

# The New Abnormal

## 2013 Commodities Outlook

- **Seeking alpha in commodities in the years ahead poses challenges, as it is now clear that the commodity super-cycle is over.** No longer will a pure long-only strategy bring the returns expected in 2002-2008. Nor will conditions approximating those of the last decade return any time soon.
- **What first occurred in US natural gas – a marshalling of capital and a new supply surplus – is being replicated across most commodities,** including critical industrial and bulk commodities and in other longer-lead time products such as oil, even with risks to supply disruptions.
- **Two structural shifts in China are also forcing a re-evaluation of commodity demand;** including lower-paced growth and a far less commodity-intensive economy.
- **A global rebound in commodities demand is anticipated, perhaps by the end of 2013,** given all of the policy stimuli packages that are being implemented. Some markets will tighten more quickly than others, but as demand rebounds along with global growth, commodity prices are unlikely to move sharply higher.
- **As demand rebounds, commodity performance is likely to become more differentiated,** with winners and losers depending on the supply/demand balances for individual commodities.
- **Seasonality has been on the rise over the past few years, particularly in oil and agriculture,** impacting fuel and food and through them inflation rates across the world. This increase reflects changing precipitation and temperature as well as changing inventory patterns.
- **Radically changing conditions are also at work.** In oil there has been a marked increase in the normal scale of supply disruptions doubling from 400-500-kb/d pre-Libyan revolution, buoying prices. Globally grains are seeing more extreme weather as part of a new “ab” normal as well.
- **Enhanced seasonality, commodity differentiation and macro conditions will continue to create new long-short strategic opportunities and new ways to invest across different asset classes,** combining commodities with foreign exchange as well as other asset markets including equities.
- **Exceptional rewards from tail risk events** should continue to make commodities an attractive investment vehicle for a wide array of portfolio managers, as no other asset class provides such an opportunity from wildcards.

- Commodities
- Quarterly

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

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## 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
<b>Energy</b>															
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	3.50	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
<b>Base Metals</b>															
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
<b>Precious Metals</b>															
COMEX Gold	USD/T. oz	1,770	1,770	1,050	1,691	1,613	1,654	1,760	1,679	1,790	1,750	1,735	1,720	1,749	1,655
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	1,556	1,650	1,650	1,700	1,700	1,675	1,775
Palladium	USD/T. oz	627	744	600	683	630	613	627	638	700	725	750	800	744	925
<b>Bulk Commodities</b>															
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
<b>Agriculture</b>															
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	1,335
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

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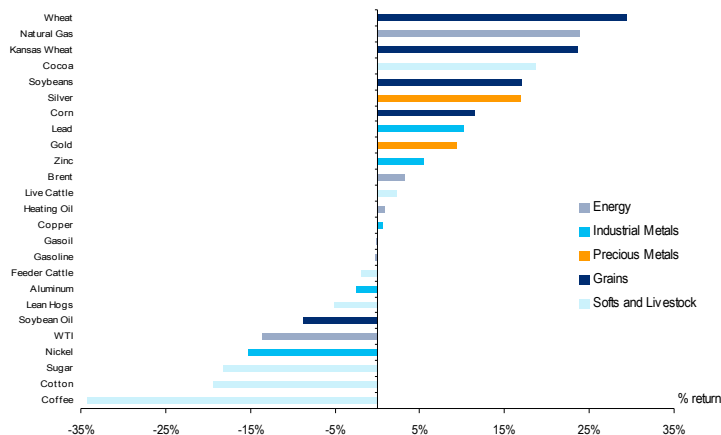
# Macro

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## 2012 in Retrospect, 2013 in Prospect

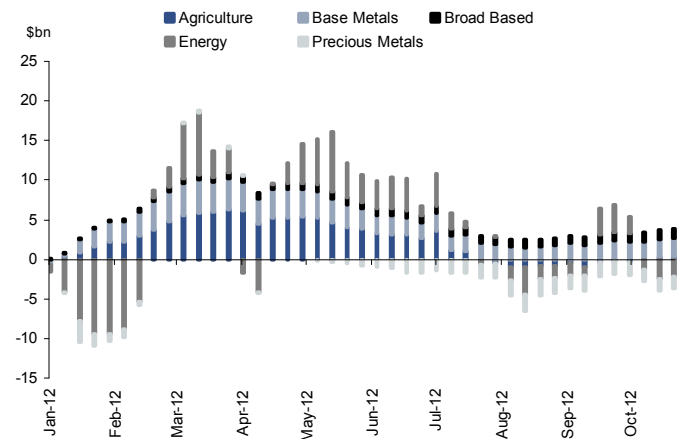
- 2012 has been a mixed year for commodities, with significant volatility and differentiation between commodities. Energy commodities, with the exception of US natural gas (+24%) and US-based West Texas Intermediate crude oil (-14%), have essentially returned to the levels they started in the beginning 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.
- Citi's 2012 Annual Outlook and 2Q'12 quarterly update discussed the potential impact of tail risks, such as geopolitics, extreme weather, the ongoing European sovereign debt and banking crisis, a potential "sudden stop" in Chinese growth, and the US fiscal cliff. The 3Q'12 update discussed the rising seasonality of commodities, highlighted by the record-breaking US drought, while the 4Q'12 update discussed the impact of the various unconventional balance sheet expansions by the world's central banks on nominal commodity prices. All of these themes- tail risks, extreme seasonality, and interrelationship with broader global macroeconomic and political forces- are part of the "new normal" or "abnormal" for commodities and are at the crux of Citi's commodities forecast for 2013.
- Financial investment into commodity indices has in aggregate moved sideways paralleling range-bound prices. Citi estimates that total Assets under Management (AUM) in benchmark commodity indices have stabilized around \$240-250bn. In the energy commodities, most investment flows occurred early in 2012, with YTD cumulative investment troughing at -\$9.5bn and peaking at +\$7.5bn in May. But since then, both investment in energy and agricultural commodities have faded away. Only net investments in base and precious metals have remained relatively stable at about +\$2.3bn and -\$1.5bn respectively. Citi expects aggregate financial investment into commodities to continue to remain stable, but masking significant sector-specific net flows and movement into relative value and alpha strategies.

Figure 2. YTD Nominal Commodity Price Returns\*



Source: Bloomberg, Citi Research, \*through 15<sup>th</sup> November 2012

Figure 3. YTD Cumulative Index Investment by Sector (Weekly)\*

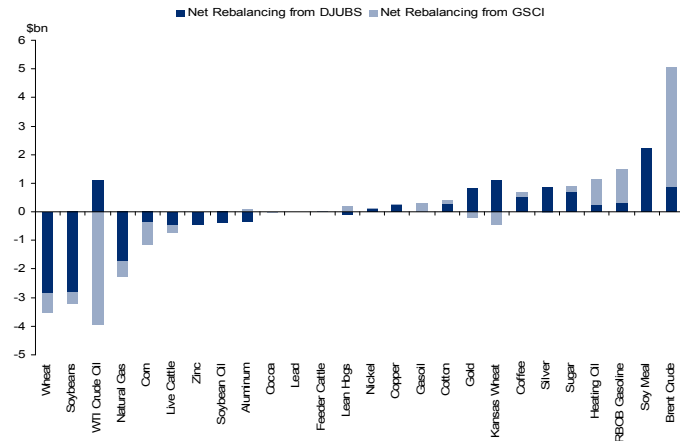


Source: CFTC, Citi Research, \*through 23<sup>rd</sup> October 2012

## Commodity Index Rebalancing and Exchange Traded Products

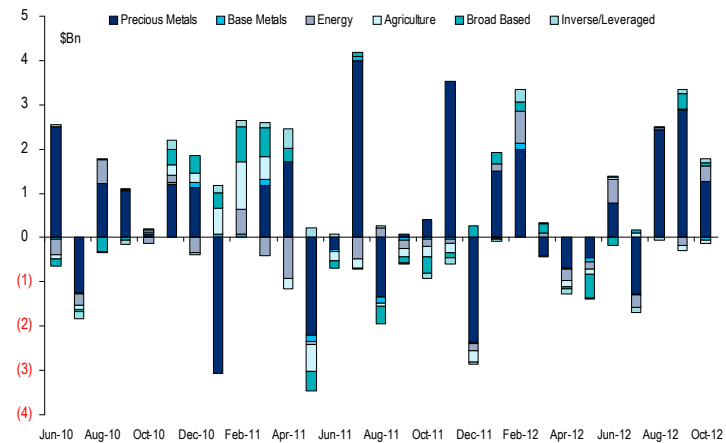
- As the end of 2012 approaches, benchmark commodity indices such as the S&P GSCI and the DJ-UBS announced their new target weights for 2013. Assuming current weightings do not substantially change by end of year due to price effects, estimates can be made as to the net financial inflows and outflows in each commodity due to this annual index rebalancing.
- With about \$100bn of assets under management (AUM) in the S&P GSCI and another \$85bn in the DJ-UBS, the scheduled 2013 rebalancing sees significant redistribution effects across commodities. Brent crude oil, soybean meal, and RBOB gasoline lead the commodities that should see significant net inflows by both index benchmarks, with Brent in particular seeing about \$5bn in net inflows; \$4.2bn from the GSCI rebalancing.
- On the other side of the spectrum, wheat, soybeans, and WTI crude oil should see significant net outflows, with wheat leading at -\$3.5bn, -\$2.9bn of that from the DJ-UBS rebalancing. WTI Crude oil is another significant loser, suffering -\$3.9bn in outflows from the GSCI although this is somewhat offset by an estimated +\$1.1bn in inflows from the DJ-UBS index.
- Investment in listed commodity exchange traded funds (ETF) continued to grow this year and is likely to remain a popular if imperfect method for institutional or retail investors to garner exposure to the asset class. While roll-risk can hinder total returns, particularly for US energy-linked funds, ETFs have proliferated in large part due to their ease of use and low fees. With AUM around \$125bn, the 'gold-dominated' product group has had net inflows of approximately \$9.3bn year-to-date (compared to about \$1.5bn in net inflows for all of 2011). In 2012, \$8bn alone is due to flows into precious metal and physical gold funds.

Figure 4. Net flows Generated by DJ-UBS and SPGSCI Index 2013 Rebalancing



Source: Bloomberg, Dow Jones, Citi Research

Figure 5. Commodity-Linked Exchange Traded Fund (ETF) Net Flows\*

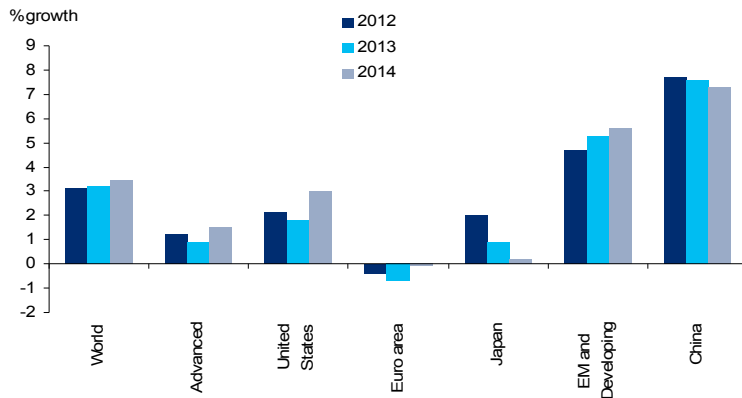


Source: Citi Research, \*biased to US listed products, through October 2012

## Where has the Growth Gone?

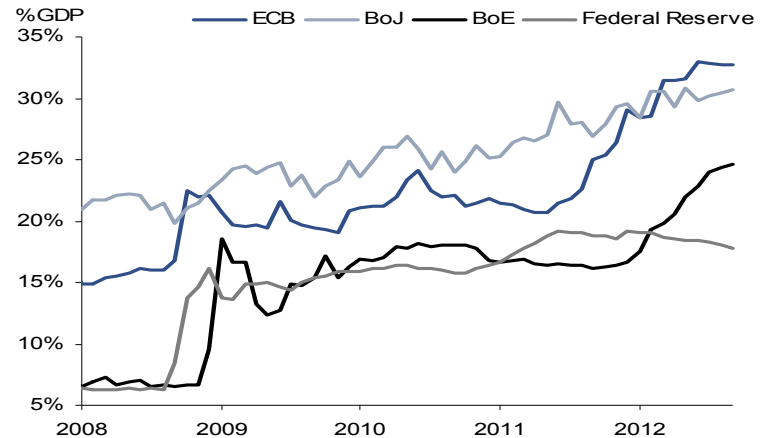
- Despite hopes for a solidifying recovery from the 2007-09 recession, global growth has remained underwhelming, especially in the advanced economies. In Citi's October Global Economic Outlook and Strategy report, Citi forecasted that the world would grow only +3.1% in 2012, after growing +3.8% in 2011. 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 6. Citi Economic Forecasts for 2012-2014 for Selected Economies and Regions



Source: Citi Research

Figure 7. Balance Sheets as % of GDP for Selected Central Banks

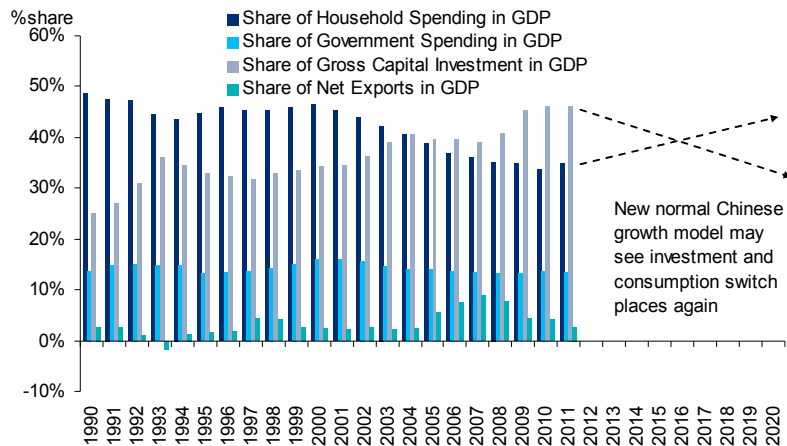


Source: Various central banks, Citi Research

## 'Made in China' to 'Bought in China'

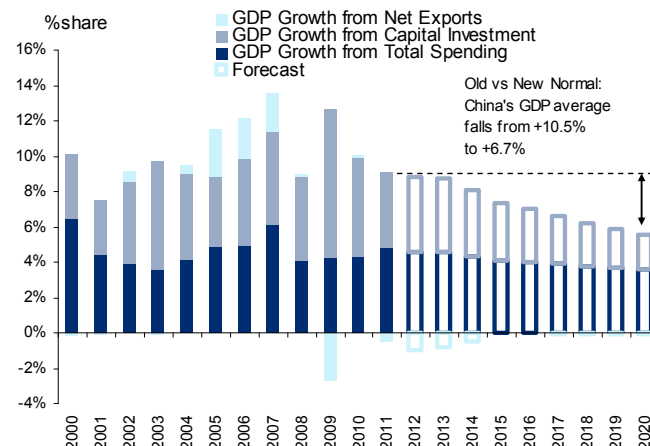
- Not only is the absolute level of Chinese growth expected to decline, but the composition of Chinese growth is also expected to shift away from raw materials-intensive manufacturing and investment and toward more “balanced” sources of growth such as household consumption and services. In a sense, this 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 8. Share of Spending, Investment, and Net Exports in Chinese GDP



Source: Haver Analytics, Citi Research

Figure 9. Sources of Chinese Growth and Forecast to 2020



Source: Citi Research



## Implications for Chinese Commodity Demand

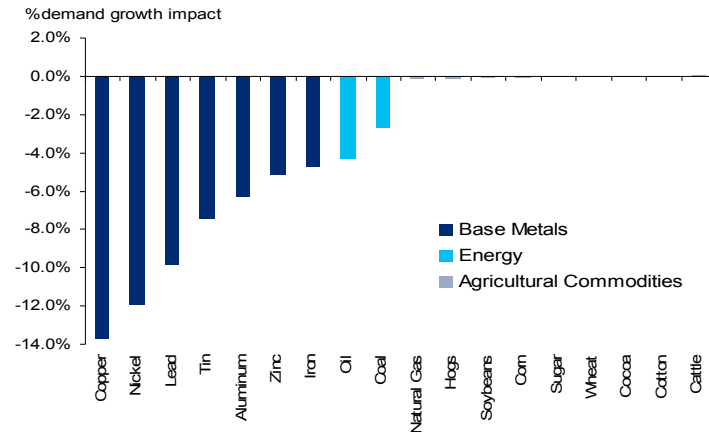
- Both the overall slowing and the restructuring of the Chinese growth model should mark a watershed in global commodity markets, if only because China had played such an outsized role in global commodity markets in the past decade. For many industrial metals, China in fact was responsible for all of 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 10. Share of China in World Commodity 2011 Demand and 1995-2011 Demand Growth



Source: Citi Research

Figure 11. Impact on Commodity Demand Growth of Chinese “New Normal”

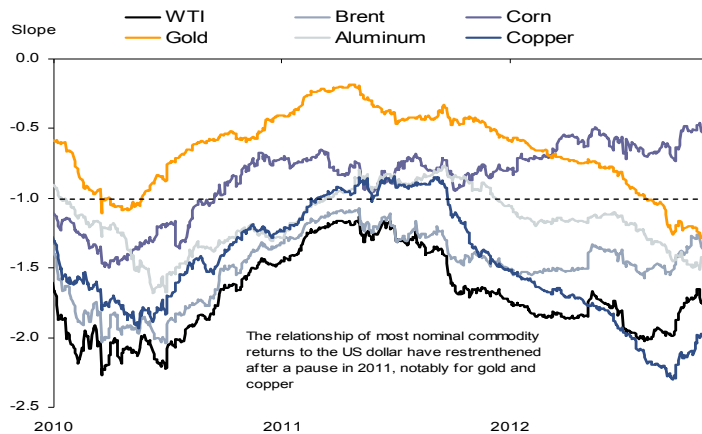


Source: Citi Research

## Dollars and FX Effects

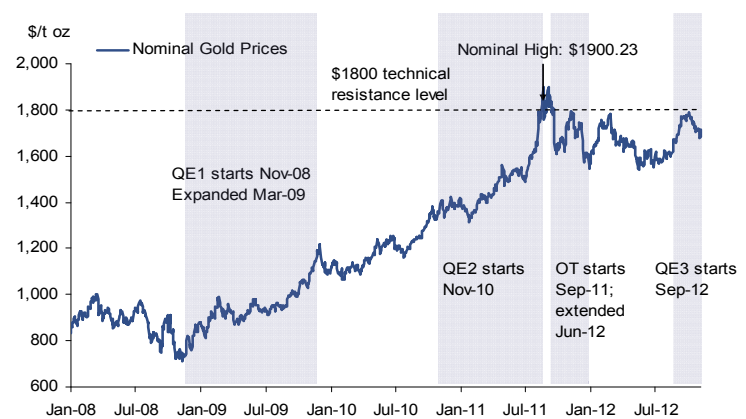
- Given the stressed macroeconomic outlook, risk-off/on factors and currency denomination effects, such factors should remain a significant influence on the direction of dollar-denominated commodity prices. In particular, since the beginning of 2012, commodity-currency relationships have strengthened 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 give historical trends and all-else-equal, drive a -10 to -20% downward pressure on nominal commodity prices.

