2.4 bn and a tentative start date of 2025.

The company reported in their Q3 results that they had completed development of access to underground ore bodies, and that production from DMLZ had commenced. The start-up of Grasberg BC in 2018 is still on track. Key development activities include work on ore flow systems & Grasberg BC shaft. The Indonesian government has assured PT-FI that it will approve the extension of operations beyond 2021 with legal & fiscal certainty. We remain skeptical that this is sufficient, but we do not assume that Freeport delays its capex programme as they have very little option in our view. In our view, there is some uncertainty as to the copper output beyond 2016/17, as there would not be concurrent mining in open pit while the are mining underground due to safety issues. We expect the company to stockpile some open pit ore as they transition to underground.

Figure 42: Grasberg's production and capex profile



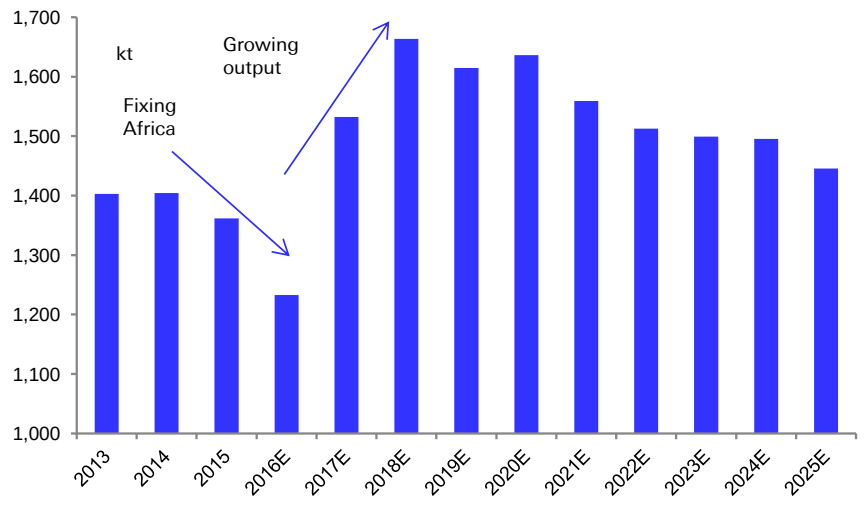
Source: Deutsche Bank, Company reports, Wood Mackenzie

In our view the transition to the underground poses some risks to the 2018/19E production profile. Relations between Freeport and the Indonesian Government will determine the rate of investment and hence the longer-term profile beyond 2019E.

Glencore: A pause for breath, and managing the balance sheet

Glencore's African assets have the potential to be solid second / third quartile operations in our view. However, erratic power in the DRC and investment delays in Zambia has meant that these assets have not had the required investment or recapitalization to move them down the cost curve. As a result, we estimate that both Katanga and Mopani were losing cash at the time of the closure announcement. Glencore's approach is to "fix" these assets until such time as costs are optimal. The company announced the suspension of production at Katanga (DRC) and Mopani (Zambia) for 18 months up until the completion of the expansionary and upgrade projects. This includes the whole ore leach at Katanga and the new shafts and concentrator at Mopani. A suspension of operations will remove c.400kt of copper cathode from the market according to the company, although we estimate this amounts to 280 – 300kt of annual capacity based on our production forecasts. Glencore's move was in our view a pre-emptive strike, with prices at the time only just eating into the cost curve. Part of the issue was rising concerns over Glencore's debt levels. We think the company is on top of its debt management, with a combination of an equity issue, a suspension of the dividend, a cut in working capital, asset and streaming sales, and a capex reduction. Although we think the copper division will remain an investment priority, cashflows will pose some limits in this environment.

Figure 43: Glencore's mined copper output from own sources



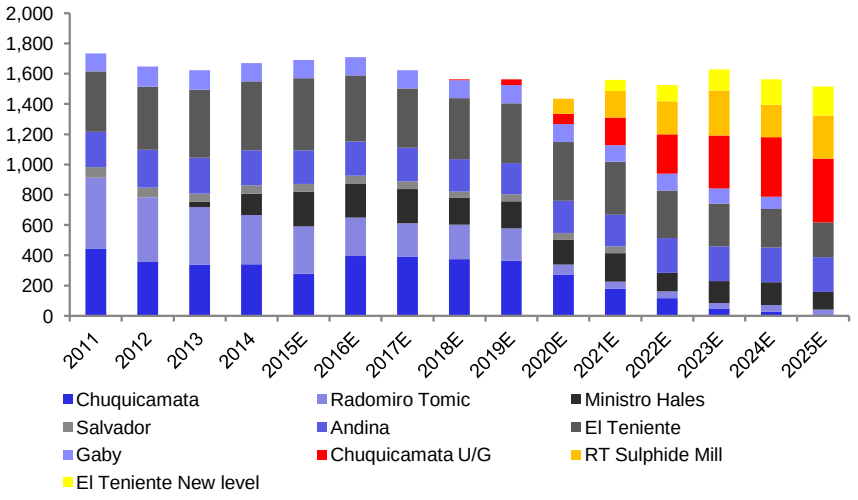
Source: Deutsche Bank, Glencore

Codelco: State funding and debt market support required

Codelco's portfolio of mines is fairly mature and requires significant investment to maintain current production levels by the end of the decade. The company has seven structural projects that will require a capital investment of at least USD20bn over the next five to seven years. The current low copper price environment will put a strain on the company balance sheet and indeed the Chilean government coffers in our view. We think it is unlikely that the company or the Chilean state will be able or willing to fund all of these projects. Furthermore many of the projects have significant technical challenges to overcome. The government of Chile issued the Capitalization Law in 2014 that will allow Codelco an in injection of capital of up to USD3bn for the period 2014-2018 and a commitment to authorize Codelco to retain profits of up to USD1bn. In our view this will not be enough to fund the company capex requirements in order to prevent a decline in production towards the end of the year.

There are four main projects covering four of their key assets; the Chuquicamata underground, the El Teniente Nuevo Nivel Mina (new level mine), the Radomiro Tomic sulphide mill, and the Andina phase II project. In our analysis, we assume that Codelco progresses three of these projects, ut has the Andina II project on hold for now. This is in line with company guidance. The El Teniente mines faces a short and medium term mine development challenges. Until 2021 most of the mine production is to be sustained with production from sectors above the Teniente 8 (level 1980) and a small amount from the Sur open pit. However post 2020, the company will need the initial ramp up of the Nuevo Nivel Mina (NNM) to replace the gradual production decrease from older parts of the mine.

Figure 44: Codelco's production profile of its fully owned mines



Source: Deutsche Bank, Wood Mackenzie

We think Codelco can maintain its current production levels or 2016 before a small tail off until the end of the decade. Beyond 2020, three "structural" projects are required to maintain production

The Nuevo Nivel de Mina (NNM) is a medium term 'structural' project intended to prolong production at El Teniente for additional 50 years allowing the Division to maintain copper production of around 400 - 430ktpa. Early works started in 2011. By 2015 the total capital investment for the NNM was estimated at USD7.7billion for the three phases excluding capital for milling expansions. Of this USD3.5 billion was already spent as part of the first stage. To finish the first Phase El Teniente is now requesting an additional USD1.2 billion which is a run of budget of the first Phase due mainly to structural changes in the mine design (bigger pillars and improve fortification for mining sustaining) and cost escalation.

Challenging underground conditions at El Teniente add to the technical complexity. Project progress 36% complete with the project "currently being redesigned and adapted to the geo-mechanical conditions found during implementation, incorporating the latest primary rock mining info available".

After 100 years of continues operation, the Chuquicamata division faces the challenge to replace the depleting open pit sulphide and leachable reserves. The open pit sulphide reserves are expected to be depleted before mid 2020 but its operation is to be extended to mid-2021 with stockpiles. To replace these reserves, the company is developing its 140ktpd ore underground project (located below the current pit) which is expected to start delivering ore by 2019 (caving by 2020) and producing at full capacity by 2025. The capital investment for this project is estimated at USD4300m (2014$).Of this, USD894m has already been spent as part of the early works in the project. On December 2014, the Board of Codelco approved the additional investment of USD 3,306m. The expansion of the Talabre tailing facility during the period 2018-2022 is forecast at USD1,574m. As of Q3'15, the company reported 23% progress on the complete project, main access tunnel, mine development and air extraction system.

The current oxide deposits at Radomiro Tomic is nearing the end of its life and the primary / secondary heap loeacg operation is expected to tail off sharply from 2019/2020E. A number of options have been proposed for a Radomiro Tomic Phase II expansion. As of mid 2012 it is understood that a USD4.5Bn project to construct a 200kt/d mill was under review. The sourcing of a sustainable water supply is an issue and additional tailings capacity will be required. Codelco may be forced to go down the BHP Billiton route and invest in a scaleable reverse osmosis plant. Sulphide ores have been mined at RT and processed at the Chuquicamata 180ktpd mill since 2008 with ore trucked until mid-2010, when a conveyor system was commissioned. The USD380m Radomiro Tomic Phase 1 project was complete in 2010 with construction of a 100ktpd conveyor system to move ore from RT mine to Chuquicamata mill

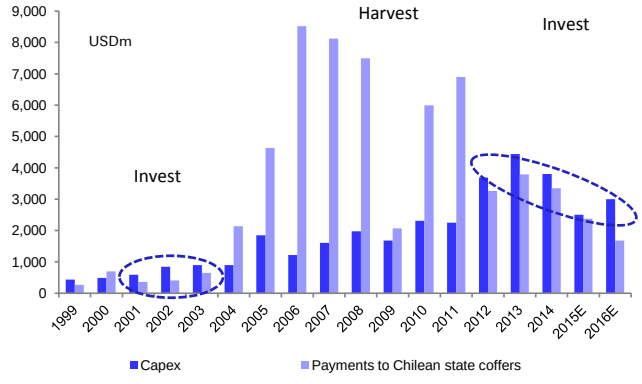
(8.3km), although 60kt/d is the current mine plan. The transfer of 60ktpd is planned to continue until 2021/22 until such time as the processing capacity at Chuquicamata becomes a bottleneck, with the ramp-up of the underground mine. Over the period 2011 to 2018 the Radomiro Tomic mine is forecast to provide around 60ktpd ore feed at Chuquicamata (1/3 of its capacity) at grades averaging 0.68%Cu and 0.013%Mo. The ore is softer than Chuquicamata ore and contains low arsenic impurity levels. As of Q3'15, Codelco reported 52% progress in the detailed engineering and in early works development. An environment impact study, related to water management remains the rate determining step.

The main constraint for RT Phase II is sufficient water supply. The go-ahead will require a desalination plant.

We do not include the Andina II project in our production forecasts. In 2014 Andina was planning to expand its 94 ktpd current milling capacity to 244ktpd by 2023. The capex at the time was estimated at USD7,5bn (US$2012). By 2015 the capex of this project was raised to around US$9.0bn. This included 1) the US$1.5-1.6bn major ore pass project or Projecto Nuevo de Traspaso that is expected to enter in operation by 2021 2) The extended Third Panel project 3) The expansion via open pit from 90kt/d ore milled to 244kt/d ore by 2025. and 4) a new 150kt/d ore concentrator to be installed in the valley. The new concentrator is expected to cost around 50% of the total capex. The scale of the capex required will in our view be too much for the company to tackle in the current environment.

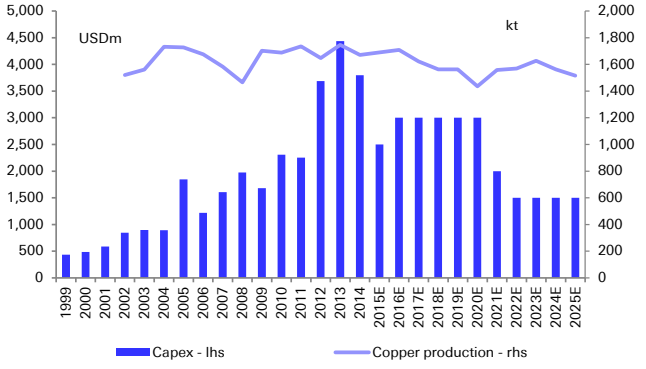
The capex burden and the continuing payment of taxes under the Law No. 13.196, specific taxes for government firms and dividends will put Codelco's balance sheet under significant pressure in our view. We outline our estimates of capex and payments to the Chilean state coffers. We forecast capex to outstrip the payments to the government, as highlighted in the two charts below:

Figure 45: Contrasting Codelco's capex versus payments to the state coffers



Source: Deutsche Bank, Codelco

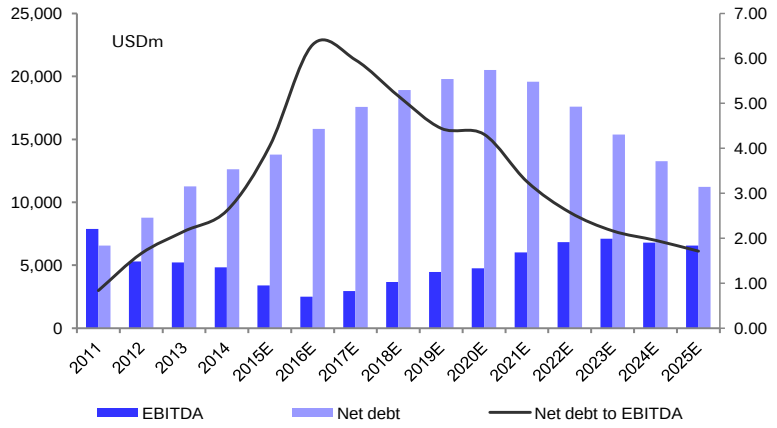
Figure 46: Codelco's estimated capex profile



Source: Deutsche Bank, Codelco

We estimate the company's net debt to EBITDA will rise to 4x by the end of 2015, peaking at over 6x in 2016E under our copper price forecast, but will stay above 4x until the end of the decade. We estimate that the company will have to raise another USD4bn of debt over the next four years, with net debt peaking at USD20.5bn by 2020E. The falling Net debt to EBITDA ratio is only by virtue of the increasing EBITDA ratio.

Figure 47: Codelco's estimated net debt profile



Source: Deutsche Bank, Codelco

Chinese smelter cuts simply reflect the cut in mined supply.

On the 30th of November, 10 major Chinese copper players made a joint announcement proposing a 350kt cut (~4.5% of China total output) in refined copper output in 2016 to support the market after the copper price hit a six-year low. We think these cuts simply mirror the cuts announced by the miners, as an attempt to balance the concentrate market. These smelter cuts could support higher TCRCs and in turn trigger more smelting activity. However, the Chinese producers do not have a good track record on sticking to joint capacity announcements. Higher TCRCs will increase copper miners' costs, but this will not be material enough to drive mine closures. The magnitude of these cuts will not be enough to drive the price higher.

Compared to the aluminium industry, curtailments in the copper industry in China were relatively limited over the past year. We only saw Yantai Penghui (smelter) running out of cash in early 2015 and Mingda Mining (miner) experiencing a temporary shutdown in Mar 2015, in addition to maintenance activities of major Chinese smelters as shown in Figure 48.

Figure 48: Maintenance activities at major copper smelters in China

Company (in Chinese)	Company (in English)	Company capacity (kt)	Maintenance period
上海大昌	Shanghai Dachang	60	Jan 2015-Feb 2015
兰溪自立	Lanxi Zili Copper	80	Jan 2015-April 2015
富春江	Fuchunjiang	200	Mar 2015-April 2015
云南铜业	Yunnan Copper	600	Mar 2015-April 2015
广西金川	Guangxi Jinchuan	400	April 2015-May 2015
中条山	ZTS Non-ferrous Metals Group	180	May-15
豫光金铅	Yuguang Gold and Lead Co., Ltd	100	May-15
云锡铜业	Yunxi Copper	100	May 2015-June 2015
金川集团	Jinchuan Group	800	May 2015-June 2015
阳谷祥光	Yanggu Xiangguang Copper	500	May 2015-June 2015
赤峰金剑	Chifeng Jinjian Copper	120	Jun-15
铜陵有色（金昌）	Tongling Nonferrous (Jinchang)	180	Jun-15
赤峰云铜	Yunnan Copper (Chifeng)	100	June 2015-July 2015
富春江	Fuchunjiang	200	July 2015-Aug 2015
紫金铜业	Zijin Copper	200	Aug-15
江西铜业	Jiangxi Copper	1,000	Sep 2015-Oct 2015
金隆铜业	Jinlong Copper	450	Sep-15
白银有色	Baiyin Non-ferrous	200	Oct-15
金冠铜业	Jinguan Copper	400	Oct-15
广西金川	Guangxi Jinchuan	400	Nov-15

Source: Deutsche Bank, SMM

Joint curtailments have in the recent past gained more momentum across the industry. On 30 Nov, 10 major copper producers (listed in Figure 49) in China released a joint announcement, proposing a **350kt cut** in refined copper output in 2016 (previous version mentioned at least a 200kt cut in FY16). A potential 350kt cut represents roughly ~4.5% of China's total refined copper output.

Figure 49: Copper producers involved in joint curtailment initiative

Company (in Chinese)	Company (in English)
江西铜业股份有限公司	Jiangxi Copper
铜陵有色金属（集团）控股有限公司	Tonglin Nonferrous Metals
云南铜业股份有限公司	Yunnan Copper
金川集团股份有限公司	Jinchuan Group
大冶有色金属有限责任公司	Daye Nonferrous
中条山有色金属集团有限公司	ZTS Non-ferrous Metals Group
白银有色集团股份有限公司	Baiyin Non-ferrous Group
烟台国润铜业有限公司	Yantai Guorun Copper
中国黄金集团公司	China National Gold Group
阳谷祥光铜业有限公司	Yanggu Xiangguang Copper

Source: Deutsche Bank

Figure 50: Copper supply demand balance

		2010	2011	2012	2013	2014	2015e	2016e	2017e	2018e	2019e	2020e
Chile production	Mt	5.47	5.29	5.52	5.91	5.89	5.84	5.77	5.86	5.72	5.91	5.88
Production Growth		*0.3%*	*-3.3%*	*4.3%*	*7.0%*	*-0.3%*	*-0.8%*	*-1.3%*	*1.6%*	*-2.5%*	*3.4%*	*-0.5%*
Chile share of global production		*34%*	*33%*	*33%*	*33%*	*32%*	*30%*	*28%*	*28%*	*27%*	*28%*	*28%*
Global Mine Production	**Mt**	**16.14**	**16.15**	**16.78**	**18.17**	**18.66**	**19.44**	**19.51**	**20.17**	**20.05**	**20.41**	**20.66**
World Mined Production Growth	*%*	*1.4%*	*0.0%*	*3.9%*	*8.3%*	*2.7%*	*4.2%*	*0.4%*	*3.4%*	*-0.6%*	*1.8%*	*1.2%*
Copper smelting capacity	Mt	17.62	18.09	18.87	19.75	20.36	22.03	22.43	22.58	23.07	23.06	23.14
Utilisation		*74%*	*71%*	*71%*	*74%*	*74%*	*71%*	*70%*	*73%*	*71%*	*73%*	*76%*
Anode production	Mt	14.92	15.59	15.87	16.59	17.61	18.27	18.39	18.97	18.91	19.45	20.16
Production Growth		*4.2%*	*4.5%*	*1.8%*	*4.6%*	*6.1%*	*3.7%*	*0.7%*	*3.1%*	*-0.3%*	*2.9%*	*3.7%*
Total scrap consumption	Mt	4.20	4.53	4.78	4.63	4.49	4.53	4.69	4.75	4.85	4.94	5.04
Consumption Growth	*%*	*24.9%*	*7.7%*	*5.6%*	*-3.2%*	*-3.0%*	*1.0%*	*3.5%*	*1.1%*	*2.1%*	*1.8%*	*2.1%*
Total SxEw Production	Mt	3.1	3.3	3.4	3.5	3.6	3.7	3.7	3.8	3.7	3.5	3.2
Global Copper Supply	**Mt**	**18.94**	**19.73**	**20.15**	**20.81**	**21.79**	**22.40**	**22.68**	**23.31**	**23.24**	**23.65**	**24.14**
Global Supply Growth	*%*	*3.7%*	*4.2%*	*2.1%*	*3.3%*	*4.7%*	*2.8%*	*1.3%*	*2.8%*	*-0.3%*	*1.8%*	*2.1%*
Chinese Consumption (real)	Mt	7.20	7.82	8.20	9.16	9.84	10.03	10.40	10.80	11.03	11.35	11.61
Consumption Growth	*%*	*10.8%*	*8.5%*	*5.0%*	*11.7%*	*7.3%*	*2.0%*	*3.6%*	*3.8%*	*2.1%*	*3.0%*	*2.3%*
Western Europe	Mt	3.40	3.20	2.93	2.94	3.09	3.24	3.32	3.37	3.36	3.34	3.33
growth	*%*	*11.4%*	*-6.1%*	*-8.2%*	*0.1%*	*5.2%*	*5.0%*	*2.3%*	*1.6%*	*-0.4%*	*-0.6%*	*-0.3%*
USA	Mt	2.19	2.20	2.22	2.29	2.33	2.40	2.44	2.43	2.38	2.39	2.39
growth	*%*	*6.5%*	*0.4%*	*1.0%*	*2.9%*	*1.8%*	*3.2%*	*1.5%*	*-0.5%*	*-1.9%*	*0.3%*	*0.3%*
Japan	Mt	1.06	1.00	0.98	0.99	1.05	1.05	1.05	1.04	1.01	0.98	0.96
growth	*%*	*21.1%*	*-5.4%*	*-1.8%*	*0.5%*	*6.1%*	*-0.3%*	*-0.1%*	*-1.0%*	*-2.5%*	*-2.7%*	*-2.1%*
Big 3 mature economies	Mt	6.66	6.40	6.14	6.21	6.47	6.69	6.80	6.84	6.75	6.71	6.69
Consumption Growth	*%*	*11.1%*	*-3.8%*	*-4.1%*	*1.2%*	*4.1%*	*3.5%*	*1.6%*	*0.5%*	*-1.3%*	*-0.6%*	*-0.3%*
Other mature economies	Mt	1.57	1.37	1.21	1.22	1.16	1.19	1.16	1.19	1.18	1.16	1.15
growth	*%*	*4.6%*	*-12.8%*	*-11.4%*	*0.8%*	*-5.2%*	*2.7%*	*-2.5%*	*2.8%*	*-0.9%*	*-1.3%*	*-1.6%*
Other developing economies	Mt	1.35	1.36	1.34	1.33	1.39	1.42	1.46	1.52	1.59	1.66	1.74
growth	*%*	*10.0%*	*0.7%*	*-0.9%*	*-1.0%*	*4.4%*	*2.0%*	*3.0%*	*3.7%*	*4.8%*	*4.6%*	*4.9%*
Brazil/India/Russia Consumption	Mt	1.43	1.63	1.57	1.55	1.48	1.38	1.44	1.50	1.55	1.62	1.68
Consumption Growth	*%*	*12.0%*	*13.9%*	*-3.2%*	*-1.3%*	*-4.5%*	*-7.0%*	*4.3%*	*4.0%*	*3.6%*	*4.3%*	*4.1%*
Other	Mt	1.00	1.03	1.09	1.16	1.25	1.30	1.33	1.38	1.43	1.49	1.54
Consumption Growth	*%*	*14.6%*	*3.8%*	*5.3%*	*6.7%*	*7.8%*	*3.7%*	*2.3%*	*3.9%*	*3.6%*	*4.5%*	*3.2%*
Global Consumption	**Mt**	**19.20**	**19.60**	**19.56**	**20.64**	**21.59**	**22.01**	**22.59**	**23.22**	**23.52**	**24.00**	**24.41**
Global Consumption Growth	*%*	*10.6%*	*2.1%*	*-0.2%*	*5.5%*	*4.6%*	*2.0%*	*2.6%*	*2.8%*	*1.3%*	*2.0%*	*1.7%*
Market balance	**Mt**	**-0.26**	**0.14**	**0.58**	**0.17**	**0.21**	**0.39**	**0.09**	**0.09**	**-0.28**	**-0.35**	**-0.28**
Average LME cash price	USD/t	**7,498**	**8,829**	**7,953**	**7,354**	**6,846**	**5,505**	**4,575**	**4,725**	**5,356**	**5,987**	**6,618**
Average LME cash price	USc/lb	**340**	**401**	**361**	**334**	**311**	**250**	**208**	**214**	**243**	**272**	**300**

Source: Deutsche Bank, Wood Mackenzie

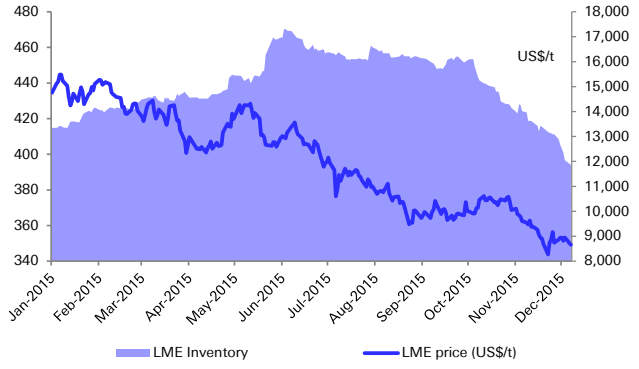
Nickel: Something has to give!

- 2015 has been Nickel's annus horriblis. The expectation of a modest market deficit and a potential price rally quickly evaporated as it became clear that weak demand in China was being compounded by destocking and a particularly "sticky" supply side. We forecast that nickel demand growth will be below 1%, and as a result we estimate that the market was in a surplus of c.60kt, a fifth year in a row. The current price of USD8,600/t means that over two thirds of the industry is cash loss making. This is unsustainable, and we expect to see an acceleration of supply cuts over the coming six months.
- General demand weakness in China, and the impact of a weak oil services sector elsewhere lead to weak stainless steel demand. We expect a modest improvement in 2016, both in China and the global oil services sector. Any signs of a nickel price rally, or improving demand should trigger a restocking rally, and we forecast demand growth of 3.1% for 2016E.
- The barriers to exit in nickel have proven to be significant. However at current prices, the industry is haemorrhaging cash. A simplified block cost curve identifies the players most likely to shut and why some of the high cost producers have not cut. A recent announcement by a coalition of Chinese NPI producers may prove to be the catalyst for further action which we think will accelerate in 2016E. The combination of capacity shuts and a modest demand recovery should result in a deficit market of c.60kt, and a modest price recovery from current levels. We forecast and average of USD9,750/t. The magnitude of the restocking event could surprise on the upside, which could see prices trading as high as USD12,000/t for brief periods.

Don't be fooled by the inventory drawdown

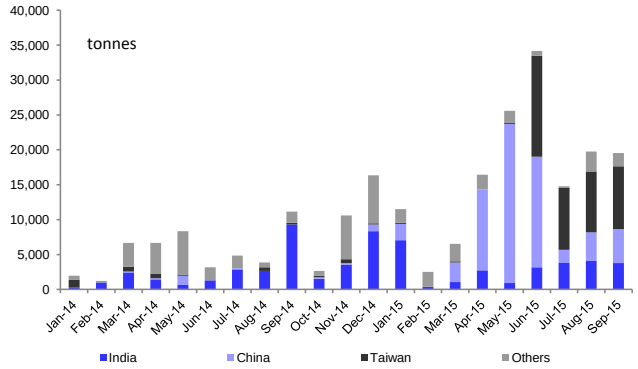
The fall in LME inventories could be construed as a bullish signal for nickel demand, just as the rise in inventories during 2014 was taken as a bearish signal. Unfortunately the reverse does not work. When metal was pouring into the Asian LME warehouses, Johor in particular, post the Qingdao scandal, a source of hidden inventory made itself known to the market. The sharp outflow of metal (nearly 50kt over the past six months) is simply a reallocation of stocks, and the market now realizes that this metal is not being consumed. The introduction of a Shanghai Futures Exchange (SHFE) earlier this year and the establishment of large quantities of nickel stored at off-exchange locations in Singapore, Malaysia and China is probably the only reason that stocks are declining.

Figure 51: LME inventories have fallen sharply over the past two months



Source: Deutsche Bank, Bloomberg Finance LP

Figure 52: Refined nickel exports from Malaysia and Singapore – recent shipments going to Taiwan



Source: Deutsche Bank, Wood Mackenzie

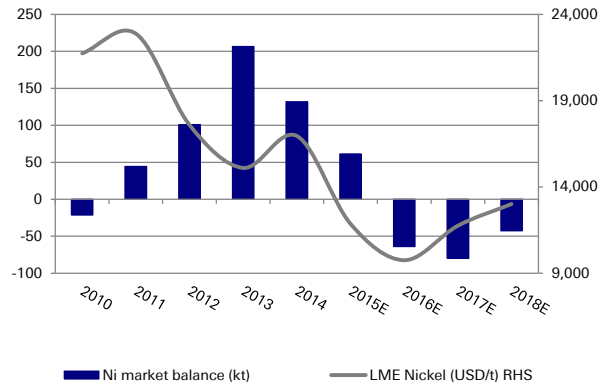
The large quantities of nickel that left China for off-exchange warehouses in Malaysia and Singapore in the second half of 2014, at the time of the Qingdao scandal, has either started to be shipped back to China or has been relocated to other SE Asian sites, perhaps before being trans-shipped to China. It is also apparent that Taiwan has been added to the list of storage locations for nickel that may ultimately return to China. We think it will only be when inventory levels return to end 2013 levels (250kt), that the market may consider the levels as normal.

We have reviewed all our assumptions for 2016, and made the following changes:

- We continue to forecast a pick-up in stainless steel demand in 2016E, but given that 2015 is essentially flat on 2014, our starting point is lower. We forecast 2015 nickel demand up 0.9% in 2015E, with lower scrap utilization and a small uplift in non-stainless applications. We expect a recovery in stainless steel demand of 4.4% in 2016E partly driven by restocking. Higher scrap utilization and a lower Austenitic ratio should trim the increase in nickel demand to 3.1%.
- We have trimmed our Philippine mine production so that mined output is essentially flat year on year. The adjustment is not so much in 2016, but more in 2015, where we note that Philippine laterite ore imports are down 4% year to date.
- We have trimmed back our refined / metal nickel output in 2016E on the back of Chinese smelter curtailment announcements. We forecast refined metal output to decline again in 2016E by 3.5%.

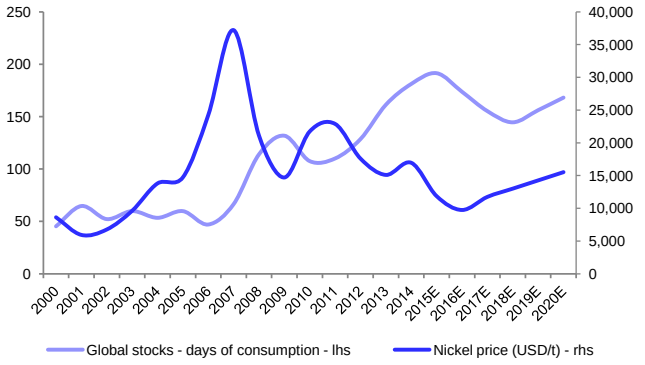
After five years of surpluses, we forecast 2016E to be the first year of a deficit market. A combination of a bounce back in demand and some curtailments (eventually) will draw down inventories, but due to the large accumulation of inventory, the level is unlikely to fall below the 100 day consumption threshold to drive any strong price rally.

Figure 53: Nickel market balance with price forecasts



Source: Deutsche Bank, Wood Mackenzie

Figure 54: Global nickel inventories with price forecasts

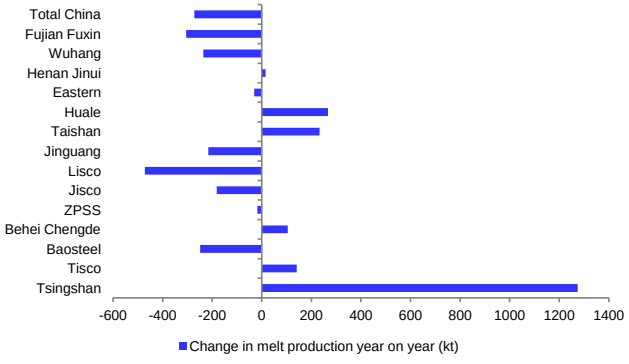


Source: Deutsche Bank, Wood Mackenzie

Weak demand in 2015 exacerbated by destocking; expect a bounce in 2016

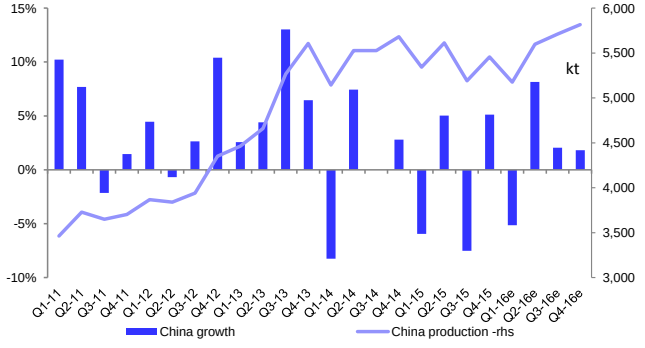
The rationalization of overcapacity in the Chinese stainless steel sector in the face of a declining export market has been brutal on the nickel market. In 2015. Channel checks suggest that 24 plants from tier 2 producers, accounting for more than 2Mtpa of capacity have been shut down over the past year. The process of consolidation with further closures is likely to continue in 2016E, with the risk that destocking continues. 2015 marks the first year that closures more than offset new starts. Weak end demand and a loss of the European export market means that Chinese stainless production is likely to be down year on year by 1%. We forecast a modest improvement in end demand in 2016, driven by a recovery in consumer good demand, the transport sector and a modest improvement in commercial construction. We prefer the outlook for stainless steel over carbon steel in China, with the focus on value add processing and manufacturing, and the growing middle classes to sustain demand growth in the medium term.

Figure 55: Gains and losses in Chinese stainless steel melt production for 2015 versus 2014



Source: Wood Mackenzie

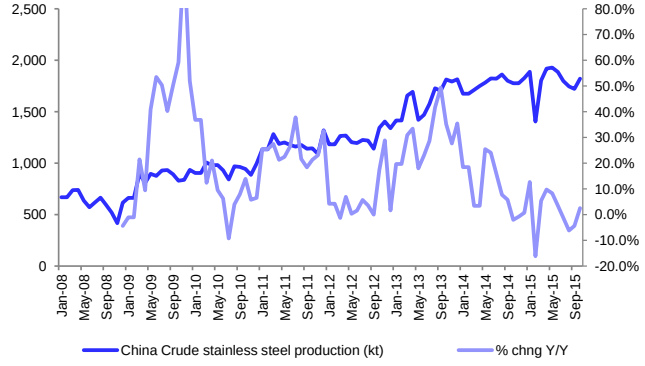
Figure 56: Chinese quarterly stainless steel melt – the strong growth phase is over



Source: Deutsche Bank, Wood Mackenzie

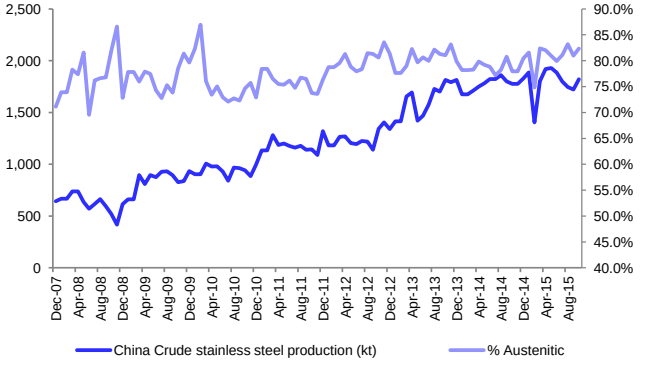
October's output showed a modest uptick in Chinese stainless output, which augers well for 2016.

Figure 57: Chinese crude stainless steel production (monthly)



Source: Bloomberg Finance LP, Deutsche Bank

Figure 58: Chinese crude stainless steel production versus % Austenitic grades

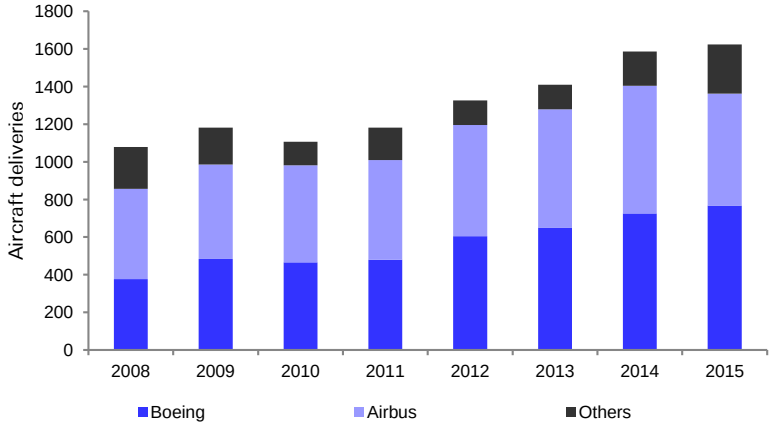


Source: Bloomberg Finance LP, Deutsche Bank

Three of Europe's major stainless flat product makers had a consistent message in their third quarter reports: that production during the period was lower than in Q2 for the usual seasonality, as well as further decline in the nickel price, which helped to cut distributor orders even further; and that while there may not be much change in Q4/15, there are reasons for optimism in 2016. All three companies acknowledged that end user demand was reasonably healthy, with the exception of the oil and gas segment, and that the demand part of the fundamental equation was likely to improve in the short-to mid-term, particularly once the nickel price stabilised. We forecast European output to be up slightly with a second half improvement offsetting the closure of Bochum's melt shop.

The demand for nickel in non-ferrous alloys remains robust, with strong demand for nickel-base alloys in aerospace applications, due to enhanced aircraft delivery rates, continues to boost the sales of alloy smelters and forgers. The latest results from four major nickel alloy producers in the USA highlight this ongoing pocket of strength. However, the overall stainless steel demand in the US has been weak due to the collapse in the oil price and the sharp fall-off in rig rates. We would expect to see some stabilization in the oil services sector and stainless steel growth in the region of 1 – 2%. Production levels may remain under pressure, but we expect an anti-dumping case to be launched in January 2016 which would be a positive signal to the market.

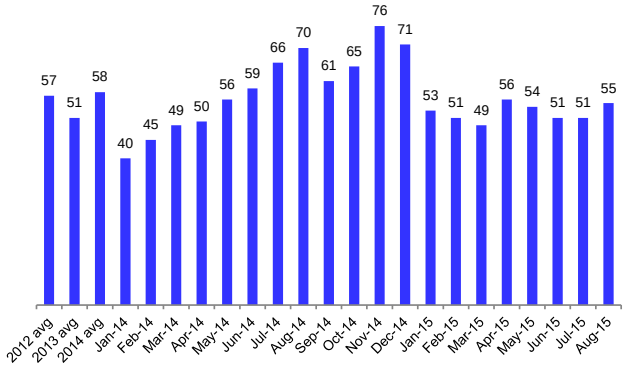
Figure 59: Aircraft deliveries – the trajectory remains positive



Source:, Boeing, Airbus, ATI, Wood Mackenzie

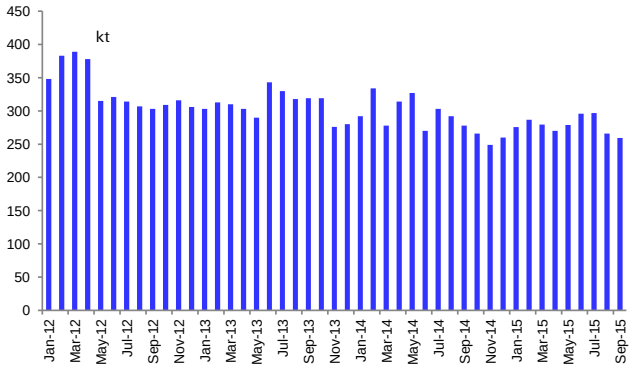
Although stainless inventories are not low, they are below "normal" levels. Although there is unlikely to be any rush to restock before year end by the distributers, a stabilization in the nickel price could drive a decent restocking rally in 2016. We highlight stainless steel stocks in Germany and China below.

Figure 60: Stainless steel inventories – cold rolled stainless – days of consumption



Source: Acerinox

Figure 61: Stainless steel stocks – Wuxi and Foshan



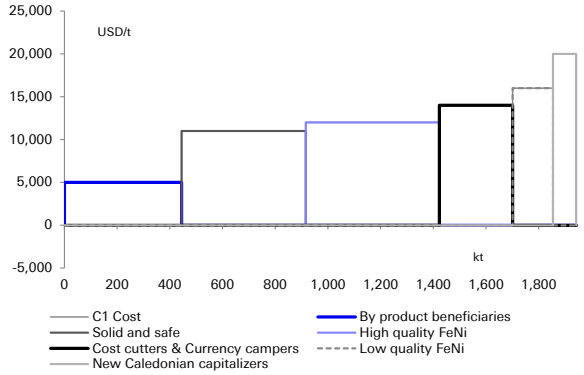
Source: Acerinox, CRU

Why haven't we seen more cuts?

At a spot price below USD9,000/t, over two thirds of the nickel industry is loss-making, let alone covering any sustaining capex. This begs the question; "why haven't there been extensive supply cuts?" In the chart below, we have simplified the Nickel cost curve into four blocks of production, with each block accounting for a quarter or 500kt of nickel production. The first block of 500kt we have dubbed the By-product beneficiaries, such as Norilsk. They may not always be the best operators, but the poly-metallic nature of their ore bodies makes for very attractive by product credits. The C1 cash cost ranges from USD-10,000/t to USD5,000/t. with robust margins throughout the cycle. The second block of production, we have dubbed "solid and safe". These are well established, well run operations in rich well charted nickel cratons. In some instances these operations still benefit from modest by-product credits. Operations include some of the Sudbury operations, Kevitsa and the First Quantum Ravensthorpe operation, with costs ranging from USD5,000/t to USD11,000/t. Clearly some of these operations are losing money at spot prices, but many producers will see themselves as well down the cost curve and expect others to cut. The third block of 500kt is the high quality Ferro-nickel producers, which includes a large portion of the Chinese RKEF nickel pig iron producers. Cash costs range from USD11,000/t – 12,000/t but these can be more variable than other parts of the industry as ore prices fluctuate. Power sector reforms in China will help the NPI producers, where c.30% of the operating costs are in the form of power. The reforms are being rolled out across China province by province. In Inner Mongolia, the grid power price has decreased by RMB0.026/KWh from the start of October, equating to a fall of USD200/t. Many of the producers in this block will think that they can cut costs by USD500/t in 2016, and are unlikely to shut capacity in our view. The last block of 500kt (the Battlers) are clearly struggling with costs ranging from USD12,000 – 20,000/t. We have sub-divided the last block of production into three further categories; the block of c.280kt with a cash cost ranging from USD12,000 – 14,000/t we have dubbed the Cost cutters and Currency campers. These are lower quality assets, but run by lean hungry management, typically in regions which have a high proportion of local currency denominated costs. The Murrin Murrin operation in Australia sits in this block. The management of the operation will be pinning their hopes on a lower AUD, and their own ability to find further cost savings. Whilst this block is vulnerable, many producers

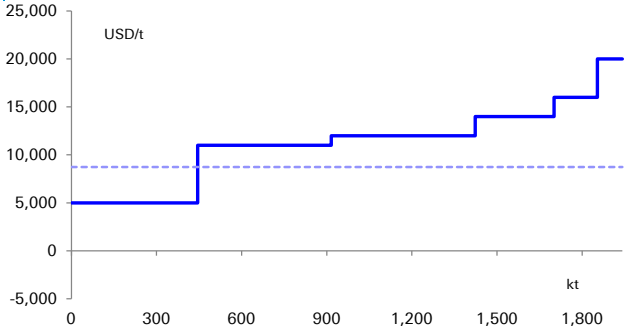
will be battling for survival. The next block of production is the low quality, older technology nickel pig iron producers. Costs range from USD14,000 – 16,000/t, which makes them vulnerable. We expect the recently announced closures in China to come from this block. The last block of producers, accounting for c.90kt of production is dominated by the New Caledonian Capitalisers. These are typically large complex operations owned by Glencore and Vale, under extended ramp-up schedules. The costs are currently being "hidden" on the balance sheets which are already under pressure. The "hope" from the companies is that once fully ramped up, these operations will be "low cost". Whilst this "hope" remains, it is unlikely that these operations will be shut. In a conclusion, a combination on national politics, the need to maintain employment, and the often ill founded hope has led to a reluctance to cut.

Figure 62: A simplified nickel cost curve – Q4'15



Source: Deutsche Bank, Wood Mackenzie

Figure 63: Only block 1 makes money at the current spot price



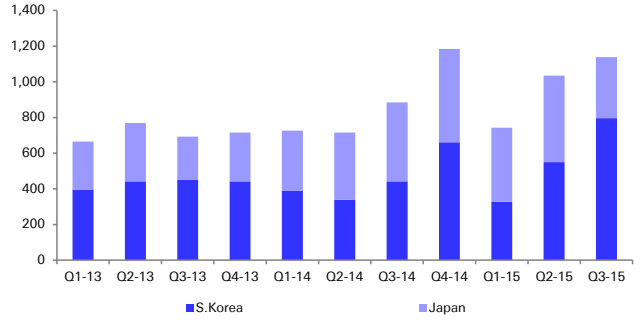
Source: Deutsche Bank, Wood Mackenzie

The slow progress on these projects may have prompted the New Caledonian government to approve nickel exports to China. After a vote in congress in late October Mai Kouaoua Mines' (MKM), will be permitted to export 300kt of ore over an 18-month period. The ore-grade will be between 1.2-1.65%. There were in total four companies that applied to export nickel ore to China, but only MKM was approved. Assuming an average grade of 1.5% nickel is exported then the volume equates to less than 3kt on a nickel contained basis. It is unlikely to have a significant impact on Chinese NPI production, unless additional exports are allowed. At present the main markets for New Caledonian ore are South Korea and Japan. Between January and September Japan imported 1.24mt from New Caledonia, up 8% y/y. For the same period, South Korea imported 1.7mt, up 43% y/y. The increased level of exports to South Korea is to feed the recently expanded Gwanyang ferronickel smelter. The smelter expanded from 30kt to 54kt this year, but there is insufficient ore from New Caledonia for it to operate at capacity.

It is also unclear whether it will be profitable to ship ore to China under current market conditions. This is because the cost of freight from New Caledonia will be higher than shipping from the Philippines. At current medium-grade ore prices even some of the Philippines miners are struggling to break-even.

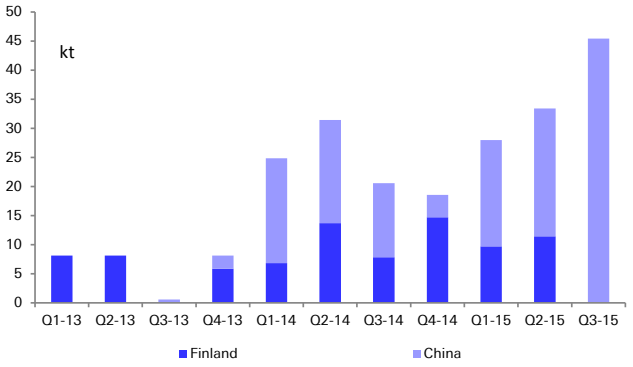
There have been some curtailments in the industry. Mirabela plans to lower annualised nickel in concentrate production at its Santa Rita mine in Brazil to 12kt from the current level of 18kt in 2016. The mine has exported concentrate to Finland and China this year, however trade data shows that there have been no shipments to Finland since the middle of this year, with China the only destination for the concentrate. The latest curtailment brings total cuts outside of China to 23kt of nickel in concentrate, and a total of c.140kt of metal if we assume that the Chinese NPI producers follow through on their announced cuts.

Figure 64: Exports of New Caledonian ore set to include China



Source: CRU

Figure 65: Consumer of Mirabela's concentrate



Source: CRU

During the meetings, eight major China nickel producers announced a proposal of a 15kt nickel output cut in Dec 15 and at least a 20% output cut in 2016. Right after the joint meeting, Jinchuan, Qingshan, Macrolink and Xinxin announced company-specific reduction plans in Dec 2015 and FY16 (details shown in Figure 66).

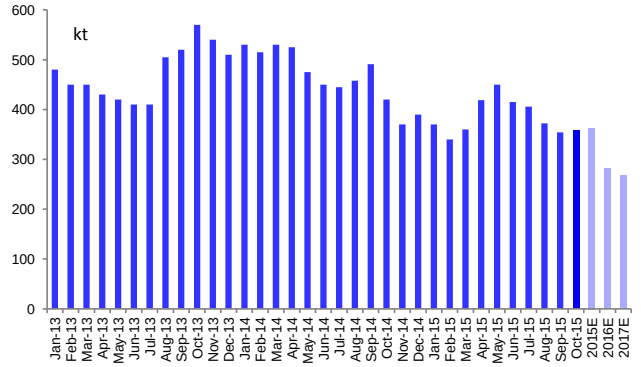
Figure 66: Nickel producers involved in joint curtailment initiative

Company (in Chinese)	Company (in English)	Reduction plan in Dec 2015	Reduction plan in FY2016
金川集团股份有限公司	Jinchuan Group	Cut by 2kt	Stop mining in low grade mines and cut external raw material procurement
青山钢铁集团	Qingshan Steel Group	Cut by 2kt	Cut by 30% (including Indonesia)
新华联矿业有限公司	Macrolink Mineral Co., Ltd	Cut by 1kt	Cut by 30%
新疆新鑫矿业股份有限公司	Xinjiang Xinxin Mining Industry Co., Ltd	Cut by 20%	Cut by 20%+
吉林吉恩镍业股份有限公司	Jilin Ji'En Nickel Industry Co., Ltd	TBA	TBA
山东鑫海科技股份有限公司	Shandong Xinhai Technology	TBA	TBA
江苏德龙镍业有限公司	Jiangsu Delong Nickel Co., Ltd	TBA	TBA
江苏宝通镍业有限公司	Jiangsu Baotong Nickel Co., Ltd	TBA	TBA
合计	**Total 8 companies**	**Cut by 15kt**	**Cut by 20%+**

Source: Deutsche Bank, Antaike

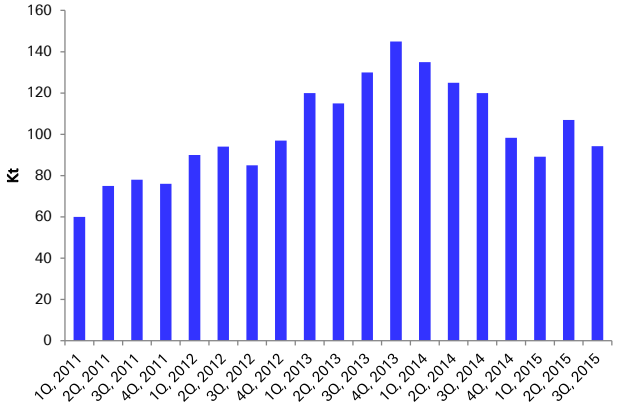
Chinese NPI output has started to decline after a temporary lift in Q2. We factor in a cut of c.70kt of production next year in 2016, which falls short of the announced 120kt. Any price rally will spark a very quick response from the Chinese producers.

Figure 67: Chinese NPI production with DB estimates



Source: Deutsche Bank, SMM

Figure 68: Chinese NPI production (quarterly) in contained Nickel terms

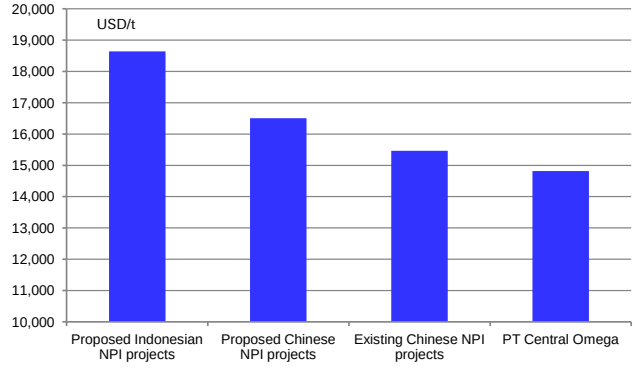


Source: CRU, SMM

Cutting long-term prices … again

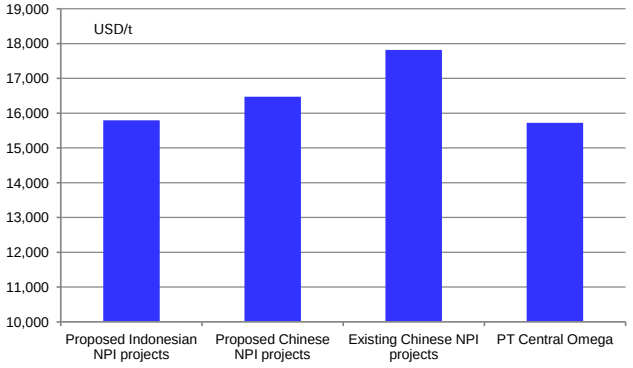
We have reviewed our project sample to determine long term prices with lower coal and power, as well as some reduction in capex, especially now that there is a bit more clarity on capex out of Indonesia. The Indonesian NPI projects may be delayed, but we expect a critical mass of capacity in 2018/19E. The capex intensity of the Indonesian projects are slightly higher than the proposed Chinese NPI projects, and range from USD16,500 to USD18,600/t. The flagship project in Indonesia, PT Central Omega has a capex intensity of USD14,815/t. Using a cost of USD11,500/t for an Indonesian NPI plant and USD12,500/t for a proposed NPI plant in China (we assume this will be fed by either New Caledonian or Philippine ore), the incentive price to earn a 15% IRR ranges from USD15,800 – USD16,500/t.. We have set our new incentive price at the upper bound of this range.

Figure 69: Capital intensity of a sample of Indonesian and Chinese NPI smelters



Source: Deutsche Bank, Wood Mackenzie

Figure 70: Incentive price for a range of Nickel smelting projects relying on laterite ore (15% IRR)



Source: Deutsche Bank, Wood Mackenzie

We outline our assumptions in Indonesian unit cash costs.

Figure 71: Indonesian NPI cash cost model

Inputs	Unit	Value
Grade	%	0.017
Strip Ratio		3
Production	kt	30
Recovery	%	90%
Power	kWhr/ t ore	775
Power Price	USD/kWhr	0.120
Coal	t/t ore	0.150
Coal Price	USD/t	65
Labour cost	USD/manyear	14,700
Consumables	USD/t ore	17
Other	USD/t ore	12
Mining	USD/t ore	23
Unit costs	**Unit**	**Value**
Mining	USD/t Ni	1,503
Other	USD/t Ni	784
Consumables	USD/t Ni	1,111
Labour	USD/t Ni	1,470
Coal	USD/t Ni	637
Power	USD/t Ni	6,078
Total	**USD/t Ni**	**11,584**
	c/lb	**5.26**

Source: Deutsche Bank, Wood Mackenzie

Figure 72: Estimating an incentive price

Parameter	Unit	
NPI production	kt	300
Ni content		9%
Contained Ni	kt	27
Capex	USDm	400
Opex	USD/t	12,000
Capex intensity	USD/t	14,815
15% ROCE	USD/t	2,222
Sustaining capex	USD/t	1,500
Incentive price	**USD/t**	**15,722**

Source: Deutsche Bank

Figure 73: Global nickel supply and demand model

		2010	2011	2012	2013	2014	2015E	2016E	2017E	2018E	2019E	2020E
Australia mine production	kt	180.9	191.2	237.3	232.6	202.9	182.2	184.4	167.9	194.7	179.7	179.1
Production growth		*2.7%*	*5.7%*	*24.1%*	*-2.0%*	*-12.8%*	*-10.2%*	*1.2%*	*-8.9%*	*16.0%*	*-7.7%*	*-0.3%*
New Caledonia mine production	kt	130	129	138	152	183	186	189	206	214	236	241
Production growth		*40.0%*	*-0.5%*	*7.1%*	*10.2%*	*20.0%*	*1.9%*	*1.5%*	*9.0%*	*4.0%*	*9.8%*	*2.3%*
Canada mine production	kt	154.7	215.3	200.3	222.5	223.4	235.4	232.8	231.5	226.6	226.6	223.3
Production growth		*18.7%*	*39.1%*	*-6.9%*	*11.1%*	*0.4%*	*5.4%*	*-1.1%*	*-0.5%*	*-2.1%*	*0.0%*	*-1.4%*
Russia mine production	kt	278.8	274.3	259.8	242.8	238.9	232.6	232.3	216.5	220.6	218.8	219.3
Production growth		*2.7%*	*-1.6%*	*-5.3%*	*-6.5%*	*-1.6%*	*-2.6%*	*-0.1%*	*-6.8%*	*1.9%*	*-0.8%*	*0.2%*
Brazil mine production	kt	55.0	95.4	125.6	94.9	116.7	86.8	107.2	114.2	114.2	111.7	109.2
Production growth		*24.7%*	*73.4%*	*31.7%*	*-24.5%*	*23.0%*	*-25.6%*	*23.6%*	*6.5%*	*0.0%*	*-2.2%*	*-2.2%*
Indonesia mine production	kt	285.8	546.3	631.3	825.4	179.0	125.9	144.3	167.3	185.6	205.6	245.6
Production growth		*41.3%*	*91.2%*	*15.5%*	*30.7%*	*-78.3%*	*-29.7%*	*14.7%*	*15.9%*	*10.9%*	*10.8%*	*19.5%*
Philippines mine production	kt	175.1	205.9	220.0	236.0	417.1	440.0	440.4	413.6	407.8	407.8	365.8
Production growth		*23.7%*	*17.6%*	*6.8%*	*7.3%*	*76.7%*	*5.5%*	*0.1%*	*-6.1%*	*-1.4%*	*0.0%*	*-10.3%*
Estimated Ni in Ore - for Ni Pig Iron	kt	356.0	651.9	750.0	944.8	451.8	427.0	439.2	425.6	427.6	447.6	445.6
Production growth		*41.1%*	*83.1%*	*15.0%*	*26.0%*	*-52.2%*	*-5.5%*	*2.9%*	*-3.1%*	*0.5%*	*4.7%*	*-0.4%*
World mine production - base case	**kt**	**1,641**	**2,051**	**2,237**	**2,437**	**2,048**	**2,044**	**2,098**	**2,115**	**2,159**	**2,182**	**2,167**
World mine production growth rate		*15.6%*	*25.0%*	*9.1%*	*8.9%*	*-16.0%*	*-0.2%*	*2.6%*	*0.8%*	*2.1%*	*1.0%*	*-0.7%*
Possible projects					**0**	**0**	**0**	**13**	**103**	**175**	**332**	**380**
Disruption allowance						**0**	**-10**	**-84**	**-85**	**-86**	**-87**	**-87**
Total world mine production	**kt**	**1,641**	**2,051**	**2,237**	**2,437**	**2,048**	**2,034**	**2,027**	**2,133**	**2,278**	**2,456**	**2,490**
Total Smelter output	**kt**	**1,504**	**1,677**	**1,802**	**2,016**	**1,985**	**1,897**	**1,915**	**1,929**	**1,973**	**1,985**	**1,939**
Implied smelter recovery	*%*	*92%*	*82%*	*81%*	*83%*	*97%*	*93%*	*94%*	*90%*	*87%*	*81%*	*78%*
Total refinery capacity	**kt**	**2,152**	**2,544**	**2,849**	**3,021**	**3,097**	**3,073**	**3,104**	**2,978**	**2,978**	**2,978**	**2,923**
Implied utilisation	*%*	*68.1%*	*64.6%*	*61.6%*	*66.0%*	*64.2%*	*63.0%*	*60.2%*	*63.6%*	*66.1%*	*71.1%*	*73.6%*
Base case refinery output	**kt**	**1,465**	**1,643**	**1,756**	**1,993**	**1,989**	**1,935**	**1,848**	**1,818**	**1,804**	**1,907**	**1,932**
Possible projects						*0*	*0*	*19*	*75*	*164*	*210*	*218*
Total refined availability / Output	**kt**	**1,465**	**1,643**	**1,756**	**1,993**	**1,989**	**1,935**	**1,867**	**1,893**	**1,968**	**2,116**	**2,150**
World refined availability growth rate		*9.2%*	*12.1%*	*6.9%*	*13.5%*	*-0.2%*	*-2.7%*	*-3.5%*	*1.4%*	*4.0%*	*7.5%*	*1.6%*
Implied Refinery recovery from mined ou	*%*	*89.3%*	*80.1%*	*78.5%*	*81.8%*	*97.1%*	*95.1%*	*92.1%*	*88.7%*	*86.4%*	*86.2%*	*86.3%*
Global stainless production	mt	33.0	34.6	36.0	40.1	42.4	42.4	44.2	45.9	47.0	48.2	49.3
Growth		*26.0%*	*4.6%*	*4.2%*	*11.3%*	*5.9%*	*-0.2%*	*4.4%*	*3.9%*	*2.4%*	*2.4%*	*2.4%*
Austenitic stainless demand	mt	23.9	25.2	26.9	30.2	32.0	31.8	32.5	33.7	34.8	35.6	36.5
Austenitic ratio		*72.4%*	*73.1%*	*73.5%*	*75.4%*	*75.5%*	*75.0%*	*73.5%*	*73.5%*	*74.0%*	*74.0%*	*74.0%*
Total nickel demand for stainless	kt	1,716	1,798	1,844	2,017	2,109	2,085	2,124	2,197	2,258	2,304	2,351
Nickel content		*7.2%*	*7.1%*	*6.9%*	*6.7%*	*6.6%*	*6.6%*	*6.5%*	*6.5%*	*6.5%*	*6.5%*	*6.4%*
Nickel scrap consumption	kt	743	740	758	814	866	834	828	879	914	945	976
Scrap ratio		*43.3%*	*41.2%*	*41.1%*	*40.4%*	*41.1%*	*40.0%*	*39.0%*	*40.0%*	*40.5%*	*41.0%*	*41.5%*
Primary Nickel in Stainless	kt	973	1057	1087	1203	1243	1251	1296	1318	1343	1359	1375
Primary Nickel in Non-Stainless	kt	513	541	568	584	614	623	635	654	668	681	694
Total world nickel consumption	**kt**	**1,486**	**1,598**	**1,655**	**1,787**	**1,857**	**1,874**	**1,931**	**1,973**	**2,011**	**2,040**	**2,070**
World nickel consumption growth	*%*	*16.9%*	*7.5%*	*3.5%*	*8.0%*	*3.9%*	*0.9%*	*3.1%*	*2.2%*	*1.9%*	*1.5%*	*1.5%*
Adjustments												
Balance	**kt**	**-21.3**	**44.2**	**101.1**	**206.7**	**132.0**	**61.2**	**-63.9**	**-79.9**	**-42.7**	**76.3**	**80.8**
Reported stocks	kt	136.9	90.5	139.9	261.6	407.0	468.2	404.3	324.4	281.8	358.1	438.9
Stock to consumption ratio	w ks	4.79	2.94	4.40	7.61	11.40	12.99	10.89	8.55	7.29	9.13	11.03
Annual Average Prices	**USD/t**	**21,745**	**22,888**	**17,591**	**15,102**	**16,955**	**11,861**	**9,750**	**11,750**	**13,008**	**14,267**	**15,525**
Annual Average Prices	**USD/lb**	**9.87**	**10.38**	**7.98**	**6.85**	**7.69**	**5.38**	**4.42**	**5.33**	**5.90**	**6.47**	**7.04**

Source: Deutsche Bank, Wood Mackenzie

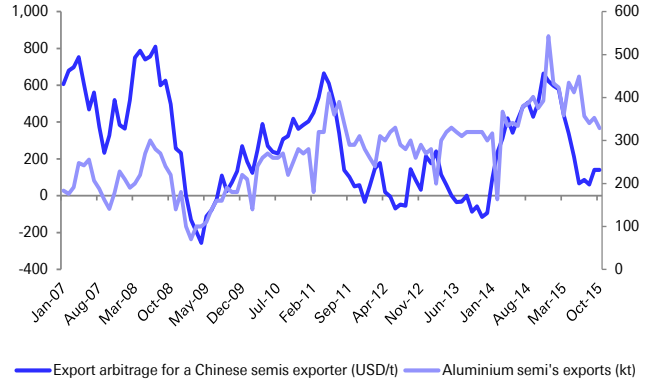
Aluminium: Cut Cut Cut 减产

- The aluminium market has not been immune to a slowdown in demand growth. However absolute demand growth rates at 4%+ are still decent compared to the other base metals. This makes sense as aluminum is the metal grabbing market share away from copper in limited electrical applications and zinc with the "body in white" light-weighting replacing galvanized auto sheet. However, the other key reason for the improving market share is because aluminium remains cheap and abundant.
- 2015 is the year that the creeping competitiveness in Chinese aluminium caught up with the rest of the world. This forced the older less competitive smelters looking for alternative markets, and the increasing semi's exports that picked up in late 2014, simply gathered pace into 2015. Regional premiums were the first to suffer, followed by the LME price. Although Alcoa announced a further cut of 500kt, we think there is a reluctance to cut outside of China for fear of simply attracting more exports. It is only with Chinese cuts (减产) that the global aluminium market will cure itself.
- We think the pace of closures is China is accelerating, and we expect more in 2016. Not enough to draw down inventories rapidly and drive a price recovery, but certainly sufficient to stabilize prices. We remain sceptical of the announcements at the recent China Nonferrous Metals Industry will result in the cut and delay in ramp-ups announced. However, it is a start, and we expect the realisation that cuts need to be permanent will grow in 2016. We forecast prices to remain under pressure for the first part of 2016, but to recover in H2.

Ceasing the downward spiral – we need more Chinese cuts

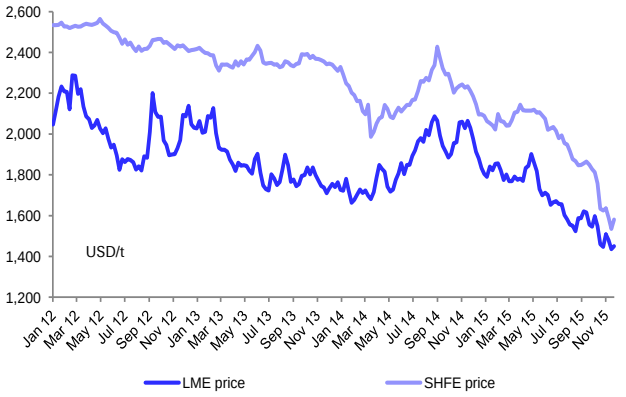
The aluminium industry has been in a downward spiral for much of 2015. There is no doubt that demand growth has slowed along with all the other metals. However, demand remains robust and aluminium is the metal taking market share away from the other base metals. The reluctance of concerted and permanent capacity shuts in the Chinese aluminium industry has led to a global oversupply. Depressed domestic pricing has in turn led to local producers to look to the export market. A favourable arbitrage for semi manufactured products (semi's) which attract a 13 – 15% export rebate, make these exports profitable at various periods. Chinese exports ultimately reduce the arbitrage by pressurizing premiums and the LME price. Any supply cuts from the non Chinese producers have simply attracted more imports, so it is with increasing reluctance that further cuts are being considered.

Figure 74: Falling arbitrage = falling Chinese exports



Source: Deutsche Bank, Bloomberg Finance LP

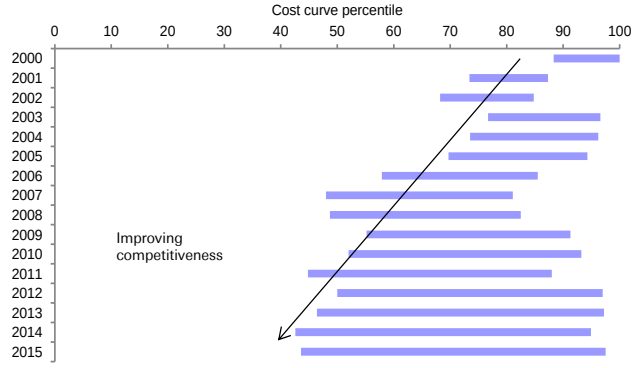
Figure 75: A sharp fall in the SHFE price has closed the arb between the LME price



Source: Deutsche Bank, Bloomberg Finance LP

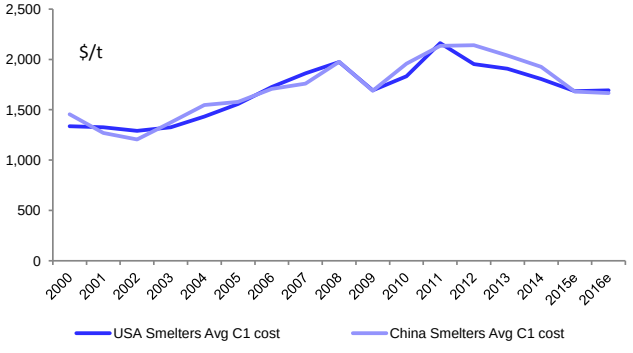
There is no doubt that more efficient coal production and hence lower prices combined with an increasing proportion of captive power has meant more competitive costs. Modern and more efficient smelting technology in China has also been instrumental in improving China's cost competitiveness. The challenge is that the older less efficient technology has been hanging on, with the help of local government subsidies. Over the medium term, the key factor in eroding this cost competitiveness is the burden of additional carbon taxes, with most of the Chinese industry being coal based. This is no different to many Western smelters, where lower power tariffs are offered as a way to keep local employment.

Figure 76: Improving cost competitiveness of the aluminium smelting industry



Source: Deutsche Bank, Wood Mackenzie

Figure 77: …especially versus the US. Comparing the average cash cost over the past 15 years

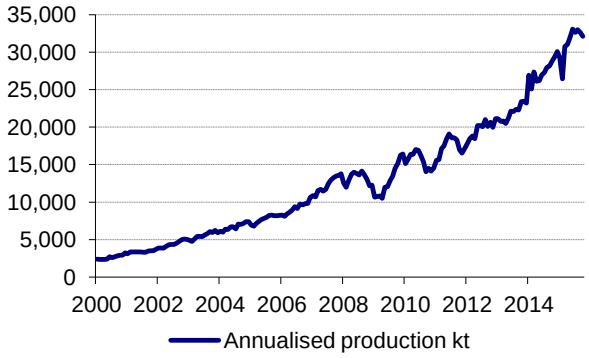


Source: Deutsche Bank, Wood Mackenzie

The irony is that the recent spate of base metal cuts from the Chinese base metal processing industry the aluminium players were late out of the starting blocks. Arguably this is the industry which needs a coordinated approach to capacity management. However, we think there is a growing realization in China that subsidizing older loss making facilities or stockpiling inventory via the SRB is simply postponing the inevitable and in no-one's interest. Capacity closures have started to accelerate in China and monthly output in China, whilst still up c.12% YoY has started to stabilize, and is down 1.5% month on month. The industry is now at the point where new capacity starts have been offset capacity closures. This can change very quickly with Chinese restarts

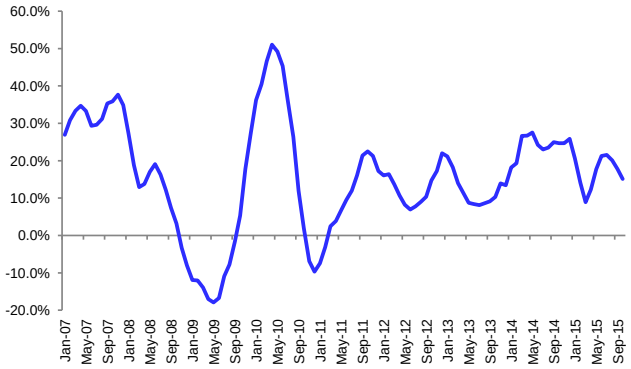
notoriously quick out of the starting blocks with the merest sniff of a price recovery. We see this momentum continuing into 2016, which will see aluminium prices stabilizing in Q2 this year, and recovering into the mid to high USD1,500's by year end.

Figure 78: Chinese production has started to stabilize



Source: Deutsche Bank, NBS

Figure 79: Chinese aluminium supply growth is slowing (3 MMA % YoY)



Source: Deutsche Bank

However, we concede that our price recovery scenario is dependent on further supply management in 2016, with more cuts required to offset the inevitable start-ups. We do note however, that some of these new capacity additions have been pushed out by a few years. China is closing additional non-competitive capacity and closures to date are around 3Mtpa. The stats provided by Wood Mac are corroborated by SMM who estimate that there were c.1.1mt of curtailments in Nov 2015 alone and potentially another 0.8mt in Dec 2015 versus an. aggregated ~2.1mt+ in Jan to Oct 2015. While closures have been growing, new capacity implementation has also stalled and has been overtaken by the volume of closures. Earlier this year, there were almost 5 Mtpa of new capacity projects scheduled for completion from 2015. The table below shows that the completion quota for 2015 has shrunk significantly since September, as the aluminium price dropped. It now appears that capacity closures will exceed new capacity addition in 2015, probably the first such occurrence in China's history as a significant aluminium producer. This will have to show up in the official production stats for the market to believe this. A strong rebound in prices is unlikely and even a modest improvement is likely to encourage a resumption of the planned new capacity build-out that has been deferred into 2016 and beyond. That will tend to keep shutdown capacity on the side lines.

Figure 80: China smelter shutdowns in kt

Company	Province	Smelter	Oper Rate Dec-14	Announced closure Q1	Announced closure Q2	Announced closure Q3	Announced closure Q4	closed
Yangquan Coal Group	Shanxi	Zhaofeng	120	20	25			45
Sichuan Qiya Aluminium	Sichuan	E'Meishan	237	65	37		135	237
Sichuan Aostar Aluminium	Sichuan	Meishan	150	23			30	53
Longquan Aluminium	Henan	Yichuan	530	100				100
Shenhuo Aluminium and	Henan	Shenhuo	475		20	35		55
CPI-Huanghe Xinye Aluminium	Qinghai	Xining City	558			154		154
CPI	Chongqing	Tiantai Al	130			15		15
Qingtongxia Aluminium	Ningxia	Qingtongxia	460			145		145
Chalco	Liaoning	Fushun	265		40	100	160	300
Hunan Chuangyuan Aluminium	Hunan	Chuangyuan	330		50	10	110	170
Dongyuan Aluminium	Yunnan	Qujing City	218			8		8
Chalco	Gansu	Baiyin	184			40	80	120
CPI Huomei Hongjun	Inner Mongolia	Tongshun Al	165				45	45
Xinheng	Qinghai	Yellow River	410	200		106		306
Chinalco	Shaanxi	Tongchuan Xinguang	30			30		30
Jinneng Xindongfang Aluminium	Shanxi	Jinneng City	63			30		30
Taiyuan Donglu Aluminium	Shanxi	Taiyuan City	80		30	25		55
Aba Aluminium	Sichuan	Wenchuan	200			92		92
Xichuan Aluminium	Henan	Henan	190			110		110
Wanji Aluminium	Henan	Henan Wanji	530			30		30
Chinalco	Gansu	Liancheng	512			150		150
Dongxing Aluminium	Gansu	Jiayuguan	1350			200		200
Dongxing Aluminium	Gansu	Longxing	0			60		60
Qixing	Shandong	Zouping	140			70		70
Dongsheng	Chongqing	Fuling	105				20	20
Yunnan Aluminium	Yunnan	Chenggong County	1035				100	100
Aba Aluminium	Sichuan	Wenchuan	200				70	70
Hengkang Aluminium	Henan	Hengkang	210				210	210
Total China			**8877**	**408**	**202**	**1410**	**960**	**2980**

Source: Deutsche Bank, Wood Mackenzie

Figure 81: China smelter capacity addition schedule

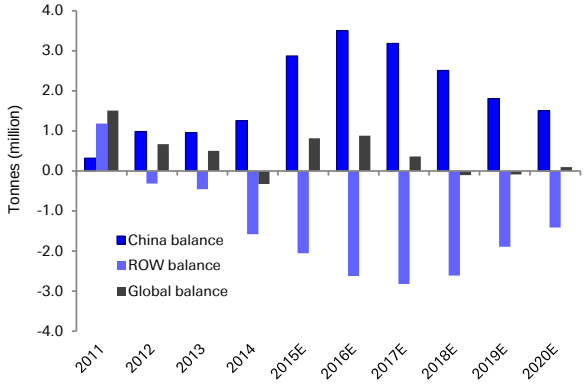
As of 2015	Avg SHFE Aluminium, $/t	Total planned capacity, kt/a	Capacity scheduled for completion 2015	2016	since May 2015 (kt/a) Beyond
May	$2,129	8760	3320	4050	1390
June	$2,059	9160	3870	3900	1390
July	$1,986	9160	3820	3900	1440
August	$1,886	9510	3405	4235	1870
September	$1,856	9510	3345	4825	1340
October	$1,728	10530	2980	4760	2790
November	$1,609	10530	2610	5065	2855

Source: Deutsche Bank, Wood Mackenzie

The deferral of capacity additions in 2015, simply means that China producers plan to install about 5Mt/a capacity in 2016. It's unlikely that the full list of projects will be implemented unless the business environment shows significant improvement. However, two large integrated producers plan to install about 50% of that total. Shandong Chiping Xinfa is constructing a 1Mtpa smelter at Xinyuan and the initial 330ktpa line is scheduled for commissioning in Q2'16. China Hongqiao plans to add 1Mtpa capacity, in 4 increments to achieve total capacity of 5.5Mtpa in 2016. Xinfa Xinjiang plans to add 500ktpa capacity in H2, lifting its capacity at Wujiaqu to 2.4Mtpa. These projects were set for implementation well before the SHFE aluminium price fell to the current lows but they will most likely be commissioned if completed.

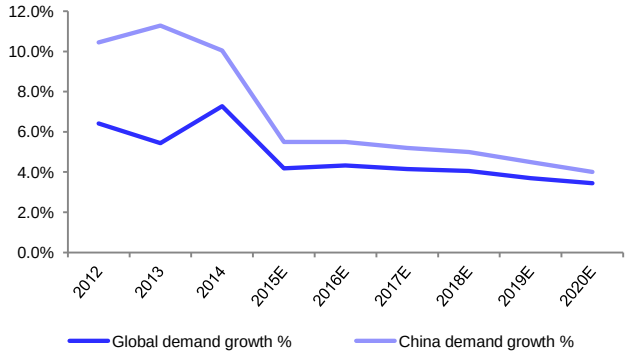
Although China plans to add a further 5Mtpa of capacity in 2016, we only factor in an additional 7% increase in Chinese output, amounting to 2.1Mtpa of net additions. We expect a lower completion rate than current expectations, as well as some capacity closures. Under our base case scenario (Chinese demand at 5.5%, and global demand growth at 4.3%), we still have the global market in surplus by 900kt, with the China surplus at 3.5Mt. Should all of the 5Mtpa of scheduled capacity increase come on line, then the closures requirement would increase by 2.5Mtpa to 4Mtpa which to us looks a stretch.

Figure 82: Aluminium S&D: China's oversupply feeds the ROW.



Source: Deutsche Bank, Wood Mackenzie

Figure 83: A sharp slowdown in demand growth



Source: Deutsche Bank, Wood Mackenzie

In order to balance the global market, we would need to see Chinese capacity increases limited to 4.2% or 1.3Mt. This implies that curtailments would need to be roughly half that of the new starts. A 1% fall in Chinese demand would mean another 300kt of shutdowns would be required.

