

Industrial Commodities 2013 Outlook

The New Abnormal

- **This is an extract taken from [The New Abnormal - 2013 Commodities Outlook](#)** — and only contains the outlook for Industrial Commodities. Please refer to the main document for Citi's full Macro, Energy and Agricultural outlook for 2013.
- **Industrial Commodities 2012 in retrospect, 2013 in prospect:** As the end of 2012 approaches the Industrial Commodity prices have generally returned to levels which they started at the beginning of the year. The base metals have emerged essentially flat, the bulks down 15-20% and the precious metals up by around 8-10%. In 2013 Citi are looking for a repeat of 2012, with the industrial complex remaining flat, albeit with increased alpha within the individual commodities. Citi's out of consensus calls for 2013 are on the bullish side; metallurgical coal, palladium and nickel on the bearish side; silver and lead.
- **The new norm of commodity consumption** — Two structural shifts in China are forcing a re-evaluation of commodity demand; including lower-paced growth and a far less commodity-intensive economy. This is likely to expedite the shift of demand into later cycle commodities and a shift down in overall consumption rates. On the supply side, the long lead time capital projects are coming to market, this is likely to leave commodities such as thermal coal and iron ore in a period of digestion and test the structural integrity of the copper story in 2013.
- **Base Metals** — Nickel remains Citi's key base metal upside call, as Citi are forecasting deficits on continuing production losses at mainstream producers, slower than expected ramp ups at new projects, and lower than consensus Chinese Nickel Pig Iron productions volumes due to lack of availability of higher quality laterite ores. On the demand side, nickel inventory at stainless mills has been significantly reduced over the last quarters, as has stainless inventory at end consumers, making the market highly vulnerable to upside prices shocks. In contrast our copper expectation remains below consensus, driven by a further pick-up in copper mine supply which continues the trend seen in Q2 and Q3 of this year, combined with the price dampening impact of expected draws from high levels of Chinese copper inventory built during 2012.
- **Bulk Commodities** — The bulk commodities are forecast to be in a tight trading range for 2013. The downside for prices of metallurgical, thermal coal and iron ore are being protected by the cost curves while the upside is being capped by over capacity and a weaker demand outlook. Another year of excess capacity in steel is likely to see very short restock and destock phases globally and in particular China. This is likely to manifest itself through higher volatility in the spot markets of iron ore and metallurgical coal.
- **Precious Metals** — Palladium is Citi's key call for 2013 on the precious side, Citi are forecast a growing deficit on the back of better growth prospects in the key gasoline focused auto markets coupled with positive net inflows into ETFs. Gold is the wildcard for 2013, Citi's below consensus base case is for a Q1 peak of \$1,800, before fading for the rest of the year on improved US macro data and an improved US dollar, while inflationary support for gold looks to be minimal despite the various rounds of QE; however the US fiscal cliff and ongoing European sovereign debt concerns are likely to result in a very bumpy ride.

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

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Contents

Commodity Price Forecasts	3
Macro	5
Where has the Growth Gone?	6
'Made in China' to 'Bought in China'	7
Implications for Chinese Commodity Demand	8
The new norm for Industrial commodity consumption	10
Dollars and FX Effects	12
Industrial Metals	13
Copper – 2013: a year of transition	14
Aluminum – LME market failure set to continue?	18
Nickel – Out of favor and fundamentally misunderstood	22
Zinc – tightness, what tightness?	26
Bulks	30
Thermal Coal	31
The new norm for Industrial commodity consumption	33
Steel	36
Iron Ore	39
Metallurgical Coal	43
Precious Metals	46
Gold – tarnished reputation?	47
Silver: Growing by-product mine supply points rising levels of producer hedging	51
Platinum Group Metals Outlook – South African driven supply issues create tightness	54
Appendix A-1	59

Commodity Price Forecasts

Figure 1. Commodity Price Forecasts*

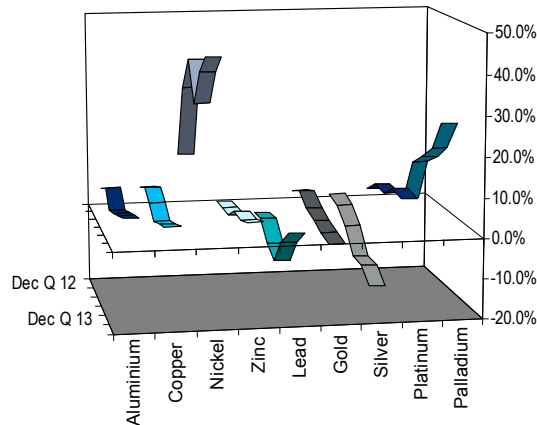
		Point Prices													
		0-3M	6-12M	5Y Cyclical	Q1 2012	Q2 2012	Q3 2012	Q4 2012E	2012E	Q1 2013E	Q2 2013E	Q3 2013E	Q4 2013E	2013E	2014E
Energy															
NYMEX WTI	USD/bbl	85.0	85.0	81.0	103.0	93.3	92.2	80.0	92.0	85.0	85.0	85.0	85.0	85.0	83.0
ICE Brent	USD/bbl	105.0	97.0	85.0	118.4	108.8	109.4	105.0	110.0	105.0	95.0	100.0	95.0	99.0	93.0
Henry Hub Natural Gas	USD/MMBtu	3.80	3.70	N/A	2.47	2.27	2.87	3.40	2.75	3.50	3.50	3.60	3.70	3.55	4.10
Base Metals															
LME Aluminum	USD/MT	2,050	2,075	2,200	2,216	2,019	1,944	2,050	2,057	2,100	2,050	2,100	2,150	2,100	2,175
LME Copper	USD/MT	8,000	7,900	6,200	8,314	7,833	7,711	8,020	7,970	8,160	8,000	7,800	7,900	7,965	7,775
LME Lead	USD/MT	2,150	2,025	2,200	2,118	1,987	1,984	2,150	2,060	2,150	2,050	2,000	2,150	2,090	2,200
LME Nickel	USD/MT	20,000	21,740	20,000	19,721	17,228	16,383	18,000	17,833	21,050	22,475	21,000	22,550	21,770	24,400
LME Tin	USD/MT	22,000	23,250	18,600	22,986	20,619	19,281	21,000	20,972	22,500	23,000	23,500	22,000	22,750	22,875
LME Zinc	USD/MT	1,950	2,040	2,100	2,040	1,933	1,902	1,950	1,956	1,975	2,000	2,080	2,100	2,040	2,125
Precious Metals															
COMEX Gold	USD/T. oz	1,770	1,770	1,050	1,691	1,613	1,654	1,760	1679	1790	1750	1735	1720	1749	1655
Silver	USD/T. oz	33	32	16.5	32.6	29.6	29.9	33.0	31.3	32.5	31.5	30.0	30.0	31.0	26.5
Platinum	USD/T. oz	1,614	1,675	1,500	1,604	1,505	1,500	1,614	1556	1650	1650	1700	1700	1675	1775
Palladium	USD/T. oz	627	744	600	683	630	613	627	638	700	725	750	800	744	925
Bulk Commodities															
Hard Coking Coal (benchmark Asia)	USD/MT	170	205	200	235	215	225	170	211	190	200	210	210	203	213
Thermal Coal Asia (NEWC)	USD/MT	98	105	105	113	88	94	98	98	105	105	105	105	105	111
Iron Ore Spot (TSI)	USD/MT	105	122	81	142	139	112	105	125	115	122	122	120	120	122
Agriculture															
CBOT Corn	USD/bu	800	675	N/A	641	618	783	770	700	770	750	655	620	700	625
CBOT Wheat	USD/bu	925	850	N/A	643	641	870	885	760	900	900	825	825	860	775
CBOT Soybeans	USD/bu	1,700	1,460	N/A	1,272	1,426	1,675	1,575	1,490	1,625	1,550	1,430	1,400	1,500	1335
CBOT Rice	USD/cw t	15.2	15.3	N/A	14.3	14.8	15.3	15.1	14.9	15.2	15.2	15.3	15.5	15.3	N/A
NYB-ICE Cotton	USD/lb	67	68	N/A	93	81	73	67	78	65	65	70	70	68	N/A
Sugar#11	USD/lb	20.0	21.0	N/A	24.5	21.2	21.0	20.5	21.8	21.0	21.0	21.0	21.0	21.0	N/A
ICE Coffee	Usd/lb	160	167	N/A	205	171	172	160	177	160	165	165	170	165	N/A
ICE Cocoa	USD/MT	2,600	2,510	N/A	2,308	2,221	2,440	2,500	2,370	2,540	2,500	2,500	2,520	2,515	N/A

Source: Citi Research, *subject to revision

2012 in Retrospect, 2013 in Prospect

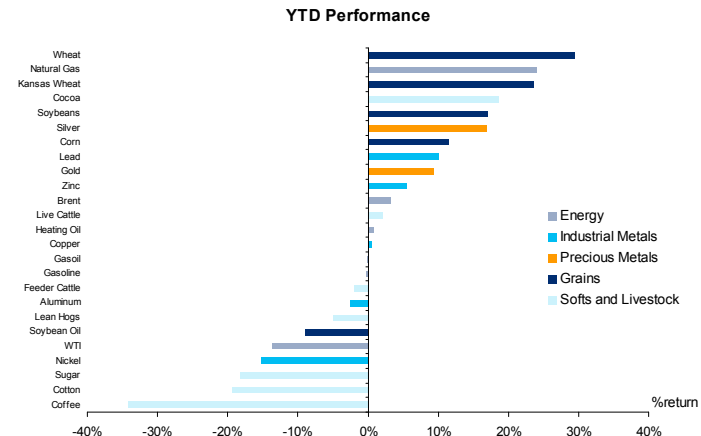
- 2012 has been a mixed year for commodities, with significant volatility and differentiation between commodities. Energy commodities, with the exception of US natural gas (+24%) and US-based West Texas Intermediate crude oil (-14%), have essentially returned to the levels they started in the beginning of the year. Base metals have also emerged essentially flat, although nickel has declined -15% YTD. Precious metals have also risen significantly, with gold up +9% and silver +17%. But the big movers have been grain and soft commodities, grains to the upside and softs to the downside. Wheat in particular has appreciated around +30% while coffee and cotton are down -20% or more. Gains in key row crops including corn and beans have also been impressive this year but have tapered off this quarter.
- In 2013 Citi are looking for a repeat of 2012, with the industrial complex remaining flat, albeit with increased alpha within the individual commodities. Citi's out of consensus calls for 2013 are on the bullish side; metallurgical coal, palladium and nickel on the bearish side; silver and lead.

Figure 2. Citi v/s Consensus



Source: Bloomberg, Citi Research

Figure 3. YTD Nominal Commodity Price Returns*



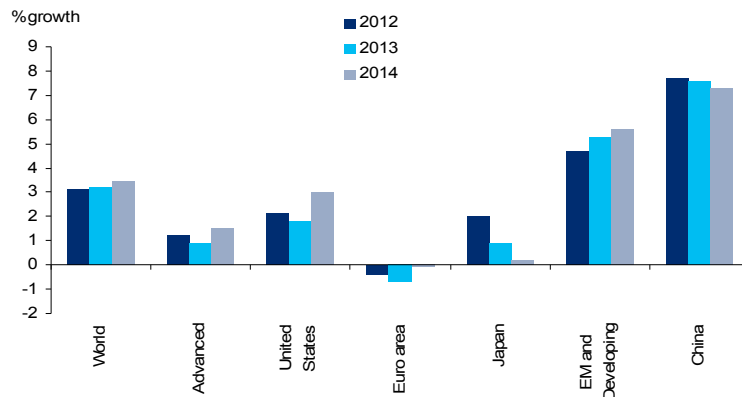
Source: Bloomberg, Citi Research, *through 15th November 2012

Macro

Where has the Growth Gone?

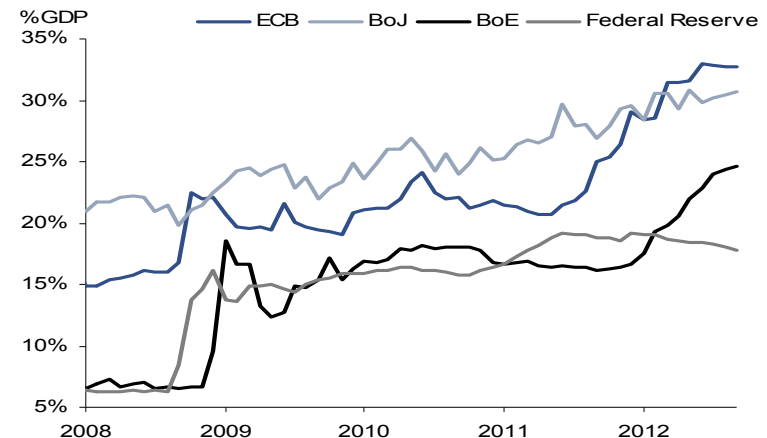
- Despite hopes for a solidifying recovery from the 2007-09 recession, global growth has remained underwhelming, especially in the advanced economies. In Citi's October Global Economic Outlook and Strategy report, Citi forecasted that the world would grow only +3.1% in 2012, after growing +3.8% in 2011. Growth in the advanced economies in particular is slowing from +1.4% in 2011 to +1.2% in 2012 and +0.9% in 2013. Meanwhile, growth in emerging and developing economies are also expected to slow from +6% in 2011 to +4.7% in 2012 before recovering to +5.3% in 2013.
- This comes despite considerable activism on part of the world's central banks-- the US Federal Reserve, the European Central Bank, the Bank of Japan, the Bank of England, and the People's Bank of China. Notably, the ECB, the BoE, and the BoJ have continued to expand their balance sheets to the tune of 3.7%, 2.9%, and 1.1% of real GDP respectively. The US Federal Reserve have committed to an open-ended MBS purchase program with QE3, while the PBoC has cut interest rates and reserve requirement ratios twice since the beginning of the year.
- Even this lackluster outlook is predicated on the assumption that European policymakers would manage through troika programs, bailouts, and ECB bond purchases to contain systemic fallout from the ongoing sovereign debt and banking crises in the European periphery. 2013 also may be potentially the year of the US "fiscal cliff," where effective tax hikes and spending cuts amounting to 3-5% of US real GDP could take effect on January 4, 2013, instantly pushing the US into recession.
- The IMF gauges that there is a 1-in-6 chance that global growth could fall below 2%, which would feature widespread recession in advanced economies and roughly marks the "tipping point" before economic behavior, including commodity demand, changes structurally.

Figure 4. Citi Economic Forecasts for 2012-2014 for Selected Economies and Regions



Source: Citi Research

Figure 5. Balance Sheets as % of GDP for Selected Central Banks

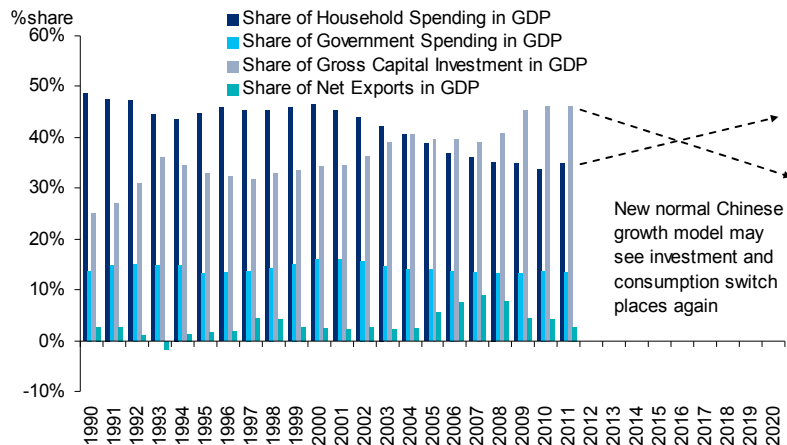


Source: Various central banks, Citi Research

'Made in China' to 'Bought in China'

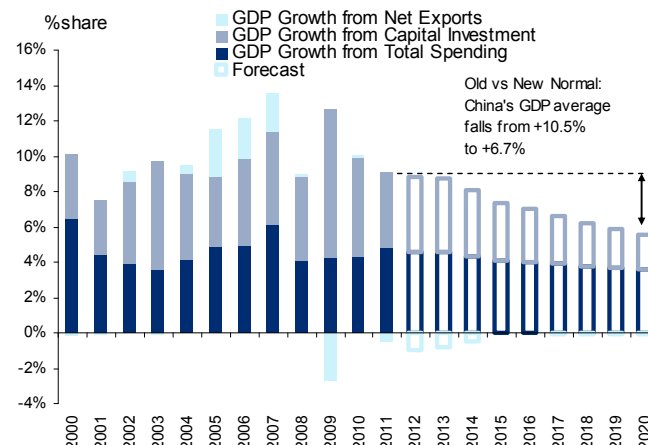
- Not only is the absolute level of Chinese growth expected to decline, but the composition of Chinese growth is also expected to shift away from raw materials-intensive manufacturing and investment and toward more "balanced" sources of growth such as household consumption and services. In a sense, this is actually a return to the past for China as household consumption had typically exceeded investment in Chinese GDP after 1990. Only in 2004 did investment displace consumption as the primary internal driver of Chinese growth. Going forward, Citi forecasts that China's overall real GDP growth might steadily fall from +9.2% in 2011 to +5.5% by 2020. Furthermore, overall investment growth, which averaged +13.6% from 2001 to 2009, would decline to only an average of +6.2% from 2013 to 2020, a slowing by a factor of roughly a half. Meanwhile, consumption growth, which averaged +8.2% from 2001 to 2009, would also fall but only slightly to average +7.8% growth from 2013 to 2020.
- Even though the 5th generation of leaders, led by President Xi Jinping, has been inaugurated, very little is known about their attitudes towards the future growth path of China. Which mode of economic growth the new leadership favors could be seen from the GDP growth target to be announced next month. If it were to remain at 7.5% or above, then more pro-growth policies might be implemented. If it were lowered to 7%, then the government may promote a more orderly transition of the economy. While many inside and outside of China have advocated for a greater focus on "quality" rather than "quantity" of growth, as expressed in the latest 12th Five Year Plan, it also seems that ensuring social stability may remain the priority. In particular, President Xi's inaugural speech has a number of references on the well-being of people. It is also noteworthy that, in the speech, among the "three responsibilities" the new leaders have, "People" was placed ahead of the "[Communist] Party." This could mark a change, as the "Party" historically has been placed ahead of the "Country." We expect a China that is not only growing slower, but also building less metals and bulks-intensive infrastructure (housing and commercial real estate projects), and shifting more toward household consumption, with a focus on energy efficiency and environmental sensitivity. This new China should have significant implications for future commodity demand.

Figure 6. Share of Spending, Investment, and Net Exports in Chinese GDP



Source: Haver Analytics, Citi Research

Figure 7. Sources of Chinese Growth and Forecast to 2020



Source: Citi Research

Implications for Chinese Commodity Demand

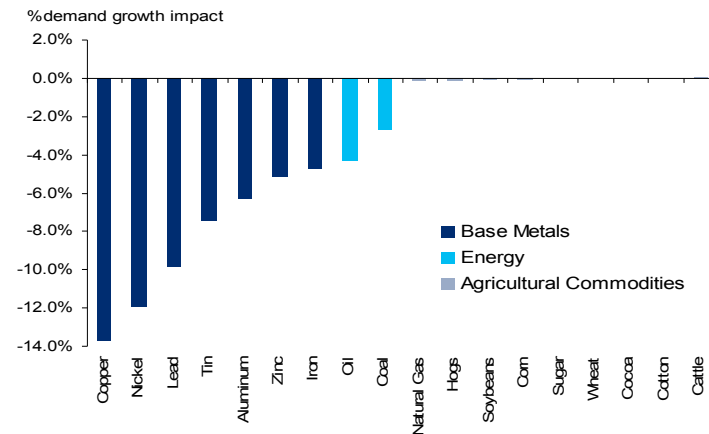
- Both the overall slowing and the restructuring of the Chinese growth model should mark a watershed in global commodity markets, if only because China had played such an outsized role in global commodity markets in the past decade. For many industrial metals, China in fact was responsible for all of net global demand growth after 1995, and also is one of the largest global consumers of energy, grain, and soft commodities.
- The “new normal” for China moving from an investment-heavy +10.5% annual economic growth to a consumption-heavy +6.7% growth should dramatically change expectations of commodity demand going forward. Citi analyzes the potential impact of this change on commodity demand growth between the “new normal” scenario and a scenario where China continues its old investment-heavy growth model. The figure below presents the results of this analysis.
- Base metals are unsurprisingly hit the strongest, with copper demand -13.7% under the “new normal” scenario relative to a scenario where China continued to grow at its old +10.5% average growth rate. Nickel, lead, tin, aluminum, zinc, and iron ore all see their demand at least -5% lower per annum under the new normal.
- Meanwhile, oil and coal see drops to the tune of -4.3% and -2.7% respectively. In the oil sector, the sharp drop in demand for distillates by the industrial sector is only partially offset by continued growth in demand for gasoline by households. But the continued need for power, transportation fuel, petrochemicals and other energy products even in the new normal scenario means Chinese energy demand is affected much less than base metals. Natural gas is almost unaffected as the shift toward the cleaner-burning fuel should continue apace even under the new normal scenario.
- And given the fact that agricultural commodities are primary consumed by Chinese households, which are forecasted to continue to grow at about the same historical pace to 2020, the demand for agricultural commodities are hardly affected at all or even see slight increases in demand relative to the old growth model.

Figure 8. Share of China in World Commodity 2011 Demand and 1995-2011 Demand Growth



Source: Citi Research

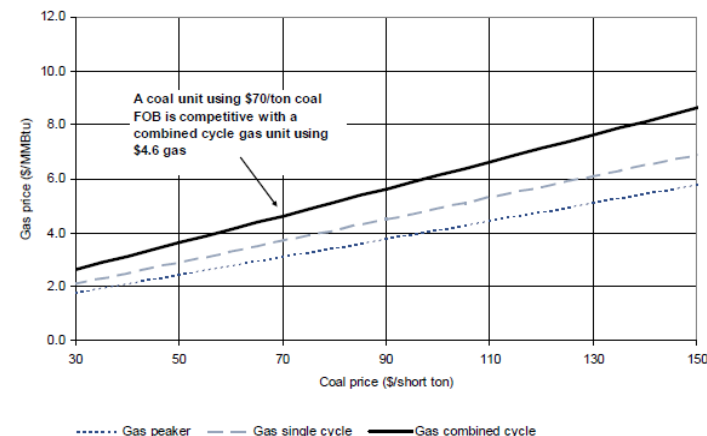
Figure 9. Impact on Commodity Demand Growth of Chinese “New Normal”



Source: Citi Research

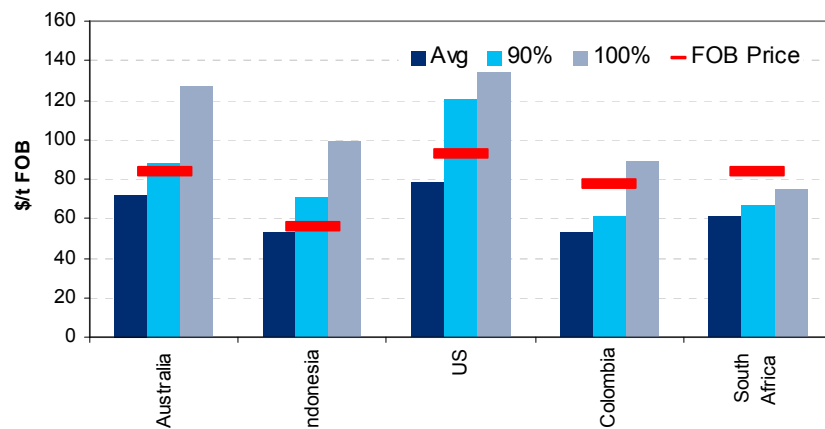
- The improvement in US gas prices is switching the arbitrage back in favor of coal. However, a mild winter should produce a gas glut again, albeit smaller than the one in 2012 (thereby pushing down gas prices, boosting coal-gas switching and lowering coal demand). Citi's meteorologist is expecting a 5% warmer-than-normal winter. Coal demand in this scenario could fall by 12mm short tons. If the US Fiscal Cliff were to hit, then coal demand would fall back to the 2010 or 12 level, making available a slightly smaller amount for exports than in this year, as production should be lower in 2013 y/y. The worst case scenario is if the Fiscal Cliff and a once-in-a-century mild winter similar to the 2011-12 season were to hit together, then coal demand could fall by a further 80mm tons versus 2012.
- Citi are expecting only modest demand growth in Chinese electricity use in 2013 and this suggests that imports are likely to be capped. The arbitrage has recently reopened but pressure remains on domestic Chinese prices. The Australian and Indonesian producers are struggling under higher operating costs and a lack of supply-side discipline largely by new entrants. Given the capacity additions over the past few years it will take time for this to work through the system.

Figure 10. US coal to gas pricing arbitrage



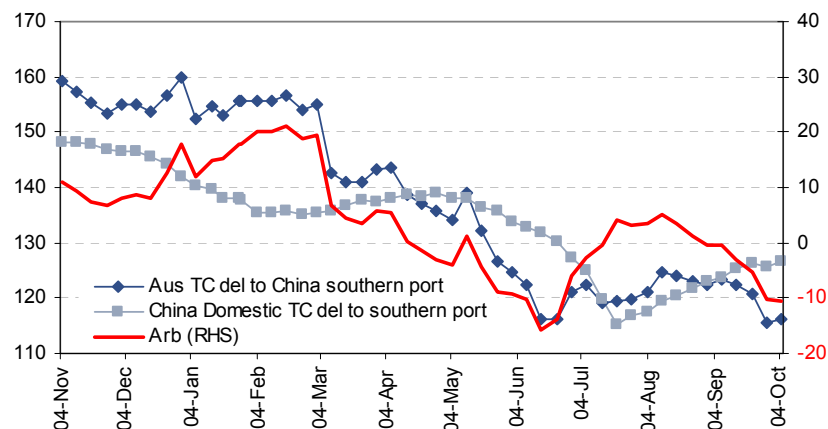
Source: Citi Research

Figure 11. Profitability and cost position – thermal coal producers



Source: Wood Mackenzie, Citi Research

Figure 12. Coal price arbitrage Australia to China

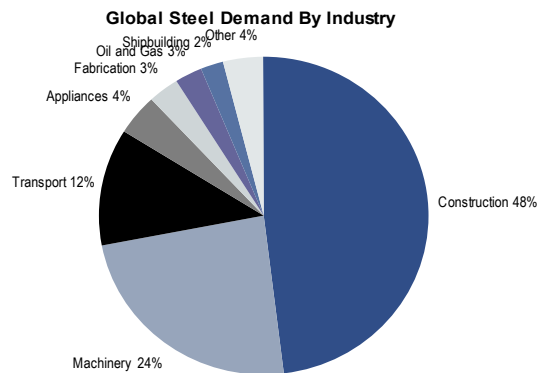


Source: Platts, Citi Research

The new norm for Industrial commodity consumption

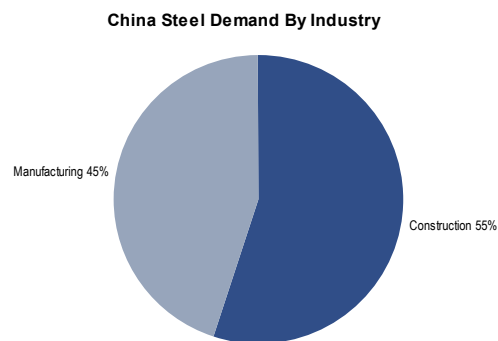
Arguably the biggest impact on industrial commodity consumption over the next decade is likely to occur from a shift in the intensity of use as China embarks on a transition towards a consumer based economy and away from construction. This is likely to impact industrial commodities differently with the later cycle commodities such as copper being relative winners against early stage commodities such as steel and iron ore. The following slides highlight the difference in demand drivers against the back drop of a changing urbanization rate in China which, Citi expects, will be a key driver of this evolution.