Figure 12. Regression slopes of nominal commodity prices to the US dollar



Source: Bloomberg, Citi Research

Figure 13. Nominal gold prices and CB easing...

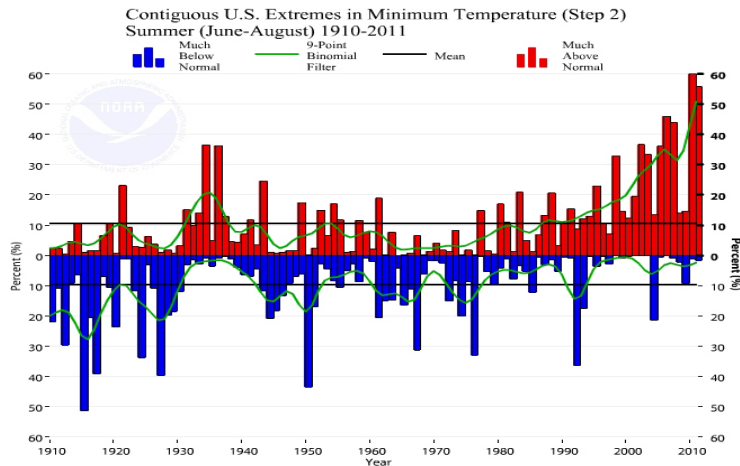


Source: FOMC, Citi Research

## Droughts, Floods and Storms

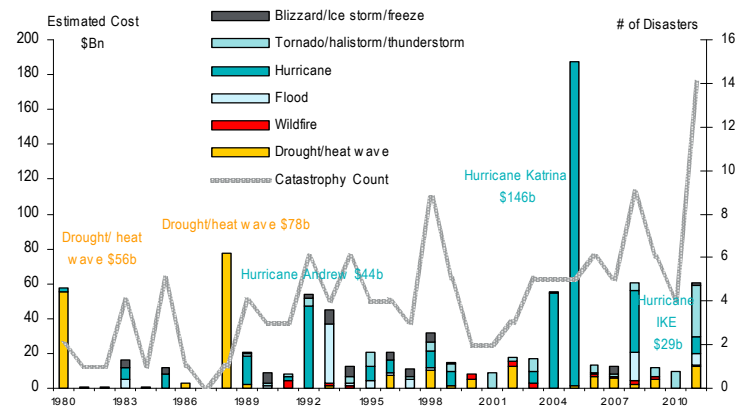
- Not only could 2013 mark a turning-point in the overall direction of commodity flat prices, but also may mark a period of ever greater seasonal gyrations in commodities prices. This may feature particularly strongly in energy and agricultural commodities, as extreme weather, temperature, drought and floods, hurricanes and other natural disasters strain the ability of global commodity demand and supply sources to equilibrate. Already, global grain prices have skyrocketed in response to a record-breaking drought in the US breadbasket. Historical data from the National Oceanic and Atmospheric Administration point to a trend of increasing incidences of extreme heat in the continental United States. But this is only part of a broader picture of more abnormal inclement weather patterns around the world.
- The US has witnessed more ‘billion dollar’ weather disasters in recent years. The number of such events, including hurricane, storm, flood, blizzard, drought and wildfire, blows to the peak of 14 times in 2011, which almost pares that of entire decade from 1980 to 1988 (16 times). At the same time, the nation suffered more from non-drought type of weather disasters. Compared with drought responsible for 72% of loss in 1980s, hurricane, flood and storms are causing majority of loss after 2000 (leaving aside the 2012 impacts of the ‘once-in-a-century’ drought that impacted the US farm-belt last summer).
- Some of these secular risks appear to be prevalent in other asset markets. Catastrophic (CAT) bonds are such an example. A higher level of cat bond coupon spreads in recent years—despite a tight credit spread environment—might be indicating a higher possibility of expected loss by investors. Vol spikes (corresponding to a major catastrophe taken place in the US) of the total return spread curve would consist of more fluctuations later periods, demonstrating the fact that markets are experiencing more disasters than the norm and that it might not be adequately priced. With commodities inexorably linked to such natural events, investor appetite has also grown for hard asset exposure and commodity derivatives. Central bank data show global OTC commodity derivative contracts had an outstanding net notional of \$2.9tn and a gross market value of \$390Bn at the end of 2011. This is double the notional and gross market values held by the Street and investors at the end of 2005 and quintuple the \$0.6tn notional amount outstanding at the end of 2000.

Figure 14. % of US Lower-48 Land Area Experiencing Temperature Extremes



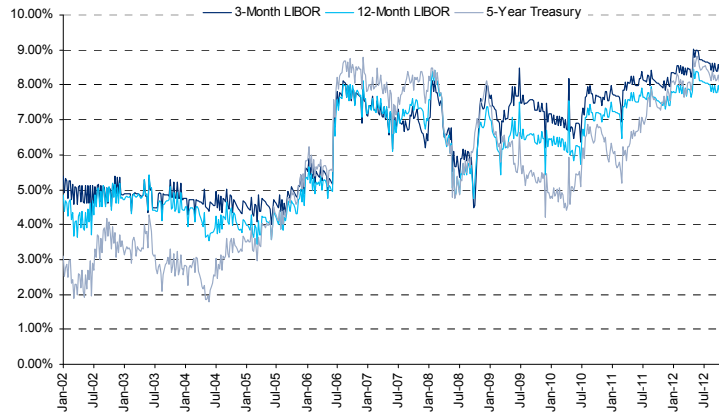
Source: NOAA

Figure 15. An Era of Multi-Billion Dollar Weather related natural disasters in the US\*?



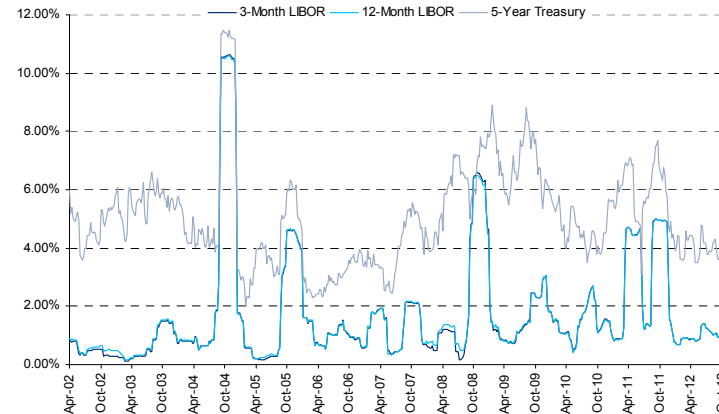
Source: BLS, NGM, NOAA, Citi Research, \*Exceeds \$1Bn threshold; estimated cost adjusted using 2011 US CPI

Figure 16. CAT Bond Coupon Spreads



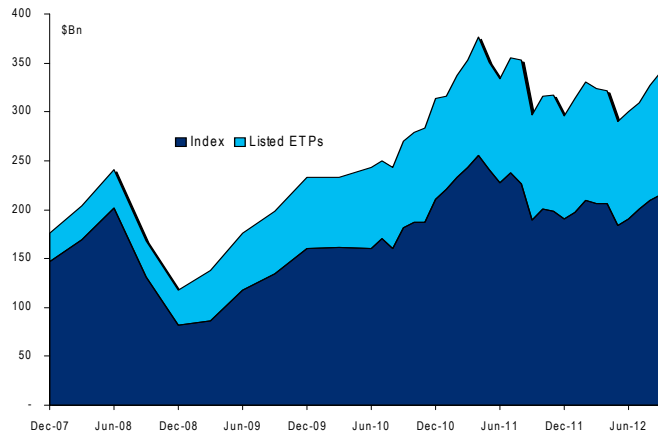
Source: Bloomberg, Citi Research

Figure 17. Three-Month Volatility of Total Return Spread\*



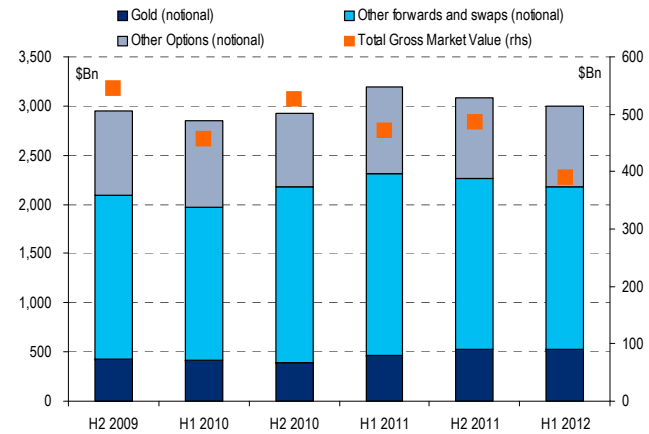
Source: Bloomberg, Citi Research, \*Swiss Re CAT Bond Index

Figure 18. Retail and Institutional Commodity Assets Under Management\*



Source: Citi Research, \*biased to US flows

Figure 19. Notional and Gross Market Values – OTC Commodity Derivatives

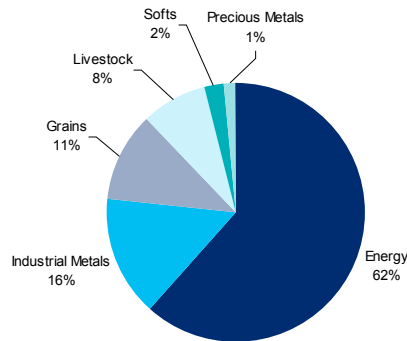


Source: BIS, Citi Research

## Smart Beta and Alpha Rising

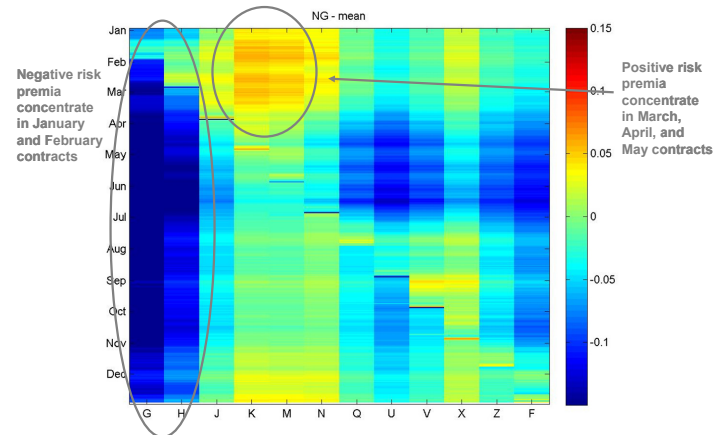
- As simple long-only strategies lose attractiveness in the face of the end of the commodity super-cycle and extended periods of negative roll yield, investors may shift to more enhanced-beta or alpha-focused commodity strategies, such as calendar spread strategies or discretionary relative value trades.
- Investor interest in commodities to protect against unexpectedly high inflation may also grow as global policymakers continue to provide monetary largess in the face of fiscal austerity and weak economies, heightening the risk of overpowering general deflationary weakness and un-anchoring inflationary expectations. Recent publications such as “Commodity Beta: Inflation Protection” published March 8, 2012 and the Citi CHIPS index introduced July 24, 2012 discuss Citi’s research into the inflation-hedging properties of commodities relative to other asset classes in asset allocation.
- The “new normal” for weather should add both volatility in commodity prices and drive higher seasonality-driven risk premia in commodity markets. This also provides new opportunities for investors. The figure on the right is taken from a recent publication “Commodity Alpha: Seasonality” published October 8, 2012 which discusses how investors can exploit seasonal patterns in commodity risk premia to gain outperformance.
- Citi’s 2013 Annual Commodities Outlook concludes that the “new normal” economic, geopolitical, and weather environment should result in generally lower demand, with prices likely to be range-bound with more downside pressures than upside (with some exceptions in the precious metals and grains). On the other hand, tail risks may pressure producers to suspend or limit capital expenditures in new sources of supply, sowing the seeds of a subsequent “supercycle” in the next half-century.

Figure 20. Citi CHIPS Commodity Sector Weights for 2012



Source: Citi Research

Figure 21. Heat Map for Natural Gas Futures Risk Premia

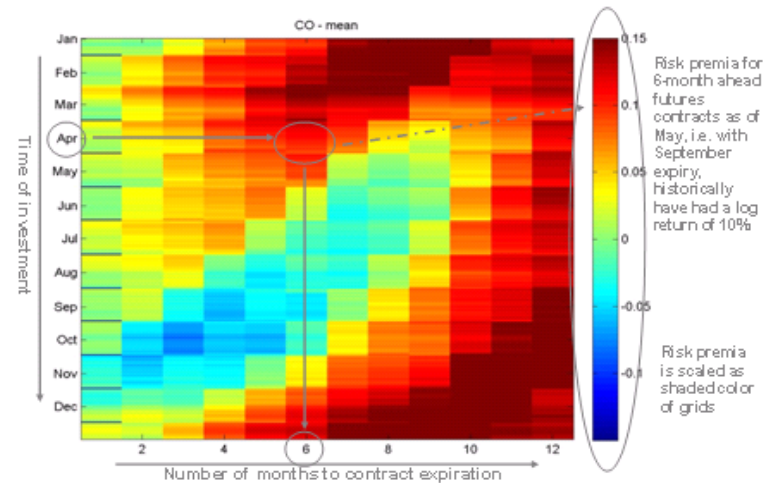


Source: Citi Research

## Seasonality becomes more pronounced in normal markets – especially in oil and agriculture

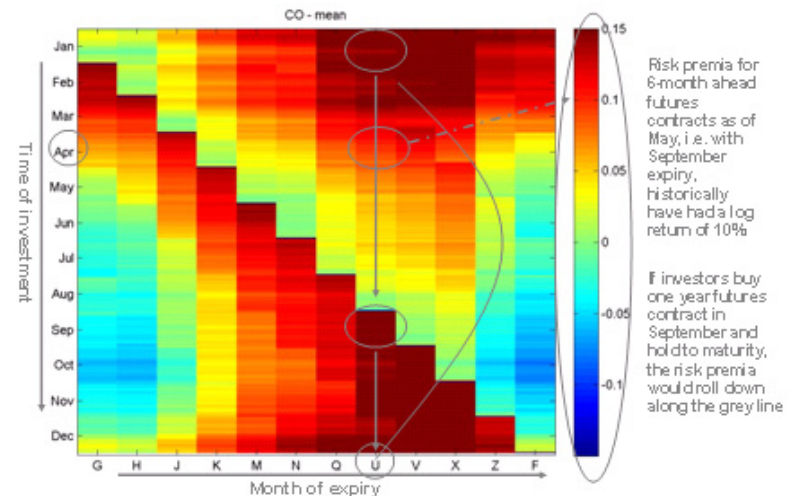
- The fundamental drivers of the increase in seasonality in normal markets for oil can be seen in the refining sector.
  - In periods of looser markets, refineries do not need to run as hard throughout the year, so the drop in refinery crude pull would be more pronounced, putting stronger downward pressure on crude during the refinery turnaround season, and tightening product supply.
  - In periods of tighter markets, refineries tend to run at higher utilization rates to build up product stocks, flattening out the seasonal patterns of refinery maintenance, and thus diminishing seasonality in crude and products
- **Seasonal risk premia:** measuring this is challenging because expected spot prices, and therefore risk premia, are directly unobservable. Furthermore, there are potentially two types of seasonality: variations across the contract maturity and variations over the time of the year
- Seasonal risk premia heat maps provide guidance to the investor on both where and when to invest in the futures curve to potentially tap positive or short negative risk premia
- Seasonal risk premia heat map for Brent crude oil:
  - Horizontal axis: number of months to expiry (when to invest)
  - Vertical axis: date of the year of observation (where to invest)
  - The value is the historical performance (in log nominal returns) of the investment in the futures curve held until maturity
  - For September delivery in the same year, would have historically earned a positive outperformance of +11%
- **Brent crude oil displays significant seasonality, with positive risk premia peaking at tenures of six months or more.**
- The positive risk premium remains for perhaps six months, until the September-dated contract reaches the April immediately before contract expiration.
- An alternative way to show the same heat map
  - The horizontal axis, instead of showing the number of months to contract expiration, actually presents the month of contract delivery.
  - 45-degree parallelogram shift of previous graph
  - The contract moves downward instead of moving diagonally

Figure 22. Estimated seasonal risk premia map for Brent Crude Oil, by time of observation and the number of months to expiration