Figure 84: Estimating the required curtailments in China – over and above existing cuts

	Base case	Balanced global market	-1% Chinese demand
China demand (Mt)	29.3	29.3	29.0
China demand growth %	5.5%	5.5%	4.5%
Global demand	58.4	58.4	58.2
Global demand growth %	4.3%	4.3%	3.8%
China smelter net additions	2.16	1.28	1.00
China smelter growth %	7.0%	4.2%	3.3%
Additions	2.5	2.5	2.5
Closures	**0.34**	**1.22**	**1.50**
China balance (Mt)	3.50	2.62	2.62
Global balance (Mt)	0.88	0.00	0.00

Source: Deutsche Bank

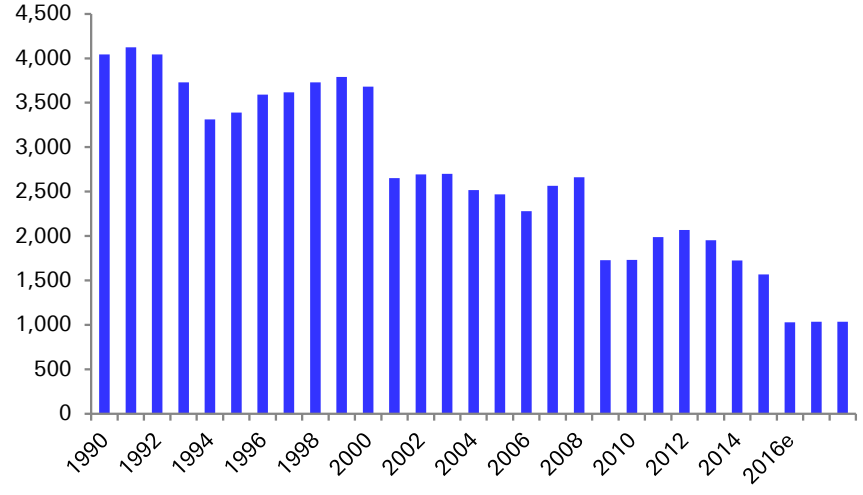
Alcoa cuts helpful, but not enough in isolation

The lurch lower in the LME aluminium price towards USD1,450/t (equating to an all in price close to USD1,600/t) prompted Alcoa to shut c.500ktpa of US smelting capacity. The company had already announced a review of 500kt of aluminium smelting capacity and 2.8Mtpa of alumina refining capacity back in March 2015. Alcoa will begin the curtailments in the fourth quarter of 2015 and will complete them by the end of the first quarter of 2016. Alcoa's actions are certainly helpful in the context of the currently over-supplied market, but the company cannot cure the market on its own. The 500ktpa cut amounts to marginally less than 1% of global demand. Ultimately, other producers will have to the follow Alcoa's lead, more specifically Chinese capacity.

In its aluminum business, Alcoa will idle the Intalco (Ferndale) and Wenatchee primary aluminum smelters in Washington State, and the Massena West smelter in New York. The Company will not modernize the New York Massena East smelter and will permanently close the facility; potlines at Massena East have been closed since March 2014. The casthouses at Intalco and Massena West, which produce value-add shaped products, will continue to operate. The Alcoa Forgings and Extrusions facility in Massena is unaffected. In its alumina business, Alcoa will partially curtail refining capacity at its Pt. Comfort, Texas facility by about 1.2 million metric tons. In a move that mirrors China, Following an agreement with New York state on an incentive package, Alcoa indicated it would reverse the earlier decision to close the 130ktpa Massena West smelter, lowering its planned closures to 373ktpa.

We estimate that the output of the US aluminium industry could dip below 1Mtpa in 2016E, depending on the outcome of power supply discussions at jointly owned (Century / Alcoa) Mt. Holly smelter. The announcement today arguably improves the likelihood of success in these negotiations, especially if the loss of domestic production is deemed to be a security threat.

Figure 85: The decline of US smelting output



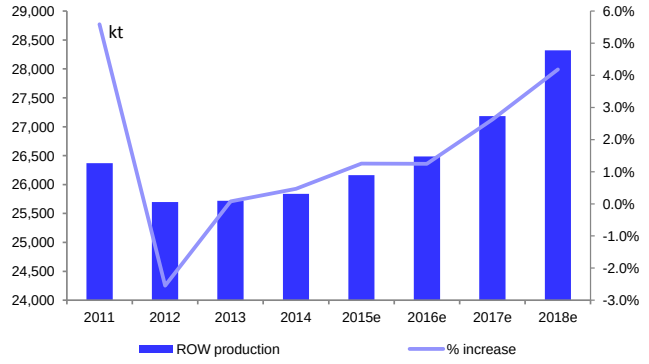
Source: Deutsche Bank, Wood Mackenzie

US output "stepped" down in both of the past two economic crises. The 2001/02 recession and the global financial crisis of 2008/09 saw a reduction of c.1Mtpa of capacity. The latest reduction in capacity is likely to be of a similar order of magnitude, and we note that capacity never recovered back to its

previous levels. This situation is not unusual. The combination of ageing technology combined with competing uses for power has meant that these mature facilities become uncompetitive over time. Regions with stranded or more competitive power will tend to invest in newer more efficient technology and ultimately force out the older production units.

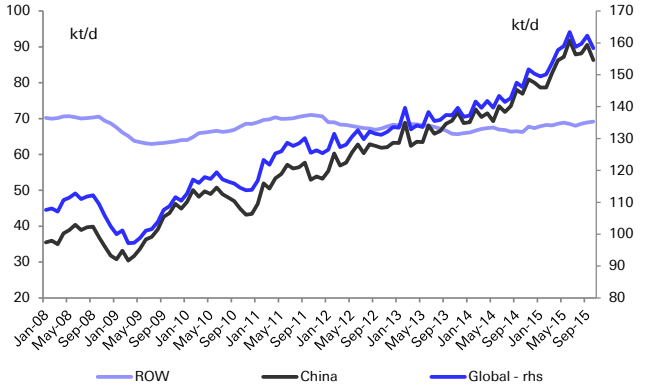
The International Aluminium Institute (IAI) pegged the ROW output at 69.1kt/d in October, up 4% year on year and breakeven on a sequential month basis. The usual adjustments to include Malaysia and other non-reporting countries show that ROW output increased to 72.4kt/d, up 4% on 2014 and 1% on the prior month. Even after significantly slowing its new capacity ramp-up schedule, India continued to push ROW output higher with small additions from Europe, the Middle East and Australia. On the negative side; rolling blackouts continued to impact output from South Africa, Century closed the third potline at the Hawesville smelter, Brazil's power woes are ongoing and poor equipment condition continued impacting Venezuela. We still forecast some modest increase in output from the Rest of the World, 1% in 2015E and 2016E, rising 3 to 4% in 2017E and 2018E. This will be price dependent in our view.

Figure 86: ROW aluminium output – limited growth in 2016E



Source: Deutsche Bank, Wood Mackenzie

Figure 87: Global aluminium production – daily rate

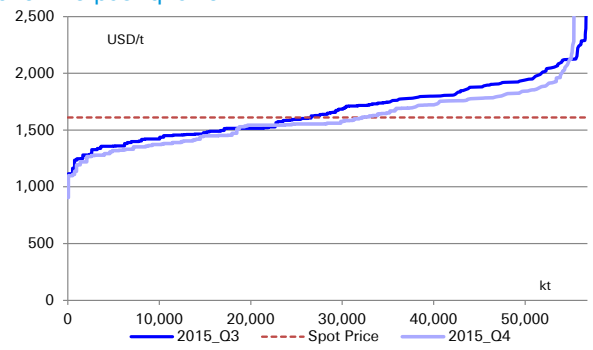


Source: Deutsche Bank, IAI

Cost curve support has been elusive in 2015

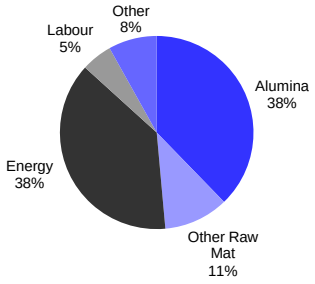
As a result of the high barriers to exit in the aluminium market, cost curve support has proved elusive for the market so far this year. We estimate that over half the industry is loss-making at based on the Q3'15 cost curve, with over two thirds of Chinese production being loss-making and nearly 40% of production ex China being loss-making. Lower alumina prices and power tariffs lowered costs, and we estimate that 40% of the industry is now loss-making. The aluminium industry has already taken out a lot of costs, and we are reaching the point of the cycle where the scope for "cost out" is becoming more limited. Costs could fall a further 5 - 10% over the next six months with the help of currencies, but this would still mean that c.20 - 30% of the industry will remain loss-making.

Figure 88: Aluminium C1 cost curve – Costs have fallen over the past quarter



Source: Deutsche Bank, Wood Mackenzie, Bloomberg Finance LP

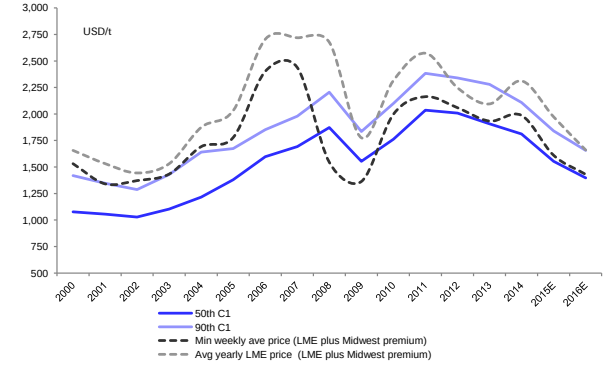
Figure 89: Aluminium cost breakdown 2015E



Source: Deutsche Bank, Wood Mackenzie

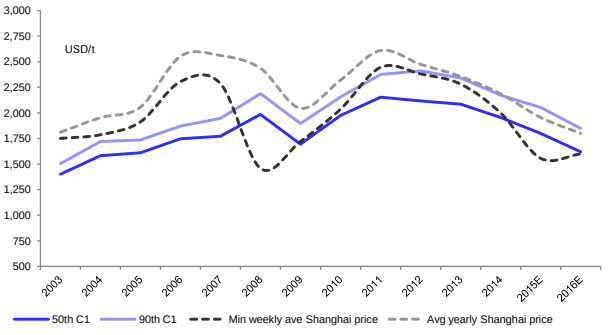
We forecast global costs to fall below 2009 levels, which means that average prices are also likely to be below 2009 levels. The 90th percentile of the cost curve is forecast to be c.USD1,730/t, which implies an average LME price of USD1,550 to USD1,600/t, a downside risk to our current forecast of USD1,613/t. If we assume that the 50th percentile remains a reasonable guide for the minimum aluminium price, then we could see LME prices trade as low as USD,1280/t.

Figure 90: Global cost curve evolution



Source: Deutsche Bank, Wood Mackenzie

Figure 91: China cost curve evolution



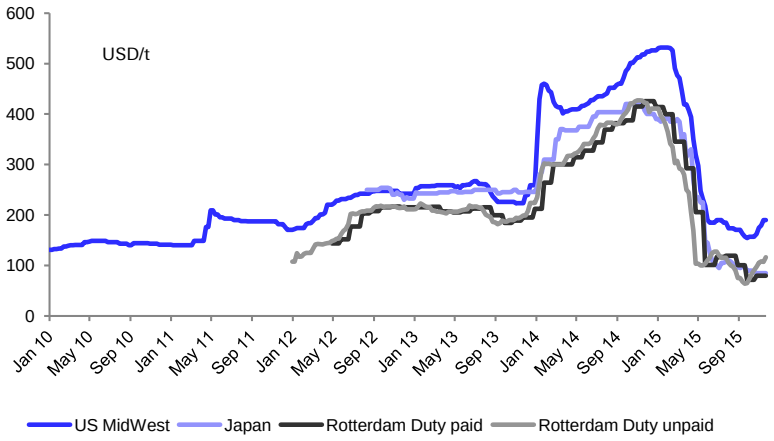
Source: Deutsche Bank, Wood Mackenzie

A brief rally in the US MidWest premium?

After a brief recovery in early November European premia have come under pressure from ongoing tightness in spreads and end of the year consumer destocking. European duty-paid premia climbed to USD160-180/t in mid November from where they lost some ground and fell to USD150/t in December. The primary reason behind the support in European premia was a recovery in LME nearby spreads in late October and into early November. Since then spreads have tightened back to low single digit. In contrast the US Midwest premia largely shrugged of tightness in spreads and continued to rise, underpinned by smelting capacity cuts in the region. These cutbacks have seen Midwest premia rally by c.USD50/t. We expect that the disconnect between US and European ingot premia will remain a market feature for the time being. The price-related cutbacks in the US will have a significant effect in North American trade balances by increasing regional dependency on imported aluminium. We expect North American consumption of primary aluminium to reach 5.8Mt in 2016E while production is likely to be 4.2Mt leaving the region in 1.6mt deficit in 2016. In contrast, poor demand and the large inventory overhang in Europe is expected to provide little support for fundamentally driven hikes in premia.

Instead, in the absence of fundamental support we expect European premia to exhibit a higher degree of sensitivity to spreads where financing demand will continue to play the role of a swing buyer.

Figure 92: Aluminium premiums show some signs of life

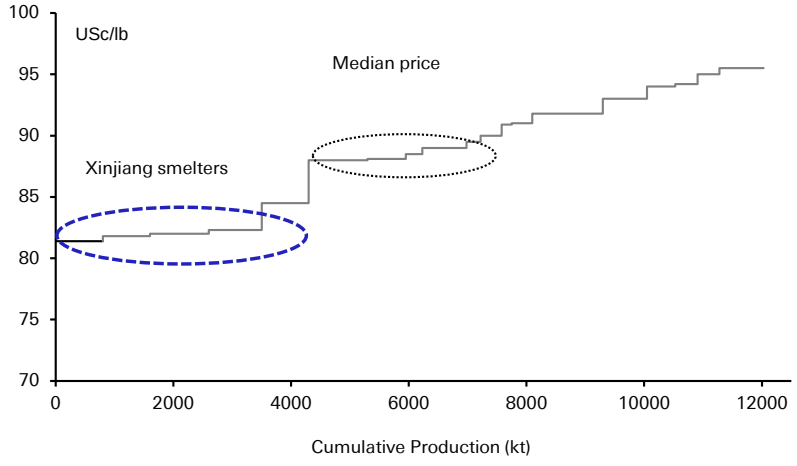


Source: Bloomberg Finance LP, Deutsche Bank

Cutting long-term prices … again

We have reviewed our project sample to determine long term prices with lower coal, power and alumina prices, as well as some reduction in capex. We estimate that a captive power plant consumes c.5-6t coal (5500kcal) for per tonne of aluminium, and assume coal costs account for 60-70% of total unit power cost. The outcome is that the generation cost is RMB0.2/kWh for coastal areas and less than RMB0.1/kWh in areas like Xinjiang. We also assume several cents for grid charge, which ranges from range from RMB0.04-0.08/kwh. This puts the power cost for the Xinjinag producers at mid 20's USD/MWhr and low 40's for the coastal producers. We also apply our new long term alumina price which is based on the marginal cost producer in Shandong of USD330/t. The median price on our incentive price curve is USc88 – 89/lb, whilst the Xinjiang smelters have an incentive price of c.USc82 – 83/lb to achieve an IRR of 12%. We think prices will remain well below the incentive price for a long period of time, but ultimately a price of USc88/lb will be required to incentivize new capacity.

Figure 93: Estimating the incentive price for aluminium – 12% IRR



Source: Deutsche Bank

Figure 94: Deutsche Bank Aluminium supply –demand balance

		2010	2011	2012	2013	2014	2015E	2016E	2017E	2018E	2019E	2020E
Primary Aluminium												
Chinese Production	Mt	17.3	19.8	22.5	24.9	27.6	30.7	32.8	34.0	34.9	35.7	36.7
growth	%	*28%*	*14%*	*14%*	*11%*	*11%*	*11%*	*7%*	*4%*	*3%*	*2%*	*3%*
Russia Production	Mt	3.9	4.0	4.0	3.7	3.5	3.5	3.6	3.7	4.3	4.7	4.9
growth	%	*4%*	*1%*	*1%*	*-7%*	*-7%*	*2%*	*3%*	*1%*	*17%*	*8%*	*5%*
Middle East Production	Mt	3.1	3.9	4.0	4.3	5.2	5.5	5.5	5.6	5.7	5.7	5.7
growth	%	*25%*	*26%*	*5%*	*6%*	*21%*	*5%*	*1%*	*1%*	*2%*	*1%*	*0%*
Europe & N. American Production	Mt	8.5	9.0	8.5	8.5	8.2	8.2	8.0	8.1	8.3	8.6	9.0
growth	%	*0%*	*6%*	*-6%*	*1%*	*-4%*	*0%*	*-3%*	*2%*	*1%*	*4%*	*4%*
Global Production	**Mt**	**42.3**	**46.2**	**48.2**	**50.6**	**53.4**	**56.8**	**59.3**	**61.2**	**63.2**	**65.6**	**68.0**
growth	%	*12.7%*	*9.2%*	*4.4%*	*5.0%*	*5.6%*	*6.3%*	*4.4%*	*3.2%*	*3.3%*	*3.7%*	*3.7%*
Global Capacity	Mt	50.3	53.1	55.7	59.8	64.9	69.2	71.0	72.5	74.5	75.7	76.4
utilisation rate	%	*84%*	*87%*	*87%*	*85%*	*82%*	*82%*	*84%*	*84%*	*85%*	*87%*	*89%*
Primary Aluminium Consumption												
China Consumption	Mt	16.7	19.5	21.5	23.9	26.3	27.8	29.3	30.8	32.4	33.8	35.2
growth	%	*18.1%*	*16.4%*	*10.4%*	*11.3%*	*10.0%*	*5.5%*	*5.5%*	*5.2%*	*5.0%*	*4.5%*	*4.0%*
China net imports (exports)	Mt	-0.4	-0.5	0.0	-0.3	-0.8	-2.9	-3.5	-3.2	-2.5	-1.8	-1.5
Developing economies (ex China)	Mt	10.4	11.2	11.4	11.7	12.3	12.7	13.2	13.8	14.4	15.0	15.7
growth	%	*11%*	*8%*	*2%*	*2%*	*6%*	*3%*	*4%*	*4%*	*5%*	*4%*	*5%*
North America	Mt	5.3	5.4	5.9	5.9	6.2	6.5	6.8	7.0	7.2	7.5	7.6
growth	%	9.8%	2.9%	8.8%	0.2%	5.2%	4.5%	3.8%	3.5%	3.2%	3.0%	2.0%
EU 15	Mt	7.9	8.3	8.4	8.5	8.8	9.0	9.2	9.4	9.7	9.9	10.1
growth	%	*11%*	*5%*	*1%*	*1%*	*3%*	*2%*	*2%*	*2%*	*2%*	*2%*	*2%*
OECD Consumption	Mt	13.7	14.0	14.6	14.5	15.1	15.5	15.9	16.2	16.5	16.8	17.0
growth	Mt	*12%*	*2%*	*4%*	*-1%*	*4%*	*3%*	*2%*	*2%*	*2%*	*2%*	*1%*
Global Consumption	**Mt**	**40.8**	**44.7**	**47.5**	**50.1**	**53.8**	**56.0**	**58.4**	**60.9**	**63.3**	**65.7**	**67.9**
check		*40.8*	*44.7*	*47.5*	*50.1*	*53.8*	*56.2*	*58.6*	*61.0*	*63.0*	*65.1*	*67.4*
growth	%	*14.1%*	*9.4%*	*6.4%*	*5.4%*	*7.3%*	*4.2%*	*4.3%*	*4.1%*	*4.0%*	*3.7%*	*3.4%*
Production adjustments	*Mt*				*0*	*0*	*0*	*-460*	*-598*	*-1,018*	*-552*	*102*
Market balance	**Mt**	**1.45**	**1.51**	**0.67**	**0.50**	**-0.32**	**0.82**	**0.88**	**0.36**	**-0.10**	**-0.09**	**0.10**
Avg. LME cash price	**$/t**	**2,191**	**2,423**	**2,052**	**1,889**	**1,893**	**1,660**	**1,514**	**1,595**	**1,707**	**1,818**	**1,930**
Avg. LME cash price	**c/lb.**	**99**	**110**	**93**	**86**	**86**	**75**	**69**	**72**	**77**	**82**	**88**

Source: Wood Mackenzie, Deutsche Bank

Zinc: Demand cannot decouple completely from steel

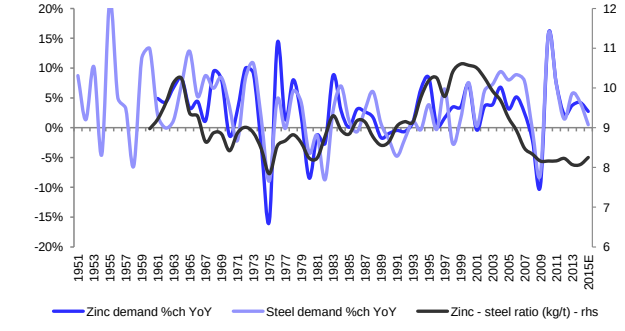
- A key question for the zinc market is whether Chinese zinc demand can diverge significantly from that of steel consumption. For example; could zinc demand continue to grow at 4%, whilst steel consumption contracts by 2%? Our analysis of the trends in some of the other developed countries suggests not. We do however think that zinc demand can remain positive, whilst steel demand contracts modestly. We have however cut our Chinese zinc demand forecasts from c.4 – 5.5% to 2.5 – 3.5% over the next few years. This means that the zinc market is not as tight as previously anticipated, despite the now well known closures of the Century and Lisheen mines due to reserve depletion and the price related cuts from Glencore and the Chinese smelters.
- On the supply side, the revival in Antamina's head grade (equivalent to the addition of a large zinc mine) offsets the proactive cuts by Glencore. However, we still think the market will be in a deficit in 2016, and once the tightness in the zinc concentrate market starts to spill over into the refined market, we forecast prices to gradually recover. The return of Glencore's capacity in 2017E, will however lead to a fairly balanced market in 2017 onwards. After the correction in pricing, zinc is now better valued, certainly from a cost curve perspective, and although our view of the fundamentals has cooled slightly, the metal is still one of our preferred picks, with prices expected to recover.

Reassessing Chinese zinc demand

In assessing Chinese zinc demand over the next five years, we have looked at the evolution of zinc demand in Japan, the US, Germany and South Korea, with respect to steel consumption. We make the following observations:

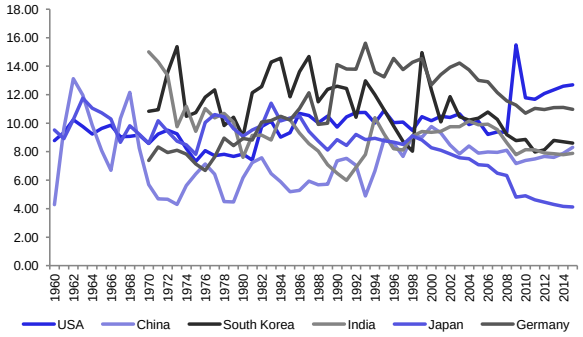
- On a global basis, the zinc to steel intensity is nearly at a low point at just over 8kg/t of steel produced. Zinc intensity fell during the lead up to the first oil crisis in the early seventies, but from then on increased reaching a peak of 10.6kg/t of steel in the late nineties. As Chinese steel production increased rapidly, zinc intensity fell sharply.
- Zinc demand tracks steel demand fairly closely, although there have been periods where demand growth in one metal has outstripped that of the other metal.
- On a regional basis, Germany and latterly the US are high zinc intensity regions, whilst China, India and South Korea medium intensity regions. Surprisingly, Japan is a low intensity region.

Figure 95: Global zinc intensity since 1960 (kg Zn/t of steel)



Source: Deutsche Bank, Wood Mackenzie, WSA

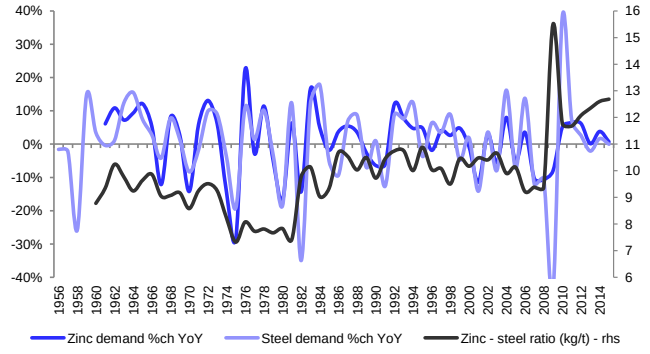
Figure 96: Contrasting regional zinc intensity



Source: Wood Mackenzie, Deutsche Bank

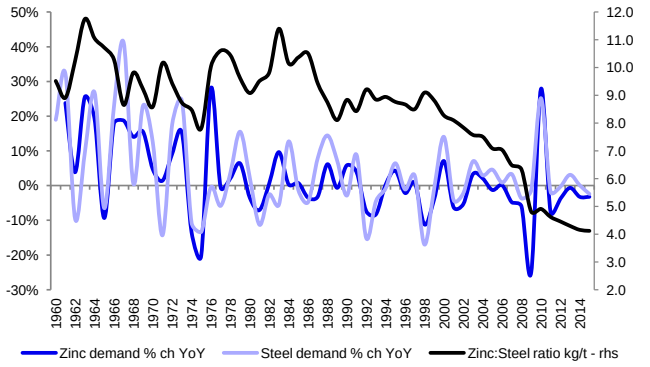
US zinc intensity has been fairly stable over large period of time, with some big fluctuations pre and post the global financial crisis. This looks slightly anomalous to us, and may be due apparent demand being skewed by inventory accumulation. Japanese zinc intensity had been falling over the course of the 2000's, but the step down post the GFC also looks slightly anomalous to us, and may be related to destocking. The recovery of the US Auto industry post the GFC has certainly contributed to the increasining intensity of zinc. In Japan, a large part of the galvanizing capacity has been off shored.

Figure 97: US zinc intensity per unit of crude steel



Source: Deutsche Bank, Wood Mackenzie, WSA

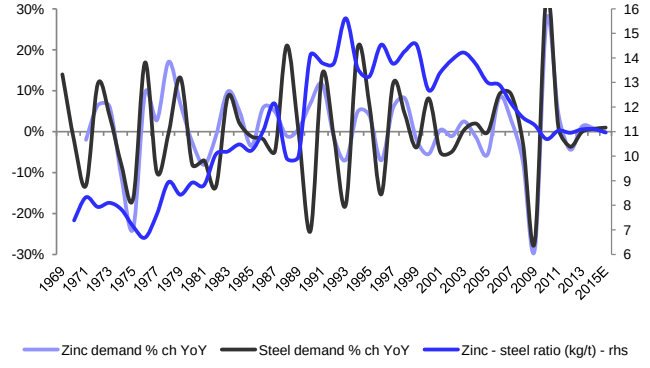
Figure 98: Japanese zinc intensity per unit of crude steel



Source: Deutsche Bank, Wood Mackenzie, WSA

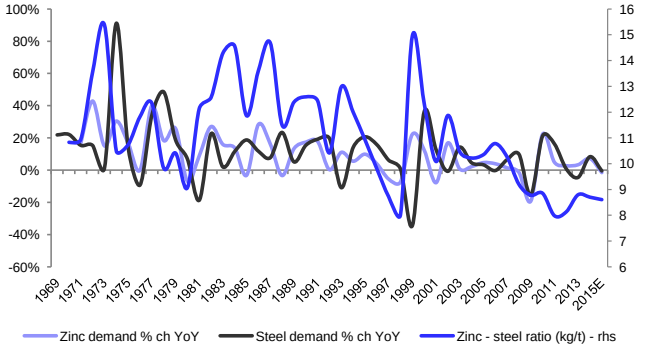
Zinc intensity in Germany and South Korea has also fallen over the 2000's, partly due to thrifting and partly due to a relocation of galvanizing and parts manufacture to lower cost regions such as Eastern Europe and south east Asia.

Figure 99: German zinc intensity per unit of crude steel



Source: Deutsche Bank, Wood Mackenzie, WSA

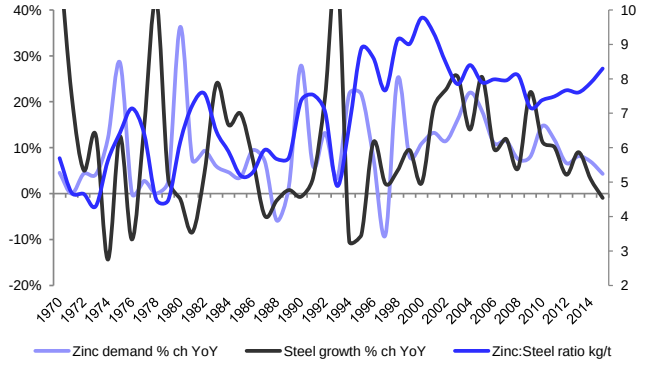
Figure 100: S. Korea zinc intensity per unit of crude steel



Source: Deutsche Bank, Wood Mackenzie, WSA

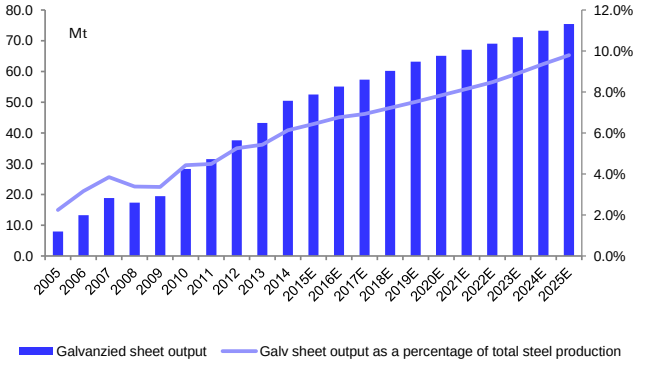
Chinese zinc demand has not been that well correlated with steel demand growth. The general trend for zinc intensity of the 2000's has also been down, although we note that this has started to rise once more post the global financial crisis. The proportion of galvanized sheet production to crude steel production has continued to rise in China and we would expect this to trend to continue, with growth in vehicle and white goods output and continued growth in commercial property. The increase in the proportion of galvanized steel output is a result of low to mid single growth in galvanized output and a falling crude steel output.

Figure 101: China zinc intensity per unit of crude steel



Source: Deutsche Bank, Wood Mackenzie, WSA

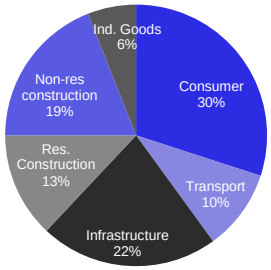
Figure 102: Chinese galvanised sheet output as a percentage of crude steel consumption



Source: Deutsche Bank, Bloomberg Finance LP, WSA

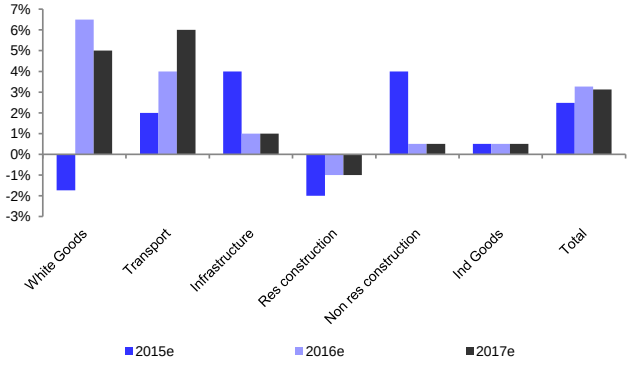
Chinese zinc demand is skewed towards infrastructure and construction, with 60% of demand coming from these activities. Consumer and transport sectors account for the remaining 40%. The outlook for transport, specifically vehicle production remains very strong, improving into 2016 and 2017E. We forecast a rebound in White good output in 2016 and 2017E, as the high inventory levels which has plagued manufacturers in 2015E is gradually worked off. We continue to expect declining demand in residential construction and low growth in non residential and infrastructure construction.

Figure 103: Chinese zinc demand by end use (2014)



Source: Deutsche Bank, Wood Mackenzie

Figure 104: Chinese zinc demand growth by end demand sector



Source: Deutsche Bank

There have been periods in a region's development where zinc consumption has increased despite steel consumption falling, as highlighted in the table below: In the 1980's and 1990's, global zinc consumption outstripped that of global steel consumption. During the 1970's and 1980's both Germany and the US registered positive zinc demand growth, whilst the steel demand contracted. In our view, Chinese zinc demand is likely to remain positive despite steel consumption likely to be close to zero, as the focus on exports and improving the quality of consumer durables increases.

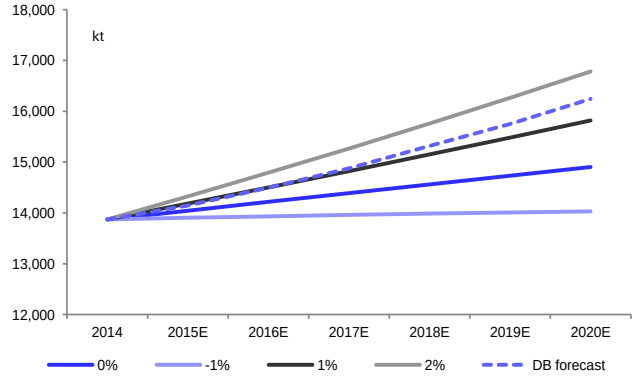
Figure 105: Regional demand growth in zinc and steel (CAGR)

	1960's		1970's		1980's		1990's		2000's	
	Steel	Zinc	Steel	Zinc	Steel	Zinc	Steel	Zinc	Steel	Zinc
US	3.4%	3.1%	-1.1%	-2.0%	-1.0%	1.2%	2.6%	3.1%	-4.8%	-3.4%
Japan	14.1%	12.9%	1.1%	1.7%	1.1%	0.8%	-1.2%	-1.8%	3.0%	-2.3%
South Korea			21.1%	17.1%	9.3%	13.0%	6.9%	6.6%	5.2%	1.8%
Germany			-1.6%	0.5%	-2.8%	1.8%	2.0%	0.9%	0.5%	-1.2%
China	0.8%	3.7%	7.6%	8.5%	4.9%	6.8%	7.4%	10.5%	16.5%	13.3%
Global	**5.5%**	**4.9%**	**1.9%**	**1.6%**	**0.7%**	**1.2%**	**1.0%**	**3.0%**	**5.4%**	**2.7%**

Source: Deutsche Bank

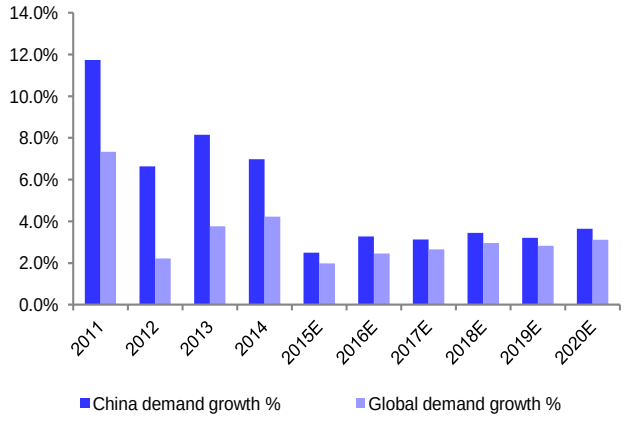
In doing a simple sensitivity analysis, if we assume that global steel consumption grows by an average of 1% p.a. and zinc intensity increases back to the average of 9kg/t of steel produced (roughly 0.1kg/t of steel), then global zinc consumption will increase to 15.8Mt by 2020E. This equates to 2.2% demand growth, which compares to current 2020E forecast of 16.2Mt. Even if global steel consumption contracts, we forecast global zinc demand to increase by 0.2%. We contrast our forecasts based on a "bottom-up" demand analysis versus implied zinc consumption at various steel consumption rates. Our own forecasts imply modestly rising zinc intensity with low steel demand growth rates.

Figure 106: Zinc demand growth under various steel growth scenarios



Source: Deutsche Bank

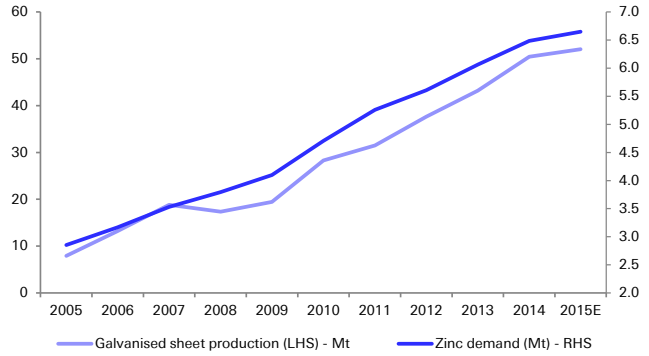
Figure 107: A structural slowdown in zinc demand growth



Source: Deutsche Bank, Wood Mackenzie

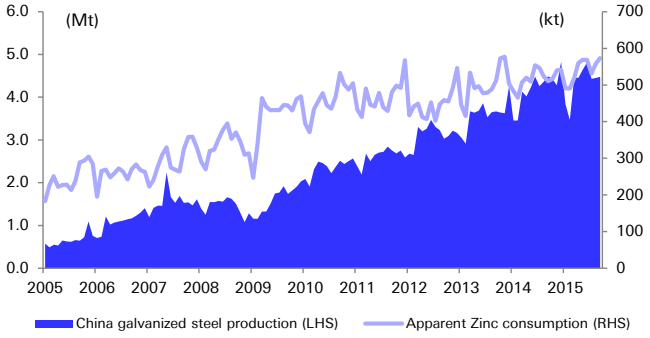
At the current run rate, Chinese galvanized steel output will be up a modest 3.2%, highlighting the inflection point in demand growth. Chinese apparent zinc demand is up 5.2% YTD, but we expect this will slow in the last few months of the year, as some of the production has gone to inventory. We estimate that real demand is closer 2.5%.

Figure 108: China's galvanised sheet production versus zinc demand



Source: CEIC, Deutsche Bank

Figure 109: Chinese galvanized steel production versus apparent* zinc consumption



*Source: Bloomberg Finance LP, NBS, Deutsche Bank, *Apparent zinc consumption = refined production plus net imports*

The Antamina zinc grade rollercoaster gives more than it takes

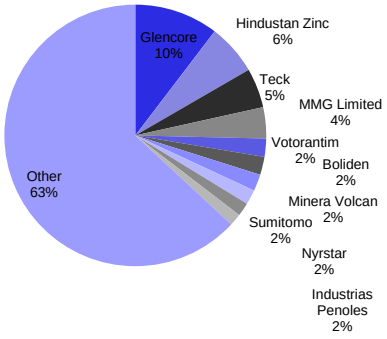
Glencore's announcements of supply cuts in zinc were at first glance something of a surprise. However, given the scale of the cuts and the company's ability to influence the market, the decision on further analysis seems very sensible. The scale of the cuts, albeit temporary are of the same order of magnitude as that of the Century mine closure. Glencore announced that the company will be cutting 500kt of zinc production from four of their mining areas in 2016E. The impact will be 100kt in 2015E. Glencore's operations at Lady Loretta in Australia and Iscaycruz in Peru will be suspended and operations at George Fisher and McArthur River in Australia and various mine operations in Kazakhstan will reduce production levels. The cut represents roughly a third of their production.

Figure 110: Summarizing Glencore's cuts

Operation	Estimated annual reduction (kt Zinc metal)
George Fisher & Lady Loretta (Mt Isa)	245
McArthur River	135
Other zinc (South America)	80
Kazzinc	40
Group change	**500**
Operation	**Estimated annual reduction (kt Lead metal)**
Group change	**100**

Source: Glencore

Figure 111: Glencore leads the pack



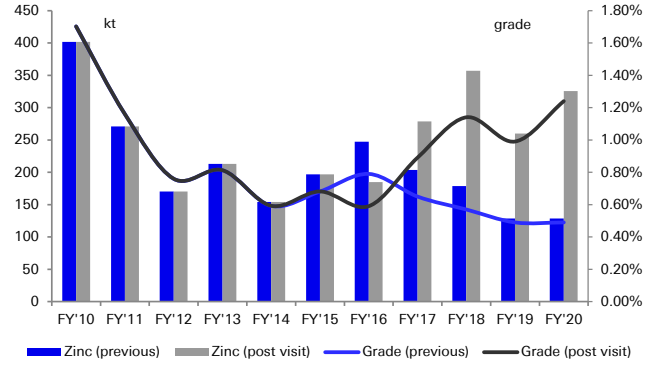
Source: Deutsche Bank, Wood Mackenzie

Glencore's official reason for the cuts was "to preserve the value of Glencore's reserves in the ground at a time of low zinc and lead prices, which do not correctly value the scarce nature of our resources". At the time of the announcement, the zinc price was USD1,650/t (it subsequently fell a further USD150/t). At the prevailing zinc, our assessment was that Glencore's mines were still cash positive. Simply put, the company thought that the price was too low. But this does make Glencore unique in its approach. Most other

mining companies will only shut operations when they are well under water weighing up the cost of closure with the likely period of sustained losses.

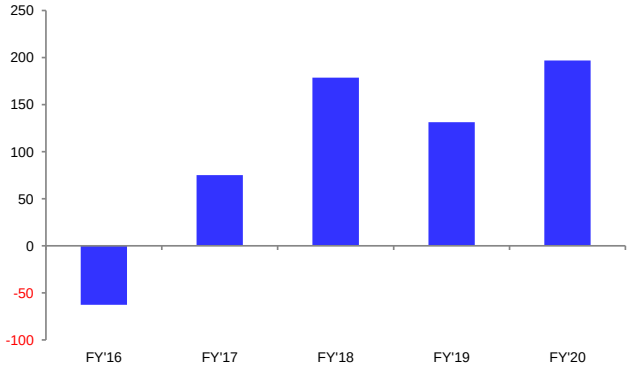
Offsetting Glencore's near-term impact on the market is Antamina's increasing zinc output over the medium term. This asset is owned in a JV structure by BHP Billiton (33.75%), Glencore (33.75%), Teck Resources (22.5%) and Mitsubishi (10%), and due to the polymetallic nature of the ore body (skarn deposit containing copper, zinc, moly, silver and lead) and the limited mine plan information, it is very difficult to forecast the zinc output. In the latest BHP Billiton Investor Briefing, the company guided to increasing grades over the next five years. The swing in grades adds over 500ktpa into the zinc market versus our expectations, which is equivalent to a medium sized mine. There is a small offset over the next 12 months where the mine will produce c.60kt less than we had anticipated, a small positive for zinc is in the near-term.

Figure 112: Antamina upgrade



Source: Deutsche Bank, BHP Billiton investor briefing

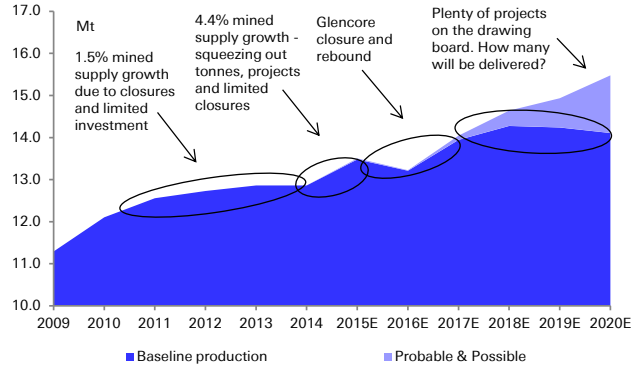
Figure 113: Antamina: Giving more than it takes



Source: Deutsche Bank, BHP Billiton investor briefing

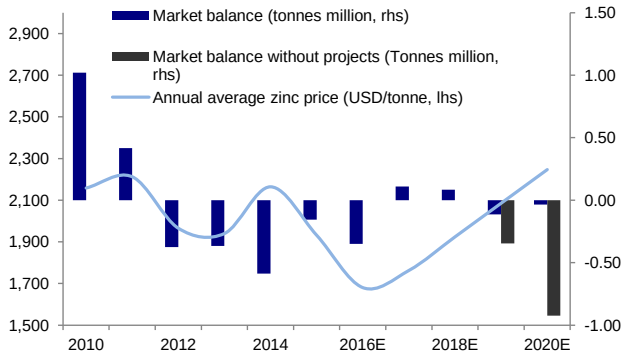
The company has already announced closures in copper and coal, with arguably little impact on these markets. This begs the question as to whether the cuts in zinc will have more of an impact. We think it will. Firstly, the cut is relatively significant, representing c.3.5% of our forecast 2016E zinc demand. Glencore's cut is of a similar scale to that of the Century mine which is in the process of closing. The heuristic for an oversupplied market is that when 10% of global supply is cut, is when prices start to stabilise. Zinc is however in a deficit market, and there is limited "latent" capacity in the market. A significant proportion of the new mined supply we forecast toward the end of the decade is from "possible" and "probable" projects. The impact from the Glencore closures in 2015E is to limit the mined supply growth to 4.4% from 5.2%. In 2016E, mined supply is forecast to decline by 0.6%, before rebounding 6% in 2017E when the operations are likely to be restarted. We think the company will be prudent in restarting capacity, and we think this will only be at a point when prices remain above USD1,800/t on a sustainable basis. We outline our forecast deficits (S&D) with and without project supply. The zinc market will be in a significant deficits (+1Mtpa) by the end of the decade if projects are not developed.

Figure 114: Zinc mined supply growth



Source: Deutsche Bank, Wood Mackenzie

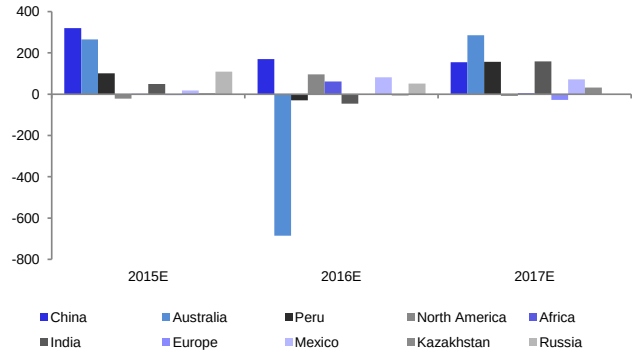
Figure 115: Zinc supply demand balance summary



Source: Deutsche Bank, Wood Mackenzie

In terms of the regional production distribution, we now forecast a c.700kt decline in Australian mined zinc supply with the closure of Century and the closure of Glencore's operations. We have Glencore's supply returning in 2017 which means a big jump in mined supply. However, we would anticipate that the return of capacity would be well managed by the company. We have factored in a consistent output of mined supply growth from China. Given that there is Chinese mined supply is down 12% year to date on the official NBS figures when pricing has been much stronger, there is clear downside risk to our assumptions; data inconsistencies notwithstanding.

Figure 116: Regional zinc mined supply growth (kt)



Source: Deutsche Bank, Wood Mackenzie

Figure 117: Highlighting the growth at the mine level

Growth	2015E	2016E	2017E	2018E	Cumulative
Bisha	0	30	15	40	85
Aguas Tenidas	46	35	0		81
Neves Corvo	-4	5	4	18	23
China	320	170	155	112	756
Santander	-1	10	12	12	33
Antamina	10	-30	89	78	147
Caribou	20	32	4	-2	54
Colquijirca	52	7	0		59
Penasquito	8	-20	41		28
Kyzyl Tashtygskoe	45	45	0		90
Lalor Lake	23	5	0		28
McArthur River	130	-58	135		207
Mount Isa	22	-226	166		-38
Rey del Plata	0	30	4		34
Total	**669**	**35**	**625**	**258**	**1,587**
Decline	**2015E**	**2016E**	**2017E**	**2018E**	
Skorpion			0	-25	-25
Pomorzany-Olkusz			-55	0	-55
Lisheen	-38	-95			-133
Century		-391			-391
Total	**-38**	**-486**	**-55**	**-25**	**-604**
Difference	**631**	**-451**	**570**	**233**	**983**

Source: Deutsche Bank, Wood Mackenzie

Figure 118: Global zinc supply & demand model

		2010	2011	2012	2013	2014	2015E	2016E	2017E	2018E	2019E	2020E
China mine production	Mt	3.7	4.2	4.5	4.7	4.9	5.2	5.4	5.5	5.6	5.7	5.7
China mine production growth	%	*16%*	*15%*	*5.2%*	*4.3%*	*4.6%*	*6.6%*	*3.3%*	*2.9%*	*2.0%*	*0.6%*	*0.0%*
Australia mine production	Mt	1.5	1.5	1.5	1.5	1.5	1.8	1.1	1.4	1.4	1.5	1.4
Australia mine production growth	%	*13%*	*0%*	*0%*	*0%*	*2%*	*17%*	*-39%*	*26%*	*4%*	*4%*	*-6%*
Peru mine production	Mt	1.4	1.2	1.2	1.2	1.2	1.3	1.3	1.4	1.5	1.4	1.5
Peru mine production growth	%	*-2%*	*-15%*	*0%*	*5%*	*-3%*	*8%*	*-2%*	*12%*	*8%*	*-6%*	*3%*
North America mine production	Mt	1.9	2.0	2.0	1.8	1.8	1.8	2.0	2.0	2.0	2.0	1.9
North America mine production growth	%	*1%*	*5%*	*0%*	*-9%*	*0%*	*0%*	*10%*	*3%*	*-2%*	*0%*	*-4%*
India mine production grow th	Mt	0.7	0.7	0.7	0.8	0.7	0.8	0.7	0.9	1.0	1.0	0.9
India mine production growth	%	*4.6%*	*3.5%*	*-1.7%*	*13.0%*	*-13.5%*	*6.9%*	*-6.0%*	*22.1%*	*8.3%*	*2.1%*	*-4.4%*
European mine production	Mt	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
European mine production growth	%	*3.3%*	*0.9%*	*1.2%*	*-3.0%*	*2.4%*	*-0.4%*	*-0.3%*	*-3.1%*	*3.3%*	*-5.9%*	*0.6%*
World Mine Production	**Mt**	**12.10**	**12.56**	**12.73**	**12.86**	**12.86**	**13.50**	**13.22**	**14.04**	**14.64**	**14.93**	**15.48**
World Mine Production Growth	%	*7%*	*3.7%*	*1.4%*	*1.0%*	*0.0%*	*5.0%*	*-2.1%*	*6.2%*	*4.2%*	*2.0%*	*3.6%*
Concentrate for smelting	Mt	12.10	12.56	12.73	12.86	12.86	13.50	13.22	14.04	14.64	14.93	15.48
Secondary & other zinc	Mt	0.9	1.0	1.0	1.1	1.1	1.1	1.1	1.2	1.2	1.3	1.3
Losses	Mt	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.6	0.6
Total Refined output	**Mt**	**12.71**	**12.97**	**12.45**	**12.94**	**13.28**	**13.99**	**14.11**	**14.95**	**15.36**	**15.59**	**16.15**
World refined availability growth	%	*14%*	*2.0%*	*-4.0%*	*3.9%*	*2.6%*	*5.3%*	*0.8%*	*6.0%*	*2.7%*	*1.5%*	*3.6%*
China Refined Consumption	Mt	4.7	5.3	5.6	6.1	6.5	6.6	6.8	7.0	7.3	7.5	7.8
Consumption growth	%	*14.8%*	*11.7%*	*6.6%*	*8.2%*	*7.0%*	*2.5%*	*2.7%*	*3.1%*	*3.4%*	*3.2%*	*3.6%*
US Refined Consumption	Mt	1.2	1.3	1.4	1.4	1.5	1.5	1.6	1.6	1.6	1.7	1.7
Consumption growth	%	*6%*	*5.9%*	*6.2%*	*0.1%*	*5.3%*	*2.8%*	*2.5%*	*2.0%*	*2%*	*2%*	*2%*
Europe Refined Consumption	Mt	1.9	1.9	1.8	1.7	1.8	1.8	1.8	1.9	1.9	1.9	1.9
Consumption growth	%	*20.5%*	*3.1%*	*-7.9%*	*-0.9%*	*2.8%*	*1.2%*	*1.3%*	*1.8%*	*1%*	*1%*	*1%*
Brazil/India/Russia Refined Consumption	%	1.0	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.3	1.4	1.4
Consumption growth		*15.9%*	*7.8%*	*4.3%*	*2.0%*	*-2.7%*	*0.2%*	*5.0%*	*6.4%*	*5%*	*5%*	*6%*
World Refined Consumption	**Mt**	**11.69**	**12.55**	**12.83**	**13.31**	**13.87**	**14.15**	**14.46**	**14.84**	**15.27**	**15.70**	**16.19**
World Refined Consumption Growth	%	*15.7%*	*7.3%*	*2.2%*	*3.8%*	*4.2%*	*2.0%*	*2.2%*	*2.6%*	*2.9%*	*2.8%*	*3.1%*
Market balance	**Mt**	**1.02**	**0.42**	**-0.38**	**-0.37**	**-0.59**	**-0.16**	**-0.35**	**0.11**	**0.08**	**-0.11**	**-0.03**
Exchange stocks	Mt	3.48	3.90	3.52	3.15	2.57	2.41	2.06	2.17	2.26	2.14	2.11
Reported-stock-to-consumption ratio	Wks	15.5	16.1	14.3	12.3	9.6	8.9	7.4	7.6	7.7	7.1	6.8
Annual average LME cash prices	**USD/t**	**2,158**	**2,212**	**1,965**	**1,940**	**2,164**	**1,931**	**1,680**	**1,763**	**1,924**	**2,085**	**2,247**
Annual average LME cash prices	**USc/lb**	**98**	**100**	**89**	**88**	**98**	**88**	**76**	**80**	**87**	**95**	**102**

Source: Deutsche Bank, Wood Mackenzie

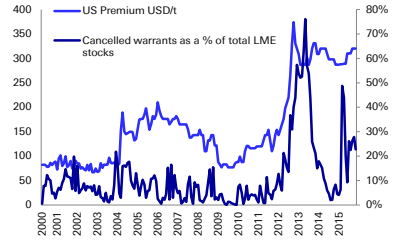
Lead: Supply tightness on the horizon

- Lead unlike other base metals was more resilient to the negative news surrounding the sluggish Chinese economy and strengthening of USD due to the high probability of increase in interest rate by the Fed by mid December. Market seems to have already priced in the reduced Chinese demand, while the fundamentals of Lead is still strong with market balance pointing to a small deficit in 2015 and about 110kt deficit in 2016. Lead also rallied albeit for a short period due to the flurry of supply cuts by Zinc producers (Glencore, Nyrstar and Chinese producers) and the corresponding cut in lead production comes to 120-130kt till 2016. Lead is the best performer since the start of the year and also since Q4 2015 with prices down 9% and up 1% respectively. Strengthening of USD and slowing demand in China will lead to a surge in refined lead and battery exports from China. This excess supply on top of weakening demand will lead to excess imports of Lead concentrates into China, unless they ramp up their production. Lead concentrates imports to China spiked in the second half of the year, thanks to the arbitrage between SHFE and LME turning positive since June 2015. E bike sector continues to be the major consumer of Lead in China, as the demand from replacement sector is offsetting the weakness in OE sector. Although US and European vehicle sales remain strong, Chinese sales have slowed down and a slow-down in base station construction by telecom operators has continued to weigh on demand. Slowing mine production from China and Europe and Australia will offset this slowing demand and as a result, market balance for Lead is forecasted to be in deficit till 2017, and this supply tightness will result in drawdown of LME inventories thereby increasing prices. From 2018 markets will be adequately supplied and demand dynamics will drive the prices

Steady fall in inventory stocks despite stable demand

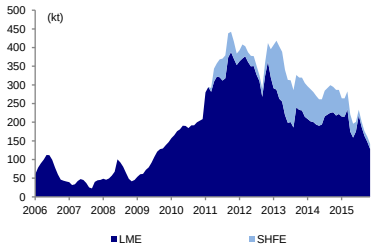
Short term indicators in the form of inventory levels were on a constant slide since the start of Q4 2015. LME inventory stood at 127kt at start of December and is at six year low. Stocks reduced by 15kt and 20kt respectively in the month of October and November, while the cancelled warrants as a percentage of LME inventory decreased from 26% in start of October to 23% by end of November. SHFE stocks have stabilized since July and currently stands at 13kt. US premiums have been steady throughout the year at decent levels, signaling robust regional demand.

Figure 119: US premiums vs cancelled warrants



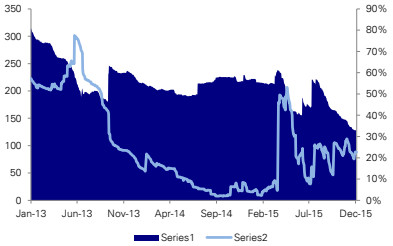
Source: Deutsche Bank, Bloomberg Finance LP, Wood Mackenzie

Figure 120: Lead exchange inventory



Source: Deutsche Bank, Bloomberg Finance LP

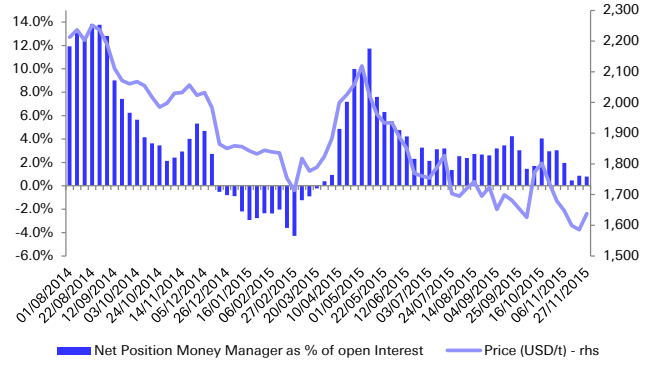
Figure 121: LME Inventory vs LME cancelled warrant as % of inventory



Source: Deutsche Bank, Bloomberg Finance LP

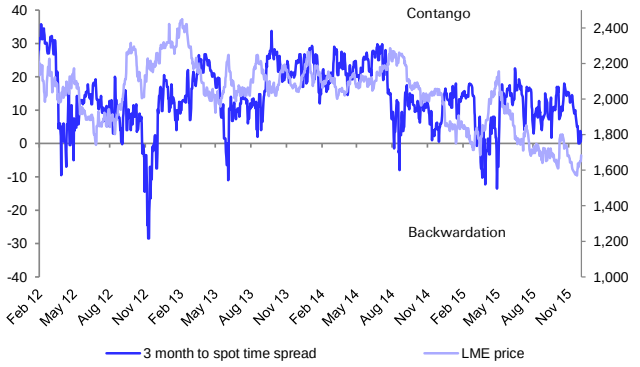
Positioning among money managers were bearish and net length of money managers position as a % of LME OI decreased to 1% since the start of Q4 2015. Short positions are highest level since July and the negative sentiment is prevalent in all base metals. Despite this Lead prices have increased 1% since Q4 2015. The market has moved back into a customary contango position, after the brief periods of backwardation, but the gap is narrowing.

Figure 122: Net Money manager positions - % of open interest



Source: Deutsche Bank, LME

Figure 123: Lead near-term time spreads

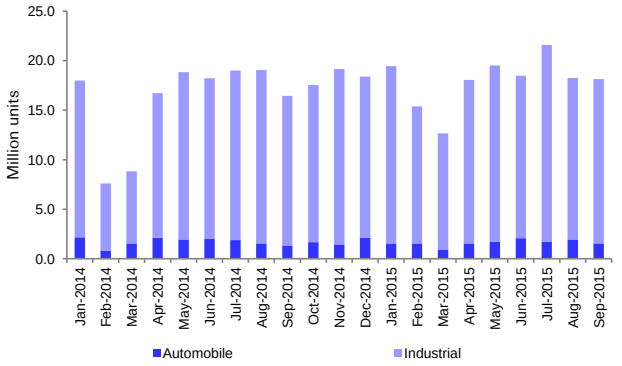


Source: Deutsche Bank, Bloomberg Finance LP

We remain positive on the medium term outlook for lead as we forecast modest growth (1%) in Chinese mine production in 2016. Chinese refined lead production has fallen by 6.4% year to date as on October 2015. Tougher pollution control standards set by the Chinese government on both primary and secondary production will lead to supply tightness in refined Lead metal. However the falling Chinese passenger vehicle and e bike sales offset the fall in supply and place the lead market in a small deficit in 2015.

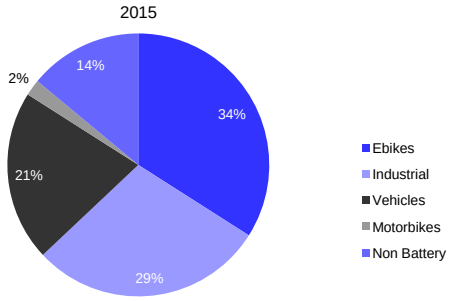
Chinese passenger vehicles sales have picked up in October, thanks to the tax cut on smaller PV with capacity less than 1.6l. October sales were up c.17% and c.8% month on month and year on year respectively. Cumulative passenger vehicle sales growth for the first ten months has slowed down to 3.8%, worst figures since 2009 despite the measure taken by the government to incentivize car purchase. Commercial vehicle sales in October registered the second positive year on year growth of 2015. Some stability seen in Chinese economy will help in sales of commercial vehicles in the coming months. Despite the positive sales in Q4 2015, the total sales (Passenger vehicles and Commercial vehicles) number looks bleak with sales till October up marginally by 1.5%. Along with slowing Auto sales, the Chinese battery sector continues to struggle with excess capacity and tough competition which has impacted margins. This over capacity translates to exports and after a sluggish restart after the Chinese New Year, Industrial battery exports in September increased by 10% y-o-y to 16.6m units. In the same period automobile batteries export fell by 22% m-o-m to 1.55m showing the falling cyclical demand in replacement batteries. Exports of automobile batteries are expected to increase on the advent of winter in US and Europe. Year to date export of Industrial batteries were up c.12% at 146 million units. Ebike sector continues to be biggest consumer of lead in China, despite the slowing sales. Replacement battery sales of Ebike increased significantly and offset the weakness in Ebike OE sales. Ban on Ebike sales in some cities due to safety reason, compounded by a weak rural growth owing to poor road networking and affordability will result in Industrial sector to be the biggest demand contributor in medium term. Increased use of substitutes (Li-ion Batteries) in premium Ebikes and fall in weight of Lead content in batteries is a negative for the sector.

Figure 124: Chinese battery exports



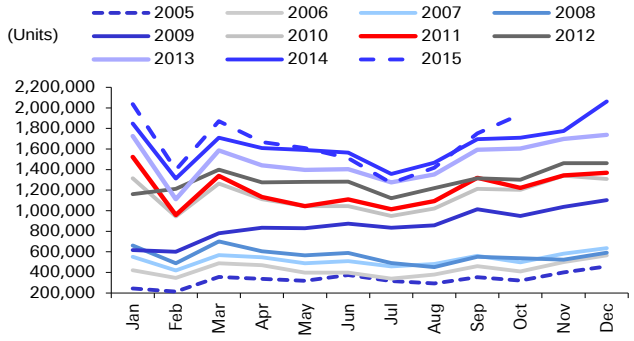
Source: Deutsche Bank, Wood Mackenzie

Figure 125: China demand breakdown



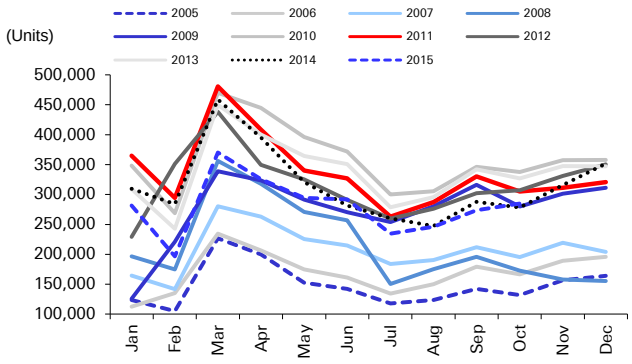
Source: Deutsche Bank, Wood Mackenzie

Figure 126: Passenger Vehicles sales in China



Source :Wood Mackenzie Deutsche Bank

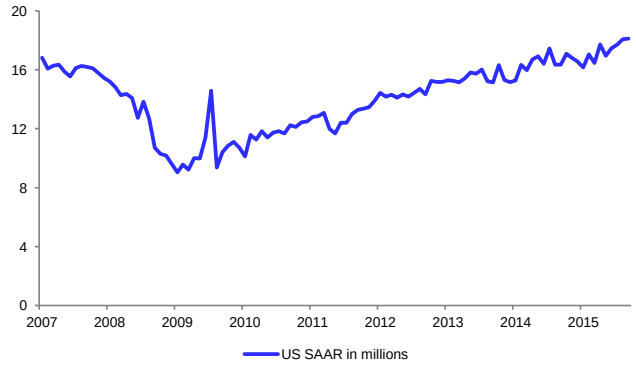
Figure 127: Commercial Vehicles sales in China



Source: Wood Mackenzie Deutsche Bank k

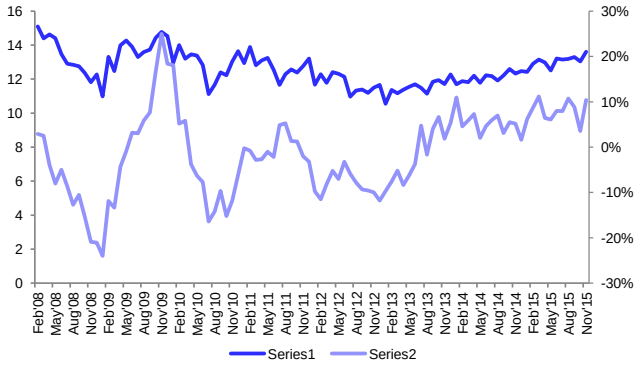
The US passenger vehicle sale continues to be robust thanks to the lower gasoline prices, combined with promotions given by the dealers. Advent of winter along with strong passenger vehicle sales is good for the OE battery and replacement battery sector. Passenger vehicles sales have gone up by c.11% in both September and October y-o-y. Based on our US Auto team's channel checks estimate that the U.S. SAAR is tracking at 18.1MM so far in November (absolute units +10.1% YOY, adjusted for two additional selling days). This is the third continuous month of a annualized sales of above 18MM. Western European automobile sales have been robust so far in Q4 2015 with September and October sales up year on year by c.11% and 3.5% respectively. Western European SAAR for November stood at 13.6MM. Start-Stop vehicles (SSVs) adoption has begun to penetrate market share as most of the new car sales are of that technology. Adoption of SSV in China will be a huge boost to the technology as Chinese government is emphasizing on curb in environmental pollution as SSV is a cheaper way to reduce emission. This will impact the traditional SLI automobile battery sales and also impact the recycling rate of batteries as SSVs batteries have a longer life. Johnson Controls Inc. has two plants in China and have commissioned another plant which is supposed to start production by 2018 at 6M units/a.

Figure 128: US auto sales



Source: Deutsche Bank, Bloomberg Finance LP

Figure 129: Western European auto sales

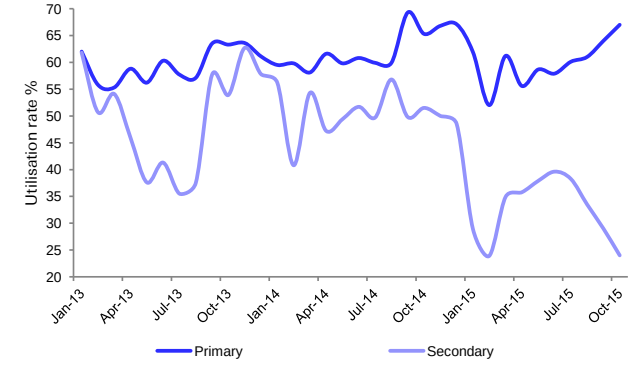


Source: Bloomberg Finance LP, Deutsche Bank

The Chinese primary and secondary utilization levels are well below that of 2014 The Chinese secondary smelting industry has been squeezed to unsustainable levels, with high scrap prices and a maturing e-bike market. E-bikes are the major market for secondary lead and the utilization rate in October 2015 was 24% about half the level of October 2014 rate. There have been some reports of smelters throttling back due to poor profitability while improvement in secondary utilization of smelters will improve when Lead prices and concentrate imports increase owing to positive arbitrage between SHFE and LME. However Chinese primary smelters have increased utilization in line with increased concentrate imports and higher domestic TC's

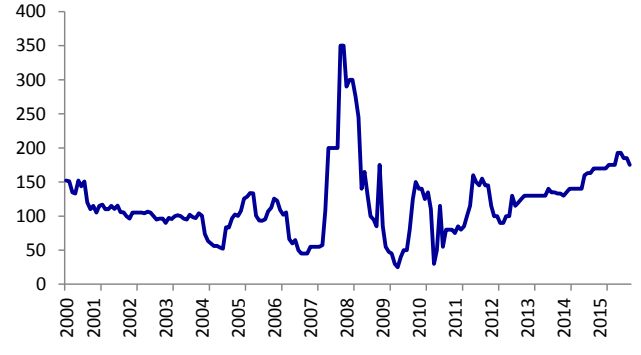
The positive arbitrage between SHFE and LME increased to $168/t in November from around $86/t in October. This equates to an arbitrage premium of $96/t concentrate. This favorable arbitrage leads to an increase in concentrate imports and September (226 kwmt) and October (200 kwmt) figures were up 80kwmt and 5kwmt over the corresponding period of last year The spot TCs have been stable in October but fell in November to USD170-180/t suggesting a continuation of slight tightness in concentrate supply.

Figure 130: Chinese Primary vs Secondary Smelter utilization rate



Source: Deutsche Bank, National Statistic Bureau

Figure 131: Lead TCs (USD/t)

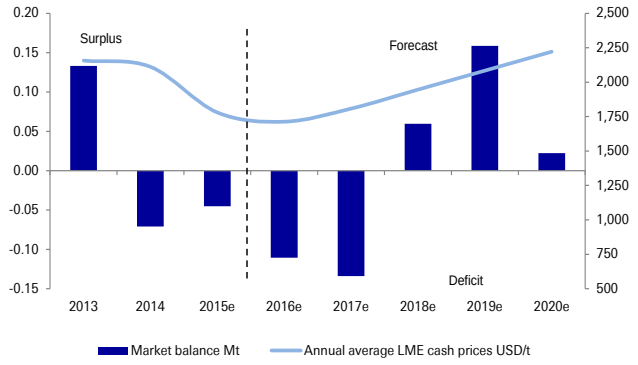


Source: Deutsche Bank, Wood Mackenzie

We forecast mined production to be up by 1% at 5.43Mt in 2015 and 5.53Mt in 2016. Our forecast for total refined production is 12.05Mt, a growth of 3% y-o-y, as scrap availability improves and secondary capacity increases meaningfully. This assumption will however be dependent on an improvement of scrap to LME spreads. We forecast global consumption to grow by 3% to

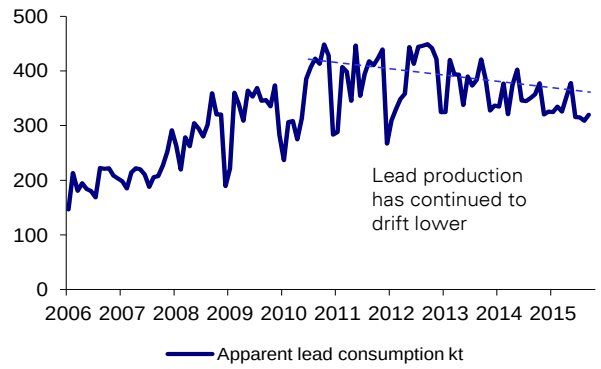
12.09Mt, leaving the market in a slight deficit for a second year in a row. 2015 - 2017 is a period of low mined growth, with low single digit growth. The flurry of closure by the Zn miners along with closure of Century mine in late December will result in concentrate tightness. 2015 – 2017E remains a period of low mined supply growth and prices are expected to tick higher.

Figure 132: Global lead market balance



Source: Deutsche Bank, Wood Mackenzie

Figure 133: Chinese lead production



Source: Deutsche Bank, NBS

Figure 134: Deutsche Bank Global lead supply & demand model

		2011	2012	2013	2014	2015e	2016e	2017e	2018e	2019e	2020e
China mine production	Mt	2.3	2.5	2.8	3.0	3.0	3.0	3.0	3.0	3.0	3.0
China mine production growth	%	*28%*	*7%*	*14%*	*5%*	*1%*	*1%*	*1%*	*0%*	*0%*	*0%*
Australia mine production	Mt	0.6	0.6	0.7	0.7	0.7	0.6	0.6	0.6	0.7	0.6
Australia mine production growth	%	*-11%*	*-1%*	*15%*	*3%*	*3%*	*-18%*	*1%*	*5%*	*8%*	*-3%*
Peru mine production	Mt	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Peru mine production growth	%	*-11%*	*7%*	*9%*	*7%*	*8%*	*3%*	*-3%*	*0%*	*-4%*	*-4%*
North America mine production	Mt	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.6	0.6
North America mine production growth	%	*3%*	*2%*	*-2%*	*2%*	*11%*	*0%*	*3%*	*-1%*	*-1%*	*-4%*
World Mine Production	**Mt**	**4.49**	**4.72**	**5.22**	**5.40**	**5.43**	**5.53**	**5.67**	**5.98**	**6.30**	**6.48**
World Mine Production Growth	%	*12%*	*5%*	*11%*	*3%*	*1%*	*2%*	*3%*	*6%*	*5%*	*3%*
Losses	Mt	0.29	0.30	0.32	0.33	0.35	0.34	0.35	0.37	0.39	0.40
Scrap	Mt	1.0	0.8	0.7	0.7	1.0	0.9	0.9	1.0	1.0	1.0
Production at Primary Refineries	Mt	5.0	5.1	5.5	5.7	6.0	6.1	6.2	6.6	6.8	6.9
Secondary refined prodcution	Mt	5.4	5.7	5.9	6.0	6.1	6.3	6.5	6.7	6.9	7.0
Total Refined Availability	**Mt**	**10.43**	**10.85**	**11.41**	**11.67**	**12.05**	**12.35**	**12.69**	**13.23**	**13.68**	**13.91**
World refined availability growth	%	*8%*	*4%*	*5%*	*2%*	*3%*	*2%*	*3%*	*4%*	*3%*	*2%*
China Refined Consumption	Mt	4.2	4.7	5.1	5.4	5.6	5.8	6.0	6.3	6.5	6.8
Consumption growth	%	*6%*	*12%*	*8%*	*5%*	*3%*	*4%*	*4%*	*4%*	*4%*	*4%*
NAFTA (US, Canada, Mexico)	Mt	1.7	1.8	1.7	1.7	1.7	1.8	1.8	1.8	1.8	1.8
Consumption growth	%	*3%*	*1%*	*-3%*	*3%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*
Japan	Mt	*19%*	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Consumption growth	%	*-2%*	*9%*	*1%*	*2%*	*2%*	*-2%*	*-2%*	*-2%*	*-2%*	*-2%*
EU (15)	Mt	*131%*	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Consumption growth	%	*3%*	*-3%*	*1%*	*1%*	*1%*	*1%*	*0%*	*-1%*	*-1%*	*-1%*
Brazil/India/Russia Refined Consumption	Mt	0.9	1.0	1.1	1.2	1.3	1.3	1.4	1.5	1.6	1.6
Consumption growth	%	*5%*	*12%*	*8%*	*7%*	*6%*	*6%*	*6%*	*5%*	*5%*	*5%*
World Refined Consumption	**Mt**	**10.14**	**10.77**	**11.28**	**11.74**	**12.09**	**12.46**	**12.82**	**13.17**	**13.52**	**13.89**
World Refined Consumption Growth	%	*5%*	*6%*	*5%*	*4%*	*3%*	*3%*	*3%*	*3%*	*3%*	*3%*
Market balance	**Mt**	**0.29**	**0.08**	**0.13**	**-0.07**	**-0.05**	**-0.11**	**-0.13**	**0.06**	**0.16**	**0.02**
Exchange stocks	Mt	1.33	1.46	1.60	1.52	1.48	1.37	1.23	1.29	1.45	1.48
Reported-stock-to-consumption ratio	Wks	6.8	7.1	7.4	6.7	6.4	5.7	5.0	5.1	5.6	5.5
Annual average LME cash prices	**USD/t**	**2,391**	**2,074**	**2,156**	**2,111**	**1,779**	**1,713**	**1,808**	**1,945**	**2,083**	**2,221**
Annual average LME cash prices	**USc/lb**	**108.5**	**94.1**	**97.8**	**95.8**	**80.7**	**77.7**	**82.0**	**88.3**	**94.5**	**100.8**

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Steel Making Materials

Closer to the bottom, but not there yet

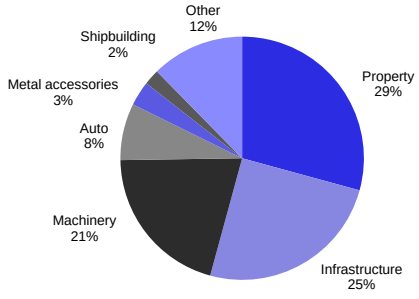
- We have cut our global **steel** forecasts by 1.2 – 1.6% over the course of the decade. We now forecast global crude steel production to decline by 3.5% in 2015E, and remain flat in 2016E. All three of the main steel consuming sectors in China have been weak in 2015. Whilst we continue to forecast a cyclical recovery in both property and infrastructure; a result of improving property sales ultimately feeding through to new starts, and improving land sales giving local governments more firepower to invest in infrastructure. Given the high inventory levels in many tier 3 cities, we think the recovery may be slightly more muted than we previously anticipated. However, overcapacity in many manufacturing sectors has led to declining capex over the last four quarters, and we expect this weakness to continue into 2016. We forecast both Property and Machinery steel consumption to be negative for a second year in succession in 2016E, only turning positive in 2017E.
- The downgrade to steel output translates into falling **iron ore** demand over the next few years. As long as Chinese domestic production and output from the non-traditional suppliers continue to shrink further in 2016E, we forecast a fairly balanced market in 2016E with limited need for mid tier closures. We think the Samarco incident and the recent Anglo American production downgrades points to a much more balanced iron ore market for 2016. However, our price recovery in 2017 onwards relies on enough capacity closures in 2016, partly as a result of weak pricing to see a continuation of a more balanced market. A more supportive pricing environment in 2016 is likely to keep these marginal mid tier producers going, which remains a downside risk to our medium term prices. Our base case on pricing remains that we will see six to nine months of sub USD45/t in order to force closures, which will lead to a modest recovery and stabilization in the low 50's for 2017.
- The **Metallurgical coal** market has been ahead of the rest of the other "metals" in the adjustment process. We have see three successive bouts of supply cuts flowed by periods of relative price stability. However, the constant price erosion over the past year means that we are due for another round of cuts. We estimate a surplus market of c.10Mt for 2016E. Considering that 2015 was oversupplied the magnitude of the cuts needs to be 15-20Mt in our view for the price to stabilize. Given that the bulk of the oversupply is in Australia, we would expect to see most of the cuts from here. A sharply falling AUD is the key risk, which to some extent will depend on the rate of the RMB devaluation.

Steel outlook: Another tough year for global steel

We forecast global steel production (crude steel) to decline by 3.5% in 2015E, and remain flat roughly in 2016E. Our new forecasts are c.1.2 – 1.6% lower than previous forecasts. The main change has been to our China steel demand outlook in the periods 2015 to 2017E. The weakness in the property sector is well known, as is the slow spend on infrastructure, partly due to anti-corruption investigations and a fiscal crunch due to weak land sales. We continue to forecast a cyclical recovery in both of these sectors as a result of improving property sales ultimately feeding through to new starts, and improving land sales given local governments more firepower to invest in

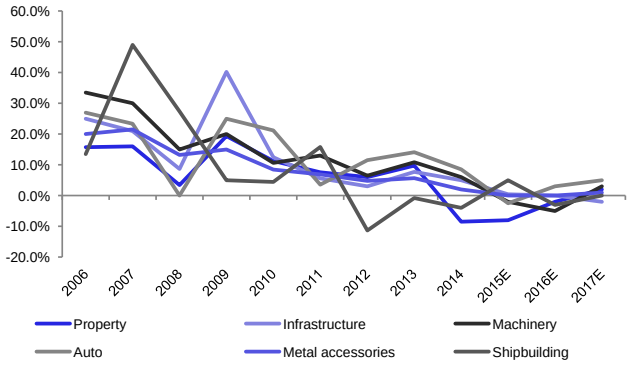
infrastructure. Given the high inventory levels in many tier 3 cities, we think the recovery may be slightly more muted than we previously anticipated. However, the overcapacity in many manufacturing sectors has led to declining capex over the last four quarters. We expect this weakness to continue into 2016. We forecast both Property and Machinery to be negative for a second year in succession in 2016E, only turning positive in 2017E.