Figure 13. Steel demand is heavily weighted towards construction.



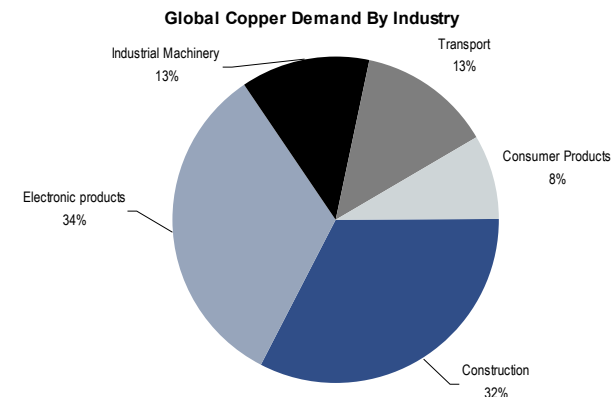
Source: Citi Research

Figure 15. In China the rapid growth of FAI has led to a steel construction above global averages.



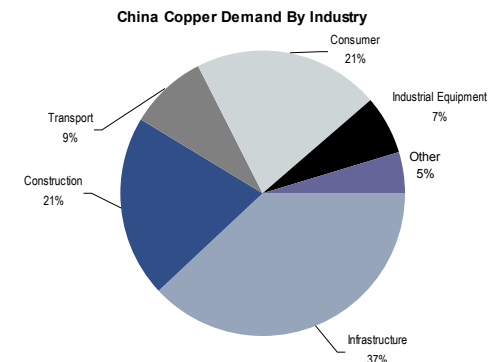
Source: Citi Research

Figure 14. While copper consumption is more balanced towards the consumer



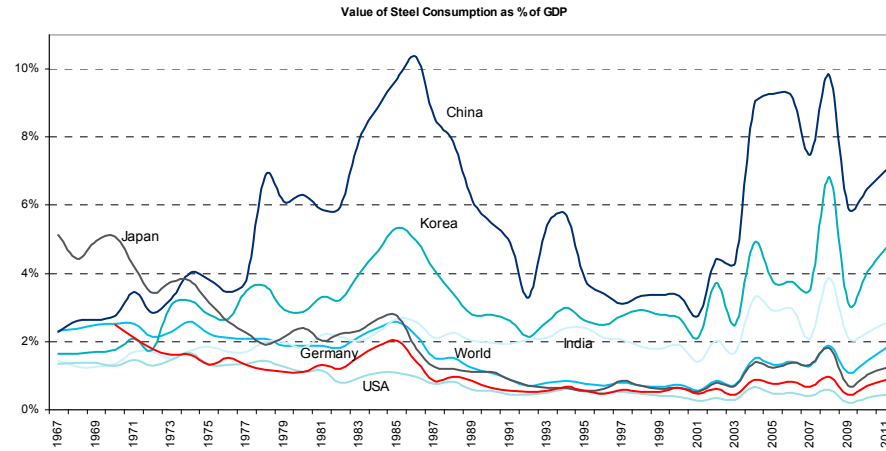
Source: Citi Research

Figure 16. China copper demand by Industry is more in line with global averages.



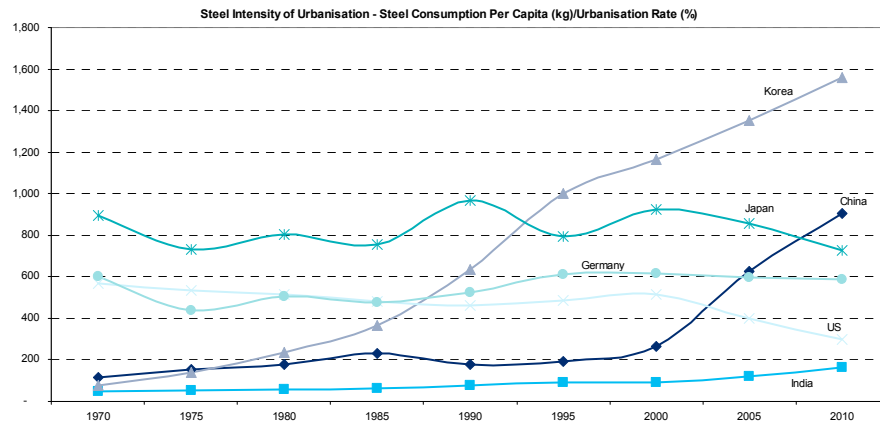
Source: Citi Research

Figure 17. Surprisingly since 2004, China has spent on average 8% of its GDP on steel



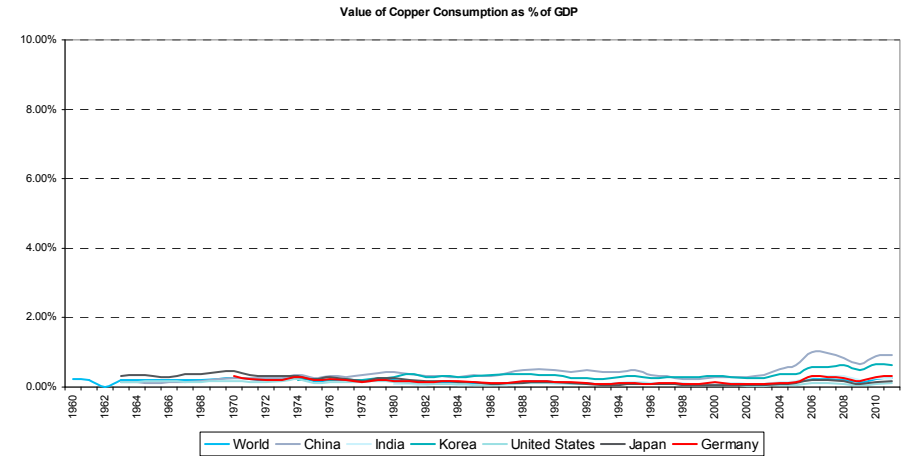
Source: Citi Research

Figure 19. There is a strong correlation between steel consumption and urbanization. From 2000-2010 the ratio of steel consumption to urbanization has risen from 266 to 904 suggesting China's steel intensity of urbanization has risen 4x, beyond the US and Japan



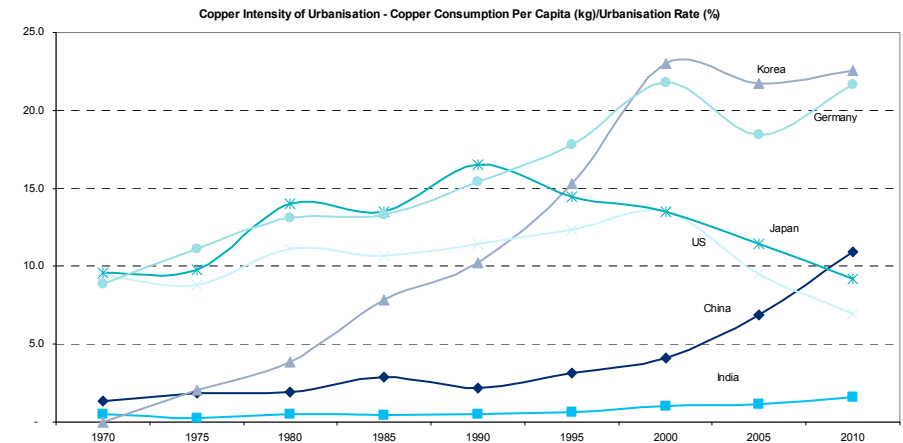
Source: Citi Research

Figure 18. While China has spend just 1% of its GDP on copper



Source: Citi Research

Figure 20. In the same period, copper consumption relative to urbanization is up just 2.75x leaving China on 11x, c.50% below the peak in both the US and Japan

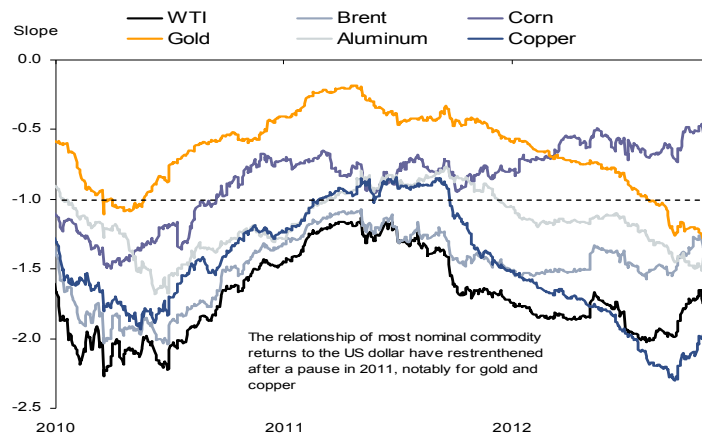


Source: Citi Research

Dollars and FX Effects

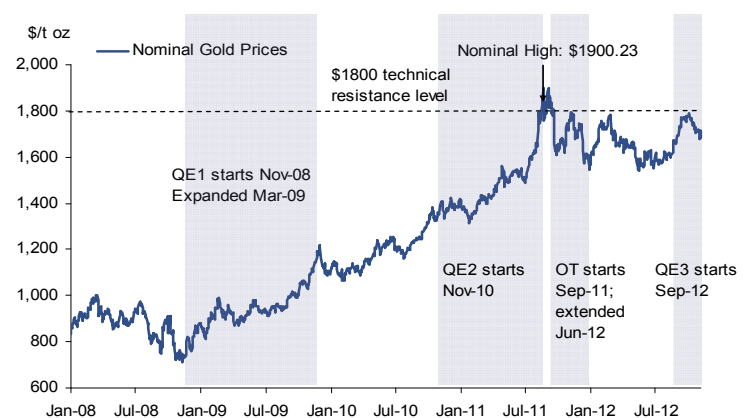
- Given the stressed macroeconomic outlook, risk-off/on factors and currency denomination effects, such factors should remain a significant influence on the direction of dollar-denominated commodity prices. In particular, since the beginning of 2012, commodity-currency relationships have strengthened for commodities such as gold, copper, and WTI crude oil. The significant strengthening of the dollar in 2Q12 contributed to overall nominal commodity price weakness, and conversely, the dollar's weakening in 3Q12 affected the reverse.
- Gold prices, given their temporary status as effectively a fiat currency, is a bellwether for commodity appreciation and depreciation from currency movements, which have been whipsawed by safe-haven flows countering the US Fed's efforts to expand money supply. Nominal gold prices have rallied after every round of unconventional balance sheet expansions by the US Federal Reserve but with sequentially weaker impacts. The recent short-lived bounce after QE3 and the difficulty of gold prices to sustain itself above technical resistance levels around \$1800/t oz suggests market fatigue even though bullion prices did receive a pop after the reelection of President Obama in the US with the bias of loose monetary policy continuing longer versus the potential Romney Administration.
- To be sure, US monetary policy should remain historically loose given sluggish growth and fiscal headwinds. However, on balance, the darker outlook for Europe and slowing growth in EM economies may see the dollar strengthen again in relative terms. Citi forecasts that the US dollar should appreciate roughly +10% against the DXY basket, which should given historical trends and all-else-equal, drive a -10 to -20% downward pressure on nominal commodity prices.

Figure 21. Regression slopes of nominal commodity prices to the US dollar



Source: Bloomberg, Citi Research

Figure 22. Nominal gold prices and CB easing...



Source: FOMC, Citi Research

Industrial Metals

Copper – 2013: a year of transition

- 2013 represents a year of transition for copper, both in terms of supply and demand. Copper bulls continue to try and talk down the possibility of significant supply growth next year, while at the same time expecting a sizable China stimulus from the incoming regime. However, Citi analysis suggests a somewhat different outlook. After a dreadful 2011 in terms of production losses, there has been clear evidence of copper mine supply improving since Q2 2012. In the first 3 quarters of 2012, production from major listed miners up by 4.1%, with a clear acceleration in the third quarter, with year-on-year growth levels up 8.3% for the quarter. Chinese mine production has also continued to surprise through 2012, up 22% over the first 3 quarters, with Chinese miners expected to account for over 11% of total copper concentrate production this year. Although question marks still remain over the extent of mine growth in 2013, it is clear that the market will be moving into a period of mine supply acceleration in 2013 and 2014.
- Sluggish demand globally has pushed copper into surplus during the second half of 2012. However, the balance picture has been somewhat confused by the draws in LME inventory and continued strong imports from China, with many market commentators mistaking trends as signs of strong underlying copper demand. In reality Chinese copper imports have been driven by collateralised financing demand, with metal simply going into bonded warehouse inventory rather than being consumed.
- An important question is how much metal is actually in bonded warehouses? The answers heard during recent LME week meetings ranged from 650,000 tons to 1 million tons. Interestingly, while most market commentators seem to have a view on bonded inventory levels, few seem to have any estimate for the number of bonded warehouses, making many of the estimates of actually bonded inventory questionable. Citi's view is that levels of inventory within China have been and continue to be consistently underestimated. With financing demand coming under increasing scrutiny particularly due to the practice 'multiple' collateralising of the same metal units, we expect metal will begin to flow out of such deals. This suggests that the impact of improving demand may well be muted by increasing metal availability from inventory next year.

Figure 23. Copper supply / demand balance

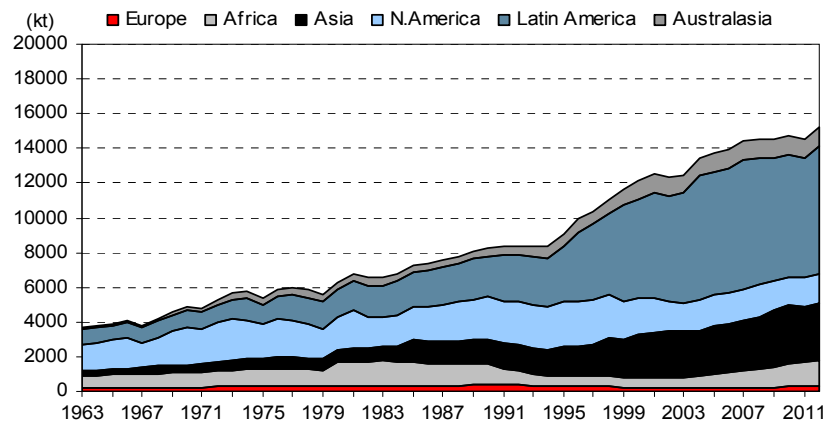
kt	2010	2011	2012	2013f	2014f	2015f	2016f
Mine Production (Concentrates)	12,822	12,734	13,243	14,211	15,276	15,577	16,401
Scrap/Resmelted blister etc. (incl losses)	1,913	2,678	2,663	1,981	2,075	2,165	2,426
Smelter Capacity	17,554	19,986	18,861	19,775	20,971	21,796	22,103
Smelter Production	14,786	15,421	15,890	16,414	17,301	17,872	18,788
Mine Production (Electrowon)	3,377	3,490	3,621	3,794	3,996	4,043	4,012
High Grade Scrap	851	625	652	650	680	688	696
Mine Production (Total)	16,199	16,211	16,864	18,005	19,242	19,620	20,043
% Change	1.2%	0.1%	4.0%	6.8%	6.9%	2.0%	4.0%
Refined Production (Total)	19,014	19,536	20,163	20,916	21,842	22,603	23,495
% Change	3.8%	2.7%	3.2%	3.7%	4.4%	3.5%	3.9%
Consumption/Demand	19,218	19,775	20,110	20,782	21,501	22,354	23,402
% Change	10.9%	2.9%	1.7%	3.3%	3.5%	4.0%	4.7%
Surplus/Deficit	-203	-239	53	134	341	249	94
Stock Change	-107	-5	53	134	341	249	337
Stocks	1,017	1,012	1,065	1,199	1,540	1,789	1,883
Stock:Consumption Ratio (wks)	2.8	2.7	2.8	3.0	3.7	4.2	4.2
Price (US\$/lb)	3.42	4.00	3.62	3.61	3.53	3.40	3.31
(US\$/t)	7,543	8,829	7,970	7,965	7,775	7,500	7,300

Source: Wood Mackenzie, WBMS, ICSG, Citi Research

Copper supply – 2013: the beginning of the next wave

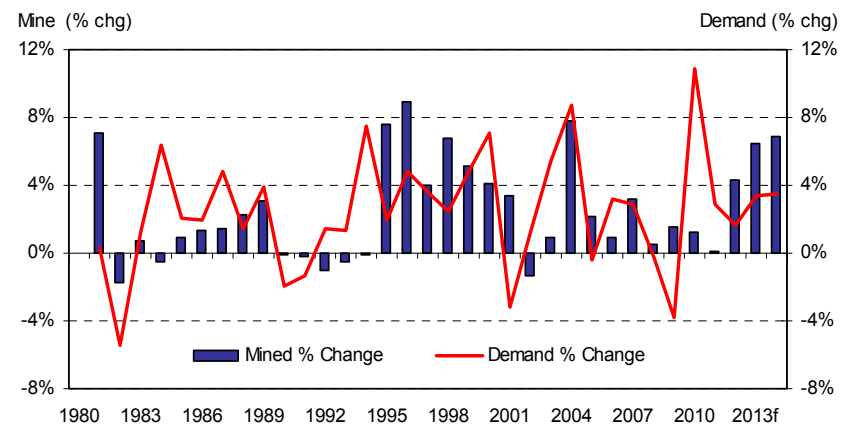
- Copper bulls continue to contend that copper supply will fail to deliver in 2013, pointing to losses due to strike activity, ore depletion and project slippage as the reasons. Obviously these have been the reasons for poor performance in recent years. However, we believe that these factors will be less of an issue in 2013; leading to an expectation of total mine supply growth of 1.1 million tons, or 6.7%, for the year.
- Disruption due to labor contract negotiations is likely to be modest. Chile and Peru, which account for around 40% of global copper mine supply, are faced with 50% of their capacity coping having expiring labor contracts during the period H2 2012/H1 2013, which obviously does create the risk of supply disruptions. However, recent quick settlements at both Andina (Codelco) and Anglo Sur (Anglo's El Soldado and Los Broncos mines) are likely to set a precedent for a quick settlement to upcoming negotiations in Chile and possibly Peru. For copper miners, losses due to strike activity have been negligible during H2 2012, and this trend is likely to continue into 2013.
- Brown and Greenfield project ramp ups are perhaps the element of 2013 mine output growth that is seen by many as vulnerable, with concerns focused on production growth in the Democratic Republic of Congo (DRC) and Mongolia. Indeed, pessimists have suggested that DRC copper production may grow by only 50,000 t next year given ongoing power problems at KOV, and the capex build delaying impact on Kolwezi of First Quantum's legal challenge over asset ownership. However, Citi expects DRC mine production growth to be closer to 140,000 t in next year, a still conservative number given the extent of green and brownfield growth provided under mining company guidance. For Mongolia, the recent agreement of a power deal with the Chinese company Inner Mongolia Power Corporation to supply energy to the Oyu Tolgoi mine puts the project firmly back on course to produce over 100,000 tons of contained copper in 2013.
- In Chile, the ore upgrade program at Escondida has been delivering significant result already this year, while Los Broncos and Esperanza ramp ups have also delivered significant growth. These trends are expected to continue into 2013, with new production also arriving from the Caserones and Mina Ministro Hales in H2. Given the volume of green and brownfield projects reaching production in 2013, the continued extreme pessimism over 2013 supply now appears naïve.

Figure 24. Mine supply – clear recovery starting in 2012



Source: Citi Research

Figure 25. 2013/2014 mine supply growth – above recent trends



Source: Citi Research

Copper demand – no major China stimulus expected in early 2013, while Europe continues to drag

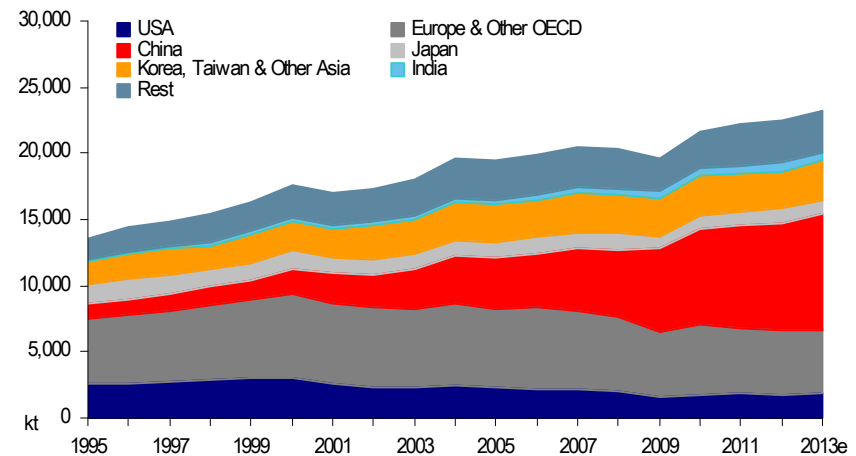
- Projections of 'continued' copper market tightness in 2013 continue to be made somewhat predictably, driven particularly by an expectation of renewed China stimulus to be implemented by the incoming Chinese leadership. The apparently more conservative tinge to the new leadership, suggests a more hawkish fiscal policy going forwards, which will mitigate against any major new 2008 style stimulus. Indeed, there is a clear desire to prevent a repeat of the asset bubbles created by the 2008 stimulus package. However, although Citi does expect some improvement in Chinese copper consumption growth rates next year as end product destocking reverses, 2013 growth is still expected to be the one of the lowest seen in the last 15 years at 7.4%.
- Moves to speed up project approvals within China, another source of bullish sentiment have yet to have any meaningful overall impact. While growth in fixed asset investment (FAI) has been around 20% yoy since Mar this year, the balance has indeed changed. Infrastructure investment had picked up firmly from negative year-on-year growth at the beginning of the year to around 25% in Sept and Oct, while growth in property sector investment dropped 15.4% yoy in Oct, halved from the levels in early-2011. While property sales are reported to have picked up in September, helped by policies such as first time buyer discounts, a very large overhang of unsold property still exists. This combined with a continuation of Government policy to control property prices suggests there is little prospect of a significant pick-up in residential construction activity in 2013. Indeed, hopes that strong FAI will significantly counter weakening copper demand in export sectors appears optimistic.
- Demand growth contracted sharply in Europe through out the year-to-date, with Citi now expecting around a 6% reduction in European copper consumption this year. Indeed, German manufacturing is being pegged back by increasingly recessionary signals from other key European markets, while slowing demand for German manufactured products from Asia and China in particular is also starting to impact. Concerns over the demand outlook for copper have recently manifested themselves in the sharp discounts producers are now offering on contract premiums for 2013 metal delivery in Europe. A key take away from LME week was the difficulty copper producers were finding in securing contract deals in Europe for next year.

Figure 26. Chinese manufacturing activity – showing signs up upturn



Source: Citi Research

Figure 27. China is the key source of consumption growth in a sluggish macro environment

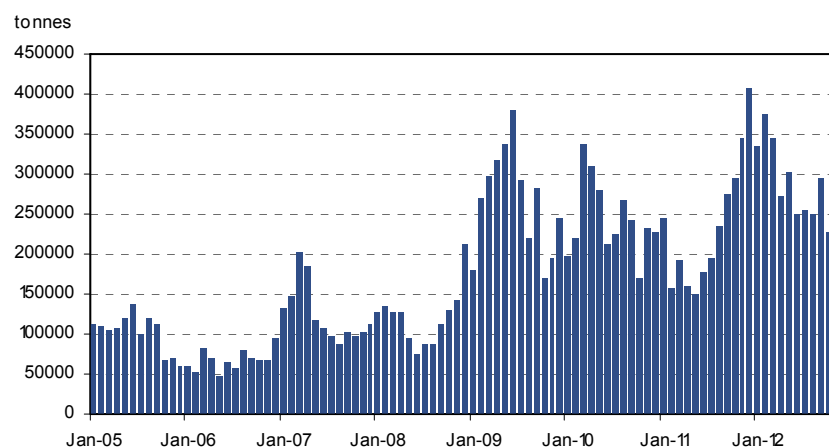


Source: Citi Research

Copper outlook – a modestly widening surplus in 2013

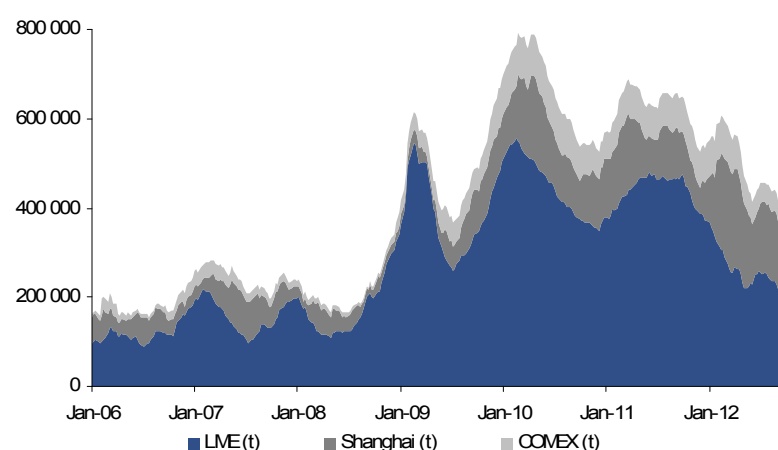
- Whilst a modest improvement in copper consumption growth rates is expected in 2013, largely driven by an end to Chinese final product destocking, this is expected to have only a moderately bullish impact on copper prices during the first half of next year. The primary reason is that primary copper inventory builds through 2012 are expected to be drawn to meet stronger Chinese demand in early 2013.
- Chinese primary copper imports have surged, with net levels up 50% in the year to September, imports of copper contained in scrap rose by 4%, while domestic refined copper production has risen by 5.5%. Imports fell off sharply only in October. Over the first 9 months of the year, the volume of copper available for consumption has been around 7.9 million tons. With Chinese copper consumption (primary and secondary) averaging 690,000 tons per month this year, this suggests China has built up inventory of some 1.6-1.7 million tons of copper, either in primary or semi-finished form. It is for this reason and for the lack of even estimates of numbers of bonded warehouses that leads to skepticism over the generally low level of bonded warehouse stock estimates.
- Clearly a portion of the excess primary is currently held in bonded warehouses for collateralized financing purposes. Given banks increasing reluctance to roll over such financing arrangements, and increasing official scrutiny of such deals, it expected such stocks will be drawn down and either be used to met growing domestic Chinese demand, or simply be exported back into the LME warehouse network in Asia. Indeed, the falling demand for metal for financing purposes are likely to see Chinese monthly copper imports retreat back to contracted levels, in the region of 225,000 tons per month. This also suggests that LME inventory will begin to rebuild in 2013.
- While improving Chinese data in Q1 is expected to see copper prices push back above \$8,000/t, significant upside potential will be hampered by a combination of continued improvement in mine production results, bonded warehouse stock draws in China, and rising metal exchange inventory levels. In addition, we see little prospect of renew speculation of physical copper ETFs having any meaningful price impact. We are therefore forecasting 2013 copper prices to average \$7,965/t.