Source: Citi Research

Figure 23. Tracking changes in risk premia over the delivery month

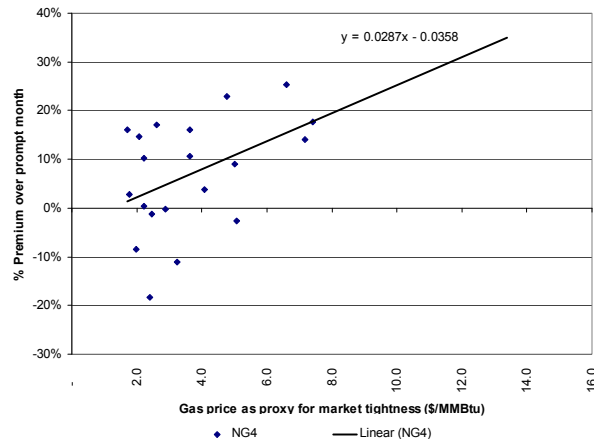


Source: Citi Research

## Seasonality more pronounced in tight markets – the case of natural gas

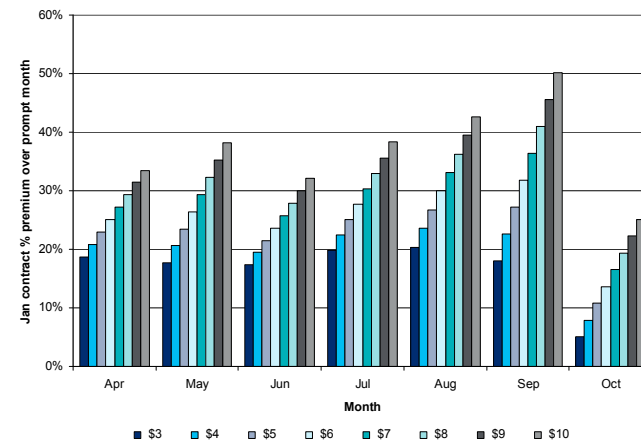
- The natural gas market is highly seasonal, given weather’s impact on demand. Demand peaks in winter months for heating, where on extreme cold days total demand could be double the demand on mild days. Demand also rises in summer, as gas is used as a fuel for power generation. The drought in the US not only helped to raise temperatures, but the lack of water also affected the operation of coal and nuclear power plants, thereby calling up gas-fired generation as a substitute and raising gas demand. On mild days, demand falls sharply.
- The deliverability of commodity, as in the case of gas supply, can affect the premium or discount on prices. When the market is or is expected to be tight, demand high and infrastructure constrained, the premium built in to both spot prices and forward contracts (eg. convenience yield) can surge. This could accentuate the appearance of seasonality. At the spot level, scarcity pricing would push prices even high, especially when the pipelines and storage fields are constrained, limiting their deliverability. At the forward level, the need to secure supply beforehand when such scarcity might be expected, either by securing the right or by buying and storing the commodity, typically pushes forward prices higher. Hence, winter European gas prices tend to be high because of a much smaller total storage capacity to demand and that a few major suppliers dominate the sector. However, if such scarcity is no longer a major concern, as the deliverability improves on the supply side, either by having greater access to supply or that supply itself is more abundant, then the premium built into the spot price or forward price should fall. This gives the appearance that seasonality might have weakened. US winter gas prices are not as high as even a few years ago
- Using the prompt month flat price gas as a proxy for market tightness (high price denotes tighter markets), the graphs show the January contracts’ percent premium over the October contract rises as the market becomes tighter. The trend lines that compare the Jan contracts’ premium over various months and across different flat price gas. Our analysis shows that this phenomenon of rising percent premium in tighter markets applies to all months from March to December.

Figure 24. January natural gas contracts’ percent premium over the October contract



Source: Citi Research

Figure 25. Jan contracts’ percent premium over other months across different flat price gas



Source: Citi Research

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# Energy

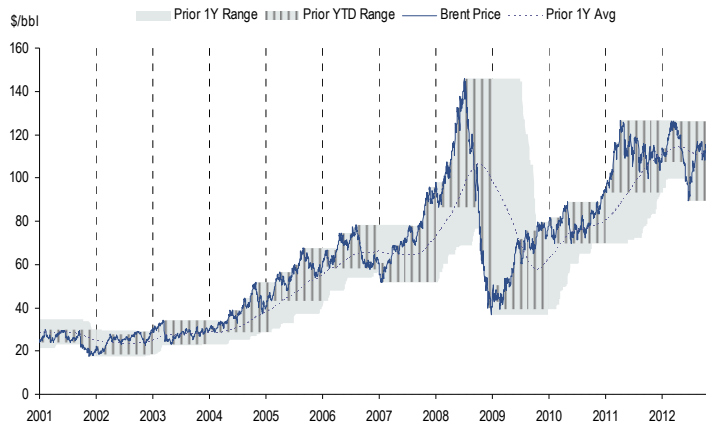
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## Crude Oil and Petroleum Products 2013 Outlook: Hail to the New Abnormal

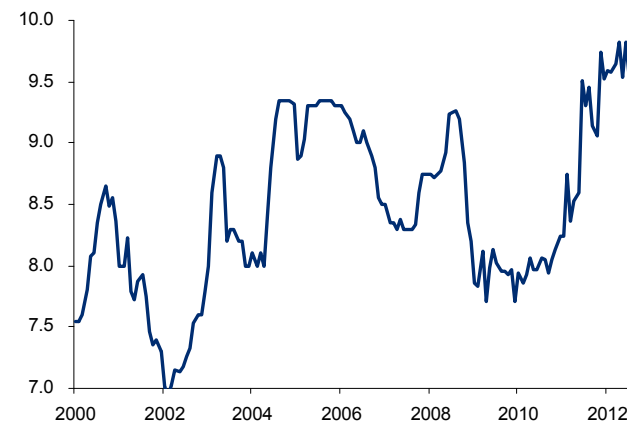
- Citi expected 2012 to be dominated by tail risks and this indeed proved to be the case** as the low level of spare capacity left the market vulnerable to supply disruptions, and the disruptions came thick and fast from Iran, Sudan, the North Sea and Hurricane Sandy to name just a few. Filling the gaps meant Saudi Arabia producing close to 10-m b/d for much of the year leaving little by way of spare capacity. The change in the supply outlook, driven by US tight oil plays, the return of Iraq and maturation of ultra deep water means the market is in the process of normalizing, i.e. rebuilding a cushion of spare capacity. This process involves weaker markets and lower prices pushing Saudi Arabia to pull back on production. Citi expects this process to begin in 2013, with both global oil demand and non-OPEC crude supply forecast to grow by ~0.9-m b/d, but the rise in NGL production (360-k b/d) and Iraqi production (430-k b/d) pressuring a removal of some 0.8-m b/d of OPEC barrels if significant stock builds are to be avoided.
- Higher levels of persistent supply disruptions.** A potential supply cornucopia comes at a time of heightened levels of geopolitical tension and globally diverse supply disruptions at the 1-m b/d level, rather than the historical 400-500-k b/d level; tail risks to upside and downside seem to be increasing in geopolitics as well as weather and technical issues; and meanwhile, even the North American supply revolution creates its own dynamics that could heighten geopolitical tension further – as it reduces import dependence from West Africa, Middle East, Venezuela, Mexico, global oil prices are pressured downwards as OPEC and other producer countries' fiscal breakevens continue to rise in the wake of the Arab/MENA Spring.
- Oil demand in the New Abnormal:** demand growth remains subdued with oil prices remaining a burden on global economy, even if they should ease slightly, in our view; meanwhile, the shale revolution increases pressure from natural gas on light ends, and through substitution of diesel fuel by LNG/CNG in natural gas vehicles. China's oil demand growth has weakened – while it should strengthen somewhat with stimulus, there is also a rebalancing from industrial activity to consumption. And, could the Middle East make good on its rhetoric to shift its direct crude burn for power gen to natural gas?

Figure 26. Brent crude oil prices, 2001-2012 (\$/bbl)



Source: Bloomberg, Citi Research

Figure 27. Saudi crude oil production, 2000-2012 (m b/d)



Source: EIG, Citi Research

## Global Oil Balances in 2013

- Citi remains bearish on Brent prices, forecasting a calendar average of \$99/bbl in 2013.** The big picture: the oil market is in the process of normalizing, that is, rebuilding a buffer of spare capacity. The way in which this happens would be for weaker markets to pressure Saudi Arabia (with some help from some other core OPEC members) to pull back on production. Citi has projected a 800-k b/d cut in Saudi production in 1H'13.
- Citi sees demand growth to rise to a higher – but still subdued versus recent years – +0.9-m b/d in 2013 on a global basis** (versus +0.6-m b/d in 2012), with a 0.6% fall forecast for OECD demand, led by Europe with a 2.2% decline. Non-OECD countries account for all of the demand growth, led by Asia, but with Latin America and the Middle East all making significant contributions.
- Non-OPEC supply is similarly forecast to increase by 0.9-m b/d,** driven by North America, but the growth out of Iraq (in OPEC but not subject to any quota as yet, though this is likely to be a contentious issue at OPEC's December meeting in November) in 2013 is conservatively forecast at 430-k b/d, with significant upside potential. With NGLs and Iraqi production also set to rise, this puts pressure on the "call on OPEC crude".

Figure 28. Citi global oil supply-demand balance 2012-13, actual and projected (m b/d)

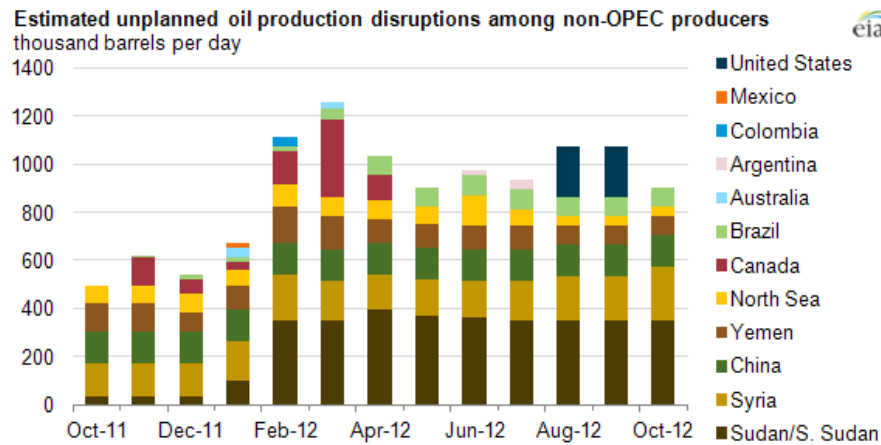
Demand	1Q12	2Q12	3Q12	4Q12	1Q13	2Q13	3Q13	4Q13	2012	2013	YoY	YoY%
North America	23.4	23.7	23.9	23.8	23.6	23.5	23.8	23.7	23.7	23.6	-0.05	-0.2%
OECD Europe	13.8	13.8	14.1	13.8	13.6	13.4	13.6	13.6	13.9	13.6	-0.30	-2.2%
OECD Asia	9.1	8.0	8.0	8.6	8.9	8.0	8.2	8.9	8.4	8.5	0.08	1.0%
<b>OECD demand</b>	<b>46.2</b>	<b>45.5</b>	<b>46.0</b>	<b>46.2</b>	<b>46.1</b>	<b>44.9</b>	<b>45.6</b>	<b>46.2</b>	<b>46.0</b>	<b>45.7</b>	<b>-0.27</b>	<b>-0.6%</b>
China	9.6	9.2	9.3	9.7	9.6	9.6	9.7	9.9	9.4	9.7	0.25	2.7%
India	3.7	3.7	3.5	3.8	3.8	3.8	3.6	3.9	3.7	3.8	0.12	3.3%
Other Asia	7.6	7.6	7.7	7.6	7.7	7.8	7.8	7.8	7.6	7.8	0.15	1.9%
Africa	3.5	3.4	3.4	3.4	3.5	3.5	3.4	3.5	3.4	3.5	0.07	2.1%
Non-OECD Europe	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.00	-0.4%
FSU	4.5	4.6	4.6	4.7	4.7	4.6	4.8	4.9	4.6	4.7	0.15	3.2%
Latin America	6.3	6.4	6.7	6.5	6.6	6.7	6.7	6.6	6.5	6.7	0.19	2.9%
Middle East	7.2	7.7	8.2	7.6	7.5	7.9	8.3	7.8	7.7	7.9	0.20	2.6%
<b>Non-OECD demand</b>	<b>43.0</b>	<b>43.4</b>	<b>44.0</b>	<b>44.0</b>	<b>44.1</b>	<b>44.6</b>	<b>45.0</b>	<b>45.2</b>	<b>43.6</b>	<b>44.7</b>	<b>1.13</b>	<b>2.6%</b>
<b>Total Demand</b>	<b>89.2</b>	<b>88.9</b>	<b>90.0</b>	<b>90.2</b>	<b>90.3</b>	<b>89.6</b>	<b>90.6</b>	<b>91.4</b>	<b>89.6</b>	<b>90.4</b>	<b>0.86</b>	<b>1.0%</b>
Supply	1Q12	2Q12	3Q12	4Q12	1Q13	2Q13	3Q13	4Q13	2012	2013	YoY	
North Sea	2.9	2.7	2.3	2.6	2.6	2.5	2.3	2.5	2.6	2.5	-0.15	
FSU	12.5	12.4	12.4	12.5	12.7	12.6	12.5	12.5	12.5	12.6	0.11	
United States	6.2	6.3	6.2	6.6	6.7	6.9	7.0	7.1	6.3	6.9	0.60	
Canada	3.1	3.1	3.3	3.4	3.3	3.4	3.4	3.5	3.2	3.4	0.21	
Mexico	2.5	2.5	2.5	2.6	2.7	2.7	2.7	2.7	2.5	2.7	0.16	
Brazil	2.2	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.0	2.1	0.01	
<b>Total Non-OPEC crude</b>	<b>42.3</b>	<b>41.8</b>	<b>41.3</b>	<b>42.2</b>	<b>42.7</b>	<b>42.8</b>	<b>42.6</b>	<b>43.1</b>	<b>41.9</b>	<b>42.8</b>	<b>0.92</b>	
Iraq	2.7	2.9	3.1	3.1	3.2	3.3	3.4	3.5	2.9	3.4	0.43	
Iran	3.4	3.1	2.8	2.7	2.8	2.8	2.8	2.8	3.0	2.8	-0.20	
<b>OPEC crude</b>	<b>31.4</b>	<b>31.7</b>	<b>31.3</b>	<b>31.2</b>	<b>31.0</b>	<b>30.7</b>	<b>30.9</b>	<b>31.0</b>	<b>31.4</b>	<b>30.9</b>	<b>-0.49</b>	
NGL production	12.6	12.5	12.7	12.8	12.9	12.8	13.0	13.3	12.7	13.0	0.36	
Biofuels	1.6	1.8	2.2	1.9	1.9	1.8	1.8	1.8	1.9	1.8	-0.04	
<b>Total Supply</b>	<b>87.9</b>	<b>87.8</b>	<b>87.5</b>	<b>88.2</b>	<b>88.5</b>	<b>88.2</b>	<b>88.4</b>	<b>89.3</b>	<b>87.8</b>	<b>88.6</b>	<b>0.74</b>	
Stock change	1.6	1.9	0.5	0.9	1.2	1.7	0.9	0.9				

Source: Citi Research

**Oil: ...but this is as heightened levels of globally diverse supply disruptions characterize the New Abnormal**

- **Globally diverse supply disruptions have moved to a higher background level** since February 2011 (more in the 1-m b/d range than at more modest, historical 500-k b/d levels), even as major headline supply disruptions – Iran since 2012, Libya in 2011 – remain and new ones could arise in an era of heightened geopolitical tail risks. Venezuela bears watching in 2013, if Chavez’s health worsens. The situation in Syria shows no sign of improving, with potential spillovers to Lebanon, and the Turkish and Israeli border areas. Yemen continues to struggle with repeated pipeline blasts. Despite some optimistic reports and a landmark deal on pipeline tariffs, Sudanese crude exports are not expected back much above a trickle until later into 2013. Libya has resumed much of its pre-conflict oil production quickly, but internal divisions remain and terrorist activity could manifest itself more, after the Benghazi attack on the US consulate. Nigeria has seen flooding and pipeline sabotage disrupt supply.
- **The Arab/MENA Spring has ushered in a new geopolitics of oil**, with rising government expenditure on social programs pushing fiscal breakevens higher, even as the North American supply revolution progressively weakens the bid on OPEC producer countries’ crude oil and is a deflationary force on global oil prices; this tension puts pressure on these producer countries, and could even lead to failed states in an already unstable region.
- **Technical challenges and potentially increasing occurrence of weather-related disruptions continue to ail oil production in globally diverse locations.** The North Sea looks to see ongoing challenges and production declines and disruptions.