Figure 135: Chinese steel demand by sector in 2015E



Source: Deutsche Bank

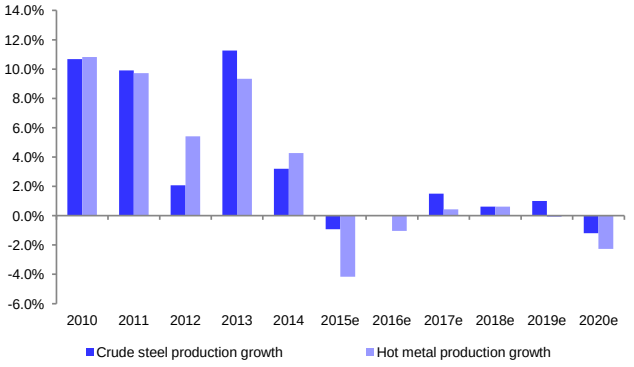
Figure 136: Chinese steel demand growth rates by sector



Source: Deutsche Bank, Industry data

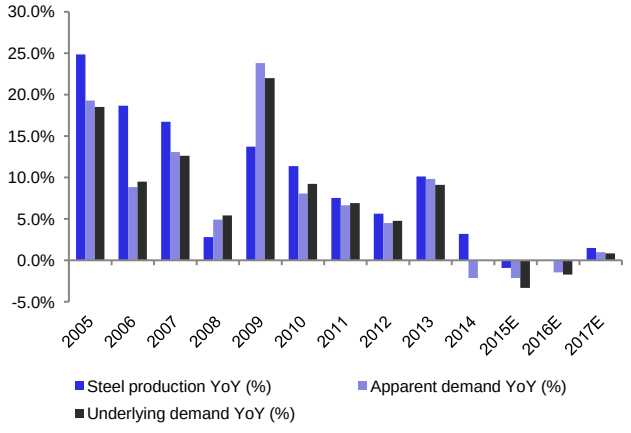
We outline our Chinese and global crude steel and hot metal output in the charts below. We forecast both the crude steel and hot metal output to be negative in 2015E and 2016E before recovering modestly in 2017E. We continue to forecast Chinese steel exports creeping higher over 2016E and 2017E, which given the weak crude steel output forecasts implies even weaker underlying demand.

Figure 137: Chinese steel production growth



Source: Deutsche Bank, WSA, CISA

Figure 138: Contrasting demand with output: Chinese steel

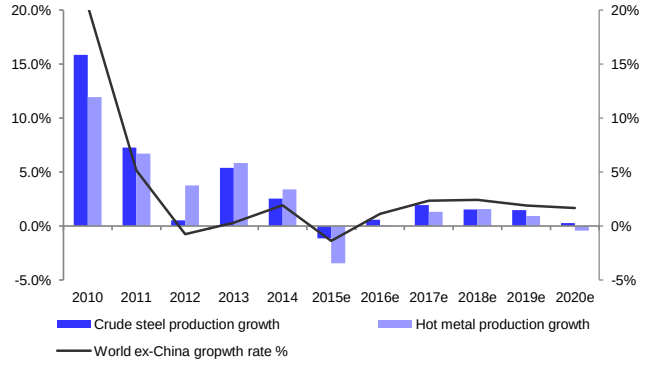


Source: Deutsche Bank, Industry data

As Chinese growth rates approach those of developed world growth rates, our forecasts for the world ex China look very similar to those of China. If anything, we expect the world ex China to prop up the global average into low single digit territory. The outlook for the major developed world production regions is fairly muted. We forecast Japanese steel output to decline by 5- 6Mtpa over the course of the decade due to unfavourable demographics and some off-

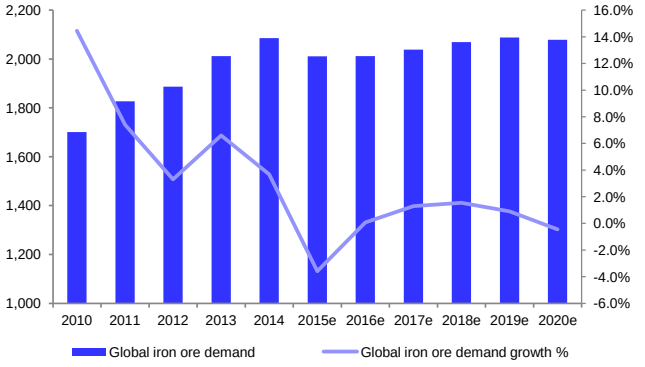
shoring of production facilities. European (EU-28) production has held up relatively well this year as domestic demand staged a recovery. Although cheaper imports will remain a constant thorn in the side of the European steel producers, we forecast a modest increase of 9 – 10Mt by the end of the decade. The burden of dragging the global steel output level higher falls to India and to a lesser extent South East Asia. We forecast robust growth from steel production growth in India of c.6.5% to the end of the decade, with favourable demographics and an emerging middle class acting as a catalyst. The risk to our Indian forecasts is the regulatory difficulties faced by companies when attempting to build greenfield facilities. Demand should however remain firm and should output disappoint on the downside, we would expect imports to increase, ultimately translating into higher output in other regions. We forecast South East Asian steel demand to growth by c.15Mt to the end of the decade, despite a challenging year in 2015E. The region is experience strong growth in construction and is the beneficiary of a shift in manufacturing production bases from China and Japan. The combination of modest crude steel output and the increasing availability of scrap means that we expect iron ore consumption to return to peak consumption levels last seen in 2014 by 2019E, before declining again as we approach the end of decade.

Figure 139: Global steel production growth



Source: Deutsche Bank, WSA

Figure 140: Global iron ore demand



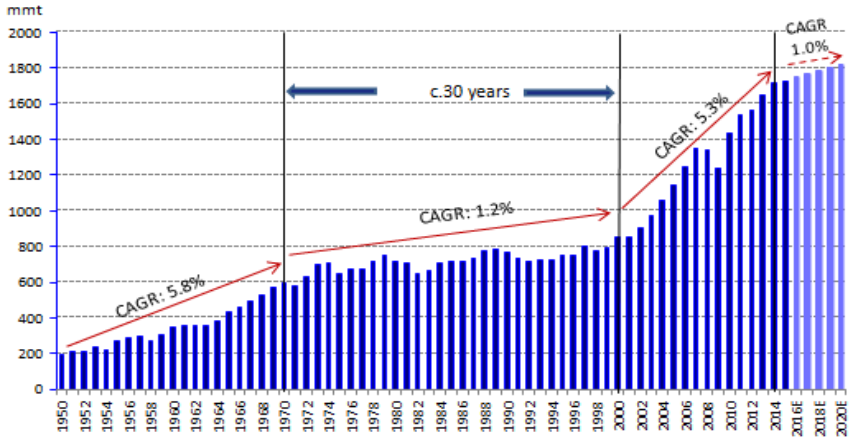
Source: Deutsche Bank, Industry data

China Steel demand to continue slowing in 2016

We believe Chinese steel demand will continue to decline in 2016 due to the leveling-off of China's economic growth. We do not see the three major demand drivers – property, infrastructure, and manufacturing – having synchronized growth, and thus see steel demand growth in 2016 as very unlikely. This suggests global steel demand is in a new era, with a growth CAGR likely to be similar to that seen in 1970-1999. Figure 141 demonstrates the evolution of global steel demand. From 1950 to 1970, global steel demand saw high growth, with a CAGR of 5.8%. After the oil crisis in the early 1970s, global steel demand started to record a much slower CAGR of 1.2%. China demand drove a high CAGR of 5.3% in 2000-2015. With the structural change in China's economy, we may potentially face a situation similar to the early 1970s.

We provide an extract from a report published by James Kan, dated the 22nd of October, entitled "Capacity rationalization absent; Downgrading 2016 outlook"

Figure 141: Global steel demand growth since 1950

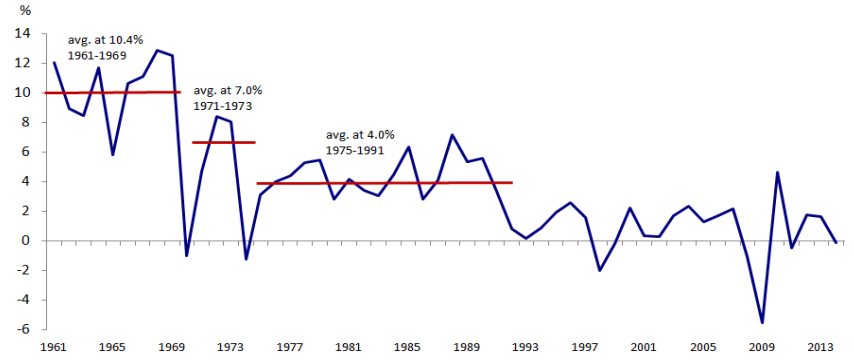


Source: Deutsche Bank estimates, World Steel Association

China's GDP growth has been leveling off, on average, from c.10% to c.7% in recent years. We have dug into the history books to find examples of developed economies that have experienced similar structured GDP growth slowdowns. While no other developed economy has ever engineered a leveling-off of economic growth in exactly the same way as China is at the moment, we did find that Japan and France experienced similar slowdowns in previous decades. Our key observations in the cases of Japan and France (Figure 142 through Figure 145) are:

- In the first few years of economic growth leveling off, the possibility of YoY declines in steel consumption is high (Japan: 1970-1977; France: 1974-1980).
- In the years of economic growth slowdowns in Japan and France, there was a downward trend in fixed capital formation (FCF) as a percentage of GDP (Japan: from 35.5% in 1970 to 30.8% in 1978; France: from 26.8% in 1974 to 24.4% in 1980).
- The cyclicality effects for steel consumption in Japan and France were strong. A deep decline in steel consumption in a certain year resulted in a strong steel demand recovery in the following years (Japan: 1971 to 1973; France: 1975 to 1976).

Figure 142: Japan GDP growth rate in previous decades



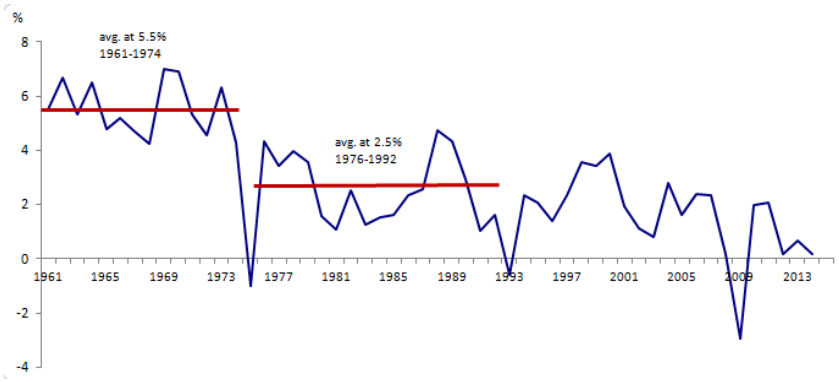
Source: Deutsche Bank, World Bank

Figure 143: GDP (%), FCF (as % of GDP), and steel consumption YoY (%) – Japan

	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
GDP (%)	11.7	5.8	10.6	11.1	12.9	12.5	-1.0	4.7	8.4	8.0	-1.2	3.1	4.0	4.4	5.3
FCF as % of GDP	32.3	30.4	30.9	32.6	33.8	35.2	35.5	34.2	34.1	36.4	34.8	32.4	31.2	30.1	30.4
Steel consumption YoY (%)	26.9	-5.6	21.6	41.2	0.5	23.0	13.6	-14.2	16.7	24.6	-10.6	-13.8	-0.4	-5.8	3.7

Source: Deutsche Bank estimates, World Bank, World Steel Association

Figure 144: France GDP growth rate in previous decades



Source: Deutsche Bank, World Bank

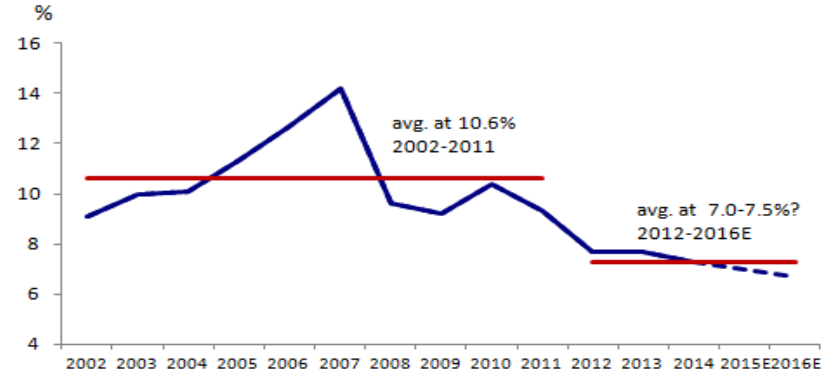
Figure 145: GDP(%), FCF (as % of GDP), and steel consumption YoY (%) - France

	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
GDP (%)	7.0	5.7	5.3	4.5	6.6	4.7	-1.1	4.4	3.6	3.9	3.4	1.6
FCF as % of GDP		25.6	25.8	25.9	26.2	26.8	25.3	24.9	24.0	23.6	23.5	24.4
Steel consumption YoY (%)	20.5	8.2	-9.4	8.6	8.5	-1.0	22.9	20.0	-12.4	-5.5	15.0	-5.2

Source: Deutsche Bank, World Bank, World Steel Association

Given the case studies about what happened in Japan and France, we believe it is highly likely that China repeats the apparent consumption decline in 2016 after two years of consecutive steel demand decline (2014 and 2015). The situation should be quite similar to what happened in 1974-1977 in Japan. Interestingly enough, FCF as a percentage of GDP in China did not go down throughout 2012-2014 when GDP growth was leveling off. If China continues to put emphasis on changing the economy structure to be less investment-oriented, then steel consumption could drop even more seriously.

Figure 146: China's GDP in the last decade and forecasts for 2015-2016



Source: Deutsche Bank, World Bank

Figure 147: GDP (%), FCF (as % of GDP), and steel consumption YoY (%) – China

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015E	2016E
GDP (%)	9.1	10.0	10.1	11.3	12.7	14.2	9.6	9.2	10.4	9.3	7.7	7.7	7.3	7.0	6.7
FCF as % of GDP	37.9	41.2	43.3	42.1	40.4	38.8	40.4	45.3	44.9	44.6	45.3	45.8	46.0	na	na
Steel consumption YoY (%)	20.8	25.0	10.7	23.1	8.8	13.1	4.9	23.8	8.1	6.6	4.5	9.8	-2.1	-1.5	-1

Source: Deutsche Bank, World Bank, World Steel Association

Regarding whether Chinese steel demand has already peaked, the China Iron and Steel Association believe that this is the case. Figure 148 shows there might be some room for Chinese per capita steel consumption to grow to reach the peak level of most of developed economies. However, if steel strength or steel usage efficiency improved 20% in the past 40 years, China would indeed be already consuming similar levels of steel as developed economies when they peaked. The current 561kg per capita can be divided by 0.8 (20% improvement) to reach the level of 700kg per capita. Thus, we are beginning to be more inclined to believe that China steel demand might have already peaked.

Figure 148: Snapshots of steel consumption per capita peak year for various countries

Country	Year	Apparent consumption per capita	30 years accumulative consumption per capita (kg)	Nominal GDP per capital USD	Fixed capital formation /GDP (%)
US	1973	696	16946	6522	22%
Japan	1973	857	7844	3806	36%
UK	1968	712	11387	1893	20%
France	1973	495	8515	5038	26%
German	1969	704	12030	2687	31%
Italy	2006	657	14180	31614	21%
Taiwan	1993	1175	8544	11079	26%
China	in 2014	561	6100	7594	46%

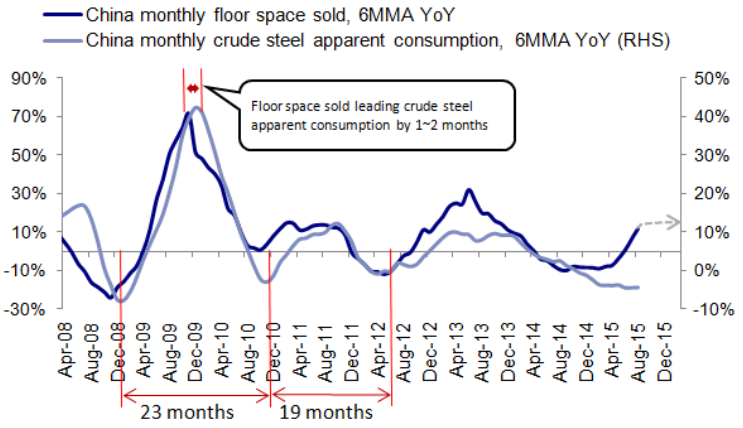
Source: Deutsche Bank, World Bank, World Steel Association

Bottom-up: no synchronized demand growth

Based on a bottom-up approach, we also see a high probability that steel demand in 2016 will be in a decline. We do not believe the three major drivers of material demand will have synchronized growth. The three major drivers of steel demand in China are property, government expenditure/infrastructure, and manufacturing capex. Our views for each of the three major drivers are as follows:

- **Property:** As shown in Figure 149, the steel demand cycle in China has historically had a high correlation with the property sales cycle. However, the correlation broke down in 2015. Several factors might have caused that. First, the property inventory level in lower-tier cities might still be high. Second, developers tend to become more prudent in terms of pushing for new projects right after seeing property sales improvement. These two factors help explain why property construction activity did not pick up after property sales rose starting in April 2015. Other factors affecting steel demand may also have faced some slowdown. From here, we see improving property sales at least stabilizing, if not reviving, the steel demand driven by the property sector. Nevertheless, the extent to which property sales can continue to pick up remains to be seen. We note that, beginning in late 2Q 2016, the higher base effect will start to kick in.

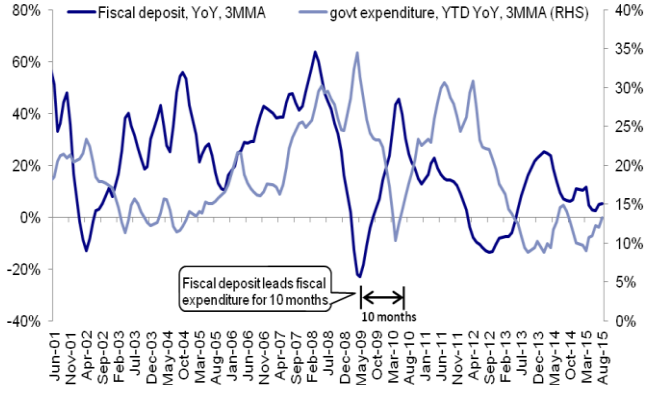
Figure 149: Property sales YoY vs. Chinese steel demand YoY



Source: Deutsche Bank, NBS

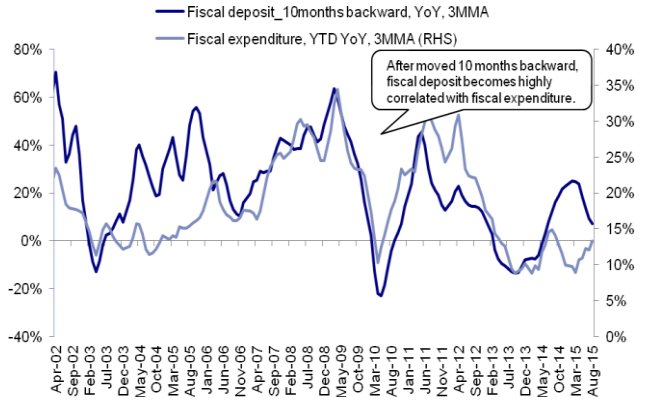
- **Government expenditure:** Historically, growth of government expenditure has had a strong correlation with growth of government fiscal deposits, with a 10-month lag, as shown in Figure 150 and Figure 151 (moving fiscal deposit growth backward). That correlation also broke down in late 2014 and early 2015. We attribute that breakdown to the Chinese government's awareness of fiscal slides in late 2014. Government expenditure has accelerated since late 2Q15. Expenditure acceleration also translated into a rapid fiscal deposit growth slowdown in mid-2015. However, China's central government allowing more local government bond issuance and improved land sales revenue (according to our China economist team) has helped to revive fiscal deposit growth. We believe it is crucial to monitor whether China can continue to accelerate its growth of fiscal deposits. If China is able to prevent fiscal deposit growth from sliding too much too quickly, the country would have more strength to lever government expenditure to stabilize the economy. Without a gearing-up or continuous improvement of land sales revenue, fiscal deposit growth will likely bottom in 2Q or 3Q16, thus bringing a slowdown in government expenditure again.

Figure 150:China fiscal deposit YoY vs. government expenditure YoY (original)



Source: Deutsche Bank, NBS, Wind

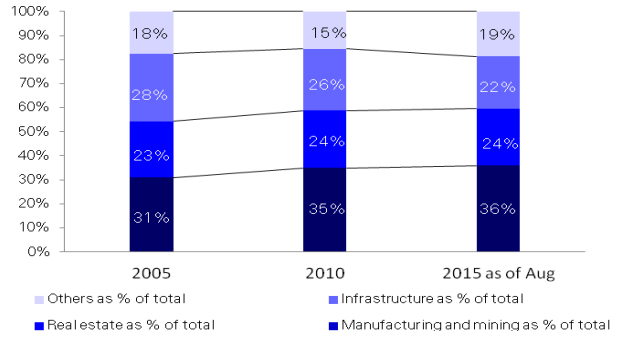
Figure 151: China fiscal deposit YoY vs. government expenditure YoY (moving fiscal deposit YoY backward)



Source: Deutsche Bank, NBS, Wind

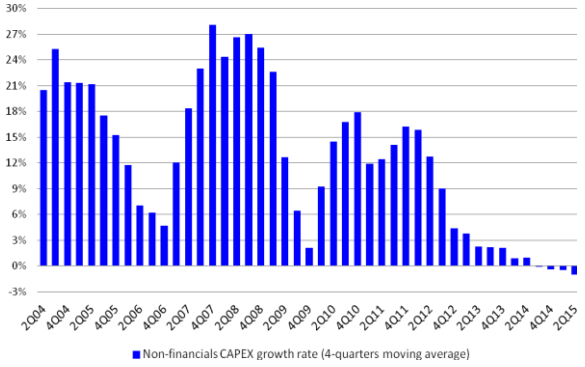
- **Manufacturing capex:** With property sales and government expenditure improvement in 3Q15, we attribute the weak material demand in 3Q15 mainly to a slowdown of manufacturing capex (Figure 153). We need to be aware that, in China, manufacturing capex has become the most important driver for FAI. This also implies that the leverage China's government has to use fiscal expenditure/ infrastructure to revive the economy is much less than it was a decade ago. We do not expect the capex cycle to turn around that easily and quickly. Overcapacity is happening for many industries in China, and most asset returns are continuing to decline. Re-investment should indeed slow. Manufacturers have also been suffering from managing their working capital, in our view. As shown in Figure 154, accounts receivable days and inventory days for A-/H-listed non-financial companies have continued to deteriorate since 2011. We believe this will also constrain manufacturers' willingness to re-invest. This echoes our view that the capex cycle will not turn around immediately.

Figure 152: Breakdown of China FAI



Source: Deutsche Bank, NBS, Wind

Figure 153: Non-financial corps (A-listed) capex YoY



Source: Deutsche Bank, NBS, Wind

Figure 154: AR days and inventory days for Chinese listed non-financial corps

Time	Accounts receivable days		Inventory days	
	A-share (non-financials)	H-share (non-financials)	A-share (non-financials)	H-share (non-financials)
2011-06-30	27.73	68.59	89.18	92.60
2011-12-31	26.42	64.74	87.43	91.97
2012-06-30	32.03	79.47	101.11	100.31
2012-12-31	30.42	78.87	98.15	100.42
2013-06-30	34.93	87.65	107.78	105.39
2013-12-31	32.95	81.88	104.48	102.47
2014-06-30	38.76	87.37	119.55	114.39
2014-12-31	37.11	98.39	113.04	109.06
2015-06-30	47.33	92.13	140.38	123.67

Source: Wind; Bloomberg Finance LP

Overall, we believe the best scenario for steel demand in coming quarters is that property sales improvements start to translate to more land sales revenues for Chinese local governments. Land sales revenue improvements allow China's government to continue to push for more fiscal expenditure until the manufacturing capex cycle turns around. However, we should be aware that the magnitude of improvement of property investment and government expenditure is unlikely to be comparable to the boom in 2009-2010. The worst-

case scenario, which we believe is still a realistic possibility, is government expenditure accelerating only through the middle of 2016, resulting from government fiscal weakness. If manufacturers' capex cycle has not turned around by then, we will likely have another leg down for Chinese materials/ steel demand. So far, we are leaning more to the second scenario, with potentially another leg down for steel demand in 2016. We do not believe recent Chinese government stimulus policies will be enough to significantly improve capacity utilization for many industries. Without material capacity utilization improvement, manufacturers probably will not further invest in capex. As such, overcapacity rationalization is also a key to turn the cycle, in our view.

Expecting some utilization pick-up only in 2017

Based on the demand and supply discussions in the previous sections, we have derived our new China steel demand/supply model, as shown in Figure 155. Our thoughts on several key factors are:

- For capacity addition, Baosteel's 8.75mtpa new capacity addition has high visibility. Wugang seems determined to ramp up the Fangcheng project to 10mtpa. Rizhao steel is starting to construct its 8mtpa steel production base in Rizhao port. These projects have less visibility regarding how much capacity will be implemented. There are also a few "replacement projects". Historically, replacement projects often become expansion projects. As such, we think our gross capacity addition number is conservative enough.
- For capacity closure, we assume the pace of shutdown will be similar to that of capacity addition, given the government's policies allowing replacement projects. We have not assumed any massive bankruptcy helping to bring down more steel capacity in China in our D/S model, as we think China's government will still prevent that from happening.
- We still assume that exports will continue to grow at a mild pace. A key swing factor will be the Chinese government's attitudes about steel exports. Anti-dumping measures from many countries might also affect the momentum of China increasing its steel exports.
- For key demand factors, we assume no growth for infrastructure demand in 2016. The trajectory we expect is YoY growth in 1H16 and then a slowdown again in 2H16. For 2017, we assume another leg down, as we believe China will still endeavor to change its economic structure to be investment driven. For steel demand in the property sector, we believe there is still potential for a slight YoY decline, with positive growth in 1H16 but a slowdown in 2H16. Machineries might contribute the most to the steel demand decline in 2016 because of the weak capex cycle.

Overall, we forecast Chinese steel apparent demand declining 1.5% in 2016 before recovering to 1% YoY in 2017. Due to an export increase, we project Chinese steel production will have 0% and 1.5% YoY growth in 2016/2017. Due to slow capacity rationalization and even some new capacity addition, we forecast that the Chinese steel industry utilization rate will remain low at 81-82%, a level at which steel mills will still have very poor profitability.

Figure 155: China crude steel supply and demand balance (2011-2017E)

(mmt)	2011	2012	2013	2014	2015E	2016E	2017E
Capacity	863	932	993	1003	1003	1003	1003
+ Net/Gross addition	63	69	69	35	15	12	10
- Phase out	0	0	8	25	15	12	10
Capacity growth %	7.9%	8.0%	6.6%	1.0%	0.0%	0.0%	0.0%
Production	685	724	797	823	815	815	828
Production growth	7.5%	5.6%	10.1%	3.2%	-0.9%	0.0%	1.5%
Capacity utilization	82.4%	80.7%	82.8%	82.4%	81.3%	81.3%	82.5%
Net import (export)	(35)	(45)	(51)	(93)	(101)	(111)	(117)
Total apparent consumption	650	679	746	730	714	704	711
Apparent consumption growth	6.6%	4.5%	9.8%	-2.1%	-2.1%	-1.5%	1.0%

Source: Deutsche Bank estimates, Industry data

Iron ore: The struggle for survival continues

The tragic Samarco dam burst and the subsequent disruption of 30Mt of premium pellets is just one part of the iron ore picture. We expect the operation to be off line for three years. The re-design of the Sishen pit is certainly a price related cut, and the slower than expected ramp-up confirms the risks to the large projects. A slower than expected ramp-up of the Roy Hill project is certainly another positive, but these supply side positives are more than offset by a weaker global steel demand picture. After balancing weaker demand with the supply disruptions, we still arrive at the same conclusion; not only will Chinese domestic production and "non-traditional" supply have to shrink to make way for the increasing tonnage from the large cap diversified miners, but so too will many of the mid tier Australian and Brazilian iron ore miners. This will only happen if prices fall below USD45/t, and stay there for a period of time in our view. Many of the producers have taken bold steps to survive at these price levels. FMG is a case in point where the breakeven price is likely to move closer to c.USD40/t over time.

A weaker demand outlook offsets the Samarco supply disruption and the Anglo cuts

However, post the Samarco disruption and the Anglo downgrade, the market looks a lot more balanced. This balance still relies on further curtailments of domestic Chinese production and a further, albeit more modest contraction of supply from the Non-traditional suppliers. As the impact of these cuts is felt in the first few months of 2016, we expect a recovery in pricing from the current sub-40's range. In the short term, the risks are to the downside however.

Figure 156: Mapping the evolution of the iron ore market

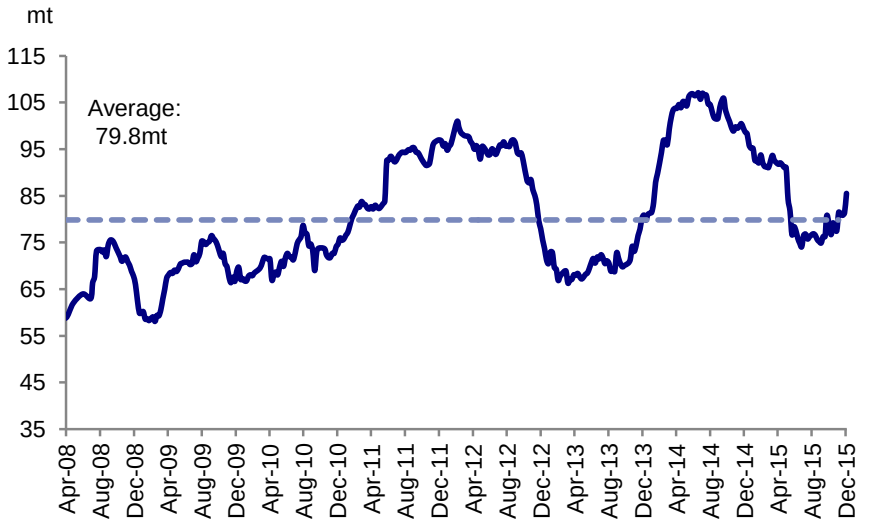
Mtpa	2015E	2016E	2017E	2018E	Cumulative	Comments	Risk
Demand growth	**-75**	**1**	**26**	**31**	**-16**	So far easing measures have not led to any meaningful uptick in the "old" economy demand. We have downgraded 2016 and 2017 forecasts	-ve
Vale	16	14	**27**	19	76	Stockpiles building up at the Malaysian trans shipment hub	Neutral
Rio	**40**	28	19	6	93	Project plans on track	Neutral
BHPB	16	19	10	4	48	Project plans on track	Neutral
FMG	4	9	4	0	17	Good work on processing and recoveries have lowered costs closer to USD40/t	-ve
Minas Rio (Anglo)	9	8	3	2	22	Slower than previously forecast ramp-up due to licensing hold-ups	Neutral
Roy Hill (Hancock)	1	**14**	**15**	**22**	52	A slower than expected ramp-up has been factored in	+ve
Big project supply growth	86	93	77	53	308		
Excess supply	161	91	51	21	**324**		
China domestic	-73	-50	-30	0	-153	Sticky supply and cost cuts could see the equilibrium output higher than expected	-ve
India	8	9	18	13	48	Indian mining output has historically disappointed due to permitting delays	+ve
Non-traditional producers	-66	-28	-17	3	-109	Favourable currencies such as the Rouble have provided a significant tailwind	-ve
South Africa	-2	-11	-1	1	-13	Redesign of the Sishen pit shell	+ve
Samarco	-4	-27	0	0	-30	The operation could come back more quickly than we have assumed.	-ve
Excess supply	**24**	**-16**	**21**	**38**	**67**		

Source: Deutsche Bank

Figure 156 provides an alternative way of looking at the iron ore supply demand balance, in trying to determine how much mid tier capacity needs to be shuttered to balance the market in that year. In 2015E, we forecast a

demand contraction of 75Mt, with the large project (the majors, Roy Hill and Minas Rio) supply bringing on c.90Mt of additional supply. The closure of Chinese domestic and non-traditional supply offsets the oversupply by c.70Mtpa each. India is likely to add some additional capacity of c.10Mtpa, offset to a certain extent by the loss of Samarco supply. We estimate that c.25Mt of mid tier production will need to be cut to balance the market. In our assessment, there have been limited cuts so far this year, which means that although we have a more balanced market in 2016, the lack of cuts in 2015 may spill over into 2016. The starting assumption is that 2014 was roughly balanced for the sake of simplicity. However, we think the market was in oversupply to the tune of 20Mt, and was evident in the build-up of Chinese ports stocks, which implies that an additional 20Mtpa of capacity will need to be shuttered, over and above the cumulative capacity of c.65Mtpa.

Figure 157: Chinese port iron ore stocks – on the up which is a negative signal



Source: Deutsche Bank, Bloomberg Finance LP

Peak iron ore demand in 2014?

Given our more muted view on the outlook for Chinese steel consumption (we include an extract from a report published by our China Steel analyst James Kan; entitled "Capacity rationalization absent; Downgrading 2016 outlook", dated the 22nd of October outlining the reasons) we forecast 2014 as the peak iron ore demand year for this decade, and possibly the next. We forecast 2018 demand to be slightly below 2014 levels, but the recovery in demand is only likely in 2017 and 2018E. We have trimmed back our global supply forecasts by c.40 – 60Mtpa over the course of the decade, mainly due to the Samarco dam failure, the Anglo cuts and a slower ramp up of Roy Hill.

A catastrophic tailings dam failure for Samarco

BHP and Vale's 30Mtpa Samarco iron ore mine in Southern Brazil (50/50 JV) has suffered a catastrophic tailings dam failure. The two affected dams are Fundao and Santarem, located at the Germamo complex. Samarco produced 24Mt of pellets in 2014, and we estimated an output of 30Mt in 2015 and 2016E. Samarco's output is only 1% of the global iron ore market, or 2% of the seaborne market. However, the output is c.7% of the global pellet market and 20% of the pellet export market. Whilst the current focus is on humanitarian

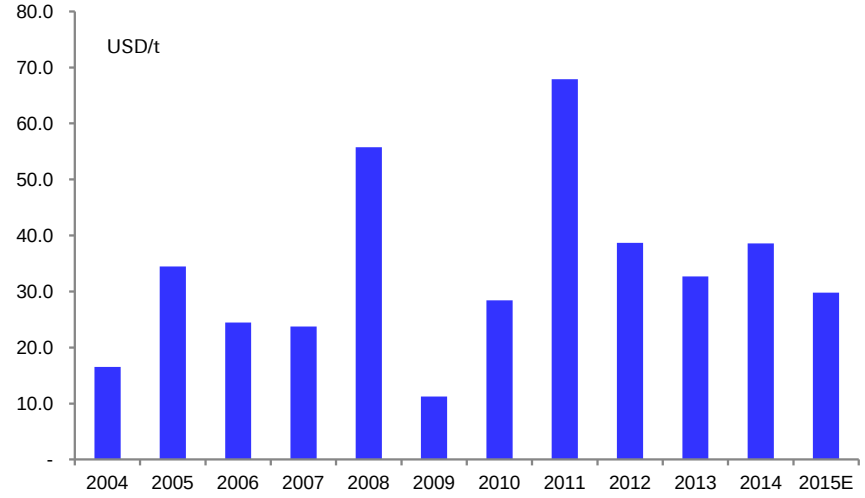
efforts, it is too early to make a definitive call on the impact on the iron ore market, we have factored in a three year outage of the entire facility.

Our initial estimate has been for a three year outage, based on one year to assess what went wrong, another to design and permit and finally a year to construct. This may now prove to be on the pessimistic end with the potential for the first two years to fold into one. There is also the potential to use the Germano pit as a temporary tailings dam, but this would be subject to permitting, pipeline infrastructure, pumping stations etc.

In terms of associated costs of reconstruction and environmental tidy up, we have assumed $300-$400m for the reconstruction of the two dams. Tidy up costs based on the $2 p/t cost of waste should be no more than ~US$100m based on our assumption of 35Mm3 of tailings having spilled. This again may prove too pessimistic given the potential to reforest the areas affected away from the river valley and banks. Adding the cost of reconstruction of the town, bridges, conveyor belts, litigation etc our initial estimate of up to $1bn remains reasonable in our view.

There may be some knock on impacts from the incident within Brazil. Certainly we expect future tailings dam permitting to be a lot more stringent. Vale have already reported conveyor belt damage which would affect c.12Mt of their production. However given the stock build up at the Teluk Rubiah distribution centre in Malaysia, we would expect Vale to manage any production losses through these stocks. Samarco has a particularly strong position in DR (direct Reduction) grade pellets, which may spill over into the BF (Blast Furnace) market. Ultimately we expect the event to be supportive for pellet premiums. Spot pellet premiums have been declining over the course of the year due to weak demand, especially in Asia, and poor profitability for the steel producers. Spot premia in Europe and Japan are c.USD30/t, down from USD35/t at the start of the year. We would expect pellet premia to ease back up to USD35/t, but the upside is limited in our view due to the weak profitability in the steel sector, which would encourage substitution into “cheaper” alternatives.

Figure 158: Blast Furnace Pellet premium basis 65% Fe FOB Tubarao



Source: Wood Mackenzie

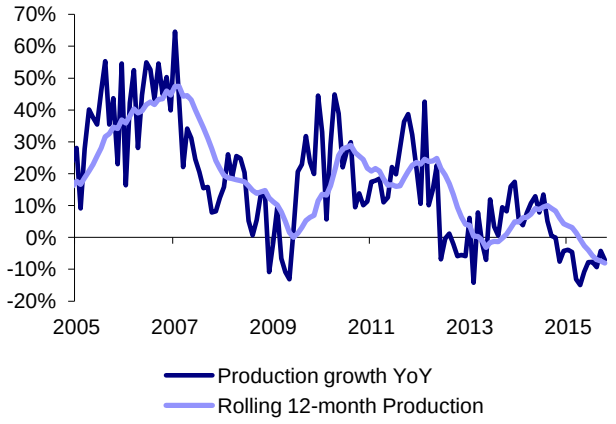
Cuts from Anglo – Slicing Sishen and a slower ramp-up from Minas Rio

Kumba has decided to reconfigure the Sishen pit to a lower cost shell configuration in order to optimise margins. This is in line with the Company's strategy to focus on value (cash generation) over volume, thereby safeguarding the mine's viability at lower prices.

The new pit shell configuration will allow for a more flexible approach, reduce execution risk and lower capital cost over the life of mine. The mine will target FOB unit costs of ~$30/t and a breakeven price of ~$40/t CFR for 2016. Waste movement is expected to be materially below previous guidance of ~230mt, at ~135 Mt and production is expected to be reduced from previous guidance of 36 Mt for 2016 to ~26 Mt. The production outlook at Minas Rio has been reduced by c.3 – 4 Mtpa due to constraints in the mining area caused by licensing delays.

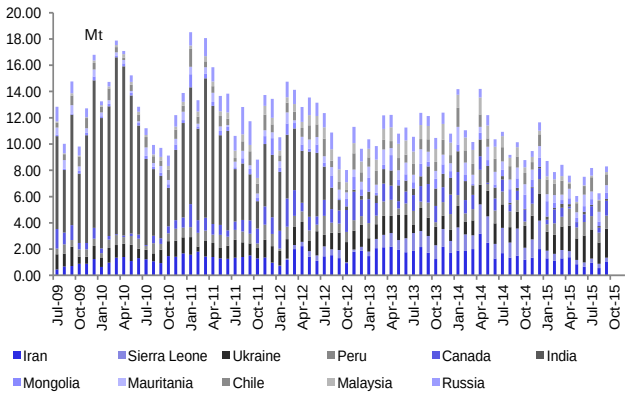
Despite the weak demand environment, the iron ore price has been relatively resilient, partly due to the contraction of domestic Chinese supply, and the contraction of non-traditional supply as highlighted by the falling Chinese imports from regions other than Brazil, Australia and South Africa. The October China production data confirmed the continued pressure on the domestic industry, with output down 5% month on month and 7% year on year. This puts the 10-month year to date production down c.9%. In the absence of any grade adjustments, this would imply a full year output of c.320Mt, which is slightly higher than our forecast of 280Mt on a 62% equivalent basis. The non-traditional suppliers staged a small comeback in September, with month on month improvements from Iran, Ukraine, Peru and Canada. Supply is however still down 40% year to date, which implies a reduction of 73Mt on an annualized basis, which is very close to our forecast decline.

Figure 159: Chinese iron ore production momentum



Source: Deutsche Bank, NBS

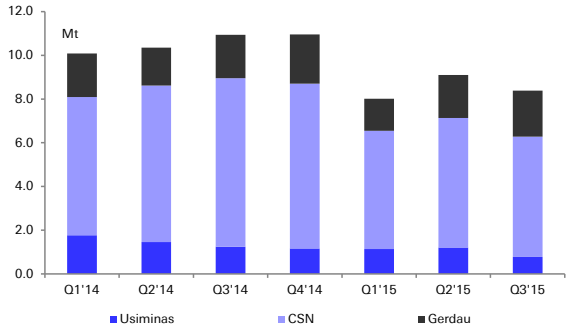
Figure 160: Chinese iron ore imports from the non-traditional suppliers



Source: Deutsche Bank, Bloomberg Finance LP

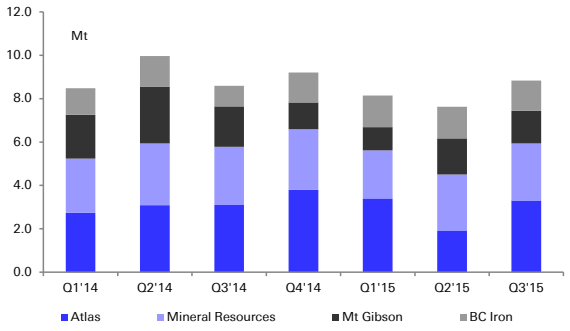
The latest Q3 production data from a sample of mid tier producers in Australia and Brazil also confirms that output is still down year to date. Although Australian mid tier output has recovered in Q3 with the ramp-up of the Atlas operations. Australian mid tier output is still down 9% year to date whilst Brazilian mid tier output is down nearly 20% year to date.

Figure 161: Brazilian mid tier iron ore producers



Source: Deutsche Bank, Company reports

Figure 162: Australian mid tier iron ore producers



Source: Deutsche Bank, Company reports

After a recent site visit, our Australian Mining analyst Paul Young thinks that Fortescue's costs are sustainable over the medium term, and as a result is unlikely to be a marginal producer. The lower unit cost is driven by a combination of Ore Processing Facility (OPF) upgrades and the continued automation of the Kings mining fleet. These upgrades have allowed a big drop in strip ratios at the Chichester Hub, and have also offset the fall in head grade as well as lifting recoveries.

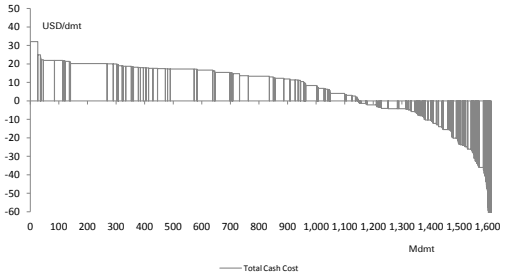
The recent site visit to FMG's mines and port demonstrated to us that the revised five year and Life of Mine (LOM) strip ratio guidance for both the Solomon and Chichester Hubs is achievable. Combined with cost cutting we also think the US$15/wmt cost target by the end of FY16 is achievable. In fact, we now think C1 costs will fall to US$14/wmt in FY17 and that strip ratios at the Chichesters may stay below 1.5:1 into FY17. This translates to all-in costs of c. US$30/wmt and a break-even price of c. US$40/dmt (62% Index). We also believe sustaining capex can stay around US$2-3/wmt for at least a few years.

The low iron ore price environment is putting immense strain on some of the on the balance sheets of the mid-tier miners. The latest announcement from BC Iron, is a reflection of the inevitable squeeze on the mid tier miners. In April 2015, they announced the suspension of production at the Nullagine mine. For the September Quarter of 2015, the Nullagine JV reported an all in cash cost guidance of US$35–39/wmt. Platts 62% Fe CFR. With adjustments for quality (around -14% for NJV product), moisture and freight the operation would be cash negative at the current spot price. On 10thth December BC Iron called a trading halt of its stock in ASX index, which we think will mean some for of debt restructuring or bankruptcy. The Nullagine production stood at 5Mtpa and had a mine life of four years.

Shifting costs lower

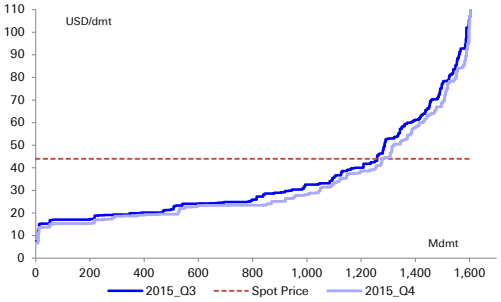
At current spot price of US$40/t, about 30% of global iron ore production is loss-making. Iron ore miners around the globe are aggressively cutting costs and we see this process continuing in 2016, although the ability to cut further will diminish. The depreciation of AUD, along with direct cost cutting measures has helped in pushing the Australian iron ore cash costs down by 43% from their 2012 peak in US dollar terms. The cost reduction of the Australian miners compared to Q3 2015 was 8% over the quarter. The three majors reduced their cost on a smaller scale as they are already are on a low cost base. FMG achieved the highest cost saving, by making improvements to their wet processing facilities. Despite achieving the highest cost cuts over the last year, the Australian mid tier producers are the most likely casualties if prices linger around the US$40/t level. The operating expense of the Ukraine and Russian of miners has gone down by 27% over the last two quarters, assisted by the fall in exchange rates of the Rouble and the Hryvnia against US dollar by more than 50% in one year.

Figure 163: Iron Ore Margin curve



Source: Deutsche Bank, Wood Mackenzie

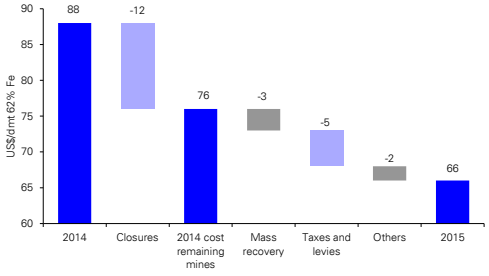
Figure 164: Flattening cost curve



Source: Deutsche Bank, Wood Mackenzie

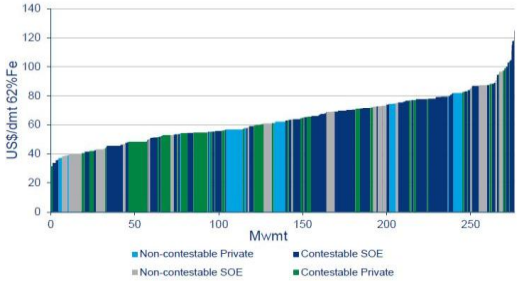
The average total cash cost of Chinese miners have fallen by US$5/dmt to US$66/dmt in 2015, when compared to H1 2015. The closure of high cost mines by private and state hold enterprise (SOE) has resulted in removing of 17Mt of iron ore from the non contestable market. Increase in mass recovery by mining higher Fe grade raw ore and lowering concentrate Fe grades to recover more concentrates with the same input of raw ore has helped in cutting cost by US$3/dmt. Labour costs are relatively low and account for 18% of total cost for the Chinese miners. A 20% cut in wage bills along with falling Diesel price has helped in cost reduction of US$2/dmt. SOE's are aggressively cutting labour cost to reduce their total cost. About 112Mt of Chinese Iron ore production, including 30Mt of private Iron ore production has negative cash margin and will ultimately be squeezed out of the market.

Figure 165: Chinese iron ore total costs – the falling in cost curve support



Source: Deutsche Bank, Wood Mackenzie

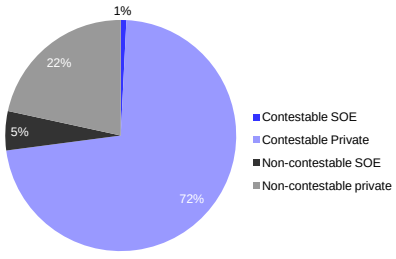
Figure 166: Chinese Iron Ore cost curve 2015



Source: Deutsche Bank, Wood Mackenzie

The estimate of closures in China is around 64Mt, with the most affected segment being the Contestable private sector

Figure 167: China capacity cuts by supplier type



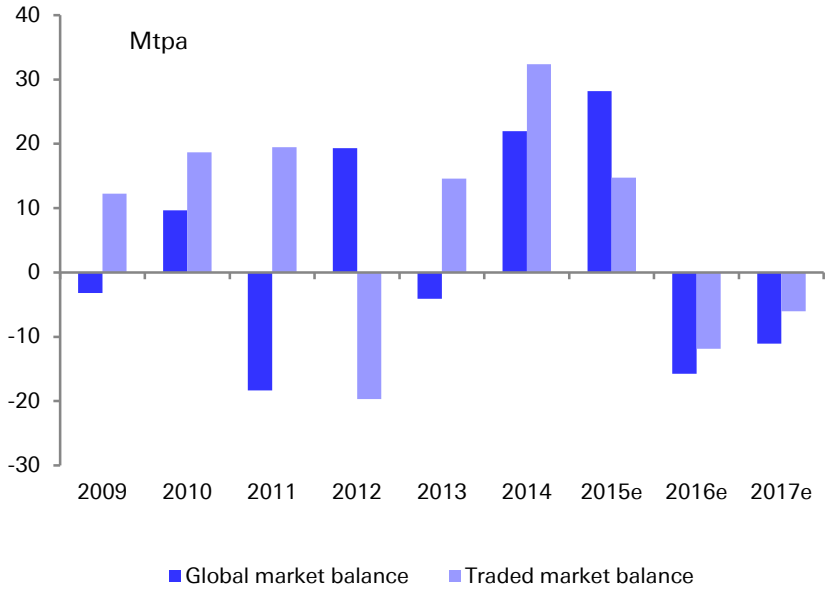
Source: Deutsche Bank

Figure 168: Iron ore supply demand balance

Supply		2009	2010	2011	2012	2013	2014	2015e	2016e	2017e	2018e	2019e	2020e
Brazil	Mt	310	365	383	378	380	399	419	415	440	461	500	505
growth	%	*-8%*	*18%*	*5%*	*-1%*	*1%*	*5%*	*5%*	*-1%*	*6%*	*5%*	*8%*	*1%*
Australia	Mt	393	433	477	529	622	749	786	846	890	916	912	910
growth	%	*14%*	*10%*	*10%*	*11%*	*18%*	*21%*	*5%*	*8%*	*5%*	*3%*	*0%*	*0%*
South Africa	Mt	55	58	58	61	67	73	71	60	59	60	59	58
growth	%	*17%*	*4%*	*0%*	*6%*	*10%*	*8%*	*-2%*	*-16%*	*-2%*	*2%*	*-2%*	*-2%*
India	Mt	210	203	180	140	148	128	104	112	118	122	125	132
growth	%	*9%*	*-3%*	*-12%*	*-22%*	*6%*	*-14%*	*-19%*	*7%*	*5%*	*4%*	*3%*	*5%*
China	Mt	242	330	362	325	399	353	280	230	200	200	180	180
growth	%	*-20%*	*37%*	*10%*	*-10%*	*23%*	*-12%*	*-21%*	*-18%*	*-13%*	*0%*	*-10%*	*0%*
CIS incl. Russia	Mt	172	199	208	206	208	201	192	187	183	179	183	186
growth	%	*-6%*	*16%*	*4%*	*-1%*	*1%*	*-3%*	*-5%*	*-3%*	*-2%*	*-2%*	*2%*	*2%*
North America	Mt	71	100	112	116	125	117	101	98	98	97	96	96
growth	%	*-30%*	*41%*	*12%*	*3%*	*8%*	*-7%*	*-14%*	*-2%*	*0%*	*-1%*	*-1%*	*-1%*
West Africa	Mt	20	23	23	26	31	32	28	24	21	21	21	21
growth	%	*-9%*	*14%*	*1%*	*11%*	*19%*	*3%*	*-13%*	*-15%*	*-10%*	*0%*	*-1%*	*-2%*
Other regions & adjustments	Mt	10	-1	5	125	27	56	58	35	29	19	14	1
Total iron ore supply	**Mt**	**1,483**	**1,710**	**1,808**	**1,906**	**2,008**	**2,107**	**2,039**	**2,007**	**2,037**	**2,077**	**2,090**	**2,088**
growth	%	*-3.7%*	*15.3%*	*5.7%*	*5.4%*	*5.3%*	*5.0%*	*-3.2%*	*-1.6%*	*1.5%*	*1.9%*	*0.7%*	*-0.1%*
Demand		**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015e**	**2016e**	**2017e**	**2018e**	**2019e**	**2020e**
Global steel production (crude steel)	Mt	1,235	1,430	1,534	1,543	1,626	1,667	1,648	1,658	1,690	1,716	1,741	1,746
Global Hot Metal production	Mt	1,005	1,125	1,200	1,245	1,318	1,363	1,316	1,317	1,334	1,355	1,367	1,362
growth	%	2.0%	11.9%	6.7%	3.8%	5.8%	3.4%	-3.5%	0.1%	1.3%	1.6%	0.9%	-0.4%
% Non scrap production	%	81%	79%	78%	81%	81%	82%	80%	79%	79%	79%	79%	78%
European crude steel production	Mt	168	206	217	209	206	209	210	212	214	215	216	217
European Hot metal production	Mt	103	106	104	105	106	107	107	107	108	108	109	109
growth	%	16%	3%	-2%	1%	1%	1%	0%	0%	1%	1%	0%	0%
% Non scrap production	%	61%	51%	48%	50%	52%	52%	51%	51%	50%	50%	50%	50%
Japan crude steel production	Mt	88	110	108	107	111	111	108	107	107	107	106	106
Japan hot metal production	Mt	67	82	81	81	84	84	82	81	81	81	81	80
growth	%	-22.3%	22.9%	-1.5%	0.5%	3.0%	0.0%	-2.4%	-1.0%	-0.1%	-0.2%	-0.3%	-0.2%
% Non scrap production	%	77%	75%	75%	76%	76%	76%	76%	76%	76%	76%	76%	76%
India crude steel production	Mt	64	69	74	78	81	85	90	96	103	112	118	124
India hot metal production	Mt	60	63	66	68	69	73	77	82	88	96	101	107
growth	%	3.0%	4.5%	4.2%	3.7%	1.6%	4.9%	6.0%	7.0%	7.5%	8.0%	5.6%	5.6%
% Non scrap production	%	95%	91%	89%	88%	85%	86%	86%	86%	86%	86%	86%	86%
China steel prodution (crude steel)	Mt	577	639	702	717	797	823	815	815	828	833	841	831
China steel production (iron ore)	**Mt**	**553**	**613**	**672**	**709**	**775**	**808**	**774**	**766**	**770**	**774**	**774**	**756**
growth	%	15.6%	10.8%	9.7%	5.4%	9.3%	4.3%	-4.2%	-1.0%	0.4%	0.6%	-0.1%	-2.3%
% Non scrap production	%	*96%*	*96%*	*96%*	*99%*	*97%*	*98%*	*95%*	*94%*	*93%*	*93%*	*92%*	*91%*
Iron Ore													
China	Mt	831	923	1024	1077	1192	1243	1191	1179	1183	1190	1189	1161
growth	%	*15%*	*11%*	*11%*	*5%*	*11%*	*4%*	*-4%*	*-1%*	*0%*	*1%*	*0%*	*-2%*
Japan	Mt	102	125	124	124	127	127	123	122	122	121	121	121
growth	%	*-22%*	*23%*	*-1%*	*0%*	*3%*	*-1%*	*-3%*	*-1%*	*0%*	*0%*	*0%*	*0%*
S. Korea & Taiwan & other	Mt	65	81	95	92	94	106	100	102	103	106	107	108
growth	%	*-13%*	*25%*	*18%*	*-4%*	*3%*	*13%*	*-5%*	*2%*	*1%*	*2%*	*2%*	*1%*
Europe	Mt	119	153	153	149	153	158	156	156	157	158	159	159
growth	%	*-30%*	*29%*	*0%*	*-3%*	*3%*	*3%*	*-1%*	*0%*	*1%*	*1%*	*0%*	*0%*
India	Mt	92	97	100	104	105	110	117	125	134	145	153	162
growth	%	*3%*	*5%*	*4%*	*3%*	*1%*	*5%*	*6%*	*7%*	*8%*	*8%*	*6%*	*6%*
Brazil	Mt	35	43	46	45	44	45	43	43	44	46	47	48
growth	%	*-28%*	*22%*	*7%*	*-3%*	*-3%*	*3%*	*-5%*	*0%*	*3%*	*3%*	*3%*	*3%*
CIS	Mt	125	135	138	141	141	138	134	133	136	140	144	147
growth	%	*-11%*	*7%*	*3%*	*2%*	*0%*	*-2%*	*-3%*	*-1%*	*3%*	*3%*	*3%*	*2%*
Total iron ore demand	**Mt**	**1,486**	**1,701**	**1,827**	**1,887**	**2,012**	**2,086**	**2,011**	**2,012**	**2,038**	**2,070**	**2,088**	**2,079**
growth	%	*-2.9%*	*14.4%*	*7.4%*	*3.3%*	*6.6%*	*3.7%*	*-3.6%*	*0.1%*	*1.3%*	*1.5%*	*0.9%*	*-0.5%*
Implied scrap ratio	%	*25%*	*26%*	*26%*	*24%*	*23%*	*22%*	*24%*	*24%*	*25%*	*25%*	*25%*	*26%*
Disruption allowance	*Mt*								*10*	*10*	*10*	*10*	*10*
Notional market balance	**Mt**	**-3**	**10**	**-18**	**19**	**-4**	**22**	**28**	**-16**	**-11**	**-3**	**-8**	**-1**
China imported fines (62% CFR)	**USD/t**	**79.8**	**146.6**	**167.0**	**123.8**	**130.0**	**97.0**	**56.0**	**46.3**	**51.5**	**55.6**	**59.8**	**63.9**

Source: Deutsche Bank, Industry data

Figure 169: Global and sea-borne iron ore supply-demand balance

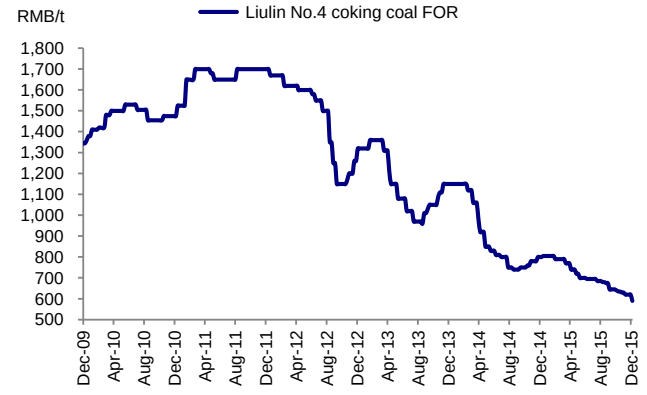


Source: Wood Mackenzie, Deutsche Bank

Metallurgical Coal: Finding the bottom in 2016?

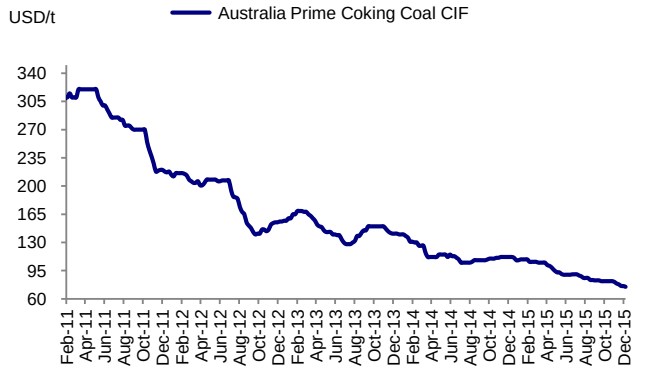
It is possibly because the Coking coal market is a small market, that it has been the "canary in the cage" for how many of the metals have played out in the past two years. Improved mining methods, ore body consolidation and improved logistics in China has made the domestic supply far more competitive versus seaborne imports. This has reduced the reliance on seaborne tonnes to supply the domestic shortfall. Weak domestic demand has exacerbated the domestic over-supply situation which in turn has resulted in "indirect" exports of the domestic overcapacity through steel and coke. On the seaborne supply side, the supply increase came early in the form of a recovery in Australian production post the Queensland floods, pushing out the high cost US suppliers. This "perfect storm" has played out in a sharp correction in seaborne prices, but subsequently weaker Chinese domestic prices have dragged down seaborne prices. Weaker producer currencies (the local currency exposure tends to be higher in Met Coal), lower fuel costs, a change in mode of operation from revenue maximization to margin protection and general mining deflation has meant that marginal producers have been able to tolerate lower prices. This has resulted in three rounds of producer cuts and three periods of price stabilization. Given the price erosion of the past year, the market needs another round of supply cuts. The key question is; will this be the last one? We think so, with three important caveat's: Firstly that Chinese steel demand is not substantially weaker than our expectations; secondly that the AUD and CAD do not "crack" substantially, and lastly that the Australian producers start to cut, and soon. We think they will.

Figure 170: China domestic coking coal price (Liulin No.4 FOR)



Source: Sxcoal, Deutsche Bank

Figure 171: Australian prime coking coal CIF China

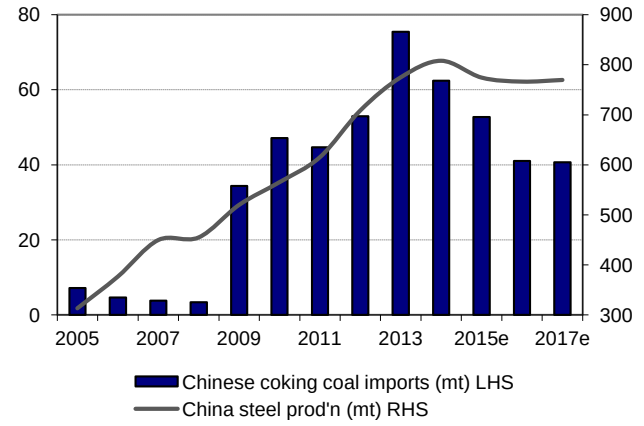


Source: Thomson Reuters Datastream, Deutsche Bank

Chinese domestic producers are also struggling with poor and negative cashflows. The recent bond repayment default by Hidili, a domestic Chinese producer in Sichuan highlights the plight of the domestic producers. As a result, we would expect limited domestic production growth in 2016E. However, domestic steel demand should result in Chinese exports fall once more. An increase in Indian imports and elsewhere should result in flat seaborne demand year on year. Currently we have flat supply expectations for 2016E, a small uptick in Australian supply and other regions such as Mozambique will offset another year declines from the US. However, this means that the Coking coal market needs a further 11Mt of curtailments, to achieve a balanced in 2016E, in our view, and whilst we still have to tally up

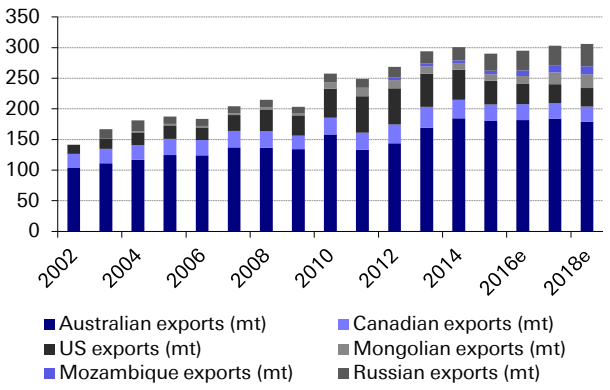
the final figures for 2015E, this is on the back of another surplus year of 4 – 5Mt. As a result, we expect prices to grind lower in Q1 and Q2, with contract settlement in the low 80's, before stabilizing in H2. Our forecast for 2016E is USD84/t for the average quarterly contract settlements.

Figure 172: Chinese coking coal imports versus steel output



Source: Deutsche Bank, Wood Mackenzie, McKloskey

Figure 173: Major and upcoming country coking coal exports



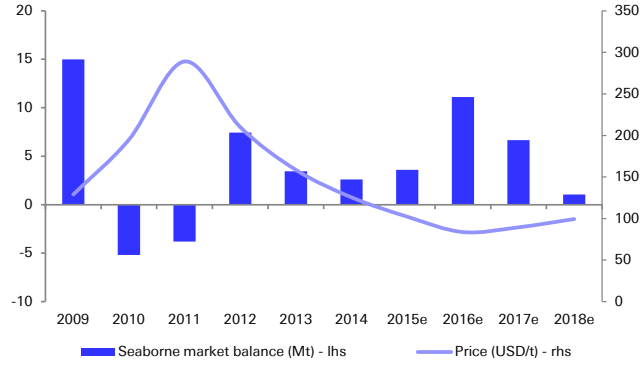
Source: Deutsche Bank, Wood Mackenzie, McKloskey

Channel checks suggest that the likely settlement for quarterly Q1 Hard Coking coal prices will be in the high 70's to low 80's. If the agreement goes the way of recent settlements, the contract price should end up sitting above current spot levels, and probably in the low US$80/t range. As usual the outcome will depend on the willingness of Japanese steel mills to pay a premium to the current spot price of USD75/t. Our Q1'16 forecast is USD83/t.

Spot prices have collapsed, but we expect the quarterly settlement to be above this level, as Japanese and Korean suppliers seek to secure supply.

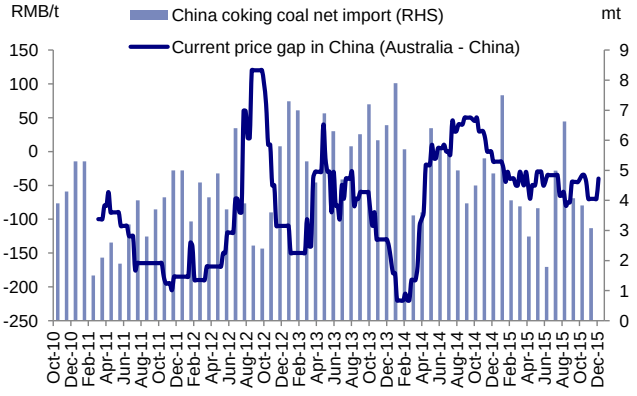
The decline in the domestic price continues to stay ahead of the seaborne price. The China benchmark coking coal (Liulin No.4) price declined to RMB590/t while the Australian coking coal price also decreased to USD75/t. The seaborne price remains marginally more attractive than the domestic price.

Figure 174: Metallurgical Coal supply – demand balance (seaborne market)



Source: McCloskey's, Wood Mackenzie, Deutsche Bank

Figure 175: Price parity vs. net import: Australia ex-tank vs. Shanxi Liulin No. 4



Source: Wind, Sxcoal, Deutsche Bank

The three "hot" topics for the metallurgical coal market for the next twelve to eighteen months remain the same as they were over the past 12 months:

- **China's trade dynamics**: Will imports continue to drift lower at the same time as coke and steel exports continue to increase? Given our view of flat to lower Chinese steel output, this is very likley.
- **The re-acceleration of supply cuts:** Supply cut announcements have stalled over the past three months. We think another tranche is required. Us producers will continue to exit the seaborne market, but this time round we will need to see some of the Australian producers exit the stage.
- **Falling unit cash costs:** We estimate that the trend of a falling and flattening industry cost curve will continue in 2016, with weaker producer currencies as a continuing source cost deflation. Following the historical 20% surge in the US dollar over the past year and a half (on a trade-weighted basis), we see the dollar upswing extending for at least another two years, though at a more modest pace. There are several unique circumstances with the current dollar upcycle, including that G10 central banks are not expected to follow the Fed's tightening impulse this time around. How 2016 shapes up will be heavily influenced by whether the main macro driver is the Fed or China. If it is the Fed, US dollar gains are likely to be slow and broad-based. Conversely, if the RMB again becomes a source of instability, US dollar gains should be heavily concentrated in commodity and EM currencies.

More cuts required

Coking coal closure announcements amounted to c.40Mt in 2015, with a further 1Mt likely to be lost from the receivership of Cockatoo Coal. Cockatoo Coal became the 2nd WICET shareholder to enter receivership, after Bandanna Energy in late 2014. Cockatoo coal was being forced to repay an AUD81m guarantee facility by 15th January 2016. The ANZ guarantee was associated with Cockatoo's take-or-pay arrangements at WICET, and could only be partially replaced by cash and alternative guarantees. Thus, financing associated with port take-or pay commitments claimed another victim in Queensland.

Figure 176: Coking Coal closures announced so far

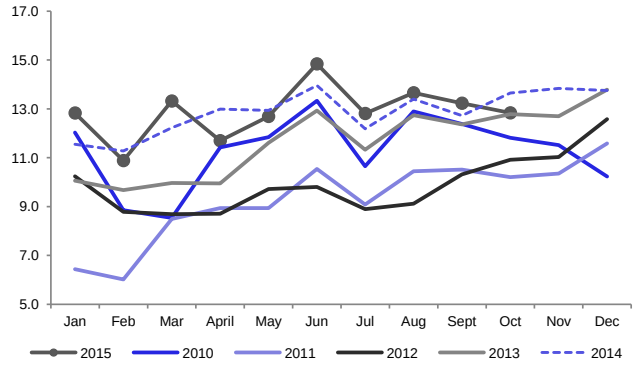
Company	Country	Mines	Region	Annualised volume impact 2014(Mt)	Annualised volume impact 2015(Mt)
Alpha Natural Resources	USA		CAPP	3.4	1.6
Anglo American	Australia	German Creek Aquila	Queensland	0.3	0
Anglo American	Canada	Peace River		0	2.5
Arcelor Mittal	USA	XMV, Concept, Extra	Appalachia	0	0.5
Arch Coal	USA	Cumberland River, Sentinel, Beckley & others	CAPP	1.3	0.2
Bayan Resources	Indonesia	Various (GBP/W'hana Ba'tama)		0	0.4
Borneo Lumbung Enerji	Indonesia	Asmin Koalindo Tuhup		1.1	0
China	China	15 companies		0	5
Cockatoo	Australia	Baralaba	Queensland	2.6	1
CONSOL	USA	Buchanan, Bailey/Enlow Fork	NAPP	1.5	0
Corsa Coal (PBS)	USA	Kimberly Run / Barbara	Appalachia	0	0.3
Glencore Xstrata	Australia	Ravensworth	New South Wales	0.6	0
Glencore Xstrata	Australia	Newlands surface	Queensland	1	0
Glencore Xstrata	Australia	All mines		0	1
Glencore Xstrata	Australia	All operations		0	0.5
Grand Cache	Canada	Surface and UG		0	1.1
Heilongjiang Longmei Group	China	Various		0	10
James River	USA	Various	CAPP	0.2	0
Jizhong Energy	China	Various		11.5	0
JSW	Poland	Budryuk (strikes)		0	0.5
KW	Poland	Various / restructuring		0	1
Mechel / Jim Justice	USA	Bluestone	CAPP	1.5	1.8
Patriot Coal	USA	Various	Appalachia	0.2	0
Patriot Coal	USA	Samples & Winchester	Appalachia	0	0.1
Peabody Energy Corp	Australia	Burton	Queensland	0.3	1.3
Peabody Energy Corp	Australia	North Goonyella	Queensland	0	1.4
Rhino Natural Resources	USA		Appalachia	0.2	0.5
Solid Energy	NZ	Stockton	NZ	0.5	0.4
Suncoke	USA	Various	Appalachia	0.3	0.6
Teck	Canada	All mines		0	1.5
Vale	Australia	Integra surface + u/g	NSW	0.5	2.1
Vale/Sumitomo	Australia	Isaac Plains	Queensland	0	1.7
Walter Energy	Canada	Willow Creek, Brule, Wolverine	British Colombia	1.9	1.6
Yancoal	Australia	Duralie/Stratford	Queensland	0.3	0.7
Total				**26.6**	**39.3**
Affecting seaborne market				**14.8**	**22.1**

Source: Wood Mackenzie, Deutsche Bank

October exports from Queensland did fall by around 1 Mt, almost entirely due to lower exports through Abbot Point. It is the first time since May that Queensland's monthly exports have been lower year-on-year. The modest reduction is probably attributable to normal variation, although China's Golden week in October had a dampening effect on imports.

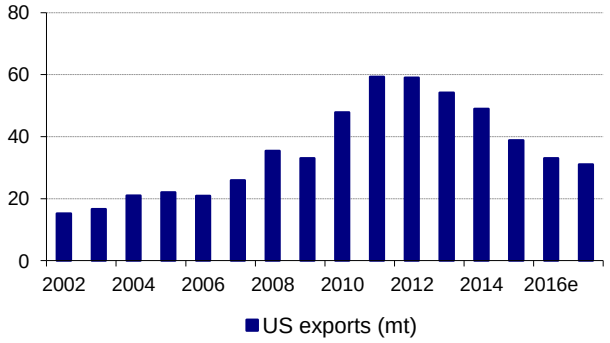
We forecast a further decline in US metallurgical coal exports, with a number under chapter 11 bankruptcy protection. Alpha Natural Resources currently under Chapter 11 proceedings reduced sales guidance for 2016 to 11.6Mt, down 3Mt from 2015E. Cliffs has stopped longwall development at two of its mines which could result in the loss of 0.7Mt.

Figure 177: Queensland Metallurgical coal exports (Mt)



Source: Wood Mackenzie, Deutsche Bank

Figure 178: US exports continue to fall in 2016E

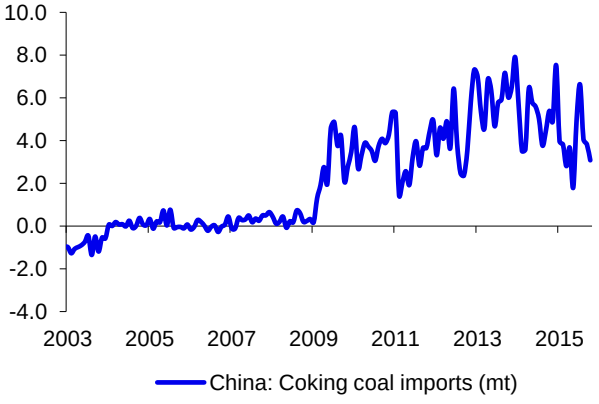


Source: Deutsche Bank, McKloskey, Wood Maceknzie

Imports continue to fall, and coke exports have started to increase once more

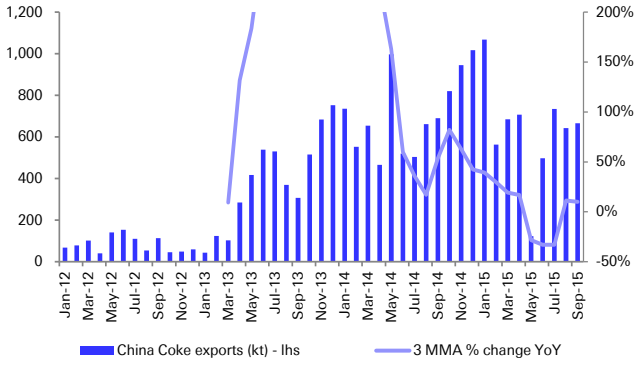
Chinese Coking coal exports continued to be weak in October, down 40% year on year. This brings the annualized total to 46Mt, down 21% year to date versus 2014. Coke exports have started to recover from the mid-year dip, but are still down 2% year to date.

Figure 179: Chinese Coking Coal imports (monthly)



Source: NBS, Deutsche Bank

Figure 180: Chinese Coke exports



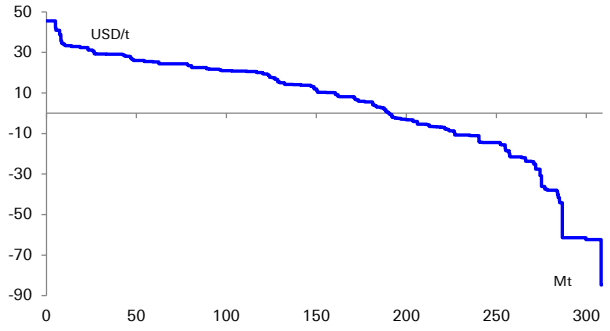
Source: NBS, Deutsche Bank

Nearly 40% of the industry has a negative margin…

We estimate that nearly 40% of the coking coal industry is loss-making. Looking back at last year's outlook, we came to a similar conclusion; that 40% of the industry was loss making. In the interim, the price has fallen 30%, which implies that cost must also fallen 30%. Part of the move can be explained by weaker producer currencies and the weaker oil price. If oil prices were to stay at current spot levels of c.USD36/bbl and currencies were to weaken a further 10%, we estimate the proportion of loss-making production would fall to 25%. As we have said before, cost curves are very dynamic, but there is no doubt that the industry remains under pressure.

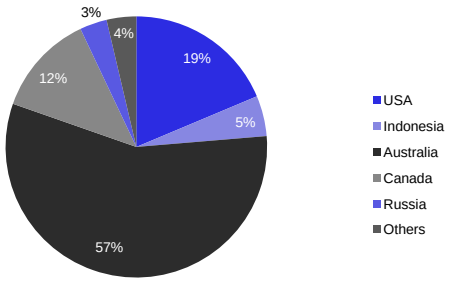
At over half, the largest portion of the loss making production can now be found in Australia, although the c.60Mt of loss making Australian production only accounts for 35% of total Australian output. We would expect closures in Australia to accelerate , and once this does, the coking coal market will be on its way to being balanced.