Figure 28. Chinese copper imports, a declining trend expected in 2013



Source: Citi Research

Figure 29. Recent uptrend in exchange inventory projected to continue in 2013



Source: Citi Research

Aluminum – LME market failure set to continue?

- The LME Aluminum price has spent much of this year becoming more and more divorced from both market fundamentals and actual consumer prices. LME Aluminum prices are currently at around \$1,900/t, but actual spot consumer prices for prompt delivery metal in Europe are between \$2,180/t - \$2,195/t, due continued rise in physical premiums, driven higher by the limited prompt availability of metal despite 5.1 million tons of metal being currently held in the LME warehousing network. Indeed, physical premiums in Europe now account for an unhedgeable 15% of the price to secure prompt metal. It is clear that the failure of the operation of warehousing properly as part of the LME's function of a physical market of last resort, combined with rising demand for physical metal for contango financing, has played a role in driving physical premium dramatically higher, not only in Europe, also in North American and Asia.
- It was a surge in cancellations of warrants combined with continued financing demand that lit the blue touch paper under Aluminum premiums. Warrant cancellations began to surge from mid-December 2011, rising from 2.8% of total inventory on December 20th 2011 to reach a to-date peak of 37.22% in July 2012 and currently stand at 34% of total inventory. High levels of cancellations at major warehouses, such as Vlissingen in the Netherlands, ensure that long load out queues are perpetuated given the maximum daily load out rates of 3,000 tpd for bigger warehouses. Indeed, a warrant holder cancelling metal today at Vlissingen would wait 55 weeks to receive the material. This creates a double benefit for physical traders owning warehousing in that warehouse rents are maximized, while revenues from physical metal sales benefit from high physical premiums. This was the key issue of debate during LME week, and remains a key issue for the market in 2013.
- Although the LME has announced a 6 month review of LME warehousing operations, the exchange has a poor track record when it has had opportunities to deal with the issues in the past. A mooted introduction of different load out rates for different LME metals may well stop the practice placing different metals in queues behind large Aluminum cancellations, as has been the case at both Vlissingen and Detroit, and more recently at Antwerp, but it would do nothing to solve the situation with large Aluminum load out queues continue to drive a divergence between LME prices and actual consumer prices. However, it is clearly not in either consumers or producers interests to see a dramatic change to guidance which would prompt of the release of a tidal wave of metal into the prompt market, with severely negative price consequences. With growing interest in the warehousing issue in both the EU and US, managing any change in warehousing rules will be key issue next year.

Figure 30. Aluminum supply / demand balance

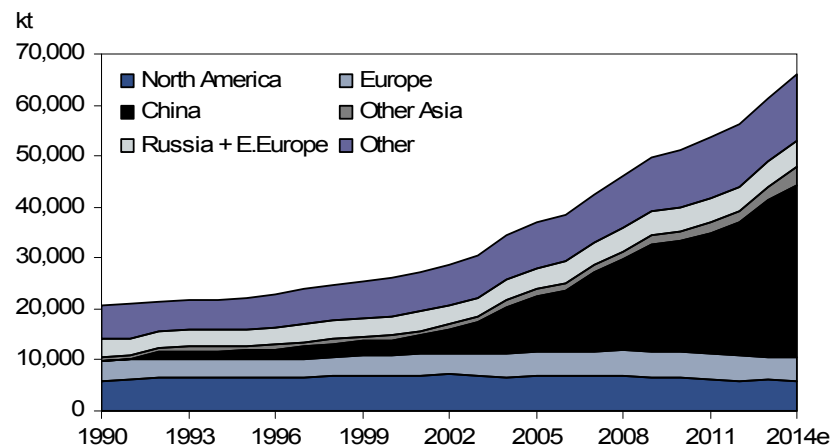
	2010	2011	2012e	2013f	2014f	2015f	2016f
Smelter Capacity ktpy	51,221	53,559	56,066	61,435	66,184	69,824	72,518
Refined Production	42,047	45,319	47,070	50,041	53,290	56,627	59,241
Capacity Utilization (%)	82%	85%	84%	81%	81%	81%	82%
Supply Incr (%)	12.6%	7.8%	3.9%	6.3%	6.5%	6.3%	4.6%
Consumption/Demand	40,823	44,637	46,515	49,381	52,543	55,703	58,416
Consumption Incr. (%)	15.3%	9.3%	4.2%	6.2%	6.4%	6.0%	4.9%
MARKET BALANCE	1,224	681	555	660	747	924	826
Stocks	6,502	6,999	7,553	8,213	8,960	9,884	10,710
Stock Change	17	496	555	660	747	924	826
Stocks (weeks)	8.3	8.2	8.4	8.6	8.9	9.2	9.5
Price: US\$/lb	0.99	1.10	0.93	0.95	0.99	1.02	0.95
US\$/t	2,173	2,423	2,057	2,100	2,175	2,250	2,100

Source: Woo Mackenzie, IAI, Citi Research

Aluminum – More and more supply in 2013

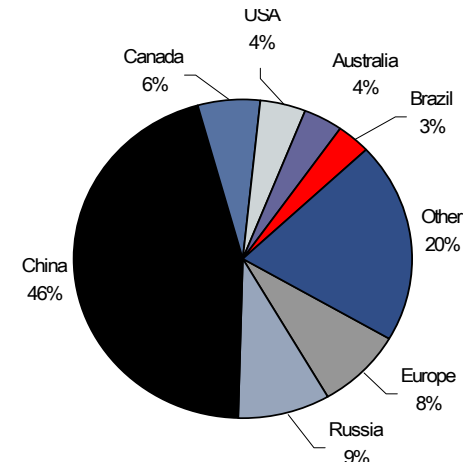
- The combined impact of the operation of LME warehousing and investor demand for physical metal for contango financing has effectively removed the laws of demand from driving production decisions. In 2012, only 3 smelters (Vlissingen, Kurri Kurri, and Porte Vesme) accounting for 1.8% of non-Chinese smelting capacity have closed in 2012 due to price/cost pressure despite around 40% of non-Chinese smelters not breaking even on a cash cost versus cash prices basis.
- Rising physical premiums have removed the impact of falling LME prices on the decision to produce metal despite a market clearly in surplus. Depressed LME prices but high premiums have also assisted some smelters from a production cost perspective, through lowering alumina cost through alumina linkage to LME prices, and lowering energy costs where LME linked power tariff contracts remain in place. Operating decisions have also been impacted by Government intervention in the form of subsidies in both Australia and Brazil.
- Supply discipline looks unlikely in 2013. Indeed, a number of new projects, including the 740ktpa Ma'aden smelter in Saudi Arabia, the 359ktpa Mahan smelter and the 325ktpa Korba smelter expansion in India, plus and the 120kt/a Samalaju smelter in Malaysia, are all scheduled be ramping up production during the first quarter of next year. Total production in the non-Chinese world is expected to rise by around 4% in 2013 to 26 million tons, driven by essentially by new capacity additions, and supported by a continuing lack of supply discipline from marginal smelters.
- Turning to China, the Aluminum sector has been the key source of global production growth in 2012, with production projected to grow by 13% this year to close to 22 million tons. Indeed, Chinese Aluminum capacity is estimated to reach 26Mtpa in 2012 and up to 31Mt/a by the end of 2013, with much of the growth coming from new capacity in Western Provinces. Slow power plant construction in Xinjiang, the source of much new capacity, had hampered production growth during 2012, but it is now understood that the completion of a number of captive power plants will reinvigorate production growth into 2013. While growth is focused in the West, Eastern seaboard smelters remain in production through the use provincial subsidies, pushing Chinese Aluminum production to 24 million tons in 2013.

Figure 31. No slowdown in supply growth going forward



Source: Wood Mackenzie, IAI, Citi Research

Figure 32. Aluminum production by region, 2012

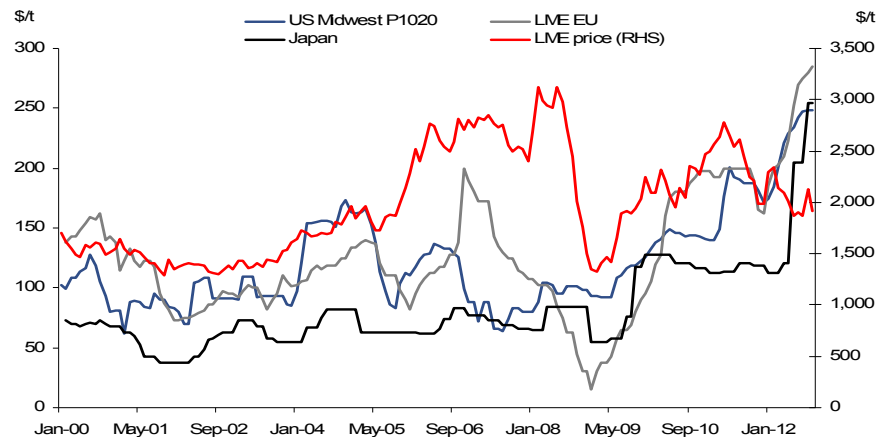


Source: Wood Mackenzie, IAI, Citi Research

Aluminum – Focus on China for demand cues

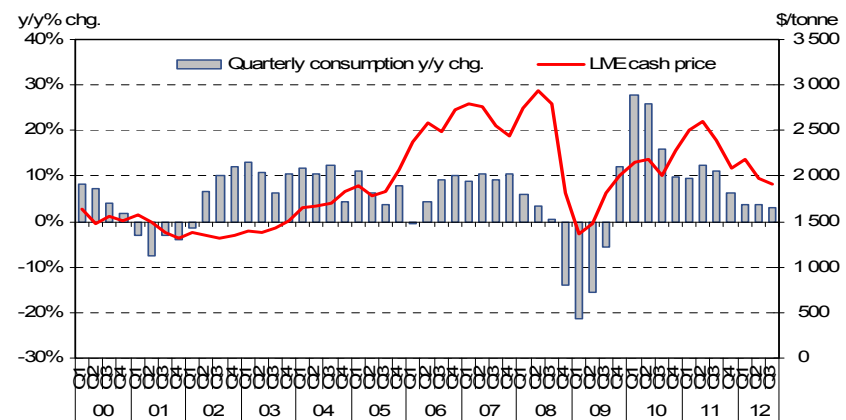
- Recent macro economic data does indicate that the Chinese economy has bottomed out in September. Data indicates that industrial production picked up modestly to 9.6% yoy in October, up 0.81% on September levels. Part of this boost has indeed come from the Government fast tracking some infrastructure spending plans, notably on metro systems for around 25 major cities, prompting a pick up in Aluminum semis production during September, up 37% yoy at a reported 2.7 million tons.
- The pick up infrastructure funding building has to some extent been balanced by a continued slowdown in property construction. In the January to September period, housing starts fell by 8.6% yoy, as a massive glut of properties and soft prices weighed on the market. Indeed, the surge in Aluminum semis production during September appears to have run significantly ahead of demand, suggesting a build in semis inventory. While little prospect of improvement in the property sector into 2013, the speeding up of (Transport) infrastructure project approval will materialize into rising levels Aluminum consumption into 2013, with Aluminum consumption rising from 8.9% this year, to 10.9% next year. However, this level of growth will not be sufficient to prevent the Chinese market moving into surplus of around 1 million tons in 2013.
- While Chinese growth is expected to pick up modestly next year, the same cannot be said for the out look for European demand. European PMI fell to 45.8 down from 46.1 in September, as manufacturing across Europe, including Germany, continued to contract. Mass market auto production has struggled through this year, with Peugeot announcing plans to close its Aulnay plant, Ford closing production at Southampton and Dagenham this year and Genk by 2014. Weak transport and construction sectors drove European Aluminum consumption to contract by 3.6% this year, and further contraction at a rate of 1.6% is expected next year. The USA market saw modest growth in 2012, largely from a more positive transport sector, plus signs of improvements in housing starts. A continuation of this trend is expected into 2013, fiscal cliff notwithstanding, with Aluminum consumption growth expected at 1.3%.

Figure 33. Spot physical premiums, set to rise further in 2013



Source: LME, Citi Research

Figure 34. Consumption growth trend slowing, expect modest pick up in H1 2013

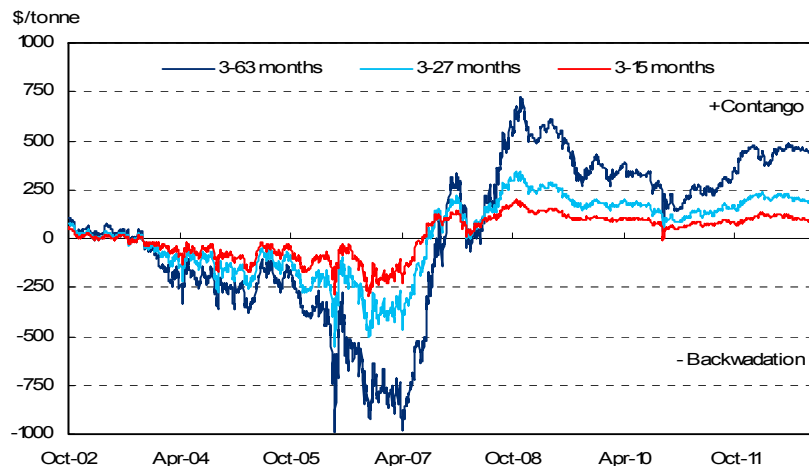


Source: Wood Mackenzie, WBMS, Citi Research

Aluminum – Rising production, rising inventory, but supported prices?

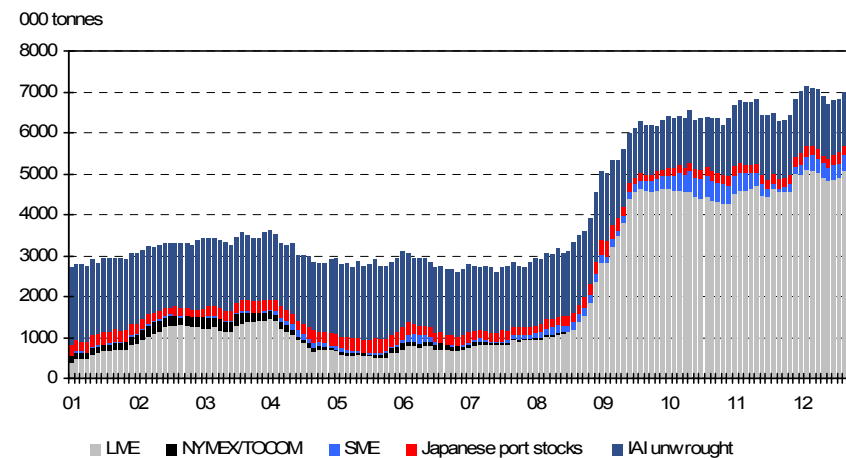
- It appears somewhat of a paradox that the 2012 Aluminum market surplus of 555,000 tons is expected to rise to 660,000 tons in 2013, yet little change in prices, in terms of annual averages, is expected. The key reason for this view is the impact of both physical and paper investors.
- Currently it is estimated that around 65-75% of 5 million tones of LME Aluminum inventory is held in contango financing arrangements, while it is speculated that an additional 5-6 million tons of metal is being held in financing off LME. Essentially over the last 3 years, investor demand for physical metal to finance has ensured that metal oversupply has not seriously negatively impacted prices. In the current low interest rate environment and with negotiable warehouse rents and a strong contango forward structure, we see little prospect of this form of Aluminum 'demand' from abating and thus continuing a floor for prices.
- At the same time, the continued oversupply and build in stocks, both reported and unreported, will act a dampener on any technically induced Aluminum price rallies. Indeed, the January and September 2012 price rallies were both technically driven events, the former being driven by CTA fund short covering prompted by index fund rebasing, while the latter was CTA short covering in the run up to the Federal Reserves QE3 announcement on September 13th, plus some panicked consumer hedging rather than an real upturn in underlying Aluminum demand. Both rallies were short lived, being strongly sold into, particularly by Aluminum producers.
- For the oversupply situation moderate would require LME prices to sustain moves below the \$1,800/t level for a matter of months to prompt significant capacity closures. However, such sustained downward moves are not expected if the trading patterns in LME Aluminum seen during 2012 continue into 2013. Indeed, dips towards \$1,800/t have seen both consumer buying and fund buying. As Aluminum prices have softened after the QE3 rally, Aluminum is increasingly being favored by funds as the long leg in relative value trades, versus metals which are viewed as still over valued, such as copper. Indeed, Aluminum is expected to continue to trade in a volatile pattern within a \$1,800-\$2,400/t range going forward as 2012 trading patterns continue in next year. However, should any significant regulatory changes occur to, for example, LME warehousing regulations, then the balance of risk is on the downside to our 2013 price forecast of \$2,100/t.

Figure 35. Forward spreads continue to make contango financing attractive



Source: LME, Citi Research

Figure 36. Reported stocks expected to climb above record levels in 2013



Source: Citi Research

Nickel – Out of favor and fundamentally misunderstood

- Nickel is currently struggling from a reputational deficit amongst many in the analytical community, stemming in our view from a fundamental misunderstanding of the complexity of issues facing the supply side. Indeed, many analysts are again hypothesizing that the nickel market is on the cusp of facing significant surpluses due to a tidal wave of new production from RKEF (Rotary Kiln/Electric Furnace) based NPI producers in China, and HPAL and Ferronickel projects in the rest of the world.
- This tidal wave of supply has actually been due to hit the nickel market every year for the last five years, but in reality is yet to materialize. Indeed, we question why on the one hand so many analysts are willing to dismiss mining companies copper production guidance on the one hand, but on the other hand readily accept guidance on nickel production and project ramp ups, when nickel has a poorer record of project development than copper.
- While the build out in RKEF based NPI capacity has occurred over the last year and half, with estimates now putting capacity at between 150-300,000 tons of nickel units per year, with more capacity in build, a glaring unanswered question is where is the ore supply going to come from? Filipino ore is simply not usable in RKEF operations due to the very low typical nickel content, while Indonesian ore flow remains highly constrained due to Indonesian Government measures to restrict and eventually ban by 2014 all ore exports. With higher grade ore stocks already heavily drawn down, and no pick up in Indonesia ore exports likely, NPI production is likely to stagnate at 2012 volumes. NPI will not be part of a tidal wave of supply in 2013.
- Obviously then the tidal wave will come from HPAL projects such as VNC (Goro) in New Caledonia, Ambatovy in Madagascar, and Ramu in Papua New Guinea? Or perhaps the new Brazilian Ferronickel operations, Barro Alto and Onca Puma? It is worth remembering that all these operations should now be operating at full capacity. Yet, as is outlined below, all these projects have failed to meet production expectations, and the HPAL projects in particular are likely to continue to do so. Indeed, price related NPI closures, plus project failures, and other disruptions, have ensured that the nickel market has balanced to even modest deficit during the second half of the year.

Figure 37. Nickel demand / supply balance

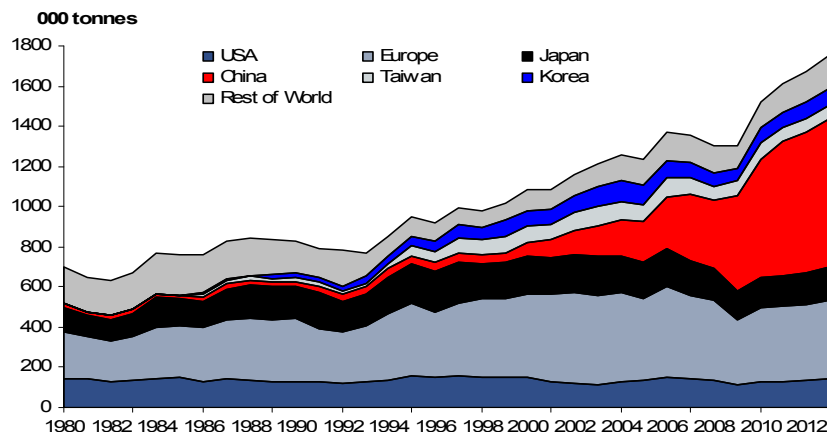
kt	2010	2011	2012e	2013f	2014f	2015f	2016f
Mine production	1,673	1,963	1,972	2,017	2,159	2,236	2,257
Refined capacity	2,113	2,310	2,467	2,492	2,563	2,579	2,532
Refinery utilization	69%	71%	70%	70%	72%	74%	78%
Nickel in Pig iron	174	282	252	260	244	256	269
Metal production	1,451	1,636	1,715	1,755	1,843	1,916	1,977
Supply	1,451	1,636	1,715	1,755	1,843	1,916	1,977
Supply (%)	9.2%	12.7%	4.8%	2.3%	5.0%	4.0%	3.2%
Consumption/Demand	1,549	1,630	1,695	1,777	1,868	1,949	2,022
Consumption (%)	16.0%	5.4%	4.0%	5.0%	5.1%	4.3%	3.8%
Surplus/Deficit	-98.2	5.7	20.1	-22.3	-24.8	-33.0	-45.0
Reported stocks	233.3	192.3	212.4	190.1	165.4	132.4	87.3
Stock change	-1.8	-40.9	10.9	-22.3	-24.8	-33.0	-45.0
Stocks (wks)	7.8	6.1	6.5	5.6	4.6	3.5	2.2
Price - US\$/lb	9.89	10.38	8.09	9.87	11.07	10.89	9.98
- US\$/t	21,814	22,888	17,833	21,770	24,400	24,000	22,000

Source: Citi Research

Nickel – destocking distorts the demand picture

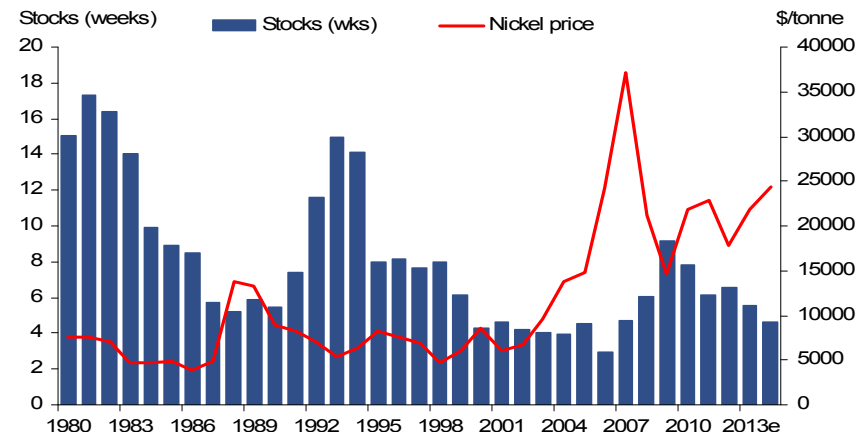
- For much of the last year, stainless steel consumers have been heavily destocking, while stainless steel mills following suit, destocking nickel as the price has steadily fallen. This trend partly explains the rise in exchange inventory that has occurred through 2012. Indeed, the pricing of stainless in Europe and the US using a base price and an alloy surcharge based on 1-2 month preceding alloy (nickel) prices creates an incentive for stainless consumers to cancel orders and run down inventory in the face of a falling nickel price, so not to be left with over priced stainless. This long destocking trend has exacerbated the bearish views towards nickel.
- In Europe, stainless steel inventories are now reported to be at historic lows, with consumers essentially operating on a hand-to-mouth basis, almost forcing stainless steel mills to follow suit in their nickel buying over and above contracted levels. This continued destocking has meant that stainless melt production in Western Europe has stagnated during 2012, with levels expected to be down by around 1% on 2011 levels. For 2013, a modest pick up in stainless demand is expected, principally in the first quarter on restocking, while nickel demand is also expected to benefit from strong demand from Europe's aerospace sector.
- Chinese stainless production is expected to grow by between 4-5% in 2012, modest by recent historic standards, but positive in contrast to other regions. However, as with Europe, stainless steel inventory is reported to have drawn significantly since the beginning of the year. However, stainless melt rates have picked up strongly since September, with the prospect of Q4 2012 being a quarterly record high as key use sectors such as white goods manufacturing picks up. In China in particular, stainless steel demand is dominated by consumer focused end uses. With the current 5-year focused on increasing average incomes and developing a domestic consumer market, stainless steel demand and therefore nickel demand is expected to be a significant beneficiary.
- The US market has been one of the brighter spots in 2012, with positive stainless demand seen from transport and construction sectors, as well as demand from such areas as water treatment plant. Stainless steel melt production has grown by 4% in 2012, pulling nickel demand up by a similar percentage. Overall nickel demand globally is expected to grow by close to 5% in 2013, rising to 1.78 million tons, pushed largely by better stainless melt rates in the US and China.