Figure 29. Non-OPEC unplanned production outages, Oct'11-Oct'12 (k b/d)



Source: EIA

Figure 30. Strait of Hormuz and selected regional pipelines

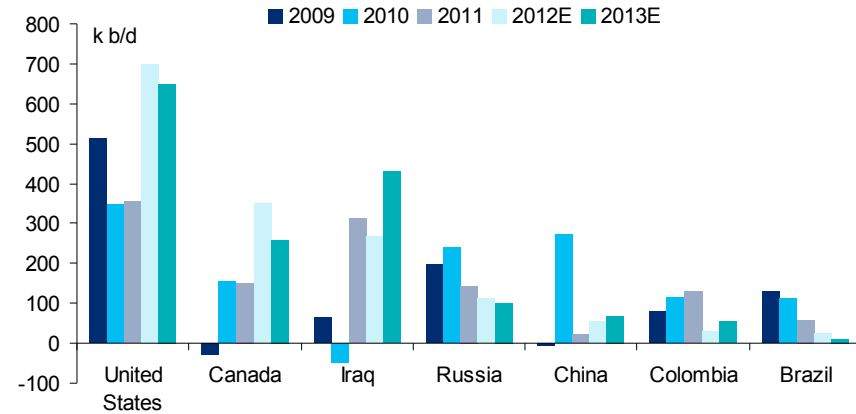


Source: EIA

**Oil: A look at the balances...**

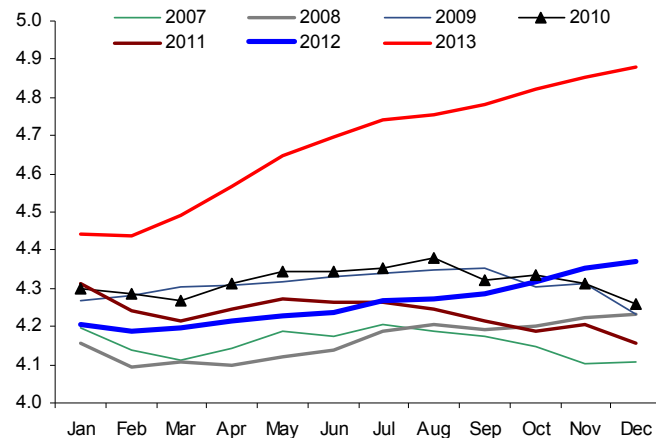
- **The large implied inventory surplus in 2012 is reasonably borne out by the inventory data** – OECD inventories rose by 161-m bbls through October in 2012, with large stock builds in China also implied by the discrepancy between imports, production and refinery runs. The market in 2012 was able to bear these builds for two reasons: global inventories outside observable areas appear snug; and geopolitics, specifically Iran but also Syria, provided an extra bid to markets.
- In 2013, barring a further escalation in geopolitical tensions, the Chinese stockpiling of crude looks set to slow, and even in terms of days of supply the balance looks unsustainably heavy. For this reason, coupled with the need to address the rise of Iraqi production outside of OPEC’s quota system, **the OPEC meeting in December could potentially be the most contentious, and interesting, in a long while.**

**Figure 31. Crude and NGL supply growth in selected fast-growing countries 2009-13E**



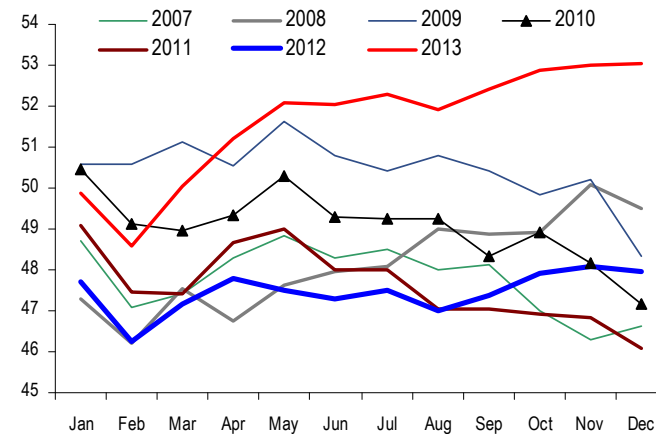
Source: IEA, Citi Research

**Figure 32. OECD stocks, 2007-13, actual and projected (m bbls)**



Source: IEA, Citi Research

**Figure 33. OECD stocks in global days of supply, 2007-13, actual and projected (m bbls)**

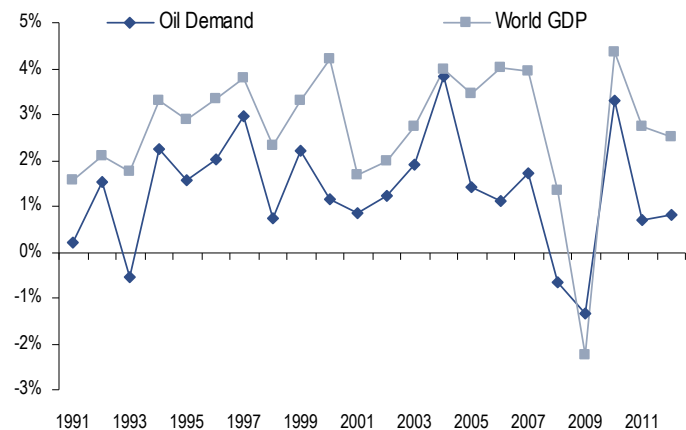


Source: IEA, Citi Research

**Oil demand remains weak as prices remain a burden on the world economy in the New Abnormal**

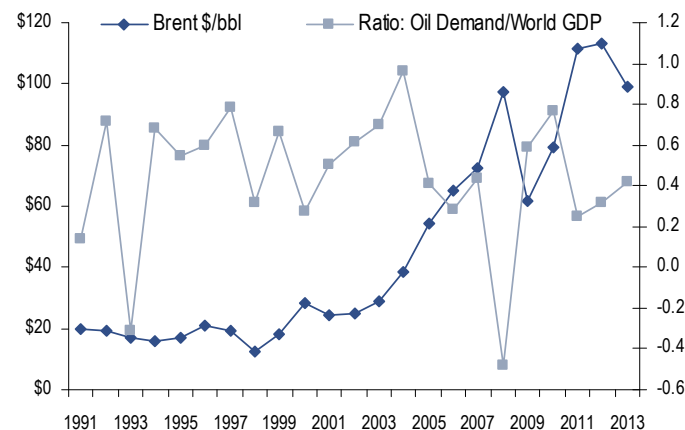
- **The structural move in oil prices over the last decade has pushed the oil demand/GDP ratio lower**, and although Citi is moderately bearish on oil prices into 2013, we expect them to stay at levels that keep the oil demand/global GDP ratio subdued. Our economists are expecting global real GDP growth of 3.2% in 2013 and our forecast for +0.9-m b/d of demand growth (1% y-o-y) is in line with this "New Abnormal" of oil demand.
- **Two-track demand continues:** OECD demand continues to decline, with anemic economic growth post-Recession, but other factors contribute to a structural decline in OECD oil consumption too - demographics, fuel efficiency, and going forward, potentially burgeoning substitution of transportation fuels away from gasoline and diesel to natural gas, electric vehicles. Global oil demand growth is driven entirely by the non-OECD, as OECD demand declines 270-k b/d y-o-y., with most of this fall from OECD Europe; Japan and OECD Asia could see very tepid growth, with a weak Japanese economy and the post-Fukushima push a thing of the past. The non-OECD countries could see growth of 1.1-m b/d, driven by China and India, but also Latin America, the Middle East and the FSU.
- **The shale gas revolution foreshadowed the shale oil revolution, and low US natural gas prices are also putting pressure on oil in other ways:** transportation substitution via NGV development, beginning with the heavy-duty truck fleet, should increase going forward, but also refinery use of natural gas, pressure on light ends from natural gas and NGLs, and in the longer-term, potential easing of direct crude burn for power generation in the Middle East, although this remains doubtful

Figure 34. Oil demand growth versus world real GDP growth, 1991-2012



Source: IMF, IEA, Citi Research

Figure 35. Brent prices versus the oil demand/world GDP ratio, 1991-2012

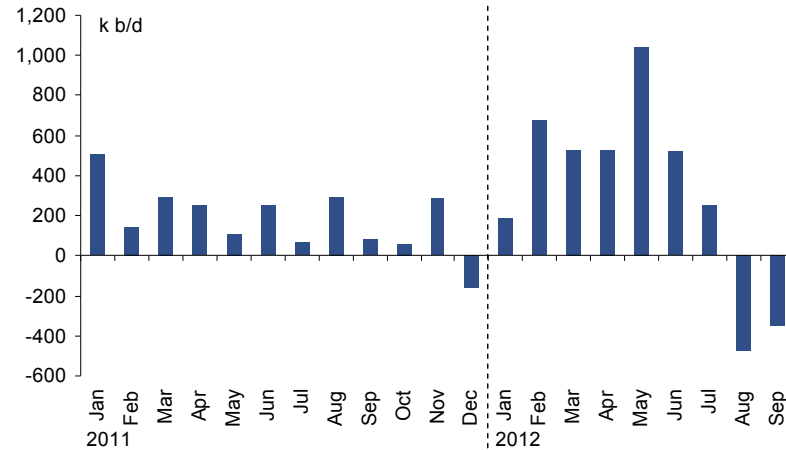


Source: IMF, IEA, Citi Research

### China's appetite for oil: demand growth easing, restocking and rebalancing?

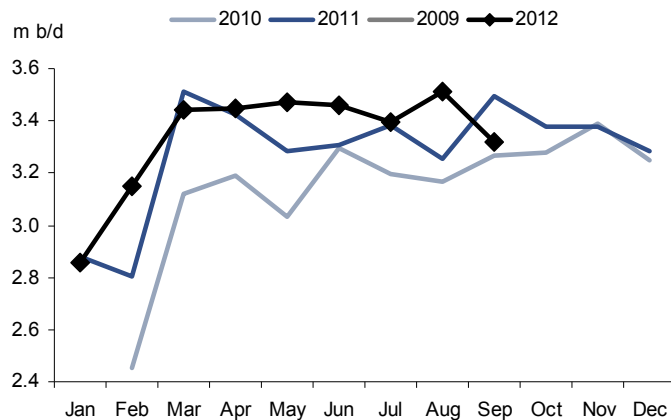
- **Chinese economic indicators have been weak but appear to be improving somewhat, except for the continued worrying presence of high coal inventories.** There are prospects for further substantial stimulus with the new leadership transition, but this could be subdued, and not be impactful on oil demand until 2H'13. Citi sees Chinese oil demand growth at ~250-k b/d in 2013.
- **Crude imports rebounded to 5.6-m b/d levels in October**, close to Jan-May 2012 levels (although this was as China was building strategic and commercial stocks), while refinery runs hit a new high in September, although this looks partly due to restocking after drawing down product stocks over the summer, as well as seasonal demand for harvesting and fishing.
- **As the Chinese economy rebalances away from industrial-led growth to consumption-led growth – and to a lower structural level of incremental growth – diesel demand growth eases while gasoline demand growth rises.** Urbanization remains a driver of oil demand growth. Going forward big questions also remain on how much Chinese crude demand could be boosted by the building up of logistical stocks, strategic stocks, and direct crude burn.

Figure 36. China implied stock builds (crude production plus net imports less refinery runs)



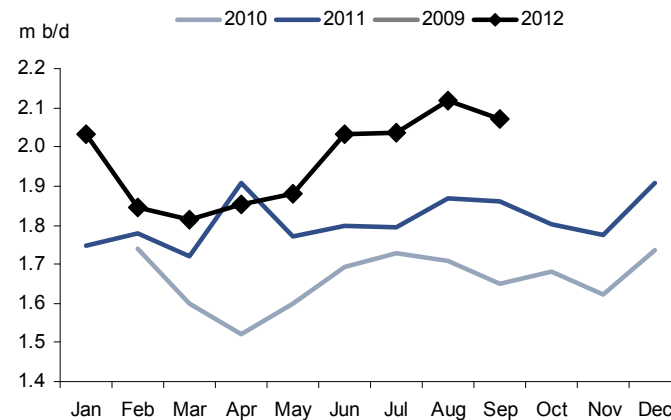
Source: China Customs, China National Bureau of Statistics, Citi Research

Figure 37. Chinese diesel demand growth has remained tepid



Source: China Customs, Citi Research

Figure 38. Chinese gasoline demand growth looks strong

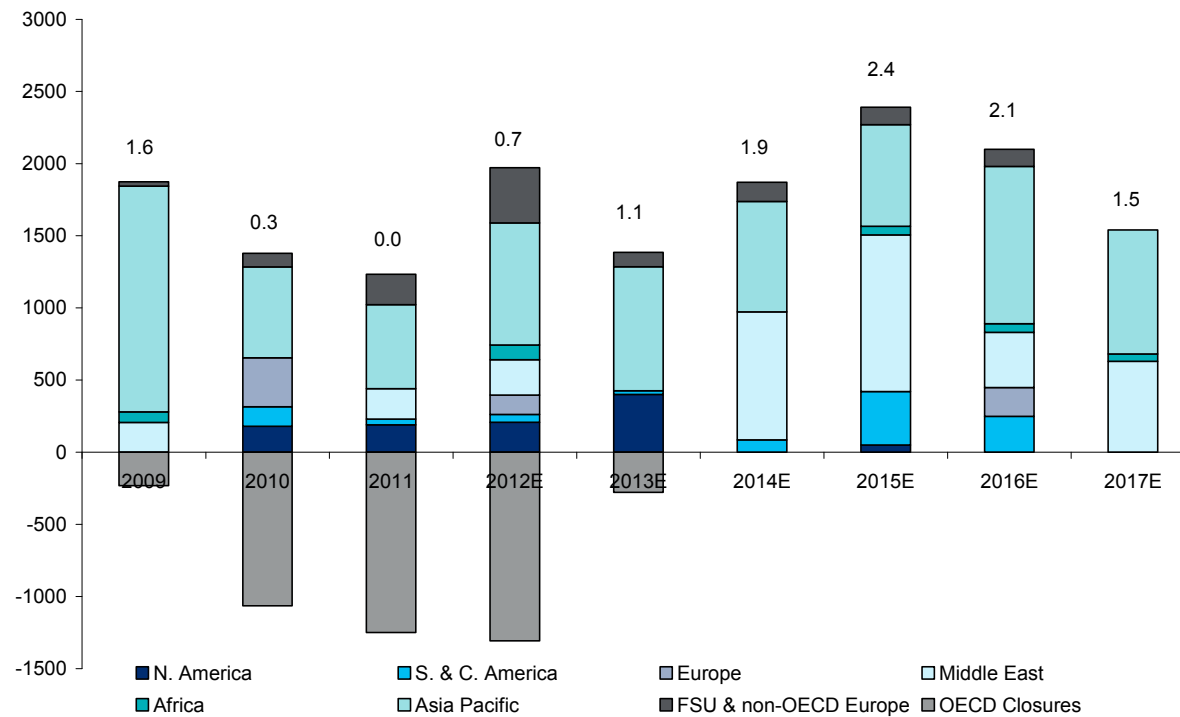


Source: China Customs, Citi Research

**Oil: Refinery capacity additions to accelerate in the coming year**

- **The surge in refining capacity over the next few years comes at time of subdued oil demand growth**, leaving the outlook for refining margins challenged at best.
- **2013 sees Motiva and Jubail hitting their stride, with the Pearl GTL plant also reaching full capacity.** Citi expects to see another 200-k b/d of closures in Europe in 2013 as the refining industry in the region continues to suffer from anemic demand and expensive feedstock. The WTI discount to Brent should narrow but remain a plus for US refiners and expect to see record product exports from the US in 2013.

**Figure 39. Gross CDU capacity additions/closures by geography (k b/d), and net capacity additions (m b/d), 2009-2017, actual and projected**

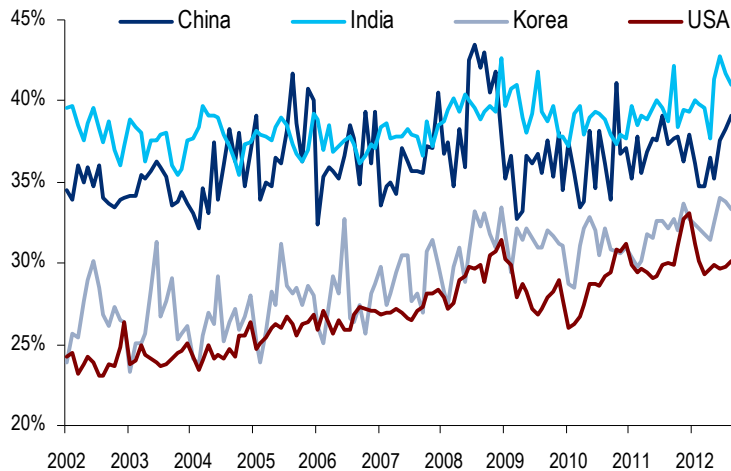


Source: Citi Research

**Oil: Middle distillates may drive demand growth, but refiners have already responded**

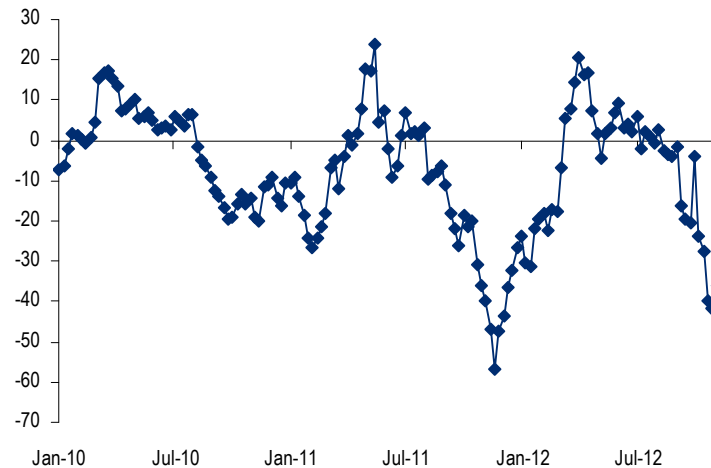
- **At various stages over the last few years there has been a mismatch between refinery yields of middle distillates and their proportion of product demand growth**, meaning that a 1-m b/d growth in refining capacity provided inadequate middle distillates to a market where total product demand growth was also 1-m b/d. Refiners have however responded to the relative pricing incentives and have been structurally increasing their distillate yields across the globe, greatly reducing this mismatch. This further erodes one of the key bullish drivers for oil markets on the products side.
- **The rise of the US as a significant LPG/naphtha exporter due to surging shale gas production is resulting in dramatic weakness in RBOB in winter time, but harder-to-produce summer specification RBOB has continued to perform** as reduced refining capacity in Europe has left the US short of the required blending components in summertime. Citi expects this seasonal pattern to continue in 2013 and possibly beyond.