Figure 181: Coking coal margin curve Q4'15



Source: Wood Mackenzie, Deutsche Bank

Figure 182: Proportion of loss making capacity by region



Source: Wood Mackenzie, Deutsche Bank

Figure 183: Deutsche Bank Metallurgical Coal supply – demand balance

		2009	2010	2011	2012	2013	2014e	2015e	2016e	2017e
Australian exports	Mt	134	158	134	144	169	184	188	190	193
growth	%	*-2%*	*18%*	*-16%*	*8%*	*17%*	*9%*	*2%*	*1%*	*2%*
Canadian exports	Mt	22	27	28	31	36	33	30	30	30
growth	%	*-18%*	*23%*	*2%*	*11%*	*16%*	*-7%*	*-9%*	*0%*	*0%*
US exports	Mt	33	48	59	59	54	45	35	35	35
growth	%	*-7%*	*45%*	*24%*	*0%*	*-8%*	*-17%*	*-22%*	*0%*	*0%*
China exports	Mt	4	5	8	7	6	8	9	10	10
growth	%	*-59%*	*39%*	*45%*	*-17%*	*-8%*	*33%*	*13%*	*11%*	*0%*
Other supply	Mt	43	29	33	61	59	46	58	74	87
Disruption allow ance			0	0	0	0	0	0	0	0
Global traded coking coal supply	**Mt**	**236**	**268**	**261**	**301**	**324**	**316**	**320**	**339**	**355**
growth	%	*1%*	*13%*	*-2%*	*15%*	*7%*	*-2%*	*1%*	*6%*	*5%*
Japanese imports	Mt	66	77	69	61	62	63	63	63	63
growth	%	*9%*	*17%*	*-11%*	*-12%*	*3%*	*1%*	*1%*	*0%*	*0%*
Korea & Taiw an imports	Mt	25	34	38	40	40	41	42	43	44
growth	%	*-23%*	*36%*	*13%*	*5%*	*0%*	*2%*	*4%*	*3%*	*1%*
European imports	Mt	46	52	53	53	54	54	54	53	53
growth	%	*-30%*	*14%*	*2%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*-1%*
China imports	Mt	34	47	45	62	80	63	56	80	88
growth	%	*912%*	*37%*	*-5%*	*38%*	*29%*	*-21%*	*-10%*	*41%*	*10%*
India imports	Mt	31	34	34	36	37	40	43	47	50
growth	%	*17%*	*11%*	*-1%*	*7%*	*0%*	*8%*	*9%*	*9%*	*8%*
Brazil imports	Mt	11	14	13	17	16	19	20	20	21
growth	%	*-32%*	*20%*	*-4%*	*31%*	*-5%*	*17%*	*5%*	*2%*	*3%*
Other imports / inventory adjustment	Mt	12	20	24	24	25	25	26	27	29
Global traded coking coal demand	**Mt**	**221**	**274**	**271**	**297**	**318**	**311**	**309**	**339**	**354**
growth	%	*-4%*	*24%*	*-1%*	*9%*	*7%*	*-2%*	*-1%*	*10%*	*4%*
Notional market balance	**Mt**	**15**	**-6**	**-10**	**5**	**6**	**5**	**11**	**1**	**1**
Contract Hard Coking Coal	**USD/t**	**129**	**195**	**289**	**210**	**159**	**126**	**111**	**116**	**131**

Source: McCloskey's, AME, Wood Mackenzie, CEIC, Deutsche Bank Research

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Energy

Crude Oil: Incomplete Adjustment

- The process of supply-demand rebalancing is only partially complete, with much of the work left to be done in the next twelve months. In addition to fundamental oversupply, threats facing the oil market in the first half of 2016 may include a repeat of anxiety around overflowing storage capacity as well as a possible continuation of warm US weather. We assess the potential impact of both of these factors.
- OPEC's dovish December decision largely met the market's bearish expectations and emphasizes that it will adhere to its current strategy of squeezing out higher cost producers by maximizing its own output. In fact, the lack of an explicit output target in OPEC's final press release is arguably more dovish than raising the target to 31.5 mmb/d excluding Indonesia as it acknowledges that members are under no production restraint whatsoever until the June 2016 meeting.
- The implication of the OPEC decision is that the pace of fundamental market adjustment may be lengthened given that higher production from Iran and possibly Libya clearly will not be accommodated. While we do not assume any offsets from unplanned outages, the extent of Iranian increases without foreign investment may disappoint consensus expectation of 800 kb/d cumulative gains over a period of one year following Implementation Day.
- **We lower our forecast deck by USD 3/bbl in 2016 and 2017** to reflect a market which continues to disincentivise investment in the US tight oil sector, which we expect will be helped by rising US interest rates and tightening credit conditions in 2016.
- Our model of a balanced market in 2017 stands since we already assume OPEC production excluding Indonesia at 32.4 mmb/d by 2017, versus actual production of 31.8 mmb/d as of October. We also note the relatively high level of unplanned outages means that there are risks of returning capacity in other countries besides Iran such as Syria and Yemen.
- Market balances in 2016 still appear weak although not necessarily more so than before the OPEC decision. Perhaps the biggest risk is that we observe Saudi production rising further in the near term, although we see this as unlikely given that this would mean running down spare capacity and worsening rifts among OPEC member states.
- Demand indicators remain strong in key markets of the US, EU, China, India and Japan. US vehicle miles travelled is growing at the strongest rate since 2004 while Chinese vehicle sales have rebounded from the mid-year slump. Although we expect a waning influence of demand elasticity, the global growth profile picks up modestly in 2016 so underlying economic activity is on a gently accelerating path.

OPEC holds the line

In contradiction of a market-reported leak partway through the closed session of OPEC member deliberations on 4 December, the final press release after the meeting unusually held no statement of an aggregate quota. Neither did the statement contain any mention of the current level of production or the organisation's intent to maintain or tighten compliance with respect to any aggregate quota.

The following section on Energy - Crude Oil, Natural Gas, and Thermal Coal – has been contributed by our commodities analyst:
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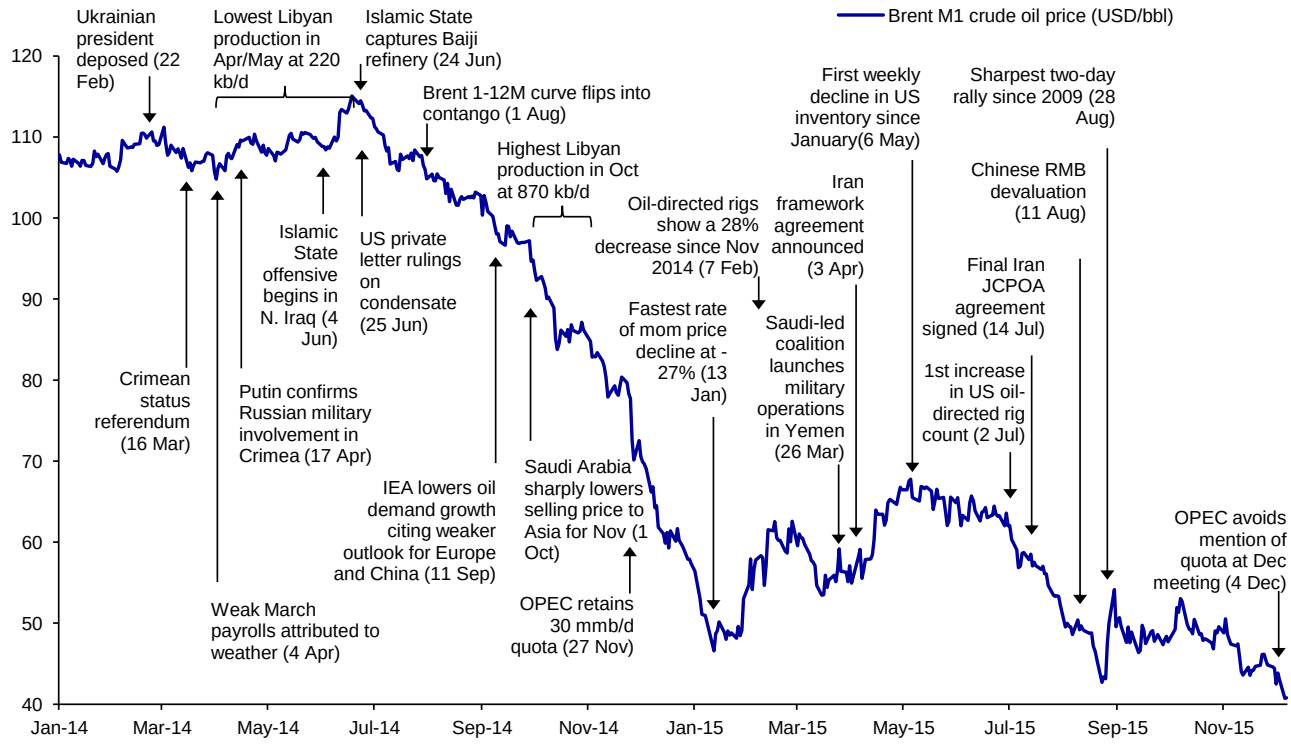
Figure 184: DB Oil price deck

	WTI (USD/bbl)	Brent (USD/bbl)
2015	49.19	54.19
Q1 2016F	45.00	49.00
Q2 2016F	50.00	55.00
Q3 2016F	50.00	55.00
Q4 2016F	50.00	55.00
2016F	48.75	53.50
2017F	55.00	60.00
2018F	65.00	70.00

Figures are period averages
Source: Deutsche Bank

Figure 185: Oil market chronology (USD/bbl)



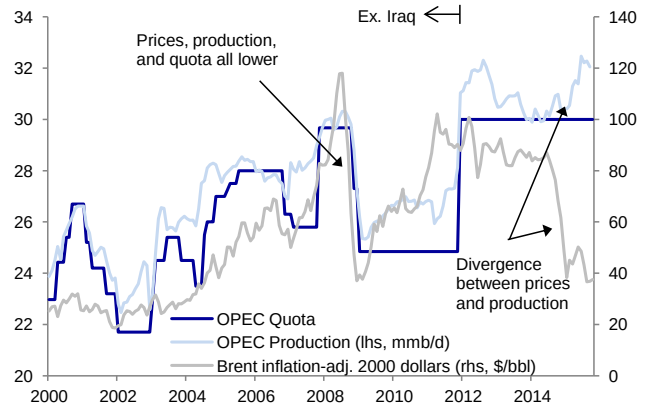
Source: Bloomberg Finance LP, Deutsche Bank

However, the earlier leak during the closed session stating an aggregate quota of 31.5 mmb/d excluding Indonesia may reveal something of OPEC's collective mindset. If a 31.5 mmb/d quota had been agreed, then this would be roughly equivalent to current production which stands at 31.8 mmb/d excluding Indonesia. In one sense, such a quota would have signaled approximately the same decision as no quota, in that it legitimizes surpluses currently being produced by Iran and Saudi Arabia. Arguably, the absence of a quota is more dovish in that it implies no restraint whatsoever at least until the quota is reassessed in June 2016, and opens the door to output maximization by all members.

The key risk now is that Saudi Arabia, which holds the preponderance of spare capacity, chooses to run down its spare capacity and maximize output. We believe this is unlikely because as prices are extending toward the lower end of any notional target price range, it makes sense to maintain spare capacity which now stands at 2.0 mmb/d in Saudi Arabia. Saudi has historically allowed spare capacity to run down to zero, but only when prices are reaching or extending above the target price range, as occurred in 2004. In the event that Saudi Arabia ran down spare capacity to zero and were too successful in constricting non-OPEC supply growth, any unforeseen upside to demand could leave the oil market vulnerable to wide price swings, against which OPEC would then have little capacity to act. Part of OPEC's mission is to ensure a steady income to producers, (i.e., a stable long-term demand outlook) which would be endangered in a case of runaway prices. Granted this scenario seems remote at the moment but a cartel with a long-term view of the market would have to recognize this possibility.

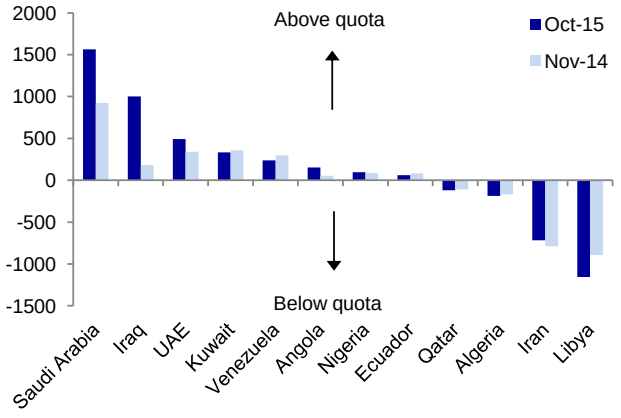
A second and perhaps less credible reason not to expect Saudi maximization is that its relationship with member states such as Iran and Venezuela arguing for OPEC supply restraint are already strained, such that further output increases could conceivably result in the outright breakup of an organization which already risks disintegration.

Figure 186: OPEC pressuring prices lower



Source: Bloomberg Finance LP, OPEC, Deutsche Bank

Figure 187: OPEC member deviation from inferred quotas



Source: Bloomberg Finance LP, OPEC, Deutsche Bank

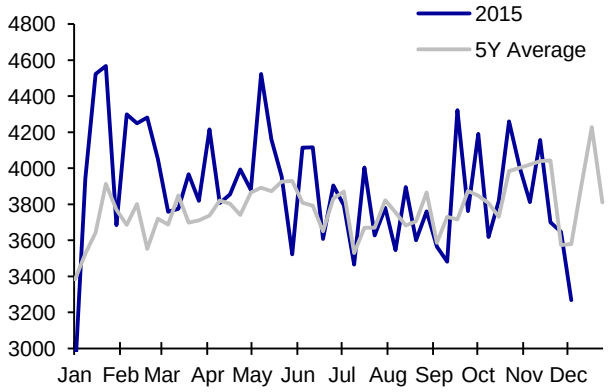
Although quotas of any flavor, aggregate or individual, are defunct at least until the next meeting in June, member countries may still be measured against the yardstick of inferred quotas from the December 2008 meeting. Key member countries above quota are Iraq and Saudi Arabia, while Libya and Iran are the largest negative offsets,Figure 186. In our 2016 modeling we incorporate an assumption of 31.6 mmb/d in H1 followed by a gradual rise to 32.4 mmb/d in 2017. This reflects a combination of rising Iranian production following Implementation Day sometime between April and October and the possibility of some limited return of Libyan production as government negotiations with protestors carry on since a special committee was formed in November.

Dangers of a mild winter in the US

A mild winter in the US thus far has dampened distillate demand by -112 kb/d versus the five-year average since the start of November. The deviation from average has been as large as -310 to -340 kb/d in some weeks, Figure 188. In terms of heating degree days (HDDs) we are running 112 HDDs short of the ten-year normal as of early December. However, the historical relationship between November to April heating degree days and either total products demand, distillate demand, or the detrended versions of both these time series, is somewhat unconvincing, with a low coefficient of determination (8%), Figure 189.

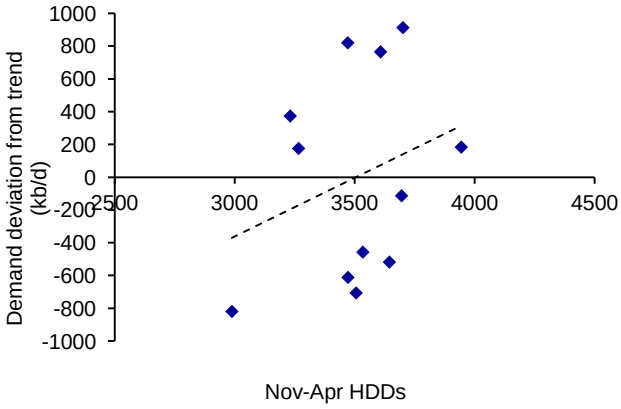
Keeping in mind that there are other factors at play, mild weather of the sort we have experienced so far, sustained over the entire winter, could result in continued lost demand of as much as -400 kb/d. However because of the weak explanatory power of weather on its own the degree of uncertainty is high. At the top end of this sensitivity, it suggests that continued mild weather could largely negate the effect of demand elasticity to price seen in 2015. The conclusion we reach is that weather can indeed have a substantial negative impact on oil-market balances if the strongest expectations of the El Niño winter become a reality.

Figure 188: 2015 distillate demand (kb/d)



Source: US EIA, Deutsche Bank

Figure 189: Effect of HDDs on detrended total products demand since 2004



Source: US EIA, Bloomberg Finance LP, Deutsche Bank

Global demand growth otherwise remains healthy

We expect global demand growth of 1.2 mmb/d in 2016 to reflect a continuation of generally strong underlying drivers in the top five demand regions of the US (19.9 mmb/d total liquids), EU (13.7 mmb/d), China (11.5 mmb/d), India (4.2 mmb/d) and Japan (4.2 mmb/d). Together these five regions account for an estimated 53.4 mmb/d of demand in 2016, or 56% of the world total, Figure 191.

In the US, apart from the aforementioned negative effect of mild weather so far on distillate demand, we see an ongoing recovery in vehicle miles travelled since the lull which began with the global financial crisis,Figure 190. Up until the weak October, miles travelled had been growing at a 2.9% rate year over year, the fastest rate of growth since 2000 (when it was 3.0%). Also, in September and October, US auto sales rebounded from a negative August to year on year growth of 14-16%, making for slightly better Jan-Oct growth than last year (6.4% versus 5.3%). Finally, US construction spending is in its strongest year of growth (10.2% yoy) in the ten months to October since 2005 (11.0% yoy). We expect these factors to support a still-strong +150 kb/d yoy growth in 2016, although this is lower than the +360 kb/d growth estimated for this year as the incremental impact of demand elasticity fades on a more positive price outlook towards the second half of 2016.

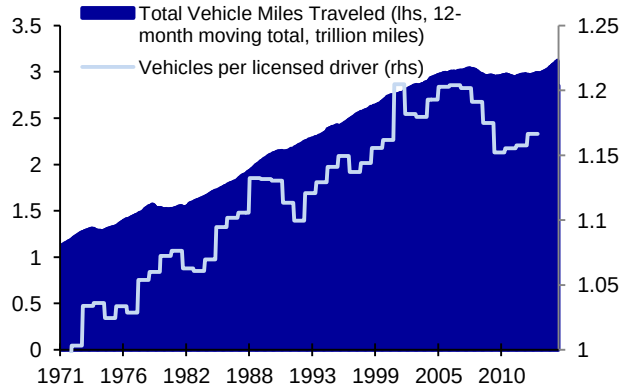
In Europe, vehicle sales have had a strong year at 3.0% growth yoy, versus 1.4% previously in 2014, which followed two consecutive years of decline. Chemical industry production is also strong, but construction confidence at -18.4 remains weak although this does represent a recovery from post-2008 lows. Our assumption of unchanged demand next year represents a positive comparison to ten-year trend rate of -200 kb/d yoy decline, but a step back from the price-induced demand growth of +300 kb/d yoy in 2015.

In China, we see perhaps the biggest upside risk to our demand assumption as vehicle sales rebounded strongly in the last two months from a Jan-Aug decline of -0.3% yoy to a +6.9% yoy growth rate. Chemical industry output is also strong but construction activity remains in the doldrums since the end of 2014, with floor space newly started down -13.7% in the first ten months of 2015. The three-month moving average of implied consumption growth is running at +420 kb/d yoy, just above our 2016 assumption of +330 kb/d yoy.

For India, vehicle sales growth of +4.5% yoy in the first ten months of 2015 is still weaker than +7.6% yoy over the same period in 2014, although sales made a strong showing in October at a +13.9% yoy rate. Our assumption of +180 kb/d still represents a strong figure relative to the ten-year trend of +138 kb/d but weaker than 2015 growth of +249 kb/d.

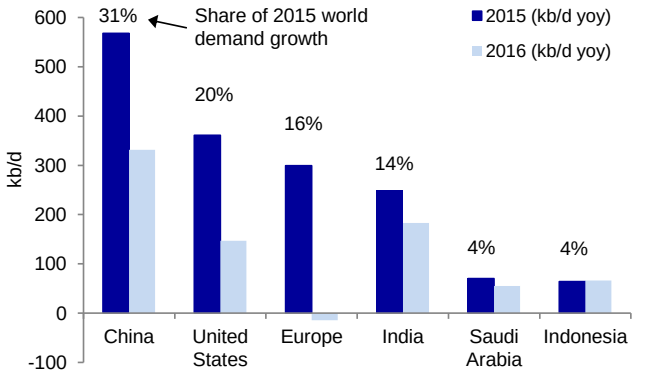
Japanese demand looks set to decline again in 2016 (-86 kb/d) although by less than in 2015 (-106 kb/d) as GDP growth strengthens from 0.7% to 1.5%. We see the three-month moving average of vehicle registrations down 6% yoy as of November restraining demand.

Figure 190: US vehicle miles traveled



Source: FHWA, DOT, Deutsche Bank

Figure 191: 2015 and 2016 demand growth assumptions



Source: IEA, Deutsche Bank

Doomsday scenarios for exceeding storage capacity appear unlikely

The most pessimistic scenario for a catastrophic price decline center around the possibility that crude oil or distillate stocks could exceed storage capacity (mainly in the US) and that the lack of a bid in the prompt market at any price would then result in prices falling dramatically even from the current level.

For crude oil however, the EIA's assessment of storage capacity does not support this interpretation. Using the most restrictive measure of crude oil storage capacity utilization (working storage instead of net available shell storage capacity), crude oil storage is only 65% full, while by using the less restrictive measure we would find that crude oil storage is only 54% full as of 4 December. Even if we were to assume that fully half of the global surplus in H1-16 enters US crude oil storage, this would only raise capacity utilization from 65% to 79% at the end of the first half of the year.

For distillate the question is more difficult to answer as the EIA does not report distillate storage capacity at refineries and elsewhere. The question is made somewhat easier, however, by the fact that the US refiners face no restrictions in selling distillate overseas, so that seaborne exports could provide a release valve.

A more significant worry is the need to maintain cash flow

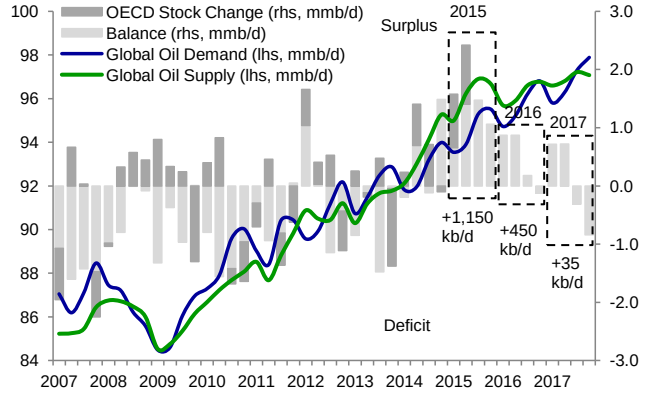
What makes us more uneasy is the fact that shut-ins of existing production are an unlikely prospect at almost any price, for a number of reasons. First and very generally speaking, producers of any commodity are reluctant to shut-in production only to yield market share and a revenue benefit to competitors. Also in a general sense, producers will be unwilling to absorb shutdown and eventual startup costs as long as the expected duration of extremely low prices below cash costs can be measured in months rather than years.

More specifically for certain regions of oil production, there may be risks of additional consequences. In the case of aging North Sea oil fields, the cost of restarting combined with low levels of output may mean that old fields would have to be decommissioned rather than temporarily shut in. The sharing of pipeline infrastructure could also mean that operating costs for remaining fields could rise, pushing other fields into a cash-negative condition. For underground oil sand projects (using CSS and SAGD recovery) the process of shutting in and restarting is known to take time and incur high costs, and sometimes result in reservoir damage, impairing the future recoverable resource.

Other reasons not to shut in could include the drill-to-hold land leases, the usage of committed transportation capacity which would otherwise be a sunk cost, and the benefit of forward hedges.

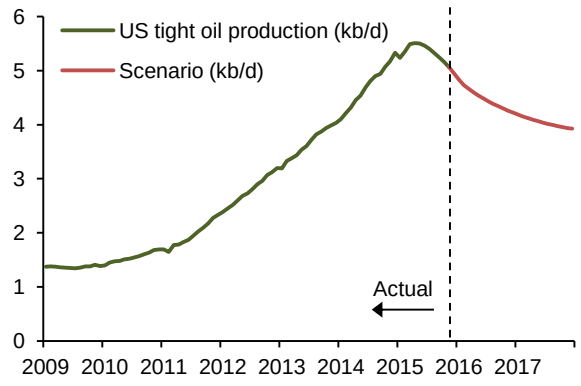
Finally we would note that companies have expressed an interest in drawing down the inventory of drilled-uncompleted wells (DUCs) in order to aid cash flow, as the drilling cost constitutes a reported 30% of the overall cost to produce. Any significant drawdown of DUC inventory could threaten the trajectory of US production decline which we expect, based on Drilling Productivity Report modeling. As of August, the North Dakota Industrial Commission, Department of Mineral Resources commented that the rig count at the time plus the DUC inventory could maintain 1.2 mmb/d of production from the Williston Basin for 24 months.

Figure 192: Quarterly oil market supply and demand: 2017 may be the first 'normal' year



Source: IEA, Deutsche Bank

Figure 193: US tight oil decline has further to go

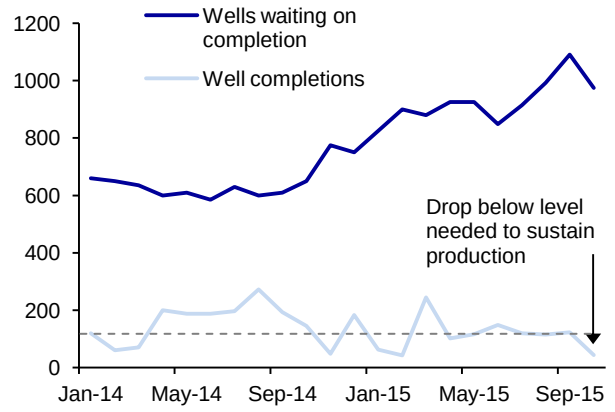


Source: US EIA, Deutsche Bank

Reasons to be bullish

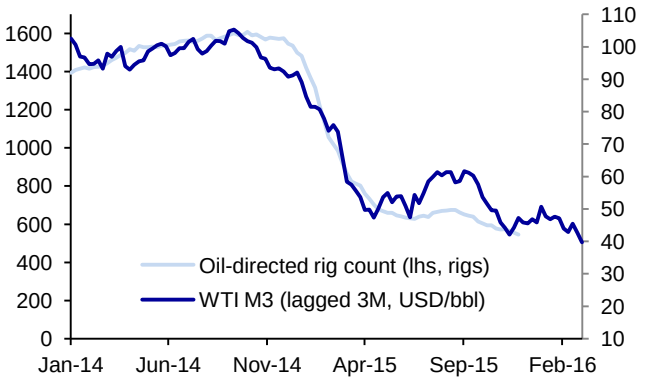
Although we believe that the first half of the new year will remain an anxious period given oversupply that we model at +870 kb/d, the annual oversupply looks much more manageable at +450 kbd when compared with 2015 at +1,150 kb/d, Figure 192. As the market begins to look forward to the following year when supply and demand could be nearly even, we would expect that the need to reincentivise investment in the US tight oil sector will become apparent. Much as the market may have historically looked to an elevated Call on OPEC as a bullish driver, a Call on the US may now be more relevant.

Figure 194: North Dakota well completions and DUCs



Source: NDIC, Deutsche Bank

Figure 195: Rig counts may keep falling until March

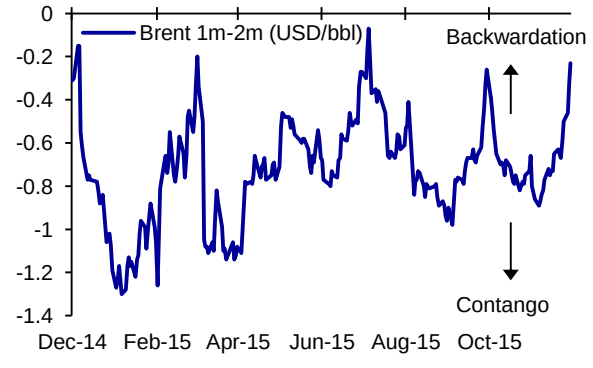


Source: Bloomberg Finance LP, Deutsche Bank

If US production growth is only flat in 2017 following our modeled decline of -650 kb/d in 2016, Figure 193, the Call on the US will become quite significant by 2018, implying a requirement of 700 kb/d of US production growth in that year. Our assumptions underlying the modeled US production profile include a flat rig count and productivity growth in line with recent shallower gains in the major basins of the Permian, Eagle Ford and Bakken. The fact that rig counts are likely to decline further rather than stay flat, offsets the possibility that the inventory of drilled-uncompleted wells may be drawn upon in 2016. In a low-price environment this should raise revenue relative to capex for a period.

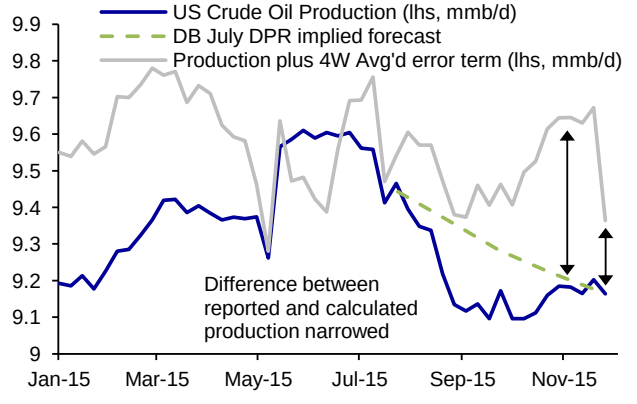
Shorter term indications from North Dakota currently support expectations that production may fall further. In the middle of 2015, The NDIC commented that to maintain production near 1.2 mmb/d, 110-120 completions per month are necessary. As of October 2015, the number of completions fell to only 43, suggesting that DUCs could stay stable or rise in the short term, and that production may likely fall, Figure 194. The profile of prices and drilling activity suggests further falls in drilling activity at least through March 2016 owing to a lag between prices and activity. This also supports the supposition that the US production decline will continue, Figure 195.

Figure 196: Front end Brent structure turns flatter



Source: Bloomberg Finance LP, Deutsche Bank

Figure 197: US inventory error term flips to negative



Source: US EIA, Deutsche Bank

Short term indicators – two for the bulls, two for the bears

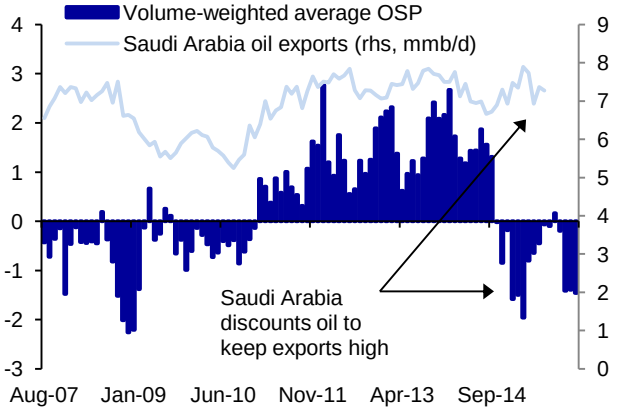
Two more volatile indicators of market conditions also suggest that the balance may not be quite as weak as prices suggest. We highlight the fact that the Brent spread from Month 1 to Month 2 has flattened as of last week, suggesting less-weak physical conditions, despite the low level of prices. However, this has happened at various points in the year with little result, so we would wait for outright backwardation (M1 above M2) before attributing more significance, Figure 196.

Secondly, the error term in US crude oil inventory builds has reversed from a positive (implying understated production and/or overstated exports) to a negative. After many weeks of consistently positive figures, this casts doubt on the probability that production has been higher than reported. Again, however, one week of reversal may be too little to be meaningful, especially if the figure returns to a positive next week, Figure 197.

The third indicator shown here argues the opposite, that physical market weakness remains and has actually intensified. The Saudi official selling price is defined as a positive or negative differential to regional benchmark prices. In the middle of 2015, the OSP moved to a near-neutral zero level against the all-important Asian OSP, priced against the average of Oman and Dubai benchmarks, Figure 198. This coincided with a period between April and August when the Brent curve structure traded at a shallower contango, Figure 15, and with a period of relative strength in China's apparent oil consumption. However, since that time, the Asian OSP has deteriorated once again, and for the three delivery months to January 2016, it is as negative as it was in the first quarter of 2015.

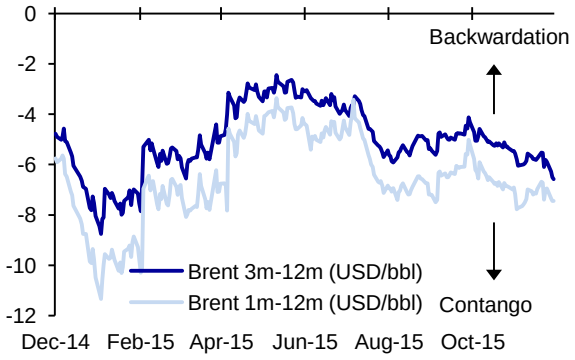
Lastly the Brent curve structure itself (Figure 199) is now as weak as it was in February and March at –USD 7.45/bbl on the first to twelfth months, while WTI contango is even weaker at –USD 8.86/bbl, Figure 200.

Figure 198: Saudi official selling price (OSP) weakens again (USD/bbl)



Source: Bloomberg Finance LP, Deutsche Bank

Figure 199: Brent contango shows weakness again



Source: Bloomberg Finance LP, Deutsche Bank

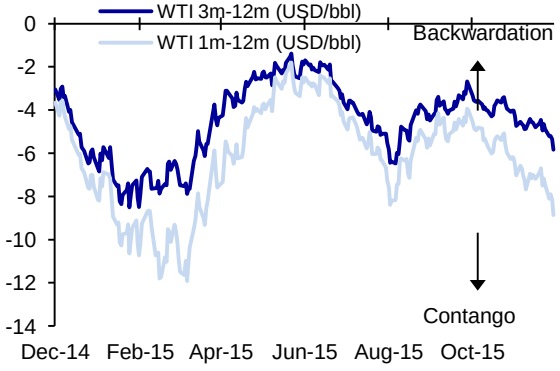
Floating storage trade signals something different this time

We monitor the level of the Brent contango in comparison to the cost of operating floating storage, and find that the current level of prices suggests that we have not yet formed a new local minimum in oil prices. The current period of weakness differs importantly from previous periods of price weakness this year, Figure 201. In mid-January and late August when Brent prices reached local minima, the Brent contango (measured here between second and third months) exceeded the all-in cost of storing oil on tankers in

the Arabian Gulf. However, owing to higher tanker rates, that is far from being the case now, with the discrepancy between Brent spreads and tanker costs (including financing, transit and transfer losses, and bunkers) being exceptionally wide.

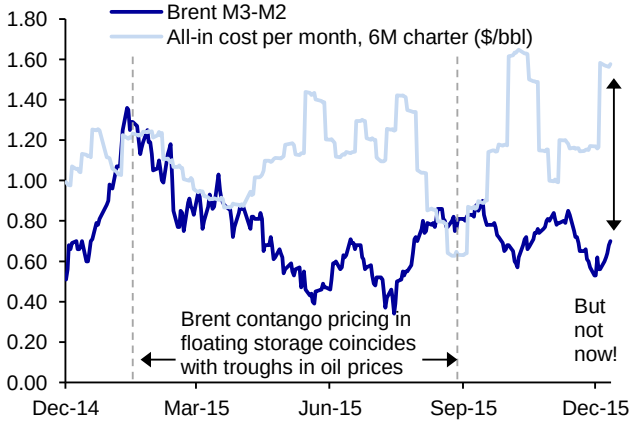
The proper interpretation may be that the incentivisation of floating storage has not yet occurred, and that to trigger this absorption of supply, the market must push front month Brent prices lower to price in floating storage. Based solely on the second to third month spread, this suggests Brent could fall by at least USD 0.80/bbl and likely more as the rest of the curve moves lower at the same time.

Figure 200: WTI contango is weaker than Brent



Source: Bloomberg Finance LP, Deutsche Bank

Figure 201: Brent doesn't price in Arabian Gulf floating storage



Source: Bloomberg Finance LP, Deutsche Bank

Picking a floor in prices remains hazardous

Given the fact of continued oversupply in the first half of the year and in the absence of any sharp contraction in supply either from OPEC or from geopolitical risk events, picking a bottom is likely to remain hazardous. We may well be premature in timing the transition from supply discentivisation to structural improvement. Further, we also recognize that prices dramatically higher would stall the supply response. However, the annual profile of improving medium-term balances in the current price environment means that a strengthening in market pricing will become increasingly likely over the next twelve months as the focus shifts to a 2017 market which we model as balanced.

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Figure 202: Global oil supply & demand

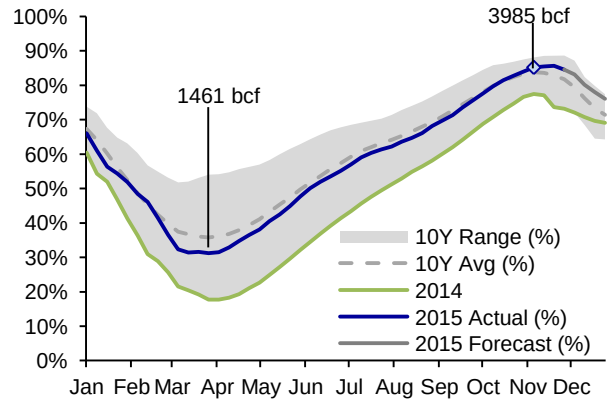
Unit: Million bbl/day	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015E	2016E	2017E	2018E	2019E	2020E	ANNUAL AVERAGE RATE '00-05	'05-10	'10-15
CONSUMPTION																		
OECD Americas	25.7	25.9	24.6	23.7	24.2	24.1	23.6	24.1	24.1	24.4	24.5	24.5	24.4	24.4	24.3	1.2%	-1.3%	0.2%
USA	20.7	20.7	19.5	18.8	19.2	18.9	18.5	19.0	19.1	19.5	19.6	19.6	19.5	19.4	19.4	1.1%	-1.6%	0.3%
OECD Europe	15.7	15.6	15.4	14.7	14.7	14.2	13.8	13.6	13.4	13.7	13.7	13.6	13.5	13.5	13.4	0.6%	-1.4%	-1.4%
Germany	2.6	2.4	2.5	2.4	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	-1.1%	-1.2%	-0.7%
OECD Asia-Pacific	8.7	8.6	8.3	7.9	8.1	8.2	8.5	8.4	8.2	8.1	8.1	8.1	8.1	8.0	8.0	-0.1%	-1.7%	0.1%
Japan	5.2	5.0	4.8	4.4	4.4	4.4	4.7	4.6	4.4	4.2	4.2	4.1	4.1	4.0	4.0	-0.7%	-3.5%	-0.8%
TOTAL OECD	50.2	50.2	48.4	46.3	47.0	46.4	45.9	46.0	45.7	46.2	46.3	46.2	46.0	45.9	45.7	0.8%	-1.4%	-0.3%
FSU	4.1	4.1	4.2	4.0	4.3	4.6	4.6	4.7	4.9	4.9	5.0	5.1	5.2	5.3	5.4	0.6%	1.9%	2.7%
Europe	0.7	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	4.5%	-1.4%	0.0%
China	7.2	7.6	7.8	7.9	9.1	9.5	9.9	10.3	10.6	11.2	11.5	11.9	12.3	12.6	13.0	7.8%	6.1%	4.3%
Other Asia	9.2	9.8	9.7	10.1	10.7	11.0	11.4	11.8	12.0	12.5	12.8	13.0	13.3	13.6	13.8	2.9%	3.6%	3.2%
Latin America	5.2	5.3	5.7	5.7	6.1	6.3	6.5	6.7	6.8	6.8	6.9	7.1	7.2	7.3	7.4	1.3%	3.9%	2.3%
Middle East	6.1	6.4	6.8	7.2	7.3	7.5	7.9	7.9	8.1	8.1	8.3	8.6	8.8	9.0	9.3	4.6%	4.0%	2.3%
Africa	2.9	3.1	3.3	3.4	3.6	3.6	3.8	3.9	4.0	4.0	4.2	4.3	4.5	4.7	4.8	3.5%	4.1%	2.4%
TOTAL NON-OECD	35.4	37.1	38.2	39.2	41.7	43.1	44.8	45.9	47.0	48.3	49.4	50.7	51.9	53.2	54.4	3.6%	4.0%	3.0%
GLOBAL OIL DEMAND	**85.6**	**87.2**	**86.6**	**85.5**	**88.7**	**89.6**	**90.7**	**91.9**	**92.7**	**94.6**	**95.7**	**96.8**	**97.9**	**99.0**	**100.2**	1.9%	0.9%	1.3%
SUPPLY																		
OECD Americas	13.9	13.8	13.3	13.6	14.1	14.5	15.8	17.2	19.0	19.8	19.4	19.5	20.4	21.2	22.1	-0.4%	0.2%	7.0%
USA	7.0	7.0	6.9	7.4	7.8	8.1	9.1	10.3	12.0	12.8	12.2	12.1	12.7	13.3	13.9	-2.4%	1.8%	10.5%
Mexico	3.7	3.5	3.2	3.0	3.0	2.9	2.9	2.9	2.8	2.6	2.6	2.7	2.7	2.8	2.8	1.8%	-4.7%	-2.6%
Canada	3.2	3.3	3.2	3.2	3.3	3.5	3.7	4.0	4.3	4.4	4.6	4.7	4.9	5.1	5.3	2.2%	1.8%	5.6%
OECD Europe	5.3	5.0	4.7	4.5	4.2	3.8	3.5	3.3	3.3	3.4	3.3	3.1	2.8	2.6	2.4	-3.5%	-6.0%	-3.8%
North Sea	4.8	4.6	4.3	4.1	3.8	3.4	3.1	2.9	2.9	3.0	2.8	2.6	2.4	2.2	2.0	-3.9%	-6.4%	-4.2%
Other OECD	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3	-7.6%	1.7%	-6.3%
TOTAL OECD	19.8	19.4	18.7	18.8	18.9	18.9	19.8	21.0	22.9	23.6	23.1	23.0	23.6	24.2	24.9	-1.6%	-1.3%	4.6%
FSU	12.3	12.8	12.8	13.1	13.5	13.6	13.6	13.8	13.9	14.0	14.0	13.9	13.8	13.8	13.7	8.2%	3.1%	0.3%
Non-OECD Europe	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-3.3%	-2.4%	-0.3%
China	3.7	3.7	3.8	3.8	4.1	4.1	4.2	4.2	4.2	4.3	4.3	4.3	4.3	4.4	4.4	2.2%	2.3%	1.2%
Other Asia	3.8	3.6	3.6	3.6	3.7	3.7	3.7	3.5	3.5	3.6	3.6	3.5	3.4	3.3	3.2	0.1%	-0.7%	-0.3%
Latin America	3.6	3.6	3.7	3.9	4.1	4.2	4.2	4.2	4.4	4.6	4.6	4.8	5.0	5.2	5.4	2.1%	3.2%	2.2%
Middle East	1.7	1.7	1.7	1.7	1.8	1.7	1.5	1.4	1.3	1.2	1.2	1.1	1.1	1.0	1.0	-3.3%	-1.0%	-6.9%
Africa	2.5	2.6	2.6	2.5	2.5	2.7	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.4	4.2%	0.5%	-1.8%
TOTAL NON-OECD SUPPLY	27.8	28.2	28.4	28.8	29.9	30.0	29.5	29.5	29.8	30.1	30.0	30.0	30.0	30.1	30.1	3.8%	2.0%	0.1%
PROCESSING GAINS	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.4	1.3%	1.2%	1.5%
GLOBAL BIOFUELS	0.8	1.0	1.4	1.6	1.8	1.9	1.9	2.0	2.2	2.3	2.4	2.5	2.6	2.7	2.8	17.3%	23.9%	4.8%
TOTAL NON-OPEC SUPPLY	**50.4**	**50.7**	**50.5**	**51.2**	**52.6**	**52.9**	**53.3**	**54.6**	**57.0**	**58.3**	**57.8**	**57.8**	**58.6**	**59.4**	**60.2**	1.4%	1.1%	2.0%
***TOTAL SUPPLY**	85.5	85.7	86.6	85.4	87.3	88.7	90.8	91.3								1.9%	0.6%	
OECD STOCK CHANGE	0.25	-0.24	0.32	0.01	0.07	-0.28	0.21	-0.17										
Industry	0.22	-0.31	0.32	-0.09	0.08	-0.20	0.18	-0.20										
Government	0.03	0.07	0.01	0.11	-0.01	-0.08	0.03	0.03										
OPEC NGLS	4.2	4.3	4.5	5.1	5.5	5.9	6.2	6.2	6.4	6.5	6.6	6.7	6.7	6.7	6.8	7.1%	5.5%	3.6%
**Other & Balance	-0.36	-1.32	-0.31	-0.18	-1.50	-0.65	-0.11	-0.47	0.56	1.15	0.46	0.06	-0.18	-0.47	-0.74			
OPEC CRUDE OIL	30.9	30.7	31.6	29.1	29.2	29.9	31.3	30.5								2.0%	-1.0%	
***IEA's Call on OPEC Crude	31.0	32.2	31.6	29.3	30.6	30.8	31.2	31.1	29.3									
***DB's Call on OPEC Crude									29.3	**29.7**	**31.3**	**32.4**	**32.6**	**32.9**	**33.2**			

Source: Deutsche Bank

US Natural Gas: No reprieve from mild winter

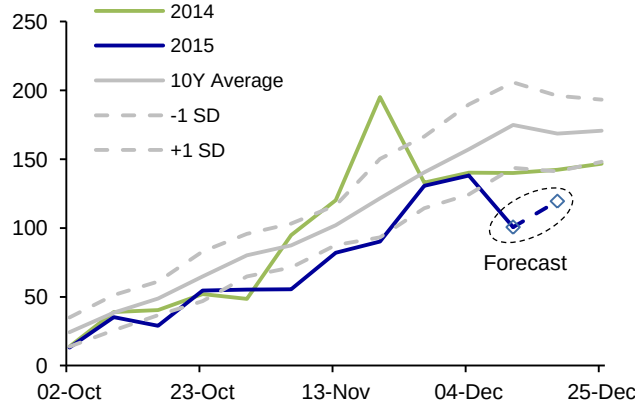
- With continued mild weather last month and into the start of December, inventories have now moved into a surplus condition for the first time this year, in our view. Stocks are nearly unchanged since the start of November, which normally marks the seasonal inventory peak. Fullness at 84.5% of working gas storage is now three points above the ten-year normal of 81.7%.
- This has happened in the context of an unexpectedly extended pause in production growth. Dry gas production has now very nearly intersected the 2014 profile, meaning zero year-on-year growth at the start of December. Without this pause prices would undoubtedly be even weaker. However, the shadow of impending production growth on the back of long-awaited infrastructure completions will hang over the market.
- In the most recent week of data, a 0.5 bcf/d step-up in dry gas production signals that the lengthy pause may now be over, while weather forecasts for December are signalling heating degree days below even the -1 standard deviation line.
- Although we believe that the market may be pricing in an entire winter of mild weather, there is little to justify higher price expectations unless the El Nino winter disappoints substantially. **Therefore we lower our price deck over the next twelve months by USD 0.30/mmBtu** as the market digests a storage surplus relative to historical levels which could well build further over the winter.
- We expect that the utility sector has already largely exercised its ability to switch fuels from coal to gas and that therefore any incremental utility demand growth in 2016 will be mainly the result of new construction rather than any further improvement in relative prices.
- Overall supply growth of 2.0 bcf/d would result in a balanced market next year, with an expected five percentage point storage surplus bringing this figure down to 1.4-1.5 bcf/d. This compares with average annual production growth of 2.42 bcf/d year over year since 2006.

Figure 203:: Storage as a share of working gas capacity: Inventories high only since start of November



Source: US EIA, Bloomberg Finance LP, Deutsche Bank

Figure 204:: Weekly US gas demand-weighted heating degree days: Weather warming just as supply ticks up



Source: Bloomberg Finance LP, NOAA, Deutsche Bank

Storage is only now in surplus

Our assessment of storage is twofold – a measurement of working gas capacity growth relative to demand, which is slightly below the rate of demand

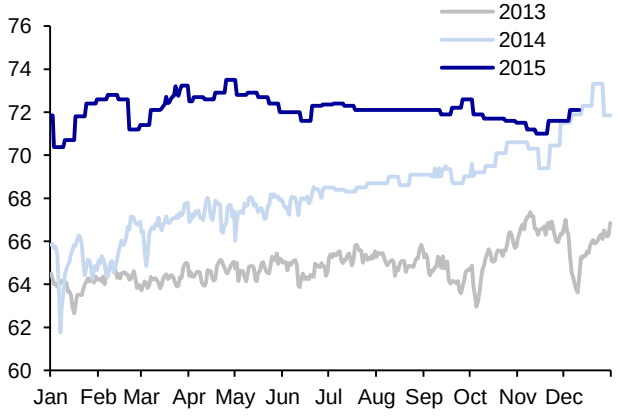
growth, and a calculation of capacity utilization relative to history. This leads to a more market-positive (lower surplus) interpretation of storage compared to what one would conclude by looking only at absolute volumes of storage. However, even on our measures, continued mild weather means that storage has entered surplus conditions since the start of November, and hence the market balance looks meaningfully weaker.

Fullness at 84.5% of working gas storage is now three points above the ten-year normal of 81.7%. Over the remainder of December this surplus looks set to widen to five percentage points at 76% of capacity versus a historical average of 71% at the end of the year, Figure 203.

No reprieve from mild weather

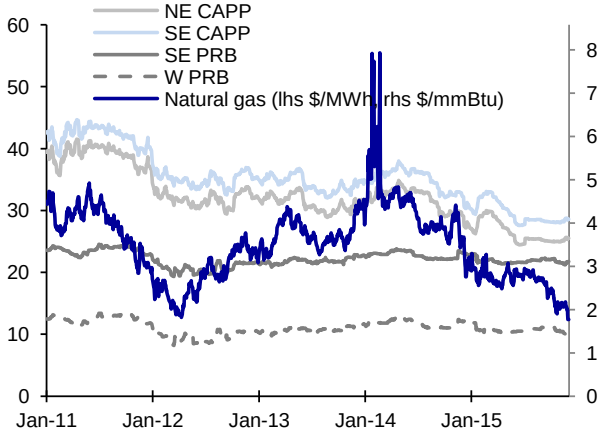
The mild winter has only intensified since November with forecasts through end of December now looking even more mild relative to historical range, Figure 204, than the -1 standard deviation levels which were observed over October and November. This weather development comes in concert with the first step-ups in winter dry gas production starting in mid-November from 71.0 bcf/d in the third week of November to 72.1 bcf/d in the week ending 11-Dec, Figure 205. This is likely associated with scheduled fourth-quarter startups of infrastructure upgrade projects. For example, Transco's Leidy Southeast Project, scheduled for December, adds pipeline segments and upgrades existing compressor stations to raise capacity by 0.525 bcf/d. A number of similar projects involving capacity increases through either pipeline reversals, new pipeline sections, or compressor upgrades are expected both for this fourth quarter 2015 as well as the fourth quarter of 2016, Figure 207.

Figure 205:: US dry gas production (bcf/d): Reprieve in supply growth now over



Source: Bentek Energy, Deutsche Bank

Figure 206:: Natural gas and coal compared: Little further demand boost from utility switching in 2016



Source: Bloomberg Finance LP, NOAA, Deutsche Bank

While we may not necessarily expect capacity improvements to be entirely additive to new gas supply, the recent jump of 0.5 bcf/d in production will probably be extended over the course of the winter.

Utility sector demand growth weaker in 2016

Natural gas prices are now at a USD 2.10/mmBtu discount to the average delivered price of Central Appalachian coal (CAPP) to the Northeast and Southeast, after having averaged at a USD 1.27/mmBtu discount for the first nine months of the year. Even so, we expect that the extent of incremental utility gas demand in 2016 over 2015 will be much less significant than it was this year (+2.5 bcf/d).

Figure 207:: US Northeast infrastructure projects

Pipeline/Compression	Operator	Capacity (million cf/d)	Completion
Leidy Southeast	Transco	525	Q4-15
East Side Expansion	Columbio TCO	312	Q4-15
Niagara Expansion	Tennessee	158	Q4-15
Northern Access 2015	National Fuel	175	Q4-15
Constitution	Williams	650	Q3-16
Algonquin - AIM	Algonquin	340	Q4-16
Northern Access 2016	National Fuel	350	Q4-16
SoNo Iroquois Access	Iroquois Gas Transmission	300	Q4-16
New Market Project	Dominion	112	Q4-16
Atlantic Sunrise	Transco	1700	Q3-17
Atlantic Bridge	Algonquin	700	Q4-17
Penn East	Penn East	1000	Q4-17
TGP Line 300 Expansion 2	Tennessee	1000	H2-18
Diamond East	Transco	1000	H2-18
Access Northeast	Algonquin	700	Q4-18

Source: Deutsche Bank US Oil & Gas Equity Research

We believe that the scope for further incremental utility demand in 2016 will be determined not substantially by relative cost but rather by two other factors: (i) the new capacity of CCGT generation, which will rise by only 5GW next year from 215GW to 220GW, (ii) coal-fired generation retirements of 11GW, and (iii) the possibility that utilities allow some small volume of long term coal supply agreements and rail transportation commitments to roll off.

The addition of gas-fired generation capacity would add 0.4 bcf/d of demand at average utilization and efficiency. The retirement of coal-fired capacity would be less significant on a megawatt for megawatt basis given the fact that (i) these stations are older and less efficient, and have previously been running at lower utilizations (29% versus fleet average of 62%), and (ii) some part of the missing generation would be made up by new wind (9GW), solar (5GW) and nuclear capacity (1GW) in 2016. On average utilizations of existing capacity of these modes of generation, and the lost power generation from the retired coal-fired plants, we would estimate that CCGTs pick up 1/3 of the load (9.7 TWh) at a maximum. This translates into at most 0.1 bcf/d of gas demand. In reality, the figure is more likely to be zero, since the total increased output of nuclear, wind and solar generation at average utilizations exceeds the total demand growth.

Figure 208:: Capacity changes in the electricity sector in 2016

	Capacity change (MW)	Normal utilisation (%)	Actual generation at normal utilisation (TWh)
Retired coal	-11,458	30%	-29.6
Gas CC	4,856	53%	22.5
Wind	8,898	32%	24.9
Solar	5,308	26%	12.1
Nuclear	1,122	92%	9.0

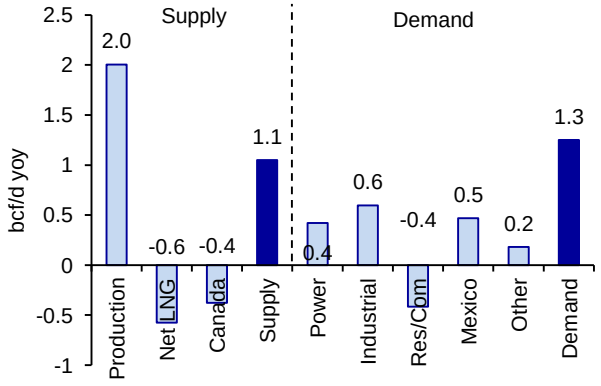
Source: Wood Mackenzie, Deutsche Bank

All of these estimates would be based on neutral weather conditions in 2016. Since summer CDDs are the primary determinant of utility demand, and because 2015 was slightly above normal in CDDs, we think it is reasonable that on a weather-neutral outlook we could expect increased utility gas demand of 0.4 bcf/d in 2016.

Market balanced with slower rates of production growth

Altogether this means that we expect that overall supply growth of 2.0 bcf/d would result in a balanced market next year, with an expected five percentage point storage surplus to bring this figure down to 1.4-1.5 bcf/d, translating into dry gas production (referencing Figure 205) averaging around 73.5 to 74.1 bcf/d. At the low end of this production growth range, it would equate to roughly half of the average annual production growth rate since 2006 (2.42 bcf/d year over year), and well below the 3.62 bcf/d year over year rate seen in the last two years.

Figure 209:: Supply-demand changes, 2016 versus 2015



Source: US EIA, Deutsche Bank

Put another way, this means that any further storage surplus accumulated over the course of the winter in the event of further mild weather, will be slow to draw down in 2016 unless production growth is extremely limited.

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Figure 210:: US natural gas supply and demand (bcf/d)

Bcf/day	2013	2014	1Q 2015	2Q 2015	3Q 2015E	4Q 2015E	2015E	1Q 2016E	2Q 2016E	3Q 2016E	4Q 2016E	2016E	2017E
CONSUMPTION													
Residential	**13.5**	**14.0**	27.5	6.9	3.7	16.3	**13.6**	25.7	7.0	3.7	16.4	**13.2**	**13.2**
Commercial	**9.0**	**9.5**	16.0	5.8	4.4	10.5	**9.2**	14.9	6.1	4.6	10.9	**9.1**	**9.1**
Industrial	**20.3**	**21.0**	22.7	20.3	20.4	23.1	**21.6**	23.6	21.1	21.1	23.1	**22.2**	**22.7**
Electric Power	**22.4**	**22.3**	23.1	24.2	30.4	21.4	**24.8**	22.4	24.7	31.0	22.7	**25.2**	**25.9**
Other	**6.5**	**6.8**	7.8	6.8	6.8	7.3	**7.2**	7.9	6.9	7.0	7.5	**7.3**	**7.4**
Lease and Plant Fuel	**4.0**	**4.3**	4.5	4.5	4.5	4.6	**4.5**	4.6	4.6	4.6	4.7	**4.6**	**4.6**
Pipeline and Distribution	**2.4**	**2.4**	3.2	2.1	2.2	2.6	**2.5**	3.2	2.2	2.2	2.7	**2.6**	**2.6**
Total Demand	**71.7**	**73.6**	97.1	63.9	65.7	78.6	**76.3**	94.5	65.9	67.3	80.6	**77.1**	**78.3**
YoY % change	**2.8%**	**2.5%**	2.1%	4.3%	6.3%	3.1%	**3.7%**	-2.6%	3.1%	2.5%	2.5%	**1.0%**	**1.6%**
DOMESTIC SUPPLY	**0.00**	**0.0**	**4.4**	**4.7**	**4.7**	**4.7**	**0.0**	**4.5**	**4.5**	**4.5**	**4.6**	**0.0**	**0.0**
Alaska	**0.9**	**0.9**	1.0	0.9	0.8	0.9	**0.9**	1.0	0.8	0.8	0.9	**0.9**	**0.9**
Gulf of Mexico	**3.6**	**3.4**	3.4	3.7	3.3	3.2	**3.4**	3.3	3.2	3.0	3.0	**3.1**	**3.2**
Other US	**65.9**	**70.4**	73.8	74.0	74.5	76.0	**74.6**	75.6	76.8	77.1	77.7	**76.8**	**78.7**
Marketed Production	**70.4**	**74.7**	78.1	78.7	78.6	80.1	**78.9**	79.8	80.8	80.9	81.6	**80.8**	**82.8**
Dry Gas Production	**66.7**	**70.4**	73.7	73.9	73.9	75.4	**74.2**	75.3	76.3	76.4	77.0	**76.2**	**78.3**
YoY % change	**1.5%**	**5.7%**	8.6%	6.6%	3.7%	2.8%	**5.4%**	2.2%	3.2%	3.3%	2.2%	**2.7%**	**2.7%**
Net Storage Withdraws	**1.5**	**-0.6**	18.4	-12.9	-9.6	2.2	**-0.5**	17.2	-10.7	-9.8	2.8	**-0.1**	**0.3**
Other & Balance	**0.0**	**0.5**	1.1	0.5	-0.7	-0.7	**0.1**	0.4	-0.5	-0.1	-0.2	**-0.1**	**-0.1**
Total Domestic Supply	**68.2**	**70.3**	93.2	61.6	63.7	76.9	**73.8**	92.9	65.1	66.4	79.7	**76.0**	**78.4**
LNG Gross Imports	**0.3**	**0.2**	0.4	0.1	0.2	0.2	**0.2**	0.1	0.2	0.2	0.2	**0.2**	**0.2**
LNG Gross Exports	**0.0**	**0.0**	0.1	0.1	0.0	0.6	**0.2**	0.7	0.7	0.7	0.7	**0.7**	**1.5**
Pipeline Gross Imports	**7.6**	**7.2**	8.4	6.7	6.4	6.9	**7.1**	7.3	6.2	6.5	6.7	**6.7**	**6.7**
Pipeline Gross Exports	**4.3**	**4.1**	4.9	4.4	4.5	4.8	**4.6**	5.1	4.9	5.1	5.3	**5.1**	**5.4**

Source: US DOE/EIA, Deutsche Bank

Thermal Coal: India passes the baton

- The prospect of better output growth from the Indian domestic coal industry adds to our conviction on sustained thermal coal weakness in the medium term, as the baton of demand growth is passed to Southeast Asia.
- We revise our expectation of Vietnamese coal production to roughly flatten from here as low coal prices impinge on previously expected growth. Altogether we expect Southeast Asia to make up 64 mt of import demand growth between now and 2020.
- However, the sustained capacity for further high-quality export supply increase from Australia, South Africa and Colombia combined with a possibly sharper shift for China from net imports to net exports may yet keep thermal coal markets oversupplied in the medium term.
- Although Coal India remains short of its target it continues to show the fastest rate of output growth on record for at least the past seven years. More importantly we can envisage reasons why the improved performance may be sustained.
- This compounds the negative consequences of rising capacity in China's high-voltage long-distance power transmission network which will suppress coastal import demand and possibly even contribute to net exports as governmental policy favours domestic producers.
- 32 mt of coal import demand is also now poised to be lost in the UK as the government announced all coal-fired power stations will be closed by 2025, further darkening longer term fundamentals.
- Export producers are likely to respond with further efforts to squeeze costs by lowering labour expense, reducing workforces, and increasing equipment utilization. We also expect they will be assisted by sustainably low oil prices and local currency depreciation.
- These factors are likely to keep margins protected and sustain oversupplied conditions for years to come as any closures of high-cost capacity will be offset by increases at projects in ramp-up phase.

Coal India performance has improved

Production by the domestic coal giant, Coal India, is performing at record rates of growth in this fiscal year. The rate of production growth in the fiscal year-to-date is 9.2%, compared with 3.9% in the past seven years and a current fiscal year target of 11.3%. If the current year is a taste of things to come, then actual performance may continue to be stronger than in the past, even while it falls short of ambitious goals through 2020. Our metals & mining team analysts believe that production in the fiscal year ending 2020 will rise to 693 mt versus the 925 mt target, equating to annualized growth of 7.0%.

Where has the improved performance come from? We can split our answer into three parts according to the relevant factors in the past, the present year, and the future.

In previous years, coal projects had often been delayed because they were denied environmental clearance and given a 'no-go' classification by the Ministry of Environment, Forest and Climate Change (MoEF). In 2012, India's Coal Ministry estimated that such delays were responsible for the loss of 190 mt in production. However, recent efforts to institute a more streamlined approval process for land acquisition and environmental clearances appear to have borne fruit. Increased production this year has been partly down to nine projects completed in the past year, primarily opencast by volume. These projects constitute a total of 24.8 mt in sanctioned capacity, with only 4.5 mt of actual production in the last fiscal year. This means that they are still in

ramp-up phase, and will continue to raise their contribution in the current fiscal year (*Coal India Limited: Despite correction, valuations do not factor in additional risks,* 1 October 2015).

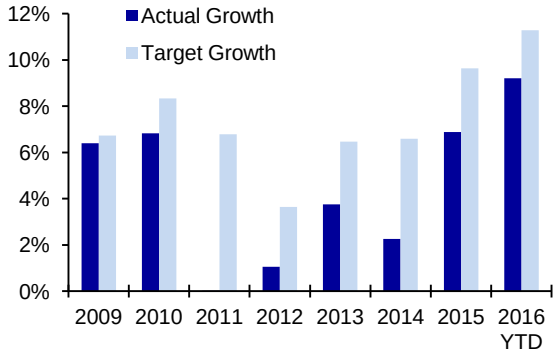
And there are reasons to believe the improvement may be sustained

In the current year, growth in overburden removal has contributed to the improvement as overburden removal exceeded target for the first time in the fiscal year ending 2015 with growth of 10.3%. Additionally, growth in this metric was reported at 27.5% yoy in April rising to 90.53 mt.

In the medium-term future, Coal India has laid out a number of strategies which we believe will help sustain output growth above the historical 3.9% rate. First, investment in the modernization and development of mining technology is expected to raise productivity through improved seismic surveys, high capacity equipment and vehicle tracking for opencast mines, and continuous mining machines in underground mines. The introduction of a model contract is also expected to assist efforts in international technology collaboration.

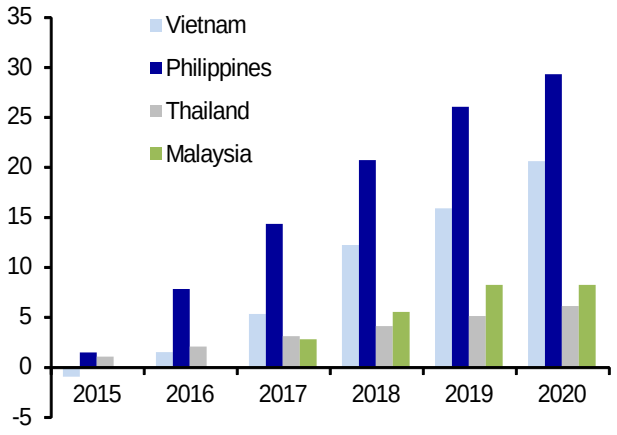
Second, investment in rail lines facilitating coal evacuation from the three largest coal-producing states will expand transport capacity. The earliest project completion is expected in 2017 for the Jharsuguda-Barpali railway in Odisha, followed by the Bhupdeopur-Raigarh-Mand in Chhattisgarh, and finally the Tori-Shivpur-Kathautia in Jharkhand. Finally there are plans for an expansion of non-coking coal washery capacity for the removal of ash from the current 13.5 mtpa to 94 mtpa, while other electronic system improvements should improve internal efficiency.

Figure 211:: Aiming higher, achieving higher: Coal India growth targets and actual output growth (%)



Source: Coal India, Deutsche Bank

Figure 212:: Cumulative incremental Southeast Asia import demand versus 2014 (million tonnes, total=64mt in 2020)



Source: National energy agencies, Deutsche Bank

Where does this all leave India's import requirement?

On our base-case assumptions for Indian power demand growth and Coal India production, and holding constant coal import demand from the cement sector, we estimate that India's import demand may actually decline slightly over the next two years to 168 mt, and then recover to 226 mt in 2020. Incorporated into these projections is our equity analyst team's forecast that the portion of coal imported for blending requirements will be reduced in the current fiscal year and may be eliminated by the fiscal year ending 2019.

Additionally, imports may be negatively affected relative to this scenario as cement companies have been substituting away from imports and into pet coke and domestic coal. This represents a meaningful downgrade from our prior assumption of 195 mt of imports in 2017, and a more modest downgrade from the longer term 2020 assumption of 243 mt.

Passing the baton to Southeast Asia

At various time in the recent past, hopes for a resumption in demand growth which could absorb new volumes have been passed from China to India and now on to Southeast Asian economies where coal-fired power generation remains a significant component of planned expansion in power capacity.

Since our last review we revise our expectation of Vietnamese coal production to roughly flatten from here to 2020 as low coal prices impinge on previously expected growth, despite reductions in average costs from USD 53/t in 2014 to USD 45/t in 2015, according to Wood Mackenzie. Consequently, imports will need to provide for a greater share of supply for an expected more-than-doubling of power generated from coal by 2020. Out of the incremental increase in demand from 2015 to 2020 of 30 mt, we expect 3 mt to be met by domestic production, 5 mt by a reduction in exports, and 22 mt to be met by an increase in imports.

Planned capacity growth in other countries, although lower in size, will also likely result in rising import demand. In the Philippines, we expect import growth of 29 mt by 2020 to result from the cumulative increase of coal-fired generation of 10.7 GW, in addition to import growth of 8 mt in Malaysia and 6 mt in Thailand. This brings the regional total increase of import demand from 2015 to 2020 to 64 mt.

One caveat is that in the cases of Indonesia, Thailand and Malaysia, import growth resulting from new-build coal-fired generation may be offset to some degree by retirements, which we have not quantified. In Thailand, for example, the volume of total retirements of powerplants of all fuel types from now through 2036 will be 24.7 GW, against planned coal-fired growth of 7.4 GW over the same period.

In Indonesia, however, we expect that cumulative coal-fired new-build additions of 29 GW by 2020 will either be met entirely by domestic production, or that any portion required to be imported for blending would then make these export volumes available.

Therefore our revised estimate of import growth in Southeast Asian countries goes only part way towards absorbing excess capacity through 2020, although Vietnam's import requirement beyond 2020 may growth further from 21 mt to 64 mt in 2030 as domestic production flags and coal-fired power generation carries on rising.

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Figure 213:: Seaborne thermal coal supply and demand (million tonnes)

Including Anthracite, Bituminous, Sub-bituminous, and Lignite

	2010	2011	2012	2013	2014	2015e	2016e	2017e	2018e	2019e	2020e
Indonesian exports	298	353	384	424	408	384	361	353	346	339	333
growth	*27%*	*18%*	*9%*	*10%*	*-4%*	*-6%*	*-6%*	*-2%*	*-2%*	*-2%*	*-2%*
Australian exports	142	148	171	188	201	204	210	219	224	223	232
growth	*2%*	*4%*	*16%*	*10%*	*7%*	*2%*	*3%*	*4%*	*3%*	*-1%*	*4%*
Russia exports	75	86	103	110	117	114	114	114	115	115	117
growth	*-3%*	*15%*	*20%*	*7%*	*6%*	*-3%*	*0%*	*0%*	*1%*	*1%*	*2%*
South African exports	71	69	76	71	76	77	78	80	82	83	84
growth	*5%*	*0%*	*6%*	*-5%*	*7%*	*2%*	*2%*	*3%*	*2%*	*1%*	*1%*
Colombian exports	69	76	79	74	75	82	84	86	88	90	92
growth	*9%*	*10%*	*4%*	*-7%*	*2%*	*10%*	*2%*	*2%*	*2%*	*2%*	*2%*
US exports excl. Canada & Mexico	15	30	46	42	30	40	40	40	40	40	40
China exports	18	11	8	6	5	4	10	10	10	10	10
Other exports	127	131	135	139	143	139	135	135	135	135	135
Total seaborne thermal supply (Mt)	**815**	**905**	**1002**	**1054**	**1056**	**1043**	**1032**	**1037**	**1040**	**1035**	**1043**
growth	*10%*	*11%*	*11%*	*5%*	*0%*	*-1%*	*-1%*	*1%*	*0%*	*-1%*	*1%*
Japanese imports	131	126	139	141	143	146	148	150	152	154	156
growth	*12%*	*-4%*	*10%*	*2%*	*2%*	*2%*	*1%*	*1%*	*1%*	*1%*	*1%*
Korea & Taiwan imports	163	174	170	172	175	178	182	185	188	191	195
growth	*11%*	*6%*	*-2%*	*1%*	*2%*	*2%*	*2%*	*2%*	*2%*	*2%*	*2%*
European imports	187	209	223	220	213	211	201	197	179	160	164
growth	*-5%*	*12%*	*7%*	*-1%*	*-3%*	*-1%*	*-5%*	*-2%*	*-9%*	*-10%*	*3%*
China imports	137	178	235	252	229	155	121	84	48	48	48
growth	*40%*	*29%*	*32%*	*7%*	*-9%*	*-32%*	*-22%*	*-31%*	*-43%*	*0%*	*0%*
India imports	75	92	119	139	172	175	175	168	178	195	226
growth	*25%*	*22%*	*30%*	*16%*	*24%*	*2%*	*0%*	*-4%*	*6%*	*10%*	*16%*
Other imports	131	144	150	155	157	159	169	184	202	215	225
Total seaborne thermal demand (Mt)	**825**	**922**	**1036**	**1078**	**1089**	**1024**	**996**	**967**	**946**	**963**	**1014**
growth	*11%*	*12%*	*12%*	*4%*	*1%*	*-6%*	*-3%*	*-3%*	*-2%*	*2%*	*5%*
Notional market balance	**-10**	**-17**	**-34**	**-24**	**-33**	**20**	**36**	**70**	**95**	**72**	**30**

Source: McCloskey, AME, BP, CEIC, Deutsche Bank

Precious Metals

All signs point lower

The following section on Precious Metals has been contributed by our commodities analysts:
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- As financial drivers remain weak for precious metals we review our fair value metrics and find that since October 2014, the goal posts have moved lower. Versus a USD 946/oz average of fair value metrics last year, the current valuation points to USD 782/oz on the same set of measures using a consistent methodology, mostly because of lower copper and crude oil prices.
- Real interest rates and the equity risk premium are the two financial drivers which we see having the most reliable influence on precious metals prices. Both of these factors promise to be negative for pricing in 2016.
- Our view on the S&P 500 rising to 2,250 by the end of 2016 implies the equity risk premium falling by 50 basis points from 4.83% currently to as low as 4.03%, holding the risk free rate and S&P earnings constant.
- Our view on the pace of normalization in the Federal Reserve policy rate implies that market expectations need to move closer to the FOMC dot plot. This directional adjustment has clearly been negative for precious metals in recent months, and we fully expect that it will continue to be the case next year.
- Last but not least, the US dollar has a relatively less reliable relationship with precious metals prices. Nevertheless, we also expect this last component to our analysis to be negative for the sector as the last stretch of dollar appreciation is realized in the maturing bull cycle. On a trade-weighted basis according to the FOMC composition, our targets imply a further 6% dollar appreciation in 2016.
- With all the stars aligned for price weakness **we lower our forecast deck for 2016 to an average of USD 1,033/oz for gold and USD 14.3/oz for silver.** We recognize risks of gold falling below USD 1,000/oz in our Q4-16 forecast of USD 980/oz.
- In 2017, the headwind from a strong US dollar fades, and dollar weakness becomes an outright bullish driver with a 5% depreciation in 2018 and further dollar weakness beyond. We think the process of US interest rate normalization will be well entrenched by the end of 2016, and the market will start to price in more benign financial drivers into the gold price. At this point mined supply may begin to contract modestly, which will be another bullish signal at the margin.

Figure 214:: Gold price fair value indicators

	Oct-14	Today
In real terms (PPI)	698	708
In real terms (CPI)	766	775
DB Global Asset Allocation model	1176	987
Relative to per capita income	661	719
Relative to the S&P500	945	927
Versus copper	1,145	820
Versus crude oil	1,462	744
Average	**979**	**812**

Source: Deutsche Bank

Reviewing fair value metrics

Given the new lows in the precious metals complex and what we believe will be sustained financial headwinds for the whole of 2016, it is an opportune time to review a range of fair value indicators. While these metrics stand below our 2016 forecast deck, they suggest further downside below our targets would be possible before the sector could be considered undervalued.

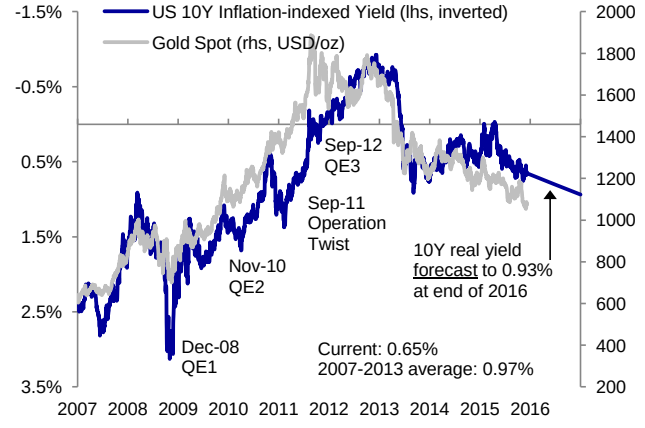
Comparing the changes from October 2014 to November 2015, weak inflation rates have meant that PPI and CPI measures have barely edged higher (1.3% and 1.1% annualized). Owing largely to a widening of the negative global output gap and US dollar strength, our Asset allocation team's model lowered its valuation of gold from USD 1,176/oz to USD 987/oz. Finally and perhaps most significantly, the decline in copper and crude oil has lowered the corresponding implied level of gold. Since declines in commodity prices have been more a result of supply momentum than an economic or financial crisis, in our view, this lends more credibility to the lowered implied valuation for precious metals.

Altogether, this brings the simple average of these fair value measures lower by 17% in the past year to USD 812/oz, or 21% below our 2016 forecast average of USD 1,033/oz. Therefore we believe that with the most important financial drivers for precious metals being modestly negative in 2016, even our lowest quarterly forecast price of USD 980/oz in the fourth quarter would not represent an overshooting to the downside.

Real interest rates and equity risk premium both pointing lower for gold

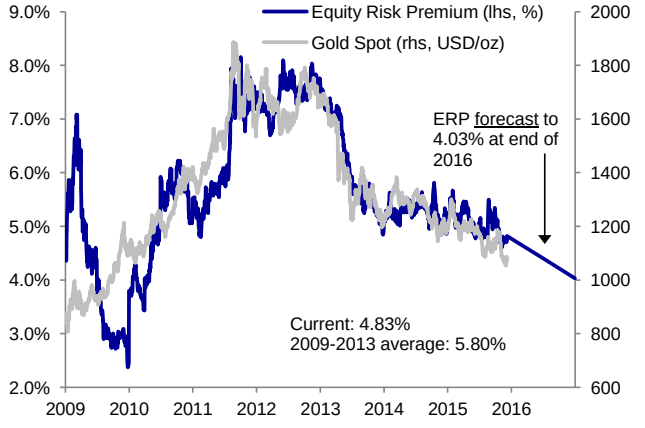
With the December Fed hike regarded as having a very high likelihood now, the more meaningful differences in expectations are now further along the rate-hike path in terms of the pace and terminal rate. For a number of reasons including upside to US productivity and real wages, and the probability that the neutral real rate rises, our fixed income analysts believe that the risks are to the upside in yields. As the Fed funds rate rises from 0.125% to 1.125% on the back of the December hike along with three further hikes over the course of 2016, we believe 10Y rates will rise from the current 2.21% to 2.50% by the end of the year, with some flattening of the yield curve.

Figure 215: US real yields to be negative for precious metals



Source: Bloomberg Finance LP, Deutsche Bank

Figure 216: Equity risk premium to be negative for precious metals



Source: Bloomberg Finance LP, Deutsche Bank

If inflation expectations remain constant then this implies a rise in the 10Y inflation-indexed yield from 0.65% to 0.94%, suggesting some modes downside risks to precious metals prices, Figure 215, as the real yield moves closer to its 2007-2013 average of 0.97%.

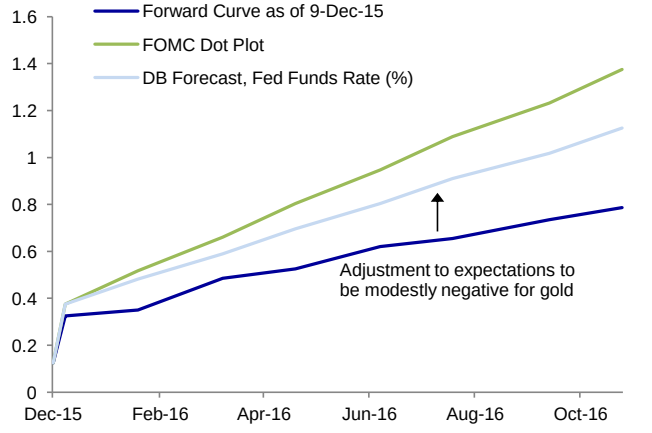
On the second key financial driver, our S&P 500 target for 2016 year-end is 2,250. If we assume no change to earnings, the impact of the higher equity price and the lower real yields assumed above mean that the equity risk premium will have fallen from the current 4.82% to 4.03%, Figure 216.

Shift in market rate expectations likely to harm precious metals

While market expectations are not wildly different from our forecast over the course of 2016, we have seen in the last several months that adjustments higher to the market expectation are negative for both gold and silver. This is true despite the fact that a longer term analysis of monthly average real yields and year-over-year changes in precious metals prices indicates that real yields at their current level are roughly neutral for prices.