Figure 38. Chinese stainless production



Source: Wood Mackenzie, INSG, Citi Research

Figure 39. Nickel inventory expected to return to a draw trend in 2013

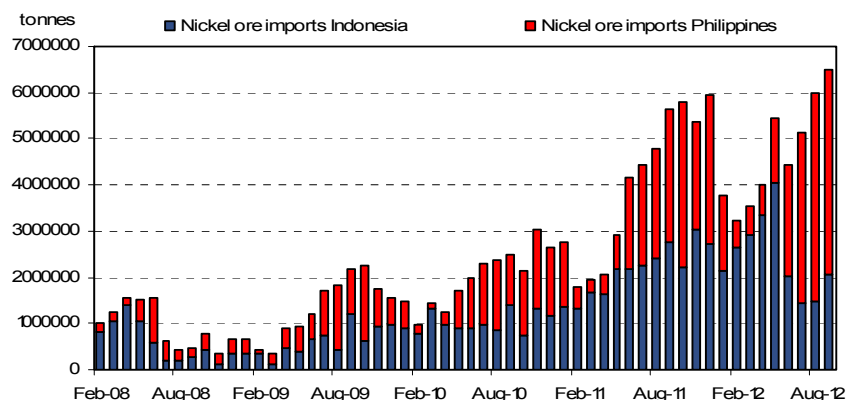


Source: Wood Mackenzie, INSG, Citi Research

Nickel – supply failure a continuing theme

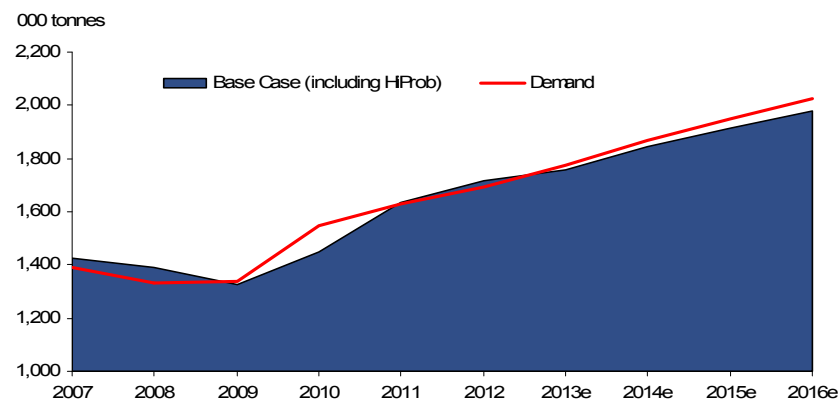
- Given the list of underperforming nickel production assets in 2012, it is clear the continued bearish sentiment towards nickel is not really born out by fundamentals. Vale's 53,000 tpy Onca Puma ferronickel operations requires a complete furnace rebuild, with production not likely to restart until mid-2013 at the earliest, with press reports indicating Vale may take ~\$1 billion write down on the outage. After an acid plant breakdown in early Q2, Vale's 55,000 tpy VNC HPAL operation is targeting a Q4 2012 restart, however partners Mitsui and Sumitomo are refusing to invest any further capital in the operation, while even Vale appears to be balking at additional costs. Indeed, it is highly questionable whether VNC will actually return to even limited operation. Production at Vale's Sudbury Division is being limited by ongoing maintenance which is not due to be completed until H2 2013, with output falling 36% q/q in Q3 2012 as a result and like to remain low for some quarters.
- Anglo's 40,000 tpy Barro Alto Ferronickel operation suffered a kiln sidewall collapse in Line 1 on October 15, with the likelihood that production will not now reach full capacity by the end of the year, as hoped. The disruption is likely to limited production to around 5,000 t per quarter for the next couple of quarters. Production at Anglo's 20,000 tpy Loma de Niquel ferronickel plant in Venezuela has halted after the Government cancelled all concession related to the operation. The Government announced it would take over running the operation on Nov-9. Without necessary support and operational experience, the plant will struggle in 2013.
- Perhaps the biggest miss will be Chinese NPI production, where low nickel prices through the summer months led to reports of up to 50% of production capacity being closed, and total nickel production including NPI being down by around 8% y/y in the year to September. High cost blast and arc furnace based production has reported born the brunt of closures. Expectations of NPI production of between 300-350,000 t of nickel units look unrealistic. In addition, RKEF furnaces are expected to begin to struggle to secure higher quality ore due to Indonesian moves to curb ore exports, which are still in place despite the recent Supreme Court ruling against the ban. While stocks of nickel ore at Chinese ports are reported to be around 19 million tons, only 4.6 million tons of this ore is said Indonesian material usable for RKEF based NPI production. This volume is the equivalent of just over 1 month's worth of Chinese nickel consumption. The increase in imports of Filipino ore since May has little benefit for RKEF based producers, as the material is simple not usable in RKEF plants. Indeed, we expect a 10% pull back in NPI production this year, minimal growth next year as PT Indoferro begin high grade NPI at their new Cilegon based plant. PT Indoferro is so far the only company to build NPI capacity in Indonesia

Figure 40. Chinese nickel ore imports, Filipino material no substitute for Indonesian ore



Source: NBS, Citi Research

Figure 41. Nickel supply is beginning to underperform

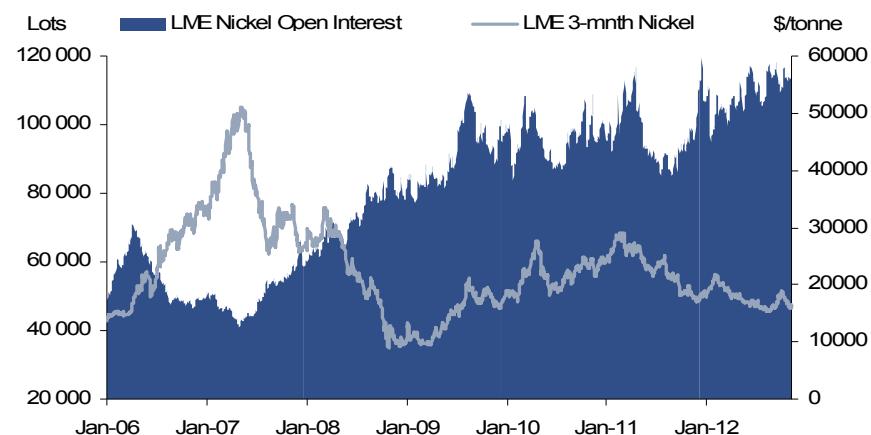


Source: Wood Mackenzie, Citi Research

Nickel – Market deficits on the horizon

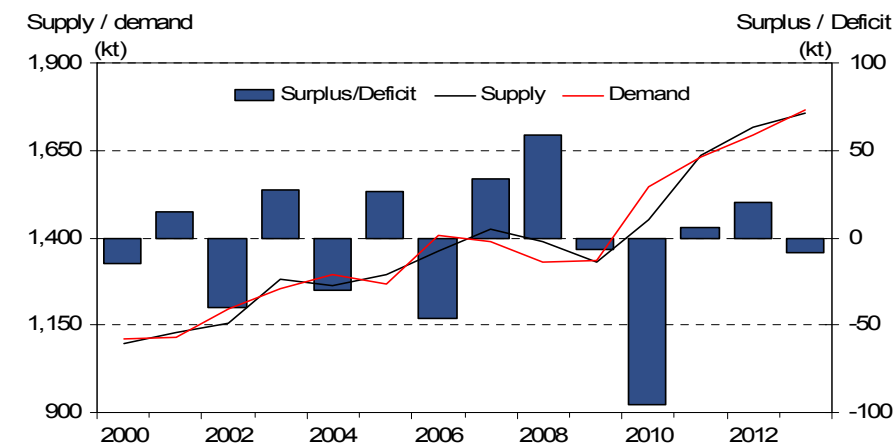
- Nickel has and continues to be one of the favored metals to short this year, with shorts building again into November due in part to the continuing negative narrative on the supply side. The story not helped by the extreme draw down in refined nickel inventory in China over the year, as evidenced by the 27% fall in refined nickel imports despite constrained NPI production and increasing stainless steel output. Indeed, with low levels of refined nickel inventory in China, high quality nickel ore stocks at Chinese ports dwindling, and restraints on Indonesian ore exports resolutely in place, Chinese refined nickel imports are expected to pick up strongly into 2013.
- At the same time that China will require more primary nickel, the supply side is likely to be found wanting. Due in part to the above mentioned production problems at various HPAL and Ferronickel operations, and ore constrained NPI production, finished nickel production is only projected to grow by 2.3% or 40,000 tons in 2013. Much of this growth will come from the commissioning of the 55,000 tpy Koniambo ferronickel plant in New Caledonia, the 19,000 tpy Taguang ferronickel/NPI operation in Myanmar, and Sherritt's much delayed 55,000 tons Ambatovy HPAL operation in Madagascar. With this later project we remain highly skeptical on start up dates and ramp up phases given the plant complexity, distant between mine and processing plants, and growing antipathy of the local population to the operation of the mine on environmental grounds.
- Interestingly, Koniambo is the last major fully funded mine to metal project due to begin production this decade. Indeed, nickel faces a distinct lack of Capex spend going forward. With major projects HPAL/Ferronickel projects costing in the region of US\$5-7 bn, major miners are looking elsewhere to focus exploration and development budgets and nickel mine supply is expected to begin to contract by 2017.
- In the short term, the combination of low consumer stainless inventories, particularly in Europe and China, and low nickel inventories with stainless mills, makes the nickel market is indeed increasingly vulnerable to a technical short covering rally perhaps prompted by index fund rebasing. However, unlike a similar rally in January 2012, it is likely that such a move in early 2013 is likely to spark consumer restocking, helping push prices towards \$21,000/t during the first quarter.

Figure 42. Nickel has been one of funds favorite shorts



Source: LME, Citi Research

Figure 43. Nickel market moves into deficit in 2013



Source: Wood Mackenzie, INSG, Citi Research

Zinc – tightness, what tightness?

- Reality appears to have at last dawned on the zinc market as LME zinc prices finally lost their 'joint best price performer' of 2013 towards the end of October, with November prices now trading below levels seen at the beginning of the year. The realization that the market is facing weak fundamentals should not be surprising given the fact that LME inventory has jumped by 340,000 tons since the beginning of the year despite Chinese refined imports jumping 56% in the year to September, while the cash-3 month spread has now moved heavily into contango since late August.
- However, the marked fall off in Chinese refined zinc production this year as smelters have struggled with depressed levels of treatment and refining charges (TC/RCs) has led some analysts to suggest the zinc market will move into deficit this year by up to 550,000 tons. According to data from the Chinese National Bureau of Statistics Chinese refined zinc production has fallen by around 8% y/y in the year to September. However, expectations of deficits in 2012 look to be highly misleading. Both International Lead Zinc Study Group (ILZSG) and World Bureau of Metals Statistics suggest a global market in surplus so far this year, with the former claiming a 216,000 tons surplus in the first 8 months of the year, and the latter a 153,000 tons surplus. Inventory moves support views of surpluses.
- The relative robustness in zinc price performance up to end-October can perhaps be partially explained by the relative lack of availability of prompt metal. Currently just over 48% of LME zinc inventory is on cancelled warrant and therefore notionally not available to the market, despite clear signs of end user demand weakness. Even this level of cancellation understates the extent of non-availability of zinc inventory to the market.
- It is estimated that at least 70% and probably significantly more of zinc inventory in New Orleans (717,875 tons) is tied up in contango driven financing, much like the situation with Aluminum in the Vlissingen or Detroit warehouses, so in essence what isn't cancelled is also unavailable to the market. Indeed, the steepening of the forward contango structure of the LME zinc curve is adding to the investor demand for physical zinc for cash and carry financing. Analysis actually suggests that at least 90% of LME inventory is, in some way or another, not available to the market due to financing or being behind long load out queues. 10% of LME inventory available for consumption would amount to around 111,000 tons of metal available to the market. While LME warehousing continues in its current dysfunctional state, there is every prospect that spot physical premiums will begin to accelerate at the expense of upside moves in LME prices, in a similar vein to Aluminum.

Figure 44. Zinc supply / demand outlook

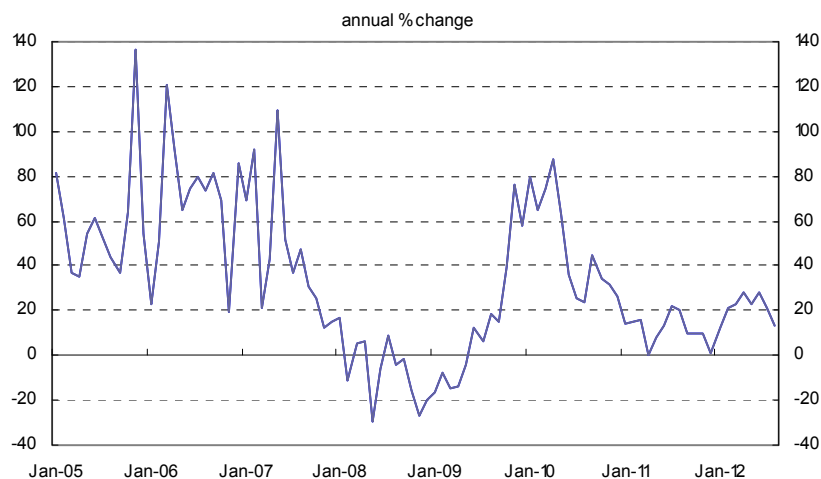
kt	2010	2011	2012f	2013e	2014e	2015e	2016e
Mine production	12,109	12,700	13,078	14,011	14,504	15,100	15,387
Concentrate required	12,366	12,754	12,994	13,327	13,854	14,620	15,032
Smelter Capacity	15,271	15,475	15,883	16,587	17,182	18,531	18,381
Primary prodn	11,795	12,165	12,394	12,711	13,206	13,944	14,338
Secondary prodn	925	943	1,020	1,056	1,055	1,065	1,065
Supply	12,721	13,108	13,414	13,767	14,261	15,482	15,938
Supply (%)	13.8%	3.0%	2.3%	2.6%	3.6%	5.3%	2.6%
Consumption	11,681	12,608	13,056	13,574	13,991	14,690	15,361
Consumption (%)	15.2%	3.0%	3.6%	4.0%	3.1%	5.0%	4.6%
MARKET BALANCE	1,039	500	357	193	270	320	42
Reported stock change	122	507	276	193	270	320	42
Total reported stocks	1,126	1,633	1,893	2,086	2,357	2,677	2,719
Stocks (wks)	5.0	6.7	7.5	7.8	8.8	9.5	9.2
Price (US\$/lb)	0.98	1.00	0.89	0.93	0.96	1.01	1.00
(US\$/t)	2,161	2,212	1,956	2,040	2,125	2,220	2,200

Source: Wood Mackenzie, ILZSG, Citi Research

Zinc – Demand still stuttering

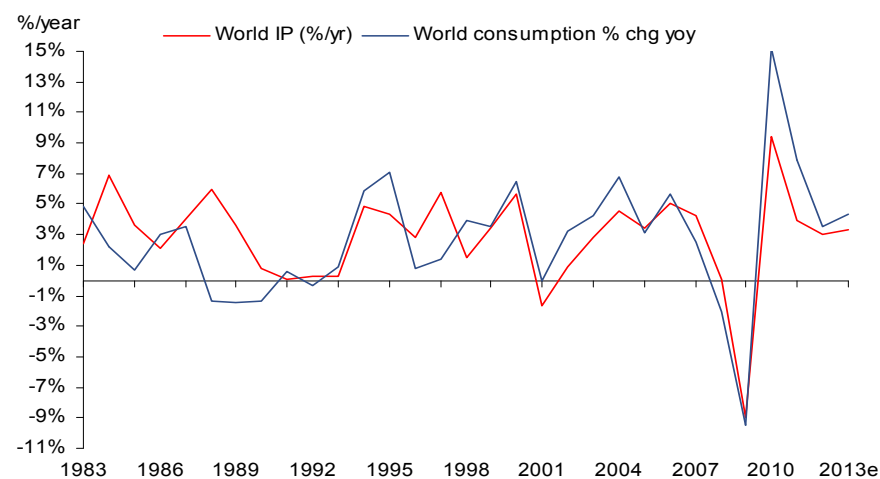
- In China, there are signs that manufacturing is showing signs of improvement. Although the official Chinese purchasing managers' index rose to 50.2 in October, up from 49.8 in September, the first monthly print above the crucial 50 mark since October last year. However, in contrast the official numbers, the HSBC manufacturing PMI survey, which focuses more on private sector companies, continued to show a contraction in activity, posting 49.5 for October.
- The general slow down is clearly visible in key end-use demand sectors such as autos and construction showing sluggish growth globally, but crucially in China. Data from the World Bureau of Metal Statistics (WBMS) suggests that global apparent zinc consumption shrank by 0.9% during the first 8 months of the year, with Europe leading the downside moves, contracting by 9.3%, while Chinese apparent consumption grew by only 1.7%.
- Looking at key end use sectors within China, growth in sales of Chinese made cars stood at 3.2% for the first 9 months of 2012, compared to 4.0% for the same period in 2011, and 33% in 2010. Construction activity, which accounts for around 70% of Chinese zinc consumption, continues to be depressed. As mentioned in the copper chapter, property sales did pick up in September, but the large overhang of unsold property that still exists, combined with a continuation of Government policy to control property prices suggests there is little prospect of a significant pick-up in residential construction activity in 2013.
- China's slower zinc demand growth rate is to some extent mirrored by the slowing rates of Chinese galvanized sheet production growth through this year when compared to 2009 and 2010. However, the concern is that galvanized sheet production, showing 20% yoy growth rate in the year to September, is still running well ahead of real underlying demand. This suggests that galvanized steel sheet inventory is being built up, possibly at producers, as steel producers are encouraged by local authorities to maintain production rates through subsidies in order to maintain employment levels. In essence this will create a drag on primary zinc demand in 2013, partially negating any positive impact from recently announced stimulus as galvanized steel sheet inventory begins to be worked off.

Figure 45. Chinese galvanized sheet production continues to slow



Source: Bloomberg, Citi Research

Figure 46. Zinc demand stalls in 2012, but modest improvement set for 2013

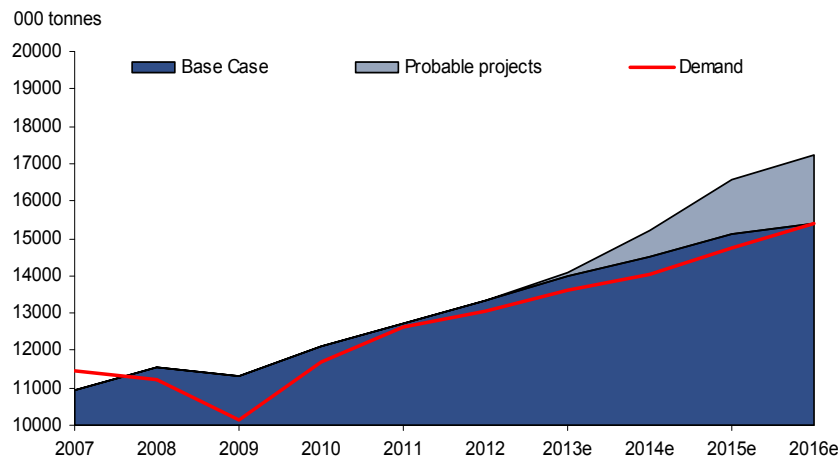


Source: Bloomberg, Wood Mackenzie, Citi Research

Zinc – No shortage of mine supply

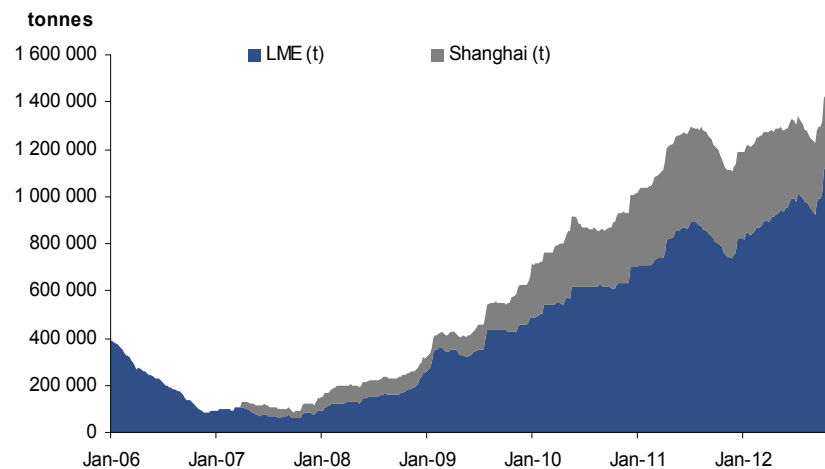
- The above mentioned contraction in Chinese refined zinc supply clear pitched the Chinese zinc market into a deficit for the year, as evidence by the 56% increase in refined imports this year. For the market as a whole to be pitched into deficit by the Chinese fall off in refined production would still require a 6.5% increase in global zinc consumption over 2011 levels. Given that China is the only major zinc location where there is demand growth, for global consumption to grow by 6.5% this year would effectively require Chinese zinc consumption to grow in the region of 12-14% this year - a scenario that is unlikely in the extreme given the above mentioned ongoing economic sluggishness in China.
- The fact that the Yunnan provincial government is taking steps in to support local smelters through the collateralizing of 50,000 tons of zinc suggests the Chinese market is not one which is suffering from a lack of material.
- Chinese refined zinc production did actually stage a modest rebound in August, with levels up 8.7% month-on-month to 397,700 tons, while September levels remained well above July lows. Given the extent of reported Chinese mine production growth through the year to date, up 21.5% yoy to 3.7 million tons, the concentrate market in China remains well supplied despite the 37% fall off in concentrate imports, suggesting that treatment and refining (TC/RCs) paid to smelters should improve through the rest of the year and into 2013, helping return Chinese refined production to growth next year.
- On the mine supply side, the bullish narrative for zinc in the form of ore depletion at larger older mining complexes continues to be pushed forward into the future. Given recent announcements over the Century mine in Australia, with Minmetals further extending mine life into 2016 and perhaps beyond, plus the probable development of other Minmetals projects, Dugald River and Izok Corridor, life of mine extensions at Skorpion in Namibia, and continued Chinese mine supply growth, there appears to be little prospect of a significant tightening of the zinc market until 2018 at the earliest.

Figure 47. No apparent shortage in Zinc mine supply



Source: Wood Mackenzie, ILZSG, Citi Research

Figure 48. Inventory continues to rise despite talk of market deficits

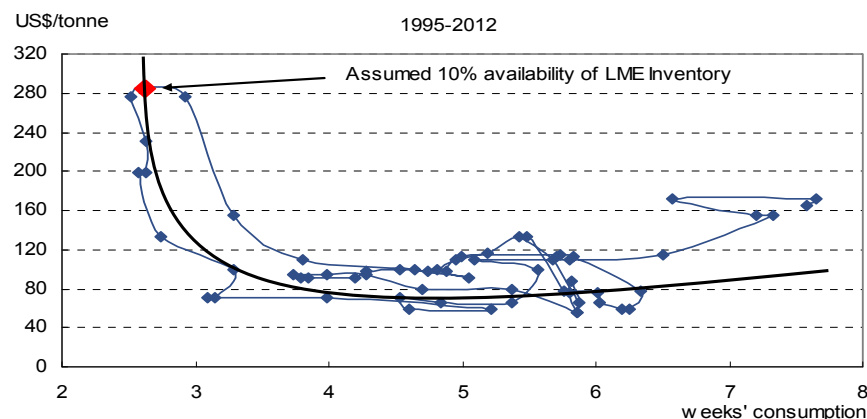


Source: LME, Citi Research

Zinc – dislocation between consumer and LME prices a growing possibility

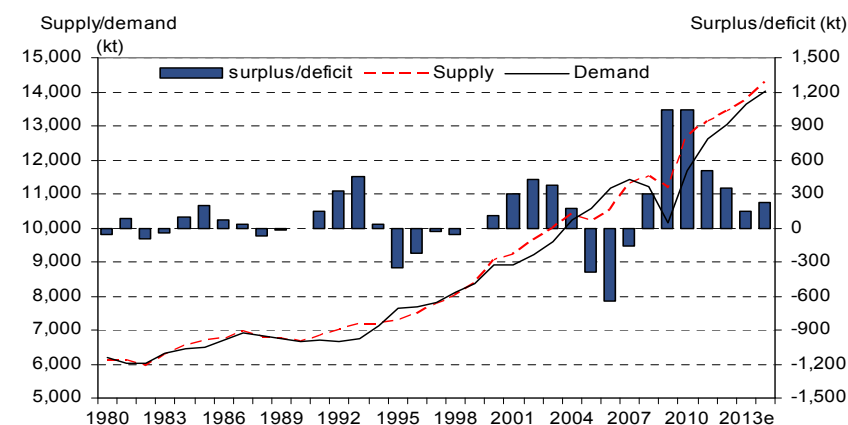
- Cancellations of LME inventory have again surged in the last week, and now account for over 48% of total inventory. As mentioned above, analysis suggests that actually metal availability is significantly lower than cancellation suggest due to financing, and load out queues. Indeed, we estimate that only 10% of LME inventory available for consumption would amount to around 111,000 tons of metal available to the market. This combined with current estimated levels of inventory at producers and consumers would point to actually available inventory being equivalent to 2.6 weeks consumption or 640,000 tons.
- Zinc cancelled warrants as a percentage of total LME warrants have been steadily rising since late April this year, from 1.71% (15,500 tons) to 48% (562,600 tons) at the time of writing. Given that the surge in cancellations really only occurred towards the end of September, should zinc premiums follow the pattern of Aluminum premiums, and cancelled zinc warrants continue to grow as a percentage of total LME inventory, there is potentially another 30 – 40% upside in physical zinc premiums in the US, pointing to physical premiums of between \$215/t-230/t before the end of the year.
- This may even be an underestimate, as if the Citi estimates of actual available metal are correct i.e. that in total only 2.6 weeks worth of zinc inventory in terms of weeks consumption is available to the market, then US physical premiums could reach levels of \$280/t. US physical premiums were least seen at this level during Q3 2006, when global zinc inventory stood at 560,000 tons, or 2.63 weeks of consumption.
- If zinc really is beginning to mimic Aluminum, then rising physical premiums should be expected prompt greater supply growth, a possibility given the continued growth in mine supply combined with a smelting sector operating well within capacity utilization constraints. This in turn suggests that zinc is unlikely to continue to be one of the base metals sectors better price performers, with oversupply hampering pricing upside. Over supply is like to continue to deepen the forward contango price structure, as has been seen through H2 2012, allowing increasingly attractive contango stock financing programs to mop up any excess metal. In such a scenario, zinc prices are projected trade sideways within \$1,850/t - \$2,150/t band in 2013, averaging \$2,040/t for the year.

Figure 49. Zinc premiums, significant upside potential in 2013



Source: LME, Citi Research

Figure 50. Market projected to remain in surplus in 2013



Source: Wood Mackenzie, ILZSG, Citi Research

Bulks

Thermal Coal

- Citi are forecasting a well-supplied thermal coal market in 2013 and as such range bound prices with ARA coal prices wrapped around \$90-105/t and Newcastle \$85 - \$95 range. The upper end of the range is likely to be capped by excess production capacity, low freight rates and a large number of suppliers that will continue to run on a cash basis. The lower end of the range is likely to be supported by the recent improvement in US gas prices and healthy burn margins globally.
- In the Atlantic region Coal remains the cheapest base load fuel and as such Europe has been at peak burn rates for much of 2012. We expect static burn rates in Europe next year and we are forecasting minimal growth rates. Given the economic outlook there appears little incentive for European utilities to increase volumes or entering into long term supply agreement. On the supply side, we expect to see lower volumes from North America in 2013 and we have cut our volume growth by around 13Mt for next year due to rising domestic gas prices. The other swing supplier is Russia which is sensitive to the ruble and diesel prices.
- The demand outlook remains weak for the Pacific region with the main consumer, China, experiencing a shift down in the electricity growth rate. The IP front remains negative for the other key demand regions of Japan and South Korea. The market is hoping for India to return to the market, especially the Indonesian producers, although given the political and economic state this could be premature. On supply the Pacific basin remains structurally in over-supply with capacity additions that entered the market over the past few years needing to be constrained.