Figure 40. Gasoil yields as % of crude throughput for key countries, 2002-12



Source: IEA, JODI, Citi Research

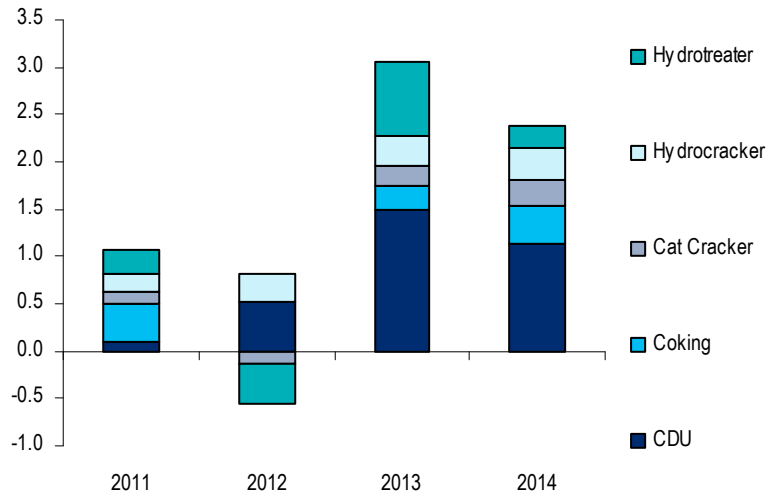
Figure 41. Rolling prompt RBOB – Heating Oil differential (c/gal), Jan 2010-Nov 2012



Source: Bloomberg, Citi Research



Figure 42. Global refinery capacity additions by unit type, 2011-14



Source: Citi Research

**Oil: Global refinery capacity growth concentrated in Asia, Middle East, Latin America**

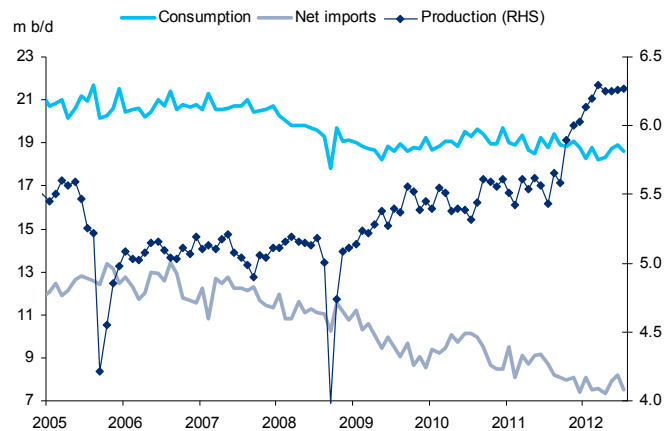
- **After two years of dramatic rationalization, the refining industry is once again on the cusp of an era of significant expansion of capacity** as projects which have been delayed either by external events or the weak demand environment finally come on line.
- **In the near-term, Motiva’s Port Arthur 325-k b/d refinery expansion is expected to start in early-2013, and Jubail in Saudi Arabia is now expected to start producing in 2Q 2013.** This 400-k b/d refinery should neatly plug Saudi Arabia’s 200-k b/d diesel import requirement in the summer and give the Kingdom net positive export availability over the rest of the year.
- **Middle East refinery runs were down y-o-y in 2012 due to lost Syrian and Iranian capacity, but the start up of Jubail should take Middle East runs to new highs.** And Jubail is only the first of three significant refinery additions coming over the next few years.
- **The shutdowns at Hovensa and Aruba slashed Latin American refinery runs in 2012.** There has been talk of a buyer for Aruba but there has been little obvious progress. The Amuay explosion further cut into regional capacity, and more problems in Venezuela are likely given the clearly perilous state of the refining system.
- **A series of refinery projects in Brazil have been delayed, with expected capacity growth over the next few years slashed from 400-k b/d to just 115-k b/d.** Brazil’s RNEST refinery (230-k b/d) was due to start up in 2013 but the project has now been delayed until late 2014. Colombia’s Cartagena refinery expansion project (to double capacity to 220-k b/d) is now not expected to be running until early 2014, so the Latin American pull on the Gulf Coast for product supplies looks set to continue through 2013 and probably beyond.
- **Although much of the Gulf Coast exports should be pulled to Latin America, flows from the US to Europe and to Africa should also increase, as should flows from Asia as that region’s capacity expansion continues.** The shift of several Mediterranean countries from gasoil importers to exporters further pressures middle distillates in Europe; more refinery closures in Europe look likely.

## Crude Oil Supply Outlook

### Geopolitics remain a wildcard even as the US and Canada lead a global supply revolution

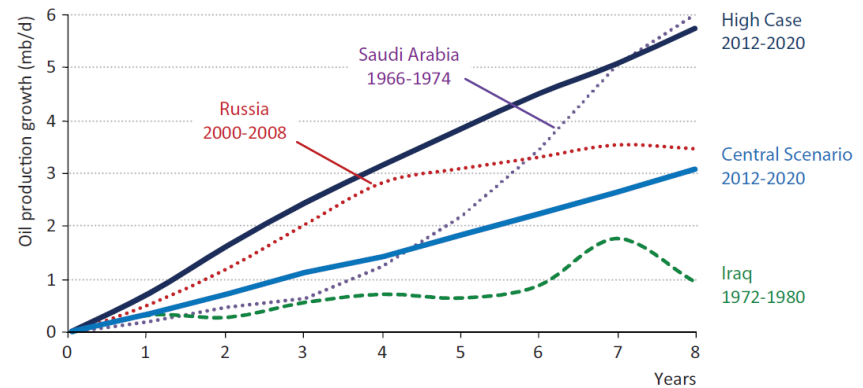
- **Globally diverse supply disruptions have moved to a higher background level** of ~1-m b/d or more, with Iranian sanctions reducing the Islamic Republic's crude exports, and the threat of an attempted closure of the Strait of Hormuz, or wider conflict in the region. Civil war in Syria continues. Venezuela bears watching in 2013, if Chavez's health worsens. Yemen, South Sudan, Nigeria and a host of other individually small, but collectively significant supply disruptions seem to contribute to a structural "new abnormal", keeping oil markets tighter.
- **Yet non-OPEC supply, combined with NGLs and Iraq, looks to grow faster than global demand, reducing the "call on OPEC crude"**. The US and Canada lead a supply growth charge, but Russia, Colombia, Kazakhstan, Mexico, and Brazil should also contribute to total non-OPEC supply growth of +0.9-m b/d in 2013. Iraq also could grow 430-k b/d or more. If Sudan, Yemen, Syria and other disrupted non-OPEC producers come back, this could add further to non-OPEC supply. NGLs add further growth that puts pressure on OPEC to cut production.

Figure 43. As US crude production has surged while demand is in structural decline, net imports have been falling substantially



Source: EIA, Citi Research

Figure 44. Iraqi oil production looks set to grow strongly to 2020

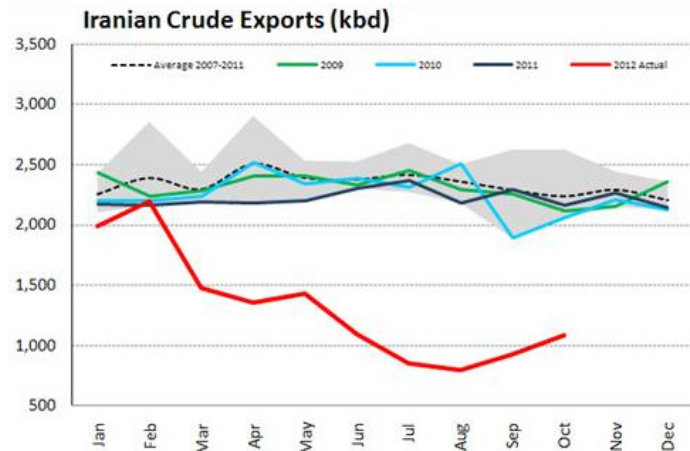


Source: IEA, Citi Research

**Oil: Iran sanctions continue to bite, and 2013 could see tensions escalate – or ease**

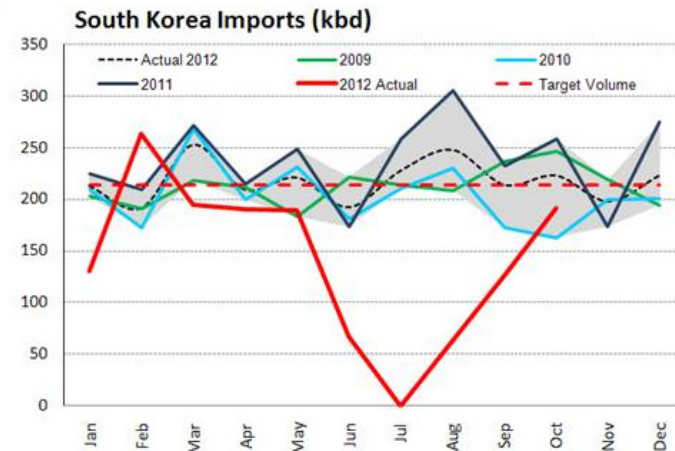
- **The Iranian sanctions impact is likely to ease somewhat in the short-term as Asian imports return.** Iranian exports fell in July as the US sanctions took effect along with the EU oil embargo. The EU and South Korea reportedly took zero Iranian crude in July and some of the crude market strength was due to late minute scrambling for replacement barrels. But more Iranian output is finding its way to market in 4Q, as both Japan and India worked out state-backed supplementary insurance schemes to cope with the loss of key protection and indemnity cover. South Korea has increased its imports of crude from Iran since August and as of October was back close to 2011 levels. **However, new EU sanctions on condensates and petrochemicals should add to new Iranian export restrictions. And when renewals of the US waivers come around, Asian buyers of Iranian crude could well see significant new pressure to reduce their Iranian exports.**
- **In 2013, the prospect for Israeli hostilities comes to the fore again,** with US elections over, and Israeli and Iranian elections to come, although prediction markets have seen the probability of an Israeli airstrike on Iran before end-2013 fall from 50% levels before the November 6 US election to 35% levels as of mid-November 2012. Even so, as Syrian domestic instability increases so too do tensions on Israel's border with Syria, Lebanon and Gaza.
- **Sanctions have materially impacted the Iranian regime through reduced oil revenues, which helped precipitate a collapse of the Iranian rial.** Although the news flow has included a mix of belligerent and conciliatory rhetoric from the Islamic Republic, there are indications that Iran is coming back to the negotiating table. A new date has been set for P5+1 talks in December 2012.

Figure 45. Iranian crude exports remain severely depressed versus 2011 levels



Source: Citi Research

Figure 46. South Korean imports have ramped back up to historical levels

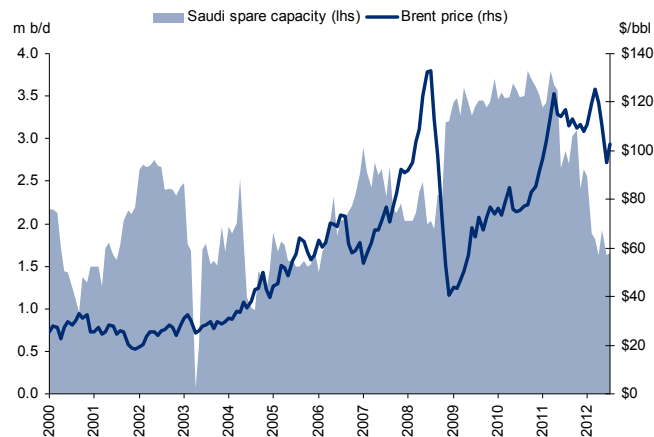


Source: Citi Research

**Oil: Assessing cushions to a supply disruption**

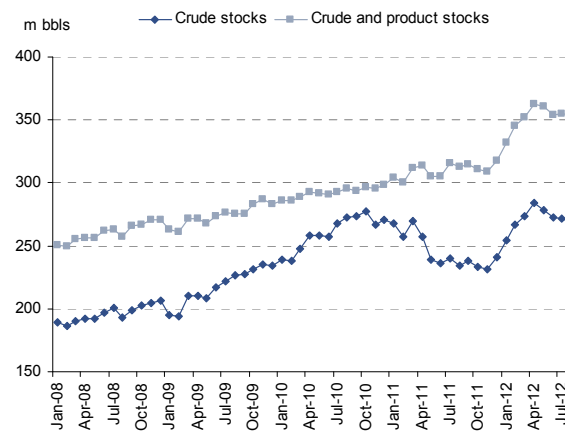
- **Saudi Arabia may have relatively slim spare capacity, but also more to draw on than meets the eye.** Saudi productive capacity is ~12.5-m b/d; with recent production close to ~10-m b/d, this leaves ~2.5-m b/d spare capacity. 0.7-m b/d of this capacity could be too heavy/sour than is demanded by markets, leaving 1.8-m b/d of effective spare capacity. This is around 2% of global requirements and is a slim margin of spare capacity. But the Kingdom also has substantial inventories; they may have some storage outside the Gulf, perhaps 10-15-m bbls, but the majority is in domestic crude stocks, which stand at substantial 269-m bbls; combined crude and product inventories stand at 354-m bbls (according to JODI).
- **The US Strategic Petroleum Reserve is a substantial 700-m bbls of crude oil, but its location and drawdown rate may limit its usefulness.** The US SPR officially claims 4.25-m b/d of daily draw down capacity. Last year's saw maximum flows of 700-850-k b/d, but there may have been redundant capacity available, although markets remain skeptical of US SPR release capacity. But the drawdown could theoretically reach ~2.6-m b/d, though perhaps closer to 2-m b/d.
- **There is growing capacity available to bypass the Strait of Hormuz, to around a third of the 17-m b/d that flows through the key oil chokepoint.** Saudi Arabia's East-West Petroline has been upgraded to 5.1-m b/d, with perhaps half in use, half capacity in reserve. Saudi efforts to add diluent to increase flow rates could enhance this nameplate capacity further. The recently refurbished IPSA line is back to crude service at 1.65-m b/d. And the UAE recently opened its Habshan-Fujairah pipeline, the ADCOP, which is another 1.5-m b/d. The spare capacity on the East-West Petroline, plus IPSA and ADCOP, come to ~5.7-m b/d of spare capacity, or around a third of the volumes that pass through the Strait. The remaining ~11.3-m b/d would have to be covered by the IEA countries in a complete disruption scenario, but given an increasing amount of Middle Eastern oil goes to Asia – with many non-IEA members – there is a clear question about the strategic stocks in those countries, particularly China and India.

**Figure 47. Saudi spare capacity and Brent prices, 2000-12**



Source: EIG, JODI, Citi Research

**Figure 48. Saudi crude and product stocks (m bbls) at a total 354-m bbls**



Source: JODI, Citi Research

**Oil: Iraq is leading a surge in OPEC availability**

- **Iraqi exports are up 400-k b/d year-to-date and could surge further by year-end, accelerating into 2013**, depending partly on the Erbil-Baghdad accords.
- **The move by companies out of the South to the North is likely to slow the ramp-up in total production** (given the South's larger starting base), but given nameplate capacity growth in 2013 is approaching 1-m b/d, Citi's forecast of 450-k b/d growth in 2013 could be conservative.
- **IEA's base case outlook for Iraq's oil production is for 4.2-m b/d by 2015 and 6.1-m b/d by 2020**, up from 3-m b/d levels today. This is more modest than Iraq's own targets, but undeniably substantial.

**Figure 49. Iraq existing and planned 2013 and future oil production (k b/d)**

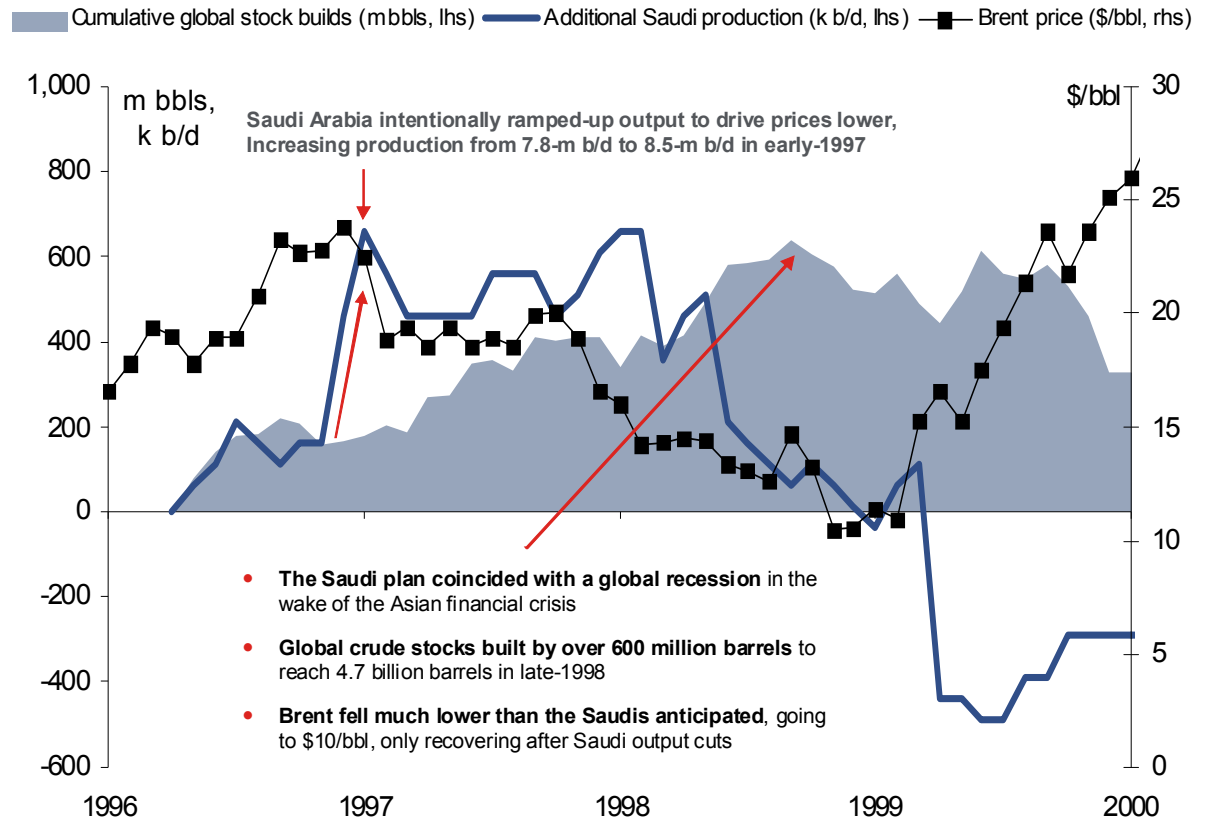
	Operators	Previous Production	Current Production	Likely production within 12 months	Planned Peak Production	Progress Status
<b>Existing Production</b>						
Rumaila	BP, CNPC	1060	1300	1500	2850	Plans to continue ramp up under question after conflicting reports of well decline
West Qurna-I	ExxonMobil, Shell	244	450	600	2325	After Exxon's venture into Kurdistan, questions hanging over continued involvement in this project. Possible disruption to investment if Exxon/Baghdad enter conflict.
Zubair	ENI, Occidental, KOGAS	180	270	500	1200	Last year, ENI announced plans to drill 68 new wells to up production to 700kbpd in 2013
Missan	CNOOC, TPAO	90	95	95	450	Complex of three fields being developed - Fakka, Buzurgan, and Abu Gharb. Production not yet increased, progress to date slow, with first well reportedly dug in June this year.
Ahdab	CNPC*	0	120	130	130	Production from field ceased post 2003 invasion. CNPC contract dating from 1997 renegotiated from Production Sharing to Technical Service in 2010. CNPC has already reached its 120-130 kbpd peak target, 6 years in advance of schedule.
<b>Total</b>		<b>1574</b>	<b>2235</b>	<b>2825</b>	<b>6955</b>	
<b>New Developments</b>						
Majnoon	Shell, Petronas	0	0	125	1800	Shut for repairs since June, Shell has said it may miss the target for first commercial production of 125kbpd by year end, but will have reached this by March 2013 latest
West Qurna-II	Lukoil	0	0	150	1800	Earlier this year, Lukoil announced a major well-digging programme that would lead to production of 150kbpd by 2013
Halfaya	CNPC, Petronas, Total	0	100	130	535	Halfaya came online this June, with 100kbpd, and the plan is to ramp up to plateau production rate by 2017
Gharaf	Petronas, Japex	0	35	60	230	Petronas has announced that it plans to produce 50kbpd by the end of 2012, rising to 60kbpd in 2013, 100kbpd in 2014
Badra	Gazprom, KOGAS, Petronas, TPAO	0	0	0	170	Exploratory Phase ongoing, slow progress to date, not factoring in much from this field.
Qaiyarah	Sonangol	0	0	0	120	Sonangol was the target of terrorist attacks earlier this year, and suffered equipment loss. Their
Najmah	Sonangol	0	0	0	110	
<b>Total</b>		<b>0</b>	<b>135</b>	<b>465</b>	<b>4765</b>	
				<b>330</b>		
<b>Grand Total</b>		<b>1574</b>	<b>2370</b>	<b>3290</b>	<b>11720</b>	
<b>Increase</b>			<b>796</b>	<b>920</b>	<b>8430</b>	

Source: Citi Research

**Oil: Saudi Arabia overproduction still a possibility amid incapacitated leadership and succession challenges**

- **The Saudi oil minister talked down markets this year**, often mentioning a \$100 level as desirable; motivation to pressure Iran, Russia (over Syria) still exists.
- **Meanwhile, leadership issues in Saudi Arabia mean there may not be concerted, coherent decision-making** on changes to oil policy.
- **Given looser balances in 2013 and a lower call on OPEC, Saudi Arabia looks like it needs to cut production** to balance markets.
- **Meanwhile, shifts in Saudi leadership bear watching.** Prince Ahmed was replaced by Prince Muhammad bin Nayef as Interior Minister, perhaps indicating that the King is more open to succession by the younger generation of princes.
- **2013 looks like the year when Iraqi production growth materially impacts the market** and OPEC should have to address both the market impact and the fact that Iraq remains exempt from OPEC quotas for now. The OPEC meeting in December is likely to be contentious as Saudi Arabia should have to corral members back into something resembling a line. The question of who the next OPEC Secretary General will be remains open.