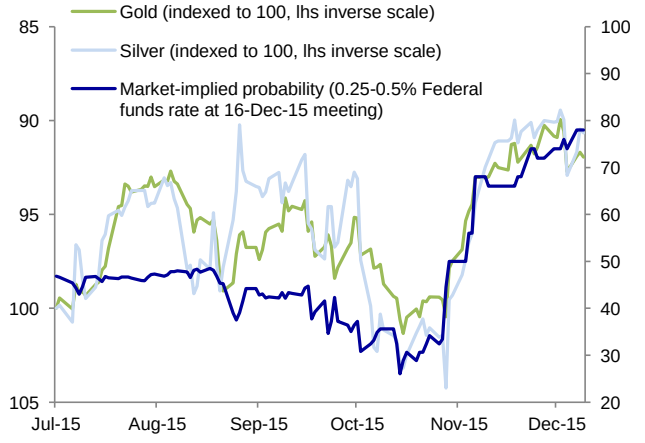
Over the second half (and particularly fourth quarter) of 2015 we saw the large adjustment in the market-implied probability of a higher Federal funds rate at the December FOMC meeting subtract roughly 10% from the value of gold and silver. Given that the further adjustment we expect in 2016 market expectations represents between 13 to 34 bps depending on the timing, the impact on precious metals prices could be nearly as large, thus helping to drive gold towards the USD 980/oz target for the fourth quarter of 2016.

Figure 217: Market to adjust US policy rate expectations higher



Source: FOMC, Bloomberg Finance LP, Deutsche Bank

Figure 218: Such adjustments have proven negative for precious metals



Source: Bloomberg Finance LP, Deutsche Bank

A maturing US dollar bull cycle

The US dollar bull cycle is entering a mature portion of its phase but based on our FX analyst team's year-end 2016 forecasts, has a further 6% upside on a trade-weighted basis according to the US FOMC's weightings, Figure 219.

Thus based only on our house view on seven major currencies composing 64% of the Fed trade-weighted basket, the implied gold price at the end of 2016 would be USD 1,003/oz. The resumption of dollar strength after 2017 and through to the end of 2019 then implies gold rising once again to USD 1,078/oz.

Figure 219: DB currency forecast implications for gold

	FOMC Weighting	Current FX spot rate	End 2016	End 2017	End 2018	End 2019
Euro area	0.16638	1.0959	0.9	0.85	1	1.1
Canada	0.12664	1.3724	1.4	1.4	1.3	1.2
Japan	0.06462	121.12	128	120	110	105
China	0.21562	6.4591	6.7	6.7	6.7	6.7
United Kingdom	0.03322	1.5164	1.27	1.15	1.27	1.34
Switzerland	0.01804	0.9857	1.28	1.39	1.2	1.14
Australia	0.0123	0.7212	0.62	0.6	0.65	0.7
Other	0.36318					
Cumulative appreciation (depreciation) versus spot FX	1.00		6.43%	7.86%	2.31%	-0.95%
Implied gold spot (USD/oz)		1,068	1,003	990	1,044	1,078

Source: Deutsche Bank

Risks to our view: gold's crisis dividend

Apart from risks that our 2016 year-end targets for real interest rates and the S&P 500 do not materalise as we expect, one should also be concerned about the possibility of some type of crisis event, whether it originates from within financial markets or from some external shock, raises demand for precious metals as a form of security or safe haven. Such risks are unpredictable by nature, but what is interesting from our decidedly unscientific aggregation of the response of gold prices to various risk events in recent memory is to note that while gold prices may rise acutely by as much as 15%, the price impact after twenty-five trading days is much less apparent.

Figure 220: Historical risk events for precious metals

Event	Event Date	Gold price (T-1)	Gold price (T+25)	Final impact after 25 trading days	Peak impact within 25 day window
Black Monday	19-Oct-87	481	475	-1%	3%
9/11 attacks on the US	11-Sep-01	286.25	282.85	-1%	8%
Bali bombings	12-Oct-02	318.25	319.45	0%	2%
Madrid train bombings	11-Mar-04	400.13	398.28	0%	7%
London transport bombings	07-Jul-05	425.05	446.45	5%	5%
Mumbai train bombings	11-Jul-06	639.03	627.91	-2%	6%
Lehman Brothers bankruptcy	10-Sep-08	762.87	806.54	6%	15%
Mumbai city attacks	26-Nov-08	813.18	857.6	5%	7%
Flash crash	06-May-10	1194	1220.14	2%	6%
Arab Spring & Tunisian Revolution	18-Dec-10	1386.41	1322.09	-5%	3%
ISIS occupies Mosul and Tikrit, Iraq	01-Jun-14	1244.27	1316.26	6%	6%
Russian military into Ukraine	22-Feb-14	1336.63	1286.92	-4%	4%
Paris Charlie Hebdo attack	07-Jan-15	1213.58	1220.08	1%	7%
Shanghai Composite crash	24-Aug-15	1155.8	1114.9	-4%	0%
Average				**0.8%**	**6.0%**

Source: Deutsche Bank

Taking a selection of events and measuring the gold price impact from one day prior to the event, we see that the Lehman bankruptcy and associated systemic risks had the largest impact on gold prices within a twenty-five day trading window, and also ties as having the most impact at the end of the twenty-five day trading period. However, what is striking is that we group the final impact of all of the events together we reach an average of only +0.8% for the gold price. One may argue that a simple average may place too much weight on relatively less significant events from a precious metals perspective. However, even incorporating the expectation of a repeat of one of the most dire events, we could expect this could roughly negate the influence of the mildly negative financial factors we describe above, leading to gold prices roughly unchanged from the current level by the end of 2016.

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Platinum Group Metals

Strikes and cuts to the rescue?

- Despite a strong recovery in Western European vehicle sales (+8%) in 2015, a combination of thrifting and pre buying by the Auto manufacturers ahead of Euro VI has led to softer than expected demand from Autocats. The diesel-gate scandal has damaged the reputation of diesel vehicles and whilst we still expect diesel to be a part of the sales mix, market share will decline as the emission abatement costs price small diesel passenger vehicles out of the market.
- The springs on the Chinese platinum jewellery market have broken. In times of weak prices, the market could normally rely on Chinese bargain hunting. Up until November when trading activity on the SGE started to pick up, this was noticeably absent. Demographic trends are not in favour of rising platinum jewellery demand, in the absence of chunky marketing spend. Indian jewellery demand is catching up but not enough to compensate for China. As a result we have a modestly over supplied market over the next two to three years.
- Moderately falling gold prices and a persistently weak Rand are two further headwinds for platinum in 2016. The only likely price stabilizers are strike action (very likely in mid 2016) and pro-active supply cuts from the South African producers. All the south African producers are cashflow negative at the current spot price, and although liquidity (through recent capital raising events) could sustain companies until the end of 2017, the situation is unsustainable. We expect some response in 2016, which will support a modest recovery in USD prices.
- The investment case on **palladium** remains compelling, with deficits of 400 – 600koz likely until the end of the decade, irrespective of South African producer behaviour. In our view, there is sufficient metal in inventories to supply the market until the end of the decade, which means that pricing is at the mercy of investor sentiment. A tough lesson for 2015 has been that the market is intolerant of “tall poppies” in a bear commodity market. The recovery in Chinese vehicle sales will extend into 2016 in our view, and drag palladium along with it. Palladium remains one of our preferred metals in 2016.
- **Rhodium** will bear the brunt of the recent diesel gate scandal. Meeting NOx emission standards under real world driving conditions is likely to utilize PGM-lite SCR (Selective Catalytic Reduction) technology. The only other demand driver for rhodium is the low price itself. We expect some substitution back into rhodium at the expense of palladium in gasoline vehicles, but certainly not enough to forecast a deficit market or prices recovering to +USD1000/oz by the end of the decade.

Platinum: Looking for price stabilizers…

…but only strikes and producer curtailments can save the day

Although platinum fundamentals are not particularly strong, they are better than the price reaction in 2015 would suggest. Strong sales growth in the diesel heartland of Western Europe and improving sales in the up and coming diesel region of India have not translated into enough of a demand pull to create a convincing deficit in 2015. Furthermore the rising concerns over global Auto sales growth, fears over a rapidly shrinking diesel market share in the wake of Diesel-gate, the continued strengthening of the USD (a Deutsche Bank house view) and the weak gold price (a Deutsche Bank house view), we are have looked at a number of potential price stabilizers for 2016. The potential price stabilizers include:

- A strengthening Rand; unlikely given over view of a strengthening USD, and a gradually weakening RMB, combined with the current South African political climate.
- The jewellery price shock absorber to finally kick in. Weak prices have so far been unable to entice Chinese consumer to increase their spend on platinum. Recent trading activity on the Shanghai Gold exchange has picked up, but the demographic trends in China are not supportive of a sustained period of strong growth in jewellery.
- A spike in Autocat demand as a "fix" to the dieselgate scandal. The preliminary indications are that VW will use a combination of software and modest non PGM hardware changes in all the affected vehicles, so this is unlikely to provide much of a stabilizer.
- A price driven supply response in recycling. Although there may be some elements of the supply chain that will hold back metal due to weak pricing, we think this only occurs for a short period of time. After which the metal returns to the market.
- This leaves either a supply curtailment or a supply shock, which in our view are the most likely price stabilizers for 2016. Although proactive supply cuts have not been forthcoming, we think the producers have more of a case to make the necessary cuts.

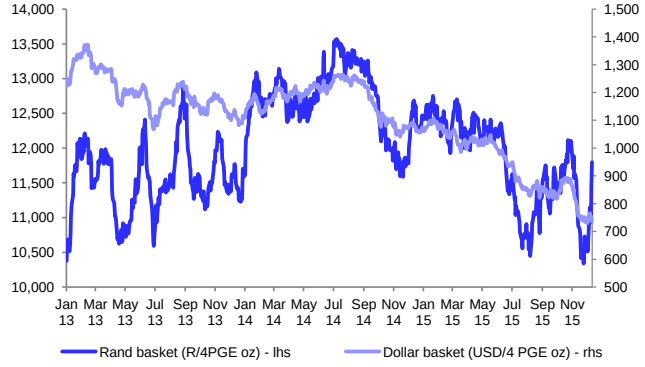
The weak Rand remains a headwind; a victim of the commodity –currency downward spiral

Our SA economist Danelee Masia has revised the Deutsche Bank rand call to R15.40/USD by end year and further to R15.70/USD in 2017. The rand exchange rate is expected to continue trading on "bad EM" fundamentals, despite expectations of a narrowing in the current account deficit next year. Expectations of weaker export prices – particularly platinum – alongside modest upside drift in oil will lead to a decline in the terms of trade. This view is more or less in line with what's priced in the forward curve. We haven't allowed for a possible ratings outlook change by S&P in this forecast and this to the exchange rate isn't negligible.

GDP growth remains unchanged at 1.1% for 2016, but revised lower to 1.3% in 2017 from 2% previously. This is mainly due to the drag of lower capex and job cuts on future growth prospects. But, we also see higher inflation in both years and as a result additional tightening of 75bps – 50bps more than before. Risks to growth forecasts for 2016 are to the downside as we haven't incorporated the potential fallout from the drought in our numbers – this could shave an initial 0.4% but up to 1% from growth next year. Given this backdrop, and the latest debacle around the changing of the SA Finance minister, we think it unlikely that the Rand will strengthen soon.

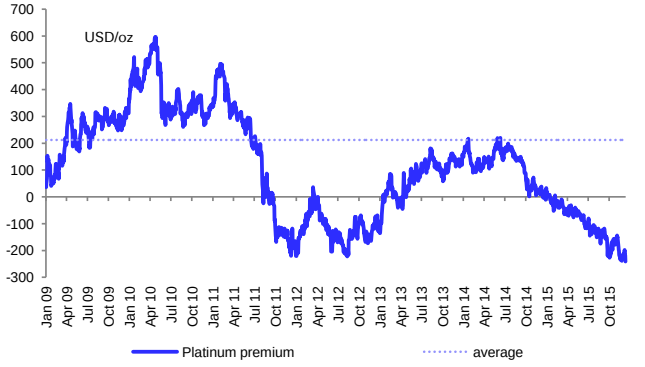
The strong surge in the USD is a double negative for platinum. Firstly, in the absence of compelling fundamentals, the metal's value is still referenced to that of gold. But secondly, the USD induced weakness in the Rand means that although the USD basket price is not nearly as low as the Rand basket price offering some respite. Despite Platinum, Palladium and Rhodium falling by (30-40%) YTD, the Rand basket has fallen by only 5% during the same time thanks to the plummeting RAND-USD ex rate (c.39% fall YTD). During the same period Dollar basket have fallen 31.5%. Producer companies have been cushioned from most of the losses from PGM price drop, thanks to depreciating Rand. The recent weakening of the Rand has been particularly helpful to the producers. The era of flat USD prices and a rising basket price is however over, which makes producer action more likely.

Figure 221:: PGE Rand basket price versus the USD basket price



Source Thomson Reuters Datastream, Deutsche Bank

Figure 222:: Platinum premium / (discount) to gold since 2009



Source: Thomson Reuters Datastream, Deutsche Bank

Auto sales have been robust, but this is unlikely to translate into strong platinum demand

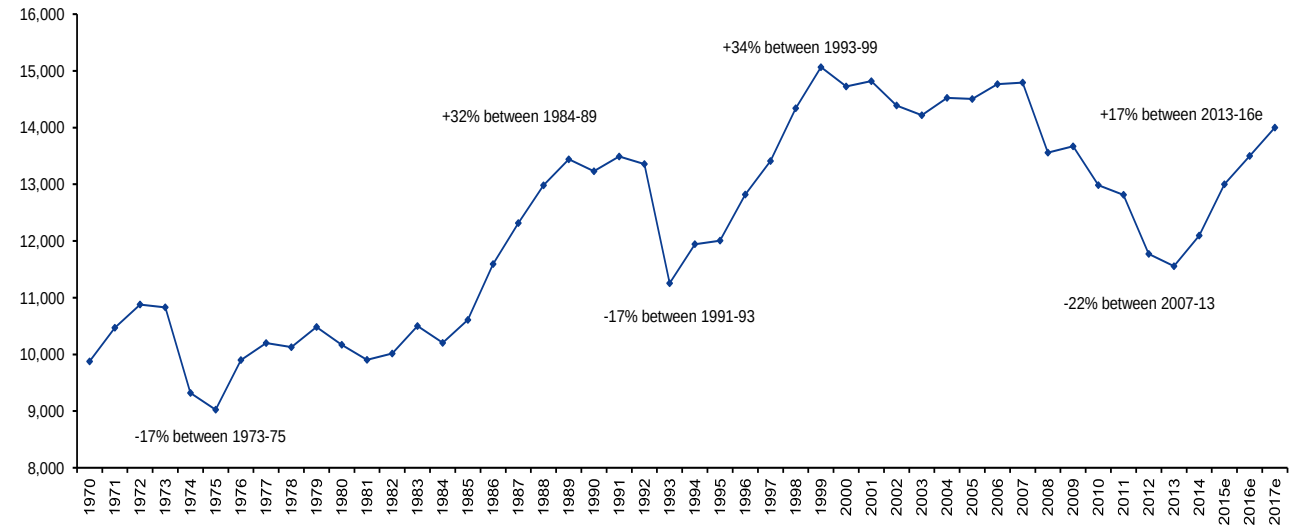
Strong growth over the next three years, but tailing off toward the end of the decade

Western European passenger vehicle sales have been one of the bright spots in the global economy. New passenger vehicle registrations have increased over 8% year to date, although we note that the absolute sales volumes are still below the pre crisis levels.

In the core markets, volumes were up 12% in November (adj. +7% as all except Spain had an extra working day). On a reported basis, Spain (+26%) and Italy (+24%) have been in the forefront in terms of growth rates. France (+11%) and Germany (+9%) have been strong as well while UK (+4%) was the slowest, albeit off a very high base. YTD, registrations are at ~9.6mn units, +9% (adj. +8%). YTD, Spain is tracking around +22% followed by Italy (+16%), France, UK (+6% each) and Germany (+5%).

Our European Auto team have upgraded their FY15 and FY16 estimates (to 13.1mn, +8% YoY, and to 13.6mn, +4%) by 100k. For FY16 our estimate is a more moderate gain of 4% underpinned by the end of scrappage incentives in Spain and a slowing down UK market. Gains should mostly occur in Italy, Spain (both still significantly below pre crisis levels) and France. This is still 6-9% below pre crisis level (14.5-14.9m units) and 4% below replacement demand (estimated at 14.2mn units).

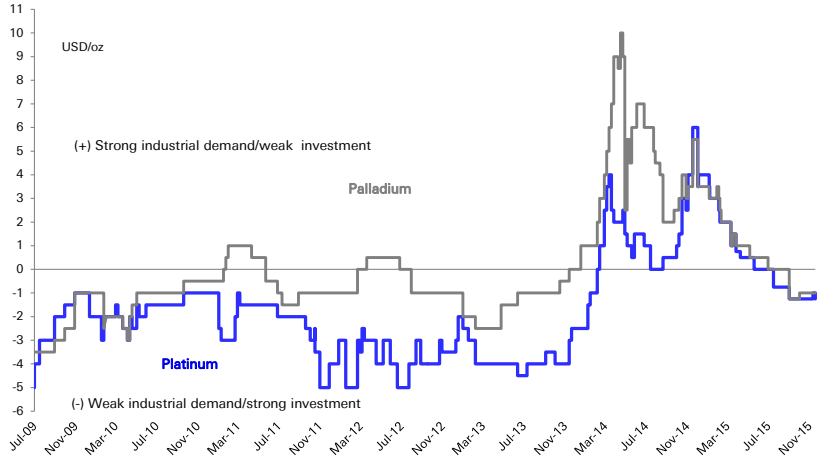
Figure 223:: W. European market trend between 1970 and 2017e (PCs)



Source: Deutsche Bank, ACEA

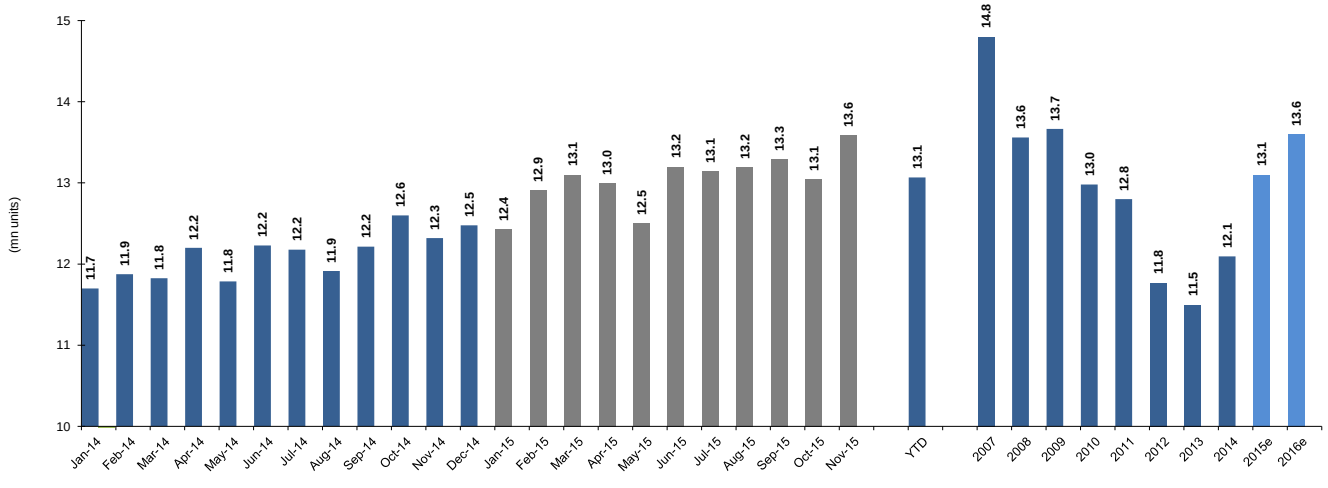
November was the 6th consecutive month where SAAR exceeded 13.0mn units and last month's selling rate was the highest since Feb 2011. The strong sales have however not translated into strong platinum demand as highlighted by the sponge – ingot arbitrage with sponge now trading at a discount.

Figure 224:: End of 2015/beginning of 2016, balance sheet position, DB estimate



Source: Deutsche Bank, Mitsubishi International Corp

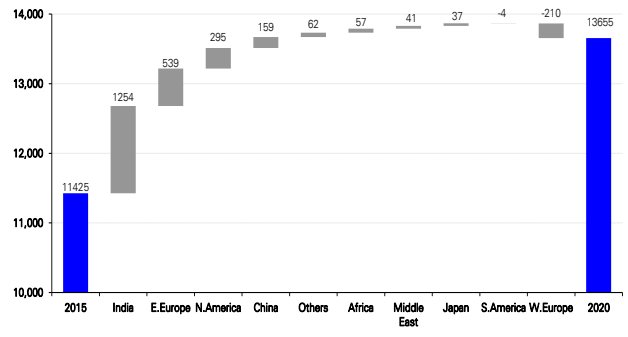
Figure 225:: SAAR on a monthly basis (Jan '13 – Nov '15) and full year estimates



Source: Deutsche Bank, LMC Automotive

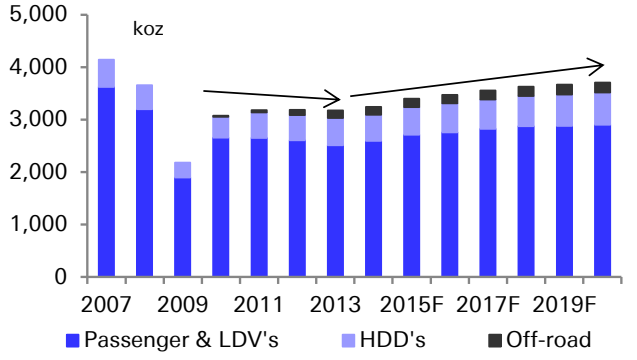
Despite the strong sales recovery in Europe, the outlook for diesel has been somewhat clouded by the diesel-gate scandal. We already factor in a declining diesel market share in Europe. However, on a global basis, growth from India offsets the loss from Western Europe. We still expect diesel to remain a key component of the Auto sales mix, especially in meeting tightening CO2 emission standards, and we expect the number of diesel cars to increase over the course of the decade. LMC Automotive's forecasts call for an increase of c.2 million units with the bulk coming from India. The challenge for platinum is that the increase in diesel vehicle numbers will be met by continual thrifting and the use of alternative technology, dampening the demand growth outlook for platinum. We estimate that the total Autocat demand including heavy duty diesel and off road applications will increase to 3.7Moz (on a gross basis) by 2020E, which is still 450koz short of the 2007 peak.

Figure 226:: Diesel passenger car production



Source: LMC Automotive, Deutsche Bank

Figure 227:: Gross platinum demand - Autocats



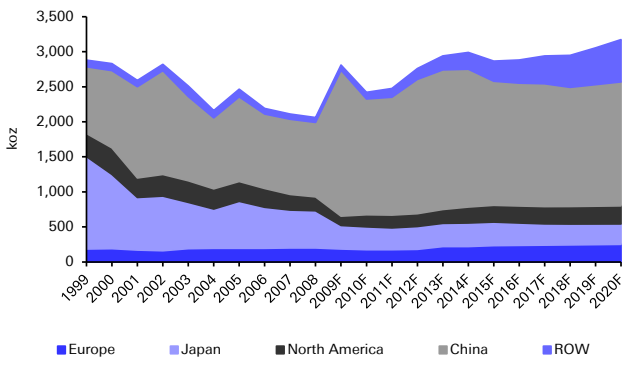
Source: Deutsche Bank, JMAT, SFA Oxford

The jewellery shock absorber may be more helpful in 2016

In periods of weak pricing, jewellery demand normally picks up which cushions the absence of industrial buying. This cushion has failed in 2015, with lower than expected sales at the Chinese retailers and overstocking at fabricators leading to lower purchases of platinum. Chinese demographics are not favourable, and given the aging population, the number of marriages are

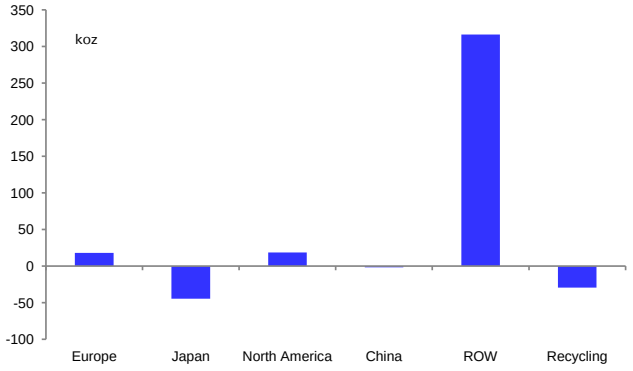
likely to fall too. Only 20% of the platinum jewellery is for the bridal market, with the other 80% related to more discretionary spend. The retail spend is very much determined by the marketing effort. The PGI's (the platinum jewellery marketing body funded by the producers) budget now has to split between India and a myriad of tier 3 and 4 cities. Platinum has experienced tough competition from white gold in the tier 1 and 2 cities.

Figure 228:: Platinum jewellery demand by region



Source: JMAT SFA Oxford, Deutsche Bank

Figure 229:: Additional ounces from jewellery demand by 2020E

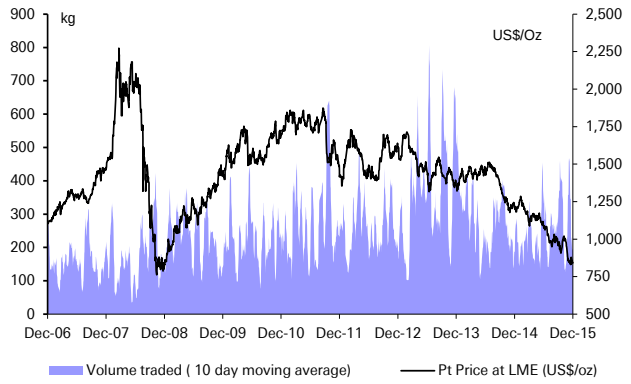


Source: JMAT SFA Oxford, Deutsche Bank

In India, the PGI has been successful in establishing the bridal jewellery campaign and has been taken up by the retailers. The efforts look reasonably sustainable to us and we expect the market to continue growing. However, India is still a small market, and is unlikely to offset the fade in China in the near-term.

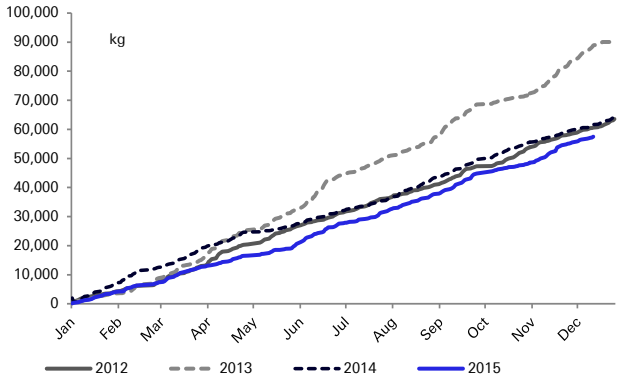
Trading on the SGE has been rather subdued in 2015, despite the general price weakness and sharp price falls. This has historically been a signal that Chinese jewellery demand is weak. In 2014, the main reason for the lower trading volumes on the SGE is the better availability of metal generally in China. Metal released from a large maintenance program at Chinese petroleum refineries is currently making its way into the market. In 2015, the reason for weak trading had been weak jewellery demand, partly due to anti-corruption investigations dampening the demand for luxury goods. November volumes showed some life however, and the trendline has diverged away from 2009/10 levels in response to the extreme weakness in price.

Figure 230:: Platinum traded on the SGE (10-day moving average)



Source: SGE, Thomson Financial datastream, Deutsche Bank

Figure 231:: Cumulative trading volumes on the SGE

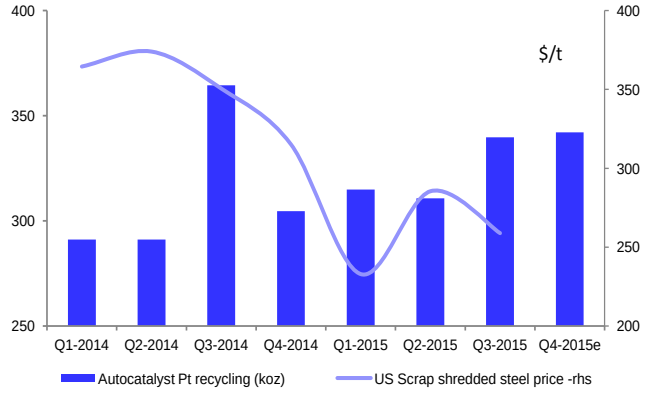


Source: SGE, Thomson Financial datastream, Deutsche Bank

Any tail off in recycling will be temporary in our view

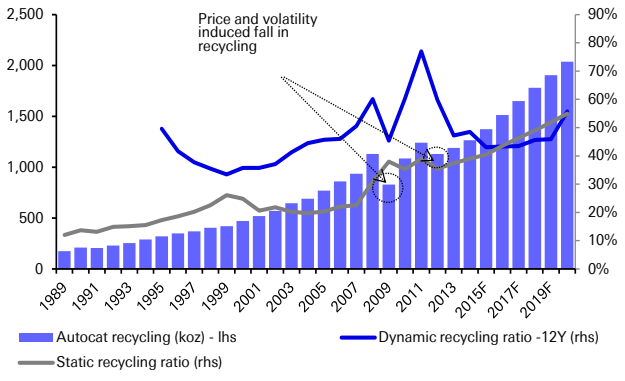
The combination of increasing recycling capacity at the major Autocat manufacturers in Johnson Matthey and the increasing loadings of autocats being recycled will result in the volume of metal being returned to the market from Autocats will increase steadily over the course of the decade. The growth rate of diesel cars being scrapped is likely to outweigh that of gasoline by a factor of 3x over the course of the decade. This means that the proportion of platinum being returned to the market versus palladium should increase. Furthermore we expect some of the gasoline cars that will be scrapped by the end of the decade to have some platinum in the catalyst. There is no doubt that recycling volumes have been impacted by weaker prices in 2015, especially due to the weaker steel prices. However, we think that this will be a temporary impact, and that volumes will pick up once again in 2016. The collection end of the supply chain is simply too cash driven to afford significant investments in working capital.

Figure 232:: Platinum autocatalyst recycling – quarterly: Expecting a recovery in 2016



Source: Deutsche Bank, SFA Oxford

Figure 233:: Long-term platinum autocatalyst recycling trends



Source: Deutsche Bank, JMAT, SFA Oxford

Cutting capacity is hard to do, but now something has to give

In our assessment of the market, the South African producers have to cut between 400 – 600koz of high cost platinum ounces in order to ensure a tight market, or at least tight enough to draw down the liquid stocks. We already include a "disruption allowance" of 200koz over the next two years increasing to 300koz in 2018E. This still yields a moderately (50 – 150koz) oversupplied market.

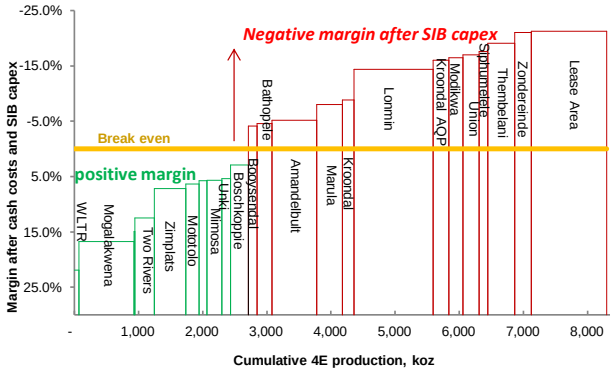
Part of disruption allowance in 2016 is to account for a likely strike event. We do not expect a repeat of 2014, but a six week strike is highly probable in Q2/3 this year. The main union in the platinum sector remains AMCU and so far they have not settled in the recent South African gold industry negotiations, despite settlements with the other major unions. We think this signals their intent and increases the probability of a strike next year. The wage negotiations also coincide with the municipal elections next year (May to August); a further reason for strike action.

Even post our disruption allowance; we still need a further 200 – 300koz of explicit cuts. Over 50% of South African supply is unprofitable at the current spot Rand basket price. The region that is most at risk is the UG2 reef on the Western limb which accounts for 50% of the country's production. The average net cash margin post sustaining capex is c-20%. This situation is unsustainable in our view.

SA Producers under continued balance sheet pressure

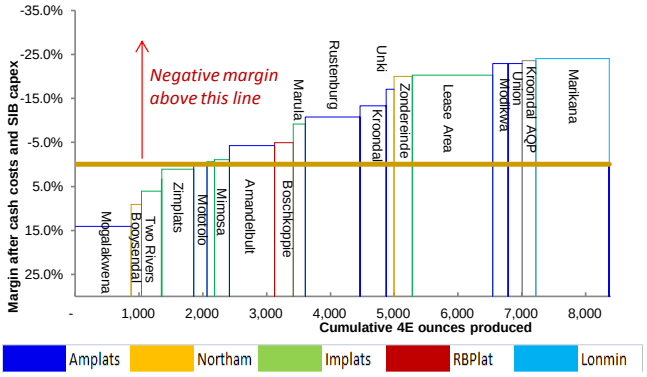
At spot Rand-PGM prices, the majority of PGM mines are cash flow negative after SIB-capex and remain so into 2016. On our estimates, each platinum producer is burning cash at a group level at current spot prices.

Figure 234:: 2015: margin curve, cash costs + SIB capex



Source: Deutsche Bank

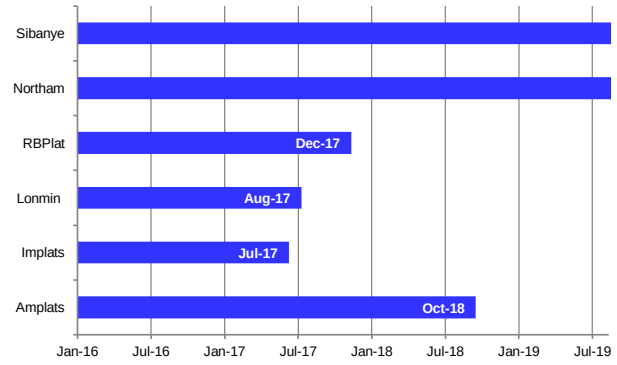
Figure 235:: 2016: margin curve, cash costs + SIB capex



Source: Deutsche Bank

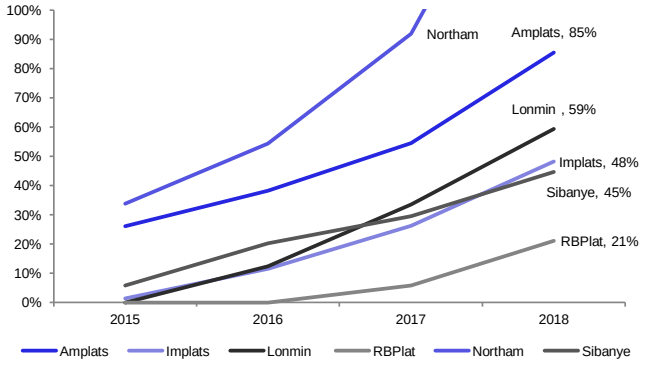
Taking into account only facilities currently in place and assuming current operating plans are implemented, we estimate Lonmin and Implats will face a liquidity crunch in mid-2017. RBPlat, starting from a net cash position, would exhaust its cash pile by the end of December 2017. Sibanye, taking into account its gold operations' free cash flow, and Northam, given its significant cash balance from preference shares, would be liquid well past 2018. Amplats would exhaust its available facilities by October 2018.

Figure 236:: How long current liquidity lasts at spot prices



Source: Deutsche Bank, Company Data

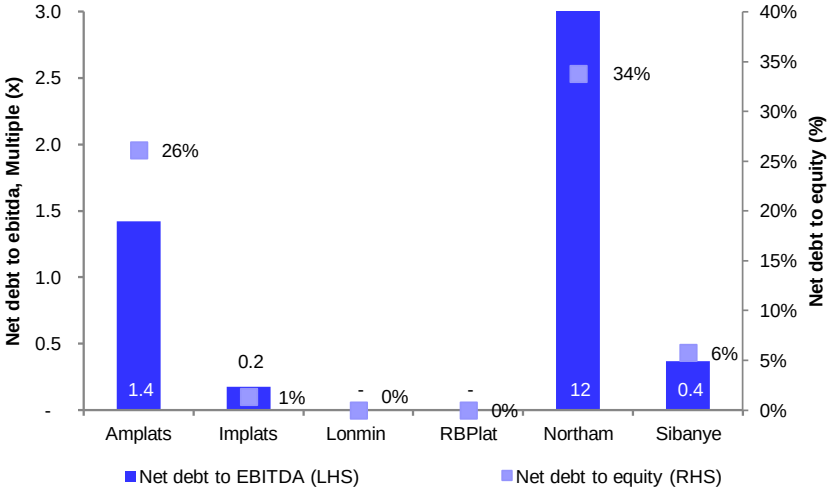
Figure 237:: Net debt to equity progression at spot prices



Source: Deutsche Bank, Company Data

Implats and Lonmin start 2016 with un-geared balance sheets, having both raised equity in 2H15. Amplats is starting from a relatively highly geared position: current net debt to EBITDA of 1.4x is second only to Northam; which is highly geared as a result of its preference share capital structure.

Figure 238:: End of 2015/beginning of 2016, balance sheet position, DB estimate



Source: Deutsche Bank, Company Data

Impala's R4.5bn convertible bonds mature in February 2018.

Figure 239: Starting point for analysis – last reported balance sheet metrics, extended to year end

Balance sheets at spot	Amplats	Implats	Lonmin	RBPlat	Northam	Sibanye
Last reported	6/30/2015	6/30/2015	30-Sep-15	30-Jun-15	30-Jun-15	30-Jun-15
Gross borrowings	15,285	6,691	7,095		6,493	2,476
Less cash	2,372	2,597	4,536	1,270	4,138	855
Net debt/(cash)	**12,913**	**4,094**	**2,559**	**(1,270)**	**2,354**	**1,665**
EBITDA (TTM)	9,225	4,368	273	727	936	6,347
Net debt to EBITDA	**1.4**	**0.9**	**9**	**n/a**	**2.5**	**0.26**
Net debt to equity	*24%*	*8%*	*10%*	*n/a*	*26%*	*11%*
DBe for year-end 2015, at spot:						
Net debt/(cash)	13,361	**769**	**Equity raised** **(1,039)**	(967)	3,038	876
EBITDA (TTM)	9,399	4,368	(168)	335	256	5,757
Net debt to EBITDA	1.4	0.2	n/a	n/a	12	0.4
Net debt to equity	*26%*	*1%*	*n/a*	*n/a*	*34%*	*6%*
Borrowings include:		Convert. bond due Feb.18			10 year pref shares	
Total facilities	31,876	3,000	5,209	458	1,000	9,800
Available liquidity at end 2015	18,515	9,097	6,248	1,901	5,138	8,924

Source: Deutsche Bank, Company Data, DataStream

Figure 240: Progression of balance sheets at spot Rand-PGM prices

DBe for 2016, at spot	Amplats	Implats	Lonmin	RBPlat	Northam	Sibanye
Opening net debt/(cash)	13,361	769	**(1,039)**	**(967)**	3,038	876
Free cash flow at spot	(4,714)	(5,260)	(3,697)	(593)	(465)	1,411
Net debt/(cash)	18,075	6,028	2,658	(374)	4,442	3,239
EBITDA (TTM)	164	(1,016)	(874)	(110)	170	6,928
Net debt to EBITDA	110	n/a	n/a	n/a	26.2	0.65
Net debt to equity	38%	11%	12%	n/a	54%	20%

DBe for 2017, at spot	Amplats	Implats	Lonmin	RBPlat	Northam	Sibanye
Opening net debt	18,075	6,028	2,658	(374)	4,442	3,239
Free cash flow burn at spot	(5,857)	(6,696)	(3,944)	(1,370)	(751)	(1,301)
Net debt	23,931	12,724	6,602	995	6,323	4,513
EBITDA (TTM)	1,746	(1,685)	(785)	(376)	(216)	5,242
Net debt to EBITDA	14	n/a	n/a	n/a	n/a	1.1
Net debt to equity	55%	26%	33%	6%	92%	30%
Available liquidity at end 2016	7,945	**(2,858)**	**(1,393)**	**(61)**	**3,922**	**5,745**

DBe for 2018, at spot	Amplats	Implats	Lonmin	RBPlat	Northam	Sibanye
Opening net debt	23,931	12,724	6,602	995	6,323	4,513
Free cash flow burn at spot	(9,559)	(8,233)	(5,102)	(2,415)	(1,080)	(2,129)
Net debt	33,490	20,957	11,704	3,410	8,701	6,376
EBITDA (TTM)	396	(2,798)	(1,215)	(424)	(569)	4,517
Net debt to EBITDA	85	n/a	n/a	n/a	n/a	1.7
Net debt to equity	85%	48%	59%	21%	181%	45%
Available liquidity at end 2016	**(1,614)**	**(11,091)**	**(6,495)**	**(2,476)**	2,842	3,615

Source: Deutsche Bank, Company Data, DataStream

Evolution of supply: + c.200-300koz platinum in 2016

From a bottom-up analysis of producers' plans, we estimate that primary production will increase by between 180-290koz in 2016, over 2015.

This is despite the current low level of prices, as producers face major barriers to exit from individual operations, a high proportion of fixed costs and weak balance sheets.

Net mined growth of 40-150koz from South Africa

Despite Rand-PGM prices well below the cost of production for most operations, producers are gearing up to deliver a net increase in South African (including Zimbabwe) production in calendar year 2016. The Lease Area ramp-up of two new shafts and a recovery at Zimplats off a low base after a ground fall are the main reasons for higher mined production. Other additions will be from on-reef development at RBPlat's Styldrift project and a full year of steady-state production from Northam's Booysendal operation (having hit steady state in late 2015). We estimate a net addition of mined supply of c.40koz in CY2016, after taking into account lower production scheduled from Lonmin Marikana and the closure of Eland platinum.

The WBJV (Platinum Group Metals) mine could add a further 70koz. In an October 2015 presentation, the company said first concentrate production is scheduled for the fourth quarter of 2015 and guided 2016 production of 116k 4E ounces (c.70koz of platinum). Other smaller operators (Bokoni, Smokey Hills, Tharisa and Jubilee) have also recently announced plans, in aggregate, to add c.40koz of platinum in 2016.

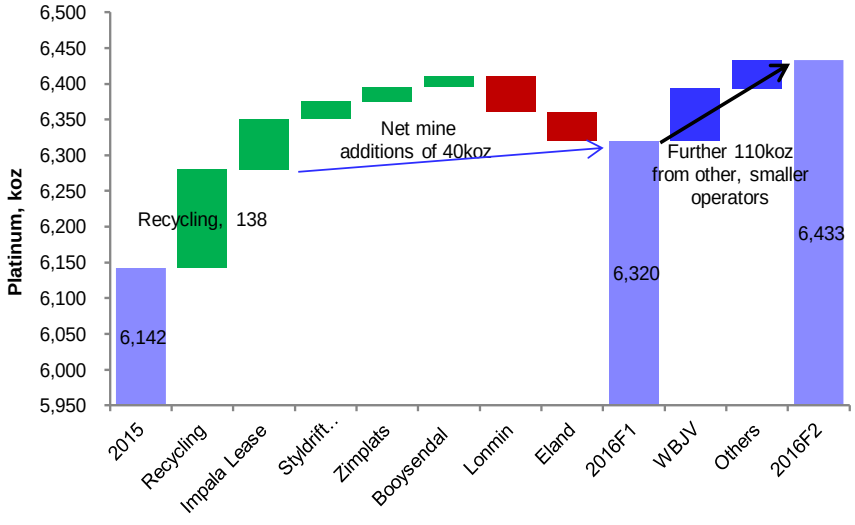
2016 production increases:

Lease Area ramp-up ***+70***
Zimplats recovery ***+20***
Styldrift development ***+25***
Booysendal steady-state ***+15***
WBJV ramp-up ***+73***
Tharisa, Smokey Hills, Jubilee production ***+41***

2016 production cuts

Marikana ***-50***
Eland platinum ***-40***

Figure 241: Growth expected in SA mined supply and recycling, 180-290koz



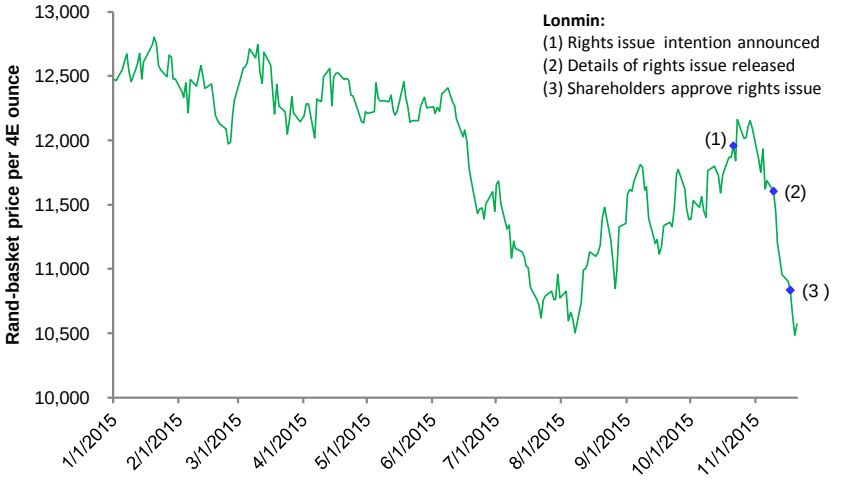
Source: Deutsche Bank, Company Data

Market disappointed by short-term supply's insensitivity to price

The most recent plummet in the Rand-PGM prices coincided with Lonmin's announcement of its business plan and intention to raise equity capital. We are often asked by investors why supply does not respond to low prices and why loss-making ounces continue to be produced and sold. In our view, there are two main reasons why short-term supply is effectively price insensitive:

- 1) Barriers to exit
  - Closure costs: environmental rehabilitation, retrenchment
  - Political and socio-economic consequences: government, communities and employees
- 2) Operational and financial leverage
  - A high proportion of fixed costs. In order to reduce unit costs, producers seek to maximise efficiencies and produce more.
  - Financial leverage exacerbates inflexibility. Financial obligations mean producers cannot hold on to inventory or idle production.

Figure 242: 2015 year-to-date, Rand-basket price (standard, 4E)



Source: Deutsche Bank, DataStream

The Rand-basket price is 16% lower year-to-date.

Figure 243: Summary of PGM price movements over trailing five-year period

Metals, FX		Current price	Average, 2015 Ytd	Diff	Price changes Ytd	1 year	3 years	5 years
Rand-basket	**R / 4E oz**	**10,573**	**11,865**	**-11%**	**-16%**	**-10.6%**	**0.2%**	**8.5%**
Rand/USD	R/USD	13.93	12.52	11%	23.7%	24.8%	60.0%	96.8%
USD-basket	**USD / 4E oz**	**759**	**953**	**-20%**	**-32%**	**-28%**	**-37%**	**-45%**
Platinum	USD/oz	858	1,075	-20%	-33%	-29%	-44%	-48%
Palladium	USD/oz	551	707	-22%	-29%	-28%	-8%	-20%
Rhodium	USD/oz	760	977	-22%	-41%	-36%	-31%	-67%
Gold	USD/oz	1,079	1,171	-8%	-11%	-6%	-36%	-21%

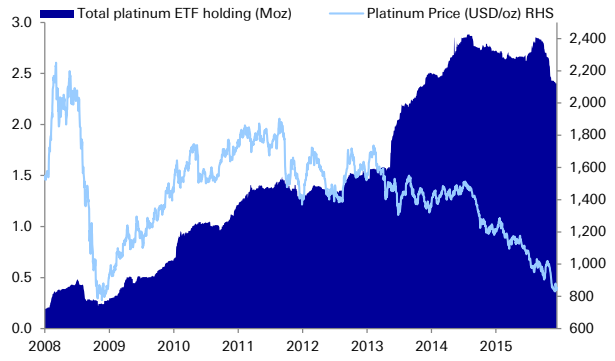
**Standard 4E basket price approximated at prill of 57.5% Pt, 32% Pd, 7.5% Rh and 3% Au*

Source: Deutsche Bank, DataStream

Investors take flight, albeit slowly

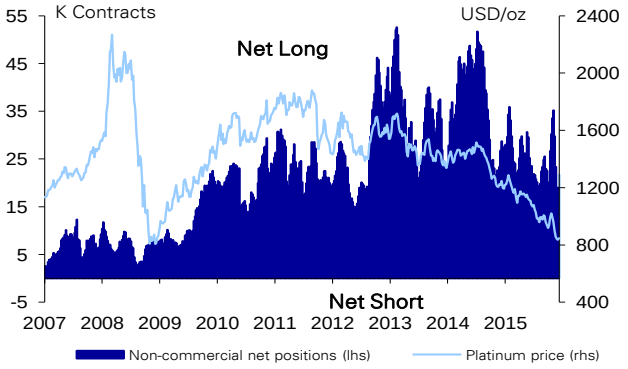
Positioning on the Nymex has moved to a much less extreme net long position. The current positioning is similar to the position back in early July of the current year. We have also seen some ETF's outflows, mostly from the South African domiciled vehicles, although the steady small outflows from elsewhere remain a feature. The various ETF's have been net sellers of c.250koz since the peak in mid 2015.

Figure 244: Total platinum ETF holdings



Source: Bloomberg Finance LP, Deutsche Bank

Figure 245: Non commercial net positions on the Nymex - platinum



Source: Reuters, CFTC, Deutsche Bank

Figure 246: Platinum supply-demand balance

Platinum		2010	2011	2012	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F
South African supply	Koz	4,635	4,855	4,205	4,353	3,091	4,182	4,121	4,191	4,214	4,193	4,311
North American supply	Koz	200	350	310	340	395	375	375	375	380	385	390
Russian production	Koz	825	835	800	740	740	735	740	745	750	755	760
Zimbabwe	Koz	280	340	365	402	390	395	431	444	444	447	447
Other	Koz	110	100	110	200	225	200	205	210	215	220	225
Autocat recycling	Koz	1,085	1,240	1,130	1,190	1,265	1,374	1,513	1,649	1,780	1,903	2,036
Total supply	**Koz**	**7,135**	**7,720**	**6,920**	**7,225**	**6,106**	**7,262**	**7,385**	**7,614**	**7,784**	**7,903**	**8,169**
Supply growth	%	4.1	8.2	-10.4	4.4	-15.5	18.9	1.7	3.1	2.2	1.5	3.4
Total demand	**Koz**	**7,160**	**7,270**	**7,090**	**7,680**	**7,271**	**7,252**	**7,428**	**7,638**	**7,538**	**7,691**	**7,845**
Demand growth	**%**	15.2	1.5	-2.5	8.3	-5.3	-0.3	2.4	2.8	-1.3	2.0	2.0
Autocatalyst	Koz	3,075	3,185	3,190	3,180	3,245	3,401	3,475	3,560	3,633	3,667	3,709
Chemical	Koz	440	470	505	585	585	600	603	618	632	646	661
Electrical	Koz	220	220	180	170	185	166	167	168	168	167	165
Glass	Koz	385	555	160	190	115	145	125	165	170	175	170
Investment	Koz	655	460	455	830	245	75	85	95	-95	-85	-75
Jewellery	Koz	1,685	1,665	1,920	2,080	2,215	2,153	2,251	2,298	2,275	2,348	2,431
Medical & Biomedical	Koz	230	230	235	240	245	252	258	265	272	278	285
Petroleum	Koz	170	210	180	170	155	170	165	170	165	170	170
Other	Koz	300	275	265	235	280	290	300	300	320	325	330
Market balance	**Koz**	**-25**	**450**	**-170**	**-455**	**-1,164**	**10**	**-44**	**-24**	**245**	**212**	**324**
Annual average price	**US$/oz**	**1612**	**1721**	**1397**	**1487**	**1386**	**1053**	**933**	**948**	**1150**	**1250**	**1390**
Market balance excl. investment demand		**630**	**910**	**285**	**375**	**-919**	**85**	**41**	**71**	**150**	**127**	**249**

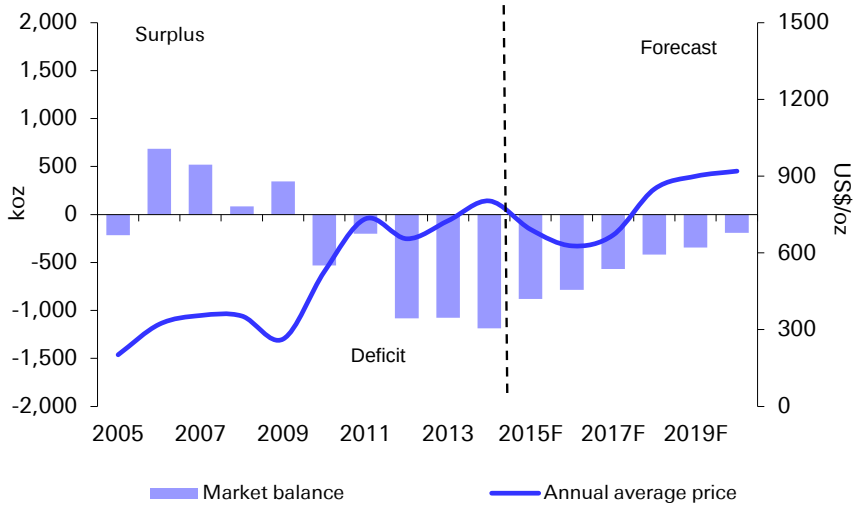
Source: Johnson Matthey, SFA oxford, Deutsche Bank

Palladium: The fundamentals remain sound…

…but no tall poppies are allowed

We continue to forecast a palladium market which is in deficit until the end of the decade. The main demand driver remains growth in gasoline vehicles especially in China, combined with increasing emission legislation. We forecast only modest supply growth, with Norilsk eking out a few more ounces and the recovery in South African supply not being as influential in palladium given the composition of the ore. Although we forecast the magnitude of the deficits to decrease over the next five years, the market is still looking more favourable and at least in palladium the ample liquid stocks are being drawn down.

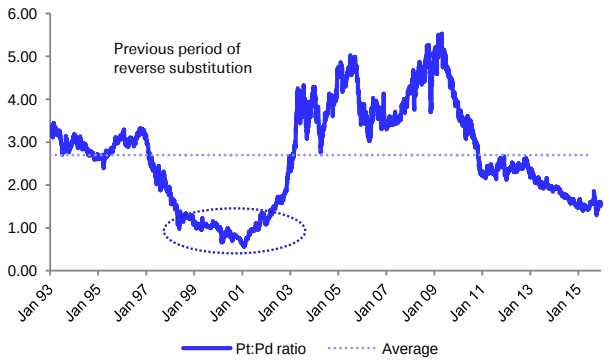
Figure 247: Palladium supply – demand balance



Source: Deutsche Bank, SFA Oxford, JMAT

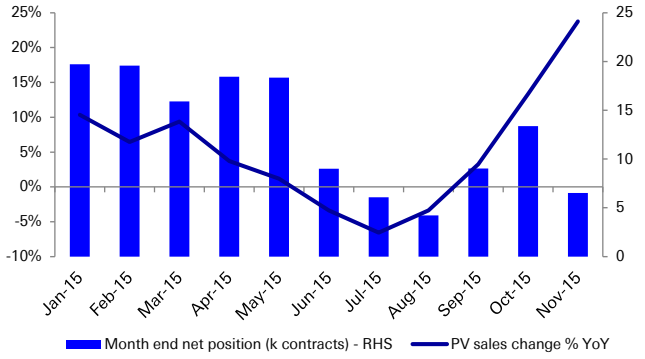
However given the ample liquid stocks (estimated at over 6Moz), the market remains very susceptible to investor sentiment. In this case a contraction in Chinese vehicle sales was the catalyst, sparking of a significant liquidation in long positions. The price ratio between platinum and palladium was also at 1.54. In the current bearish commodity market, a significant out-performer is often dragged back by the entire complex. Such was palladium's fate in 2015 (as was Zinc). Now that the palladium derating has happened, we think the price outlook is favourable once more, and forecast a modest price recovery. The recovery in price will only be driven in part by the fundamentals, but we expect some strike action in South Africa, which investors will want to play through palladium as opposed to platinum in our view.

Figure 248: Pt-Pd ratio



Source: Thomson Reuters Datastream, Deutsche Bank

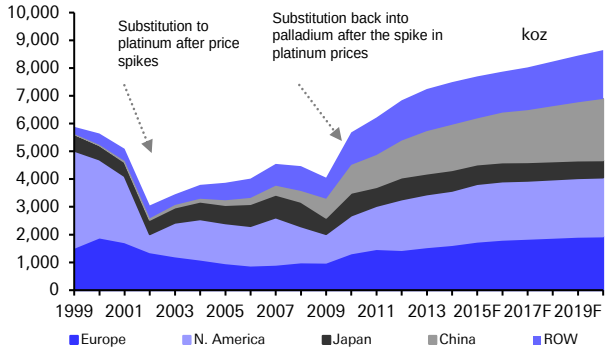
Figure 249: Comex net position vs China PV sales growth



Source: Deutsche Bank, Reuters, CFTC

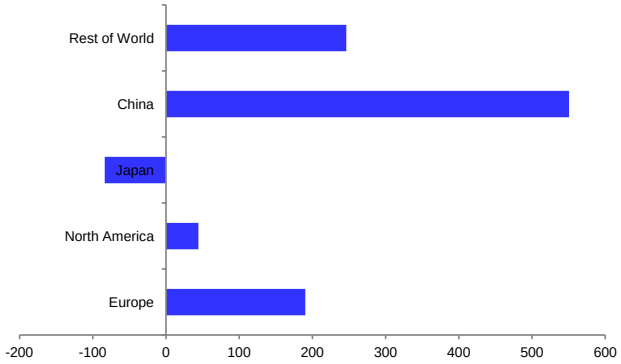
The increase in demand for palladium continues to be Auto demand, and in particular Chinese Auto demand. The drivers are twofold - increasing vehicle sales and the catch-up emission legislation. The growth rate in vehicle sales in China is likely to be mid single digits on a sustainable basis, as there is now an element of saturation in the Chinese market, not dissimilar to the platinum jewellery market. Tier 1 and 2 cities now afford limited growth. The growth opportunities are most likely to come from the lower tier cities where a whole new marketing effort is required. We do not want to overstate the saturation case, because the overall vehicle ownership level is still low. Simply, that e dealerships will need to grow in the lower tier cities. The continued weakness in the oil price, is likely to continue skewing demand back to the larger displacement engine light trucks in North America, which will drive palladium demand in tandem with tighter emission legislation. The continued substitution of palladium in diesel autocats (albeit modest in light of Euro VI legislation is a factor in the increasing demand in Europe. Some of the emerging markets, such as Brazil and Russia have however been particularly disappointing. We do not forecast much of an improvement in 2016.

Figure 250: Palladium Autocat demand



Source: JMAT, SFA Oxford, Deutsche Bank

Figure 251: Additional ounces by region from 2015 to 2020E



Source: JMAT, SFA Oxford, Deutsche Bank

China remains the key market in both absolute volume terms and growth terms. Sales of passenger vehicles jumped over 13% in October, as sales were boosted by a sales tax cut from 10% to 5% for vehicles smaller than 1.6 litres. October also saw a sharp increase in SUV sales, mirroring the trend in the US. This is positive for palladium as these vehicles typically have a higher loading.

China scrapped nearly 1 million vehicles in the first 10 months of 2015. These vehicles were mainly sub-Euro 3 diesel vehicles which means that there should be limited impact from the recycling stream. We expect China vehicle sales to grow 7% YoY in Nov-Dec, and 8% in 2016E. We do not envision as strong growth as in 2009/10 considering 1) a much higher vehicle sales base, as well as 2) lukewarm macroeconomic growth with mild property sales growth and lack of a strong FAI push. With the expiry of stimulus, we only expect 4% YoY vehicle sales growth in 2017E.

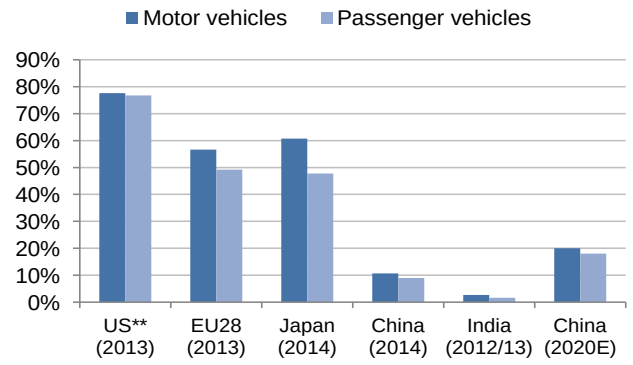
Figure 252: Deutsche Bank's China vehicle sales volume forecast

(m units)	2012	2013	2014	2015E	2016E	2017E	Remarks
Passenger vehicles (PV)							
Sedans	10.74	12.01	12.38	11.51	12.00	11.82	We believe demand for sedans will underperform overall PV sales, despite help from the small-engine car tax cut until 2016E, given the increasing customer desire to diversify.
YoY%	*6.1%*	*11.8%*	*3.1%*	*-7.0%*	*4.2%*	*-1.5%*	
MPVs	0.49	1.30	1.91	2.02	2.11	2.20	We expect MPV sales growth to be consistent, considering the potential increase in family size.
YoY%	*-0.9%*	*164.3%*	*46.8%*	*5.6%*	*4.5%*	*4.0%*	
SUVs	2.00	2.99	4.08	6.10	7.32	8.34	We expect the SUV segment's sales outperformance to continue, on increasing demand to differentiate from typical sedan consumption and availability of small-engine SUVs.
YoY%	*25.5%*	*49.4%*	*36.4%*	*49.7%*	*19.9%*	*13.9%*	
Mini-cars	2.26	1.63	1.33	1.06	0.95	0.95	We expect mini-car demand to trough in 2016E and that long-term demand should still be supported by rural economic development.
YoY%	*-0.1%*	*-28.0%*	*-18.1%*	*-20.6%*	*-10.4%*	*0.0%*	
Total passenger vehicles	**15.50**	**17.93**	**19.70**	**20.69**	**22.38**	**23.30**	
YoY%	*7.1%*	*15.7%*	*9.9%*	*5.0%*	*8.1%*	*4.1%*	
Commercial vehicles (CV)							
Heavy-duty trucks and tractor trailers	0.64	0.77	0.74	0.54	0.56	0.57	2015E truck demand is weak because of sluggish fixed-asset investment growth and lukewarm logistics activities. However, we still expect truck sales growth to normalize in 2016E on further improvement in infrastructure spending and logistics activities, including domestic ecommerce activities.
YoY%	*-27.8%*	*21.7%*	*-3.9%*	*-27.4%*	*3.3%*	*2.6%*	
Medium trucks	0.29	0.29	0.25	0.18	0.18	0.19	
YoY%	*-0.6%*	*-1.2%*	*-13.6%*	*-25.9%*	*-2.0%*	*3.3%*	
Light trucks	1.84	1.91	1.66	1.54	1.60	1.64	
YoY%	*-2.0%*	*3.6%*	*-12.9%*	*-7.6%*	*3.9%*	*3.0%*	
Mini-trucks	0.53	0.53	0.53	0.54	0.56	0.58	
YoY%	*8.7%*	*-1.5%*	*0.6%*	*1.9%*	*4.4%*	*3.2%*	
Buses	0.51	0.56	0.61	0.58	0.61	0.64	Buses' sales growth should trough in 2015E, and long-term demand should still be supported by increasing demand for passenger hauling on highways and for public transportation in cities.
YoY%	*4.0%*	*10.4%*	*8.4%*	*-4.0%*	*5.1%*	*3.7%*	
Total commercial vehicles	**3.81**	**4.06**	**3.79**	**3.38**	**3.51**	**3.62**	
YoY%	*-5.5%*	*6.4%*	*-6.5%*	*-10.8%*	*3.8%*	*3.1%*	
Aggregate vehicles sales	**19.31**	**21.98**	**23.49**	**24.08**	**25.89**	**26.92**	
YoY%	*4.3%*	*13.9%*	*6.9%*	*2.5%*	*7.5%*	*4.0%*	
Old vehicle sales forecast				**23.88**	**25.41**	**n.a.**	
YoY%				*1.7%*	*6.4%*	*n.a.*	

Source: China Association of Automobile Manufacturers (CAAM), Deutsche Bank estimates

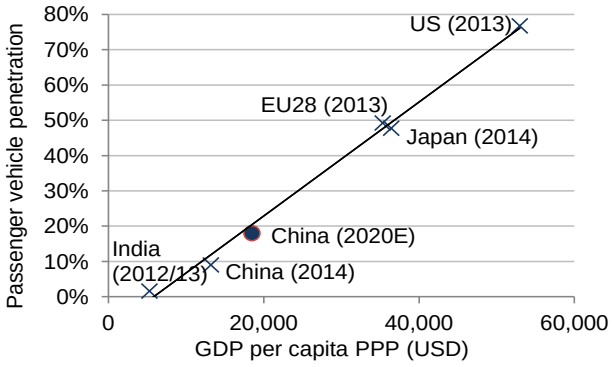
we believe that China auto demand and fleet size are far from saturation simply considering the low penetration of PV ownership (at 9% as of 2014) vs. other major global economies (see Figure 253). What we also notice is the close correlation between PV penetration and per-capita GDP (at purchasing power parity, or PPP; see Figure 254).

Figure 253: Motor vehicle penetration* comparison



Remarks: * Penetration = Number of PVs/Population; ** Trucks are included
Source: CEIC, ACEA, Deutsche Bank

Figure 254: Passenger vehicle penetration vs. GDP per capita PPP



Source: CEIC, ACEA, World Bank, Deutsche Bank

Thirteenth Five-Year Plan implying possible doubling of fleet size

At China's Fifth Plenum, held in late October, the plenum approved the proposals for national economic and social development during the Thirteenth Five-Year Plan. In the proposal, the Chinese government committed to doubling the 2010 per-capita GDP by 2020E. If we use the GDP per capita PPP as a proxy, China GDP per capita PPP is supposed to double to about USD18,500 in 2020E. This is similar to Japan's GDP per capita PPP in 1989, when the country's PV penetration was at 26%. In Figure 254, the best-fit line also implies that a reasonable PV penetration level when GDP per capita PPP is USD18,500 is about 20%. Considering the Japanese experience and the current correlation between major economies' PV penetration and per capita GDP, we believe it is indeed prudent to forecast that China's PV penetration could double to 18% by 2020E.

Assuming China will have about 1.4bn population by the end of 2020E, 18% PV penetration means that the number of PVs in China will amount to 252m units, or a net increase of about 128.7m units between 2015E and 2020E. If we prudently add another 3.0m units of potential PV exports (9M15: 323,225 units) and 10% of the existing 123m-unit PV fleet, or 12.3m units, as replacement of scrapped PVs during the period, total new PV shipment in China in 2015-20E would be about 144.0m units. If we assume linear growth in PV sales volume in 2018-20E (see Figure 255) after the stimulus-affected period in 2015-17E, 2020E PV sales could amount to 27.2m units, implying a 5.6% five-year CAGR. In our view, this is not a stretched estimate, as China's annual GDP growth is still likely to stay above 6% during the period, in our view.

Figure 255: Deutsche Bank's 2015-20 passenger vehicle sales forecast

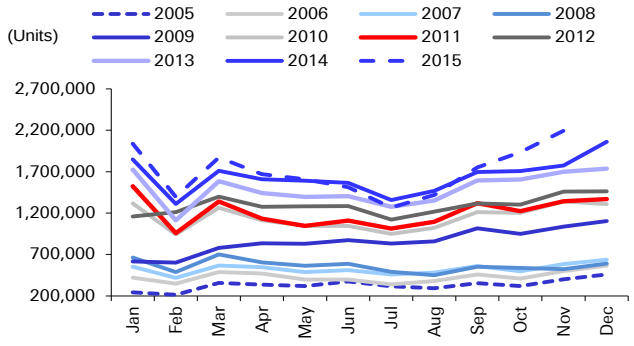
(million units)	2015E	2016E	2017E	2018E	2019E	2020E	Total 2015-20E
Passenger vehicle sales	20.7	22.4	23.3	24.6	25.9	27.2	144.0
YoY%	5.0%	8.1%	4.1%	5.5%	5.2%	5.0%	

Source: Deutsche Bank estimates

November passenger vehicle (PV) sales were 2.2m units, implying a YoY growth rate of 23.7% (13.4% MoM). By segment, SUV sales stayed strong (up by 72.1% YoY and accounting for 33% of China PV sales) and local brands' performance benefitted with their SUV sales making up 55% of total November SUV sales. Regarding the impact of the sub-1.6L PVs' 5ppt partial

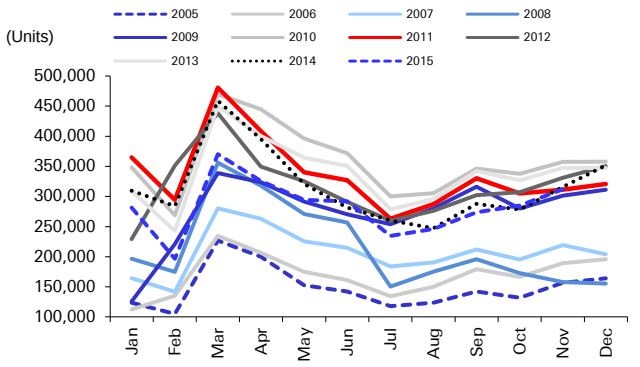
purchase tax cut, the policy led to 29.0% YoY (16.5% MoM) wholesale growth for that segment to 1.56m units, reflecting the effectiveness of the policy. In comparison, above-1.6L PV wholesales went up by 13.2% YoY in November. Commercial vehicle sales were up 10% MoM, but down c.1% YoY. Commercial vehicle sales will pick in the following months as some stability in Chinese environment is seen.

Figure 256: China Passenger Vehicle sales



Source: Deutsche Bank, CAAM

Figure 257: China Commercial Vehicle sales

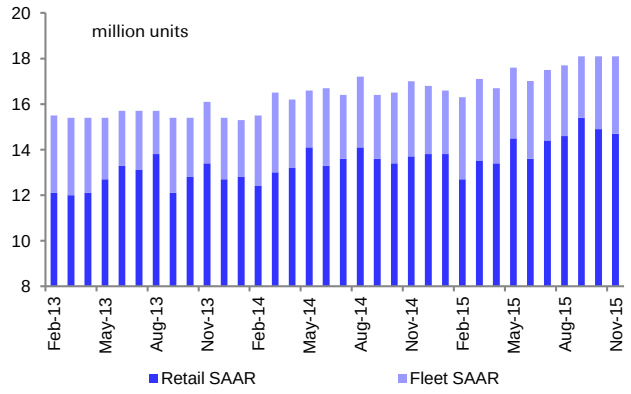


Source: Deutsche Bank, CAAM

Pent up demand has driven US sales growth since 2010 but the sustainability of growth for 2016E is now in question. Employment growth and low gasoline prices are supportive, but easy credit terms are now the largest contributor to sales. Manufacturers will be forced to chase market share and volumes with large incentives. In a rising interest rate environment, this may not be sustainable.

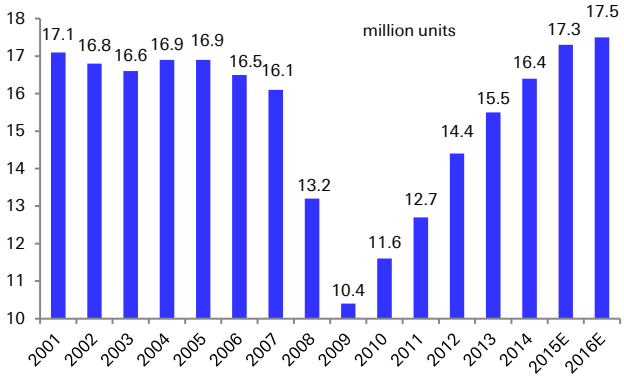
Looking at the U.S., Autos, Electronics and Housing have been the top categories of increased consumer spending this year (offsetting weakness in apparel and other softer goods). And this trend continued in November with a U.S. light vehicle SAAR of 18.1MM, in-line with our estimate (above 18 MM for the third month in a row). We believe that autos are being supported by a continuation of strong vehicle affordability (high used prices, low rates, and relatively loose financing terms), improving consumer confidence, off-lease volumes, and low fuel prices. If the SAAR were to remain around 18MM in December, U.S. sales would finish the year between 17.35MM-17.45MM units. We currently forecast a 2016 SAAR of 17.5MM, and we believe that a strong close to the year could the door for upside to the high 17MM unit range. As of mid November U.S. vehicle pricing was more benign than the past four months, but we believe that these pricing levels are not entirely meaningful given the holiday promotions were not been taken into account. In addition, a number of the Industry's promotions are being perceived as more aggressive than they really are. The implications of this are mixed, as Automakers may feel some pressure to up the ante once these expire.

Figure 258: US Auto Sales Total Annualized SAAR



Source: Deutsche Bank

Figure 259: US SAAR forecasts

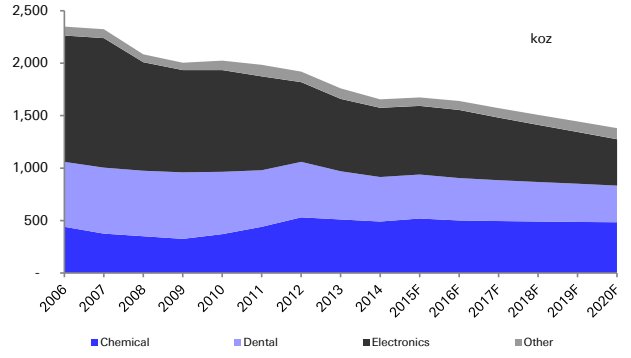


Source: Deutsche Bank

After a drop of 39% in Oct, last month's light vehicle sales in Russia plunged the most this year (-43%) underpinned by the deteriorating ruble and overall weak macro economic conditions, according to AEB. YTD, volumes are just under 1.5mn units, -35%. Ruble has fallen by 23% over the last 12 months. We expect the market to reach 1.57m units only this year, underlying a high decline of -47% in Q4 (on a high base).

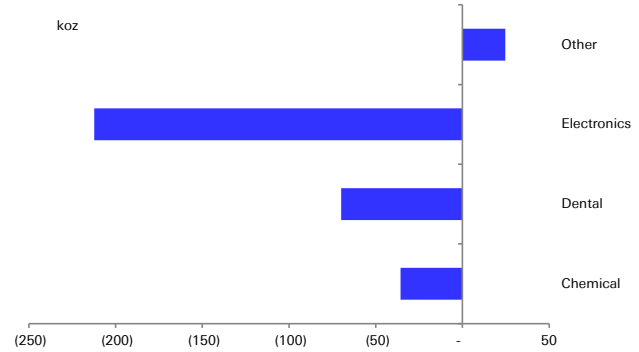
Palladium consumption under the industrial category is likely to register very slight growth in 2015 (1%), with the steep fall in price leading to an uptick in Chemical demand, which bucks the long term trend of falling dental (substitution by gold and ceramics) and electrical applications (substituting by Ni and Cu in MLCC's). However over the next five years we forecast Industrial demand to fall by c.290koz, or a CAGR of 3.8%.

Figure 260: Falling palladium Industrial demand



Source: JMAT, SFA Oxford, Deutsche Bank

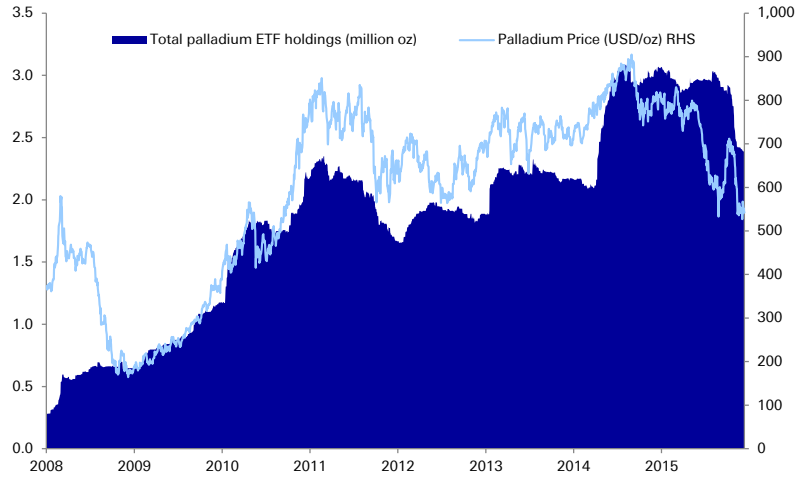
Figure 261: Additional / (less) ounces by application from 2015 to 2020E



Source: JMAT, SFA Oxford, Deutsche Bank

The negative sentiment and the sharp fall in price has led to some ETF outflows, although the magnitude of the outflows is relatively modest when compared to the fall in price. Outside of South Africa there has been modest and persistent selling over the last two years, but over the past two months South African ETF's have turned net sellers.

Figure 262: Palladium ETF holdings



Source: Bloomberg Finance LP, Deutsche Bank

Figure 263: Palladium supply-demand balance

Palladium		2010	2011	2012	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F
South African supply	koz	2,640	2,576	2,251	2,376	1,845	2,340	2,383	2,436	2,476	2,526	2,570
North American supply	koz	590	900	895	928	1,055	1,038	1,015	1,008	1,001	994	988
Zimbabwe	koz	220	265	265	331	315	335	337	348	348	349	349
Russian production	koz	2,720	2,705	2,630	2,650	2,690	2,595	2,630	2,685	2,785	2,785	2,785
Russian stockdraw	koz	1,000	775	260	250	0	0	0	0	0	0	0
Russian sales	koz	3,720	3,480	2,890	2,900	2,690	2,595	2,630	2,685	2,785	2,785	2,785
Other mine	koz	185	155	300	200	455	455	455	455	455	455	455
Secondary Supply		1,315	1,695	1,585	1,685	1,805	1,930	2,068	2,219	2,346	2,487	2,700
Total supply	**koz**	**8,670**	**9,071**	**8,186**	**8,420**	**8,165**	**8,693**	**8,888**	**9,151**	**9,411**	**9,598**	**9,848**
Supply growth	*%*	*7.5*	*4.6*	*-9.8*	*2.9*	*-3.0*	*6.5*	*2.2*	*3.0*	*2.8*	*2.0*	*2.6*
Total demand	**koz**	**9,295**	**7,930**	**9,480**	**9,521**	**9,950**	**9,083**	**9,533**	**9,580**	**9,692**	**9,808**	**9,908**
Demand growth	*%*	*25.9*	*-14.7*	*19.5*	*0.4*	*4.5*	*-8.7*	*5.0*	*0.5*	*1.2*	*1.2*	*1.0*
Autocatalyst	koz	5,680	6,215	6,835	7,241	7,490	7,696	7,866	8,021	8,233	8,445	8,644
Dental	koz	595	540	530	460	425	420	405	390	378	365	350
Electronics	koz	970	895	760	690	660	654	649	596	544	493	442
Chemical	koz	370	440	530	510	490	519	500	495	490	486	483
Jewellery	koz	495	295	255	245	205	203	167	125	89	52	16
Investment	koz	1,095	-565	470	275	600	-490	-140	-138	-136	-134	-132
Other	koz	90	110	100	100	80	80	85	90	95	100	105
Market balance	**koz**	-625	1,141	-1,294	-1,101	-1,785	-390	-645	-429	-282	-210	-60
Annual average price	**US$/oz**	**525**	**733**	**644**	**726**	**803**	**692**	**628**	**670**	**850**	**900**	**920**
Market balance without investment demand	**koz**	**470**	**576**	**-824**	**-826**	**-1,185**	**-880**	**-785**	**-567**	**-418**	**-344**	**-192**

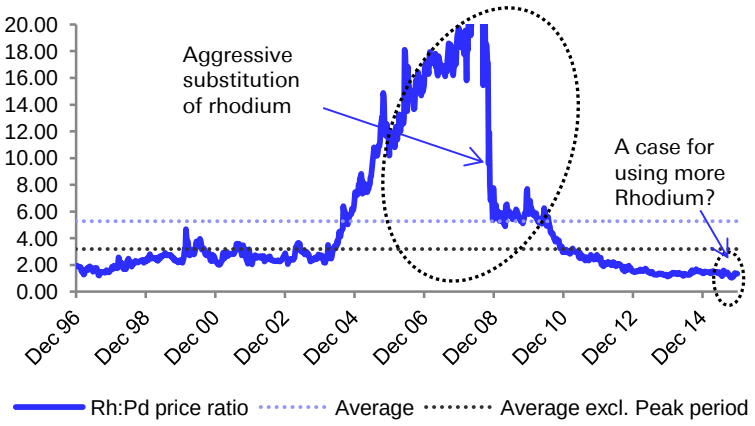
Source: Johnson Matthey, SFA oxford, Deutsche Bank

Rhodium: The biggest casualty from diesel-gate

Losing one of the two demand drivers

The rhodium market has been trying to re-establish itself as an important component in the auto-catalyst mix post aggressive substitution post the price spike to +USD10,000/oz. There were two key drivers in re-establishing demand; firstly the price itself which has collapsed to less than a tenth of its peak pricing, and is at an a near historical low versus palladium; and secondly the successive waves of Euro VI legislation where significant quantities of metal were used in light duty diesels for the first time in Lean NOx traps (LNT's). The first demand driver remains intact. Rhodium's main autocat market is the gasoline three-way catalyst, where the outlook for growth remains robust (China) if not stellar. The attractive price ratio versus palladium (now at 1.34) should in theory drive some substitution back into rhodium from palladium.