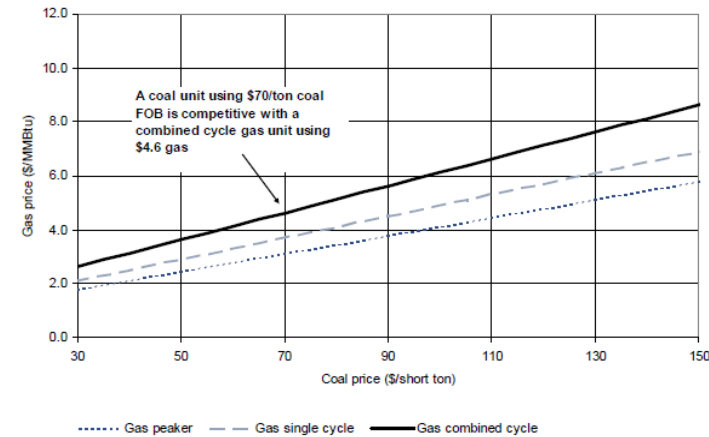
Figure 51. Seaborne Thermal Coal market balance

	2012e	2013e	2014e	2015e	2016e
Demand					
Europe	152	155	158	161	165
Americas	23	23	24	24	25
Middle East / other	22	22	22	22	22
<i>sub total Atlantic</i>	197	200	204	208	211
India	95	111	117	133	147
China	231	234	238	261	319
Japan	129	124	114	113	114
South Korea	102	101	96	102	105
Taiwan	65	63	62	59	58
Other Pacific	19	20	19	22	93
<i>sub total Pacific</i>	640	651	646	690	466
Total	837	851	850	897	977
Supply					
North America – Atlantic	44	32	32	36	40
Colombia	78	83	99	115	125
Russia	51	51	51	51	51
South Africa	75	82	82	82	91
Australia	173	184	194	211	246
Indonesia	354	365	369	388	390
China	20	19	13	15	19
Russia	24	24	24	25	25
Other	35	41	42	42	43
Total	853	882	907	965	1031
Implied Balance	16	31	57	68	53

Source: Citi Research, Tex Reports, Wood Mackenzie

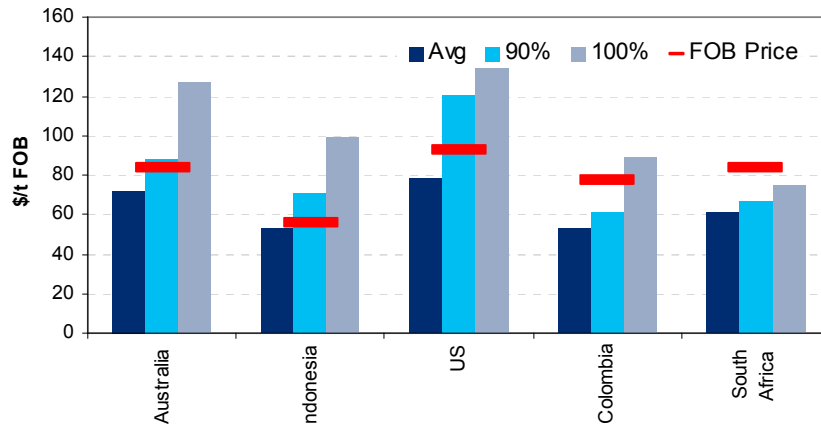
- The improvement in US gas prices is switching the arbitrage back in favor of coal. However, a mild winter should produce a gas glut again, albeit smaller than the one in 2012 (thereby pushing down gas prices, boosting coal-gas switching and lowering coal demand). Citi's meteorologist is expecting a 5% warmer-than-normal winter. Coal demand in this scenario could fall by 12mm short tons. If the US Fiscal Cliff were to hit, then coal demand would fall back to the 2010 or 12 level, making available a slightly smaller amount for exports than in this year, as production should be lower in 2013 y/y. The worst case scenario is if the Fiscal Cliff and a once-in-a-century mild winter similar to the 2011-12 season were to hit together, then coal demand could fall by a further 80mm tons versus 2012.
- Citi are expecting only modest demand growth in Chinese electricity use in 2013 and this suggests that imports are likely to be capped. The arbitrage has recently reopened but pressure remains on domestic Chinese prices. The Australian and Indonesian producers are struggling under higher operating costs and a lack of supply-side discipline largely by new entrants. Given the capacity additions over the past few years it will take time for this to work through the system.

Figure 52. US coal to gas pricing arbitrage



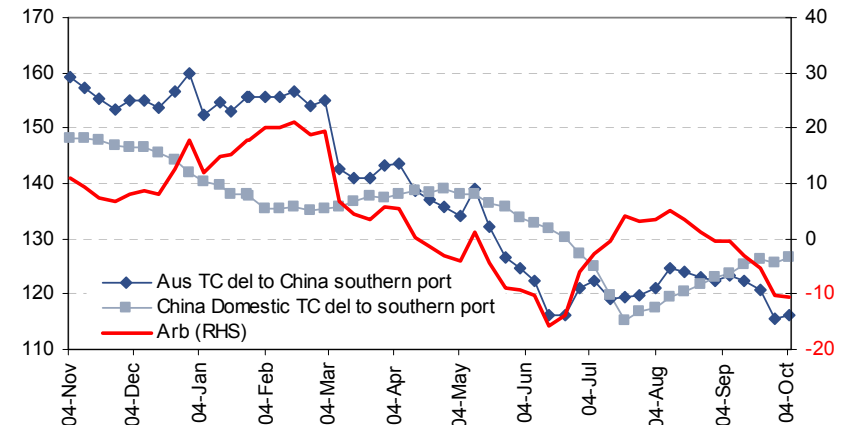
Source: Citi Research

Figure 53. Profitability and cost position – thermal coal producers



Source: Wood Mackenzie, Citi Research

Figure 54. Coal price arbitrage Australia To China

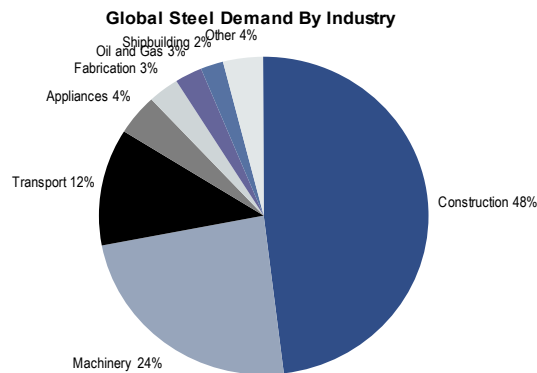


Source: Platts, Citi Research

The new norm for Industrial commodity consumption

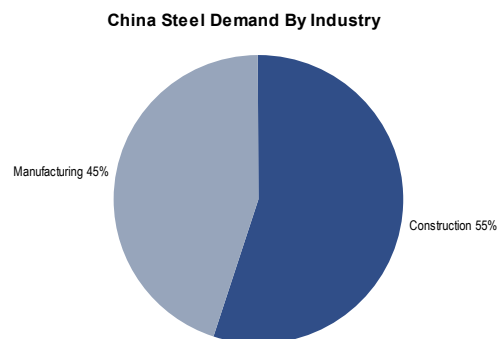
Arguably the biggest impact on industrial commodity consumption over the next decade is likely to occur from a shift in the intensity of use as China embarks on a transition towards a consumer based economy and away from construction. This is likely to impact industrial commodities differently with the later cycle commodities such as copper being relative winners against early stage commodities such as steel and iron ore. The following slides highlight the difference in demand drivers against the back drop of a changing urbanization rate in China which, Citi expects, will be a key driver of this evolution.

Figure 55. Steel demand is heavily weighted towards construction.



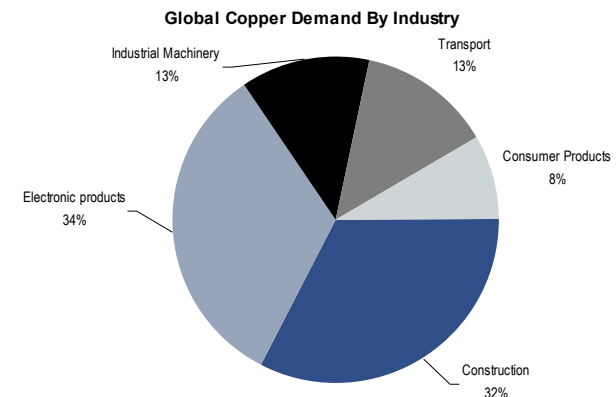
Source: Citi Research

Figure 57. In China the rapid growth of FAI has led to a steel construction above global averages.



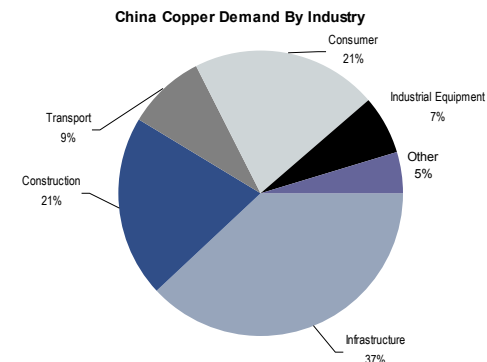
Source: Citi Research

Figure 56. While copper consumption is more balanced towards the consumer



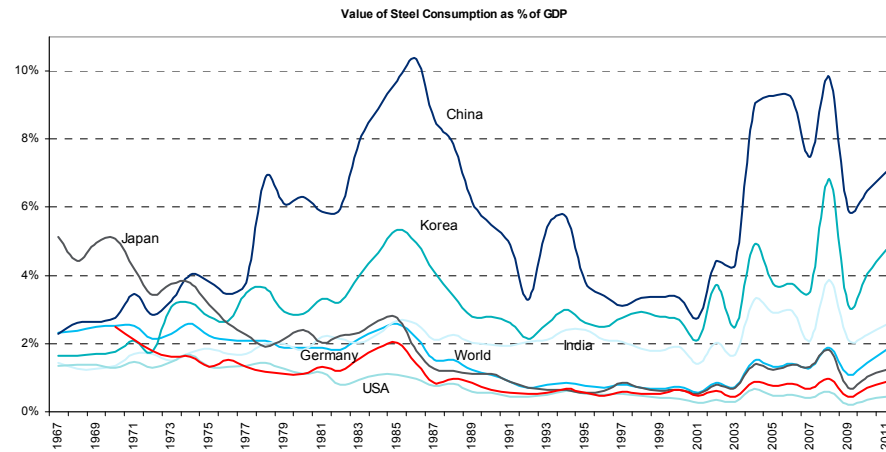
Source: Citi Research

Figure 58. China copper demand by Industry is more in line with global averages.



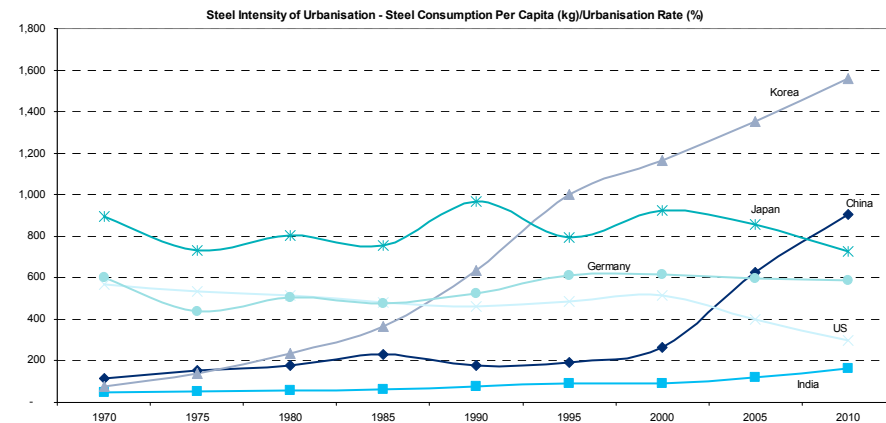
Source: Citi Research

Figure 59. Surprisingly since 2004, China has spent on average 8% of its GDP on steel



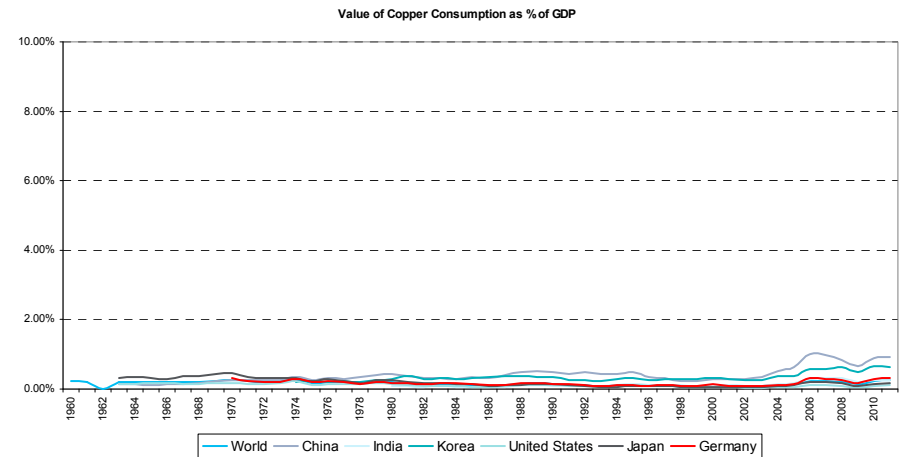
Source: Citi Research

Figure 61. There is a strong correlation between steel consumption and urbanization. From 2000-2010 the ratio of steel consumption to urbanization has risen from 266 to 904 suggesting China's steel intensity of urbanization has risen 4x, beyond the US and Japan



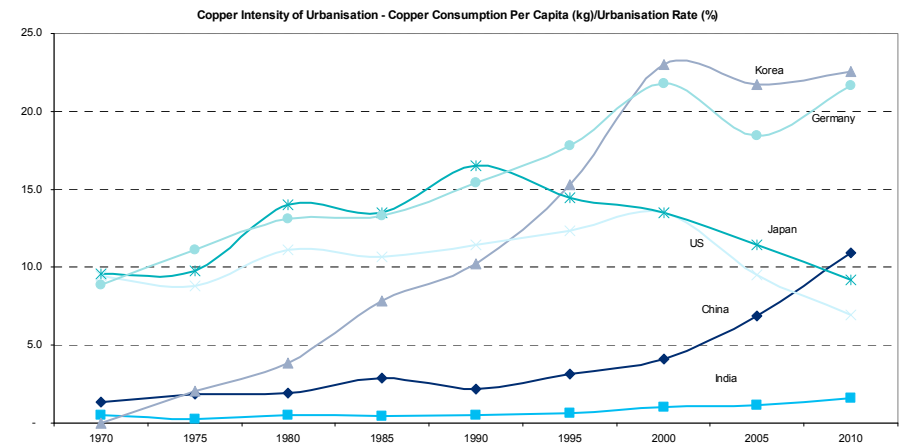
Source: Citi Research

Figure 60. While China has spend just 1% of its GDP on copper



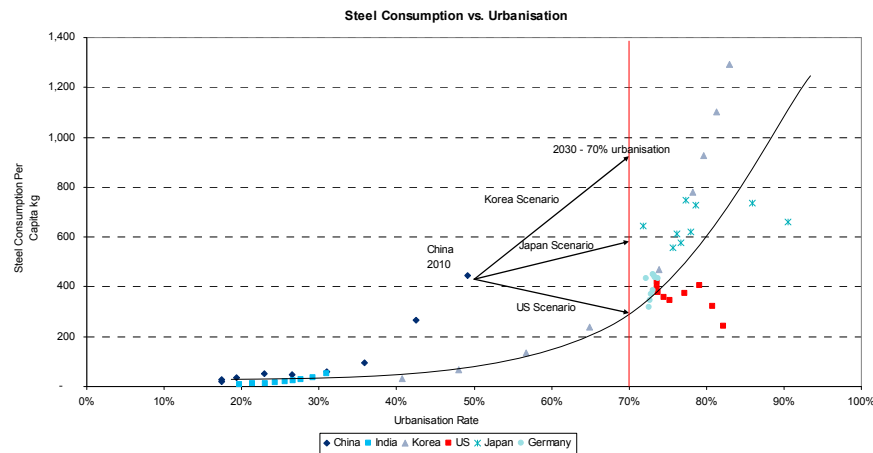
Source: Citi Research

Figure 62. In the same period, copper consumption relative to urbanization is up just 2.75x leaving China on 11x, c.50% below the peak in both the US and Japan



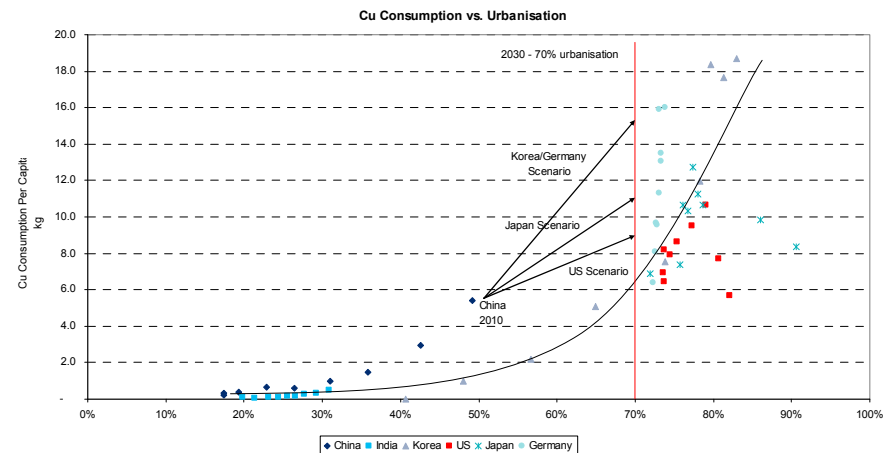
Source: Citi Research

Figure 63. In steel, China is consuming well above demand trend. Despite being just 50% urbanized China is consuming at levels similar to the US (82%) and Germany (74%), suggesting significant pull through of demand. Reversion to a US urbanization ratio suggests downside to consumption.



Source: Citi Research

Figure 64. Copper consumption per capita is also above trend but remains well below the peak in developed markets. There remains significant upside to the peak copper/urbanization ratio levels of US, Japan and Germany/Korea.



Source: Citi Research

The transition of China's economy suggests more upside in copper than steel/iron ore

- GDP/capita tends to increase over time as urbanization levels rise.
- Academic studies put the simple correlation coefficient of urbanization and GDP per capita at 0.85¹.
- Increasing wealth generates demand for consumer products benefitting late cycle commodities such as copper. Demand uplift for steel from increasing auto penetration is unlikely to offset the impact of declining construction expenditure.

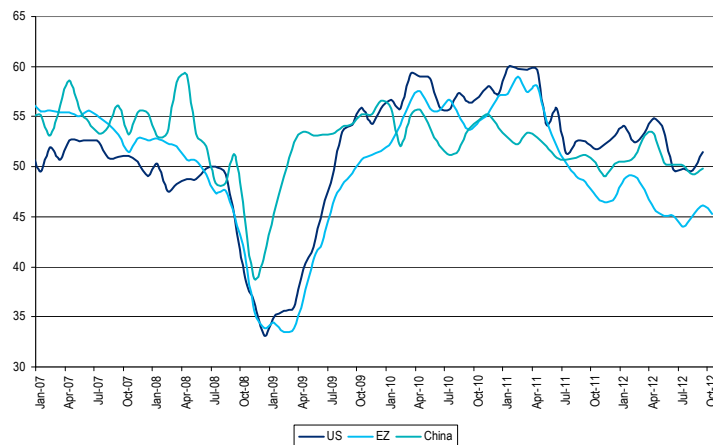
1. Henderson (2003)

Steel

Demand – Significant improvement on 2012 unlikely

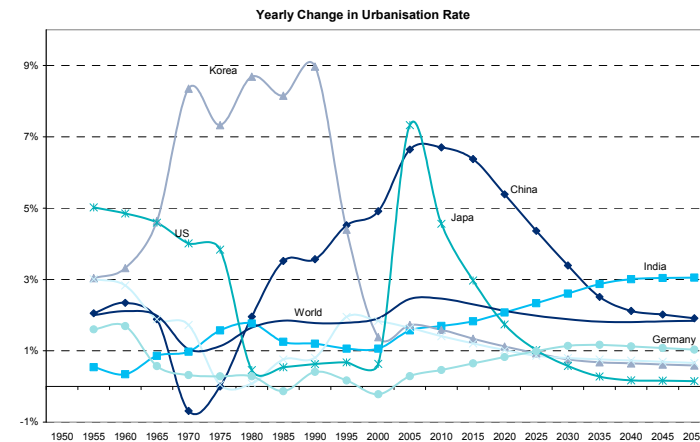
- Demand for steel in key regions is unlikely to materially improve in 2013. We see little potential in Europe, where Eurozone pressures will rumble on and constrain growth; our house view is for negative Euro Area IP growth of 0.4% and negative GDP growth of 0.7%. Europe will remain one of the most imbalanced steel markets; we estimate supply currently outstrips demand by around 40mt. We expect Europe will continue to be one of the lowest margin regions for steel producers in 2013. In fact, without a reorganization of the industry - which probably needs to be directed from Brussels – we see little change to this scenario in the medium term.
- US indicators have turned more positive in recent weeks; PMI's tracked back above 50, while housing starts rose 15% to a seasonally adjusted 872k units, the highest level since 2008. However, we feel there are significant downside risks owing to the uncertainty surrounding the looming fiscal cliff and as such we remain relatively cautious on the market in the US. That said, the US remains one of the more profitable markets for steel producers, with higher operating margins thanks to a more balanced supply picture than Europe, for example, and relatively stronger manufacturing activity and lower energy costs. We expect this to remain the case in 2013.
- Of course the biggest determinant of global steel markets in 2013 is China. Exactly what shape policy will take post the power transfer in early November remains the subject of much debate. However, as demonstrated by our thematic work throughout this year ([The Great China Steel Debate: - Urbanization and Steel Intensity](#)) we are increasingly of the view that the risk to consensus expectations of Chinese steel demand is to the downside. Demand growth from Urbanization and further infrastructure investment is open to debate.

Figure 65. Global PMI indicators: US indicators have improved recently but we remain cautious on the US due to the looming fiscal cliff



Source: Citi Research

Figure 66. China will continue to urbanize but at a slower rate than seen previously

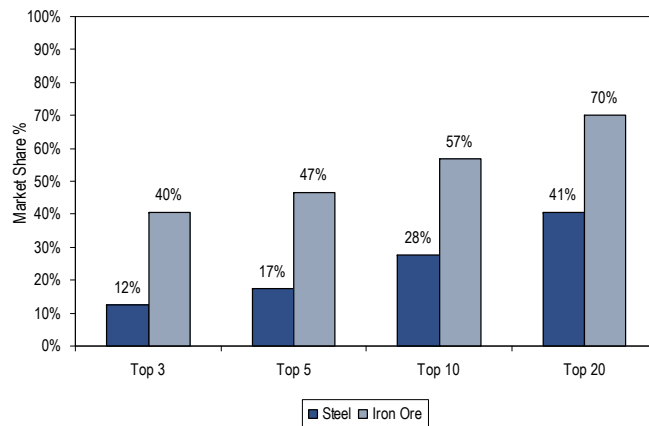


Source: Citi Research

Supply – Another year of excess looming

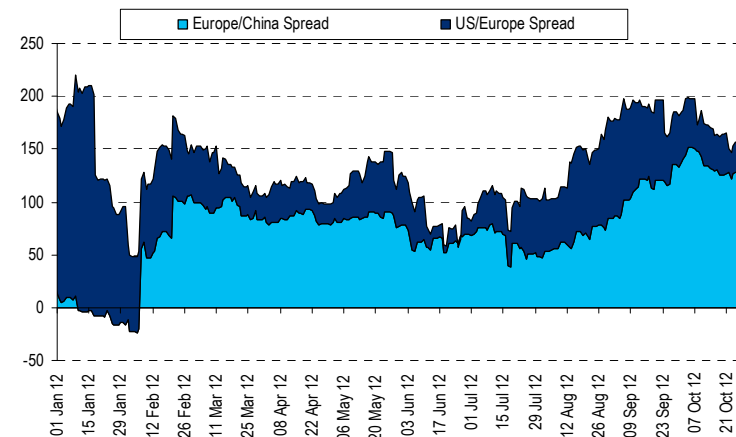
- Oversupply is the major hindrance to the steel industry; the market globally is lacking discipline. Capacity cuts in Europe and the US are offset by new approvals in China. In May 2012 the Chinese government approved a further 19mt of capacity, comprising Baosteel's Zhanjiang project (10mt capacity) and WISCO's Fangchengang project (9.2mt). Ground work had already begun prior to approval and as such we should see the mills come on line in 2013, taking capacity in the country over 900mt according to our estimates. Moreover Chinese state owned mills controlled by province-level authorities appear to be used as a tool for ensuring employment, thereby exacerbating the supply problem. With forecast production of 718mt in 2013, we expect the Chinese steel industry to operate at just below 80% of capacity
- As mentioned, we think more needs to be done in Europe to deal with excess capacity. With crude steel demand over the last 3 years around 150-170mt and a regional capacity of over 200mt, we think up to another 40mt needs to be taken out of the market in addition to the 15-20mt currently idled. We are unlikely to see progress on this front in 2013 and as such demand and supply will remain out of balance. We could however see some supply disruption in Italy, where Ilva's Taranto plant has been threatened with closure due to claims of environmental violations. Taranto is one of the largest steelworks in Europe, with crude steel capacity of 11.5mt. The plant has been operating at significantly reduced levels and there have been calls to halt operations completely. This could provide some support for pricing, though we think it would be relatively short-lived given the extent of overcapacity in Europe and globally.