Figure 50. Saudi "overproduction" during an economic recession in 1997-99 led to stock builds, depressed prices

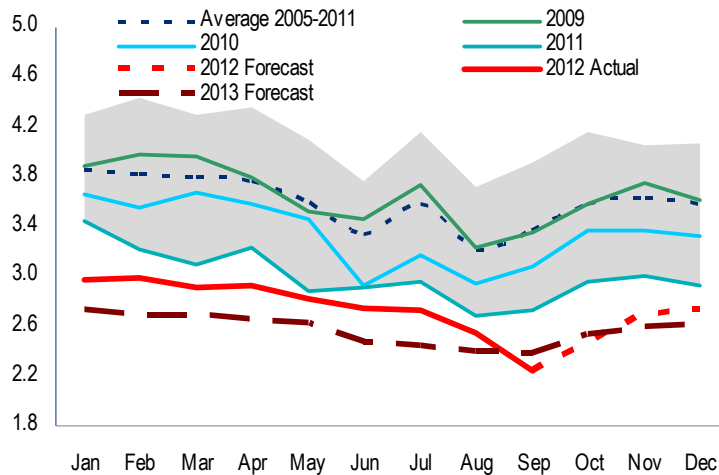


Source: EIG, Citi Research

**Oil: Brent / Northwest Europe balances**

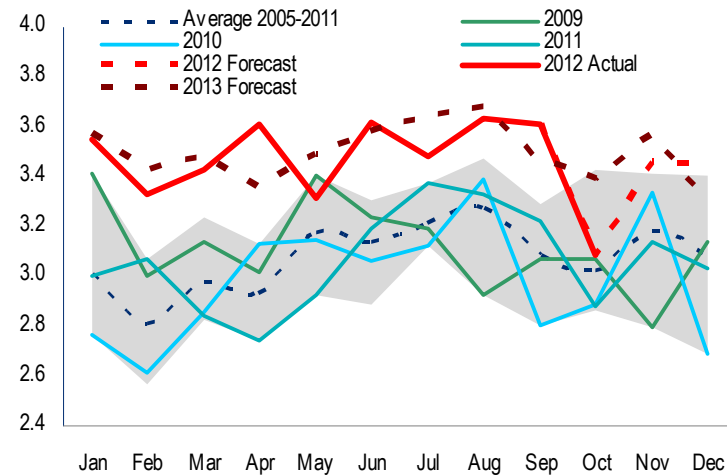
- **Brent is not a perfect price benchmark as it has increasingly seen higher volatility in price and production.** Just as WTI suffers from flaws that leave it a poor reflection of the global crude oil market, Brent also suffers from issues related to the declines in North Sea production. Northwest Europe is structurally short crude, and the steep drops in North Sea production over the last few years are leaving the region increasingly short each year.
- **A new feature of the Brent market is the rise in exports to Korea,** now some 200-k b/d due to incentives created by the recent FTA with the EU. The suspended 3% tax on a VLCC-load of imports is worth some \$8 million per cargo, far more than the transport costs.
- **In 2012, despite the closures of 1.2-m b/d of refining capacity in Europe, robust utilization rates at the remaining refineries meant that European crude demand stayed virtually flat y-o-y.** The sharp drop in North Sea production left Europe to pull in record amounts from West Africa, also requiring a premium for Brent.

**Figure 51. NW Europe monthly crude oil production, 2005-2012 (m b/d)**



Source: Citi Research

**Figure 52. Net monthly crude imports into NW Europe, 2005-2012 (m b/d)**

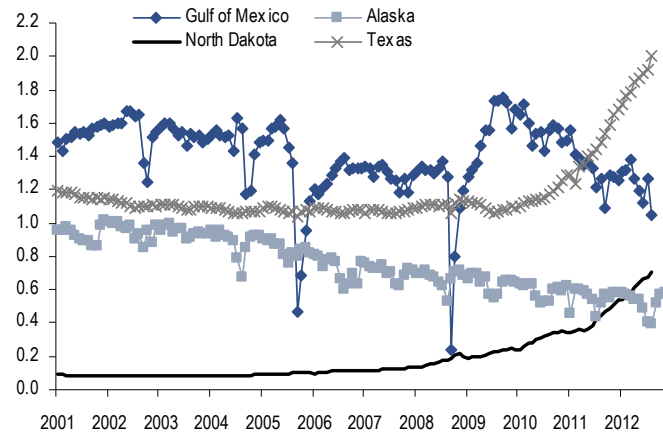


Source: Citi Research

## Medium-term oil outlook: the unconventional revolution in North America has begun

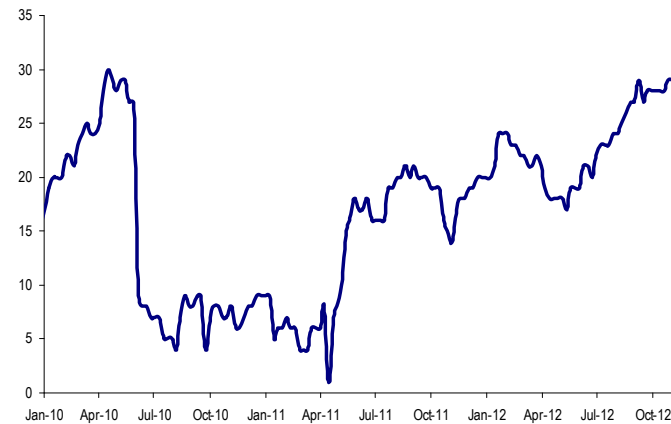
- **Against conventional wisdom from only several years ago, the US has reduced its net crude oil imports drastically over the last five years.** The US increased total liquids production by 2.6-m b/d from 2007-12; combined with reduced consumption, net oil imports fell 4.3-m b/d, more than most countries' oil production except Russia, Saudi Arabia, the US itself, and more than Canada, China, Iran, Iraq, Kuwait, Norway, the UAE, Venezuela...
- **In 2011-12, this growth continued even with a slowdown in the Gulf of Mexico, post-Macondo.** In 2011 the combination of North Dakota and Texas saw crude production rise by +49-k b/d each month; in 2012, this rose to +61-k b/d per month. Issues in the Gulf of Mexico and ongoing declines in Alaskan production weighed on total US production in 3Q 2012, but the start-up of several fields in the GOM and the end of pipeline maintenance on the Trans-Alaskan Pipeline have already resulted in rebounds from both (though state data is only available from Alaska) meaning that 4Q 2012 should see an impressive rebound in US production and this should have legs into 2013.
- **The ripple effects of the North American supply revolution depend on physical factors.** When are lumpy pipeline and rail infrastructure built or expanded to allow stranded oil in western Canada or the US midcontinent to reach the US Gulf, East and West Coasts? Will US crude exports be allowed other than to Canada, or re-exports of foreign (mainly Canadian) crude? The outlook for these factors, and their impacts on price differentials and geopolitics, are discussed below.

Figure 53. Oil production of selected US states, 2001-2012 (m b/d)



Source: EIA, Citi Research

Figure 54. US Gulf of Mexico rotary rig count back to pre-Macondo levels (no. of rigs)



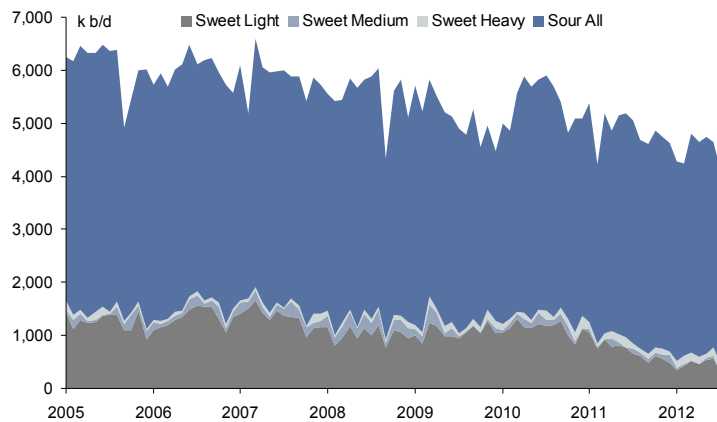
Source: Baker Hughes, Citi Research



**Oil: Phase I - West Africa, Northwest Europe lose light, sweet markets in the US...**

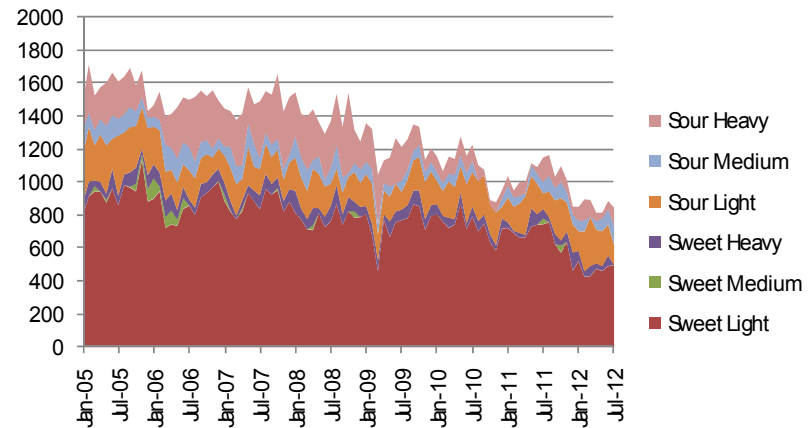
- **Expect periods of increased volatility and spread blowouts**, as shale oil and syncrude supplies grow robustly; pipeline and rail infrastructure is built to bring surging supplies to the Gulf Coast, East and West Coasts, unblocking congestion at Cushing; upgrade projects are completed for PADD II refineries to process more heavy crude, but reducing demand for light crude; seasonal refinery maintenance in PADD II, and increasingly PADD III, drive some seasonality in spreads.
- **...followed by a new equilibrium where Brent > LLS > WTI**: 2013 sees swings in the WTI-Brent spread with Seaway capacity ramping-up to 300-400-k b/d in Q1, Longhorn in Q3, with blowouts in between with refinery turnarounds and continued US and Canadian supply growth; the Gulf Coast leg of Keystone XL could be ready by late 2013. 2014 sees the “twinning” of the Seaway pipeline to over 800-k b/d capacity, bringing in the WTI-LLS spread to pipeline costs of ~\$3; LLS moves to a permanent discount to Brent, perhaps ~\$3 by 2014 as the crude glut moves to PADD III and all light, sweet crude imports are pushed out perhaps as soon as mid-2013.
- **WTI-Brent should narrow to settle at \$6-7**, with potential blowouts if light, sweet crude has no escape via exports, perhaps by end-2013, and almost certainly by 2015.
- **Rail has changed the picture**, with burgeoning volumes connecting Bakken and Western Canada to the Gulf Coast – Bakken, syncrude and WCS narrowing vis-à-vis LLS and moving to a premium to WTI at times, although oil sands upgrader maintenance is also a key factor. And rail can increasingly bring domestically produced light sweet to the East and West Coasts, further pushing out light, sweet imports there, too.
- **There are growing pressures to export light, sweet crudes from the US Gulf Coast**. Already, US crude exports are going to Canada, but how much crude can this northern neighbor absorb? Will crude exports be allowed more generally, and if so, how much? And whose crude?

**Figure 55. PADD III crude imports by quality (k b/d) – the decline driven by light, sweet crude imports, down to 300-k b/d levels in July 2012**



Source: EIA, Citi Research

**Figure 56. PADD I (East Coast) crude imports by quality (k b/d) – the ~500-k b/d light, sweet crude market should see growing US shale volumes arriving by rail**

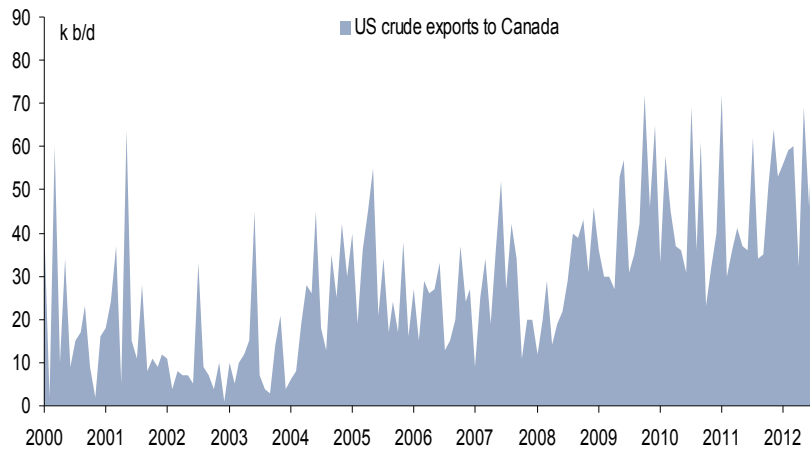


Source: EIA, Citi Research

**Oil: ...and in Canada too, via limited but growing US crude exports**

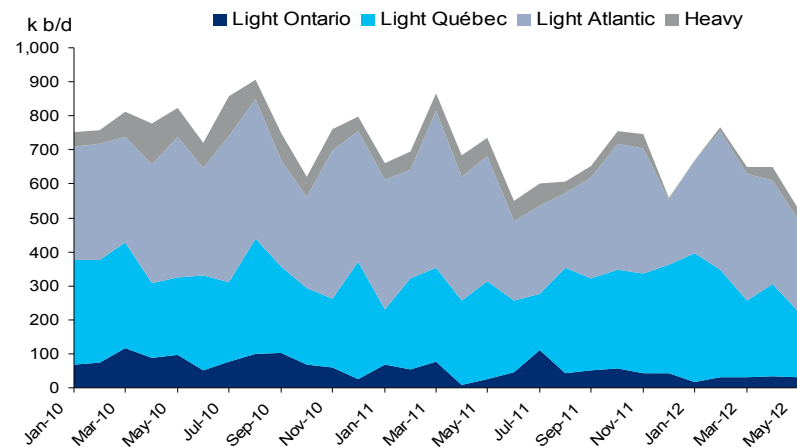
- **US/Canadian crude values look hard to maximize due to stranded pockets and the inability to be waterborne;** in the US, it is the inability/very limited ability to export crude (though the US has great ability to export refined products).
- **Export controls currently provide limited ability to export crude, with new rules possible going forward, but process is likely to be slow.** The Department of Commerce currently imposes export controls of domestically produced US crude oil with a license being required for crude exports to all destinations. However, a Presidential waiver would be needed for the DOC to grant licenses for crude exports of US origin – this includes US Gulf of Mexico oil, which resides in Federal waters. Canadian oil, as crude of foreign origin, is allowed to be exported under current rules with a DOC issued license and without a Presidential waiver, but could face political opposition. Domestically produced US crude oil transported by rail (rather than pipeline) is not currently covered by the rules, and new rules would have to be written before export licenses could be issued, which could invite political involvement during the cross-agency review process.
- **Exports to Canada are already allowed, albeit only small quantities have been seen to date.** BP, Shell and Vitol look like they are getting export licenses to export to Canadian refineries. Statoil has already begun railing Bakken crude to Irving’s Saint John refinery in eastern Canada. Canadian imports of light, sweet crude are in the 500-k b/d range. US exports of 50-k b/d levels today could quadruple to 200-k b/d in 2013, 400-k b/d in 2014, to push out these imports.
- **The Jones Act continues to limit shipping of petroleum between US ports.** Shipping crude from the US Gulf Coast to ports on the East or West Coast falls under the Jones Act, which requires that the goods be carried on US flag vessels, constructed in the US, owned by US citizens and crewed by US citizens. There are practically no US flag vessels available for these purposes – disconnecting the US coasts, especially the East Coast, from the supply in the USGC. Pipelines to the East or West Coasts remain limited. But rail solutions are already beginning to move crude to both coasts, which should see imports pushed out further.