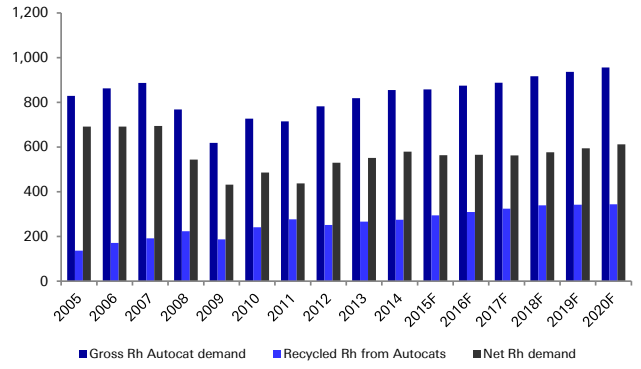
Figure 264 Rhodium - palladium ratio



Source: Thomson Reuters Datastream, Deutsche Bank

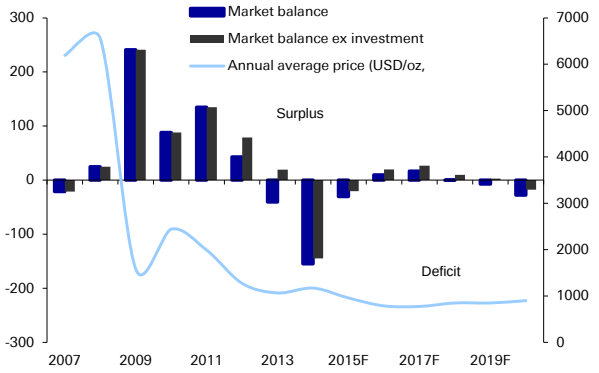
The second demand driver has been dealt a severe blow as a result of the diesel-gate scandal. In our view, the main outcome from the VW NOx emissions scandal is that it highlights the challenges in meeting Euro VI standards under real world driving conditions. However tests by the ICCT also show that some vehicles can meet these standards under real world driving conditions. The technology does exist. However, the technology is the ultra low PGM SCR solution. The relative cost means that small diesel cars where LNT's are the main technology of choice will become increasingly uneconomic. As a result, we have downgraded our demand expectations for rhodium, which means the market looks modestly oversupplied for the four years. In Autocats, we estimate that an additional demand of c.100koz will be required by the end of the decade, most of which will be supplied by recycling c.70koz, resulting in a modest net demand of 30koz by the end of the decade. As South African supply recovers from the strike, we forecast the market to be in a surplus for the next two years.

Figure 265: Rhodium demand in Autocats



Source: Deutsche Bank, JMAT, SFA Oxford

Figure 266: Rhodium supply demand balance



Source: Deutsche Bank, JMAT, SFA Oxford

In a market which is in a small surplus, or balanced at best, it is difficult to build a case for sharply recovering prices from a fundamental perspective, especially when there are highly liquid producer stocks of c.300 – 350koz. There are two potential upside risks for near-term prices. The first is a protracted strike in South Africa which has the potential to push the market into a significant deficit as in 2014. We factor in a limited strike in South Africa in our supply demand balance and price forecast. The second upside risk is new supply contracts which incentivize the auto manufacturers to buy rhodium, either through discounts or to link the quantity of palladium to the amount of rhodium taken. The conundrum however, is that these short-term upsides may damage the market over the medium term, with auto manufacturers already nervous about the security of supply.

Figure 267: Rhodium supply-demand balance

Rhodium		2010	2011	2012	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F
Total supply	**Koz**	**975**	**1,043**	**1,001**	**1,003**	**860**	**1,004**	**1,045**	**1,073**	**1,092**	**1,113**	**1,122**
Supply growth	%	1.9	7.0	-4.0	0.3	-14.3	16.7	4.0	2.7	1.8	1.9	0.8
South African supply	koz	632	641	599	590	425	546	583	598	584	619	625
North American supply	koz	10	23	35	35	40	45	45	45	45	45	45
Zimbabwe	koz	19	29	30	31	35	34	23	21	38	22	22
Other	koz	3	3	10	10	10	10	11	11	12	12	13
Russian sales	koz	70	70	75	70	75	74	73	73	73	73	73
Secondary	koz	241	277	252	267	275	295	310	325	340	342	344
Total demand	**Koz**	**887**	**908**	**958**	**1,044**	**1,015**	**1,034**	**1,035**	**1,052**	**1,090**	**1,118**	**1,147**
Demand growth	%	23.9	2.4	5.5	9.0	-2.8	1.9	0.1	1.6	3.6	2.6	2.6
Autocat	koz	727	715	782	819	855	858	875	884	915	934	954
Chemical	koz	67	72	80	85	85	90	70	75	80	86	92
Electrical	koz	4	5	5	5	5	6	7	7	6	6	6
Glass	koz	68	78	25	35	15	25	27	29	31	33	35
Investment	koz	0	0	36	60	10	10	10	10	10	10	10
Other	koz	21	38	30	40	45	45	46	47	48	49	50
Market balance	**Koz**	**88**	**135**	**43**	**-41**	**-155**	**-30**	**10**	**21**	**2**	**-5**	**-26**
Annual average price (USD/oz,	**US$/oz**	**2,442**	**1,990**	**1,274**	**1,067**	**1,172**	**958**	**788**	**775**	**850**	**850**	**900**

Source: Johnson Matthey, SFA oxford, Deutsche Bank

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Equities summary

Post these commodity revisions, the price to NPV ratio for the Mining Sector (where the sector is defined as the stocks under coverage) is at 0.67x.

All of the stocks under our coverage are trading at par or at a discount to NAV, with the exception of Aquarius Platinum, Fresnillo, Lonmin and Polymetal.

Figure 268: European metals & mining valuation table (Calendar year)

				MCap	P/E			EV/EBITDA			P/CFPS			Div Yld	P/NPV
Company	**Rec**	**Price**	**Target**	**US$mn**	**2014**	**2015E**	**2016E**	**2014**	**2015E**	**2016E**	**2014**	**2015E**	**2016E**	**2015E**	**Current**
Acacia Mining plc	Buy	160	250	1,000	17.4	29.5	26.4	5.7	4.6	4.9	5.4	4.9	6.0	1.7	0.69
Anglo American PLC	Hold	281	300	5,501	13.8	5.9	62.8	17.6	4.3	7.4	5.6	1.6	2.5	7.5	0.36
Antofagasta PLC	Hold	412	530	6,182	27.9	67.2	47.6	7.7	10.6	11.4	7.1	6.1	13.1	0.5	0.73
Aquarius Platinum Ltd	Buy	11	12.9	246	nm	nm	nm	19.8	NM	NM	23.8	24.9	24.7	0.0	2.04
BHP Billiton	Hold	669	935	59,943	14.0	21.5	21.3	7.5	7.4	5.8	6.7	5.4	3.9	8.6	0.62
Boliden AB	Buy	140.1	170.0	4,517	15.4	14.3	10.3	6.0	6.1	4.7	5.0	5.9	5.5	2.1	0.99
Ferrexpo Plc	Buy	21	120	185	4.3	2.0	4.3	3.6	3.6	4.7	4.2	1.3	1.8	10.5	0.17
Fresnillo PLC	Hold	665	570	7,453	186.9	63.2	51.3	19.0	13.0	12.7	83.0	10.1	15.2	0.8	1.02
Glencore	Buy	80	125	16,140	16.7	11.3	20.3	9.1	5.3	5.4	8.7	1.2	2.5	5.0	0.44
KAZ Minerals PLC	Buy	90	197	614	22.1	19.4	14.4	5.7	9.8	10.3	9.0	nm	4.3	0.0	0.34
Lonmin Plc	Sell	0.80	0.75	350	nm	nm	nm	nm	nm	2.3	nm	nm	nm	0.0	1.00
Nordgold N.V.	Hold	2.75	2.70	1,030	6.2	5.4	nm	2.4	2.9	6.7	1.8	2.5	7.2	5.6	0.77
Norsk Hydro ASA	Hold	29.58	34.0	6,938	18.6	9.5	19.5	5.9	3.4	3.8	11.6	4.5	9.8	4.2	0.81
Nyrstar NV	Hold	1.27	2.20	455	nm	61.7	4.6	4.2	4.7	3.2	1.7	7.1	1.1	0.0	0.42
Polymetal International	Hold	539	460	3,459	nm	12.2	18.2	6.9	6.7	8.4	7.1	7.4	6.8	6.1	1.91
Randgold Resources	Buy	4042	4600	5,731	29.7	34.0	52.4	16.6	18.8	17.5	21.9	17.1	15.2	1.0	0.88
Rio Tinto PLC	Buy	1848	3300	52,941	10.5	10.0	12.7	6.3	5.4	5.9	6.8	5.0	5.8	7.7	0.63
South32	Buy	47	68	3,806	nm	nm	nm	nm	4.2	3.1	nm	4.0	3.3	0.0	0.69
Vedanta Resources PLC	Sell	276	200	1,159	nm	nm	nm	6.3	8.4	7.9	1.7	1.8	0.9	1.2	0.82
Weighted Average				**177,650**	**20.9**	**18.9**	**21.8**	**8.0**	**6.8**	**6.6**	**10.5**	**5.3**	**5.8**	**6.4**	**0.67**

Source: Deutsche Bank, Company data, Priced 14 DEC 2015

Changes to estimates

Figure 269: European miner financial year earnings estimates and target price revisions

			Rec	Target	2014	2015E	2016E	2017E
Acacia Mining	(US¢)	Prev	Hold	200	22	9	15	20
		New	Buy	250	22	8	9	25
		% change	Rating Changed	25.0%	0.0%	-9.2%	-39.8%	26.9%
Antofagasta	(US¢)	Prev	Hold	610	47	12	10	27
		New	Hold	530	47	9	13	38
		% change		-13.1%	0.0%	-21.0%	35.0%	42.4%
Anglo American	(US¢)	Prev	Buy	1070	173	82	45	101
		New	Hold	300	173	73	8	72
		% change	Rating Changed	-72.0%	0.0%	-11.0%	-82.2%	-28.7%
Aquarius	(US¢)	Prev	Buy	12.9	-1	-3	-1	0.7
		New	Buy	12.9	-1	-3	-2	-1.2
		% change		0.0%	0.0%	0.0%	-76.4%	-268.4%
BHP Billiton	(US¢)	Prev	Hold	1300	247	162	41	61
		New	Hold	935	247	161	37	66
		% change		-28.1%	0.0%	-0.2%	-8.9%	8.3%
Boliden	(SEK)	Prev	Hold	175	6.9	11.6	16.0	21.6
		New	Buy	170	6.9	9.8	13.7	20.5
		% change	Rating Changed	-2.9%	0.0%	-15.4%	-14.4%	-4.8%
Ferrexpo	(US¢)	Prev	Buy	140	49	16	9	9
		New	Buy	120	49	16	7	7
		% change		-14.3%	0.0%	-5.1%	-17.0%	-15.6%
Fresnillo	(US¢)	Prev	Hold	705	7	16	29	39
		New	Hold	570	7	16	20	41
		% change		-19.1%	0.0%	-3.3%	-32.1%	5.1%
Glencore	(US¢)	Prev	Buy	200.0	32.6	12.2	10.9	13.1
		New	Buy	125.0	32.6	10.7	6.0	7.7
		% change		-37.5%	0.0%	-12.5%	-45.0%	-41.1%
Kaz Minerals	(US¢)	Prev	Buy	240	19	8	8	28
		New	Buy	197	19	7	9	34
		% change		-17.9%	0.0%	-14.5%	15.7%	22.9%
Lonmin	(US¢)	Prev	Buy	2.80	0.1	-0.2	0.0	0.2
		New	Sell	0.75	0.1	-0.2	0.0	0.0
		% change	Rating Changed	-71.4%	0.0%	0.0%	-177.2%	-100.1%
Nordgold	(US¢)	Prev	Hold	3.40	25.8	51.9	-0.9	5.1
		New	Hold	2.70	25.8	51.0	-7.4	14.3
		% change		-20.6%	0.0%	-1.8%	-730.8%	178.9%
Norsk Hydro	(NOK)	Prev	Buy	38.0	1.8	3.19	1.86	2.41
		New	Hold	34.0	1.8	3.12	1.52	3.17
		% change	Rating Changed	-10.5%	0.0%	-2.3%	-18.2%	31.9%
Nyrstar	(€)	Prev	Hold	3.10	-0.27	0.07	0.56	0.88
		New	Hold	2.20	-0.27	0.02	0.27	0.53
		% change		-29.0%	0.0%	-69.7%	-51.2%	-40.0%
Polymetal	(US¢)	Prev	Hold	540.0	-0.6	0.68	0.66	0.47
		New	Hold	460.0	-0.6	0.66	0.45	0.57
		% change		-14.8%	0.0%	-1.9%	-32.1%	21.5%
Randgold	(US¢)	Prev	Buy	5050	252	186	140	189
		New	Buy	4600	252	180	117	261
		% change		-8.9%	0.0%	-3.3%	-16.8%	37.7%
Rio Tinto	(US¢)	Prev	Buy	3500	502	307	265	381
		New	Buy	3300	502	281	220	351
		% change		-5.7%	0.0%	-8.7%	-16.9%	-7.7%
South32	(US¢)	Prev	Buy	90	8	11	5	7
		New	Buy	68	8	11	0	3
		% change		-24.4%	0.0%	0.0%	-99.2%	-57.2%
Vedanta	(US¢)	Prev	Hold	500	14	-14	-124	-132
		New	Sell	200	14	-14	-137	-148
		% change	Rating Changed	-60.0%	0.0%	0.0%	-10.4%	-12.1%

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Figure 270: Gearing and cash positions for the miners.

	Gearing - ND/(ND+E)			EBITDA/ND			FCF (USD mn)			FCF - post Div (USD mn)		
	2014	2015	2016	2014	2015	2016	2014	2015	2016	2014	2015	2016
Acacia Mining	-0.08	-0.07	-0.06	-1.66	-1.36	-1.44	31	-24	-45	17	-41	-63
Anglo American	0.30	0.38	0.40	0.19	-0.22	0.21	-468	-833	-1010	-2390	-2117	-1024
Antofagasta	-0.04	0.01	0.04	-7.29	15.00	2.73	219	-235	-389	-1158	-344	-286
Aquarius	-0.04	-0.24	-0.24	-1.43	-0.27	0.06	-7	-5	-8	-7	-5	-8
Boliden	0.22	0.14	0.06	0.89	1.63	4.78	1579	2928	3389	1100	2313	2568
BHP Billiton	0.23	0.26	0.27	1.18	0.76	0.53	11018	7671	6785	4631	1173	168
Ferrexpo	0.49	0.79	0.82	0.73	0.31	0.24	62	136	43	-15	59	43
Fresnillo	0.22	0.14	0.17	0.83	1.65	1.27	-289	258	-86	-378	216	-150
Glencore	0.40	0.35	0.30	0.34	0.29	0.32	-718	7873	3373	-2962	5525	3373
KAZ Minerals	0.31	0.53	0.57	0.37	0.09	0.09	-995	-1395	-443	-995	-1395	-443
Lonmin	0.01	0.11	-0.01	-3.90	-0.28	-0.59	-209	-148	-140	-246	-167	-159
Norsk Hydro	0.00	-0.03	0.02	81.59	-6.96	8.26	2784	7645	-15	841	3293	-2557
Nyrstar	0.28	0.53	0.50	0.65	0.42	0.58	22	-364	-127	22	-364	-126
Nordgold	0.50	0.35	0.49	0.51	0.97	0.25	213	146	-95	173	102	-152
Polymetal	0.57	0.62	0.61	0.59	0.50	0.41	305	234	172	240	-73	93
Randgold	-0.03	-0.06	-0.07	-5.15	-1.62	-1.44	96	119	100	42	70	36
Rio Tinto	0.19	0.22	0.21	1.43	0.89	0.86	6296	5156	4739	2586	1031	845
South32	-0.02	0.04	0.00	-4.71	4.61	-23.34	829	1209	566	829	1209	566
Vedanta	0.31	0.41	0.37	0.57	0.44	0.32	828	-124	-193	319	-635	-333

*Source: Deutsche Bank.... *FCF values for NHY, NYR & BOL in NOK m, EUR m & SEK m respectively*

Acacia Mining

Buy

Reuters: ACAAL.L Exchange: LSE Ticker: ACA LN

Rebuilding confidence in the Bulyanhulu turnaround

Price target (GBP)	250
FTSE 100 INDEX	5,874

The key themes for 2016

- **Rebuilding confidence in the Bulyanhulu turnaround:** Acacia aims is to get its flagship Bulyanhulu mine to a consistent 1000 ounce per day production run rate, mainly through increased development and delivering planned higher grades. Achieving sustained higher development rates whilst changing mining methods to facilitate increased efficiencies has not been easy – in 2H15, Acacia brought back development and drilling contractors to keep the mine on track. We forecast that Acacia will fall short of achieving the 350kozpa target for Bulyanhulu in the medium-term: we estimate 315koz in 2016 and a peak of 337koz in 2018. But even with this lower volume assumption, we note our valuation for the mine is £1.60 per share, in line with the current share price for the whole Acacia group.
- **Earnings and cash flow to remain under pressure:** We forecast the gold price will drop 11% on average in 2016 compared with 2015. On our estimates, whilst production will increase 12.5% due to a better performance at all three of Acacia's mines, the gold price drop eats into the better volumes and group earnings flat line as a result. We expect capex to increase by US$9m to US$211m and therefore Acacia's All-In Sustaining costs remain high in 2016 at US$1,020/oz, a very thin cash margin against the gold price we expect – any successful delivery of further cost cuts will drive positive operational gearing for the group.
- **Strong balance sheet a useful buffer**: The group's net cash balance remains strong at US$124m by the end of 2016 on our forecasts (0.7x 2016e net debt/EBITDA). Other than its recent commitment to spending US$20m in 2016 on its Kenyan and West African exploration efforts, we expect Acacia to keep capex to a minimum to keep its balance sheet un-geared and with a buffer whilst the Bulyanhulu improvements are delivered.

Key events:

- 4Q15 production results: 19 January 2016

Valuation and risks:

- Our 12-month TP is based on 1.1x our 2016e NAV, applying a WACC of 5% to life of- mine discounted cash flows and a long-term gold price of US$1,300/oz. Our WACC of 5% is based on a risk free rate of 4%, a market risk premium of 6%, a beta of 0.3x and a 30% target gearing. We apply the 10% premium to our NPV to derive our target price –this reflects the ranking we assign to Acacia within our coverage universe. Our rankings are derived from debt reduction, P/E valuation, near-term earnings growth, and management action taken to control cash flows.
- Key downside risks include lower than expected gold prices, higher than expected costs and volatility in the Tanzanian Shilling. The failure to deliver cost and capex cuts as planned, plus the failure to improve grades especially at its Bulyanhulu mine, are two key downside risks. There is a risk of an overhang in the shares from any further sell-down by Barrick Gold's 64% majority stake in Acacia Mining.

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Model updated:14 December 2015

Running the numbers

Europe

United Kingdom

Gold

Acacia Mining plc

Reuters: ACAA.L Bloomberg: ACA LN

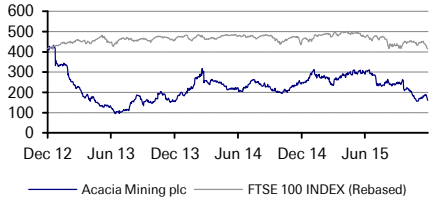
Buy

Price (14 Dec 15)	GBP 160.40
Target Price	GBP 250.00
52 Week range	GBP 156.60 - 313.50
Market Cap (m)	GBPm 658
	USDm 994

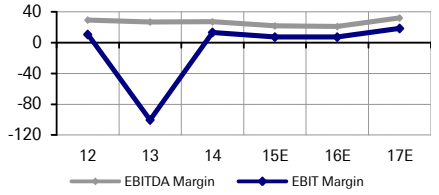
Company Profile

Acacia Mining is a gold exploration and mining company with three operating mines in Tanzania, producing c.800 koz of gold p.a. The company was spun out of parent company Barrick Gold, which is the world's largest gold producer. Acacia aims to grow production to over 1Moz of gold p.a. through a series of brownfield expansions at its existing mines, potential Greenfield projects in Burkina Faso and Kenya, plus potential M&A.

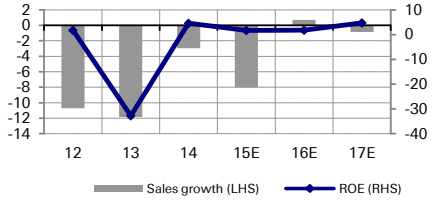
Price Performance



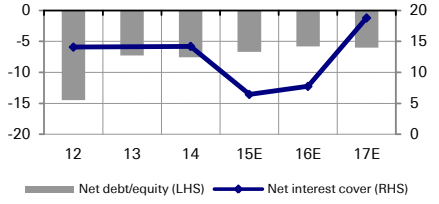
Margin Trends



Growth & Profitability



Solvency



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Fiscal year end 31-Dec	2012	2013	2014	2015E	2016E	2017E
Financial Summary						
DB EPS (USD)	0.23	0.30	0.22	0.08	0.09	0.25
Reported EPS (USD)	0.12	-1.86	0.22	0.08	0.09	0.25
DPS (USD)	0.16	0.03	0.04	0.04	0.00	0.11
BVPS (USD)	6.7	4.7	4.9	5.0	5.2	5.6
Weighted average shares (m)	410	410	410	410	410	410
Average market cap (USDm)	2,550	1,189	1,573	994	994	994
Enterprise value (USDm)	2,172	1,053	1,426	862	875	861
Valuation Metrics						
P/E (DB) (x)	27.3	9.7	17.4	29.5	26.4	9.5
P/E (Reported) (x)	53.7	nm	17.5	29.5	26.4	9.5
P/BV (x)	1.01	0.65	0.82	0.49	0.47	0.43
FCF Yield (%)	nm	nm	2.0	nm	nm	nm
Dividend Yield (%)	2.6	1.0	1.1	1.7	0.0	4.7
EV/Sales (x)	2.0	1.1	1.5	1.0	1.0	1.0
EV/EBITDA (x)	6.8	4.1	5.7	4.6	4.9	3.1
EV/EBIT (x)	18.8	nm	11.5	14.0	14.1	5.5
Income Statement (USDm)						
Sales revenue	1,087	959	930	856	862	854
Gross profit	432	372	370	258	247	342
EBITDA	319	257	252	186	179	274
Depreciation	159	158	128	124	117	116
Amortisation	45	1,061	0	0	0	0
EBIT	115	-962	124	62	62	158
Net interest income(expense)	-8	-8	-9	-10	-8	-8
Associates/affiliates	0	0	0	0	0	0
Exceptionals/extraordinaries	0	0	0	0	0	0
Other pre-tax income/(expense)	0	0	0	0	0	0
Profit before tax	107	-970	115	52	54	149
Income tax expense	71	-188	26	18	16	45
Minorities	-11	-17	0	0	0	0
Other post-tax income/(expense)	0	0	0	0	0	0
Net profit	47	-765	90	34	38	104
DB adjustments (including dilution)	46	887	1	0	0	0
DB Net profit	93	123	90	34	38	104
Cash Flow (USDm)						
Cash flow from operations	287	187	290	202	167	219
Net Capex	-313	-375	-258	-225	-212	-234
Free cash flow	-26	-187	31	-24	-45	-15
Equity raised/(bought back)	0	0	0	0	0	0
Dividends paid	-74	-55	-14	-17	-17	0
Net inc/(dec) in borrowings	0	142	0	-20	-41	-41
Other investing/financing cash flows	-54	-19	-6	5	4	4
Net cash flow	-154	-119	12	-56	-99	-52
Change in working capital	*0*	*0*	*0*	*0*	*0*	*0*
Balance Sheet (USDm)						
Cash and other liquid assets	401	282	294	238	144	77
Tangible fixed assets	1,964	1,281	1,425	1,502	1,597	1,715
Goodwill/intangible assets	278	211	211	211	211	211
Associates/investments	0	0	0	0	0	0
Other assets	685	658	653	631	635	648
Total assets	3,329	2,432	2,583	2,582	2,588	2,652
Interest bearing debt	0	142	142	101	20	-61
Other liabilities	553	363	439	432	432	419
Total liabilities	553	505	581	534	452	358
Shareholders' equity	2,752	1,922	1,997	2,044	2,131	2,289
Minorities	23	5	5	5	5	5
Total shareholders' equity	2,775	1,927	2,002	2,049	2,135	2,294
Net debt	*-401*	*-140*	*-152*	*-137*	*-124*	*-138*
Key Company Metrics						
Sales growth (%)	-10.7	-11.8	-3.0	-8.0	0.7	-0.9
DB EPS growth (%)	-66.0	31.2	-26.3	-62.7	11.9	176.8
EBITDA Margin (%)	29.3	26.8	27.1	21.7	20.8	32.0
EBIT Margin (%)	10.6	-100.3	13.3	7.2	7.2	18.4
Payout ratio (%)	141.1	nm	19.2	51.1	0.0	44.4
ROE (%)	1.7	-32.7	4.6	1.7	1.8	4.7
Capex/sales (%)	28.8	39.1	26.5	26.3	24.6	27.4
Capex/depreciation (x)	2.0	2.4	1.9	1.8	1.8	2.0
Net debt/equity (%)	-14.5	-7.3	-7.6	-6.7	-5.8	-6.0
Net interest cover (x)	14.1	nm	14.2	6.4	7.7	18.8

Source: Company data, Deutsche Bank estimates

Anglo American

Hold

Reuters: AAL.L Exchange: LSE Ticker: AAL

Downgrade to Hold: not enough delivery

Price target (GBP)	300
FTSE 100 INDEX	5,874

The key themes for 2016:

- Whilst we believe that Anglo American management has the right strategy to turn around the group's performance, we are concerned about the lack of apparent urgency to implement the plan, particularly given our forecast for further commodity price weakness in 2016. The main drivers of improving FCF of cost-out and disposals have been flagged to the market but delivered too slowly. Whilst we agree that suspending the dividend was the right thing to do, it does not stem the cash burn: management has guided to a cash outflow of US$1bn in 2016 at spot prices and FX. Planned disposals would reduce debt by US$2bn, but we believe a doubling of this is required in combination with faster cost out progress to move the balance sheet back into a more comfortable position: net debt of US$10bn would leave net debt/EBITDA at ~2.5x for 2017, compared with c. 4x today. In our view, there is a lack of commitment from management to a clear timeframe and details to achieving this debt reduction - in addition, we think the market now needs to see actual delivery of the plan. We have a Hold rating - we are cognisant of the fundamental upside to our fair value should we see delivery, and the downside risks given the balance sheet should we not.

Key events:

- 4Q15 production results: 28 January 2016
- FY15 financial results: 16 February 2016

Valuation and risks

- We value Anglo on a sum of the parts basis, using DCF-derived NPV valuations for each division. We use a WACC of 8.7%. To derive our TP we apply a NPV multiple of 0.5x – this reflects the ranking we assign to Anglo within our coverage universe. Our rankings are derived from debt reduction, P/E valuation, near-term earnings growth, and management action taken to control cash flows.
- Upside and downside risks include weaker/stronger-than-expected operating currencies (Rand, A$) and higher/lower commodity prices than we forecast, in particular PGMs, copper and iron ore. More specific risks include delays in taking out costs or faster than expected delivery of cost cuts, increased risks regarding security of tenure in South Africa, further delays in the Minas Rio ramp-up, a significant improvement or deterioration in diamond demand, strike/labour disputes in the group's platinum mines and faster or slower than planned non-core asset disposals.

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Model updated:15 December 2015

Running the numbers

Europe

United Kingdom

Metals & Mining

Anglo American

Reuters: AAL.L Bloomberg: AAL LN

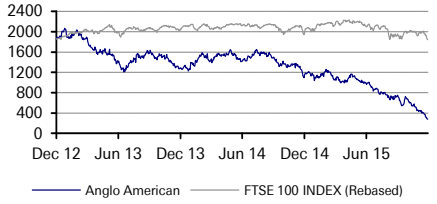
Hold

Price (14 Dec 15)	GBP 280.80
Target Price	GBP 300.00
52 Week range	GBP 280.80 - 1,259.00
Market Cap (m)	GBPm 3,617
	USDm 5,466

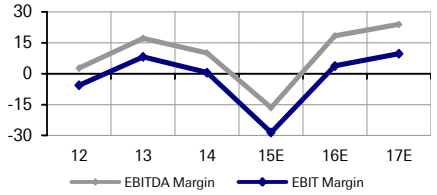
Company Profile

Anglo American plc is a globally diversified mining company. It has interests in diamonds, platinum, met coal, thermal coal, copper, nickel, iron ore and industrial minerals. The Group has operations and developments in Africa, Europe, Australia, and South and North America. The company first listed in London in 1999, and has been disposing of non-core assets to create a more focused mining group. Anglo's diamond and platinum assets differentiate it from the other diversified miners.

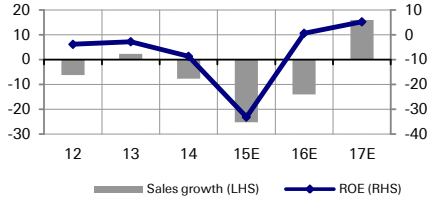
Price Performance



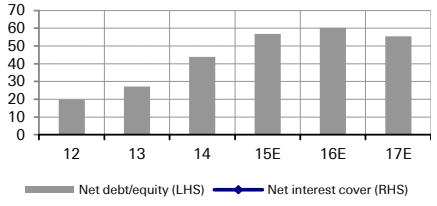
Margin Trends



Growth & Profitability



Solvency



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Fiscal year end 31-Dec	2012	2013	2014	2015E	2016E	2017E
Financial Summary						
DB EPS (USD)	2.27	2.08	1.73	0.73	0.08	0.72
Reported EPS (USD)	-1.17	-0.75	-1.96	-5.62	0.08	0.72
DPS (USD)	0.85	0.85	0.85	0.32	0.00	0.29
BVPS (USD)	30.0	24.7	20.6	13.4	13.5	14.1
Weighted average shares (m)	1,254	1,281	1,284	1,288	1,288	1,288
Average market cap (USDm)	42,590	31,653	30,608	5,466	5,466	5,466
Enterprise value (USDm)	54,383	44,609	48,182	23,027	23,892	23,369
Valuation Metrics						
P/E (DB) (x)	15.0	11.9	13.8	5.8	50.3	5.9
P/E (Reported) (x)	nm	nm	nm	nm	50.3	5.9
P/BV (x)	1.02	0.88	0.91	0.32	0.31	0.30
FCF Yield (%)	nm	0.3	nm	nm	nm	15.8
Dividend Yield (%)	2.5	3.4	3.6	7.5	0.0	6.8
EV/Sales (x)	1.9	1.5	1.8	1.1	1.4	1.2
EV/EBITDA (x)	70.3	8.8	17.7	nm	7.5	4.8
EV/EBIT (x)	nm	18.5	349.1	nm	36.6	11.9
Income Statement (USDm)						
Sales revenue	28,680	29,342	27,073	20,240	17,398	20,171
Gross profit	774	5,045	2,729	-3,333	3,192	4,831
EBITDA	774	5,045	2,729	-3,333	3,192	4,831
Depreciation	2,374	2,638	2,591	2,431	2,540	2,869
Amortisation	0	0	0	0	0	0
EBIT	-1,600	2,407	138	-5,764	653	1,962
Net interest income(expense)	418	271	242	115	27	16
Associates/affiliates	421	168	208	82	102	146
Exceptionals/extraordinaries	1,396	-469	-385	-155	0	0
Other pre-tax income/(expense)	-806	-677	-462	-389	-658	-674
Profit before tax	-171	1,700	-259	-6,111	125	1,449
Income tax expense	393	1,274	1,265	819	-11	307
Minorities	906	1,387	989	305	27	211
Other post-tax income/(expense)	0	0	0	0	0	0
Net profit	-1,470	-961	-2,513	-7,234	109	932
DB adjustments (including dilution)	4,330	3,634	4,730	8,169	0	0
DB Net profit	2,860	2,673	2,217	935	109	932
Cash Flow (USDm)						
Cash flow from operations	4,787	6,078	5,435	3,314	2,222	3,357
Net Capex	-5,541	-5,985	-5,903	-4,006	-3,058	-2,492
Free cash flow	-754	93	-468	-692	-836	864
Equity raised/(bought back)	24	14	-97	-27	14	14
Dividends paid	-2,237	-2,237	-1,922	-1,285	-20	-253
Net inc/(dec) in borrowings	5,834	1,043	1,825	-39	-1,641	-2,618
Other investing/financing cash flows	-5,678	-148	-179	1,235	0	0
Net cash flow	-2,811	-1,235	-841	-808	-2,483	-1,992
Change in working capital	*0*	*0*	*0*	*0*	*0*	*0*
Balance Sheet (USDm)						
Cash and other liquid assets	9,094	7,704	6,748	5,829	3,346	1,353
Tangible fixed assets	45,089	41,505	38,475	29,989	30,682	30,412
Goodwill/intangible assets	4,571	4,083	3,912	3,802	3,802	3,802
Associates/investments	6,291	7,548	6,775	3,868	3,868	3,868
Other assets	14,324	10,325	10,100	9,585	9,495	10,316
Total assets	79,369	71,165	66,010	53,073	51,193	49,752
Interest bearing debt	17,754	17,848	20,859	18,941	17,316	14,714
Other liabilities	17,828	15,953	12,974	11,058	10,674	10,931
Total liabilities	35,582	33,801	33,833	29,999	27,990	25,645
Shareholders' equity	37,657	31,671	26,417	17,276	17,398	18,216
Minorities	6,130	5,693	5,760	5,798	5,805	5,891
Total shareholders' equity	43,787	37,364	32,177	23,074	23,203	24,107
Net debt	*8,660*	*10,144*	*14,111*	*13,112*	*13,970*	*13,361*
Key Company Metrics						
Sales growth (%)	-6.2	2.3	-7.7	-25.2	-14.0	15.9
DB EPS growth (%)	-53.2	-8.4	-17.0	-58.0	-88.4	757.8
EBITDA Margin (%)	2.7	17.2	10.1	-16.5	18.3	23.9
EBIT Margin (%)	-5.6	8.2	0.5	-28.5	3.8	9.7
Payout ratio (%)	nm	nm	nm	nm	0.0	40.0
ROE (%)	-3.8	-2.8	-8.7	-33.1	0.6	5.2
Capex/sales (%)	19.6	20.9	22.1	19.9	17.6	12.4
Capex/depreciation (x)	2.4	2.3	2.3	1.7	1.2	0.9
Net debt/equity (%)	19.8	27.1	43.9	56.8	60.2	55.4
Net interest cover (x)	nm	nm	nm	nm	nm	nm

Source: Company data, Deutsche Bank estimates

Antofagasta

Hold

Reuters: Anto.L Exchange: LSE Ticker: Anto

More cost cutting required

Price target (GBP)	530
FTSE 100 INDEX	5,874

The key themes for 2016:

- **Some Peso and self-help required to offset copper price pressure:** We have assumed that Antofagasta will shift its cost cutting up a gear in response to the persistent copper price weakness, with some help from the continued weakness in the Chilean Peso – we forecast a further 10% weakening in 2016 versus 2015. In addition to incorporating its newly- acquired 50% of the Zaldivar mine from 1Q16, we believe the group will have to increase its cost cutting efforts through supply chain reductions and the delivery of mining synergies from the Centinela district. Whilst we expect Antofagasta to keep its net unit costs flat year-on-year in 2015, we forecast an 11% increase in 2016 – driven mainly by a squeeze on gold and molybdenum prices.
- **Closure of the Zaldivar deal:** Antofagasta's acquisition of a 50% operator stake in Barrick's Zaldivar mine is due to be completed by end 2015. We forecast that the mine will produce 128kt next year, i.e. in the middle of the current guidance range of 100-150kt (100% basis). Once Antofagasta has full operating control of Zaldivar we would expect it to push production higher, mainly from recovery improvements which we currently estimate at 60%. In terms of costs, there is some downside risk to our forecast for USc145/lb for 2016, which is in the middle of the current guidance range of USc130-170/lb.
- **Cash flow squeezed but just about OK:** With the 17% drop in our copper price forecast for 2016 (from USc250/lb to USc208/lb), Antofagasta will need to deliver on cost control, its plan for capex to drop to US$800-950m (DBe US$860m) from US$1,300m in 2015, and release working capital. On our current forecasts, we estimate that the group will be FCF negative to the tune of US$255m before dividends.

Key events:

- 4Q15 production results: 27 January 2016
- FY15 financial results: 15 March 2016

Valuation and risks:

- Our 12-month price target is set at 10% premium to our DCF valuation to reflect the ranking we assign to Antofagasta within our coverage universe. Our rankings are derived from debt reduction, P/E valuation, near-term earnings growth, and management action taken to control cash flow. We use a WACC of 10.5% (reflects a cost of equity (Beta 1.2) of 11.2%, cost of debt (post tax) of 6.2%, long-term gearing of 10% and a tax rate of 25%.
- Key risks include higher- or lower-than-expected copper, gold, and molybdenum prices than our estimates, and a weaker-or stronger-than expected Chilean Peso than we currently forecast. Grades may be significantly higher or lower than we assume at the main Los Pelambres mine, and cost savings may be higher or lower than guided.

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Model updated:14 December 2015

Running the numbers

Europe

United Kingdom

Metals & Mining

Antofagasta PLC

Reuters: ANTO.L Bloomberg: ANTO LN

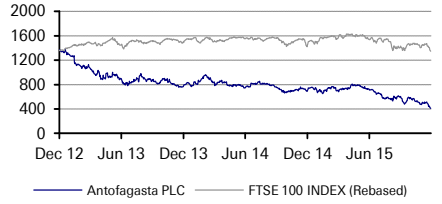
Hold

Price (14 Dec 15)	GBP 412.30
Target Price	GBP 530.00
52 Week range	GBP 412.30 - 807.50
Market Cap (m)	GBPm 4,065
	USDm 6,143

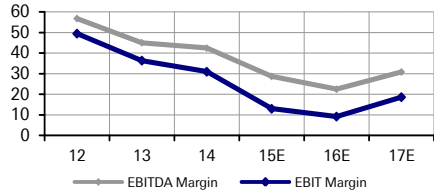
Company Profile

Antofagasta plc is one of the world's top ten copper producers with operations centered in Chile. The company also has diversified holdings in the transport, port energy and water industries, all as a way of hedging input costs. The Group's mining operations however represent the core of earnings (c.90%) and specialise in copper, via their Los Pelambres, El Tesoro, Esperanza and Michilla mines. Their transport operations encompass an extensive rail network, which serves the mining region of Northern Chile. The company has an extensive portfolio of early stage exploration and development projects across the globe.

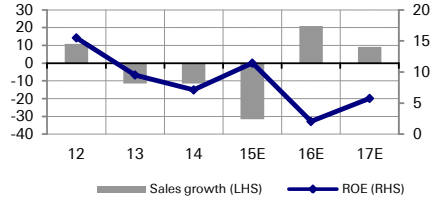
Price Performance



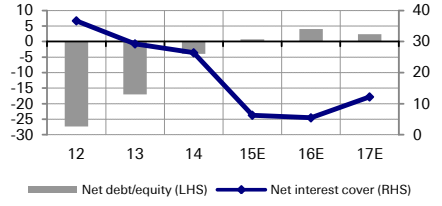
Margin Trends



Growth & Profitability



Solvency



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Fiscal year end 31-Dec	2012	2013	2014	2015E	2016E	2017E
Financial Summary						
DB EPS (USD)	1.41	0.67	0.47	0.09	0.13	0.38
Reported EPS (USD)	1.05	0.67	0.47	0.72	0.13	0.38
DPS (USD)	0.99	0.95	0.22	0.03	0.05	0.13
BVPS (USD)	7.2	6.8	6.3	6.3	6.4	6.7
Weighted average shares (m)	986	986	986	986	986	986
Average market cap (USDm)	18,810	14,525	12,813	6,143	6,143	6,143
Enterprise value (USDm)	20,991	17,802	17,248	10,955	11,232	11,100
Valuation Metrics						
P/E (DB) (x)	13.5	22.0	27.9	67.2	47.6	16.4
P/E (Reported) (x)	18.2	22.0	27.9	8.6	47.6	16.4
P/BV (x)	2.98	2.00	1.88	0.98	0.97	0.93
FCF Yield (%)	10.4	2.2	1.7	nm	nm	1.5
Dividend Yield (%)	5.2	6.4	1.7	0.5	0.7	2.1
EV/Sales (x)	3.1	3.0	3.3	3.0	2.6	2.3
EV/EBITDA (x)	5.5	6.6	7.7	10.6	11.4	7.5
EV/EBIT (x)	6.3	8.2	10.5	23.3	27.9	12.5
Income Statement (USDm)						
Sales revenue	6,740	5,972	5,290	3,617	4,374	4,775
Gross profit	3,829	2,702	2,222	1,039	983	1,473
EBITDA	3,829	2,690	2,246	1,038	983	1,473
Depreciation	494	518	606	568	580	582
Amortisation	0	0	0	0	0	0
EBIT	3,335	2,172	1,640	470	403	891
Net interest income(expense)	-91	-74	-62	-75	-74	-73
Associates/affiliates	10	-14	-4	17	36	77
Exceptionals/extraordinaries	-500	0	0	620	0	0
Other pre-tax income/(expense)	0	0	0	0	0	0
Profit before tax	2,754	2,084	1,573	413	366	894
Income tax expense	1,021	844	723	156	131	319
Minorities	702	580	391	166	106	201
Other post-tax income/(expense)	0	0	0	0	0	0
Net profit	1,032	660	460	711	129	374
DB adjustments (including dilution)	360	0	0	-620	0	0
DB Net profit	1,392	660	460	91	129	374
Cash Flow (USDm)						
Cash flow from operations	2,818	1,763	1,804	1,010	471	1,110
Net Capex	-864	-1,450	-1,585	-1,245	-860	-1,020
Free cash flow	1,954	313	219	-235	-389	90
Equity raised/(bought back)	0	110	0	0	0	0
Dividends paid	-1,141	-1,437	-1,377	-109	103	48
Net inc/(dec) in borrowings	-189	-528	1,000	0	0	0
Other investing/financing cash flows	-142	345	419	-33	-5	-5
Net cash flow	481	-1,198	262	-377	-291	133
Change in working capital	*-30*	*-43*	*140*	*202*	*-92*	*-50*
Balance Sheet (USDm)						
Cash and other liquid assets	4,297	2,685	2,375	1,997	1,706	1,839
Tangible fixed assets	6,513	7,425	8,227	8,904	9,182	9,618
Goodwill/intangible assets	158	133	119	119	119	119
Associates/investments	376	453	808	808	808	808
Other assets	1,527	1,694	1,287	1,284	1,524	1,654
Total assets	12,870	12,390	12,815	13,112	13,340	14,038
Interest bearing debt	1,889	1,212	2,059	2,059	2,059	2,059
Other liabilities	2,176	2,514	2,721	2,654	2,549	2,629
Total liabilities	4,065	3,726	4,780	4,713	4,608	4,688
Shareholders' equity	7,111	6,725	6,174	6,247	6,336	6,634
Minorities	1,694	1,939	1,861	2,152	2,396	2,716
Total shareholders' equity	8,805	8,664	8,035	8,399	8,732	9,350
Net debt	*-2,407*	*-1,473*	*-315*	*62*	*353*	*220*
Key Company Metrics						
Sales growth (%)	10.9	-11.4	-11.4	-31.6	20.9	9.2
DB EPS growth (%)	0.3	-52.6	-30.3	-80.1	41.2	189.6
EBITDA Margin (%)	56.8	45.0	42.4	28.7	22.5	30.8
EBIT Margin (%)	49.5	36.4	31.0	13.0	9.2	18.7
Payout ratio (%)	94.1	142.0	46.2	4.5	35.0	35.0
ROE (%)	15.5	9.5	7.1	11.4	2.1	5.8
Capex/sales (%)	12.8	24.3	30.0	34.4	19.7	21.4
Capex/depreciation (x)	1.7	2.8	2.6	2.2	1.5	1.8
Net debt/equity (%)	-27.3	-17.0	-3.9	0.7	4.0	2.4
Net interest cover (x)	36.7	29.3	26.4	6.3	5.5	12.2

Source: Company data, Deutsche Bank estimates

Aquarius Platinum Limited

Buy

Reuters: AQP.L Exchange: LSE Ticker: AQP

Under offer

Price target (GBp)	12.90
FTSE 100 INDEX	5,874

The key theme for 2016:

We have a Buy recommendation for Aquarius for three main reasons: (i) Kroondal is running at above nameplate, ensuring maximum operating cash flow; (ii) the significant increase in cash held by Aquarius, from the sale of Everest for R450m to Northam, the sale of another non-core asset, a rights issue and the delivery of corporate cost savings; (iii) the successful repurchase of convertible debt due end 2015- we think the early timing of preparing the balance sheet for this was sensible, alleviating pressure in a tough operating environment. Sibanye Gold bid US$294m for the entire issued share capital of Aquarius Platinum on 6 October 2015. On a per share basis, this is USc19.5, a 60.3% premium to AQP's closing price on 5 October. The offer has been unanimously recommended by the Aquarius Board and is subject to a shareholder vote in January 2016.

Key events:

- 2Q16 operating results: 28 January 2016
- Shareholder vote on bid: January 2016

Valuation and risks:

Sibanye Gold has offered US$294m for Aquarius' equity. We think this will be a cap for the share price and we set our target price at the offer price of GBp12.9 per share. The downside risk to our price target is a failure of the bid. It is subject to a vote by Aquarius shareholders and also needs the approvals of the South African Competition Commission and Competition Tribunal. Competition Approval is expected to be obtained by the end of March 2016 and, subject to Aquarius shareholders approving the transaction, completion of the deal should take place by the end of April 2016

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Model updated:11 December 2015

Running the numbers

Sub-Saharan Africa

South Africa

Platinum

Aquarius Platinum

Reuters: AQP.L Bloomberg: AQP LN

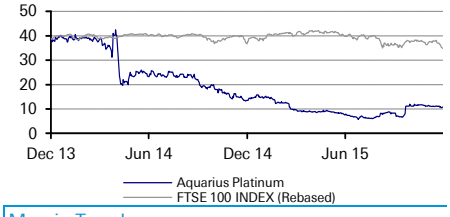
Buy

Price (14 Dec 15)	GBP 10.75
Target Price	GBP 12.90
52 Week range	GBP 5.65 - 15.75
Market Cap (m)	GBPm 162
	USDm 245

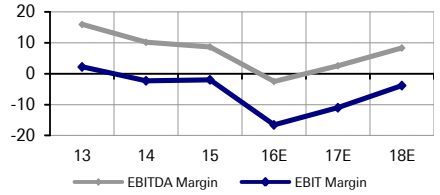
Company Profile

Aquarius Platinum Limited is a platinum group metals (PGM) producer in southern Africa with listings on the Australian and London stock exchanges. Through its wholly owned subsidiary Aquarius Platinum South Africa, the Company operates the Kroondal mine and a tailing retreatment facility in South Africa. The Company also has a fifty percent stake in the Mimosa Platinum Mine in Zimbabwe. Aquarius is under cash offer from Sibanye, with the board recommending the offer be accepted.

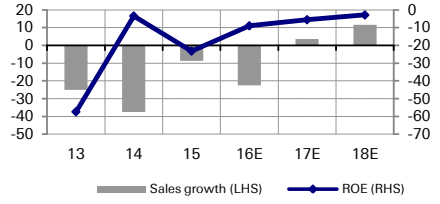
Price Performance



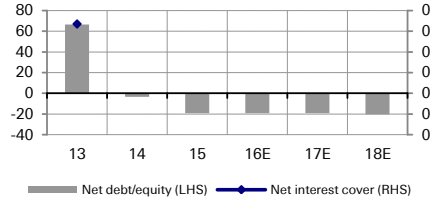
Margin Trends



Growth & Profitability



Solvency



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Fiscal year end 30-Jun	2013	2014	2015	2016E	2017E	2018E
Financial Summary						
DB EPS (USD)	-0.11	-0.01	-0.03	-0.02	-0.01	-0.01
Reported EPS (USD)	-0.58	-0.01	-0.07	-0.02	-0.01	-0.01
DPS (USD)	0.00	0.00	0.00	0.00	0.00	0.00
BVPS (USD)	0.6	0.5	0.2	0.2	0.2	0.2
Weighted average shares (m)	480	943	1,461	1,505	1,505	1,505
Average market cap (USDm)	352	597	349	245	245	245
Enterprise value (USDm)	545	580	280	179	183	179
Valuation Metrics						
P/E (DB) (x)	nm	nm	nm	nm	nm	nm
P/E (Reported) (x)	nm	nm	nm	nm	nm	nm
P/BV (x)	0.97	0.79	0.44	0.72	0.76	0.77
FCF Yield (%)	nm	nm	nm	nm	nm	1.3
Dividend Yield (%)	0.0	0.0	0.0	0.0	0.0	0.0
EV/Sales (x)	1.5	2.5	1.3	1.1	1.1	0.9
EV/EBITDA (x)	9.2	24.4	15.2	nm	41.2	11.3
EV/EBIT (x)	66.1	nm	nm	nm	nm	nm
Income Statement (USDm)						
Sales revenue	373	233	213	165	171	191
Gross profit	74	31	25	0	9	21
EBITDA	60	24	18	-4	4	16
Depreciation	51	29	23	23	23	23
Amortisation	0	0	0	0	0	0
EBIT	8	-5	-4	-27	-19	-7
Net interest income(expense)	-31	-28	-15	-11	-3	-3
Associates/affiliates	0	5	-48	-8	-5	-3
Exceptionals/extraordinaries	-281	-2	-9	0	0	0
Other pre-tax income/(expense)	-21	18	-14	0	0	0
Profit before tax	-324	-13	-90	-46	-27	-13
Income tax expense	-44	1	8	-15	-8	-4
Minorities	-1	0	-2	0	0	0
Other post-tax income/(expense)	0	0	0	0	0	0
Net profit	-279	-13	-96	-31	-18	-9
DB adjustments (including dilution)	226	2	46	0	0	0
DB Net profit	-53	-11	-51	-31	-18	-9
Cash Flow (USDm)						
Cash flow from operations	8	21	18	8	13	20
Net Capex	-54	-28	-23	-16	-16	-17
Free cash flow	-45	-7	-5	-8	-3	3
Equity raised/(bought back)	0	218	-1	0	0	0
Dividends paid	0	0	0	0	0	0
Net inc/(dec) in borrowings	-10	-1	2	-124	0	0
Other investing/financing cash flows	-22	26	72	4	0	0
Net cash flow	-77	236	67	-128	-3	3
Change in working capital	*-4*	*-43*	*0*	*0*	*0*	*0*
Balance Sheet (USDm)						
Cash and other liquid assets	103	137	196	68	65	68
Tangible fixed assets	261	100	101	94	87	80
Goodwill/intangible assets	59	54	18	18	18	18
Associates/investments	0	230	151	143	138	135
Other assets	341	196	129	129	129	129
Total assets	765	717	594	451	436	430
Interest bearing debt	300	120	127	3	3	3
Other liabilities	168	123	110	110	110	110
Total liabilities	468	244	237	113	113	113
Shareholders' equity	297	474	357	339	323	317
Minorities	0	0	0	0	0	0
Total shareholders' equity	297	474	357	339	323	317
Net debt	*197*	*-17*	*-69*	*-65*	*-62*	*-65*
Key Company Metrics						
Sales growth (%)	-25.0	-37.6	-8.6	-22.5	3.5	11.7
DB EPS growth (%)	64.7	89.8	-207.1	40.7	41.3	50.1
EBITDA Margin (%)	15.9	10.2	8.7	-2.5	2.6	8.3
EBIT Margin (%)	2.2	-2.3	-1.9	-16.5	-11.0	-3.8
Payout ratio (%)	nm	nm	nm	nm	nm	nm
ROE (%)	-57.3	-3.4	-23.2	-8.9	-5.5	-2.8
Capex/sales (%)	14.4	12.0	10.9	9.9	9.4	8.8
Capex/depreciation (x)	1.0	1.0	1.0	0.7	0.7	0.7
Net debt/equity (%)	66.4	-3.5	-19.3	-19.1	-19.1	-20.4
Net interest cover (x)	0.3	nm	nm	nm	nm	nm

Source: Company data, Deutsche Bank estimates

BHP Billiton Plc

Hold

Reuters: BLT.L Exchange: LSE Ticker: BLT

A transitional year with lower growth but solid balance sheet

Price target (GBP)	935
FTSE 100 INDEX	5,874

The key themes for 2016:

- BHP remains in a strong position despite the drop in commodity prices, with robust operating cash flow and a strong balance sheet. Despite the shares trading at a greater than 20% discount to our NPV, we see FY16 as a transitional year as group production is falling c. 5%, and capex is still being cut to maximise cash flow. In addition, the debate surrounding the cost of the Samarco incident, the sustainability of the US$6.6bn progressive dividend, and the lack of growth continues to weigh on the stock.
- We forecast around US$(500)m of FCF in FY16 post the dividend. We think the US$8.5bn group capex guidance for FY16 will likely be lowered to below US$8bn with further cuts to exploration spend, US Onshore and Jansen. We also think most divisional cost guidance will be exceeded.
- BHP has always made it clear that the balance sheet is the first priority, then growth, then the dividend (although the last two have interchanged at times over the past decade). The current credit rating is single A, but we think it could drop to A- based on the ratings agencies revised commodity price assumptions. We expect the progressive dividend is maintained in February and will only be cut if there is a risk the credit rating will be cut to BBB+ or a value accretive acquisition presents itself. Cutting the dividend does not change the valuation of the company. However the weak oil and iron ore price are impacting the approval of high returning mineral projects (such as Spence) in order to safeguard the progressive dividend. This also comes at a time when BHP's oil production is in decline, from 256Mmboe in FY15 to our forecast 180Mmboe by FY20, even with volumes from the Permian.

Key events:

- 2Q15 operational results: 20 January 2016
- 1H16 financial results: 23 February 2016

Valuation and risks:

- We value BHP using life-of-mine cash flows with a WACC of 9.3%. Our price target is set at a 10% discount to our NPV valuation to reflect the ranking we assign to BHP Billiton within our coverage universe. Our rankings are derived from debt reduction, P/E valuation, near-term earnings growth, and management action taken to control cash flow.
- Key risks include variance in commodity prices and exchange rates vs. our estimates. Downside risks include delivery risk on longer-dated growth projects such as Jansen potash, petroleum growth projects (both US Onshore and the GoM), Spence Hypogene and Olympic Dam. Sustained higher US onshore oil volumes could limit upside in both the oil price and US nat gas price - limiting drilling, volumes and earnings from the Permian oil field dry gas fields. Upside risks include weaker currencies, and higher oil, copper and iron ore prices from recovering demand, and supply cuts due to low prices or supply constraints (especially in copper).

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Model updated:14 December 2015

Running the numbers

Europe

United Kingdom

Metals & Mining

BHP Billiton Plc

Reuters: BLT.L Bloomberg: BLT LN

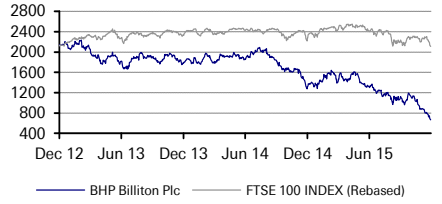
Hold

Price (14 Dec 15)	GBP 669.30
Target Price	GBP 935.00
52 Week range	GBP 669.30 - 1,643.50
Market Cap (m)	GBPm 35,615
	USDm 53,828

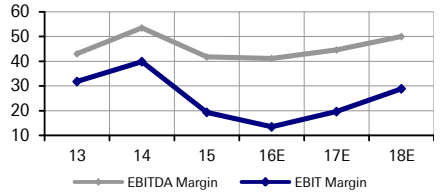
Company Profile

BHP Billiton Plc is an international resources company. The company's principal business lines are mineral and petroleum production, including coal (thermal and coking), iron ore, aluminium, manganese, nickel, copper concentrate and cathode, diamonds, and oil & gas (conventional and unconventional, LNG).

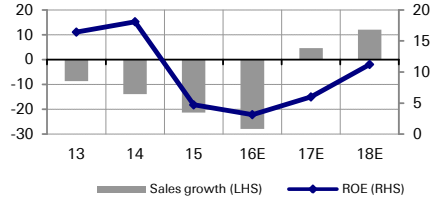
Price Performance



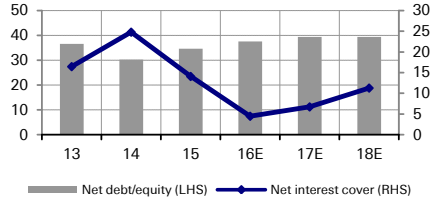
Margin Trends



Growth & Profitability



Solvency



Fiscal year end 30-Jun	2013	2014	2015	2016E	2017E	2018E
Financial Summary						
DB EPS (USD)	2.29	2.47	1.61	0.37	0.66	1.17
Reported EPS (USD)	2.10	2.54	0.64	0.37	0.66	1.17
DPS (USD)	1.16	1.21	1.24	1.24	1.24	1.24
BVPS (USD)	13.3	14.9	12.2	11.4	10.7	10.2
Weighted average shares (m)	5,321	5,321	5,318	5,321	5,321	5,321
Average market cap (USDm)	163,671	162,159	134,883	53,828	53,828	53,828
Enterprise value (USDm)	193,925	191,748	162,133	81,955	82,384	82,508
Valuation Metrics						
P/E (DB) (x)	13.4	12.3	15.7	27.3	15.3	8.7
P/E (Reported) (x)	14.6	12.0	39.7	27.3	15.3	8.7
P/BV (x)	1.93	2.17	1.61	0.89	0.95	0.99
FCF Yield (%)	0.2	6.8	5.7	12.6	14.3	15.9
Dividend Yield (%)	3.8	4.0	4.9	12.3	12.3	12.3
EV/Sales (x)	2.9	3.4	3.6	2.5	2.4	2.2
EV/EBITDA (x)	6.8	6.3	8.7	6.2	5.5	4.4
EV/EBIT (x)	9.2	8.5	18.7	18.8	12.4	7.6
Income Statement (USDm)						
Sales revenue	65,953	56,762	44,636	32,191	33,670	37,725
Gross profit	24,433	29,140	18,142	13,252	15,020	18,876
EBITDA	28,380	30,365	18,638	13,252	15,020	18,876
Depreciation	7,378	7,716	9,986	8,897	8,390	7,964
Amortisation	0	0	0	0	0	0
EBIT	21,002	22,649	8,652	4,355	6,629	10,913
Net interest income(expense)	-1,276	-914	-614	-972	-984	-967
Associates/affiliates	0	0	0	0	0	0
Exceptionals/extraordinaries	0	0	0	0	0	0
Other pre-tax income/(expense)	0	0	0	-185	-170	-330
Profit before tax	19,726	21,735	8,038	3,199	5,475	9,616
Income tax expense	6,906	6,780	3,666	995	1,698	2,980
Minorities	1,597	1,392	968	226	256	410
Other post-tax income/(expense)	0	0	0	0	0	0
Net profit	11,223	13,563	3,404	1,978	3,521	6,226
DB adjustments (including dilution)	985	-385	5,199	0	0	0
DB Net profit	12,208	13,178	8,603	1,978	3,521	6,226
Cash Flow (USDm)						
Cash flow from operations	20,154	25,364	19,296	13,957	13,349	14,616
Net Capex	-19,905	-14,346	-11,625	-7,172	-5,673	-6,040
Free cash flow	249	11,018	7,671	6,785	7,676	8,577
Equity raised/(bought back)	21	14	9	0	0	0
Dividends paid	-6,167	-6,387	-6,498	-6,617	-6,617	-6,617
Net inc/(dec) in borrowings	7,157	-1,011	-728	5,000	1,000	-800
Other investing/financing cash flows	-364	224	-649	-757	-983	-1,279
Net cash flow	896	3,858	-195	4,411	1,076	-119
Change in working capital	*-7,514*	*116*	*-187*	*1,805*	*-523*	*-1,734*
Balance Sheet (USDm)						
Cash and other liquid assets	5,677	8,803	6,753	11,164	12,240	12,121
Tangible fixed assets	100,565	108,787	94,072	92,346	89,629	87,705
Goodwill/intangible assets	5,496	5,439	4,292	4,335	4,380	4,452
Associates/investments	1,880	2,436	2,944	2,944	2,944	2,944
Other assets	25,560	25,948	16,519	13,120	13,396	14,455
Total assets	139,178	151,413	124,580	123,910	122,589	121,676
Interest bearing debt	33,187	34,589	31,170	36,170	37,170	36,370
Other liabilities	30,700	31,442	22,865	21,057	22,165	23,780
Total liabilities	63,887	66,031	54,035	57,227	59,335	60,150
Shareholders' equity	70,667	79,143	64,768	60,618	56,683	54,151
Minorities	4,624	6,239	5,777	6,066	6,571	7,375
Total shareholders' equity	75,291	85,382	70,545	66,683	63,254	61,526
Net debt	*27,510*	*25,786*	*24,417*	*25,006*	*24,930*	*24,249*
Key Company Metrics						
Sales growth (%)	-8.7	-13.9	-21.4	-27.9	4.6	12.0
DB EPS growth (%)	-28.6	7.9	-34.7	-77.0	78.0	76.8
EBITDA Margin (%)	43.0	53.5	41.8	41.2	44.6	50.0
EBIT Margin (%)	31.8	39.9	19.4	13.5	19.7	28.9
Payout ratio (%)	55.0	47.5	193.7	333.6	187.4	106.0
ROE (%)	16.4	18.1	4.7	3.2	6.0	11.2
Capex/sales (%)	33.7	26.8	26.8	22.3	16.8	16.0
Capex/depreciation (x)	3.0	2.0	1.2	0.8	0.7	0.8
Net debt/equity (%)	36.5	30.2	34.6	37.5	39.4	39.4
Net interest cover (x)	16.5	24.8	14.1	4.5	6.7	11.3

Source: Company data, Deutsche Bank estimates

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Boliden AB

Buy

Reuters: BOL.ST Exchange: STO Ticker: BOL

Getting on with business – upgrade to Buy

Price target (SEK)	170
OMX Stockholm Index	1,389

Our investment case:

1. **A solid history of management performance:** Boliden has one of the best delivery track records of the companies that we cover and finished top of the performance table. It does just what a mining company should – create value by developing big orebodies into big mines. Its hedging polices remain sensible and it has delivered a solid growth profile with its Garpenberg expansion/modernization complete. Medium term it has further expansion potential at Aitik, and longer term it has potential at Kylylahti;

2. **Commodity price tailwind into 2016**. There are very few commodities that we believe will have a higher price in 2016 than 2015; zinc is one and nickel another – Boliden produces both of these.

3. **Currency exchange rates are a tailwind**. The weakness of the Kroner was a significant tailwind in the first half of 2015 and ongoing weakness should continue to help cost performance.

4. **Low gearing with net debt continuing to reduce**. Boliden continued to improve its gearing ratio (now 24% in 3Q15 vs 20% target), with a net debt of SEK6,170m and Free cash flow of SEK953m in the third quarter 2015. Garpenberg reported a stable production of precious metals and Aitik is transitioning out of its low grade zone despite mill issues as the copper mine suffered a gear box failure in one of its mills during 3Q15.

Key catalysts for the stock:

- Ongoing cash generation from commodity prices and fx movements.

Changes made:

The cut in our commodity price expectations has driven a14% and 5% reduction in our earnings expectations for 2016 and 2017 respectively. With the stock trading below our price target, we have upgraded it to Buy.

Valuation and risks:

Our SEK170ps TP is based on our DCF-derived NPV (WACC of 8.7% based on cost of equity 11.3%, cost of debt 6.5%, tax rate of 28% and target gearing 40%). We apply a 20% premium to our NPV in setting the price target to reflect its relative performance. Risks include varied metal prices from expectations. Movements in the SEK relative to our expectations would also provide variation to our expectations. From an operational perspective, lower volumes from the Aitik expansion is a key downside risk.

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Model updated:14 December 2015

Running the numbers

Europe

Sweden

Metals & Mining

Boliden AB

Reuters: BOL.ST Bloomberg: BOL SS

Buy

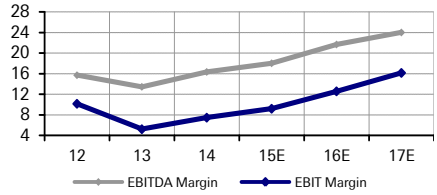
Price (14 Dec 15)	SEK 140.10
Target Price	SEK 170.00
52 Week range	SEK 112.50 - 198.50
Market Cap (m)	SEKm 38,319
	USDm 4,523

Company Profile

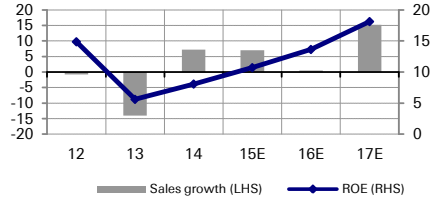
Boliden is an international mining and smelting company which mines, smelts and refines zinc and copper. By-products include lead, gold, silver, among others. The group operations in five countries Sweden, Finland, Norway, Ireland and Netherlands.

Price Performance

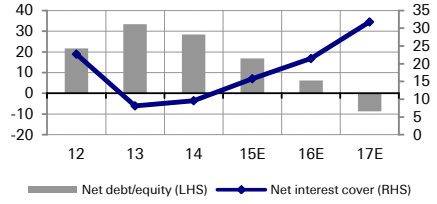
Margin Trends



Growth & Profitability



Solvency



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Fiscal year end 31-Dec	2012	2013	2014	2015E	2016E	2017E
Financial Summary						
DB EPS (SEK)	11.96	4.72	6.95	9.78	13.66	20.53
Reported EPS (SEK)	11.96	4.72	6.95	9.78	13.66	20.53
DPS (SEK)	4.00	1.75	2.25	3.00	5.00	7.00
BVPS (SEK)	83.9	84.4	87.7	94.8	105.5	121.0
Weighted average shares (m)	274	274	274	274	274	274
Average market cap (SEKm)	29,531	27,295	29,169	38,319	38,319	38,319
Enterprise value (SEKm)	35,137	35,463	36,234	43,071	40,503	35,817
Valuation Metrics						
P/E (DB) (x)	9.0	21.1	15.4	14.3	10.3	6.8
P/E (Reported) (x)	9.0	21.1	15.4	14.3	10.3	6.8
P/BV (x)	1.46	1.17	1.43	1.48	1.33	1.16
FCF Yield (%)	4.5	nm	5.4	7.6	8.8	15.8
Dividend Yield (%)	3.7	1.8	2.1	2.1	3.6	5.0
EV/Sales (x)	0.9	1.0	1.0	1.1	1.0	0.8
EV/EBITDA (x)	5.6	7.7	6.0	6.1	4.7	3.3
EV/EBIT (x)	8.6	19.7	13.1	11.8	8.1	4.9
Income Statement (SEKm)						
Sales revenue	40,002	34,408	36,890	39,466	39,641	45,684
Gross profit	6,288	4,634	6,035	7,117	8,595	10,970
EBITDA	6,288	4,634	6,035	7,117	8,595	10,970
Depreciation	2,218	2,831	3,276	3,481	3,604	3,585
Amortisation	0	0	0	0	0	0
EBIT	4,070	1,803	2,759	3,636	4,991	7,385
Net interest income(expense)	-179	-221	-287	-230	-232	-232
Associates/affiliates	0	0	0	0	0	0
Exceptionals/extraordinaries	0	0	0	0	0	0
Other pre-tax income/(expense)	0	0	0	0	0	0
Profit before tax	3,891	1,582	2,472	3,406	4,759	7,153
Income tax expense	617	287	572	732	1,023	1,537
Minorities	2	3	0	0	0	0
Other post-tax income/(expense)	0	0	0	0	0	0
Net profit	3,272	1,292	1,900	2,674	3,736	5,615
DB adjustments (including dilution)	0	0	0	0	0	0
DB Net profit	3,272	1,292	1,900	2,674	3,736	5,615
Cash Flow (SEKm)						
Cash flow from operations	5,516	3,504	5,788	6,518	6,992	8,668
Net Capex	-4,179	-4,971	-4,209	-3,590	-3,603	-2,615
Free cash flow	1,337	-1,467	1,579	2,928	3,389	6,053
Equity raised/(bought back)	0	0	0	0	0	0
Dividends paid	-1,094	-1,094	-479	-615	-821	-1,368
Net inc/(dec) in borrowings	364	2,154	-876	-1,831	0	0
Other investing/financing cash flows	0	-1	2	3	0	0
Net cash flow	607	-408	226	485	2,568	4,685
Change in working capital	*320*	*-546*	*489*	*81*	*-348*	*-533*
Balance Sheet (SEKm)						
Cash and other liquid assets	1,011	611	865	1,440	4,008	8,693
Tangible fixed assets	25,279	27,348	28,623	28,497	28,495	27,525
Goodwill/intangible assets	3,160	3,130	3,516	3,441	3,441	3,441
Associates/investments	136	33	45	45	45	45
Other assets	10,449	10,719	10,817	10,338	11,344	12,881
Total assets	40,035	41,841	43,866	43,761	47,333	52,585
Interest bearing debt	5,981	8,307	7,683	5,806	5,806	5,806
Other liabilities	11,105	10,459	12,208	12,021	12,678	13,682
Total liabilities	17,086	18,766	19,891	17,827	18,484	19,488
Shareholders' equity	22,949	23,075	23,975	25,933	28,849	33,097
Minorities	0	0	0	0	0	0
Total shareholders' equity	22,949	23,075	23,975	25,933	28,849	33,097
Net debt	*4,970*	*7,696*	*6,818*	*4,366*	*1,798*	*-2,887*
Key Company Metrics						
Sales growth (%)	-0.8	-14.0	7.2	7.0	0.4	15.2
DB EPS growth (%)	-3.5	-60.5	47.1	40.7	39.7	50.3
EBITDA Margin (%)	15.7	13.5	16.4	18.0	21.7	24.0
EBIT Margin (%)	10.2	5.2	7.5	9.2	12.6	16.2
Payout ratio (%)	33.4	37.1	32.4	30.7	36.6	34.1
ROE (%)	14.9	5.6	8.1	10.7	13.6	18.1
Capex/sales (%)	10.4	14.4	11.4	9.1	9.1	5.7
Capex/depreciation (x)	1.9	1.8	1.3	1.0	1.0	0.7
Net debt/equity (%)	21.7	33.4	28.4	16.8	6.2	-8.7
Net interest cover (x)	22.7	8.2	9.6	15.8	21.5	31.8

Source: Company data, Deutsche Bank estimates

Ferrexpo Plc

Buy

Reuters: FXPO.L Exchange: LSE Ticker: FXPO

No prizes for quality at the moment – but it will come

Price target (GBP)	120
FTSE 100 INDEX	5,874

Our investment case:

1. **Competing investment forces:** On one hand, Ferrexpo operates a well run, cash generative operation with a proven track record of both project and strategy delivery – it services the high end of the steel industry which is the segment that is most likely to benefit from the shift in growth in China to a consumer driven economy. On the other hand, the company has too much debt (ND of US$816m YE15 DB forecast) and an amortization schedule that is too rapid (refinancing is needed) – on top of this, the collapse of Bank F&C and losses of up to US$174m highlights the economic risk in Ukraine (all sales and banking are now outside the country). Finally political risk relating to the border dispute with Russia in the East adds to the uncertainty.

2. **Growth and quality step up completed.** Ferrexpo has completed both its production and quality ramp-up and can now produce ~12Mtpa of 65% grade iron ore pellets which positions its offering well above its European competitors. 2016 will be a year to consolidate its improved production base.

3. **Debt refinancing still needed:** The company was in the process of refinancing its debt before the collapse of its transactional bank. The loss of more than half of its cash position has made this restructuring requirement more urgent.

4. **Operational and financial dichotomy:** The contrast between the record September production and the failure of its transaction bank in the same month is stark, but it is clear that the business can be managed with the cash kept predominantly out of the country.

5. **Tied to the iron ore price.** Despite the significant weakening in freight rates (Ferrexpo's received prices have linkages to the C3 capesize rate), the share price performance remains tied to the iron ore price. Costs have been helped by the significant devaluation of the Hryvnia with little resultant inflation evident yet.

Key catalysts for the stock:

- Consolidation of the iron ore price to a point that the market believes is sustainable; the stabilization of the political issues in the Ukraine.

Valuation and risks:

Our revised Pt for the company is £1.20ps set at 1x npv in line with market performance (10.2% WACC – COE13%, COD 7.9%, gearing 40%) suggesting significant value; however; the debt burden is large with the loss of the US$174m. Downside risks include sensitivity to iron ore prices, FX and inflation and potential disruption from political unrest in the country. Additional financial risks include an inability to restructure its debt payments. Volatile inflation outcomes post the devaluation of the Hyrvnia are likely and we expect will cause earnings forecast volatility.

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Model updated:14 December 2015

Running the numbers

Europe

United Kingdom

Metals & Mining

Ferrexpo Plc

Reuters: FXPO.L Bloomberg: FXPO LN

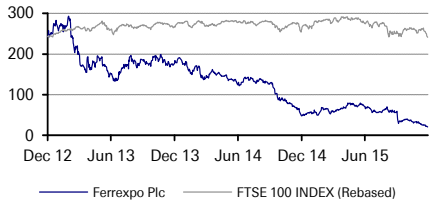
Buy

Price (14 Dec 15)	GBP 20.75
Target Price	GBP 120.00
52 Week range	GBP 20.75 - 80.00
Market Cap (m)	GBPm 121
	USDm 184

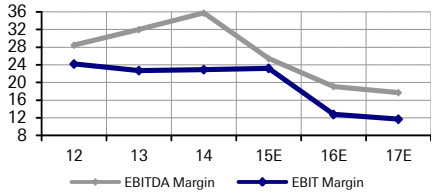
Company Profile

Ferrexpo is a Top 12 global pellet producer, enjoys close proximity to customers in Europe. Ferrexpo is principally involved in the production and export of iron ore pellets to Ukraine, European and Asian steel industries. The principal asset of Ferrexpo is Ferrexpo Poltava GOK Corporation which operates an open-pit iron ore mine, concentrating and pelletising operations situated in central Ukraine, on the banks of the river Dnipro.

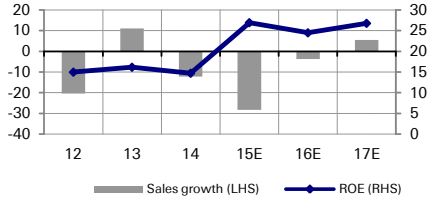
Price Performance



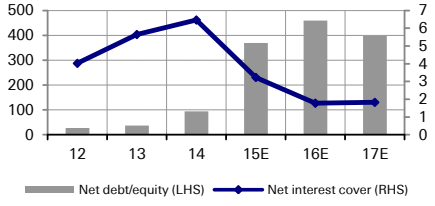
Margin Trends



Growth & Profitability



Solvency



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Fiscal year end 31-Dec	2012	2013	2014	2015E	2016E	2017E
Financial Summary						
DB EPS (USD)	0.37	0.50	0.49	0.16	0.07	0.07
Reported EPS (USD)	0.37	0.45	0.30	0.21	0.08	0.08
DPS (USD)	0.13	0.13	0.13	0.03	0.00	0.00
BVPS (USD)	2.6	2.9	1.2	0.4	0.3	0.3
Weighted average shares (m)	585	585	585	585	585	585
Average market cap (USDm)	3,041	1,755	1,229	184	184	184
Enterprise value (USDm)	3,409	2,220	1,807	902	859	836
Valuation Metrics						
P/E (DB) (x)	14.1	6.0	4.3	2.0	4.3	4.3
P/E (Reported) (x)	14.0	6.7	6.9	1.5	3.9	4.0
P/BV (x)	1.56	1.08	0.68	0.85	1.12	1.00
FCF Yield (%)	nm	nm	5.0	74.1	23.6	12.7
Dividend Yield (%)	2.5	4.4	6.3	10.5	0.0	0.0
EV/Sales (x)	2.4	1.4	1.3	0.9	0.9	0.8
EV/EBITDA (x)	8.4	4.4	3.6	3.6	4.7	4.7
EV/EBIT (x)	9.9	6.2	5.7	3.9	7.0	7.1
Income Statement (USDm)						
Sales revenue	1,424	1,581	1,388	996	959	1,011
Gross profit	405	506	496	253	183	179
EBITDA	405	506	496	253	183	179
Depreciation	54	100	82	58	58	58
Amortisation	7	47	96	-36	3	3
EBIT	345	359	318	231	122	118
Net interest income(expense)	-86	-64	-49	-72	-69	-65
Associates/affiliates	0	0	0	0	0	0
Exceptionals/extraordinaries	7	10	-15	-4	4	4
Other pre-tax income/(expense)	0	0	0	0	0	0
Profit before tax	266	305	254	156	58	58
Income tax expense	47	42	70	30	11	11
Minorities	1	2	6	1	1	1
Other post-tax income/(expense)	0	0	0	0	0	0
Net profit	217	262	178	125	47	46
DB adjustments (including dilution)	-1	32	108	-33	-4	-4
DB Net profit	216	294	286	91	43	43
Cash Flow (USDm)						
Cash flow from operations	119	235	291	139	103	103
Net Capex	-428	-277	-229	-3	-60	-80
Free cash flow	-310	-42	62	136	43	23
Equity raised/(bought back)	0	0	0	0	0	0
Dividends paid	-39	-78	-77	-77	0	0
Net inc/(dec) in borrowings	51	7	274	-384	14	25
Other investing/financing cash flows	5	-93	-22	-198	0	0
Net cash flow	-294	-206	236	-524	57	48
Change in working capital	*-128*	*-103*	*-15*	*-13*	*0*	*0*
Balance Sheet (USDm)						
Cash and other liquid assets	597	390	627	103	160	208
Tangible fixed assets	1,348	1,534	926	646	574	567
Goodwill/intangible assets	112	117	60	38	29	26
Associates/investments	76	196	109	102	102	102
Other assets	626	695	413	351	340	349
Total assets	2,758	2,932	2,135	1,240	1,205	1,253
Interest bearing debt	1,020	1,029	1,305	919	933	958
Other liabilities	191	168	113	100	104	106
Total liabilities	1,211	1,197	1,417	1,019	1,037	1,064
Shareholders' equity	1,527	1,713	709	217	164	184
Minorities	21	22	8	4	5	5
Total shareholders' equity	1,547	1,735	718	221	168	189
Net debt	*423*	*639*	*678*	*816*	*773*	*750*
Key Company Metrics						
Sales growth (%)	-20.4	11.0	-12.2	-28.3	-3.7	5.5
DB EPS growth (%)	-62.1	36.0	-2.8	-68.0	-53.0	-0.2
EBITDA Margin (%)	28.5	32.0	35.7	25.4	19.1	17.7
EBIT Margin (%)	24.2	22.7	22.9	23.2	12.8	11.7
Payout ratio (%)	35.5	29.5	43.3	15.5	0.0	0.0
ROE (%)	15.0	16.2	14.7	26.9	24.5	26.8
Capex/sales (%)	30.1	17.6	16.9	4.5	6.3	7.9
Capex/depreciation (x)	7.7	2.8	2.8	0.7	1.0	1.3
Net debt/equity (%)	27.4	36.8	94.5	369.7	459.6	396.9
Net interest cover (x)	4.0	5.6	6.5	3.2	1.8	1.8

Source: Company data, Deutsche Bank estimates

Fresnillo

Hold

Reuters: FRES.L Exchange: LSE Ticker: FRES

Building on options in a tough pricing environment

Price target (GBP)	570
FTSE 100 INDEX	5,874

The key themes for 2016:

- **Better Fresnillo mine results to continue:** guidance for group silver production in 2015 is between 45-47moz, including 3.5moz from the Silverstream. We forecast 46.2moz, including guidance for silver grades at Fresnillo mine of 245g/t by year end (DBe 240g/t). Gold output should be between 715-730koz – we forecast 716koz. Throughput rates and grade management at the Fresnillo mine remain an issue and the group's biggest operational challenge but the increase in development rates throughout 2H15 is encouraging and we do expect an improved 4Q15 exit rate as the company has guided.
- **Peso weakness helps costs:** We continue to expect gold and silver prices to drift lower, but the 15% weakening in the Mexican Peso year to date, on top of the 12% weakening in 2014, should provide a tailwind to costs and we forecast a 26% improvement in EBITDA in 2015 as a result. Increased production in 2016 should see a further modest increase (+4%) in EBITDA in 2016 on our forecasts.
- **Driving ahead with growth options:** Fresnillo has a full pipeline of projects and growth options in various stages of execution. The group's US$235m Saucito II project has been ramping up throughout 2015, to a steady-state of 8.4moz of silver and 35koz of gold. The US$515m San Julian project continues, with the leach plant being constructed at present. Fresnillo has guided to first production during 2H15, and steady-state of 10.3moz of silver and 44koz of gold. Beyond 2015, Fresnillo has Brownfield expansion options at Cienega and Fresnillo mines and Greenfield options around Centauro, Juancipio and Orisyvo.