Figure 67. The steel industry is much more fragmented than the iron ore industry, which arguably erodes pricing power. We think 2013 will see continued weak operating margins



Source: Citi Research

Figure 68. US price premium over China has average \$140/t in 2012. The potential for a sustainable increase in 2013 is limited by oversupply



Source: Citi Research

Figure 69. Steel Prices – Historical and Forecast

	1Q09	2Q09	3Q09	4Q09	1Q10	2Q10	3Q10	4Q10	1Q11	2Q11	3Q11	4Q11	1Q12	2Q12	3Q12	4Q12	1Q13	2Q13	3Q13	4Q13	1Q14	2Q14	3Q14	4Q14	1Q15	2Q15	3Q15	4Q15
EU Hot Rolled Coil US\$/t	595	517	506	567	638	756	672	700	844	856	765	662	693	694	650	663	676	676	676	676	676	676	676	676	676	676	676	676
EU CR Coil Price US\$/t	741	653	650	675	722	894	760	825	940	989	860	797	802	812	761	774	787	787	787	787	787	787	787	787	787	787	787	787
EU CR Coil Price €/t	523	493	463	464	504	663	616	601	692	693	610	590	617	631	585	595	605	605	605	605	605	605	605	605	605	605	605	605
EU HR Coil Price €/t	420	390	360	390	445	560	545	510	602	592	543	490	533	539	500	510	520	520	520	520	520	520	520	520	520	520	520	520
EU CR-HR €/t	103	103	103	74	59	103	71	91	90	101	68	100	84	92	85	85	85	85	85	85	85	85	85	85	85	85	85	85
EU Shredded Scrap €/t	193	167	170	187	220	281	249	275	353	338	300	290	320	310	294	300	306	306	306	306	306	306	306	306	306	306	306	306
Heavy Plate (€/t)	723	650	625	625	713	685	690	651	736	713	714	649	622	616	571	583	594	594	594	594	594	594	594	594	594	594	594	594
EU Rebar \$/t	585	464	454	509	572	742	619	653	763	791	785	750	735	699	670	683	696	696	696	696	696	696	696	696	696	696	696	696
EU Rebar €/t	413	350	323	350	399	550	502	476	573	547	557	532	565	543	515	525	536	536	536	536	536	536	536	536	536	536	536	536
US Rebar US\$/t	610	540	530	600	600	688	653	719	800	802	806	801	844	800	766	782	797	797	797	797	797	797	797	797	797	797	797	797
US HRC US\$/t	561	450	441	591	640	752	655	670	877	896	755	729	789	714	660	688	716	716	716	716	716	716	716	716	716	716	716	716
US Plate	950	738	685	700	741	970	845	827	1000	1146	1120	1054	1054	997	925	964	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003
US Shredded scrap US\$/t	209.5	190	255	260.5	347	363	335	412	463	445	460	432	422	405	388	396	404	404	404	404	404	404	404	404	404	404	404	404
US-EU Premium/(Discount)	-34	-67	-65	24	2	-4	-17	-30	33	40	-10	68	5	70	10	25	40	40	40	40	40	40	40	40	40	40	40	40

Source: Citi Research

Figure 70. Regional Crude Steel Production

Regional Production - Crude Steel	2009	2010	2011	2012e	2013e	2014e	2015e
EU (15)	116	144	150	146	147	147	147
Other Europe	48	54	60	64	64	66	66
CIS	96	107	112	116	121	121	121
NAFTA	81	111	118	123	125	131	131
Central/South America	38	44	50	57	65	76	81
China	566	637	694	697	718	733	777
Japan	88	110	108	111	111	114	111
India	56	66	72	78	90	106	112
Other Asia/Pacific	80	95	104	116	116	118	120
Africa/Middle East	32	36	34	48	55	57	57
Global Production	1,203	1,405	1,502	1,555	1,610	1,669	1,722
Estimate Production Excess/(Deficit)	4	46	63	96	107	125	109
Finished Steel Production	1143	1335	1427	1478	1529	1585	1636

Source: Citi Research

Figure 71. Regional Finished Steel Demand

Regional Demand - Finished Steel	2009	2010	2011	2012e	2013e	2014e	2015e
EU (15)	102	122	125	124	125	127	129
Other Europe	34	43	44	44	45	45	46
CIS	38	48	51	52	54	56	58
NAFTA	77	103	111	114	116	120	124
Central/South America	31	38	39	41	42	44	45
China	558	596	645	648	667	681	722
Japan	66	84	81	82	83	85	86
India	55	59	63	67	73	78	85
Other Asia/Pacific	112	129	132	137	142	148	154
Africa/Middle East	67	68	70	73	75	77	79
Global Demand	1,139	1,289	1,363	1,382	1,422	1,460	1,527
Global Finished Steel Production	1,143	1,335	1,427	1,478	1,529	1,585	1,636
Estimate Production Excess/(Deficit)	4	46	63	96	107	125	109

Source: Citi Research

Iron Ore

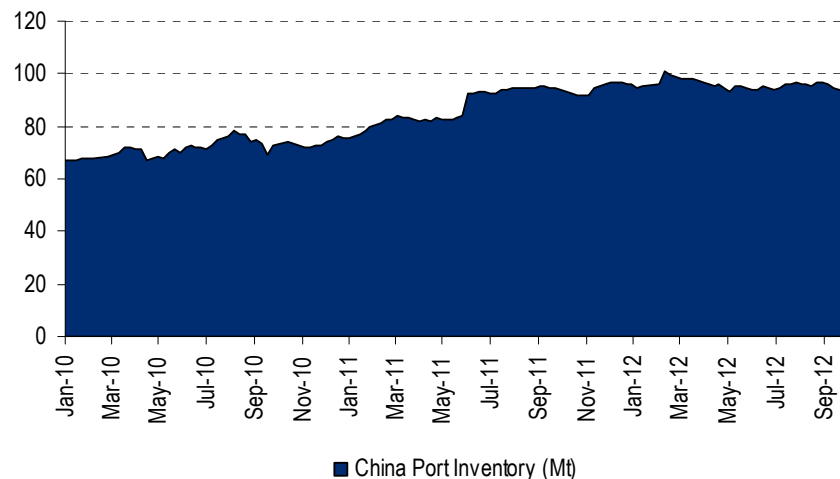
- Citi expects the closure of Chinese high-cost production to be the key defining price setting mechanism for iron ore in 2013. We maintain our 2013 forecast at \$120/t based on our calculation that it will take 2-3 years to knock out high cost capacity in China. However we expect increased volatility in iron ore pricing, with spot prices being set off the Chinese restocking and destocking steel cycle resulting in iron ore prices swing from the high cost domestic production (under a restock) to the marginal of new seaborne supply (destock).
- Given our view of modest growth in Chinese steel consumption (even with the announced stimulus packages) and over capacity in the market we expect the destock/restock cycles to decrease in duration. Supply continues to be challenged with the push back of new projects in Brazil, and mining and export bans in India. Our supply additions are predominately from the Australian producers. We see a surplus developing from 2015 with acceleration in 2018 to over 100mt.

Figure 72. Iron Ore Supply Demand Balance

Mt	2008	2009	2010	2011	2012e	2013e	2014e	2015e	2016e	2017e	2018e	2019e	2020e
Supply: Seaborne Exports													
Australia	308	362	401	437	476	553	596	673	721	770	807	834	851
Brazil	282	266	311	331	329	322	345	386	417	414	457	505	526
India	106	115	102	90	50	50	50	50	50	50	50	50	50
Canada	22	28	28	25	31	34	37	39	39	39	39	39	39
Africa	44	55	59	61	71	84	97	104	109	123	140	145	146
Other	43	55	86	86	97	51	48	50	45	45	45	45	45
Total Seaborne Exports	800	871	966	1,030	1,055	1,094	1,172	1,302	1,381	1,441	1,537	1,617	1,657
Demand: Seaborne Imports													
Japan	140	115	134	128	133	133	137	133	136	139	141	144	147
Korea	50	42	58	66	67	73	74	75	81	86	92	98	105
Taiwan	16	12	19	21	19	19	20	20	21	23	24	26	27
EEC	125	81	98	94	92	97	97	97	97	97	97	96	96
USA	9	4	6	5	9	11	11	12	12	11	11	11	11
Other (inc 3G)		20	40	40	40	40	49	65	113	147	156	161	168
Total Seaborne Imports	340	274	356	354	360	374	388	402	459	502	521	536	555
Market balance ex-china	460	597	611	676	694	720	784	899	922	939	1016	1081	1102
China Adjustment													
Available exports for China	460	597	611	676	694	720	784	899	922	939	1,016	1,081	1,102
Chinese requirements (@63% Fe)	745	872	996	1,087	1,063	1,094	1,117	1,183	1,211	1,238	1,238	1,238	1,238
Surplus/(Deficit) Pre China Domestic Production	-285	-275	-386	-410	-369	-375	-333	-284	-289	-299	-222	-157	-136
Domestic production	314	251	386	424	368	347	332	324	317	317	324	317	317
Implied Total Surplus/(Deficit)	29	-24	1	14	-1	-28	-1	40	28	18	102	159	181

Source: Tex Report, Citi Research

Figure 73. China Port Inventory Mt



Source: Bloomberg, Citi Research

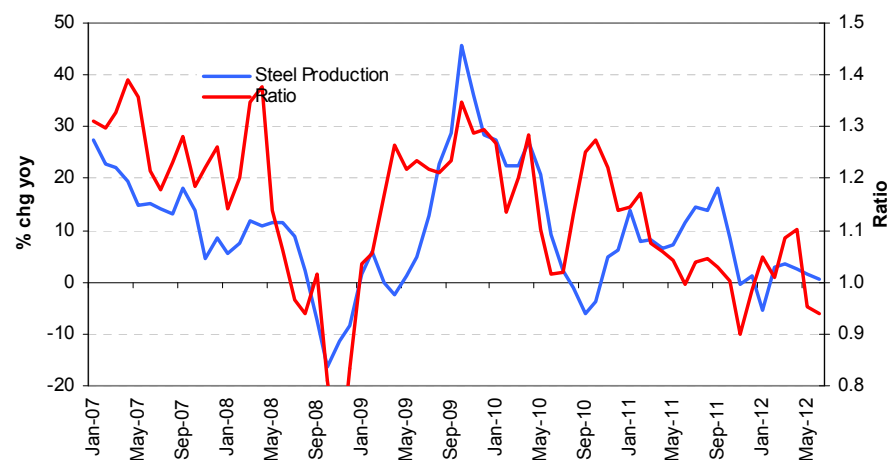
- How Chinese steel production holds up will be the key to how the iron ore market will perform for 2013. Recent China steel production numbers from the China Iron and Steel Association (CISA) shows that production levels have increased back to the levels seen in the period from April to May. Citi base case forecasts call for an average crude steel production number of 718Mt for 2013.
- The relationship between the new orders/inventory ratio (Figure 75) suggests the current production rate has moved ahead of underlying demand and suggests a pull back in steel production.

Figure 74. China weekly iron ore prices and forward curve against Citi forecasts



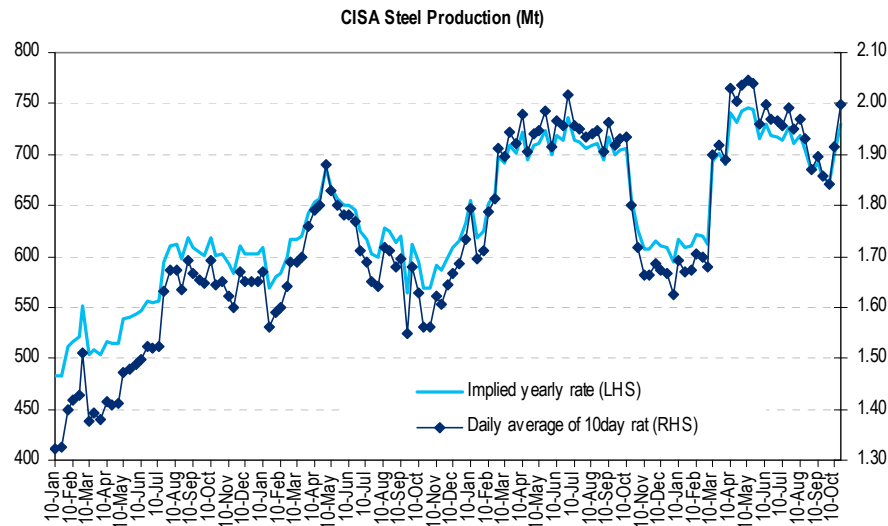
Source: Bloomberg, Citi Research

Figure 75. New Orders/Inventory Ratio vs. Steel Production



Source: Bloomberg, Citi Research

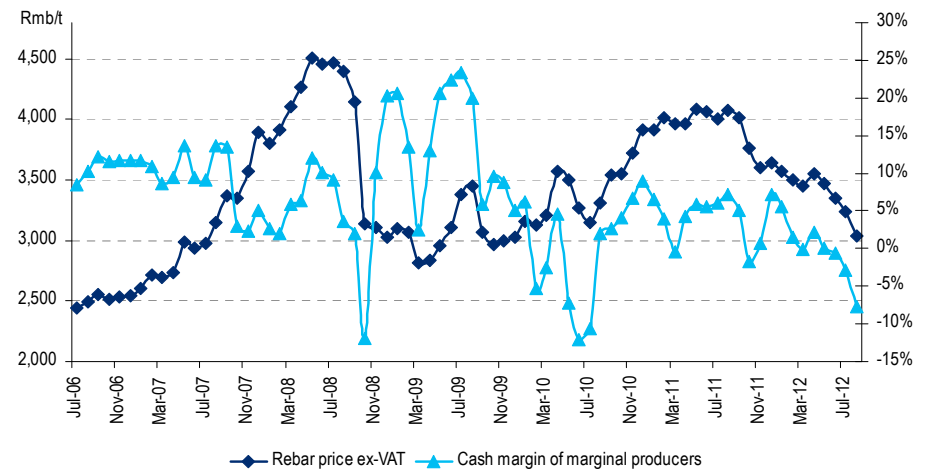
Figure 76. China Steel Production remains high



Source: CISA, Citi Research

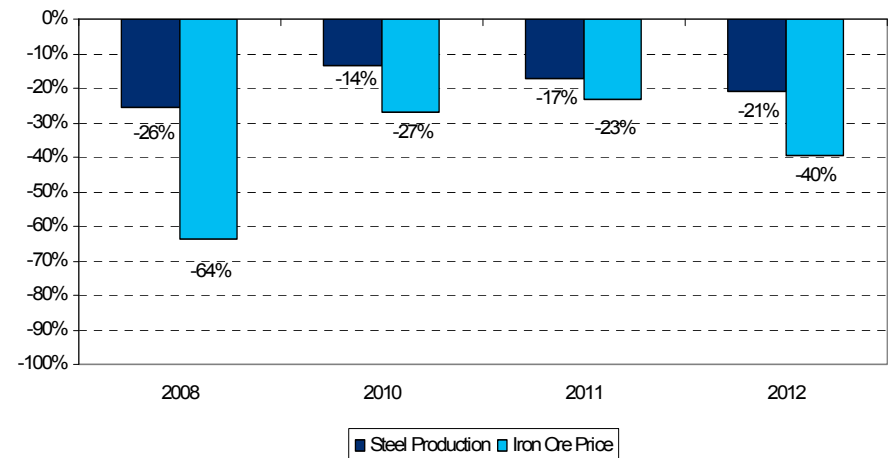
- Cash margins at Chinese steel producers have improved due to lower coking coal and iron ore prices but the profitability of the industry is effectively being subsidized by the state via cheap debt. The wildcard for next year is financing costs both for inventories and steel mills.
- We expect that iron ore volatility is likely to remain as the Chinese steel industry swings from destock to restock. We have seen peak to trough moves of around 40% for iron ore prices and we believe that given the iron ore producers are running at maximum capacity and are taking market price and given the limited ability to store and stockpile iron ore that we will increasingly see these period of extreme volatility.

Figure 77. Chinese Steel Spot Cash Margins vs. Rebar Price (Rmb/t)



Source: CRU, Citi Research

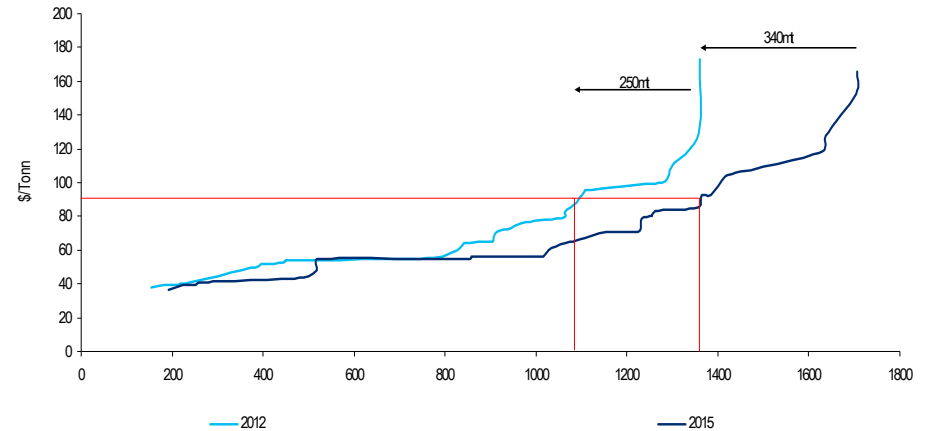
Figure 78. Peak to Trough % Change in Chinese Steel Production and Iron Ore



Source: CRU, Citi Research

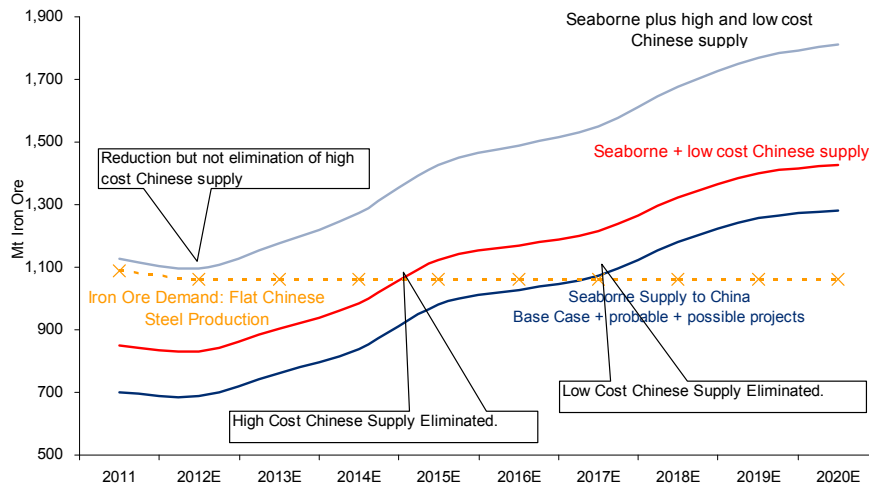
- Our base case Chinese steel production in 2013 increases 3% on 2012, rising from 697mt to 718mt. This in turn is likely to lead to an increase in Chinese domestic iron ore production from 229mt (contained Fe) to 251mt even as average prices fall YoY from \$135/t to \$120/t. We expect low cost capacity to gain share as high cost is knocked out. We estimate c.60mt of high cost 63% equivalent production will be uneconomic at \$120.

Figure 79. Global Iron Ore Cost Curve (CIF China, \$/t)



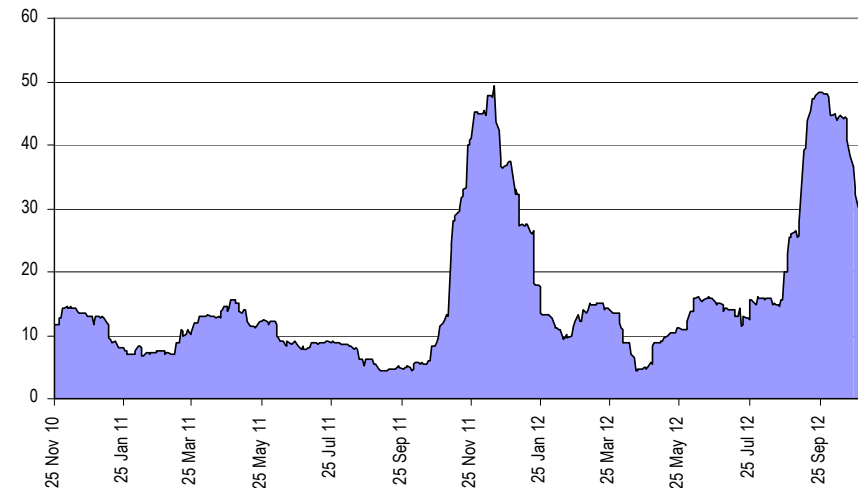
Source: Citi Research

Figure 80. Global iron ore supply all possible sources.



Source: Tex Report, Citi Research

Figure 81. Volatility in the iron ore price – 30 day historical vol

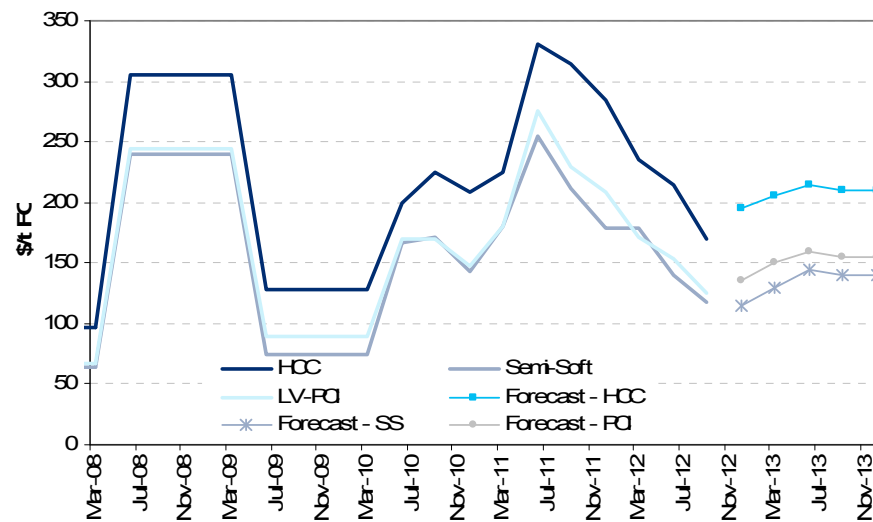


Source: Tex Report, Citi Research

Metallurgical Coal

- Citi are forecasting gradual improvements in coking coal prices over the course of 2013 in the range of \$180 to \$210/t. This is based on expectations of continued producer cut to enable a balanced market, the wildcard remains the Australian weather conditions as over the past few years Q1 rains have resulted in major disruptions to production. The downside risk is from anemic global steel productions and supply additions, principally from the BMA, which is returning to full production. The upside to prices are likely to be capped by the high costs US production which is likely to return to the market above \$200/t, equally with spot prices trading at around the \$149/t (FOB Australia) level it is already well into the cost curve for the major producers.

Figure 82. Metallurgical Coal Prices and Forecasts



Source: Platts, Bloomberg, Citi Research

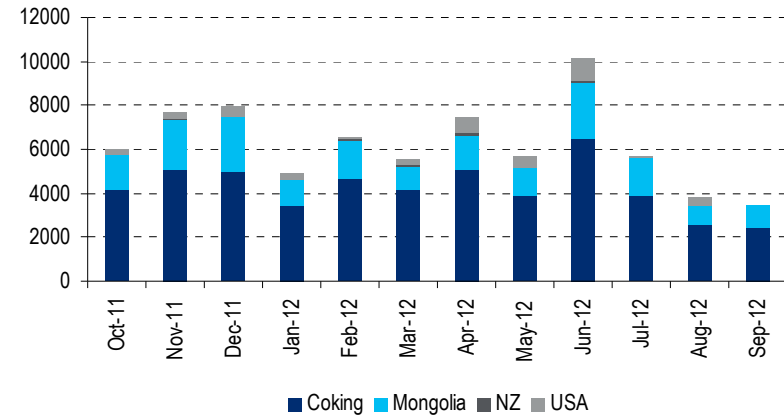
Figure 83. Metallurgical Coal Market Balance

IMPORTS (Mt)	2010	2011	2012e	2013e	2014e	2015e	2016e
Japan	64.8	53.6	59.8	59.9	61.6	59.9	61.1
South Korea	31.9	30.3	28.3	28.3	28.8	29.3	31.4
India	35.5	32.1	10.1	10.1	10.3	10.5	9.0
Europe	56.8	36.3	41.3	56.7	85.4	91.8	99.0
China (excl Mongolia)	38.2	23.1	35.0	35.2	35.2	35.2	35.1
Brazil	12.9	18.0	30.0	9.4	12.6	23.7	19.8
Other	26.1	31.7	18.8	19.7	20.5	21.5	23.2
Total	266.1	225.1	26.4	33.1	29.1	33.4	35.4
EXPORTS (Mt)	2010	2011	2012e	2013e	2014e	2015e	2016e
Australia	158.9	132.8					
US	47.8	53.0	134.4	164.5	185.6	184.6	200.4
Canada	26.1	26.1	50.0	50.0	52.5	55.0	55.0
China	1.1	0.6	26.1	25.0	25.0	25.0	25.0
Russia	12.4	14.0	0.6	0.6	0.6	0.6	0.6
Mozambique	0.0	4.4	12.0	12.0	12.0	13.0	13.0
Other	12.2	11.3	6.0	10.0	12.2	12.2	17.2
Total	258.6	242.2	3.0	3.0	3.0	3.0	3.0
IMPLIED MARKET BALANCE			-21	16	6	-10	5

Source: Platts, Wood Mackenzie, Tex Report, Citi Research

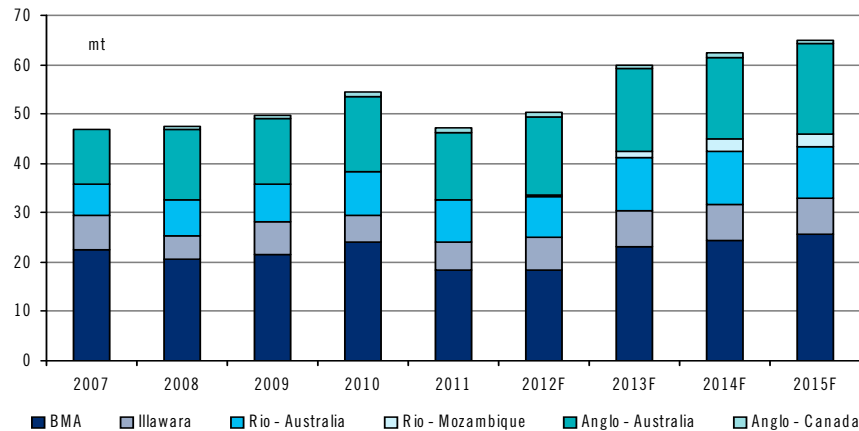
- Citi are forecasting anemic steel volume growth outside of China in 2013 and around 3% growth within China. Chinese stimulus measures are likely take effect in 2013, however Citi analysis suggests the demand pull through is likely to be minimal. With abundant Chinese capacity this leaves the market subject to very short destocking and restocking periods.
- It is interesting to note that the BMA set the Q4 coking coal price at \$170/t, which was well down on the Q3 settlement of \$225/t. Discussions with the company would suggest that BHPB will continue to chase volumes over price and may have settled a lower coking coal price with the aim of placing more volumes in 2013. Queensland's met coal exports have increased but remain around 20% below the 2010 levels.

Figure 84. Chinese imports have come down aggressively in the destock



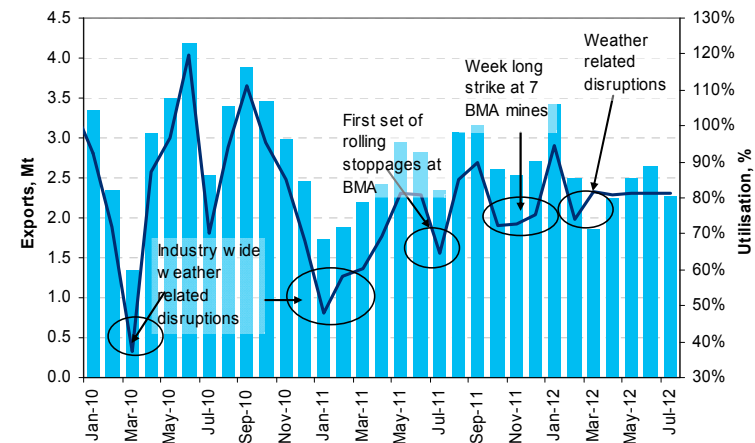
Source: China Customs, Tex Report, Citi Research

Figure 85. Met coal production UK Big 3 operations



Source: Company Reports, Citi Research

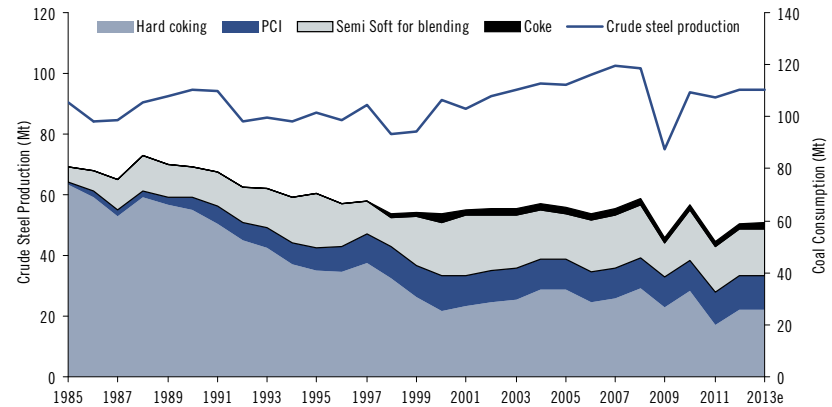
Figure 86. Australia exports are set to increase



Source: Tex Report, ABS, Company Reports, Citi Research

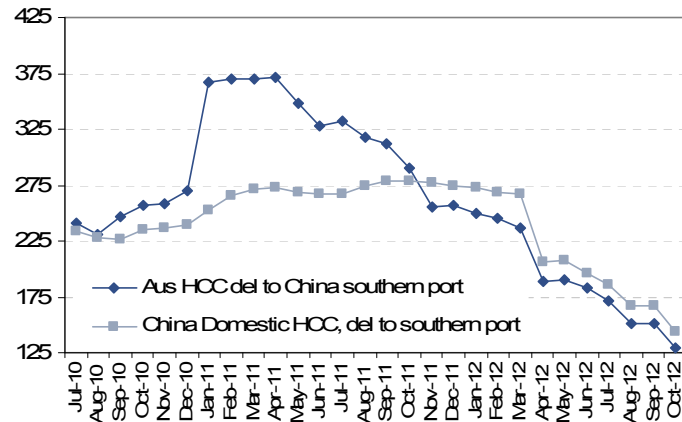
- The hard coking coal prices ex Australia have fallen at a faster rate than domestic prices in China, and this has resulted in the arbitrage reopening. This is resulting in a clear pick up of purchasing in China and is helping stabilize the market in the short term.
- On supply, spot coking coal prices well into the cost curves of major producers the industry is facing a major cross road. Producers are taking steps to balance the market with around 20Mtpa of production cuts over the past quarter, with the bulk of that coming from North American producers but BHPB in the BMA and Russian producers have followed suit.
- The key to 2013 is likely to be the BMA, who continue to ship well below their 2010 production levels, and will arguably seek to sell additional tons over the next twelve months. On Citi's calculations the company's first half operating costs were around \$180/t including royalties and freight, the company expect costs to come down by around 40% however this will be predicated on additional volumes to hit the cost targets. This leaves us with the view that the high cost capacity in the US is likely to remain closed for the majority of 2013 to stabilize the market.