**Figure 57. US crude oil exports to Canada could quadruple to 200-k b/d levels**



Source: EIA, Citi Research

**Figure 58. Canadian crude imports by API gravity, region – the ~500-k b/d light crude import market in Eastern Canada as an opportunity for the US at the expense of West Africa**

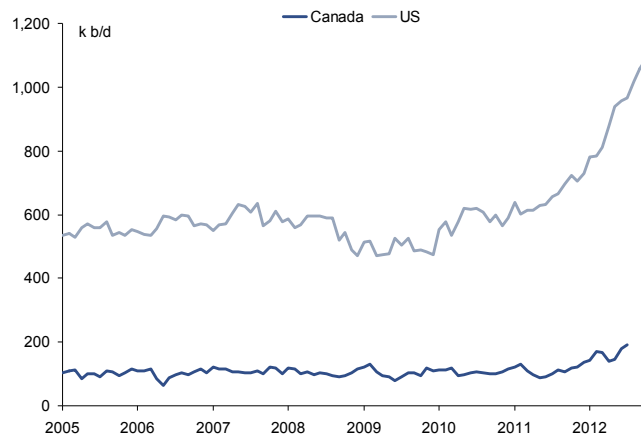


Source: EIA, Citi Research

**Oil: Phase II - Heavier crudes from Canada present a challenge to Mexico, Venezuela, OPEC producers**

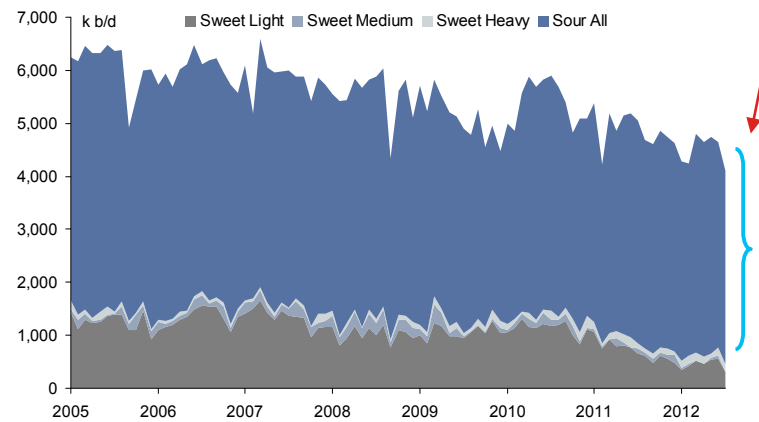
- **It looks even with Keystone XL and other delays, Canadian crude could glut the US Gulf Coast before there is a Pacific Basin option.** PADD III sour crude imports are at 3.6-m b/d levels as of July 2012, which could be covered by US GoM (+2.45-m b/d from 1.3-m b/d levels to 3.75-m b/d by 2020) and Canadian oil sands (+2.1-m b/d to 3.7-m b/d or more by 2020).
- **Pipelines and rail by 2014:** TransCanada Keystone XL (830-k b/d, late-2014 to early-2015) from Hardisty, AB to Steele City, NE; Gulf Coast Project (700-k b/d, 2H'13, could ramp-up to 830-k b/d) from Cushing to Nederland, TX; Enbridge Flanagan South (585-k b/d, could add 215-k b/d to reach 800-k b/d with additional pumping stations, 2014) from Flanagan, IL to Cushing.
- **Railcar loadings of petroleum are surging,** with US petroleum rail loadings up ~360-k b/d y-o-y, and Canadian crude rail loadings up ~100-k b/d y-o-y.
- **Upgraded refining provides US Gulf Coast and Midcontinent refiners a choice,** with light-heavy spreads fluctuating between parity and \$7/bbl. US Gulf Coast refiners should opt for sour crudes if they are priced \$4-7 below light sweet crudes.
- **Canadian imports could push out virtually all sour imports in US PADD III, the largest upgrading refining sector in world.** Only NOC term relationships (Mexico, Venezuela, Saudi Arabia) should remain in US market, to supply their own refineries. If exported, Canadian sour crudes could find an export market against Urals in Europe, priced at a discount to Urals (~\$2) minus transatlantic transportation (~\$1), minus pipeline tariffs (~\$7-8), or a netback to Alberta of Urals minus ~\$10. Only eventual pipeline outlets to the Pacific could create potentially higher netbacks.

**Figure 59. US petroleum railcar loadings have grown 360-k b/d y-o-y, and Canadian crude railcar loadings up almost 100-k b/d y-o-y (k b/d, 4wma)**



Source: AAR, Statistics Canada, Citi Research

**Figure 60. PADD III crude imports by quality – the 3.6-m b/d of sour crude imports could be backed out by Canadian crude as pipelines are built out and rail volumes grow**

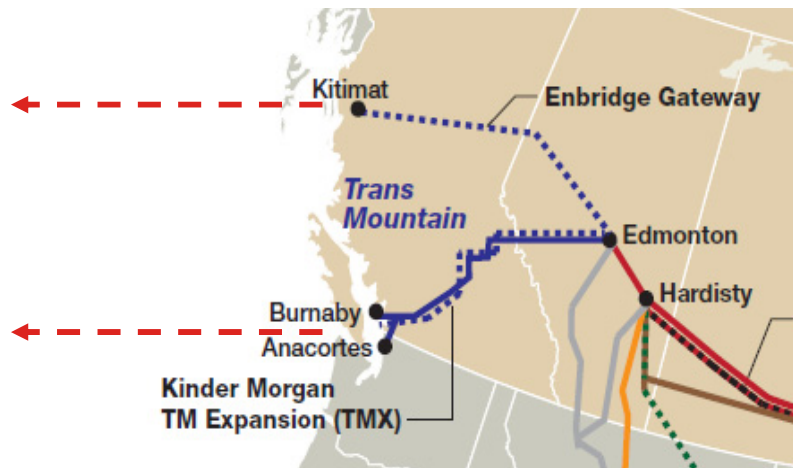


Source: EIA, Citi Research

**Oil: Phase III - Canadian and Russian crudes contend for the role of Pacific Basin benchmark**

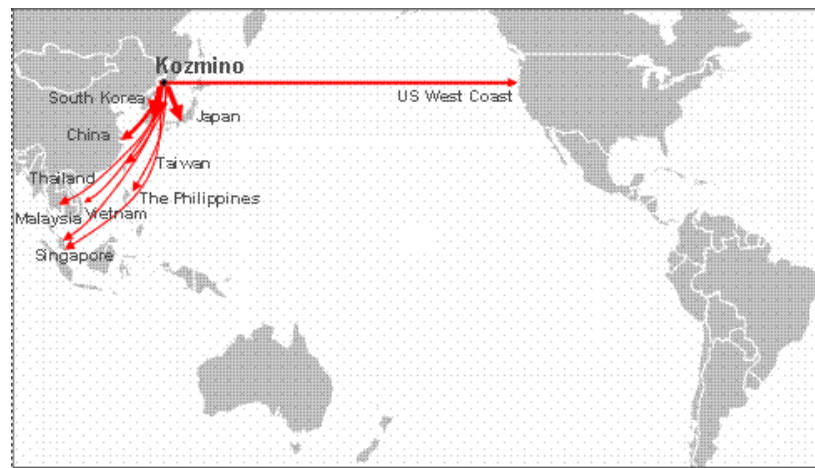
- **Roll forward to two West Coast pipelines, with combined capacity – and export potential – of an additional 975-k b/d.** Kinder Morgan Trans Mountain expansion (+450-k b/d to existing 300-k b/d to reach 750-k b/d, potentially ready by 2017-18?) from Edmonton, AB to Burnaby, BC; Enbridge Northern Gateway (new +525-k b/d, potentially ready by 2017-18, could ramp-up to 830-k b/d) from Bruderheim, AB to Kitimat, BC. These volumes could be all sold spot, fob Canada West Coast.
- **Who’s the competition? Not the higher volume contract sellers (Middle East, West Africa) - the main competitor would be Russia.** The Russian government is pushing a new contract traded on the St. Petersburg Exchange. But Canada – without government support – could be a natural new benchmark provider with WCS becoming the price setting grade for Middle East crudes – a role ANS once played.
- **ESPO and Canadian crudes (probably mostly syncrude or WCS/synbit, but eventually mostly syncrude) should become the largest suppliers to the Pacific Basin market.** For both ESPO and syncrude, the Pacific Basin market, as the fastest growing market in the world, provides enormous market optionality. ESPO is already mainstreaming - it started as a discount to Middle East crudes; now is at a premium and effectively sets the benchmark for Asia; what’s missing for complete transition to a benchmark is a formal traded contract on an exchange, which Russia are pursuing.
- **But although the optionality of the Pacific Basin is attractive, crude sales are still dependent on refinery configurations.** ESPO can make it in the Pacific Basin now; WCS can make it on the US Gulf Coast now, but would need more refinery upgrading in Asia (it won’t work in the Japanese market). Big questions – will China, India, other new refining in Asia have ample coking capacity to provide competitive bidding for WCS?
- **If all works as might, Middle East crude to the Pacific Basin should be priced off of Pacific benchmarks, not Oman/Dubai, causing loss of a \$1-2/bbl premium.**

Figure 61. Westward pipelines for Albertan oil sands



Source: CAPP, Citi Research

Figure 62. ESPO destination markets



Source: Platts, Citi Research

**Oil: Is the shale revolution replicable elsewhere?**

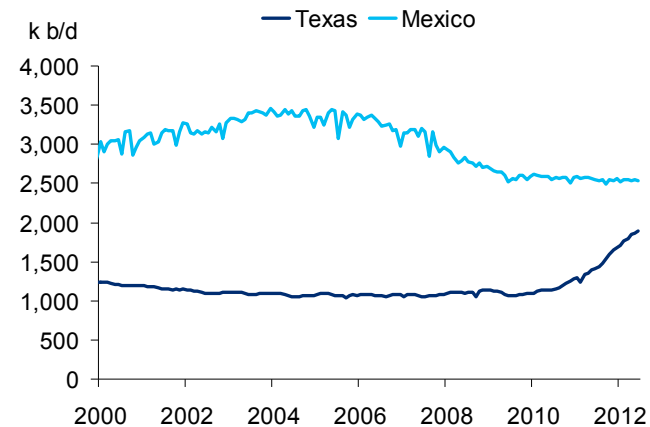
- **The US, and to some extent Australia, Canada and the UK, enjoys several advantages that have facilitated the head-turning growth of shale gas and oil production.**
- Only US and Canadian geology has been explored and delineated so widely; only the US and Canada have state/provincial government management of land policy; only the US and Australia, Canada and the UK have independent entrepreneurial companies, and favorable capital markets. Only the US and Canada have private land ownership rights, enabling “fiscal” returns to be determined by market forces.
- Independents have demonstrated a strong ability to experiment, which is harder to replicate by majors and large companies
- ...so the shale revolution can extend elsewhere, but it could take a long time
- **China has huge resources and potential, but its geology remains questionable,** and major problems with lack of water, little technological experience, limited mapping of resources, lack of infrastructure. Government price controls on natural gas are a major disincentive, so company strategy is to gain acreage, learn from abroad and wait for price control changes
- **Saudi Arabia needs gas to accommodate growing power consumption, free up oil being used for power generation,** but like China, suffers from lack of water and the need for price reform. However, it has started major new drilling programs to develop shale. A major question is whether a big company like Aramco can succeed, or whether it is even worth it – should independents be brought in?
- **Russia has incentives to accelerate shale exploitation** given its volumetric constraints on the conventional resource base.

Figure 63. US and Mexico both have significant shale resources



Source: EIA, Citi Research

Figure 64. ...but while crude production is surging north of the border (Texas is up ~800-k b/d since the mid-2000s to 1.9-m b/d in June 2012), Mexican production remains flat – for now



Source: EIA, Citi Research

**Oil: Geopolitical winners and losers of the North American supply revolution**

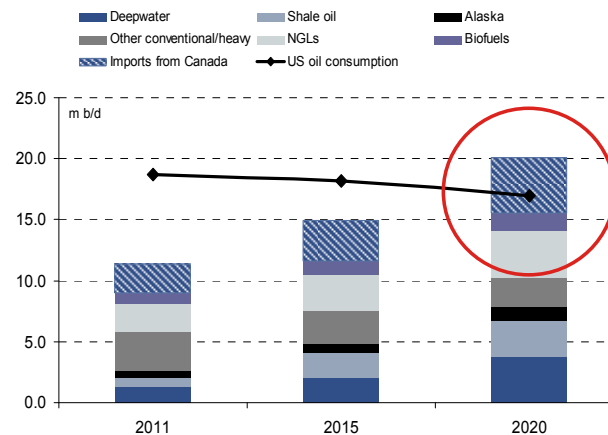
- **The economic consequences of the North American supply revolution strengthen the US**, with positive effects on GDP and employment. And the current account could strengthen from lower oil imports as well as a renaissance in domestic petrochemical, steel and energy-intensive industries.
- **Dollar vulnerability and physical oil vulnerability could end.** These are benefits that no other country is likely to enjoy (not China, nor Russia).
- **Potential impacts on foreign policy:** the US could conduct a values-based foreign policy freer from shackles to despotic regimes. But it does not mean isolation – for all practical purposes, in an age of cyber warfare, biological warfare and terrorism, US borders are global. But no other country should have reduced vulnerabilities like US seems to.
- **But geopolitical impacts remain:** Lower prices are a crimp on revenue of oil/gas producers. While the US has the chance to retain superpower status vs. others, this does not necessarily mean a more peaceful or less resentful world. There are increased opportunities for failed states and the uncertainties and insecurities associated with these.

Figure 65. Fiscal breakeven oil prices for selected oil producer countries (\$/bbl)

Country	Fiscal breakeven oil price
Algeria	\$105
Bahrain	\$119
Iran	\$117
Iraq	\$112
Kuwait	\$44
Libya	\$117
Oman	\$77
Qatar	\$42
Saudi Arabia	\$71
United Arab Emirates	\$84
Yemen	\$237
Russia*	\$117

Source: IMF, Citi Research

Figure 66. The US could see a 3-m b/d surplus of crude supply over consumption by 2020; with less dependence on imported oil, the US could pursue a values-based foreign policy.

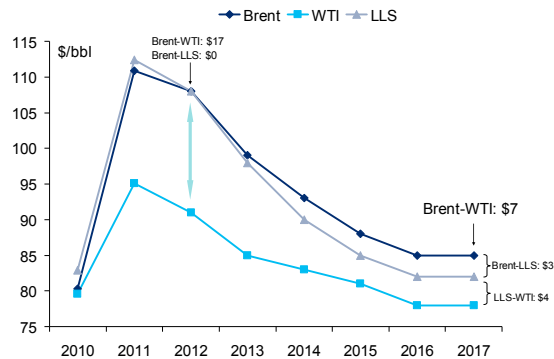


Source: Citi Research

**Oil: WTI-Brent widens in 1Q'13 before reconnecting to a degree through 2013-14...but the end game hinges on US crude exports, North Sea tightness**

- **Significant pipeline and rail transportation capacity begins to reconnect the US midcontinent with the US Gulf Coast, narrowing WTI-LLS, but also bringing the crude glut to the water's edge, and pushing out potentially all light, sweet imports.** 2013 sees swings in the WTI-Brent spread with Seaway capacity ramping-up to 300-400-k b/d in Q1, Longhorn diverting Permian Basin flows away from Cushing in Q3, and the southern leg of the Keystone XL pipeline in Q4. Blowouts are expected in between with seasonal refinery turnarounds and continued US and Canadian supply growth. The upgrade project of BP Whiting is underway and has taken a 250-k b/d sweet crude unit offline, as it is converted to sour crude use, structurally reducing light, sweet crude demand in the Chicago refining area. 2014 sees the Seaway and Spearhead twinning bring in the Brent-WTI spread to ~\$6-7, as LLS-Brent moves towards \$3-4 as the crude glut moves down to PADD III and all light, sweet crude imports are pushed out late-2013. This assumes exports to Canada continue and grow, but no other US crude exports are allowed in the short-term.
- **North Sea issues support Brent:** Brent has been strengthened by local North Sea supply issues this year, mainly at the Buzzard field. Northwest Europe is structurally short crude, and the steep drops in North Sea production over the last few years are leaving the region increasingly short each year.
- **Commodities indices rebalance to put more weight in Brent, and less in WTI.** In a repeat of January 2012, benchmark index rebalancing next January will once again favor ICE-traded Brent at the expense of NYMEX WTI. The petroleum complex-heavy GSCI increases its 2013 target allocation to the North Sea contract by 4 points to over 22%; coupled with a marginal increase in the DJ-UBS, Brent crude should see net inflows of approximately \$5Bn. NYMEX WTI net rebalancing outflows from GSCI are likely to be around -\$3.9Bn, partially offset by DJ-UBS rebalancing, assuming mid-November markets.