Key events:

- 4Q15 production report: Late January 2016
- FY15 financial results: Early March 2016

Valuation and risks:

- Our price target is set at a 10% discount to our NPV valuation to reflect the ranking we assign to Fresnillo within our coverage universe. Our rankings are derived from debt reduction, P/E valuation, near-term earnings growth, and management action taken to control cash flow. Our NPV is based on life-of-mine cash flows, using a long-term gold price of US$1,300/oz and a silver price of US$20/oz. The WACC of 6.4% is based on a risk-free rate of 4%, a market risk premium of 6%, a Beta of 0.4, and 0% gearing.
- A key risk is higher or lower than expected silver and gold prices. The company has an excellent exploration track record and could surprise on the upside by discovering significant resources of silver and gold, leading to an upgrade in future production expectations or improving grades at the large Fresnillo mine. The company has an extensive project pipeline over the medium term, and the key risk here is higher capex and a later start than we have assumed. Deterioration in community relations could result in production interruptions.

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Model updated:14 December 2015

Running the numbers

Europe

United Kingdom

Gold

Fresnillo

Reuters: FRES.L Bloomberg: FRES LN

Hold

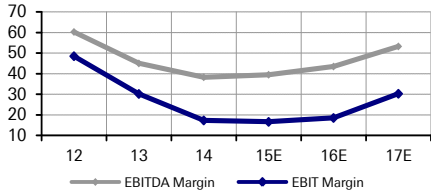
Price (14 Dec 15)	GBP 665.00
Target Price	GBP 570.00
52 Week range	GBP 588.00 - 924.50
Market Cap (m)	GBPm 4,900
	USDm 7,406

Company Profile

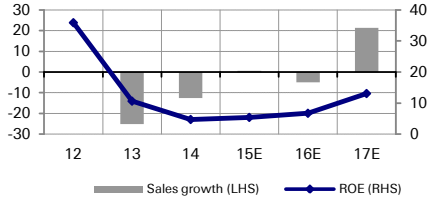
Fresnillo is the world's largest primary silver producer and a significant gold producer. All its operations are currently based in the highly prospective gold and silver belts of Mexico. The group currently has five operating mines, two advanced stage development and four medium-term growth projects, as well as significant land holdings in Mexico. Fresnillo's goal is to double production silver and gold by 2018, equating to 65Moz of silver and over 400koz of gold.

Price Performance

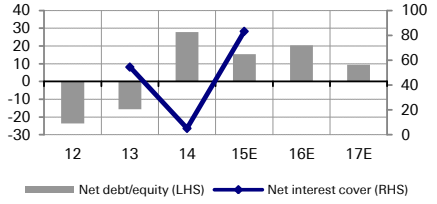
Margin Trends



Growth & Profitability



Solvency



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Fiscal year end 31-Dec	2012	2013	2014	2015E	2016E	2017E
Financial Summary						
DB EPS (USD)	0.91	0.38	0.07	0.16	0.20	0.41
Reported EPS (USD)	1.03	0.33	0.15	0.16	0.20	0.41
DPS (USD)	0.58	0.34	0.08	0.08	0.10	0.21
BVPS (USD)	3.1	3.1	3.1	2.8	3.0	3.3
Weighted average shares (m)	717	737	737	737	737	737
Average market cap (USDm)	19,191	13,455	10,122	7,406	7,406	7,406
Enterprise value (USDm)	18,331	13,002	10,312	7,322	7,468	7,276
Valuation Metrics						
P/E (DB) (x)	29.4	48.4	187.1	63.2	51.3	24.5
P/E (Reported) (x)	26.1	56.0	93.7	62.6	51.3	24.5
P/BV (x)	9.63	3.99	3.87	3.54	3.39	3.05
FCF Yield (%)	1.2	nm	nm	3.5	nm	3.9
Dividend Yield (%)	2.2	1.9	0.6	0.8	1.0	2.0
EV/Sales (x)	8.5	8.0	7.3	5.2	5.5	4.4
EV/EBITDA (x)	14.1	17.9	19.0	13.0	12.7	8.3
EV/EBIT (x)	17.5	26.7	42.1	30.9	29.8	14.7
Income Statement (USDm)						
Sales revenue	2,157	1,615	1,413	1,421	1,350	1,639
Gross profit	1,598	1,000	803	789	692	970
EBITDA	1,301	727	541	562	588	873
Depreciation	254	239	296	325	337	377
Amortisation	0	0	0	0	0	0
EBIT	1,047	488	245	237	250	497
Net interest income(expense)	8	-9	-47	-3	4	3
Associates/affiliates	0	0	0	0	0	0
Exceptionals/extraordinaries	118	-54	77	0	0	0
Other pre-tax income/(expense)	-8	-6	-24	-37	-51	-74
Profit before tax	1,165	418	251	197	203	426
Income tax expense	319	158	134	79	59	123
Minorities	109	21	9	0	0	0
Other post-tax income/(expense)	0	0	0	0	0	0
Net profit	736	240	108	118	144	302
DB adjustments (including dilution)	-84	38	-54	-1	0	0
DB Net profit	652	278	54	117	144	302
Cash Flow (USDm)						
Cash flow from operations	736	446	122	732	487	658
Net Capex	-506	-560	-411	-474	-573	-370
Free cash flow	230	-114	-289	258	-86	288
Equity raised/(bought back)	0	346	-451	0	0	0
Dividends paid	-424	-505	-88	-42	-64	-98
Net inc/(dec) in borrowings	0	830	0	0	0	0
Other investing/financing cash flows	120	81	-270	99	27	30
Net cash flow	-73	638	-1,098	315	-123	219
Change in working capital	*0*	*0*	*0*	*0*	*0*	*0*
Balance Sheet (USDm)						
Cash and other liquid assets	613	1,252	154	470	347	566
Tangible fixed assets	1,480	1,838	1,969	2,131	2,367	2,360
Goodwill/intangible assets	0	0	0	0	0	0
Associates/investments	615	436	478	441	417	391
Other assets	562	558	845	538	551	607
Total assets	3,270	4,084	3,447	3,579	3,682	3,923
Interest bearing debt	0	836	796	797	797	797
Other liabilities	669	576	644	661	671	672
Total liabilities	669	1,412	1,440	1,457	1,468	1,468
Shareholders' equity	2,233	2,273	2,275	2,092	2,185	2,426
Minorities	369	399	27	29	29	29
Total shareholders' equity	2,602	2,672	2,302	2,122	2,214	2,455
Net debt	*-613*	*-415*	*642*	*327*	*450*	*231*
Key Company Metrics						
Sales growth (%)	nm	-25.1	-12.5	0.6	-5.0	21.4
DB EPS growth (%)	na	-58.5	-80.5	116.5	23.3	109.3
EBITDA Margin (%)	60.3	45.0	38.3	39.5	43.5	53.3
EBIT Margin (%)	48.5	30.2	17.3	16.7	18.5	30.3
Payout ratio (%)	56.4	104.6	54.6	50.4	50.0	50.0
ROE (%)	35.9	10.7	4.8	5.4	6.8	13.1
Capex/sales (%)	24.1	35.4	30.1	33.6	42.4	22.6
Capex/depreciation (x)	2.0	2.4	1.4	1.5	1.7	1.0
Net debt/equity (%)	-23.6	-15.5	27.9	15.4	20.3	9.4
Net interest cover (x)	nm	54.5	5.2	83.3	nm	nm

Source: Company data, Deutsche Bank estimates

Glencore

Buy

Reuters: GLEN.L Exchange: LSE Ticker: GLEN

Delivering the plan – simple

Price target (GBP)	125
FTSE 100 INDEX	5,874

Our investment case:

1. **Executing the plan.** While some miners are struggling to act, Glencore has been busy executing its debt reduction plan to the extent that it has now extended its target set in September from US$10b debt reduction to US$13b by the end of 2016. The company is clearly trying to lift the veil of uncertainty that plagued its performance. With the liquidity and debt position improving, it is increasingly apparent that the market sell-off on debt concerns was overdone and in our expectations will continue to correct.

2. **New commitments provided underline a lower net debt target.** At the latest investor update, Glencore has provided a series of additional new commitments: i)Current liquidity is now > US$14b (from US$13.8 at the end of September), ii) net debt target is now US$18-19b from low 20's, iii) 2016 capex guidance is reduced to US$3.8b from US$5b.

3. **The marketing division of Glencore looks steady.** With just 3 weeks left in the year, we assume the forecast US$2.5b of marketing EBIT has a low variability around it and confirms the earnings stability as it hits the US$2.5-2.6b guidance provided in August despite the falls in commodity prices since then. The guidance for next year of US$2.4- 2.7b is effectively a flat performance on this year on lowered volumes and inventory levels which makes sense. While short of the long-run US$2.7-3.7 company expectation, it is well above market fears of a collapse in the marketing earnings.

Key catalysts for the stock remain longer dated

- Ongoing asset sales will continue to reflate the balance sheet and will be ongoing catalysts for the stock. We expect another streaming deal within the next few weeks and an Ag deal in the first half of next year.
- Finding a copper and zinc price floor will also be a significant catalyst for the company in our view.

Changes made:

The cut in our commodity price expectation has driven a circa 40% reduction in our 2016 and 2017 earnings expectations.

Valuation and risks:

Our GBp125 price target is set at 0.69x our DCF-derived NPV (WACC 8.6%, CoD 4%, Gearing 20%, Tax 20%, RfR 3.0%) in line with its relative sector performance. Downside risks include lower commodity prices than expected (particularly copper and zinc) or stronger operating currency (particularly the AUD). Glencore still needs to rebuild its relationship and trust with equity investors. However the rapid debt reduction plans should remove the balance sheet and trading fears that have overly impacted the share price. Through to 1Q16 we should see a number of positive catalysts including additional asset sales.

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Model updated:14 December 2015

Running the numbers

Europe

United Kingdom

Metals & Mining

Glencore

Reuters: GLEN.L Bloomberg: GLEN LN

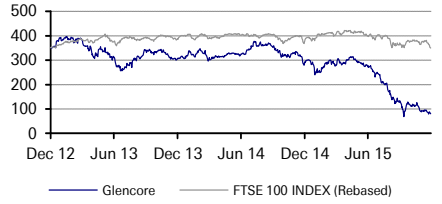
Buy

Price (14 Dec 15)	GBP 80.00
Target Price	GBP 125.00
52 Week range	GBP 68.62 - 314.90
Market Cap (m)	GBPm 10,612
	USDm 16,038

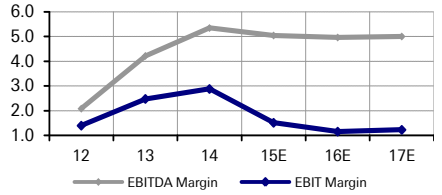
Company Profile

Glencore is one of the world's leading integrated producers and marketers of commodities, covering metals and minerals, energy and agricultural commodities. The company has worldwide activities in production, sourcing, processing, refining, transporting, storage and financing of commodities. The recent merger with Xstrata has significantly increased its mining output and moved it from a trading dominated to mining dominated company.

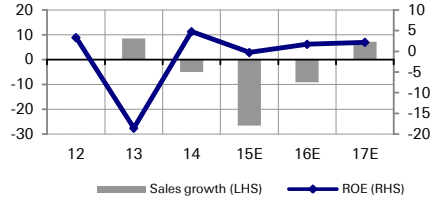
Price Performance



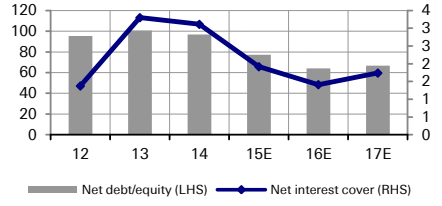
Margin Trends



Growth & Profitability



Solvency



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Fiscal year end 31-Dec	2012	2013	2014	2015E	2016E	2017E
Financial Summary						
DB EPS (USD)	0.07	0.32	0.33	0.11	0.06	0.08
Reported EPS (USD)	0.14	-0.65	0.18	-0.01	0.06	0.08
DPS (USD)	0.16	0.17	0.18	0.06	0.12	0.19
BVPS (USD)	4.4	3.7	3.7	3.4	3.5	3.4
Weighted average shares (m)	7,011	11,141	13,099	13,264	14,245	14,245
Average market cap (USDm)	40,987	57,866	71,207	16,038	16,038	16,038
Enterprise value (USDm)	51,412	92,485	107,112	43,503	38,678	39,015
Valuation Metrics						
P/E (DB) (x)	80.7	16.1	16.7	11.3	20.3	15.7
P/E (Reported) (x)	43.3	nm	31.0	nm	20.3	15.7
P/BV (x)	1.30	1.41	1.28	0.36	0.34	0.36
FCF Yield (%)	3.4	nm	nm	49.1	19.6	12.3
Dividend Yield (%)	2.7	3.2	3.3	5.0	9.9	15.4
EV/Sales (x)	0.2	0.4	0.5	0.3	0.3	0.2
EV/EBITDA (x)	11.5	9.4	9.1	5.3	5.3	4.9
EV/EBIT (x)	17.1	16.0	16.8	17.6	22.6	20.0
Income Statement (USDm)						
Sales revenue	214,436	232,694	221,073	162,502	147,635	158,308
Gross profit	5,474	9,825	11,825	8,201	7,331	7,926
EBITDA	4,477	9,825	11,825	8,201	7,331	7,926
Depreciation	1,473	4,049	5,448	5,735	5,619	5,976
Amortisation	0	0	0	0	0	0
EBIT	3,004	5,776	6,377	2,466	1,711	1,950
Net interest income(expense)	-2,184	-1,751	-2,050	-1,286	-1,212	-1,121
Associates/affiliates	367	0	0	0	0	0
Exceptionals/extraordinaries	0	-11,068	-74	-1,027	0	0
Other pre-tax income/(expense)	-111	-1	0	-256	0	0
Profit before tax	1,076	-7,044	4,253	-104	500	829
Income tax expense	-76	254	1,809	203	-226	-149
Minorities	148	104	136	-167	-127	-122
Other post-tax income/(expense)	0	0	0	0	0	0
Net profit	1,004	-7,402	2,308	-140	853	1,100
DB adjustments (including dilution)	-466	11,068	1,977	1,558	0	0
DB Net profit	538	3,666	4,285	1,418	853	1,100
Cash Flow (USDm)						
Cash flow from operations	4,381	9,184	8,136	13,154	6,863	5,822
Net Capex	-3,005	-9,329	-8,854	-5,281	-3,490	-3,699
Free cash flow	1,376	-145	-718	7,873	3,373	2,122
Equity raised/(bought back)	0	10	-767	2,191	0	0
Dividends paid	-1,066	-2,062	-2,244	-2,348	0	-2,656
Net inc/(dec) in borrowings	6,123	558	-559	-3,421	-3,020	-2,352
Other investing/financing cash flows	-4,956	1,706	4,263	1,532	1,452	197
Net cash flow	1,477	67	-25	5,827	1,805	-2,688
Change in working capital	*727*	*2,599*	*-703*	*7,126*	*826*	*-993*
Balance Sheet (USDm)						
Cash and other liquid assets	2,782	2,849	2,824	8,651	10,456	7,768
Tangible fixed assets	23,238	67,233	70,110	68,404	66,275	63,998
Goodwill/intangible assets	2,664	9,158	8,866	8,707	8,707	8,707
Associates/investments	25,353	21,073	16,902	16,420	15,770	15,770
Other assets	51,500	53,799	53,503	45,154	43,735	46,597
Total assets	105,537	154,112	152,205	147,336	144,943	142,840
Interest bearing debt	35,526	55,173	52,693	49,143	45,473	43,121
Other liabilities	35,711	47,008	48,032	45,701	44,882	46,752
Total liabilities	71,237	102,181	100,725	94,844	90,355	89,873
Shareholders' equity	31,266	48,563	48,542	49,099	51,194	49,574
Minorities	3,034	3,368	2,938	3,393	3,393	3,393
Total shareholders' equity	34,300	51,931	51,480	52,492	54,587	52,967
Net debt	*32,744*	*52,324*	*49,869*	*40,492*	*35,017*	*35,353*
Key Company Metrics						
Sales growth (%)	nm	8.5	-5.0	-26.5	-9.1	7.2
DB EPS growth (%)	na	345.9	0.9	-67.3	-44.0	29.0
EBITDA Margin (%)	2.1	4.2	5.3	5.0	5.0	5.0
EBIT Margin (%)	1.4	2.5	2.9	1.5	1.2	1.2
Payout ratio (%)	111.0	nm	102.2	nm	200.5	241.3
ROE (%)	3.3	-18.5	4.8	-0.3	1.7	2.2
Capex/sales (%)	1.5	4.1	4.1	3.3	2.4	2.3
Capex/depreciation (x)	2.1	2.4	1.7	0.9	0.6	0.6
Net debt/equity (%)	95.5	100.8	96.9	77.1	64.1	66.7
Net interest cover (x)	1.4	3.3	3.1	1.9	1.4	1.7

Source: Company data, Deutsche Bank estimates

KAZ Minerals

Buy

Reuters: KAZ.L Exchange: LSE Ticker: KAZ

Ramping up in 2016

Price target (GBP)	197
FTSE 100 INDEX	5,874

Our investment case:

1. **Transformation underway and on the verge of delivery.** Kazakhmys is undertaking its plan to convert from a high cost copper producer to a low cost copper producer post the commissioning of its two Greenfield projects, Bozshakol and Aktogay. Aktogay first production was reported in early December and Bozshakol is on track for commissioning in January 2016; Bozshakol should start delivering cash shortly after. These would more than double the group's current production levels over the next 12-18 months.

2. **Kaz relationship with China is paying off at Aktogay.** Kaz Minerals announced in November 2015 that it has agreed to defer US$300m of payment on the Aktogay project from 2016 and 2017 into 2018. The agreement was struck with its principle contractor, Non Ferrous China (NFC). The US$300m deferral will provide some much needed breathing space. Importantly, it is a clear indication of China's desire/interest in getting the copper projects delivered.

3. **FX and volumes helping.** The weakness in the Kazakh Tenge continues to help KAZ Minerals. The Tenge denominated copper price is as high as in 2007. While inflation in Kazakhstan will be a headwind, it will not offset the fx gains. The company is also on the verge of stepping up volumes with the leaching pads at Aktogay moved into operation and the concentrator at Bozshakol on track for commissioning in the first quarter of next year.

Key catalysts for the stock:

- Demonstrated successful delivery of the two growth projects will be key milestones for the company and the market is likely to start reacting to these when they near completion and all capital commitments have been made.
- Kazakhmys is currently the archetypal leveraged copper play and as such will be highly influenced by the moves in the copper price in Tenge.

Valuation and risks:

We have a £197.ps price target. Our PT is set at 0.77x times our NPV in line with its relative performance in the sector. We use life of mine cash flow analysis to arrive at our DCF valuation (WACC 10.6%: CoE 11.8% & CoD 6.5%, tax rate of 20%). Risks include project delivery as it continues its major greenfield copper projects in Kazakhstan, Bozshakol and Aktogay

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Model updated:14 December 2015

Running the numbers

Europe

United Kingdom

Metals & Mining

KAZ Minerals

Reuters: KAZ.L Bloomberg: KAZ LN

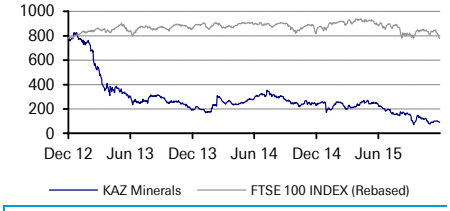
Buy

Price (14 Dec 15)	GBP 90.30
Target Price	GBP 197.00
52 Week range	GBP 72.70 - 269.90
Market Cap (m)	GBPm 404
	USDm 610

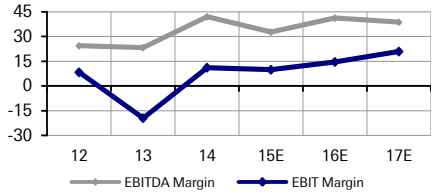
Company Profile

Kazakhmys is a Top 10 global copper producer, Top 5 in silver, an expanding zinc producer, enjoys bottom quartile costs, has expansion and acquisition potential and close proximity to key end-consumer, China. Kazakhmys listed in London recently and entered the FTSE 100 index. Its assets are all located in Kazakstan.

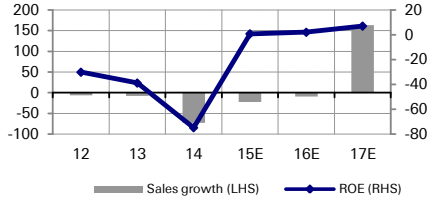
Price Performance



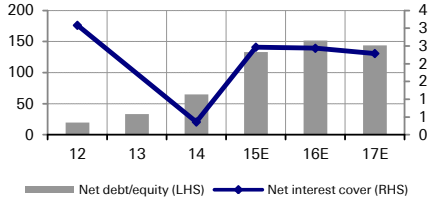
Margin Trends



Growth & Profitability



Solvency



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Fiscal year end 31-Dec	2012	2013	2014	2015E	2016E	2017E
Financial Summary						
DB EPS (USD)	0.94	0.37	0.19	0.07	0.09	0.34
Reported EPS (USD)	-4.32	-3.96	-5.28	0.04	0.09	0.34
DPS (USD)	0.11	0.00	0.00	0.00	0.00	0.03
BVPS (USD)	12.0	9.4	4.7	4.6	4.7	5.0
Weighted average shares (m)	526	513	447	447	447	447
Average market cap (USDm)	6,790	3,050	1,919	610	610	610
Enterprise value (USDm)	3,910	2,296	2,013	2,107	2,551	2,596
Valuation Metrics						
P/E (DB) (x)	13.8	16.1	22.1	19.4	14.4	4.0
P/E (Reported) (x)	nm	nm	nm	37.0	14.4	4.0
P/BV (x)	1.06	0.38	0.86	0.29	0.29	0.27
FCF Yield (%)	nm	nm	nm	nm	nm	nm
Dividend Yield (%)	0.9	0.0	0.0	0.0	0.0	2.0
EV/Sales (x)	1.2	0.7	2.4	3.2	4.3	1.6
EV/EBITDA (x)	4.8	3.2	5.7	9.8	10.3	4.3
EV/EBIT (x)	13.9	nm	21.2	32.3	29.1	7.9
Income Statement (USDm)						
Sales revenue	3,353	3,099	847	657	598	1,577
Gross profit	819	722	356	215	247	610
EBITDA	819	722	356	215	247	610
Depreciation	278	288	43	75	105	165
Amortisation	260	1,036	218	75	54	115
EBIT	281	-602	95	65	88	331
Net interest income(expense)	-91	-79	-263	-26	-36	-144
Associates/affiliates	-2,374	-1,224	-2,128	0	0	0
Exceptionals/extraordinaries	0	0	0	0	0	0
Other pre-tax income/(expense)	0	0	0	0	0	0
Profit before tax	-2,204	-681	-168	39	52	186
Income tax expense	86	127	65	22	9	34
Minorities	0	0	0	0	0	0
Other post-tax income/(expense)	0	0	0	0	0	0
Net profit	-2,270	-2,032	-2,361	17	42	153
DB adjustments (including dilution)	2,763	2,222	2,448	15	0	0
DB Net profit	493	190	87	32	42	153
Cash Flow (USDm)						
Cash flow from operations	620	293	214	-13	141	416
Net Capex	-1,019	-1,271	-1,209	-1,382	-584	-456
Free cash flow	-399	-978	-995	-1,395	-443	-40
Equity raised/(bought back)	-88	0	0	0	0	0
Dividends paid	-121	-42	0	0	0	-6
Net inc/(dec) in borrowings	569	683	-26	361	-12	188
Other investing/financing cash flows	178	802	1,036	-2	0	0
Net cash flow	139	465	15	-1,037	-455	142
Change in working capital	*70*	*-13*	*21*	*-63*	*-4*	*87*
Balance Sheet (USDm)						
Cash and other liquid assets	1,246	1,715	1,730	693	238	380
Tangible fixed assets	3,062	3,312	2,740	4,099	4,578	4,869
Goodwill/intangible assets	64	52	11	10	10	10
Associates/investments	4,088	1,293	871	868	868	868
Other assets	1,533	2,247	366	274	251	711
Total assets	9,993	8,619	5,718	5,944	5,945	6,838
Interest bearing debt	2,468	3,111	3,092	3,456	3,443	3,631
Other liabilities	1,260	1,287	522	415	385	950
Total liabilities	3,728	4,398	3,614	3,871	3,828	4,581
Shareholders' equity	6,259	4,217	2,101	2,071	2,113	2,254
Minorities	6	4	3	3	3	3
Total shareholders' equity	6,265	4,221	2,104	2,074	2,116	2,257
Net debt	*1,222*	*1,396*	*1,362*	*2,762*	*3,206*	*3,251*
Key Company Metrics						
Sales growth (%)	-5.9	-7.6	-72.7	-22.4	-9.0	163.6
DB EPS growth (%)	-66.1	-60.5	-47.4	-63.7	34.6	260.2
EBITDA Margin (%)	24.4	23.3	42.0	32.7	41.2	38.7
EBIT Margin (%)	8.4	-19.4	11.2	9.9	14.7	21.0
Payout ratio (%)	nm	nm	nm	0.0	0.0	8.0
ROE (%)	-30.1	-38.8	-74.7	0.8	2.0	7.0
Capex/sales (%)	30.4	41.0	142.8	210.3	97.6	28.9
Capex/depreciation (x)	3.7	4.4	28.1	18.4	5.6	2.8
Net debt/equity (%)	19.5	33.1	64.7	133.2	151.5	144.1
Net interest cover (x)	3.1	nm	0.4	2.5	2.4	2.3

Source: Company data, Deutsche Bank estimates

Lonmin Plc

Sell

Reuters: LMI.L Exchange: LSE Ticker: LMI

Downgrade to Sell: Leaking cash with no price recovery

Price target (GBP)	0.75
FTSE 100 INDEX	5,874

Key themes for 2016:

- As a marginal producer, our price forecasts (based on marginal costs) leave Lonmin leaking cash slowly but steadily over time. Lonmin's position as the marginal producer with a single mine complex also leaves the group's balance sheet vulnerable to both operational risks (strikes, safety stoppages, operational failures) as well as to prices declining further. We believe higher-than-forecast prices (i.e. above marginal cost) are unlikely in the medium-term given the well-supplied PGM metals market; and alternative sources of metal for end-users from recycling and above-ground stocks.
- Lonmin has performed operationally, assisted by its high ore reserve availability, and has no further obvious levers to pull in our view. Management has already made the tough decision to lower production: output from the Marikana complex will reduce by 100koz to 650kozpa over FY16 and FY17 as the Hossy and Newman Shafts are closed and some of the smaller, contractor-operated mines are put onto care-and-maintenance.
- We see a concentration of downside risks to being exposed to the high-cost producer in an industry under pressure, and with low-prices expected to persist for the medium-term we have a Sell recommendation.

Key events:

- 1Q16 production report: late January 2016

Valuation and risks:

- Our price target is derived by applying a 0.9x multiple to the group's DCF valuation. The 10% discount is based on company management performance, relative to the broader Metals and Mining peer group (based on life-of-mine cash flows discounted at a WACC of 10.0%, Beta 1.4, ERP 6%).Risks include a weaker-than-expected rand and/or higher-than-expected PGM prices leading to stronger than forecast cash flow, taking pressure off the balance sheet. Additional risks include corporate action or an approach for Lonmin given its distressed position; better-than-expected production as a result of unexpected improvements in productivity; grades; recoveries or a combination of the above.

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Model updated:14 December 2015

Running the numbers

Sub-Saharan Africa

South Africa

Platinum

Lonmin Plc

Reuters: LMI.L Bloomberg: LMI LN

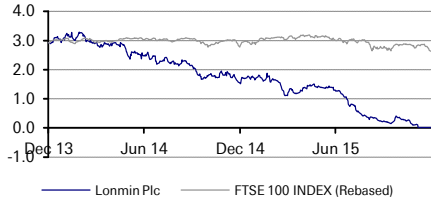
Sell

Price (14 Dec 15)	GBP 0.84
Target Price	GBP 0.75
52 Week range	GBP 0.84 - 188.30
Market Cap (m)	GBPm 232
	USDm 350

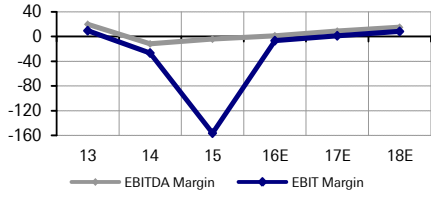
Company Profile

Lonmin specializes in the mining of PGMs (platinum group metals). The group operates a number of platinum mines, concentrators, smelters and a refinery in its core Marikana operations, all situated in the Bushveld Igneous Complex of South Africa. The company's target is to produce 700koz in FY16, and then 650kozpa in the two years thereafter.

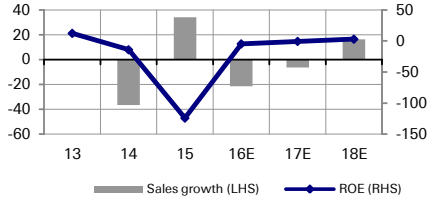
Price Performance



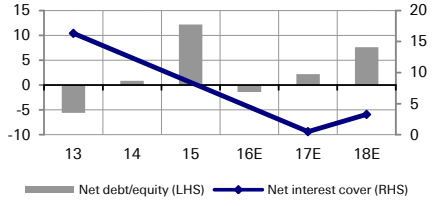
Margin Trends



Growth & Profitability



Solvency



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Fiscal year end 30-Sep	2013	2014	2015	2016E	2017E	2018E
Financial Summary						
DB EPS (USD)	0.20	0.05	-0.16	0.00	0.00	0.00
Reported EPS (USD)	0.31	-0.33	-2.86	0.00	0.00	0.00
DPS (USD)	0.00	0.00	0.00	0.00	0.00	0.00
BVPS (USD)	6.4	5.7	2.8	0.1	0.1	0.1
Weighted average shares (m)	532	570	582	27,585	27,585	27,585
Average market cap (USDm)	2,503	2,612	1,148	350	350	350
Enterprise value (USDm)	2,037	2,398	1,077	41	84	167
Valuation Metrics						
P/E (DB) (x)	23.1	85.1	nm	nm	nm	8.6
P/E (Reported) (x)	15.1	nm	nm	nm	nm	8.6
P/BV (x)	0.81	0.53	0.09	0.18	0.18	0.18
FCF Yield (%)	nm	nm	nm	nm	nm	nm
Dividend Yield (%)	0.0	0.0	0.0	0.0	0.0	0.0
EV/Sales (x)	1.3	2.5	0.8	0.0	0.1	0.2
EV/EBITDA (x)	6.7	nm	nm	2.8	1.0	1.0
EV/EBIT (x)	13.9	nm	nm	nm	6.0	1.8
Income Statement (USDm)						
Sales revenue	1,520	965	1,293	1,016	951	1,107
Gross profit	304	-113	-52	15	84	168
EBITDA	304	-113	-52	15	84	168
Depreciation	157	142	1,966	80	70	74
Amortisation	0	0	0	0	0	0
EBIT	147	-255	-2,018	-66	14	94
Net interest income(expense)	-9	-64	-239	-34	-27	-29
Associates/affiliates	4	-6	-5	0	0	0
Exceptionals/extraordinaries	0	0	0	0	0	0
Other pre-tax income/(expense)	-2	-1	0	0	0	0
Profit before tax	140	-326	-2,262	-100	-13	65
Income tax expense	-58	-123	-363	-28	-4	18
Minorities	32	-15	-238	-9	-1	6
Other post-tax income/(expense)	0	0	0	0	0	0
Net profit	166	-188	-1,661	-62	-8	41
DB adjustments (including dilution)	-57	219	1,567	0	0	0
DB Net profit	109	31	-94	-62	-8	41
Cash Flow (USDm)						
Cash flow from operations	16	-116	-12	-8	66	110
Net Capex	-159	-93	-136	-132	-110	-188
Free cash flow	-143	-209	-148	-140	-44	-78
Equity raised/(bought back)	824	1	3	407	0	0
Dividends paid	-11	-37	-19	-19	-19	-19
Net inc/(dec) in borrowings	-742	175	331	-135	0	0
Other investing/financing cash flows	-42	12	10	-38	0	0
Net cash flow	-114	-58	177	75	-63	-97
Change in working capital	*-223*	*32*	*60*	*50*	*9*	*-11*
Balance Sheet (USDm)						
Cash and other liquid assets	201	143	320	395	332	235
Tangible fixed assets	2,908	2,882	1,477	1,529	1,569	1,683
Goodwill/intangible assets	502	497	94	94	94	94
Associates/investments	466	392	147	147	147	147
Other assets	539	451	391	265	238	258
Total assets	4,616	4,365	2,429	2,430	2,380	2,417
Interest bearing debt	0	172	505	370	370	370
Other liabilities	1,006	811	404	289	272	281
Total liabilities	1,006	983	909	659	642	651
Shareholders' equity	3,409	3,233	1,629	1,908	1,896	1,937
Minorities	201	149	-109	-137	-158	-170
Total shareholders' equity	3,610	3,382	1,520	1,770	1,738	1,766
Net debt	*-201*	*29*	*185*	*-25*	*38*	*135*
Key Company Metrics						
Sales growth (%)	nm	-36.5	34.0	-21.4	-6.4	16.4
DB EPS growth (%)	na	-73.6	na	98.6	86.7	na
EBITDA Margin (%)	20.0	-11.7	-4.0	1.5	8.8	15.1
EBIT Margin (%)	9.7	-26.4	-156.1	-6.5	1.5	8.5
Payout ratio (%)	0.0	nm	nm	nm	nm	0.0
ROE (%)	12.4	-14.1	-124.0	-4.6	-0.6	3.0
Capex/sales (%)	10.5	9.6	10.5	13.0	11.6	17.0
Capex/depreciation (x)	1.0	0.7	0.1	1.6	1.6	2.5
Net debt/equity (%)	-5.6	0.9	12.2	-1.4	2.2	7.6
Net interest cover (x)	16.3	nm	nm	nm	0.5	3.3

Source: Company data, Deutsche Bank estimates

Nordgold

Hold

Reuters: NORDNq.L Exchange: LSE Ticker: NORD

Despite currency help, a tougher 2016 awaits

Price target (USD)	2.70
FTSE 100 INDEX	5,874

Key themes for 2016:

- **Production should be strong in 4Q15 then tail off:** Nordgold reported sluggish production in 3Q15 following geopolitical and weather-related disruptions in West Africa. We expect production will be stronger in 4Q15, taking FY15 production to 960koz, down 2.5% year on year. We forecast production to drop again to 955koz in 2016 with grade declines at Taparako and Bissa, all four Russian mines and Suzdal in Kazakhstan. The Bouly mine should ramp up, delivering 59koz to offset some of the decline, and ramping up to a steady state of 118koz by 2018.
- **Tailwind for costs from currency/oil dissipating:** Throughout 2015, Nordgold has built up headroom versus the gold price from reductions in its All-In Sustaining Costs. We forecast that the group's AISC will come in below US$800/oz (DBe US$758/oz) this year, down 15% year on year, but then jump 21% in 2016 to US$920/oz as production drops and inflation steps up at the group's Russian mines.
- **Another round of share buyback announced**: Nordgold should complete its current US$30m buyback programme by end 2015 (91% complete to date). The group has confirmed it will start a second buyback programme of US$15m in 2016, indicating that Nordgold continues to see value in its shares. Management has also stated it will seek a premium listing on the London Stock Exchange which would require its free float to be at least 25%. At the current share price, when the second buyback completes, Nordgold's free float will drop below 10.5%, meaning that a 15% to 20% increase in shares is needed to get to a 25% and 30% free float respectively. This implies a gross raising of US$211m to US$305m at today's share price level. Nordgold has indicated it would most likely use the proceeds to deliver its project pipeline.

Key events:

- 4Q15 operating results: late January 2016

Valuation and risks:

- We value Nordgold using a sum-of-the-parts of life of mine DCF models. We apply an NPV multiple of 0.7x to reflect the ranking we assign to Nordgold within our coverage universe. Our rankings are derived from debt reduction, P/E valuation, near-term earnings growth, and management action taken to control cash flow. We value the group's longer-dated growth options at US$134m or US$0.36/GDR. We use a WACC of 10.2% and a long-term (real) gold price of US$1,300/oz.
- Key risks include higher- or lower-than-expected gold prices, higher- or lower-than-expected costs and a stronger-/weaker-than-expected Rouble, Tenge, Guinean franc and Central African franc. Operational risks are concentrated around management's ability to deliver on development projects and to sustain cost reduction programs. Further risks include changes in fiscal regime and/or mining legislations. The planned seeking of a premium listing in London requires a minimum free float of 25% - Nordgold has indicated it will issue new shares to meet this requirement thus there is a risk of dilution to existing shareholders.

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Model updated:14 December 2015

Running the numbers

Emerging Europe

Russia

Metals & Mining

Nordgold

Reuters: NORDNq.L Bloomberg: NORD LI

Hold

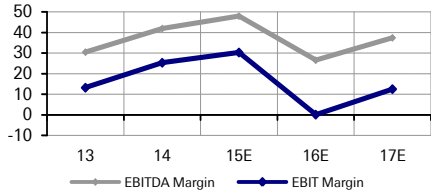
Price (14 Dec 15)	USD 2.75
Target Price	USD 2.70
52 Week range	USD 1.40 - 3.20
Market Cap (m)	EURm 934
	USDm 1,030

Company Profile

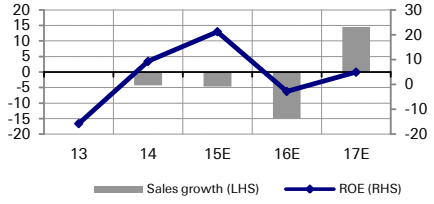
Nordgold is a gold mining and exploration company with eight operating mines in Russia, Kazakhstan, Burkina Faso and Guinea. The company is a former subsidiary of Severstal Group, spun off in January 2012, when a portion of Nordgold's share capital was listed in the form of Global Depositary Receipts.

Price Performance

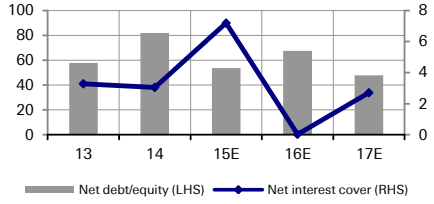
Margin Trends



Growth & Profitability



Solvency



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Fiscal year end 31-Dec	2013	2014	2015E	2016E	2017E
Financial Summary					
DB EPS (USD)	-0.55	0.26	0.51	-0.07	0.14
Reported EPS (USD)	-0.58	0.26	0.55	-0.07	0.14
DPS (USD)	0.08	0.10	0.15	0.00	0.04
BVPS (USD)	3.1	2.5	2.7	2.7	3.0
Weighted average shares (m)	378	378	375	371	371
Average market cap (USDm)	973	602	1,030	1,030	1,030
Enterprise value (USDm)	1,756	1,238	1,620	1,768	1,629
Valuation Metrics					
P/E (DB) (x)	nm	6.2	5.4	nm	19.2
P/E (Reported) (x)	nm	6.1	5.0	nm	19.2
P/BV (x)	0.52	0.60	1.04	1.02	0.90
FCF Yield (%)	15.2	35.3	14.2	nm	14.5
Dividend Yield (%)	3.1	6.5	5.6	0.0	1.6
EV/Sales (x)	1.4	1.0	1.4	1.8	1.4
EV/EBITDA (x)	4.5	2.4	2.9	6.8	3.9
EV/EBIT (x)	10.4	4.0	4.6	nm	11.5
Income Statement (USDm)					
Sales revenue	1,271	1,216	1,159	986	1,129
Gross profit	461	572	633	376	544
EBITDA	388	510	556	262	423
Depreciation	219	202	205	260	281
Amortisation	0	0	0	0	0
EBIT	168	308	352	2	142
Net interest income(expense)	-51	-101	-49	-48	-52
Associates/affiliates	0	0	0	0	0
Exceptionals/extraordinaries	-386	-24	0	0	0
Other pre-tax income/(expense)	0	0	0	0	0
Profit before tax	-269	183	303	-47	89
Income tax expense	-70	60	76	-14	27
Minorities	19	25	21	-5	10
Other post-tax income/(expense)	0	0	0	0	0
Net profit	-218	98	205	-28	53
DB adjustments (including dilution)	9	-1	-14	0	0
DB Net profit	-209	97	191	-28	53
Cash Flow (USDm)					
Cash flow from operations	310	328	406	143	339
Net Capex	-162	-115	-260	-238	-191
Free cash flow	148	213	146	-95	148
Equity raised/(bought back)	0	0	0	0	0
Dividends paid	-71	-40	-44	-57	0
Net inc/(dec) in borrowings	232	-21	-2	-5	66
Other investing/financing cash flows	-110	-268	-58	0	0
Net cash flow	199	-115	43	-157	214
Change in working capital	*-199*	*116*	*-85*	*157*	*-214*
Balance Sheet (USDm)					
Cash and other liquid assets	244	128	368	211	425
Tangible fixed assets	816	669	741	754	754
Goodwill/intangible assets	906	708	679	679	679
Associates/investments	20	240	65	65	65
Other assets	646	498	495	559	563
Total assets	2,632	2,242	2,349	2,269	2,487
Interest bearing debt	968	944	944	939	1,005
Other liabilities	413	300	331	253	268
Total liabilities	1,381	1,245	1,275	1,192	1,273
Shareholders' equity	1,172	939	994	1,003	1,130
Minorities	78	59	80	75	84
Total shareholders' equity	1,251	998	1,074	1,078	1,214
Net debt	*724*	*817*	*575*	*728*	*580*
Key Company Metrics					
Sales growth (%)	nm	-4.3	-4.7	-15.0	14.5
DB EPS growth (%)	na	na	97.9	na	na
EBITDA Margin (%)	30.5	41.9	48.0	26.5	37.4
EBIT Margin (%)	13.2	25.3	30.3	0.2	12.5
Payout ratio (%)	nm	39.6	27.9	nm	30.0
ROE (%)	-15.7	9.3	21.2	-2.8	5.0
Capex/sales (%)	12.8	9.5	22.4	24.1	16.9
Capex/depreciation (x)	0.7	0.6	1.3	0.9	0.7
Net debt/equity (%)	57.9	81.9	53.6	67.6	47.8
Net interest cover (x)	3.3	3.1	7.2	0.0	2.7

Source: Company data, Deutsche Bank estimates

Norsk Hydro

Hold

Reuters: NHY.OL Exchange: OSL Ticker: NHY

A well-liked strategy

Price target (NOK)	34
Oslo All Share Index	623

Our investment case:

1) Well managed operations. Norsk Hydro is a well-managed integrated aluminium producer. It benefits from its low cost Hydro power in Norway and is now benefitting from its upstream bauxite and alumina operations in Brazil with the cost cutting coming through. The group will have additional benefits this year when its onerous legacy contracts roll off.

2) No net debt: Possibly one of the biggest attractions to the stock is that it has no net debt. The recent cash windfall delivered by ramping regional premiums and a weakening NOK has meant that the company is now carrying no net debt into the current volatile pricing and market backdrop.

3) More growth than expected and still paying a dividend. Most mining companies are cutting capex, Hydro is growing its capex significantly. Capex is guided to grow from NOK5.8b in 2015 to 8.6 in 2016 and 6.7 in 2017. Hydro expects aluminium to continue to replace steel and copper in cars and is investing in Body-in-White plants in Europe and also in can recycling. The company foresees primary aluminium growth of 200kt over the next 10 years, more than the 103kt we are forecasting. Norsk Hydro on top of this has a 40% payout ratio with a 1NOK/share minimum.

4) But a lot is priced in. While We like the direction that the management team is following, the current share price is already factoring in a lot of the upside and we have lowered our recommendation to Hold.

Key catalysts for the stock:

- Weakening fx – the weaker NOK has been a catalyst, however a bigger near term catalyst could be the weakening of the BRL, which has stabalised but could weaken further with a Fed rate hike.
- Continuing pressure on the aluminium price and alumina price will weigh on the stock performance.

Valuation and risks:

Our PT for NHY is NOK34ps which is set at 0.93x our NPV valuation for the company in line with its sector performance – WACC 10.0%, CoE 12.4%, CoD 6.5%). Our target price is in line with our valuation. Risks to valuation and price target include significant movements in our aluminium price, exchange rate and cost assumptions. The key area of risk is NHY's ability or otherwise to negotiate the removal of the ICMS fuel charge.

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Model updated:14 December 2015

Running the numbers

Europe

Norway

Metals & Mining

Norsk Hydro

Reuters: NHY.OL Bloomberg: NHY NO

Hold

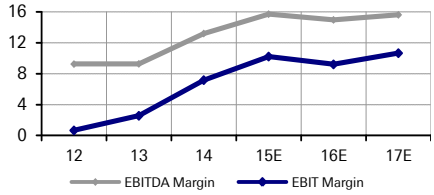
Price (14 Dec 15)	NOK 29.58
Target Price	NOK 34.00
52 Week range	NOK 26.54 - 47.68
Market Cap (m)	NOKm 60,350
	USDm 6,956

Company Profile

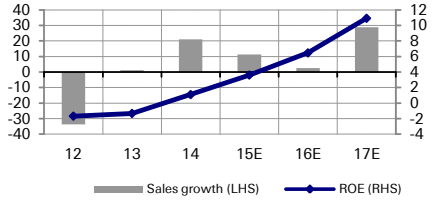
Hydro is a fully integrated aluminium producer with power generating, alumina refining, aluminum smelting and aluminium processing operations. Its recent acquisition of the Brazilian aluminium, alumina and bauxite assets from Vale has shifted its balance from naturally short alumina (neutral when including long-term offtake agreements) to naturally long. With the transfer of the assets only just complete, the company is in the process of integrating them into its business. Once done, the bauxite and alumina assets offer significant growth options to Hydro. The company is in the process of commissioning its major greenfield smelter in Qatar.

Price Performance

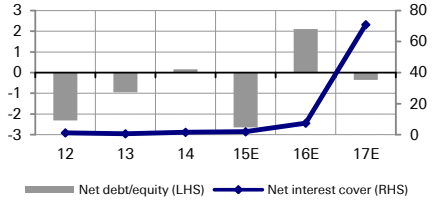
Margin Trends



Growth & Profitability



Solvency



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Fiscal year end 31-Dec	2012	2013	2014	2015E	2016E	2017E
Financial Summary						
DB EPS (NOK)	0.25	0.93	1.83	3.12	1.52	3.17
Reported EPS (NOK)	-0.61	-0.45	0.39	1.28	2.27	4.13
DPS (NOK)	0.75	0.75	1.00	1.25	0.75	1.27
BVPS (NOK)	34.2	34.3	36.3	34.5	35.7	39.8
Weighted average shares (m)	2,037	2,038	2,039	2,040	2,041	2,041
Average market cap (NOKm)	56,708	52,775	69,384	60,350	60,350	60,350
Enterprise value (NOKm)	49,843	39,187	61,296	47,225	50,691	48,595
Valuation Metrics						
P/E (DB) (x)	112.5	27.8	18.6	9.5	19.5	9.3
P/E (Reported) (x)	nm	nm	86.9	23.1	13.0	7.2
P/BV (x)	0.82	0.79	1.17	0.86	0.83	0.74
FCF Yield (%)	4.0	4.6	4.0	12.7	nm	6.0
Dividend Yield (%)	2.7	2.9	2.9	4.2	2.5	4.3
EV/Sales (x)	0.8	0.6	0.8	0.5	0.6	0.4
EV/EBITDA (x)	8.3	6.5	5.9	3.4	3.8	2.7
EV/EBIT (x)	115.4	23.4	10.8	5.3	6.1	3.9
Income Statement (NOKm)						
Sales revenue	64,580	65,359	79,075	87,946	90,197	116,216
Gross profit	5,976	6,066	10,444	13,821	13,505	18,155
EBITDA	5,976	6,066	10,444	13,821	13,505	18,155
Depreciation	5,544	4,392	4,770	4,827	5,196	5,761
Amortisation	0	0	0	0	0	0
EBIT	432	1,674	5,674	8,994	8,309	12,394
Net interest income(expense)	-348	-2,550	-3,553	-4,621	-1,113	-175
Associates/affiliates	0	0	0	0	0	0
Exceptionals/extraordinaries	0	0	0	0	0	0
Other pre-tax income/(expense)	0	0	0	0	0	0
Profit before tax	84	-876	2,121	4,373	7,196	12,219
Income tax expense	803	153	892	1,409	2,254	3,431
Minorities	-13	82	431	346	303	369
Other post-tax income/(expense)	-528	189	0	0	0	0
Net profit	-1,234	-922	798	2,618	4,638	8,420
DB adjustments (including dilution)	1,738	2,823	2,930	3,741	-1,535	-1,942
DB Net profit	504	1,901	3,728	6,358	3,103	6,478
Cash Flow (NOKm)						
Cash flow from operations	5,434	5,074	5,965	13,382	6,172	10,907
Net Capex	-3,183	-2,637	-3,181	-5,737	-6,187	-7,280
Free cash flow	2,251	2,437	2,784	7,645	-15	3,626
Equity raised/(bought back)	72	56	21	25	0	0
Dividends paid	-1,741	-1,528	-1,943	-4,351	-2,541	-1,531
Net inc/(dec) in borrowings	2,245	-511	-1,346	-4,603	-500	0
Other investing/financing cash flows	-3,771	1,369	1,463	-261	699	8
Net cash flow	-944	1,823	979	-1,546	-2,357	2,103
Change in working capital	*0*	*0*	*0*	*0*	*0*	*0*
Balance Sheet (NOKm)						
Cash and other liquid assets	11,377	10,892	11,039	9,563	8,256	11,409
Tangible fixed assets	61,772	50,670	55,719	49,290	51,330	53,899
Goodwill/intangible assets	0	0	0	0	0	0
Associates/investments	15,950	23,767	24,042	24,187	24,342	24,497
Other assets	28,258	29,906	35,472	34,026	40,153	46,338
Total assets	117,357	115,235	126,272	117,066	124,081	136,144
Interest bearing debt	9,630	10,181	11,167	7,578	9,890	11,103
Other liabilities	32,230	29,790	35,164	34,322	36,483	39,025
Total liabilities	41,860	39,971	46,331	41,900	46,374	50,128
Shareholders' equity	69,662	69,981	74,030	70,360	72,901	81,209
Minorities	5,835	5,283	5,911	4,806	4,806	4,806
Total shareholders' equity	75,497	75,264	79,941	75,166	77,707	86,015
Net debt	*-1,747*	*-711*	*128*	*-1,985*	*1,635*	*-306*
Key Company Metrics						
Sales growth (%)	-33.7	1.2	21.0	11.2	2.6	28.8
DB EPS growth (%)	-87.7	277.0	96.0	70.5	-51.2	108.7
EBITDA Margin (%)	9.3	9.3	13.2	15.7	15.0	15.6
EBIT Margin (%)	0.7	2.6	7.2	10.2	9.2	10.7
Payout ratio (%)	nm	nm	255.5	97.1	33.0	30.8
ROE (%)	-1.7	-1.3	1.1	3.6	6.5	10.9
Capex/sales (%)	5.0	4.1	4.2	6.6	6.9	6.3
Capex/depreciation (x)	0.6	0.6	0.7	1.2	1.2	1.3
Net debt/equity (%)	-2.3	-0.9	0.2	-2.6	2.1	-0.4
Net interest cover (x)	1.2	0.7	1.6	1.9	7.5	70.9

Source: Company data, Deutsche Bank estimates

Nyrstar NV

Hold

Reuters: NYR.BR Exchange: BRU Ticker: NYR

Balancing debt, smelter performance and mining exit ance.

Price target (EUR)	2.20
EURO (STOXXE)	3,139

Our investment case:

1. **Earnings momentum is finally positive**: We expect Nyrstar's NPAT to finally be positive in 2016 on the back of improved smelter performance and improving zinc price.

2. **Plugging the 2016 hole.** At its recent IMS Nyrstar made some significant announcements that should help clarify the company's strategy i) The company is shutting the door on its mining strategy and will sell and/or close the majority of its capacity and ii) Trafigura has revealed its intentions including supply and offtake agreements, but not takeover. While we see value in the equity, without knowing the full extent of the financing costs, we maintain our Hold rec in a volatile market.

3. **Recapitalization details on the table**. Nyrstar is considering a broad range of methods to correct its balance sheet. First, a zinc pre-payment of €150-200m to be repaid in zinc tonnes after a 1 year grace period in 8 equal quarterly shipments at the prevailing zinc price. We expect the prepayment to complete before the end of the year. Second, Nyrstar contemplates a €250-275m rights issue. The rights issue which is expected to be launched post the 2015 reporting in early 2016 has been fully underwritten (50% Trafigura, 50% by banks) and will require shareholders approval.

As a result of the lowering of our commodity price forecasts, we have lowered our Nyrstar earnings expectations by 51% in 2016 and 40% in 2017. We have also lowered our target price from €3.10 to €2.20ps.

Key catalysts for the stock:

- A successful reflation of the balance sheet.
- A ramp in the zinc price or ongoing weakening of the Euro would be key catalysts for the stock.
- Early/successful delivery of its smelter projects
- Early/successful closure or sale of its cash burning mining operations.

Valuation and risks:

Our €2.20ps TP is set at 0.73x our NPV in line with its market performance, using a WACC of 10%. Nyrstar is highly leveraged to the zinc price and the Euro, thus differences in these values from our expectations are the biggest risk factors. Other key risks to valuation sit with timing, size and form of its capital restructuring. Nyrstar is highly leveraged to the zinc price risk while a better than-expected project delivery offers upside risk.

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Model updated:15 December 2015

Running the numbers

Europe

Belgium

Metals & Mining

Nyrstar NV

Reuters: NYR.BR Bloomberg: NYR BB

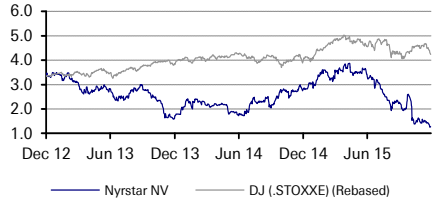
Hold

Price (14 Dec 15)	EUR 1.27
Target Price	EUR 2.20
52 Week range	EUR 1.25 - 3.87
Market Cap (m)	EURm 414
	USDm 457

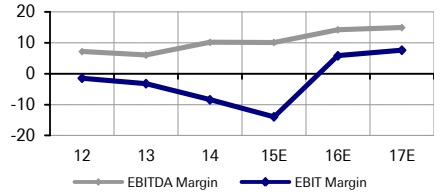
Company Profile

Nyrstar is the global leader in zinc smelting (~10% market share) with assets in Europe, Australia, the US and JVs in Asia. It also owns and operates a lead smelter in Australia, has a 50% interest in a lead recycling business in Australia and generates a small amount of its earnings from downstream zinc businesses in Asia and France. The company was formed in late 2007 through the combination of these assets from Zinifex (Australia) and Umicore (Belgium). The company's largest sensitivities in order are; the Eur/USD exchange rate, the LME zinc price and the Zinc treatment charge (the benchmark price is negotiated annually).

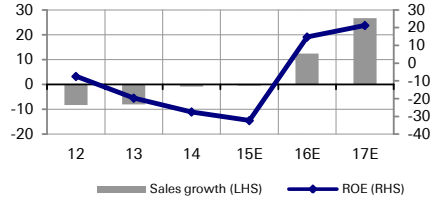
Price Performance



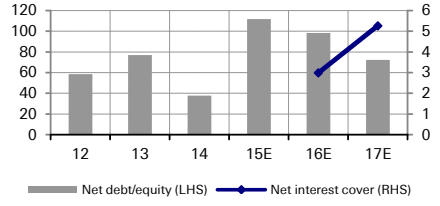
Margin Trends



Growth & Profitability



Solvency



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Fiscal year end 31-Dec	2012	2013	2014	2015E	2016E	2017E
Financial Summary						
DB EPS (EUR)	-0.55	-1.29	-0.27	0.02	0.28	0.53
Reported EPS (EUR)	-0.57	-1.29	-1.18	-0.79	0.28	0.53
DPS (EUR)	0.16	0.00	0.00	0.00	0.10	0.20
BVPS (EUR)	7.1	5.6	3.5	1.8	2.4	3.2
Weighted average shares (m)	162	154	235	327	327	327
Average market cap (EURm)	612	414	538	414	414	414
Enterprise value (EURm)	1,225	1,307	1,202	1,319	1,405	1,394
Valuation Metrics						
P/E (DB) (x)	nm	nm	nm	61.7	4.5	2.4
P/E (Reported) (x)	nm	nm	nm	nm	4.5	2.4
P/BV (x)	0.47	0.32	0.83	0.69	0.54	0.40
FCF Yield (%)	12.8	24.6	4.1	nm	nm	14.0
Dividend Yield (%)	4.2	0.0	0.0	0.0	7.9	15.8
EV/Sales (x)	0.4	0.5	0.4	0.5	0.4	0.4
EV/EBITDA (x)	5.6	7.7	4.2	4.7	3.2	2.4
EV/EBIT (x)	nm	nm	nm	nm	7.7	4.6
Income Statement (EURm)						
Sales revenue	3,070	2,824	2,799	2,787	3,134	3,967
Gross profit	203	117	284	282	446	592
EBITDA	220	170	284	282	446	592
Depreciation	218	220	259	249	264	291
Amortisation	46	40	261	422	0	0
EBIT	-44	-90	-236	-388	182	302
Net interest income(expense)	-91	-99	-108	-111	-61	-57
Associates/affiliates	-1	1	0	0	0	-1
Exceptionals/extraordinaries	0	0	0	0	0	0
Other pre-tax income/(expense)	27	0	1	0	0	0
Profit before tax	-110	-189	-343	-499	121	244
Income tax expense	-14	11	-57	-210	25	58
Minorities	-3	0	0	-1	-1	-1
Other post-tax income/(expense)	0	0	0	0	0	0
Net profit	-92	-200	-285	-288	96	187
DB adjustments (including dilution)	4	0	222	296	5	5
DB Net profit	-89	-200	-63	7	101	191
Cash Flow (EURm)						
Cash flow from operations	290	295	314	58	366	551
Net Capex	-212	-193	-292	-422	-493	-493
Free cash flow	78	102	22	-364	-127	58
Equity raised/(bought back)	0	12	256	20	40	40
Dividends paid	-26	-24	0	0	1	1
Net inc/(dec) in borrowings	-34	21	-133	-70	-165	0
Other investing/financing cash flows	0	0	0	0	0	0
Net cash flow	18	111	145	-413	-251	99
Change in working capital	*163*	*206*	*103*	*-100*	*-27*	*39*
Balance Sheet (EURm)						
Cash and other liquid assets	188	292	499	291	40	51
Tangible fixed assets	1,730	1,772	1,917	1,777	2,006	2,208
Goodwill/intangible assets	133	10	14	15	15	15
Associates/investments	67	46	44	35	35	35
Other assets	1,383	1,110	1,310	1,405	1,477	1,604
Total assets	3,502	3,231	3,784	3,522	3,573	3,913
Interest bearing debt	869	962	937	961	796	796
Other liabilities	1,436	1,388	1,692	1,962	2,006	2,086
Total liabilities	2,304	2,350	2,629	2,923	2,803	2,882
Shareholders' equity	1,161	870	1,155	600	770	1,032
Minorities	0	0	0	0	0	0
Total shareholders' equity	1,161	870	1,155	599	770	1,031
Net debt	*680*	*670*	*438*	*670*	*756*	*745*
Key Company Metrics						
Sales growth (%)	-8.3	-8.0	-0.9	-0.4	12.5	26.6
DB EPS growth (%)	-24.6	-136.3	79.2	na	1,268.1	89.8
EBITDA Margin (%)	7.2	6.0	10.1	10.1	14.2	14.9
EBIT Margin (%)	-1.4	-3.2	-8.4	-13.9	5.8	7.6
Payout ratio (%)	nm	nm	nm	nm	34.0	35.0
ROE (%)	-7.5	-19.7	-27.5	-32.3	14.7	21.3
Capex/sales (%)	8.0	6.8	10.5	15.2	15.7	12.4
Capex/depreciation (x)	1.1	0.9	1.1	1.7	1.9	1.7
Net debt/equity (%)	58.6	77.0	37.9	111.8	98.2	72.2
Net interest cover (x)	nm	nm	nm	nm	3.0	5.3

Source: Company data, Deutsche Bank estimates

Polymetal

Hold

Reuters: POLYP.L Exchange: MICEX Ticker: POLY

FCF positive in a lacklustre gold price environment

Price target (GBP)	460
FTSE 100 INDEX	5,874

Key themes for 2016:

- **Top line performance in 2016 will depend on the gold price:** Polymetal delivered a strong production result in 3Q15 and is on track to achieve its 1,35Moz FY15 guidance. The group also targets 1.35Moz gold equivalent in 2016. We believe this is achievable and we estimate gold will represent 63% of group output compared with 59% in 2015, with more tonnage and higher grades from Voro and Varvara. Polymetal's top line will therefore be more sensitive to the gold price. We forecast an average gold price of US$1,033/oz for 2016, down 11% vs. 2015. Our lower estimate factors in the effects of a higher interest rate environment in 2016 (following the Fed hike expected in Dec-15).
- **FCF story should continue in 2016:** The majority of Polymetal's mines sit in the lower half of the cost curve. 90% of them are in Russia and the remaining 10% in Kazakhstan. Polymetal's costs are therefore in Rouble or Tenge, and currency tailwinds have benefited Polymetal throughout 2015. We also expect the company to continue to explore additional cost reduction initiatives. Combining these factors altogether, we believe Polymetal will remain free cash flow positive even in the low gold price environment: we forecast US$170m Free Cash Flow in 2016.
- **Kyzyl has opened the next chapter of growth for Polymetal:** Polymetal acquired the Kyzyl project as its next leg of growth. The reserve base is high grade and Polymetal guides for an average of 7.7g/t above the group current average of 4.7g/t. The mine has a relatively long life of reserves at 22 years. Bakyrchik is in a well-established mining region in eastern Kazakhstan with good infrastructure, low power costs and supply of mining personnel. This should allow for a relatively quick construction, planned to start in 2Q16 with first production in 2018. We estimate total capex at Kyzyl of USS$990m. Polymetal believes the deposit is more amenable to open pit mining (for the first 10 years) with production expected to peak at 360koz in 2022. Polymetal then aims to transition to a fully mechanized underground mine by 2026 for the rest of the life of the mine. The underground mine grades are guided higher at an average of 8.5g/t.

Key events:

- 4Q15 production results: 28 January 2016
- FY15 financial results: 29 March 2016

Valuation and risks:

- Our price target is set at a 10% discount to our DCF valuation, to reflect the ranking we assign to Polymetal within our coverage universe. Our rankings are derived from debt reduction, P/E valuation, near-term earnings growth, and management action taken to control cash flow. We value Polymetal from a sum-of-the-parts life-of-mine DCF model. We apply a 9% WACC based on a targeted capital structure of 70% equity and 30% debt.
- Key risks include silver and gold prices significantly higher/lower than our expectation as well as Russian macroeconomic factors such as ruble appreciation/depreciation. Management risks are concentrated around its ability to integrate newly acquired deposits. Other risks include changes in fiscal regimes and/or mining legislation. 90% of Polymetal's assets are in Russia, with the residual 10% in Kazakhstan.

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Model updated:14 December 2015

Running the numbers

Emerging Europe

Russia

Metals & Mining

Polymetal

Reuters: POLYP.L Bloomberg: POLY LN

Hold

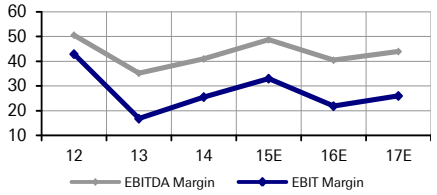
Price (14 Dec 15)	GBP 538.50
Target Price	GBP 460.00
52 Week range	GBP 427.10 - 614.00
Market Cap (m)	GBPm 2,274
	USDm 3,437

Company Profile

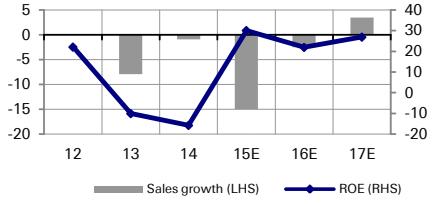
Polymetal International is the holding company of Polymetal, a leading Russian gold and silver miner. In 2010, Polymetal was the fourth largest gold producer in Russia by production volume and its largest silver producer, ranked eighth worldwide Polymetal produced 810koz of gold equivalent in 2011 at six operating assets and targets a 73% organic growth in gold equivalent output by 2014.

Price Performance

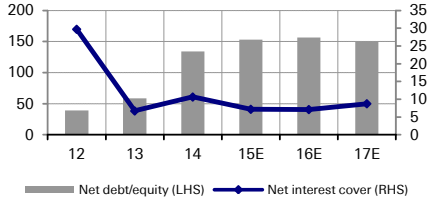
Margin Trends



Growth & Profitability



Solvency



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Fiscal year end 31-Dec	2012	2013	2014	2015E	2016E	2017E
Financial Summary						
DB EPS (USD)	1.13	0.30	-0.61	0.66	0.45	0.57
Reported EPS (USD)	1.10	-0.51	-0.53	0.62	0.45	0.57
DPS (USD)	0.81	0.09	0.36	0.50	0.13	0.17
BVPS (USD)	5.6	4.6	2.2	2.0	2.0	2.2
Weighted average shares (m)	383	386	397	422	424	424
Average market cap (USDm)	6,088	4,420	3,645	3,437	3,437	3,437
Enterprise value (USDm)	6,888	5,427	4,796	4,727	4,748	4,782
Valuation Metrics						
P/E (DB) (x)	14.1	37.8	nm	12.2	18.2	14.4
P/E (Reported) (x)	14.5	nm	nm	13.2	18.2	14.4
P/BV (x)	3.39	2.05	4.11	3.99	4.02	3.76
FCF Yield (%)	2.8	3.2	8.4	6.8	5.0	4.2
Dividend Yield (%)	5.1	0.8	3.9	6.1	1.6	2.1
EV/Sales (x)	3.7	3.2	2.8	3.3	3.4	3.3
EV/EBITDA (x)	7.3	9.0	6.9	6.7	8.4	7.5
EV/EBIT (x)	8.7	18.9	11.1	10.0	15.5	12.7
Income Statement (USDm)						
Sales revenue	1,854	1,707	1,690	1,437	1,401	1,450
Gross profit	1,149	829	929	853	710	779
EBITDA	938	601	693	701	567	638
Depreciation	142	238	260	226	260	260
Amortisation	0	76	0	0	0	0
EBIT	796	287	432	475	307	377
Net interest income(expense)	-27	-43	-41	-66	-43	-43
Associates/affiliates	-2	-2	-7	0	0	0
Exceptionals/extraordinaries	-21	-310	35	-20	0	0
Other pre-tax income/(expense)	-95	-90	-558	-2	2	2
Profit before tax	651	-158	-138	386	265	336
Income tax expense	223	40	71	126	77	97
Minorities	7	0	0	0	0	0
Other post-tax income/(expense)	0	0	0	0	0	0
Net profit	421	-198	-209	260	188	238
DB adjustments (including dilution)	10	315	-35	20	0	0
DB Net profit	431	117	-244	280	188	238
Cash Flow (USDm)						
Cash flow from operations	541	462	515	464	508	483
Net Capex	-372	-319	-210	-230	-336	-338
Free cash flow	169	142	305	234	172	144
Equity raised/(bought back)	0	0	0	0	0	0
Dividends paid	-77	-316	-65	-307	-79	-64
Net inc/(dec) in borrowings	-149	213	202	85	-84	-114
Other investing/financing cash flows	-584	8	-350	-80	0	0
Net cash flow	-640	47	92	-68	9	-34
Change in working capital	*-212*	*0*	*-81*	*-87*	*59*	*-16*
Balance Sheet (USDm)						
Cash and other liquid assets	19	66	157	89	98	64
Tangible fixed assets	2,206	2,095	2,021	1,997	2,073	2,151
Goodwill/intangible assets	115	31	18	18	18	18
Associates/investments	45	39	15	29	29	29
Other assets	1,254	1,025	786	1,007	927	949
Total assets	3,638	3,255	2,997	3,141	3,144	3,210
Interest bearing debt	864	1,111	1,323	1,408	1,438	1,438
Other liabilities	622	356	805	871	850	856
Total liabilities	1,486	1,467	2,128	2,278	2,287	2,293
Shareholders' equity	2,152	1,787	869	862	857	917
Minorities	0	0	0	0	0	0
Total shareholders' equity	2,152	1,787	869	862	857	917
Net debt	*845*	*1,046*	*1,165*	*1,318*	*1,340*	*1,374*
Key Company Metrics						
Sales growth (%)	nm	-8.0	-0.9	-15.0	-2.5	3.5
DB EPS growth (%)	na	-73.1	na	na	-32.7	26.6
EBITDA Margin (%)	50.6	35.2	41.0	48.8	40.5	44.0
EBIT Margin (%)	42.9	16.8	25.6	33.0	21.9	26.0
Payout ratio (%)	73.6	nm	nm	81.2	30.0	30.0
ROE (%)	22.1	-10.1	-15.7	30.0	21.9	26.9
Capex/sales (%)	21.4	18.7	12.4	16.0	24.0	23.3
Capex/depreciation (x)	2.8	1.3	0.8	1.0	1.3	1.3
Net debt/equity (%)	39.3	58.5	134.0	152.9	156.3	149.8
Net interest cover (x)	29.7	6.7	10.6	7.2	7.1	8.7

Source: Company data, Deutsche Bank estimates

Randgold Resources

Buy

Reuters: RRS.L Exchange:LSE Ticker: RRS

Next stop: Ghana

Price target (GBP)	4,600
FTSE 100 INDEX	5,874

Key themes for 2016:

- **Randgold aims to move into Ghana:** Randgold has entered an investment agreement with AngloGold Ashanti (Buy, ZAR102) aiming to form a 50/50 joint venture to redevelop AngloGold's Obuasi mine in Ghana. Upon completion of a bankable Feasibility Study (FS), with South African Reserve Bank approval, and agreement with the Government of Ghana, Randgold would operate the mine, after implementing a re-designed development plan. The cost of completing the new feasibility study is US$4m. Randgold will not pay any upfront cash or capital to enter into the JV if it goes ahead. The group's CEO has commented that total capital to develop the mine would not exceed US$1bn and Randgold's share of US$500m certainly fits the investment size that it has signaled for its next potential mine development.
- **Resilient EBITDA in a lower gold price environment:** We forecast the gold price to be 11% lower on average in 2016 compared with 2015. We think Randgold's EBITDA, net earnings and cash flow will be remain resilient however: we forecast a 7% increase in production, to just over 1.2moz, and that Randgold will be able to deliver a 14% drop in unit cash costs as Kibali reaches steady state and Loulo's production increases from higher grades. This should result in EBITDA remaining flat year on year. Cash flow is then supported by a 17% drop in capex as the Kibali project capex is complete.
- **We expect increased dividends as well as Obuasi move:** We forecast that Randgold will increase its dividends in 2016, paying out 55% of earnings (US$58m), up from 34% in 2015 (US$39m). Post dividends, we forecast the group will generate US$100mof free cash flow. We expect up to US$400m of capex will be needed for Randgold's share of Obuasi project spend, and that it will seek some project financing for this. Overall, we expect management to be comfortable moving into a net debt position in the short term (we forecast US$175m by end 2016) in order to deliver the Obuasi growth option.

Key events:

- Obuasi FS results: due late January 2016
- 4Q15 results: 8 February 2016

Valuation and risks:

- Our price target is set at our NPV, to reflect the ranking we assign to Randgold within our coverage universe. Our rankings are derived from debt reduction, P/E valuation, near-term earnings growth, and management action taken to control cash flow. We derive our NVP from a DCF model of life of mine cash flows. We use a long-term gold price of US$1,300/oz and a WACC of 5% (based on a risk-free rate of 4%, a market risk premium of 6%, a beta of 0.3x and a 30% target gearing).
- Key risks include lower-than-expected gold prices, higher-than-expected costs, particularly due to labour inflation, and volatility in the Euro/Dollar exchange rate.

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Model updated:10 December 2015

Running the numbers

Europe

United Kingdom

Gold

Randgold

Reuters: RRS.L Bloomberg: RRS LN

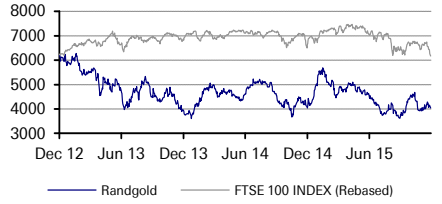
Buy

Price (14 Dec 15)	GBP 4,042.00
Target Price	GBP 4,600.00
52 Week range	GBP 3,625.00 - 5,685.00
Market Cap (m)	GBPm 3,768
	USDm 5,695

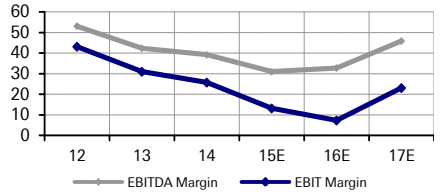
Company Profile

Randgold Resources is a gold exploration and mining company focusing on prospective regions in West Africa and the Congo Craton. The company currently has three operating mines and one low-grade stockpile processing facility in Mali and the Cote d'Ivoire, producing c.750koz of gold in 2011F. The company plans to ramp up its newly commissioned mines and grow the portfolio to five mines producing c.1.2Moz of gold by 2014.

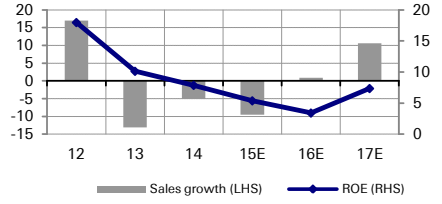
Price Performance



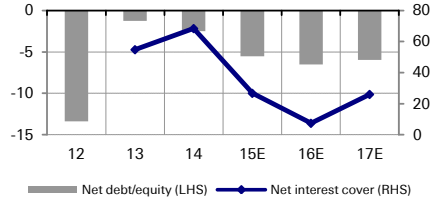
Margin Trends



Growth & Profitability



Solvency



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Fiscal year end 31-Dec	2012	2013	2014	2015E	2016E	2017E
Financial Summary						
DB EPS (USD)	4.65	3.00	2.52	1.80	1.17	2.61
Reported EPS (USD)	4.65	3.00	2.52	1.80	1.17	2.61
DPS (USD)	0.50	0.50	0.60	0.62	0.64	0.66
BVPS (USD)	28.5	31.2	33.4	34.2	34.7	36.7
Weighted average shares (m)	92	92	93	93	93	93
Average market cap (USDm)	9,332	7,089	6,942	5,695	5,695	5,695
Enterprise value (USDm)	9,122	7,227	7,062	5,720	5,695	5,727
Valuation Metrics						
P/E (DB) (x)	21.9	25.6	29.8	34.0	52.4	23.4
P/E (Reported) (x)	21.9	25.6	29.8	34.0	52.4	23.4
P/BV (x)	3.39	2.01	2.05	1.79	1.76	1.67
FCF Yield (%)	nm	nm	1.4	2.1	1.8	1.2
Dividend Yield (%)	0.5	0.7	0.8	1.0	1.0	1.1
EV/Sales (x)	6.9	6.3	6.5	5.8	5.7	5.2
EV/EBITDA (x)	13.0	14.9	16.6	18.8	17.5	11.4
EV/EBIT (x)	16.1	20.4	25.3	44.2	78.6	22.6
Income Statement (USDm)						
Sales revenue	1,318	1,145	1,087	984	992	1,098
Gross profit	735	536	462	344	383	559
EBITDA	700	485	426	305	325	504
Depreciation	132	131	147	175	252	251
Amortisation	0	0	0	0	0	0
EBIT	568	355	279	129	72	253
Net interest income(expense)	1	-6	-4	-5	-10	-10
Associates/affiliates	0	54	78	94	77	100
Exceptionals/extraordinaries	0	0	0	0	0	0
Other pre-tax income/(expense)	0	0	0	0	0	0
Profit before tax	569	403	353	219	140	343
Income tax expense	58	77	82	32	19	73
Minorities	80	47	36	18	11	25
Other post-tax income/(expense)	0	0	0	0	0	0
Net profit	432	278	235	169	109	245
DB adjustments (including dilution)	0	0	0	0	0	0
DB Net profit	432	278	235	169	109	245
Cash Flow (USDm)						
Cash flow from operations	494	445	317	333	376	420
Net Capex	-561	-728	-222	-214	-276	-354
Free cash flow	-67	-283	96	119	100	66
Equity raised/(bought back)	14	1	2	0	0	0
Dividends paid	-62	-73	-53	-48	-63	-72
Net inc/(dec) in borrowings	15	0	0	0	0	0
Other investing/financing cash flows	0	2	1	35	0	0
Net cash flow	-100	-353	45	106	36	-7
Change in working capital	*0*	*0*	*0*	*0*	*0*	*0*
Balance Sheet (USDm)						
Cash and other liquid assets	387	38	83	189	225	218
Tangible fixed assets	1,742	1,458	1,495	1,488	1,511	1,615
Goodwill/intangible assets	0	0	0	0	0	0
Associates/investments	4	2	1	1	1	1
Other assets	994	1,879	1,954	2,093	2,067	2,151
Total assets	3,127	3,377	3,533	3,771	3,804	3,985
Interest bearing debt	15	0	0	0	0	0
Other liabilities	327	319	230	263	239	223
Total liabilities	342	319	230	263	239	223
Shareholders' equity	2,620	2,879	3,098	3,187	3,237	3,420
Minorities	166	179	205	214	226	251
Total shareholders' equity	2,786	3,058	3,303	3,402	3,463	3,671
Net debt	*-373*	*-38*	*-83*	*-189*	*-225*	*-218*
Key Company Metrics						
Sales growth (%)	17.0	-13.1	-5.1	-9.5	0.9	10.6
DB EPS growth (%)	13.6	-35.5	-16.0	-28.6	-35.2	123.6
EBITDA Margin (%)	53.1	42.4	39.2	31.0	32.7	45.9
EBIT Margin (%)	43.1	31.0	25.7	13.2	7.3	23.1
Payout ratio (%)	10.6	16.6	23.7	34.2	54.5	25.1
ROE (%)	18.0	10.1	7.9	5.4	3.4	7.4
Capex/sales (%)	42.7	63.6	20.4	21.7	27.8	32.3
Capex/depreciation (x)	4.3	5.6	1.5	1.2	1.1	1.4
Net debt/equity (%)	-13.4	-1.2	-2.5	-5.5	-6.5	-5.9
Net interest cover (x)	nm	54.8	68.4	26.7	7.4	26.0

Source: Company data, Deutsche Bank estimates

Rio Tinto

Buy

Reuters: RIO.L Exchange:LSE Ticker:RIO

Mechanical - Cost out, working capital down

Price target (GBp)	3,300
FTSE 100 INDEX	5,874

Our investment case:

1. **Sticking with the basics:** Against a backdrop of extremely complex supply and demand dynamics in the commodity markets, Rio's simple strategy of reducing costs and inventories and paying down debt offers a significant comfort for the market.