Figure 87. Japanese Met coal consumption vs. Crude Steel production



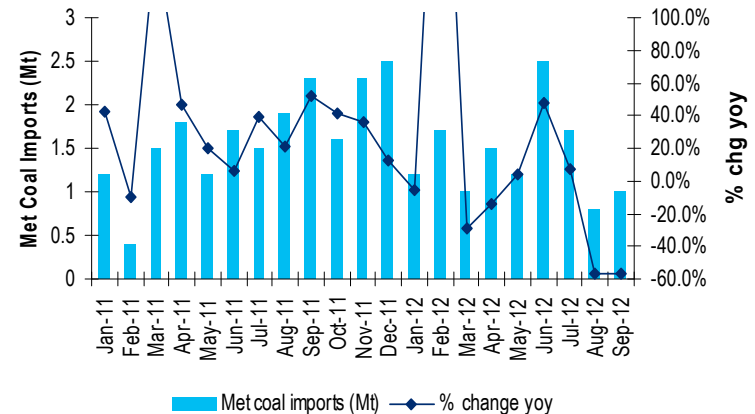
Source: The Tex Report, IISI, Citi Research

Figure 88. The arb between China and Australia is still conducive for Chinese imports



Source: Platts, Citi Research

Figure 89. Mongolian exports have the potential to curb Chinese import demand



Source: Platts, Citi Research

Precious Metals

Gold – tarnished reputation?

- Citi has been relatively bullish gold and remain so – it should add positive returns while not being the top performing commodity. For much of the market the narrative for gold has been much more bullish, with many commentators expecting gold prices to push above \$2,000/oz during the first quarter, and then in the second quarter, and then in the fourth quarter of 2012 after QE3. Now the breach of the magic \$2,000/oz target has been postponed by the super bulls to either the second or third quarters of 2013. While there remains sufficient systemic macro risk to push gold prices higher, forecasting a 2013 annual average gold price of \$1750/oz, peaking in Q1 at close to \$1,800/oz, slowly improving US macro data, and a stronger dollar (versus the Euro) will limit the extent of the upside.
- While QE 1 and 2 were both unannounced and therefore a positive surprise to markets, QE3 was long trailed, with markets anticipating it for at least a month before the actual announcement was made and in the month up the actual announcement gold prices rallied by 10%. However, post the September 13th announcement, gold sputtered, with improving US macro data and Europe's continued travails providing dollar support, effectively undermining the shorter term impact of QE3 on dollar values and thus the bull gold narrative. Gold may see another short-lived bounce in 1Q13 from further Fed action to replace the ending OT2, but signs of fatigue are increasingly apparent.
- Net official sector gold buying is posited as source of gold price support, and indeed central banks have been active this year, with estimates for the year as whole being 490 tons, up around 7% on 2011 levels (a slowdown compared to the 450% growth in central bank buying in 2011). What is notable about central bank gold purchases through this year is that buying has been far more price sensitive and opportunistic in nature than in the past. Indeed, central banks have provided a floor during dips in gold prices, but have not been a price driving factor this year. Little change is expected in this trend into 2013.
- An Obama victory was supposed to be bullish in that gold would benefit from a continuation of dovish monetary policy. Indeed, gold rallied briefly from \$1673/oz on November 5th to \$1739/oz on November 9th before stalling in the face of a strengthening dollar. The market quickly switched focus to negotiations over the 'fiscal cliff', with potential for the lack of an agreement before January. Such an extreme situation has been broadly viewed as positive for the dollar, playing the ultimate safe haven role, and thus not positive for gold given the current inverse dollar-gold relationship.

Figure 90. Gold supply / gold balance

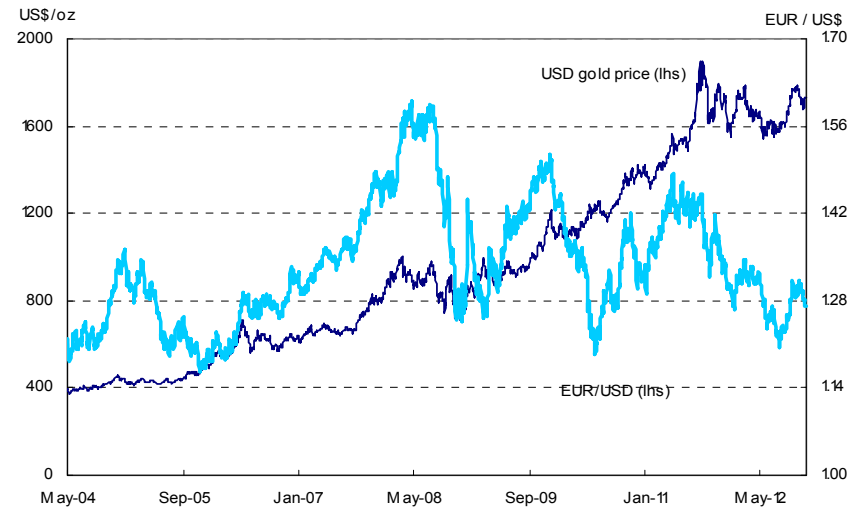
kt	2010	2011	2012e	2013e	2014e	2015e	2016e
Mine Supply	2,689	2,819	2,834	2,889	2,964	2,818	2,800
Scrap Supply	1,645	1,661	1,636	1,837	1,518	1,300	1,300
Net Producer Hedging	0	12	20	82	114	122	100
Total Supply	4,334	4,486	4,470	4,808	4,596	4,208	4,150
Jewelry	2,017	1,973	1,863	1,775	1,926	2,273	2,300
Other fabricationa and Industrial use	767	786	751	730	732	682	670
Total Fabrication Demand	2,779	2,759	2,614	2,505	2,658	2,955	2,970
Official Sector Purchases	77	456	493	380	300	300	280
Physical Bar Investment	880	1,202	1,048	810	864	631	560
Net Producer De-hedging	103	0	20	11	0	0	0
Implied Other Investment	485	69	295	1,102	774	322	340
- of which: ETFs	368	160	150	250	220	150	150
Coins, Medals, Other	161	-91	228	847	429	397	397
Total Demand	4,334	4,486	4,470	4,808	4,596	4,208	4,150
(US\$/oz)	1,225	1,570	1,679	1,749	1,655	1,540	1,350

Source: Thomson Reuters GFMS, Citi Research

Gold - Investors less bullish

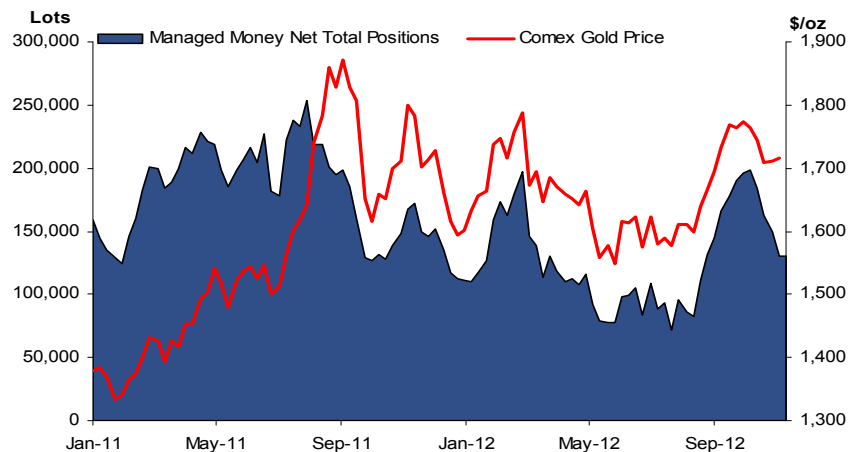
- Investors appear to be losing faith in the bull story for gold, if net managed money positions on Comex provide a reasonable guide. Indeed, net long managed money positions on Comex have fallen by 33% since October 2 2012, not exactly a vote of confidence for further significant gold upside. Perhaps only more concerted European policy moves with reference to managing Greece/Spain may provide Euro confidence, and thus gold upside.
- ETF uptake has been an important indicator of investor sentiment toward gold, with physical gold holdings up 237.85 tons in the year-to-date, with much of that uptake focused in August and September on pre QE3 expectations. Since the beginning of October positive flows have stalled, with redemptions seen in November.
- Even within the central bank world, one the most consistent purchasers since April 2007, the Russian Central appears to have reversed its policy. Indeed, the bank reduced gold holding by 2 tons in September. Looking further forward, signatories of the Central Bank Gold Agreement (CBGA) remain outweighed in gold, leading to expectations that sale could resume towards the end of 2013.

Figure 91. Dollar has been strengthening vs. Euro despite open ended QE3, not helping gold



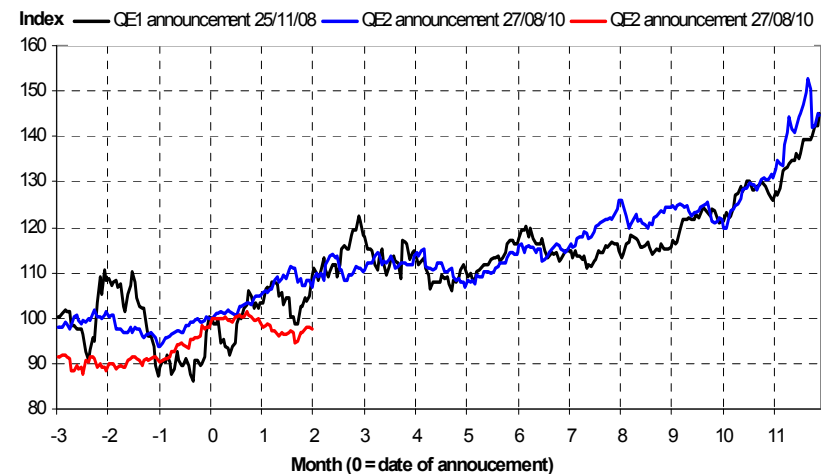
Source: Bloomberg, Citi Research

Figure 92. Fund managers have been rapidly reducing positions since the QE3 announcement



Source: COMEX, Citi Research

Figure 93. QE3 has had a significantly less positive impact on prices than previous easing

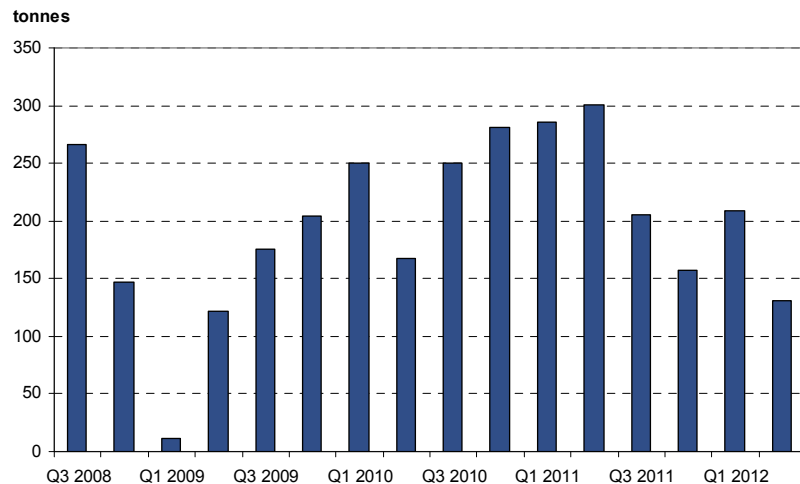


Source: Bloomberg, Citi Research

Gold - Indian market shows some signs of life

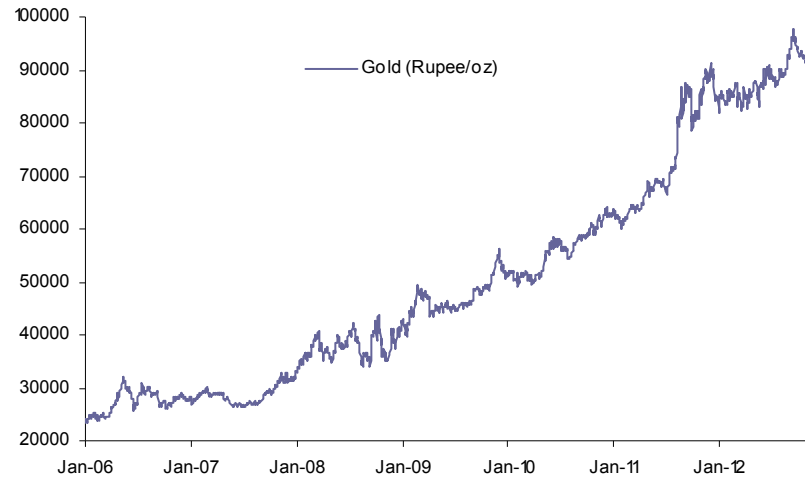
- Indian gold demand has been in the doldrums through 2012, struggling under the impact of weak Rupee and a temporary import duty rate hike in H1, and thus gold prices consistent new record highs in Rupee terms through the year. In H1, gold imports declined by 42% y/y (or 247 tons). The trend has continued into H2, with August levels reported at 37.1 tons, 34% lower than the H1 monthly average.
- There is some expectation that India demand will pick now with the onset of traditional festive season, with Dhanteras and Diwali particularly associated with the giving of gifts (gold). Some gold purchasing have been seen in October by Indian gold traders and stockists, but the concern remains that if no demand acceleration is seen this quarter, then there is a risk that gold inventory will be offloaded back into the wider market.
- Even in China, now the world's largest gold market has showed signs of stagnating in recent months, helping push expectations for a 5% decline in jewelry consumption this year, and a continuing declining trend in 2013, as Indian demand in particular continues to struggle.

Figure 95. India gold imports, struggled on weakening Rupee



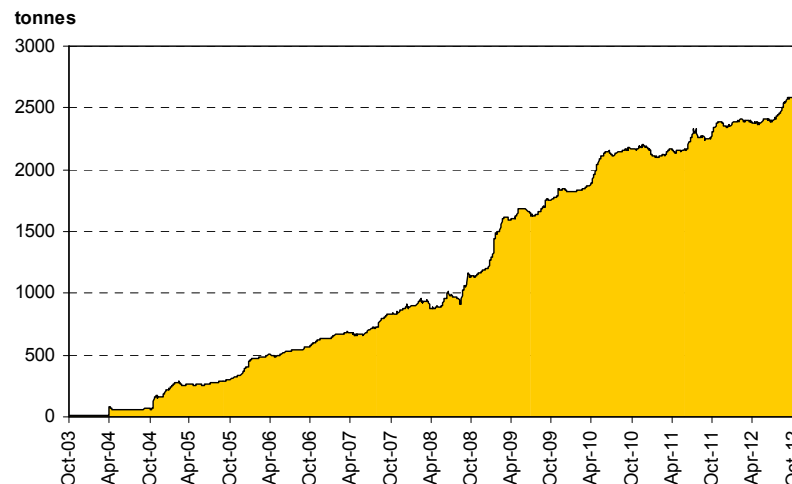
Source: Citi Research

Figure 94. Rupee gold prices remain close to record highs



Source: Citi Research

Figure 96. ETF uptake no match for weak fabrication demand in the year to date

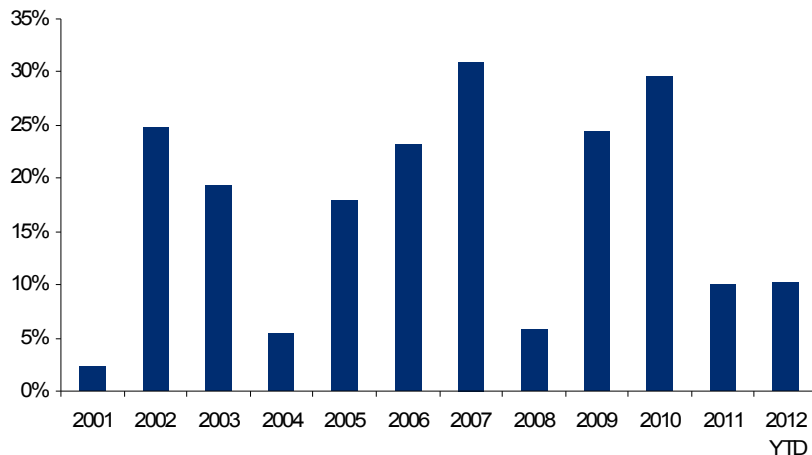


Source: Citi Research

Gold – Modest Q1 2013 upside expected

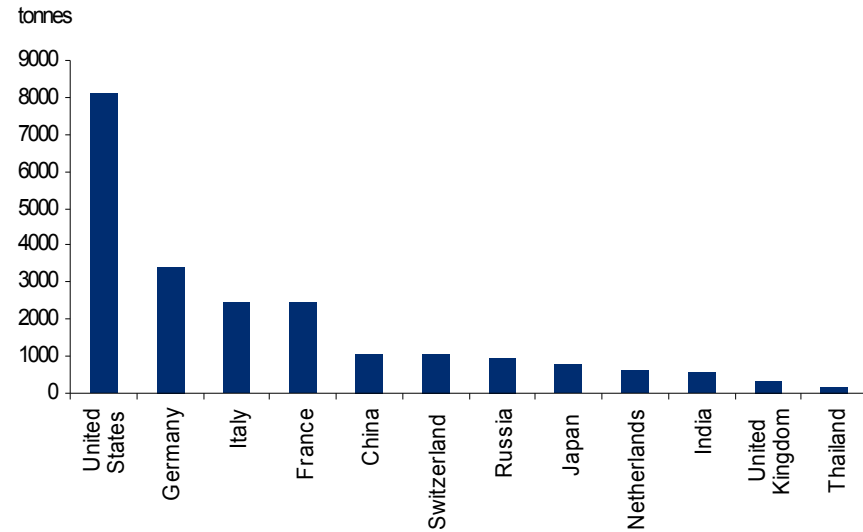
- On the supply side, tensions in the South African mining sector, and particularly in the gold sector, appear to have eased. Reported losses Anglo Gold Ashanti were down around 2 tons in Q3 compared to guidance, while Gold Fields losses were around 0.5 tons in the same quarter.
- The outlook in 2013 is for mine production to accelerate, with production from Pueblo Veijo, Grasberg and Detour Lake adding 50 tons according to analysts GFMS, pushing total mine supply up by 2%. However, physical demand is expected to continue to struggle, falling by 11%, largely due to continued jewelry sector weakness. This in turn suggests a greater requirement for uptake from physical investors.
- With US macro data showing continue signs of improvement, US CPI still at low levels and inflation expectations suppressed, for gold to rally significantly into 2013 requires one of two events, in the absence of a US return to recession. Either a major geo-political event (less likely) or a greater confidence in the Euro zone to be able to manage the ongoing debt crisis, more importantly in Spain (more likely) are needed. Indeed, we expect an official request by Spain for an ECB bailout to trigger upward moves in gold in Q1.

Figure 98. Gold Annual returns, 2000 - 2012



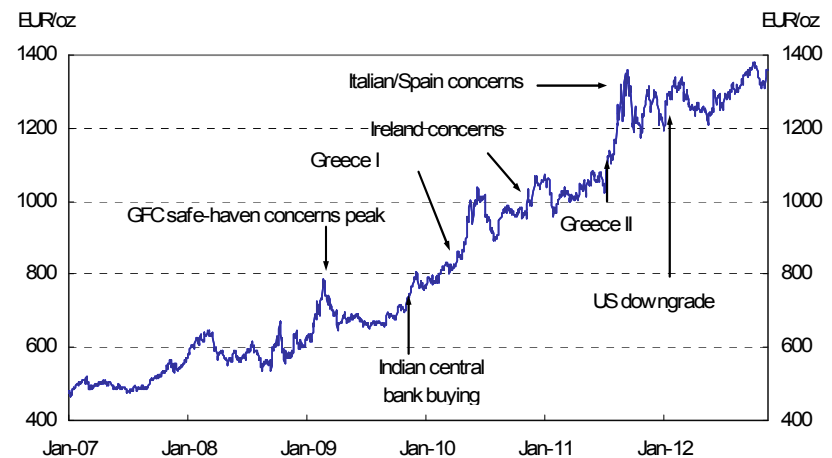
Source: Bloomberg, Citi Research

Figure 97. Official sector gold holdings, November 2012



Source: GFMS, Citi Research

Figure 99. Gold in Euros, up on renewed Euro/Dollar weakness



Source: Bloomberg, Citi Research

Silver: Growing by-product mine supply points rising levels of producer hedging

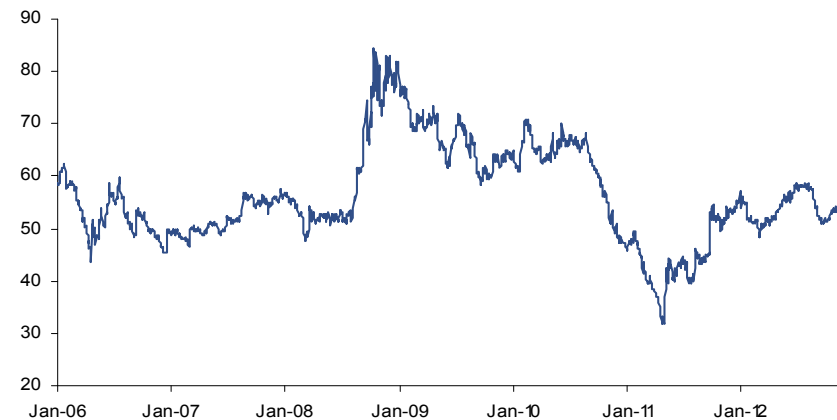
- As with the wider industrial and precious metals complex, silver prices saw a sharp rally prior to September on the expectation of QE3, eventually reaching an H2 2012 high of \$35.36/oz on October 1st before the rally ran out of steam, with prices settling back into a \$31-33/oz trading range after testing a \$30.5/oz level in early November. Unlike gold however, QE3 expectation did not drive silver to 2012 highs, which in the year-to-date were seen in late February when levels hit \$37.48/oz. Indeed, investors, and particularly retail investors, still appear to have the severe losses which inflicted on them in late April/early May 2011 fresh in their memories, effectively breaking the trend of silver outperforming gold in periods of bull sentiment towards the precious complex. We expect this silver caution to continue in 2013
- On the supply side, the market is likely to remain fairly loose. Production is likely to be boosted by several key projects such as Pascua-Lama, Conchenco and Pueblo Viejo, Saucito and Penasquito. It should be noted that the start up date for Pascua-Lama has been pushed back into the second half of 2014, essentially resulting in 2014 total mine production for the year by around 20 million oz according to analysts GFMS. Indeed, the mine is now expected to contribute 10 million ounces to 2014 mined silver production, but when at full production should add 30 million oz into 2015/2016.
- Despite the slower than originally planned ramp up of Pascua Lama, production of silver as a by-product of gold is likely to maintain strong growth, with Conchenco and Pueblo Vieja expected to contribute 15m oz by 2015. Analysts GFMS expect strong growth from by-product production from the lead-zinc industry, with growth rates of 4% for 2012 and similar annual growth rates going forward. For primary silver production, the growth outlook is less positive. Although the Inmaculada silver-gold mine project should add to primary supply in 2014, and the Escobal project in Guatemala potentially earlier in 2013, primary production is likely to decline to ore grade issues at older mining complexes such as Fresnillo in Mexico. However, total mine supply is expected to grow by 2.7% in 2012, 3.2% in 2013, slowing to 1.1% in 2014 before accelerating again in 2015. Given the continued rise in by-product supply as a percentage of total mine production, volumes of producer hedging (especially base metal producers hedging Ag by-product) is likely to rise over the forecast period, effectively limiting the upside potential of prices.