2. **Dominant iron ore position:** While the iron ore price has come under pressure, Rio's low cost position means that it is continuing to generate over 50% margins on its iron ore. While the earnings are robust, the sentiment around a declining iron ore price will present a head wind in the near term.

3. **Quality aluminium portfolio:** Rio's earnings exceeded market expectations in the first half of 2015 and the beat was predominantly in the aluminium division. We expect this to happen again in February 2016 when the company presents its full year results. The last company provided consensus earnings expectations for the division are US$1.09b from a half year result of US$0.79b. We are at the top end of consensus at US$1.45b and remain very comfortable at this level, with bauxite, achieved metal premiums, and cost cutting driving the solid result.

4. **Committed to its primary share holder contract:** Rio's message is clear; the company is committed to its share holder returns in general and to its progressive dividend in particular. While dividend yield is not normally a reason to buy mining companies, Rio's 8% yield is extraordinary and certainly pays share holders to wait for the market turmoil in the mining stocks to complete. It is also the only UK diversified miner that looks capable of covering its dividend and capex from operating cash

Key catalysts for the stock:

- The iron ore price finding a floor.
- February results and confirmation of the dividend.

Changes made:

We have included the updated commodity and fx assumptions in our model. The cut in our commodity price expectation has moved our 2016 and 2017 earnings expectations by 17% and 8% respectively.

Valuation and risks:

Our PT of £33ps is set at 1.12x our DCF derived valuation in line with its relative sector performance (9.3% WACC, CoE 10.5%, CoD 3.6%, RFR 3.0%, ERP 6%, beta 1.25). It reflects the cash on the balance sheet as well as the lower costs. Downside risks include weaker commodity prices and higher costs.

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Model updated:15 December 2015

Running the numbers

Europe

United Kingdom

Metals & Mining

Rio Tinto

Reuters: RIO.L Bloomberg: RIO LN

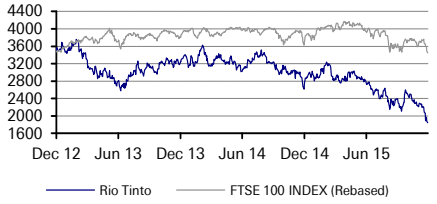
Buy

Price (14 Dec 15)	GBP 1,848.00
Target Price	GBP 3,300.00
52 Week range	GBP 1,848.00 - 3,237.50
Market Cap (m)	GBPm 33,553
	USDm 50,712

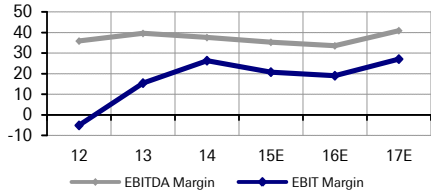
Company Profile

Rio Tinto is a global diversified mining company with interests in aluminum, borax, coal, copper, diamonds, gold, iron ore, titanium dioxide feedstock, uranium and zinc. Its key mining operations are located in Australia, New Zealand, South Africa, South America, the United States, Europe, and Canada. Rio Tinto's management structure is based primarily on six principal global products businesses Aluminium, Diamonds, Copper, Energy (coal and uranium), Industrial Minerals, and Iron Ore supported by worldwide exploration and technology groups.

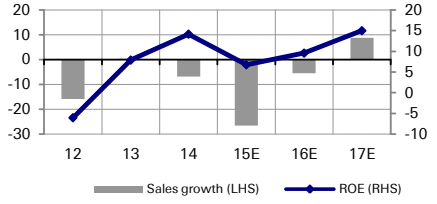
Price Performance



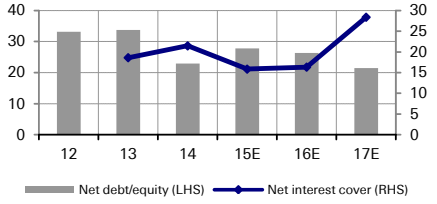
Margin Trends



Growth & Profitability



Solvency



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Fiscal year end 31-Dec	2012	2013	2014	2015E	2016E	2017E
Financial Summary						
DB EPS (USD)	5.01	5.50	5.02	2.81	2.20	3.51
Reported EPS (USD)	-1.61	1.97	3.52	1.64	2.20	3.51
DPS (USD)	1.67	1.92	2.15	2.16	2.18	2.24
BVPS (USD)	25.3	24.8	25.0	23.1	22.9	24.0
Weighted average shares (m)	1,852	1,852	1,853	1,816	1,805	1,805
Average market cap (USDm)	94,549	91,212	97,549	50,712	50,712	50,712
Enterprise value (USDm)	117,000	110,477	111,964	66,378	65,456	63,437
Valuation Metrics						
P/E (DB) (x)	10.2	9.0	10.5	10.0	12.7	7.9
P/E (Reported) (x)	nm	25.0	14.9	17.0	12.7	7.9
P/BV (x)	2.25	2.27	1.88	1.21	1.22	1.16
FCF Yield (%)	nm	2.6	6.5	10.2	9.4	11.7
Dividend Yield (%)	3.3	3.9	4.1	7.7	7.8	8.0
EV/Sales (x)	2.3	2.2	2.3	1.9	2.0	1.8
EV/EBITDA (x)	6.4	5.5	6.3	5.4	5.9	4.3
EV/EBIT (x)	nm	14.0	8.9	9.1	10.4	6.5
Income Statement (USDm)						
Sales revenue	50,967	51,171	47,664	35,034	33,118	36,002
Gross profit	17,872	19,858	18,614	12,383	11,551	15,005
EBITDA	18,275	20,234	17,893	12,353	11,107	14,726
Depreciation	4,441	4,791	4,860	4,630	4,801	4,965
Amortisation	16,410	7,531	473	439	0	0
EBIT	-2,576	7,912	12,560	7,284	6,306	9,761
Net interest income(expense)	-160	-425	-585	-459	-386	-344
Associates/affiliates	0	0	0	0	0	0
Exceptionals/extraordinaries	-7	0	0	0	0	0
Other pre-tax income/(expense)	168	-3,982	-2,423	-1,815	-382	-382
Profit before tax	-2,568	3,505	9,552	5,009	5,538	9,035
Income tax expense	429	2,426	3,053	1,958	1,717	2,801
Minorities	-14	-2,586	-28	72	-155	-110
Other post-tax income/(expense)	0	0	0	0	0	0
Net profit	-2,990	3,665	6,527	2,979	3,976	6,345
DB adjustments (including dilution)	12,293	6,552	2,778	2,117	0	0
DB Net profit	9,303	10,217	9,305	5,096	3,976	6,345
Cash Flow (USDm)						
Cash flow from operations	9,368	15,078	14,286	10,202	8,695	11,379
Net Capex	-17,575	-12,720	-7,990	-5,046	-3,955	-5,463
Free cash flow	-8,207	2,358	6,296	5,156	4,739	5,915
Equity raised/(bought back)	1,474	0	0	-2,021	0	0
Dividends paid	-3,038	-3,322	-3,710	-4,125	-3,894	-3,951
Net inc/(dec) in borrowings	7,888	2,122	-3,034	-3,598	-1,193	-1,740
Other investing/financing cash flows	-666	1,756	2,639	15	0	0
Net cash flow	-2,549	2,914	2,191	-4,573	-348	224
Change in working capital	*401*	*557*	*1,519*	*1,081*	*69*	*-701*
Balance Sheet (USDm)						
Cash and other liquid assets	7,082	10,216	12,423	7,830	7,482	7,706
Tangible fixed assets	75,131	70,827	68,693	65,668	64,822	65,321
Goodwill/intangible assets	9,402	6,770	7,108	6,539	6,157	5,775
Associates/investments	7,966	6,406	6,389	6,188	6,188	6,188
Other assets	17,992	16,806	13,214	11,366	11,256	11,887
Total assets	117,573	111,025	107,827	97,591	95,905	96,876
Interest bearing debt	26,343	28,271	24,918	21,659	20,466	18,726
Other liabilities	32,915	29,425	28,315	26,245	26,195	26,917
Total liabilities	59,258	57,696	53,233	47,904	46,661	45,643
Shareholders' equity	46,865	45,886	46,285	41,661	41,295	43,340
Minorities	11,156	7,616	8,309	8,026	7,948	7,893
Total shareholders' equity	58,021	53,502	54,594	49,686	49,243	51,233
Net debt	*19,261*	*18,055*	*12,495*	*13,829*	*12,984*	*11,020*
Key Company Metrics						
Sales growth (%)	-15.8	0.4	-6.9	-26.5	-5.5	8.7
DB EPS growth (%)	-37.9	9.8	-8.7	-44.1	-21.5	59.6
EBITDA Margin (%)	35.9	39.5	37.5	35.3	33.5	40.9
EBIT Margin (%)	-5.1	15.5	26.4	20.8	19.0	27.1
Payout ratio (%)	nm	97.0	61.1	131.3	98.9	63.7
ROE (%)	-6.0	7.9	14.2	6.8	9.6	15.0
Capex/sales (%)	34.5	25.3	17.1	14.4	13.8	15.2
Capex/depreciation (x)	4.0	2.7	1.7	1.1	0.9	1.1
Net debt/equity (%)	33.2	33.7	22.9	27.8	26.4	21.5
Net interest cover (x)	nm	18.6	21.5	15.9	16.3	28.4

Source: Company data, Deutsche Bank estimates

South32

Buy

Reuters: S32.L Exchange: LSE Ticker: S32

The year to deliver cost cutting success

Price target (GBP)	68
FTSE 100 INDEX	5,874

The key themes for 2016:

- South32 has a strong balance sheet and reasonable cash flow from what we think is a mixed asset base. We reiterate our view that growth and cost cutting opportunities are limited, capex will climb in South Africa, Cu Eq production is falling with grade decline, and the SA assets are facing numerous headwinds. Therefore commodity prices, fixed cost reductions and currency depreciation must drive earnings growth. We think management will focus on cost-cutting and acquisitions.
- Guidance for FY16 appears conservative in our view. Management is targeting US$350m of controllable cost reductions by FY18 with Illawarra, GEMCO and Cannington to do the heavy lifting. We think multiples of this target can be removed at constant currency. Capex is expected to fall from US$768m in FY15 (S32's share) to below US$700m in FY16. New guidance builds in only "a slight benefit from weaker currencies". Several assets continue to struggle to generate free cash. These include Metalloys, Hotazel, Cerro Matoso and Illawarra. Some tough decisions on asset closures might need to be made, which we would view as a positive.
- South32 is trading at a 40% discount to NPV and we believe the stock remains attractive on a valuation basis (on both DCF and replacement value methodologies). At spot commodities and FX, S32 is still generating FCF on our forecasts (post the cost cuts though) and the company has a strong balance sheet with only US$100-200m in net debt.

Key events:

- 2Q16 quarterly report: 21 January 2016
- 1H16 financial results: 25 February 2016

Valuation and risks:

- We derive our valuation for South32 from a sum-of-the-parts DCF model, aggregating life of mine cash flows for each asset. We derive a group NPV using a nominal WACC of 10% (CoE 11.5%, Rf 4%, Rp 6.0%; CoD 6% on a D/E of 20%; Beta of 1.25). We set our target price in line with our NPV.
- The key downside risks to our target price are:(i) higher sustaining capex, particularly for the aluminium assets; (ii) more severe grade declines, resulting in larger falls in copper equivalent production; (iii) changes in BEE legislation in South Africa; (iv) more severe electricity price increases in South Africa; and (v) lower commodity prices and stronger FX rates than we forecast

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Model updated:14 December 2015

Running the numbers

Europe

United Kingdom

Metals & Mining

South32

Reuters: S32.L Bloomberg: S32 LN

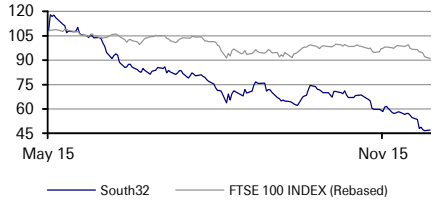
Buy

Price (14 Dec 15)	GBP 47.00
Target Price	GBP 68.00
52 Week range	GBP 46.75 - 118.00
Market Cap (m)	GBPm 2,502
	USDm 3,782

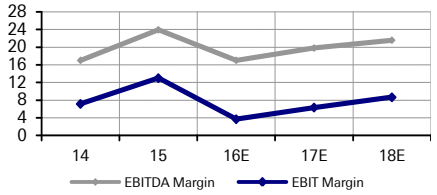
Company Profile

South32 is a diversified miner whose assets were previously owned by BHP Billiton. The portfolio includes the Illawarra met coal complex, Cannington base metals mine, GEMCO manganese mine, the Worsley bauxite mine and alumina refinery all in Australia; Energy Coal mines and Samancor Manganese in South Africa, Mozal aluminium smelter in Mozambique, MRN bauxite mine in Brazil, Cerro Matoso nickel mine in Colombia.

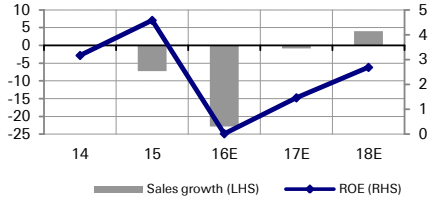
Price Performance



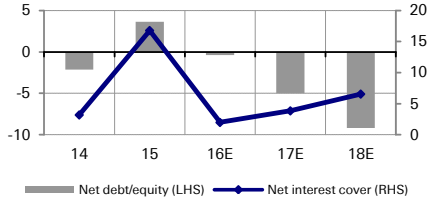
Margin Trends



Growth & Profitability



Solvency



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Fiscal year end 30-Jun	2014	2015	2016E	2017E	2018E
Financial Summary					
DB EPS (USD)	0.08	0.11	0.00	0.03	0.06
Reported EPS (USD)	0.08	0.11	0.00	0.03	0.06
DPS (USD)	0.00	0.00	0.00	0.01	0.02
BVPS (USD)	2.6	2.1	2.1	2.2	2.3
Weighted average shares (m)	5,321	5,324	5,324	5,324	5,324
Average market cap (USDm)	na	8,681	3,782	3,782	3,782
Enterprise value (USDm)	na	9,005	3,660	3,121	2,602
Valuation Metrics					
P/E (DB) (x)	na	15.1	nm	22.4	11.9
P/E (Reported) (x)	na	15.1	nm	22.4	11.9
P/BV (x)	0.00	0.65	0.33	0.32	0.32
FCF Yield (%)	na	13.9	15.0	16.2	20.7
Dividend Yield (%)	na	0.0	0.0	1.8	3.4
EV/Sales (x)	nm	1.2	0.6	0.5	0.4
EV/EBITDA (x)	nm	4.9	3.6	2.7	2.0
EV/EBIT (x)	nm	8.9	16.6	8.3	4.9
Income Statement (USDm)					
Sales revenue	8,344	7,743	5,972	5,921	6,159
Gross profit	1,715	1,840	920	1,134	1,335
EBITDA	1,421	1,855	1,017	1,174	1,330
Depreciation	823	848	796	798	796
Amortisation	0	0	0	0	0
EBIT	598	1,007	221	376	534
Net interest income(expense)	-187	-60	-111	-98	-81
Associates/affiliates	62	-6	-51	10	48
Exceptionals/extraordinaries	343	547	0	0	0
Other pre-tax income/(expense)	-323	-482	0	0	0
Profit before tax	150	459	59	288	501
Income tax expense	47	431	57	120	182
Minorities	0	0	0	0	0
Other post-tax income/(expense)	0	0	0	0	0
Net profit	446	575	2	169	319
DB adjustments (including dilution)	0	0	0	0	0
DB Net profit	446	575	2	169	319
Cash Flow (USDm)					
Cash flow from operations	1,419	1,838	1,136	1,134	1,275
Net Capex	-590	-629	-570	-522	-494
Free cash flow	829	1,209	566	612	781
Equity raised/(bought back)	0	0	0	0	0
Dividends paid	0	0	0	-4	-132
Net inc/(dec) in borrowings	-205	0	-50	0	0
Other investing/financing cash flows	-488	-658	-70	-69	-130
Net cash flow	136	551	446	539	519
Change in working capital	*1,562*	*136*	*0*	*0*	*0*
Balance Sheet (USDm)					
Cash and other liquid assets	364	644	1,090	1,629	2,148
Tangible fixed assets	13,393	9,550	9,324	9,048	8,746
Goodwill/intangible assets	290	306	306	306	306
Associates/investments	107	77	77	77	77
Other assets	2,887	4,912	4,912	4,912	4,912
Total assets	17,041	15,489	15,708	15,972	16,189
Interest bearing debt	62	1,046	1,046	1,046	1,046
Other liabilities	2,904	3,408	3,311	3,229	3,152
Total liabilities	2,966	4,454	4,357	4,275	4,198
Shareholders' equity	14,075	11,036	11,352	11,698	11,991
Minorities	0	-1	-1	-1	-1
Total shareholders' equity	14,075	11,035	11,351	11,697	11,990
Net debt	*-302*	*402*	*-44*	*-583*	*-1,102*
Key Company Metrics					
Sales growth (%)	nm	-7.2	-22.9	-0.8	4.0
DB EPS growth (%)	na	29.3	-99.6	7,665.4	88.8
EBITDA Margin (%)	17.0	24.0	17.0	19.8	21.6
EBIT Margin (%)	7.2	13.0	3.7	6.4	8.7
Payout ratio (%)	0.0	0.0	40.0	40.0	40.0
ROE (%)	3.2	4.6	0.0	1.5	2.7
Capex/sales (%)	7.1	8.1	9.5	8.8	8.0
Capex/depreciation (x)	0.7	0.7	0.7	0.7	0.6
Net debt/equity (%)	-2.1	3.6	-0.4	-5.0	-9.2
Net interest cover (x)	3.2	16.8	2.0	3.9	6.6

Source: Company data, Deutsche Bank estimates

Vedanta Resources

Sell

Reuters: VED.L Exchange:LSE Ticker: VED

Downgrade to Sell: cash flow squeeze and liquidity crunch

Price target (GBP)	200
FTSE 100 INDEX	5,874

Key themes for 2016:

- **Earnings and cash flow pressure from commodity mix**: Vedanta's exposure to higher cost Aluminium, copper, and iron ore production is likely to pressurize EBITDA margins down to 7%, 6% and 10% for those respective divisions in FY16. Zinc and oil continue to be the more robust cash flow generators for the group, but cash flow cannot be protected by much lower capex from here: Vedanta has cut group capex from US$2.2bn in FY15 down to US$807m (DBe, guidance of US$700m) in FY16. We forecast this to be the lowest capex can go with Vedanta's current production plans, and estimate an increase back to US$1bn in FY17, in line with company guidance. Despite the targeted drop in capex and working capital release in 1H16, we forecast Vedanta to be FCF negative to the tune of US$(1)bn in FY16.
- **Balance sheet crunch time**: Gearing stays high on our forecasts, at 59% net debt/equity in FY16, dropping to 52% in FY17 In the meantime, the group has US$6bn of debt maturing across all subsidiaries by end March 2017. Whilst Vedanta is fortunate that its covenants, such as net debt/EBITDA, are tested on a trailing 12 month income statement (we forecast 2.74x Net debt/EBITDA for FY16 compared with a covenant of 2.75x), the pressure will remain on management to refinance debt as quickly and as cheaply as possible.
- **Simplification stalling**? There could be some balance sheet relief if the proposed merger of Cairn India and Vedanta Ltd receives shareholder approval –the vote is due to take place in 1Q16 calendar. The big win, however, would be a sale of the Indian government's stakes in HZL and Balco, which we think is critical for maximising cash fungibility across all group entities – this potential auction process has not progressed in the last 12 months.

Key events:

- 3Q16 production results: 29 January 2016
- 4Q16 production results: 11 April 2016
- FY16 financial results: 12 May 2016

Valuation and risks

- Our price target is set at a 40% discount to our DCF valuation, to reflect the ranking we assign to Vedanta within our coverage universe. Our rankings are derived from debt reduction, P/E valuation, near-term earnings growth, and management action taken to control cash flow. Our DCF valuation (10.9% WACC - cost of equity 13%, post-tax cost of debt 6.1% and target gearing 30%: RFR 4.0%, ERP 6%) is calculated using life of mine cash flow analysis.
- Upside risks include higher metal prices than we expect and a weaker Indian Rupee. A sale of the government's stake in Hindustan Zinc sooner than FY16 would also be an upside risk to our target price. Faster execution of projects and the turnaround plan for Copper Zambia are also upside risks.

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Model updated:14 December 2015

Running the numbers

Europe

United Kingdom

Metals & Mining

Vedanta Resources

Reuters: VED.L Bloomberg: VED LN

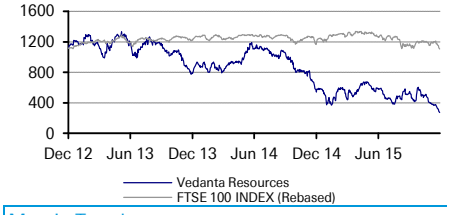
Sell

Price (14 Dec 15)	GBP 276.30
Target Price	GBP 200.00
52 Week range	GBP 276.30 - 675.00
Market Cap (m)	GBPm 762
	USDm 1,152

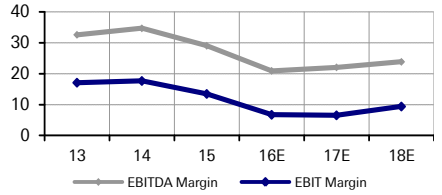
Company Profile

Vedanta Resources Ltd. mines and processes a variety of metals (copper, zinc and aluminium), with its core operations being domiciled in India. Since its listing in London in late 2003, the company has diversified its exposure by both metal and geography mostly via acquisition; Iron ore, power and oil in India, copper in Zambia and zinc in Southern Africa and Ireland.

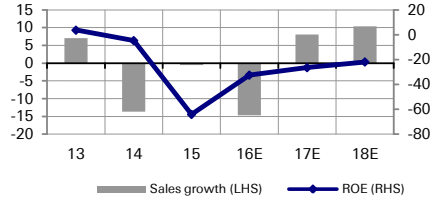
Price Performance



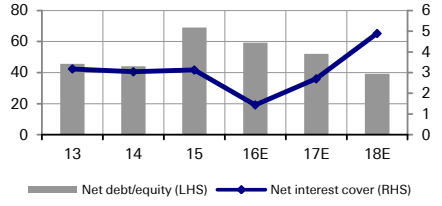
Margin Trends



Growth & Profitability



Solvency



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Fiscal year end 31-Mar	2013	2014	2015	2016E	2017E	2018E
Financial Summary						
DB EPS (USD)	1.37	0.14	-0.14	-1.37	-1.48	-0.96
Reported EPS (USD)	0.62	-0.70	-6.55	-1.97	-1.48	-0.96
DPS (USD)	0.58	0.61	0.63	0.00	0.00	0.00
BVPS (USD)	16.1	14.7	5.8	6.3	4.9	3.9
Weighted average shares (m)	273	274	275	276	276	276
Average market cap (USDm)	4,635	4,538	3,707	1,152	1,152	1,152
Enterprise value (USDm)	25,516	24,724	24,433	20,615	19,716	18,268
Valuation Metrics						
P/E (DB) (x)	12.4	117.6	nm	nm	nm	nm
P/E (Reported) (x)	27.5	nm	nm	nm	nm	nm
P/BV (x)	0.95	1.03	1.27	0.66	0.86	1.07
FCF Yield (%)	15.4	18.2	nm	nm	78.1	125.7
Dividend Yield (%)	3.4	3.7	4.7	0.0	0.0	0.0
EV/Sales (x)	1.7	1.9	1.9	1.9	1.7	1.4
EV/EBITDA (x)	5.2	5.5	6.5	9.0	7.5	5.8
EV/EBIT (x)	9.9	10.8	14.1	27.9	25.3	14.8
Income Statement (USDm)						
Sales revenue	14,990	12,945	12,879	10,983	11,871	13,106
Gross profit	4,888	4,491	3,741	2,300	2,620	3,127
EBITDA	4,888	4,491	3,741	2,300	2,620	3,127
Depreciation	2,323	2,203	2,006	1,561	1,842	1,894
Amortisation	0	0	0	0	0	0
EBIT	2,565	2,288	1,736	739	778	1,233
Net interest income(expense)	-806	-752	-555	-512	-288	-252
Associates/affiliates	0	0	0	0	0	0
Exceptionals/extraordinaries	-42	-418	-6,821	0	0	0
Other pre-tax income/(expense)	0	0	0	0	0	0
Profit before tax	1,717	1,118	-5,640	227	490	981
Income tax expense	40	129	-1,853	420	279	367
Minorities	1,508	1,185	-1,989	351	619	878
Other post-tax income/(expense)	0	0	0	0	0	0
Net profit	169	-197	-1,799	-544	-408	-264
DB adjustments (including dilution)	206	236	1,760	166	0	0
DB Net profit	375	40	-39	-378	-408	-264
Cash Flow (USDm)						
Cash flow from operations	2,946	3,015	2,165	614	1,968	2,301
Net Capex	-2,233	-2,187	-2,289	-807	-1,069	-853
Free cash flow	713	828	-124	-193	899	1,448
Equity raised/(bought back)	-784	-2,839	-819	-912	0	0
Dividends paid	-411	-508	-512	-140	-248	-351
Net inc/(dec) in borrowings	115	298	231	-76	0	0
Other investing/financing cash flows	210	-120	-795	-5	0	0
Net cash flow	-156	-2,341	-2,018	-1,326	652	1,097
Change in working capital	*10*	*630*	*131*	*-625*	*157*	*139*
Balance Sheet (USDm)						
Cash and other liquid assets	7,982	8,938	8,210	9,253	10,153	11,601
Tangible fixed assets	33,121	31,044	23,352	21,891	21,117	20,076
Goodwill/intangible assets	17	125	119	108	103	98
Associates/investments	1,046	1,653	1,314	1,189	1,189	1,189
Other assets	3,786	3,615	3,995	3,124	3,491	3,814
Total assets	45,950	45,374	36,989	35,564	36,052	36,777
Interest bearing debt	16,593	16,871	16,668	16,451	16,451	16,451
Other liabilities	10,496	10,528	8,064	6,980	7,504	7,966
Total liabilities	27,089	27,400	24,732	23,431	23,955	24,417
Shareholders' equity	4,398	4,010	1,603	1,748	1,340	1,076
Minorities	14,463	13,964	10,654	10,386	10,757	11,284
Total shareholders' equity	18,861	17,975	12,257	12,134	12,097	12,360
Net debt	*8,611*	*7,933*	*8,458*	*7,198*	*6,298*	*4,850*
Key Company Metrics						
Sales growth (%)	7.0	-13.6	-0.5	-14.7	8.1	10.4
DB EPS growth (%)	-1.8	-89.7	na	-868.0	-8.0	35.3
EBITDA Margin (%)	32.6	34.7	29.0	20.9	22.1	23.9
EBIT Margin (%)	17.1	17.7	13.5	6.7	6.6	9.4
Payout ratio (%)	93.9	nm	nm	nm	nm	nm
ROE (%)	3.7	-4.7	-64.1	-32.4	-26.4	-21.9
Capex/sales (%)	14.9	16.9	17.8	7.3	9.0	6.5
Capex/depreciation (x)	1.0	1.0	1.1	0.5	0.6	0.5
Net debt/equity (%)	45.7	44.1	69.0	59.3	52.1	39.2
Net interest cover (x)	3.2	3.0	3.1	1.4	2.7	4.9

Source: Company data, Deutsche Bank estimates

Research Contribution:
The authors of this report wish to acknowledge the contribution made by Ankit Agarwal and Srivathsan M, employees of Irevna, a division of CRISIL Limited, a third-party provider to Deutsche Bank of offshore research support services.

Appendix 1

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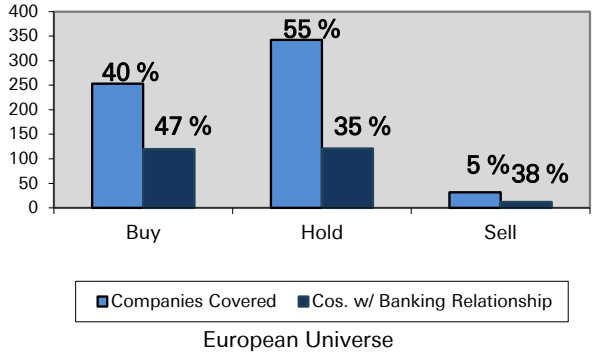

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Rocks & Ores

The future of iron ore

Goldman Sachs

Commodities Research

A maturing steel market in China sends iron ore miners into hibernation

The cost curve has flattened further than expected

Iron ore prices have reached our US$40/t forecast one year ahead of schedule. In our view, the timing of this decline and the continued backwardation of the forward curve are partly due to a recent downward shift at the higher end of the cost curve that was well beyond the typical rate of cost deflation. We adjust our estimate of marginal cash cost of production to US$35/t and we downgrade our 2016/17/18 forecasts to US$38/35/35/t (down 14%/13%/13%) to reflect the need to displace c.250Mt of seaborne mining capacity over the next three years, equivalent to 18% of current supply. We expect the pace of mine closures to accelerate in 2016 as producers with negative cash flow struggle to find alternative sources of funding. Meanwhile, a maturing steel market in China is ushering in a long period of hibernation for the iron ore industry and we also downgrade our long-term price forecast to US$34/t (down 25%).

Scrap will come back

Iron ore has faced limited competition from scrap in China's steel sector because falling steel raw materials prices in 2014-15 undermined the competitiveness of steel recycling. However, scrap supply is steadily growing and the price gap has narrowed. In the long term, China is likely to follow the example of the United States, where a rising stock of steel in the economy eventually provided the supply of scrap necessary to boost steel recycling rates. As the Chinese market matures and the steel stock ages, the rising supply of scrap should lift the share of steel recycling to 47% by 2040, up from 11% currently.

Rising steel stock, falling steel consumption

Iron ore consumption in the Chinese steel sector has significant downside risks. The steel stock in the Chinese economy is fast approaching OECD levels. If the stock per capita were to stabilize at 10t by 2040 (versus 5.6t today), our analysis indicates that steel consumption would find an equilibrium level slightly below 600Mtpa, a 17% drop from 2015. Iron ore demand is likely to fall by 50% over that period on the back of lower steel consumption and higher recycling rates, and the iron ore sector may have to hibernate for an extended period before alternative steel markets in other regions take over from China and usher in the next bull market.

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Market roundup

Iron ore prices have remained below US$40/t and port stocks have held steady at 87.5Mt. The closure of 5Mtpa at BC Iron and 10Mtpa of planned cuts at Kumba were not enough to offset bearish sentiment among steel mills and traders in China, where tight liquidity and depressed profit margins are driving buyers away from the seaborne market. Negotiations between Japanese steel mills and **metallurgical coal** producers have resulted in a US$81/t quarterly price benchmark for Q1 2016, a 9% qoq decline and a 11-year low. In Mozambique, the expansion of Vale's Moatize mine is due for completion this month; upgrades to rail and port infrastructure will continue into next year. Finally, **thermal coal** prices remained range-bound in the Pacific basin. As a result, the price arbitrage for seaborne coal remained shut in China and the downward trend in import volumes is likely to continue. Coal prices in the Atlantic basin fell 6% wow to US$50/t FOB RBCT, bringing South African coal below parity with Australian coal in the Indian market.

Exhibit 1: Bulk commodities snapshot
Spot prices, China domestic prices, inventory levels and freight rates

			Latest	wow	mom	yoy	ytd
Iron Ore							
Spot prices							
62% fines	*CFR China*	US$/t	38.50	-2%	-20%	-44%	-46%
58% fines	*CFR China*	US$/t	31.30	-2%	-22%	-45%	-48%
Carajas 66% fines	*CFR China*	US$/t	41.30	-22%	-36%	-53%	-55%
China domestic - incl. VAT	*Tangshan*	RMB/t	440	-2%	-18%	-37%	-28%
Freight							
Australia - China	*Capesize*	US$/t	3.40	-17%	-25%	-33%	-32%
Brazil - China	*Capesize*	US$/t	8.20	-9%	-7%	-39%	-26%
Inventory							
Chinese port stocks		Mt	87.5	0%	6%	-13%	-6%
as days of seaborne consumption		#	36				
Metallurgical Coal							
Spot prices							
HCC premium low vol	*FOB Australia*	US$/t	75.65	1%	1%	-33%	-32%
HCC mid vol	*FOB Australia*	US$/t	72.15	1%	2%	-29%	-30%
PCI low vol	*FOB Australia*	US$/t	65.40	1%	1%	-29%	-29%
China domestic - incl. VAT	*Tangshan*	RMB/t	700	0%	0%	-23%	-22%
Freight							
Australia - China	*Panamax*	US$/t	5.35	-4%	-12%	-49%	-41%
Australia - India	*Panamax*	US$/t	6.65	-4%	-11%	-49%	-39%
Thermal Coal							
Spot prices							
Benchmark (6,700kcal GAD)	*FOB Newcastle*	US$/t	52.40	0%	3%	-16%	-16%
Benchmark (6,000kcal NAR)	*FOB RBCT*	US$/t	50.11	-6%	-5%	-24%	-21%
Basin spread	*note 1*	US$/t	2.29	-0.79	-2.07	-3.84	-0.96
China domestic (5,500 kcal NAR)	*FOB Qinhuangdao*	RMB/t	355	0%	-1%	-32%	-32%
Freight							
Qinhuangdao - Guangzhou	*Panamax*	RMB/t	30.2	13%	42%	-5%	2%
Australia - Guangzhou	*Panamax*	US$/t	5.35	-4%	-12%	-49%	-41%
Arbitrage							
AUS vs RBCT to India	*note 2*	US$/t	-1.94	0.89	2.57	3.34	2.06
AUS vs QHD to South China	*note 3*	US$/t	-3.97	-4.22	-2.93	15.49	11.49
Inventory							
Qinhuangdao		Mt	4.9	-17%	-26%	-31%	-29%

Notes: 1) Newcastle price minus RBCT price, 2) a positive number indicates Australian coal is competitive, 3) a positive number indicates Australian coal is competitive after adjustments for calorific value and VAT and based on an estimate of Capesize freight rates.

Source: Platts, McCloskey, MySteel, Goldman Sachs Global Investment Research

The future of iron ore

Iron ore prices have reached our US$40/t forecast one year ahead of schedule. We believe the timing of this decline and the continued backwardation of the forward curve are partly due to improved mine planning and lower production costs at the higher end of the cost curve, and we downgrade our 2016/17/18 forecasts to US$38/35/35/t (Exhibit 2) to reflect the need to displace c.250Mt of seaborne mining capacity over the next three years. We also downgrade our long-term price forecast to US$34/t (down 25%) because our analysis of a maturing steel market in China indicates lower steel consumption, higher scrap utilization and an eventual 50% decline in iron ore consumption even as the steel stock per capita converges towards OECD levels.

Exhibit 2: We downgrade our short- and long-term price forecasts

Iron Ore Price Forecast Summary US$/dmt		Q3 2015	Q4 2015E	Q1 2016E	Q2 2016E	2014	2015E	2016E	2017E	2018E	Long Term 2015 real $
Iron Ore											
Fines - 62% Fe	*CFR China*	$ 55	$ 47	$ 40	$ 38	$ 97	$ 56	$ 38	$ 35	$ 35	$ 34
change vs previous			*-5%*	*-13%*	*-15%*		*-1%*	*-14%*	*-13%*	*-13%*	*-25%*
Fines - 62% Fe	*FOB Aust*	$ 49	$ 41	$ 34	$ 31	$ 88	$ 50	$ 31	$ 29	$ 29	$ 28
Sinter feed - 65% Fe	*FOB Brazil*	$ 44	$ 38	$ 30	$ 27	$ 81	$ 47	$ 27	$ 25	$ 25	$ 25

Source: Platts, Goldman Sachs Global Investment Research

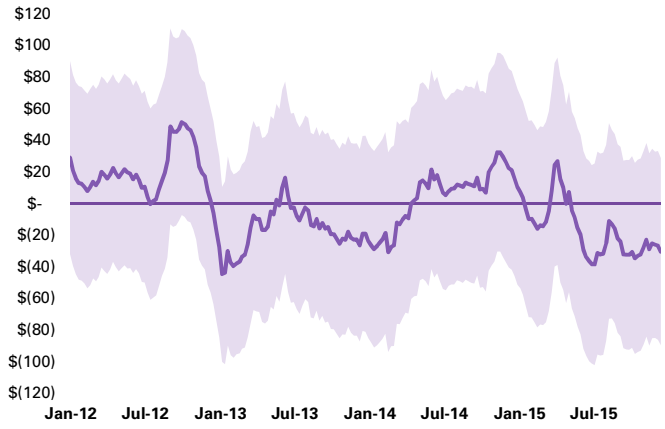
The short-term outlook remains exposed to the deteriorating health of the Chinese steel industry. Record export volumes have failed to fully offset a material decline in domestic demand, and operating margins have been under pressure for most of the year (Exhibit 3). The accumulated cash losses of a typical mill have already surpassed those in similar periods during 2013-14, and balance sheets continue to deteriorate with each passing day. Reports of job cuts and permanent closures are mounting, and we expect spot demand for seaborne ore to be depressed in the period to Chinese New Year; buyers operating on a day-to-day basis can turn instead to port inventory.

Mine closures and production cuts have resumed after a 6-month hiatus earlier this year. We believe the pace should accelerate next year because a) cost deflation is not enough to offset weak market fundamentals and b) the forward curve is in backwardation and the appetite for asset sales or capital raising in debt and equity markets is limited, so producers with negative cash flow should struggle to find new sources of funding.

- The Big 3 are positioned at the lower end of the industry cost curve and are the least vulnerable to low prices, but some degree of portfolio optimization may be possible. FMG mines are also well positioned under the new cost structure, so the margin of adjustment on the supply side will come mainly from Tier 2 producers higher up the cost curve.
- Some Tier 2 producers are still in expansion mode. Growth projects are likely to proceed in the face of record low prices, partly because most of the capital expenditure has already been incurred and partly because mining operations must operate at nameplate capacity before management can assess the competitiveness of the asset in question.
- Within the constraints imposed by company balance sheets, this particular segment of the market is therefore likely to be less price-sensitive than other Tier 2 producers where the scope for cutting costs and the rationale for financing future periods of negative cash flow will be more limited. We note that the production cuts required over the forecast period (c.250Mt, equivalent to 18% of current seaborne supply) are

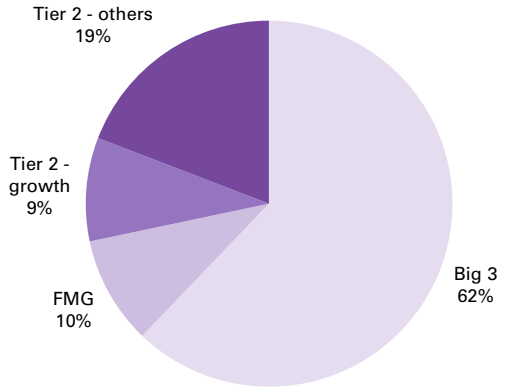
similar in scale to the aggregate mining capacity of Tier 2 producers with stable output (Exhibit 4).

Exhibit 3: Cash losses keep rising among Chinese mills
Indicative range of cash margins among steel mills – US$/t



Source: MySteel, Platts, Goldman Sachs Global Investment Research

Exhibit 4: Limited room left for Tier 2 iron ore miners
Seaborne iron ore mining capacity pre-closures – 2017E



Source: Company data, Goldman Sachs Global Investment Research

These trends point to a smaller number of producers towards the end of the decade, together with a greater market share for the three dominant producers. However, market concentration is not sufficient to ensure pricing power. Just like their predecessors were unable to extract economic rent in the 1980s and 90s, we expect the Big 3 to compete in an environment where scores of recently idled mines can respond to any potential price recovery and where a maturing Chinese steel market is likely to weigh on iron ore demand for years to come.

Exhibit 5: A flatter cost curve with a marginal production cost of US$35/t
Production costs for generic iron ore producers in the top quartile of the cost curve

		Australia				Brazil			
Region		**2014**	**2015**	**2016**	**2017**	**2014**	**2015**	**2016**	**2017**
Ore grade		56%	55%	54%	54%		38%		
Overburden	$ / BCM	$ 6.00	$ 4.87	$ 4.27	$ 4.23	$ 4.00	$ 3.09	$ 2.45	$ 2.32
SR	prime BCM / t ROM	3.5	2.5	2.0	2.0		1.5		
Overburden	$ / t ROM	$ 21.00	$ 12.18	$ 8.55	$ 8.46	$ 6.00	$ 4.63	$ 3.67	$ 3.48
Mining	$ / t ROM	$ 5.50	$ 4.47	$ 3.92	$ 3.88	$ 3.50	$ 2.70	$ 2.14	$ 2.03
sub-total	$ / t ROM	$ 26.50	$ 16.64	$ 12.47	$ 12.34	$ 9.50	$ 7.34	$ 5.81	$ 5.51
Product grade			58%				63%		
Yield	%	96%	94%	92%	92%		60%		
Processing	$ / t ROM	$ 4.00	$ 3.51	$ 3.21	$ 3.21	$ 6.00	$ 4.90	$ 4.05	$ 3.88
sub-total	$ / t	$ 31.92	$ 21.47	$ 17.02	$ 16.88	$ 25.70	$ 20.29	$ 16.34	$ 15.56
Sustaining capital	$ / t	$ 4.00	$ 3.00	$ 1.50	$ 1.50	$ 4.00	$ 3.00	$ 2.50	$ 2.00
Royalties	$ / t	$ 2.92	$ 1.99	$ 1.46	$ 1.45	$ 3.20	$ 1.60	$ 1.12	$ 1.00
Overheads	$ / t	$ 3.00	$ 2.00	$ 1.00	$ 1.00	$ 2.00	$ 1.63	$ 1.35	$ 1.29
FOR	$ / t	$ 41.84	$ 28.46	$ 20.98	$ 20.83	$ 34.90	$ 26.52	$ 21.31	$ 19.85
Distance to port	km		300				500		
Transportation rate	$ / t.km	$ 0.015	$ 0.013	$ 0.011	$ 0.011	$ 0.021	$ 0.016	$ 0.013	$ 0.013
Transportation	$ / t	$ 4.50	$ 3.77	$ 3.34	$ 3.34	$ 10.50	$ 8.19	$ 6.55	$ 6.27
Port fees	$ / t	$ 2.00	$ 1.70	$ 1.54	$ 1.52	$ 13.00	$ 10.51	$ 8.60	$ 8.15
FOB	$ / t	$ 48	$ 34	$ 26	$ 26	$ 58	$ 45	$ 36	$ 34
Freight	$ / t	$ 8.50	$ 5.00	$ 4.50	$ 4.50	$ 20.00	$ 11.50	$ 10.00	$ 10.00
Grade discount	%	12%	10%	9%	8%	0%	0%	0%	0%
CFR China - 62% Fe basis									
Operating cost	$ / dmt	$ 66	$ 44	$ 36	$ 35	$ 77	$ 56	$ 46	$ 44
All-in cost	$ / dmt	$ 75	$ 50	$ 39	$ 38	$ 82	$ 61	$ 50	$ 47

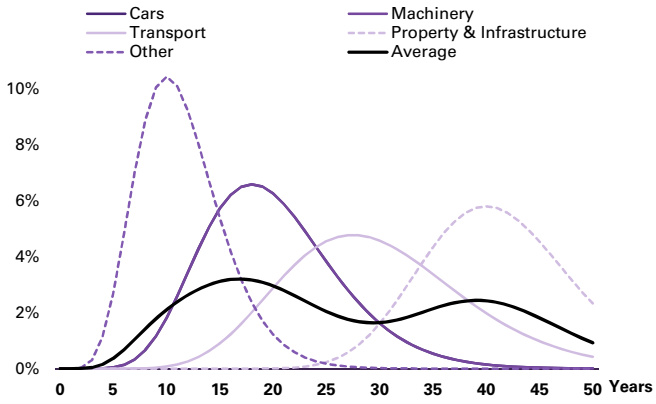
Source: Goldman Sachs Global Investment Research

Our estimate of marginal cost has been based on Australian and Brazilian mines outside of the Big 3 producers (Vale, Rio Tinto and BHP Billiton). All regions have benefited from weaker currencies, lower input costs and rising efficiency but we believe some mines have gone beyond the typical rate of cost deflation. A revised mine plan at FMG widens the gap between them and producers higher up the cost curve, and we reset our marginal cost estimate to US$35/t CFR China on that basis (Exhibit 5).

Scrap will come back

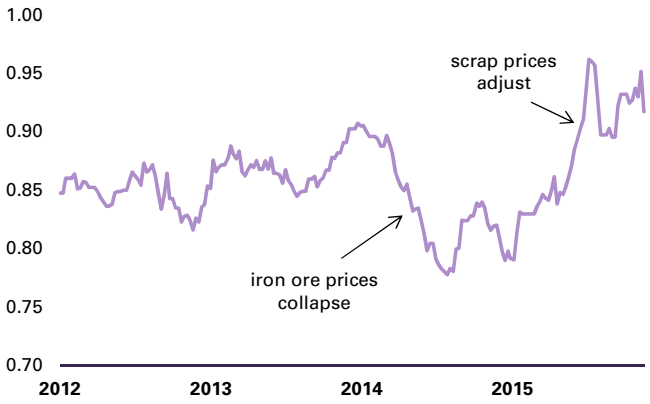
Iron ore has faced limited competition from scrap in China's steel in recent years. This is counterintuitive to some extent because scrap supply is steadily growing on the back of historical steel consumption (Exhibit 6). However, scrap use in China has been handicapped by high power tariffs and, more recently, by falling iron ore and metallurgical coal prices. The ratio of ore-based to scrap-based steel production costs moved against scrap in 2014, and it is only recently that scrap prices adjusted to the new environment (Exhibit 7). The economics of scrap-based steel production in China have started to improve and the decline in scrap content per tonne of crude steel should stabilize, even if primary steel production from iron ore remains ahead.

Exhibit 6: Scrap supply determined by past consumption
Probability curves of steel products operating life by end use



Source: Goldman Sachs Global Investment Research

Exhibit 7: Scrap suppliers needed time to adjust
Steel production cost ratio – ore based to scrap based



Source: NBS, WSA, CAMU, MySteel, Bloomberg, Goldman Sachs Global Investment Research

In the near term, the steel industry needs to see a decline in processing costs and/or raw material costs in order to see scrap gain market share in China (Exhibit 8). Electric arc furnaces (EAF) consume significant amounts of electricity to melt the scrap, and the power tariff paid by many industrial users in China is still too high to make scrap competitive. However, the significant gap between the on-grid tariff and the tariff paid by industrial users (Rmb0.39/kWh versus Rmb0.77/kWh) shows that the economics of steel recycling would benefit from a potential deregulation of the Chinese power sector. Scrap use should also benefit if policies to curtail pollution continue to penalize inefficient blast furnaces, coke ovens and sintering plants without proper emission controls.

Exhibit 8: The gap between BF and EAF steel making costs is closing
Cash costs of production for secondary (from scrap) and primary (from iron ore) steel - VAT incl.

	Steel from scrap	
Input costs	**2014**	**Nov-15**
Scrap	2,091	1,085
Hot metal	189	110
Electricity	196	193
Other costs	255	250
Total - CNY/t	2,732	1,637
Total - US$/t	**$445**	**$257**

	Steel from iron ore	
Input costs	**2014**	**Nov-15**
Iron ore	1,290	743
Coking coal	376	224
Scrap	163	84
Other costs	455	450
Total - CNY/t	2,284	1,501
Total - US$/t	**$372**	**$236**

Note: one tonne of secondary steel requires 0.9 tonnes of scrap, 0.15 tonnes of iron ore and 250kWh of electricity; one tonne of primary steel requires 1.5 tonnes of iron ore, 0.4 tonnes of met coke and 0.07 tonnes of scrap

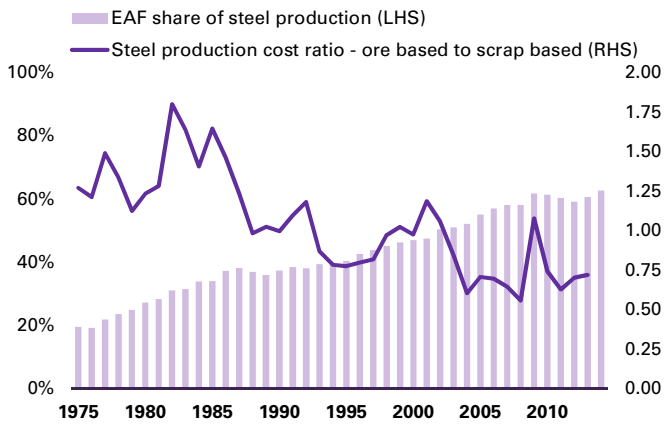
Source: NBS, MySteel, Bloomberg, Goldman Sachs Global Investment Research

A mature Chinese market implies lower steel output

In the long term, we believe a maturing Chinese steel sector will boost scrap use well above current levels. The growth model adopted by China until now may be different given the higher-than-usual share of GDP allocated to investment, but there are also parallels with other developed economies like the United States. First, steel consumption per capita tends to stabilize at an equilibrium level at which demand is driven by the replacement of cars, buildings and other assets that have reached the end of their operating life. Second, the supply of steel scrap initially lags steel production but it eventually catches up, and the share of secondary steel production (i.e., steel recycling) rises accordingly. These trends bring significant downside risks for iron ore consumption.

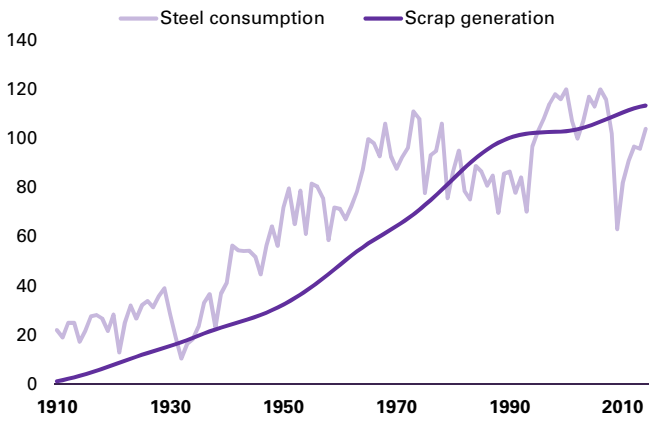
For example, the steel stock per capita peaked in the United States during the late 1970s. This period saw a significant increase in the use of EAFs that rely primarily on steel scrap as an input; EAFs account for 60% of current US steel production. Scrap also was for a period a cheaper source of iron than iron ore itself (Exhibit 9). The growing market share of secondary steel production was made possible by an increase in scrap supply that followed steel consumption trends with a time lag of 20+ years (Exhibit 10).

Exhibit 9: Low scrap prices encouraged more recycling
US steel production in EAF and ore:scrap cost ratio



Source: WSA, USGS, Haver, EIA, Goldman Sachs Global Investment Research

Exhibit 10: Scrap supply follows steel consumption
US steel consumption and scrap generation - Mt



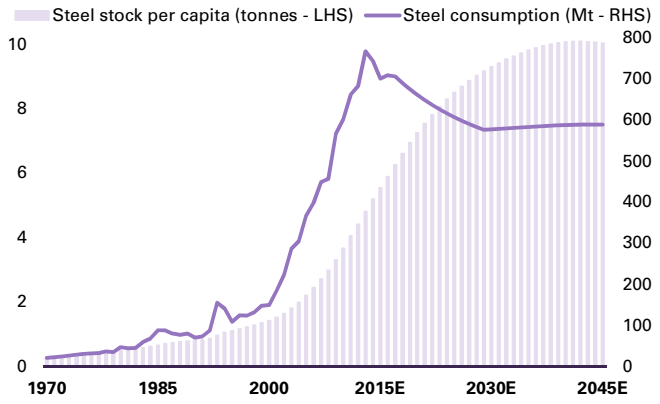
Source: WSA, USGS, Goldman Sachs Global Investment Research

The Chinese steel market is not nearly as developed as the US market but it is catching up fast and the steel stock in the economy is fast approaching OECD levels. The ultimate amount of steel required will depend on many variables including future GDP per capita

and technological innovation in steel (stronger products, more efficient designs) as well as competing materials. In this report we present a scenario in which the steel stock per capita stabilizes at 10 tonnes, at the lower end of the OECD range and a 80% increase on the current level of 5.6 tonnes. Our analysis indicates that the implied accumulation of cars, buildings and other assets would be achieved *in spite* of a gradual decline in steel consumption (Exhibit 11). In contrast to a widely held view that stable volumes are the new normal for Chinese steel demand, we believe instead that demand may find an equilibrium level slightly below 600Mt by 2030, a 17% drop on current levels. This would result in a modest decline in global steel consumption per capita to a level well above the historical average (Exhibit 12).

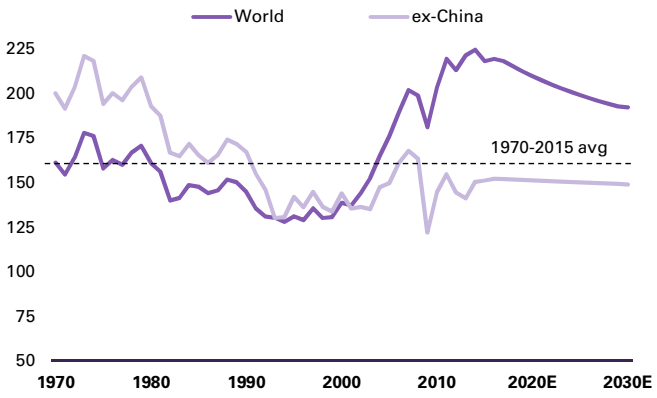
Moreover, this trend would coincide with rising levels of scrap generation. Just as scrap supply in the United States increased with a time lag relative to steel consumption, the remarkable surge in Chinese steel demand in the past 15 years should eventually result in large volumes of steel products reaching the end of their operating lives; some would be discarded in junkyards and lost for good, but others would be recycled. Our analysis suggests that scrap may account for 47% of Chinese steel production by 2040, again at the lower end of the OECD range for steel recycling rates.

Exhibit 11: Steel demand should stabilize at a lower level
Chinese steel consumption and stock in use



Source: WSA, USGS, Goldman Sachs Global Investment Research

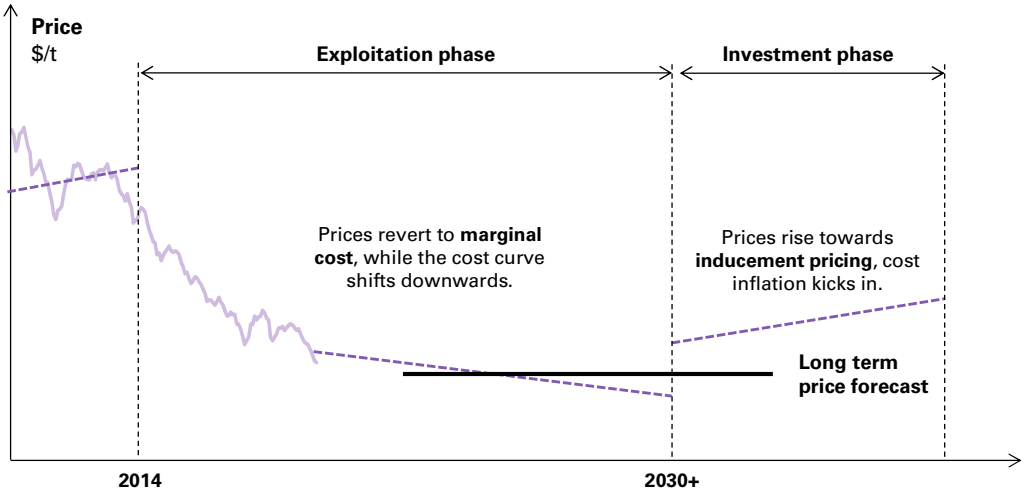
Exhibit 12: Deviating from the mean
Crude steel consumption by region – kg per capita



Source: WSA, USGS, Goldman Sachs Global Investment Research

Iron ore demand is likely to fall by 50% over that period on the back of lower steel consumption and higher recycling rates. Given China's scale relative to the rest of the world, this is equivalent to a c.30% decline in global iron ore consumption. In our view, steel demand is other markets is not robust enough to prevent a temporary contraction in global demand, so the time when the iron ore market will run out of spare capacity should be pushed further out in the future. As we have previously argued (*Commodities: Investor returns will survive the productivity comeback*, April 24, 2014), commodity cycles alternate between periods of surplus and shortage. Historical precedent suggests the current exploitation phase in iron ore should last 15+ years, but the expected trends in China could results in a longer-than-average period of surplus mining capacity and we reflect that in our long term price forecast (Exhibit 13). The iron ore sector may have to hibernate for an extended period before alternative steel markets in other regions take over from China and usher in the next bull market.

Exhibit 13: We reset our long term price forecast to US$34/t
GS long term price forecast methodology



Source: Platts, Goldman Sachs Global Investment Research

Exhibit 14: Bulk commodity prices and forecasts

	Spot prices			Historical prices					Price Forecasts									
	unit	Price	mom change	3Q 14	4Q 14	1Q 15	2Q 15	3Q 15E	4Q 15E	1Q 16E	2Q 16E	3Q 16E	2014	2015E	2016E	2017E	2018E	LT(2015 real)
Iron ore[1]	US$/t	38.50	↓ -9.50	90	74	63	58	55	49	40	38	38	97	56	38	35	35	34
Hard Coking Coal[2]	US$/t	75.65	↑ 0.70	112	111	105	87	84	80	85	85	85	115	89	85	90	100	110
Semi-soft Coal[2]	US$/t	61.65	↑ 0.95	75	78	79	69	64	62	65	65	65	80	69	65	68	68	70
PCI[2]	US$/t	65.40	↑ 0.45	90	89	92	74	64	65	65	65	65	94	74	65	70	80	85
Thermal Coal[3]	US$/t	52.40	↑ 1.55	68	63	61	60	59	60	56	54	54	71	58	54	52	51	50
Potash[4]	US$/t	280.00	↓ -15.00	354	373	361	335	316	299	290	290	265	350	328	274	245	235	325

Notes: (1) CFR China, 62% Fe fines; (2) FOB Australia (Queensland); (3) FOB Australia (Newcastle), 6,000kcal/kg NAR; (4) MOP, granulated, CFR Brazil.

Source: Platts, McCloskey, CRU, Goldman Sachs Global Investment Research

Exhibit 15: Approximately 250Mt of production cuts ex-China are needed to balance the market over 2016-18
Iron ore supply and demand balance

Million tonnes	2012	2013	2014E	2015E	2016E	2017E	2018E	2019E	2020E
Crude steel production									
China	725	815	823	804	788	784	764	745	728
EU27	169	166	169	170	175	175	176	176	176
Japan	107	111	111	109	109	109	109	109	109
Korea	70	66	71	62	61	60	59	58	57
Taiwan	21	22	23	23	24	24	24	24	24
Middle East & North Africa	68	70	70	73	77	81	85	89	94
Key importing regions	1,160	1,250	1,267	1,241	1,233	1,233	1,216	1,201	1,187
% growth	*2.1%*	*7.8%*	*1.3%*	*-2.0%*	*-0.7%*	*0.0%*	*-1.4%*	*-1.2%*	*-1.1%*
Others	350	354	367	363	373	385	395	406	417
Global Steel Production	1,510	1,604	1,634	1,604	1,606	1,617	1,611	1,606	1,604
% growth	*-1.7%*	*6.3%*	*1.8%*	*-1.8%*	*0.1%*	*0.7%*	*-0.4%*	*-0.3%*	*-0.1%*
secondary from steel scrap	394	392	400	403	418	432	442	453	464
secondary as % of total	26%	24%	24%	25%	26%	27%	27%	28%	29%
primary from iron ore	1,116	1,213	1,234	1,201	1,188	1,185	1,168	1,153	1,141
Iron ore consumption - 62% Fe basis									
China	1,033	1,177	1,185	1,147	1,112	1,094	1,054	1,016	980
Other	767	779	805	790	804	818	831	845	859
Global iron ore demand 62% Fe	1,800	1,956	1,990	1,937	1,917	1,912	1,884	1,860	1,840
% growth	*2.8%*	*8.7%*	*1.7%*	*-2.6%*	*-1.1%*	*-0.2%*	*-1.4%*	*-1.3%*	*-1.1%*
Iron ore production - *dmt*									
average Fe grade (in situ)	*19%*	*20%*	*21%*	*21%*	*21%*	*21%*	*21%*	*21%*	*21%*
China - ROM	1,328	1,436	1,076	879	724	632	576	536	488
China - 62% Fe	361	381	311	257	214	188	171	159	145
RoW - 62% Fe equivalent	1,439	1,575	1,679	1,680	1,703	1,724	1,714	1,701	1,695
Iron ore seaborne imports									
China	745	820	933	945	950	960	935	915	900
EU27	105	115	120	120	123	122	122	122	121
Japan	131	136	136	129	128	128	128	127	127
Korea	66	63	74	69	65	64	63	62	61
Taiwan	18	22	23	23	24	24	24	24	24
Middle East & North Africa	38	39	41	44	47	50	53	57	61
Other	21	22	28	35	30	31	32	33	34
Total seaborne imports	1,126	1,217	1,356	1,365	1,367	1,379	1,356	1,339	1,328
% growth	*5.0%*	*8.1%*	*11.4%*	*0.7%*	*0.1%*	*0.9%*	*-1.6%*	*-1.3%*	*-0.9%*
Seaborne as % of global market	63%	62%	68%	70%	71%	72%	72%	72%	72%
Seaborne as % of China supply	66%	67%	74%	78%	81%	83%	84%	84%	85%
Project pipeline									
Australia	-	-	-	1	31	56	75	114	176
Brazil	-	-	-	1	2	18	47	88	131
West & Central Africa	-	-	-	-	0	8	17	35	62
Others	-	-	-	4	15	29	39	55	90
Total incremental - unrisked	-	-	-	6	48	110	178	291	459
Total incremental - risk-adjusted	-	-	-	6	48	99	134	159	189
Iron ore seaborne exports									
Australia	494	579	720	759	796	790	764	756	755
Brazil	327	330	344	365	351	390	427	430	432
India	33	16	10	4	8	10	8	8	7
South Africa	54	63	66	65	52	45	38	37	34
West & Central Africa	32	32	39	22	22	19	16	15	14
Canada	35	38	38	35	34	32	27	25	23
Sweden	23	23	25	23	21	21	19	18	16
Other	118	136	116	91	81	72	57	52	47
Total seaborne exports	1,115	1,216	1,358	1,365	1,367	1,379	1,356	1,339	1,328
% growth	*2.6%*	*9.1%*	*11.7%*	*0.5%*	*0.1%*	*0.9%*	*-1.6%*	*-1.3%*	*-0.9%*
Implied mine closures									
Mine closures - ex-China			32	71	79	84	85	25	24
Mine closures - China (62% Fe)			90	60	45	25	10	5	5

Source: WSA, Wood Mackenzie, Goldman Sachs Global Investment Research

Disclosure Appendix

Reg AC

We, Christian Lelong and Amber Cai, hereby certify that all of the views expressed in this report accurately reflect our personal views, which have not been influenced by considerations of the firm's business or client relationships.

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MBI062DA 39.51 -1.68 39.51/39.51 MBUL
At 6:18 Op 39.51 Hi 39.51 Lo 39.51 Prev 41.19

Curve Analys | 96) Excel | 97) Histogram | Page 1/2 | Commodity Price Forecasts: Product Detail

Iron Ore Fines62% Fe spot USD/MT | 99) Browse | As Of 01/13/16 | Ticker Type Actual

○Quarterly Forecast ◉Yearly Forecast

	Spot	As Of	2016	2017	2018	2019
Median		12/31/15	48.00	49.00	53.00	57.00
Mean		12/31/15	49.15	50.41	53.33	58.20
High		12/31/15	61.00	65.00	70.00	80.00
Low		12/31/15	38.00	35.00	35.00	41.00
Current Fwd	39.51	01/12/16	358.55	408.48	444.75	466.06
Diff (Median - Curr)			-310.55	-359.48	-391.75	-409.06

Firm	Analysts (22)	As Of↑	2016	2017	2018	2019	*
1) Prestige Economics LL	J. Schenker	12/31/15	57.00	55.00	--	--	
2) Commerzbank AG	E. Weinberg	12/22/15	48.00	53.50	--	--	
3) Goldman Sachs Group	C. Lelong	12/16/15	38.00	35.00	35.00	--	
4) Societe Generale SA	R. Bhar	12/16/15	45.00	45.00	45.00	45.00	
5) BMI Research	D. Snowdon	12/11/15	48.00	49.00	70.00	80.00	
6) Westpac Banking Corp	J. Smirk	12/08/15	40.00	43.00	53.00	57.00	
7) Itau Unibanco Holding	I. Goldfajn	12/03/15	42.00	42.00	41.00	41.00	
8) Bank of America Merri	M. Widmer	11/25/15	45.00	45.00	59.00	--	
9) BMO Capital Markets C	J. Fung	11/24/15	55.00	65.00	70.00	--	
10) Toronto-Dominion Ban	B. Melek	10/29/15	61.00	--	--	--	
11) Citigroup Inc	I. Szpakowski	09/23/15	40.75	42.00	40.00	--	

*Forecasts made 180+ days ago (shown in grey) are excluded from median calculation.

MBIO62DA 39.51 -1.68 39.51/39.51 MBUL
At 6:18 Op 39.51 Hi 39.51 Lo 39.51 Prev 41.19

Curve Analys | 96) Excel | 97) Histogram | Page 1/2 | Commodity Price Forecasts: Product Detail

Iron Ore Fines62% Fe spot USD/MT | 99) Browse | As Of 01/13/16 | Ticker Type Actual

◉Quarterly Forecast ○Yearly Forecast

	Spot	As Of	Q1 16	Q2 16	Q3 16	Q4 16	Q1 17	Q2 17
Median		12/31/15	45.00	47.00	48.00	52.50	52.00	48.00
Mean		12/31/15	47.89	48.11	49.33	50.63	50.60	48.50
High		12/31/15	60.00	60.00	62.00	62.00	60.00	56.00
Low		12/31/15	40.00	38.00	38.00	38.00	41.00	42.00
Current Fwd	39.51	01/12/16	358.12	355.25	355.25	365.71	406.75	406.75
Diff (Median - Curr)			-313.12	-308.25	-307.25	-313.21	-354.75	-358.75

	Firm	Analysts (12)	As Of↑	Q1 16	Q2 16	Q3 16	Q4 16	Q1 17	Q2 17	*
1)	Prestige Economic	J. Schenker	12/31/15	52.00	56.00	60.00	58.00	58.00	56.00	
2)	Commerzbank AG	E. Weinberg	12/22/15	46.00	47.00	48.00	50.00	52.00	53.00	
3)	Goldman Sachs Gr	C. Lelong	12/16/15	40.00	38.00	38.00	--	--	--	
4)	Westpac Banking C	J. Smirk	12/08/15	42.00	39.00	41.00	38.00	41.00	43.00	
5)	Itau Unibanco Hold	I. Goldfajn	12/03/15	43.00	43.00	42.00	42.00	42.00	42.00	
6)	Toronto-Dominion	B. Melek	10/29/15	58.00	60.00	62.00	62.00	--	--	
7)	Citigroup Inc	I. Szpakowski	09/23/15	45.00	40.00	38.00	40.00	--	--	
8)	Capital Economics	C. Bain	09/11/15	45.00	50.00	55.00	55.00	60.00	--	
9)	Intesa Sanpaolo S	D. Corsini	09/02/15	60.00	60.00	60.00	60.00	--	--	
10)	Australia & New Ze	M. Pervan	02/23/15	58.00	59.00	60.00	61.00	--	--	*
11)	Numis Securities L	C. Barker	01/14/15	90.00	85.00	90.00	89.52	--	--	*

*Forecasts made 180+ days ago (shown in grey) are excluded from median calculation.

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Delayed Prices (Specified Investments Product

Futures : AJ AU CN CY EC ED EY HK ID IN IU JB JG KJ KU MD MY ND NK NS NU PH SGP ST SY TD TH TU TW UC UJ US UY YS

Options : ED EY(T) EY(T+1) IN(T) IN(T+1) JB(T) JB(T+1) NK(T) NK(T+1) SGP(T) SGP(T+1) TW(T) TW(T+1)

Commodities : 1MF 3MF 4CF 5CF ACF BRF CCF CFF CIF EF FB FEF GD GOF HRF KRF LPF M58F NJF PECF PESF PPCF PPSF PXF RGF RT T58F TF VCF

Commodities Options : FEF(T) FEF(T+1)

Contract: SGX TSI Iron Ore CFR China (62% FE Fines) Index Futur

Trading Session: (•) ALL ( ) T ( ) T + 1

SGX TSI Iron Ore CFR China (62% FE Fines) Index Futures Contract
SGX QUEST (T) Trading Hours: Mon-Fri 8.00am - 8.00pm
SGX QUEST (T+1) Trading Hours: Mon-Fri 9.00pm - 2.00am

As at 14-01-2016 2:20 AM

	Contract Month	Last	Chg From Prev Settle	Bid	Ask	Open	High	Low	Vol	Open Int	Settle	Prev. Day Settle
E	Jan 18	-	-	-	-	-	-	-	0	1,135	31.51	30.89
E	Jan 16	-	-	-	-	-	-	-	0	79,815	39.88	39.48
E	Feb 16	36.86	+0.06	-	-	37.05	37.15	36.86	115	80,746	37.67	36.80
E*	Feb 16	-	-	-	-	-	-	-	0	-	-	-
E	Mar 16	35.53	+0.26	-	-	35.50	35.55	35.45	61	72,012	36.13	35.27
E*	Mar 16	-	-	-	-	-	-	-	0	-	-	-
E	Apr 16	-	-	-	-	-	-	-	0	40,843	35.43	34.65
E*	Apr 16	-	-	-	-	-	-	-	0	-	-	-
E	May 16	34.27	+0.25	-	-	34.27	34.27	34.27	1	38,419	34.87	34.02
E*	May 16	34.39	-	-	-	34.39	34.39	34.39	30	-	-	-
E	Jun 16	-	-	-	-	-	-	-	0	38,650	34.37	33.48
E*	Jun 16	-	-	-	-	-	-	-	0	-	-	-
E	Jul 16	-	-	-	-	-	-	-	0	16,880	33.68	32.75
E*	Jul 16	-	-	-	-	-	-	-	0	-	-	-
E	Aug 16	-	-	-	-	-	-	-	0	16,880	33.49	32.65
E*	Aug 16	-	-	-	-	-	-	-	0	-	-	-
E	Sep 16	-	-	-	-	-	-	-	0	16,880	33.36	32.55
E*	Sep 16	-	-	-	-	-	-	-	0	-	-	-
E	Oct 16	-	-	-	-	-	-	-	0	25,082	32.59	31.80
E*	Oct 16	-	-	-	-	-	-	-	0	-	-	-
E	Nov 16	-	-	-	-	-	-	-	0	25,082	32.51	31.68

E*	Nov 16	-	-	-	-	-	-	-	0	-	-	-
E	Dec 16	-	-	-	-	-	-	-	0	25,082	32.43	31.62
E*	Dec 16	-	-	-	-	-	-	-	0	-	-	-
E	Jan 17	-	-	-	-	-	-	-	0	6,720	31.84	31.19
E*	Jan 17	-	-	-	-	-	-	-	0	-	-	-
E	Feb 17	-	-	-	-	-	-	-	0	6,720	31.84	31.19
E*	Feb 17	-	-	-	-	-	-	-	0	-	-	-
E	Mar 17	-	-	-	-	-	-	-	0	6,720	31.84	31.19
E*	Mar 17	-	-	-	-	-	-	-	0	-	-	-
E	Apr 17	-	-	-	-	-	-	-	0	7,005	31.81	31.16
E*	Apr 17	-	-	-	-	-	-	-	0	-	-	-
E	May 17	-	-	-	-	-	-	-	0	7,005	31.81	31.16
E*	May 17	-	-	-	-	-	-	-	0	-	-	-
E	Jun 17	-	-	-	-	-	-	-	0	7,005	31.81	31.16
E*	Jun 17	-	-	-	-	-	-	-	0	-	-	-
E	Jul 17	-	-	-	-	-	-	-	0	6,880	31.78	31.13
E*	Jul 17	-	-	-	-	-	-	-	0	-	-	-
E	Aug 17	-	-	-	-	-	-	-	0	6,880	31.78	31.13
E*	Aug 17	-	-	-	-	-	-	-	0	-	-	-
E	Sep 17	-	-	-	-	-	-	-	0	6,880	31.78	31.13
E*	Sep 17	-	-	-	-	-	-	-	0	-	-	-
E	Oct 17	-	-	-	-	-	-	-	0	6,860	31.74	31.09
E*	Oct 17	-	-	-	-	-	-	-	0	-	-	-
E	Nov 17	-	-	-	-	-	-	-	0	6,860	31.74	31.09
E*	Nov 17	-	-	-	-	-	-	-	0	-	-	-
E	Dec 17	-	-	-	-	-	-	-	0	6,860	31.74	31.09
E*	Dec 17	-	-	-	-	-	-	-	0	-	-	-
E*	Jan 16	-	-	-	-	-	-	-	0	-	-	-
E*	Jan 18	-	-	-	-	-	-	-	0	-	-	-
E	Feb 18	-	-	-	-	-	-	-	0	1,135	31.51	30.89
E*	Feb 18	-	-	-	-	-	-	-	0	-	-	-
E	Mar 18	-	-	-	-	-	-	-	0	1,135	31.51	30.89
E*	Mar 18	-	-	-	-	-	-	-	0	-	-	-
E	Apr 18	-	-	-	-	-	-	-	0	1,185	31.51	30.89
E*	Apr 18	-	-	-	-	-	-	-	0	-	-	-
E	May 18	-	-	-	-	-	-	-	0	1,185	31.51	30.89
E*	May 18	-	-	-	-	-	-	-	0	-	-	-
E	Jun 18	-	-	-	-	-	-	-	0	1,185	31.51	30.89
E*	Jun 18	-	-	-	-	-	-	-	0	-	-	-
E	Jul 18	-	-	-	-	-	-	-	0	1,220	31.51	30.86
E*	Jul 18	-	-	-	-	-	-	-	0	-	-	-
E	Aug 18	-	-	-	-	-	-	-	0	1,220	31.51	30.86
E*	Aug 18	-	-	-	-	-	-	-	0	-	-	-
E	Sep 18	-	-	-	-	-	-	-	0	1,220	31.51	30.86
E*	Sep 18	-	-	-	-	-	-	-	0	-	-	-
E	Oct 18	-	-	-	-	-	-	-	0	1,075	31.51	30.86
E*	Oct 18	-	-	-	-	-	-	-	0	-	-	-
E	Nov 18	-	-	-	-	-	-	-	0	1,075	31.51	30.86
E*	Nov 18	-	-	-	-	-	-	-	0	-	-	-
E	Dec 18	-	-	-	-	-	-	-	0	1,075	31.51	30.86
E*	Dec 18	-	-	-	-	-	-	-	0	-	-	-
E	Jan 19	-	-	-	-	-	-	-	0	0	31.40	30.90
E*	Jan 19	-	-	-	-	-	-	-	0	-	-	-
E	Feb 19	-	-	-	-	-	-	-	0	0	31.40	30.90
E*	Feb 19	-	-	-	-	-	-	-	0	-	-	-
E	Mar 19	-	-	-	-	-	-	-	0	0	31.40	30.90
E*	Mar 19	-	-	-	-	-	-	-	0	-	-	-

E	Apr 19	-	-	-	-	-	-	-	0	0	31.40	30.90
E*	Apr 19	-	-	-	-	-	-	-	0	-	-	-
E	May 19	-	-	-	-	-	-	-	0	0	31.40	30.90
E*	May 19	-	-	-	-	-	-	-	0	-	-	-
E	Jun 19	-	-	-	-	-	-	-	0	0	31.40	30.90
E*	Jun 19	-	-	-	-	-	-	-	0	-	-	-
E	Jul 19	-	-	-	-	-	-	-	0	0	31.40	30.90
E*	Jul 19	-	-	-	-	-	-	-	0	-	-	-
E	Aug 19	-	-	-	-	-	-	-	0	0	31.40	30.90
E*	Aug 19	-	-	-	-	-	-	-	0	-	-	-
E	Sep 19	-	-	-	-	-	-	-	0	0	31.40	30.90
E*	Sep 19	-	-	-	-	-	-	-	0	-	-	-
E	Oct 19	-	-	-	-	-	-	-	0	0	31.40	30.90
E*	Oct 19	-	-	-	-	-	-	-	0	-	-	-
E	Nov 19	-	-	-	-	-	-	-	0	0	31.40	30.90
E*	Nov 19	-	-	-	-	-	-	-	0	-	-	-
E	Dec 19	-	-	-	-	-	-	-	0	0	31.40	30.90
E*	Dec 19	-	-	-	-	-	-	-	0	-	-	-

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