Figure 100. Silver Price (US\$/oz) : Resistance at \$35/oz



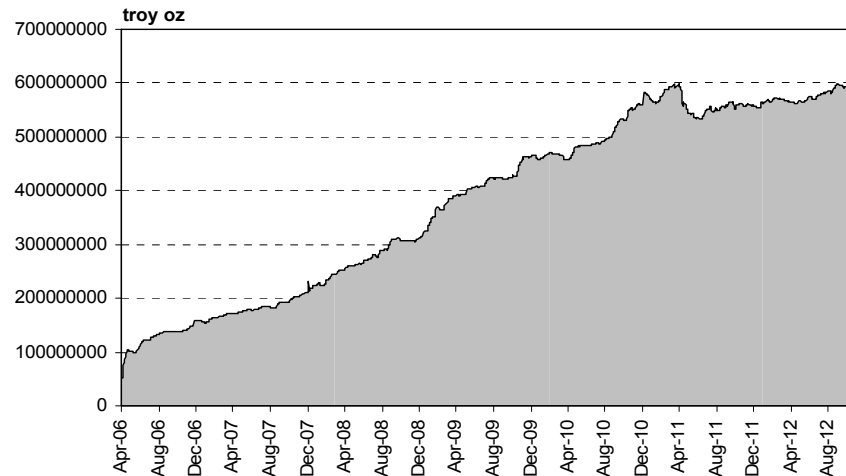
Source: GFMS, Citi Research

Figure 101. Gold / Silver Ratio : Neutral Territory



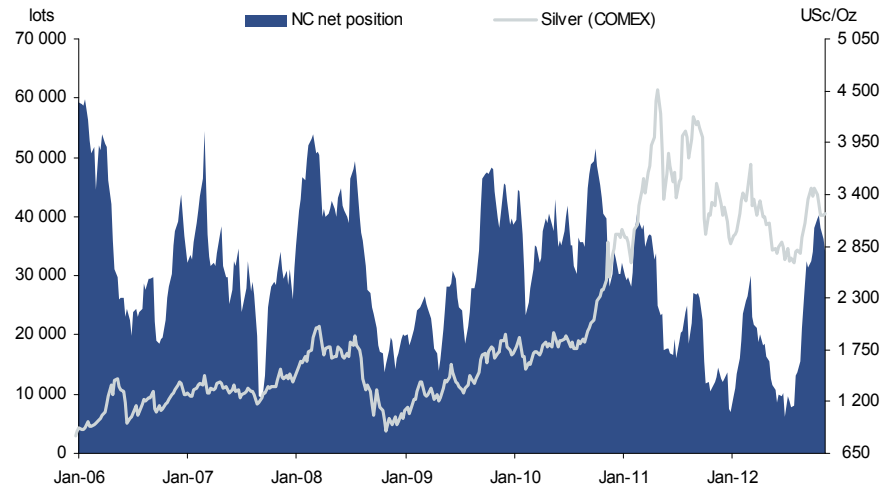
Source: GFMS, Citi Research

Figure 102. Silver ETF holdings – slowing upward momentum



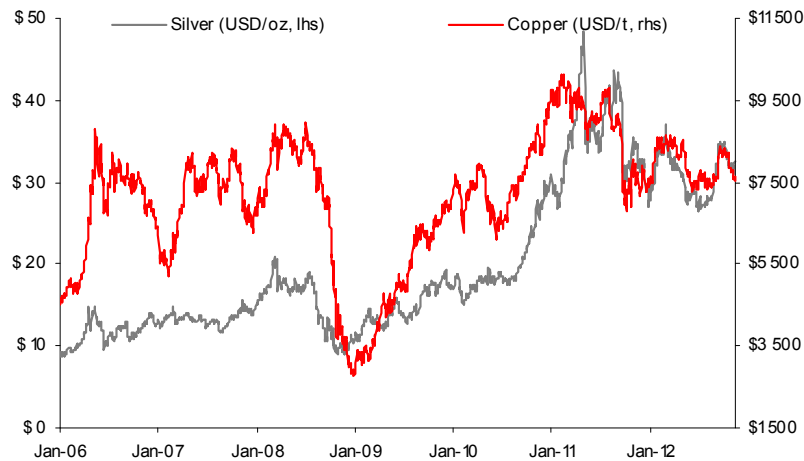
Source: Bloomberg, Citi Research

Figure 103. Non commercial net longs appear to have peaked in mid October



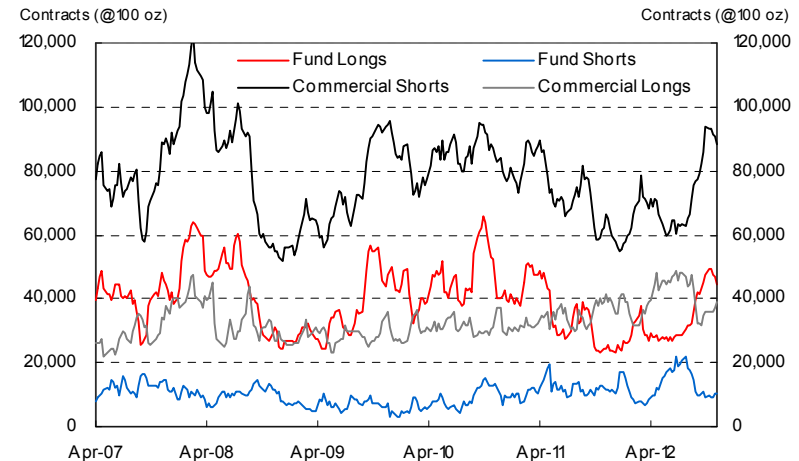
Source: Bloomberg, Citi Research

Figure 104. Silver again back to tracking industrial metals



Source: Bloomberg, Citi Research

Figure 105. Commercial shorts surged in October as producers hedged



Source: Bloomberg, Citi Research

Silver: High investment demand required in the face of stalled demand

- The demand picture for silver remains slow, with Jewelry demand in US, Europe, and India under pressure. Indeed Indian imports are estimated to be down by between 25-30% in the year-to-date, while Chinese imports are down 15% y/y in the year to September. In 2013, a modest reversal in the 2011/2012 downtrend in Jewelry demand for silver is expected on relative silver price stabilization, and continued high gold prices. Indeed, Jewelry demand fell by 4.5% in 2011 under the weight of the very high price and we expect a modest 2.4% decline in 2012 followed by 1.6% growth in 2013 and 10.1% growth in 2014 as the price eases back.
- Industrial demand fell by 2.7% in 2011 but we expect 2012 demand to remain slightly subdued, largely due to weakness in the European solar cell demand due to the removal of feed in tariffs (FiTs) and a general slowdown in demand for consumer goods (TVs, computers, white goods etc). The rapid growth in solar cell manufacturing in China has meant that the industry now suffers from significant over capacity, suggesting that growth in demand from this sector going forward may be limited. However, industrial demand is expected pick up in 2013, rising by 3.8% largely on the back of strong demand for silver containing consumer products principally China and other emerging markets such as India.
- Photographic demand continues to shrivel due to the rise of digital technology. Indeed, photographic consumption fell by 9.1% in 2010 and by 8.3% in 2011 and continued declines of 7.4%, 7.8% and 7.3% in are expected for 2012, 2013 and 2014.
- Weak fabrication demand for silver essentially places more focus on investors to absorb excess metal. Investment demand in 2011 was 163.9m oz and this would need to rise to 251m oz in 2013 if the market is to be in balance. Uptake of physical silver has stalled over the last month, in response to the post QE3 price pull back. However, in line with our modest gold upside expectations, we do expect to see modest silver rallies prompting a return to ETF inflows in Q1 2013. Looking further forward, given the extent of likely oversupply, it is questionable whether investors will have the appetite to absorb more metal, suggesting that silver prices will enter a period of decline.

Figure 106. Silver Demand and Supply

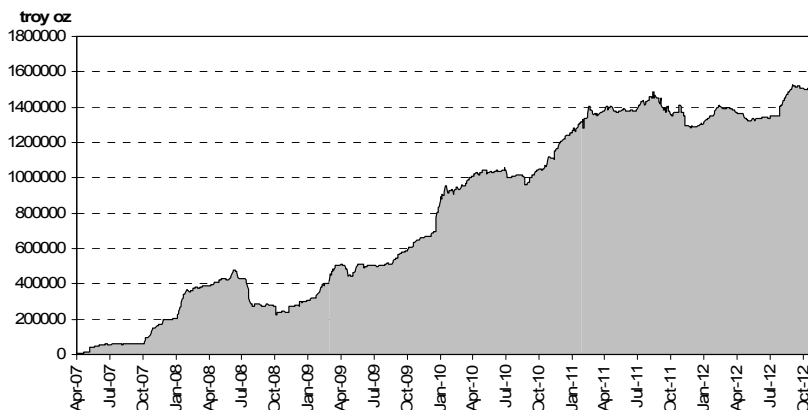
(m ounces)	2009	2010	2011	2012e	2013e	2014e
Supply						
Mine Production	716.1	751.4	761.6	782.3	807.3	816.5
Scrap	199.9	228.7	256.7	285.0	285.0	285.0
Total Supply	931.6	1074.7	1040.5	1107.3	1129.3	1140.5
Demand						
Industrial	405.1	500.0	486.5	480.0	498.3	521.6
Photographic	79.3	72.1	66.1	61.2	56.4	56.4
Jewelry	159.8	167.4	159.8	156.0	158.5	174.5
Silverware	59.1	51.2	46.0	42.3	41.3	40.5
Coins & Medals	78.8	99.4	118.2	122.5	123.7	125.9
Total Fabrication	782.1	890.1	876.6	862.0	878.2	919.8
Net Producer de-hedging	17.4	0.0	0.0	0.0	0.0	0.0
Implied Investment	132.1	184.6	163.9	245.3	251.1	225.7
Total Demand	931.6	1074.7	1040.5	1107.3	1129.3	1140.5
Price	14.48	20.24	35.26	31.30	31.00	26.50

Source: GFMS ,Citi Research

Platinum Group Metals Outlook – South African driven supply issues create tightness

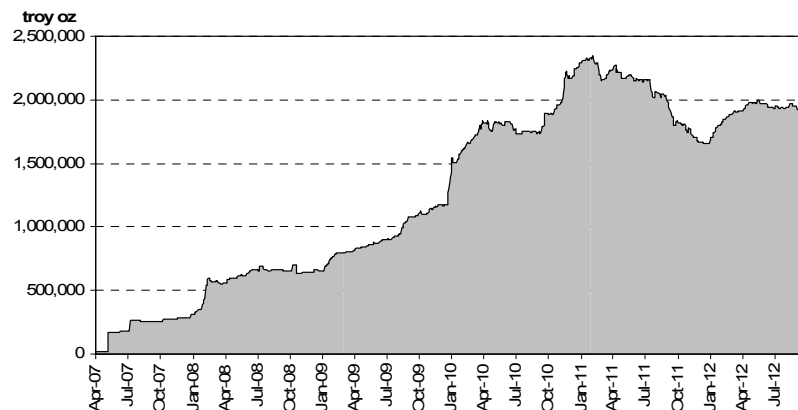
- Recent price moves in both platinum and palladium have been dominated by the strike disruption in South Africa, effectively counteracting a weaker demand picture most notably from the European auto sector. While SA events have had a significant impact most notably on pgm prices in the short term, pushing platinum prices to 2012 to-date highs of \$1,726/oz on October 5th. However, as our balance and price expectations were updated during September in response to the SA supply problems, no further changes have been made to our 2012-16 platinum and palladium price assumptions. Refer to [“Back In Balance, But Hold Your Horses”](#).
- Illegal strikes in SA, mine closures and project delays have resulted in a balanced outlook for platinum in 2012-14, deficit thereafter, in sharp contrast to previous expectations of 200-400k ounce surplus for platinum each year in the outlook period. The strikes, and precedent set by the 22% wage increase agreement at the Marikana mine, have intensified already significant cost pressure facing the South African mining industry. Indeed, Eskom, the state power utility has requested 16% power tariff increases each year through to 2018, but with major industrial users to face a 21% increase in 2013. While margin pressure, prompting mine closures are clearly price supportive, cumulative surplus and existing above ground inventory held by traders/stockists, plus the possibility of return to production of mothballed mines will limit platinum's upside price potential. Platinum prices are forecast to average \$1,675/oz in 2013, well below the recent October peak...
- Our updated supply/demand outlook for palladium continues to suggest a growing deficit market. Although not as influential on palladium mining compared to platinum, SA supply disruption has helped to offset the impact of slower auto production growth in key gasoline markets such as China. Indeed, a 468k ounce deficit is still forecast for 2012, rising to 579k ounces and 1,002k ounces in 2013 and 2014 respectively. Indeed, the South African situation notwithstanding, the outlook for palladium generally remains the brighter of the 2 pgm metals, largely as a result of a lack of supply growth from the worlds largest producer, Norilsk, a lack of mine project pipeline elsewhere, combined with a more positive demand outlook principally from continued demand growth from key gasoline markets such as North America and emerging auto markets such as India, plus continued albeit slower growth from China. Indeed, we project palladium prices to average \$744/oz in 2013.

Figure 107. Platinum ETF holdings - Lift from South African strike beginning to ebb



Source: Bloomberg, Citi Research

Figure 108. Palladium ETF holdings – On the decline since May



Source: Bloomberg, Citi Research

Figure 109. Platinum demand / supply

000 ounces	2010	2011	2012e	2013f	2014f	2015f	2016f
Mine production:							
South Africa	4,915	5,195	4,719	4,896	5,067	5,192	5,294
Russia	825	835	815	798	767	752	737
North America	210	350	325	381	376	371	366
Rest of World	110	100	120	120	120	120	120
Total Mine Supply	6,060	6,480	5,979	6,195	6,330	6,435	6,517
Autocatalyst recycling	1,085	1,225	1,346	1,447	1,524	1,602	1,685
Total Supply	7,145	7,705	7,326	7,642	7,854	8,037	8,202
% chg.	4.1%	7.8%	-4.9%	4.3%	2.8%	2.3%	2.1%
Gross Autocatalyst demand	3,075	3,105	3,229	3,249	3,391	3,491	3,560
Net Jewelry demand	1,680	1,660	1,841	1,995	2,069	2,156	2,221
Industrial demand	1,681	2,050	2,103	2,160	2,238	2,321	2,409
Investment	655	460	89	141	120	120	120
Total Demand	7,091	7,275	7,262	7,544	7,818	8,087	8,310
% chg.	13.8%	2.6%	-0.2%	3.9%	3.6%	3.4%	2.8%
Surplus / (Deficit)	54	430	63	98	36	-50	-108
- US\$/oz	1,614	1,722	1,557	1,675	1,775	1,825	1,800

Source: Johnson Matthey, Citi Research

Figure 110. Palladium demand / supply

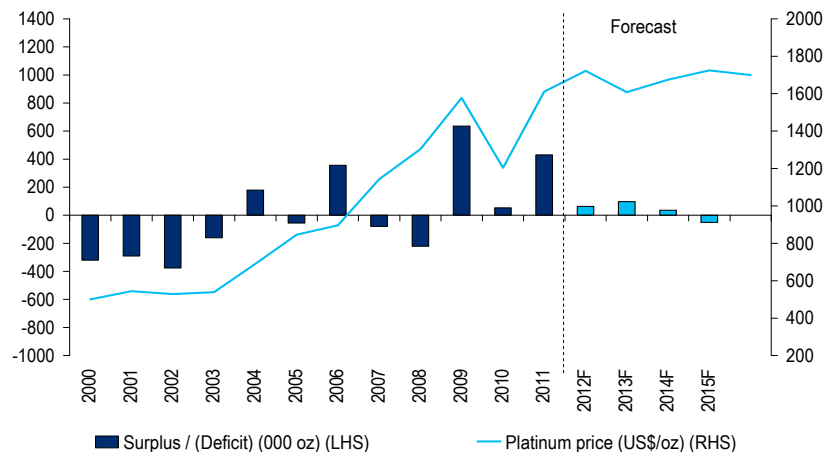
000 ounces	2010	2011	2012e	2013f	2014f	2015f	2016f
Mine production:							
South Africa	2,860	2,825	2,675	2,785	2,853	2,922	2,970
Russia	2,720	2,705	2,700	2,650	2,650	2,650	2,650
North America	590	900	795	870	980	1,050	1,050
Rest of World	185	155	180	180	180	180	180
Total Mine Supply	6,355	6,585	6,350	6,485	6,663	6,802	6,850
Russian stock sales	1,000	775	775	775	775	775	775
Autocatalyst recycling	1,310	1,655	1,844	1,974	2,072	2,173	2,280
Total Supply	8,665	9,015	8,969	9,234	9,510	9,750	9,905
% chg.	7.4%	4.0%	-0.5%	3.0%	3.0%	2.5%	1.6%
Gross Autocatalyst demand	5,580	6,030	6,809	7,233	7,858	8,528	9,051
Net Jewelry demand	495	295	277	305	331	362	436
Industrial demand	2,025	2,000	2,052	2,107	2,183	2,264	2,350
Investment	1,095	-565	299	167	140	126	126
Total Demand	9,195	7,760	9,437	9,813	10,512	11,280	11,963
% chg.	26.6%	-15.4	-0.2%	3.9%	3.6%	3.4%	2.8%
Surplus / (Deficit)	-530	1,255	-468	-579	-1,002	-1,531	-2,059
- US\$/oz	529	734	649	744	925	925	825

Source: Johnson Matthey, Citi Research

Platinum Outlook – mine closures and project postponements point to better price support

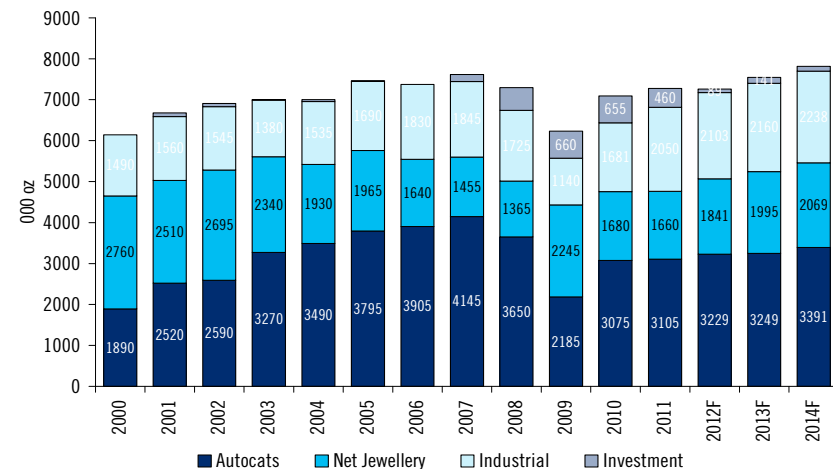
- September saw a clear strike premium price into platinum. Production losses have indeed been substantial losses at major South African miners, with some key producers hard hit and showing Q3 2012 mine production down 45.7% y/y, prompting a 20.8% fall in Q3 refined output. However, the strike premium in the platinum prices was somewhat short lived, retreating from 2013 highs of \$1,726/oz on October 5th, to end the month at \$1,523/oz, as wage dispute began to be settled, and the market refocused on the weak demand picture. Indeed positive physical uptake of metal by Platinum ETFs seen from July to September reversed in October as sentiment withered. Non-commercial net long positions on the NYMEX market, which had surged to 47,676 lots by Mid-October compared to 18,527 lots in Mid-August, also pulled back towards the end of the month. Indeed, platinum demand remains sluggish due to only marginal increases in global LV production in 2012, but principally due to a virtually collapse in European LV demand, the key global diesel and therefore platinum autocatalyst market. What growth there has been has principally been driven by continued growth in China and a recovery in the US (with auto and commercial vehicle sales up 7% and 12% respectively in the year to date). Indeed, the recessionary environment in Western Europe is expected to result in a 6% contraction in LV production in this region during 2012 as a whole and limited growth in 2013.
- However, despite the weaker demand picture, a balanced market is projected for platinum during the FY12-14 period, and deficit from FY15 onwards. As mentioned above this contrasts significantly with the previous Citi expectation of continued surplus over the outlook period. The change in our S/D outlook was mainly due to lower supply from SA due to a combination of illegal strike action, mine closures and capex delays. Despite this, our price outlook still remains only cautiously positive in part due to volumes of above ground inventory over hanging the market, and also the possibility of mouth balled mine restarts, and also because of growing scrap availability. Indeed, metal provided by auto catalyst recycling is expected to increase by 10% to 1.35m ounces in 2012; in line with the long-term trend of a rising number of vehicles produced, higher recycling rates, and higher PGM loadings. Looking further forward, the levels of inventory, scrap availability and idled mine overage are likely to also limited any positive platinum price impact of released pent up Europe diesel auto demand as economy recovery kicks in later in the decade.

Figure 111. Citi Platinum Surplus (deficit) forecasts



Source: Johnson Matthey, Citi Research

Figure 112. Citi Platinum demand by application forecasts

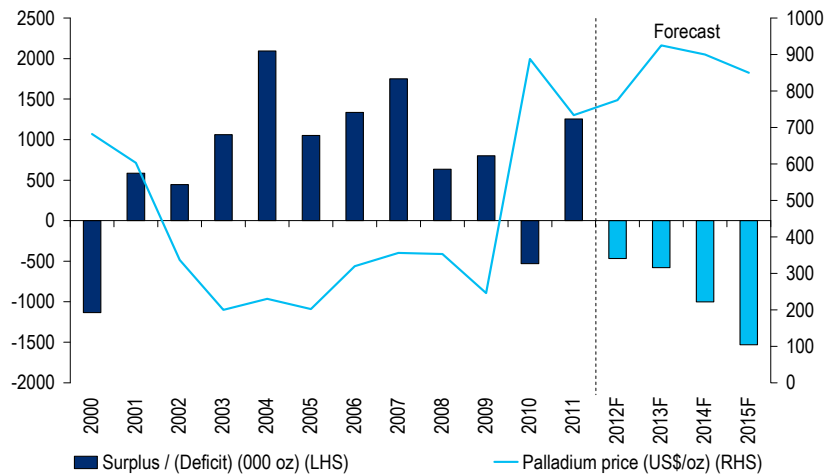


Source: Johnson Matthey, Citi Research

Palladium Outlook – Stronger demand picture, plus slower supply growth point to a return to price outperformance

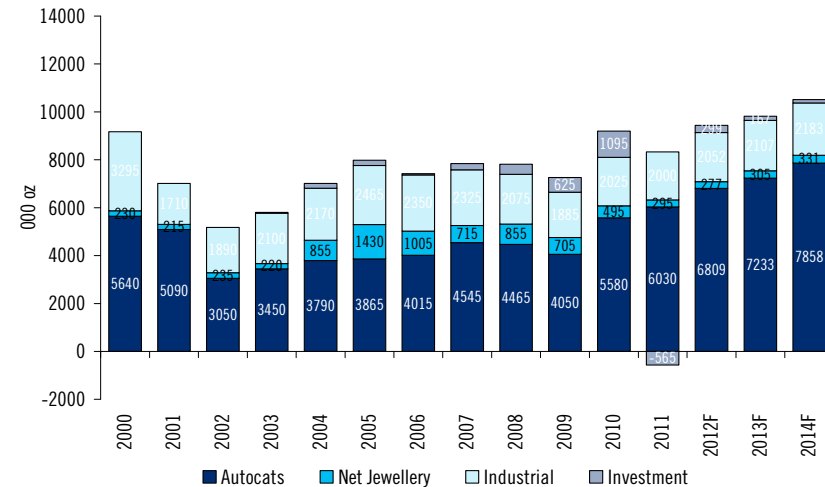
- South Africa accounts for roughly 42% of palladium mine supply (in typical non-strike years), but around 80% of global platinum mine supply. Thus it is easier to understand why palladium received less of lift from South Mine disruption. Indeed, unlike platinum, when palladium rallied during early October on the back of the strikes to intraday highs of \$676/oz, it remained short of the year-to-date peaks seen in pre-strike September of \$703/oz. However, palladium is expected to be the more positive price performer on sounder fundamentals into 2013. Indeed, a growing deficit is forecast for the palladium market into 2013. This view is largely driven by the expectation of better growth prospects in key gasoline focused auto markets, with a continued recovery in US auto production and sustained 5-11% medium-term growth in Chinese LV demand. We also expect an acceleration of positive net inflows into ETFs during 2013, compared to the modest year to date inflows of 5.94 tons in 2012, and in contrast to the significant net outflows in 2011.
- SA palladium mine supply cuts, expected to be down 5% y/y in 2012, have somewhat offset the somewhat slower global auto production growth outlook this year, as have contractions in supply from the world's largest producer Norilsk. Norilsk reported 2.08 million oz of palladium production over the first three quarters of this year, down 25,000 oz over the same period last year, and further contractions are expected next year. Indeed, a 468k oz deficit is forecast in 2012, rising to 579k oz and 1,002k oz in 2013 and 2014 respectively despite our above consensus expectations for Russian Government stockpiles sales going forward.
- This price positive primary supply effect and continued strong primary palladium demand from the gasoline auto sector is likely to be only modestly offset by lower jewelry demand and a pick-up in auto catalyst recycling. Indeed, auto catalyst recycling is expected to grow by 18% to 1.95m ounces this year, and a further 8% in 2013, largely as a result of the maturing Chinese auto market as a source of supply as the rise in vehicle sales over the last 4 years result in more old vehicles being traded-in, scrapped and recycled.

Figure 113. Citi Palladium Surplus (deficit) forecasts



Source: Johnson Matthey, Citi Research

Figure 114. Citi Palladium demand by application forecasts

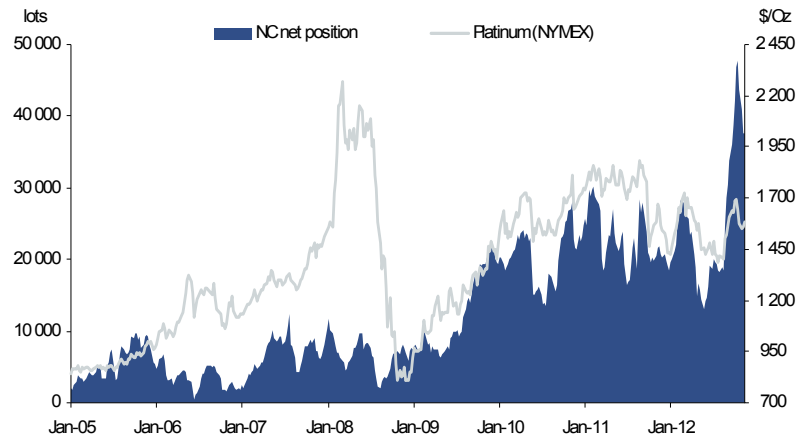


Source: Johnson Matthey, Citi Research

SA political issues in platinum mining

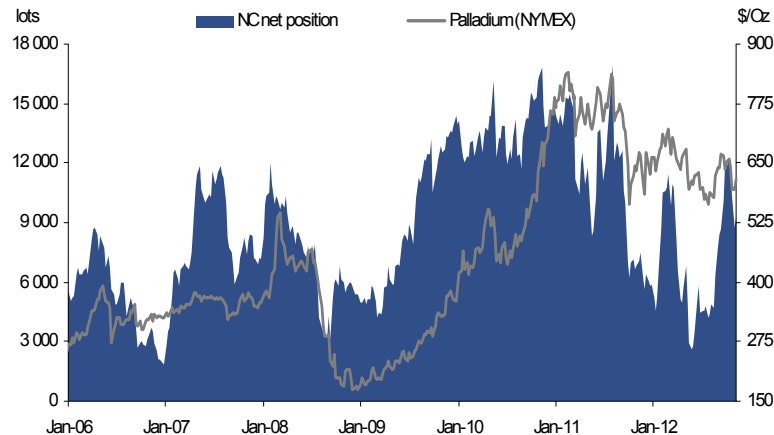
- There have been a number of supply side disruptions in the SA platinum sector during 2012. These include illegal strikes at IMP's Lease area and LON's Marikana mine. To date we estimate that the sector has lost ~360,000 ounces of platinum production from illegal strikes. Refer to our note ["Recap of Strikes: Who Has Lost What"](#).
- We believe union saturation is a key theme which underpins the recent violence we have seen in the SA mining industry. The mining sector is at 81% unionization and unions have no growth vector. This creates inter union rivalry as these unions are fighting for fee paying members. The miners working conditions have been similar since inception of the mines and these social issues are a secondary force rather than the driving force of recent tension. We believe that this inter union rivalry will continue and remains a risk within the SA mining space.

Figure 115. Net non-commercial NYMEX platinum positions vs. Price...



Source: NYMEX, Citi Research

Figure 116. Net non-commercial NYMEX palladium positions vs. price



Source: NYMEX, Citi Research

Figure 117. Expect platinum/palladium spread squeezed in 2013, as palladium outperforms



Source: Bloomberg, Citi Research

Appendix A-1

Analyst Certification

The research analyst(s) primarily responsible for the preparation and content of this research report are named in bold text in the author block at the front of the product except for those sections where an analyst's name appears in bold alongside content which is attributable to that analyst. Each of these analyst(s) certify, with respect to the section(s) of the report for which they are responsible, that the views expressed therein accurately reflect their personal views about each issuer and security referenced and were prepared in an independent manner, including with respect to Citigroup Global Markets Inc and its affiliates. No part of the research analyst's compensation was, is, or will be, directly or indirectly, related to the specific recommendation(s) or view(s) expressed by that research analyst in this report.

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