Figure 67. Brent, LLS, WTI differentials 2012-17



Source: Citi Research

Figure 68. Brent, LLS, WTI outlook 2012-17

\$/bbl	2010	2011	2012	2013	2014	2015	2016	2017
Brent	80.3	110.9	108	99	93	88	85	85
WTI	79.6	95.1	91	85	83	81	78	78
LLS	82.9	112.4	108	98	90	85	82	82
WTI-Brent	-1	-12	-17	-14	-10	-7	-7	-7
Brent-LLS	-2.5	-1.4	0	1	3	3	3	3
WTI-LLS	-3.3	-17.3	-17	-13	-7	-4	-4	-4

Source: Citi Research



## US Natural Gas – Seasonality Dominates with Winter Coming, but Fiscal Cliff Can Have Worse Impact

- **Citi marks to market Q3'12 Henry Hub cash prices to \$2.90/MMBtu, thereby raising the 2012 price to \$2.75/MMBtu from \$2.60. Citi also raises 2013 prices from \$3.35/MMBtu to \$3.55/MMBtu**, as a result of lower end-of-Oct'12 inventory levels, lower expected imports from Canada and higher exports to Mexico. Strong demand towards the end of the injection season, coupled with persistently strong gas demand in the West region outside of areas with coal-gas switching boosted demand beyond what gas prices and switching would have implied. West gas demand rose on lingering nuclear outages, weak hydro in California and warmer summer weather. Imports from Canada will likely fall by 0.5-Bcf/d as production is anticipated to stabilize at 13-Bcf/d in 2013. Higher exports to Mexico come partly on the loss of gas processing capability after an explosion at the 0.8-Bcf/d Reynosa plant. **If not addressed, the Fiscal Cliff could lower demand by 2.9-Bcf/d, requiring prices to fall to \$2.45 to keep storage from going over 4-Tcf in 2013.**
- **Although domestic production is expected to fall YoY in 2013, the steep fall in dry gas production would likely be offset by stronger associated gas production and the clearing of the backlog of drilled-but-not producing wells**, perhaps 1,000 of them or more. While NGL prices should remain low, the economics still favor liquids and oil production and the need to secure liquids acreages should support drilling. Ongoing technological advances and learning-by-doing also improve gas production rates, which might have doubled in the last 3 years in some areas, eg. Marcellus, partly mitigating the impact of lower rig counts.
- **Scenarios - Seasonality Dominates.** Coal-gas switching is expected to fall, as the end-of-Mar'13 storage will likely be 1.97-Tcf, down 0.5-Tcf from Mar'12. Oct'13 storage will likely be 3.89-Tcf based on normal weather. But a mild winter at 5% warmer than the 30-year normal, as indicated by Citi's in-house meteorologist, could push Mar'13 storage to 2.15-Tcf and Oct'13 storage to 4.06-Tcf. Prices would have to fall by 20¢ to get to the same storage levels in a normal weather scenario. Conversely, a 5% colder winter could cause prices to rise to \$4 for 2013. If production does not decline, Oct'13 could reach 4.13-Tcf, so prices have to fall by 20¢ to reach 3.9-Tcf in storage. If production falls by 2-Bcf/d, then Oct'13 storage could fall to 3.5-Tcf and prices would have to rise to \$4 to push storage back up to 3.9-Tcf.
- **Citi also initiates coverage of 2014 gas and expects Henry Hub cash prices to average \$4.1/MMBtu.** To support this price, total supply has to rise by 1.8-Bcf/d YoY to accommodate the cumulative demand growth from all sectors: power generation by 0.4-Bcf/d, industrials by 0.6-Bcf/d, residential/commercial by 0.2-Bcf/d, and fuel for gas consumption and transport by 0.2-Bcf/d. Mar'14 storage could top 2.02-Tcf again, but stronger underlying demand must be matched by nearly 2-Bcf/d YoY increase in domestic production at prices above \$4. At this price level, Oct'14 storage could come close to 4.0-Tcf.

Figure 69. US Natural Gas Supply and Demand Balance

Quarter	Jul-12	Oct-12	Jan-13	Apr-13	Jul-13	Oct-13	Jan-14	Apr-14	Jul-14	Oct-14	2012	2013	2014	'13v'12	'14v'13
<b>Total Supply</b>	<b>70.1</b>	<b>70.0</b>	<b>69.5</b>	<b>67.7</b>	<b>67.7</b>	<b>68.9</b>	<b>71.4</b>	<b>69.5</b>	<b>69.5</b>	<b>70.7</b>	<b>69.9</b>	<b>68.4</b>	<b>70.3</b>	<b>(1.4)</b>	<b>1.8</b>
Prod	65.1	65.6	65.1	64.4	64.0	64.7	67.0	66.4	65.9	66.7	65.4	64.6	66.5	(0.8)	1.9
LNG	0.3	0.5	0.6	0.4	0.3	0.5	0.6	0.4	0.3	0.5	0.4	0.4	0.4	-	-
Exports to Mexico	(1.5)	(1.5)	(1.4)	(1.7)	(1.6)	(1.4)	(1.4)	(1.8)	(1.7)	(1.5)	(1.4)	(1.5)	(1.6)	(0.1)	(0.1)
Imports from Canada	6.2	5.3	5.2	4.6	5.0	5.1	5.2	4.6	5.0	5.1	5.5	5.0	5.0	(0.5)	-
<b>Total Demand</b>	<b>63.9</b>	<b>73.1</b>	<b>85.3</b>	<b>57.4</b>	<b>59.4</b>	<b>72.6</b>	<b>86.1</b>	<b>59.0</b>	<b>60.9</b>	<b>74.3</b>	<b>70.2</b>	<b>68.7</b>	<b>70.1</b>	<b>(1.5)</b>	<b>1.4</b>
IND	17.4	19.3	20.5	17.9	17.6	19.6	21.0	18.5	18.3	20.3	18.5	18.9	19.5	0.4	0.6
ResComm	8.0	24.9	39.8	13.4	7.9	24.9	40.0	13.6	8.1	25.2	19.9	21.5	21.7	1.6	0.2
EG	33.3	20.9	19.5	21.5	29.0	20.1	19.4	22.1	29.5	20.7	26.0	22.5	22.9	(3.4)	0.4
Pipe Use	1.8	2.0	2.4	1.6	1.6	2.0	2.4	1.6	1.7	2.0	1.9	1.9	1.9	(0.0)	0.0
Lease and Plant Fuel	3.9	3.9	3.8	3.7	3.7	3.8	4.0	3.8	3.8	3.9	3.9	3.8	3.9	(0.1)	0.1
Other	(0.5)	2.2	(0.7)	(0.7)	(0.5)	2.2	(0.7)	(0.7)	(0.5)	2.2					
<b>End-Quarter Inventory (Bcf)</b>	<b>3,674</b>	<b>3,384</b>	<b>1,971</b>	<b>2,910</b>	<b>3,672</b>	<b>3,331</b>	<b>2,021</b>	<b>2,983</b>	<b>3,772</b>	<b>3,444</b>					
<b>End-Oct Inventory (Bcf)</b>	<b>3,929</b>				<b>3,887</b>				<b>3,997</b>						
<b>Gas price (\$/MMBtu)</b>	<b>2.87</b>	<b>3.40</b>	<b>3.50</b>	<b>3.50</b>	<b>3.60</b>	<b>3.70</b>	<b>4.20</b>	<b>4.00</b>	<b>4.00</b>	<b>4.20</b>	<b>2.75</b>	<b>3.55</b>	<b>4.10</b>	<b>0.77</b>	<b>0.55</b>

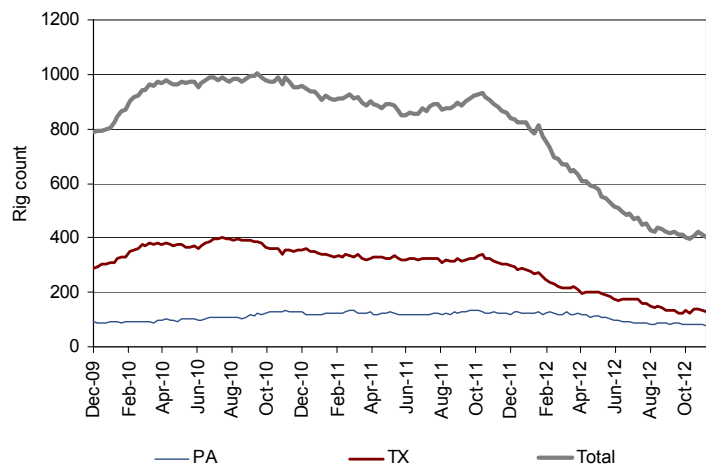
Source: EIA, Citi Research



### US Natural Gas Supply: Domestic production may fall but not by much

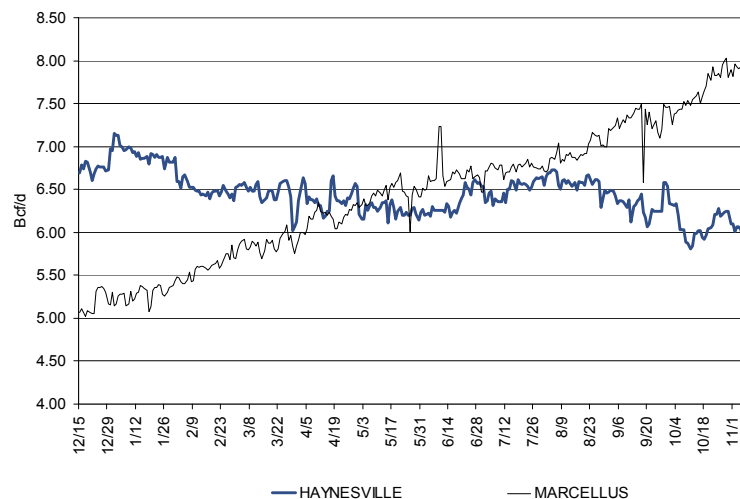
- Domestic production is expected to fall by 0.8-Bcf/d, as the impact of sharply cutting gas rigs from the 2011 average of 887 to 576 YTD, and just above 400 in the most recent week, is partly offset by higher production from associated gas and drilled-but-not producing wells. But the decline could be mitigated in three ways.
- First, technological advances and learning-by-doing are improving productivity, and limiting the increases in or reducing well costs. Production rates of a typical Marcellus well, for example, have at least doubled between 2009 and 2012, so that the rig requirement has fallen. The improvement is ongoing. But if some producers, for the purpose of holding acreages, decide to just drill wells to start production without much fracturing being done, it might appear that production rates have worsened.
- Second, drilled but not producing wells could contribute about 2.4-Bcf/d of production. These wells could come online as pipeline infrastructure is completed. Lower rig counts would not have reflected production increase from this segment, as this is deferred production from before, particularly in the Marcellus region. If indeed there are 1,000 drilled-but-not producing wells in Marcellus coming online over the next year, for example, then this debottlenecking alone could add between 1.1-Bcf/d (if 2009 type curves are used) and 2.4-Bcf/d (if 2011 type curves are used) of production on average in the coming 12 months. Higher cumulative production from these wells later in the year could partially or more than offset the natural decline of existing production. Other such wells do exist outside of the Marcellus, including those in liquids plays. Clearing the backlog of liquids wells can bring additional associated gas production.
- Third, associated gas production growth from oil and liquids-rich plays could reach 2.0-Bcf/d in 2013 due to strong liquids production growth. Oil production could climb by 0.5-mb/d and NGLs higher by 0.2- to 0.3-mb/d YoY in 2013. The growth will mostly happen in PADDs 3 and 2, which includes North Dakota. Permian and Eagle Ford lead the growth in Texas and PADD 3. PADD 2 receives contribution from Woodford and other Midcontinent liquids plays. Citi expects that oil and liquids production growth should continue at similar rates beyond 2013. As such, associated gas production growth should continue at a similar pace.

Figure 71. Gas rig count in Pennsylvania, Texas and Total. Gas rig count has fallen in PA...



Source: Smith International, Citi Research

Figure 72. ...But Marcellus production continues to rise

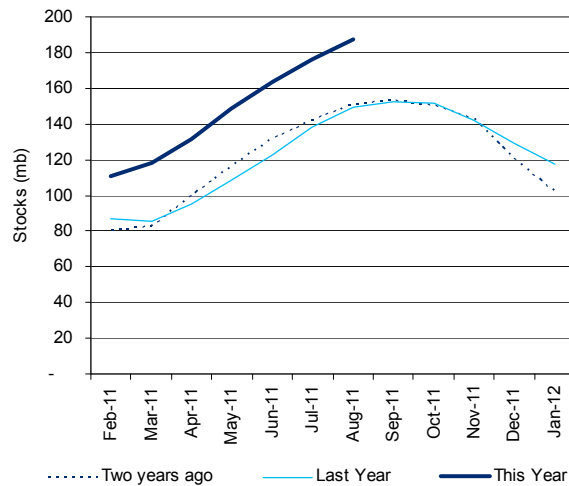


Source: Bentek, Citi Research

**US Natural Gas Supply: NGL production to remain strong, supporting associated gas production, but prices remain depressed**

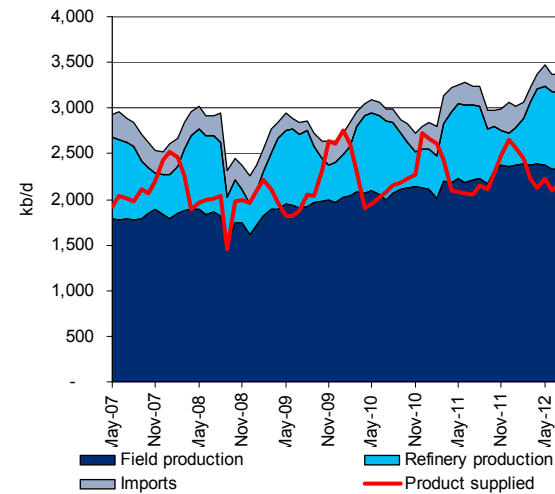
- Strong production of liquids and oil should boost associated gas production – one of the two drivers keeping gas production in 2013 from falling sharply. Natural gas liquids and oil production should continue to be the focus of producers due to the premium over natural gas that they can fetch, and the need to secure liquids-rich and oil acreages. Both could support drilling activities despite the sharp price drop earlier this year and the subsequent range-bound pricing in 2012.
- But prices of lower-value natural gas liquids should remain under pressure. The NGL basket price fell from \$1.40/gallon at the same time last year to \$0.96/gallon in Mont Belvieu, TX – a key price hub in the US. Historically traded at a ratio of 50% to Brent crude oil, and at 54% in the same week last year, the ratio fell to as low as 33% earlier in 2012 before making a modest recovery to 37% now.
- Prices are being dragged down by lower ethane and propane prices due in part to high inventories. Pipes that bring liquids from the Midcontinent to the Gulf Coast relieved the glut up north but exacerbated the glut down in the Gulf Coast. With strong liquids production growth expected but not so for ethane/propane demand until the mid-decade, the glut should remain, as should depressed prices
- Demand cannot increase enough to absorb the increase in supply. Demand growth awaits major brownfield and greenfield development in the petrochemical, fertilizer and other industrial sectors, which will not be coming until 2016 or later. Final Investment Decisions on most of these proposed facilities have yet to be made, making the timeline of when they could come online still somewhat uncertain. Meanwhile, utilization rates of petrochemical facilities are already at a high level, some well in the 90% range. While export facilities are being added incrementally, they cannot alleviate the NGL glut.
- For now, NGL prices may get support from home heating use of propane. But if the winter turns out to be mild, the glut of inventory will push prices lower in 2013.

Figure 73. NGL inventories in the Lower 48



Source: EIA, Citi Research

Figure 74. NGL supply and demand

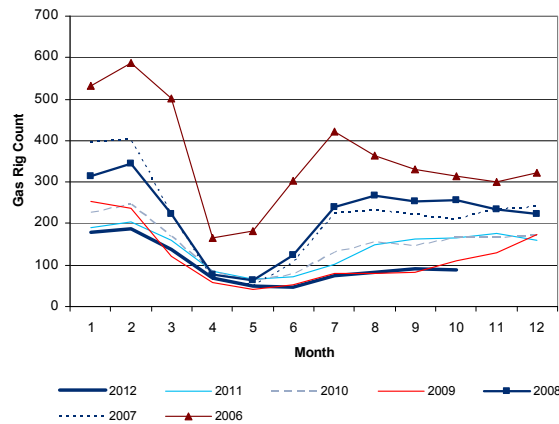


Source: EIA, Citi Research

**US Natural Gas Supply: Canadian production stabilizing, but exports to US to fall**

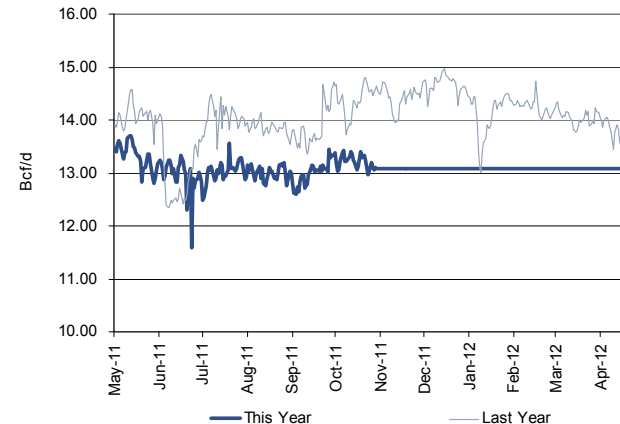
- Imports from Canada will likely fall by 0.5-Bcf/d, as Canadian production is expected to stabilize at 13-Bcf/d in 2013, a level seen since the start of summer after a steep drop between Jan and May'12. The shapes of the gas rig count and production in 2012 mirror those of 2009. Despite the sharp fall in the number of rigs in 2009, gas production steadied in 2010 at close to the level seen in 2H'09. Producers are also shifting their drilling from the drier eastern part of Alberta to wet plays in the Peace River region in the northwestern part of the province. Higher demand from oil sands production is partly offset by weaker demand in eastern provinces. New England will still have to rely on Canadian supply in winter via the Iroquois pipeline. By now, the export route from Ontario to New York has effectively been shut due to strong Marcellus production. Re-exports from Michigan to Ontario should also fall, offsetting the decline of lower Canadian gas flow to the US Midwest.
- Exports to Mexico could edge higher by 0.1-Bcf/d YoY in 2013. Besides the structurally increasing demand for power generation and industrial uses, the explosion at the 0.8-Bcf/d Reynosa natural gas processing plant also initially prompted a diversion plan, drawing on more local production, higher pipeline gas imports and greater LNG imports. But the cost of LNG imports, due to the need to compete for effectively Asian cargoes, so internal demand would be dialed down instead and not import LNG.
- LNG imports should remain flat at the contract minimum level of 0.44-Bcf/d due to low North American gas prices. New England remains the only area that prices could surge to a high enough level to be competitive with European prices in attracting LNG cargoes. New England's pipeline network still leaves it highly dependent on imports, particularly LNG. The Algonquin pipeline, which is the only major pipe serving the region, could take domestically produced gas at its western leg but not anywhere else. Until the NJ-NY line is completed, which has a capacity of 0.8-Bcf/d, New England will remain constrained. This gives rise to the sharp increase in local gas prices vs. Henry Hub on days with very high demand. In contrast, cash gas bases across the country vs. Henry Hub have been narrowing. However, even the UK is not attracting many LNG cargoes because Asia has been getting more gas. European winter gas forward price has a larger premium because of smaller storage capacity and fewer suppliers.

Figure 75. Canadian gas rig count



Source: Baker Hughes, Citi Research

Figure 76. Canadian gas production

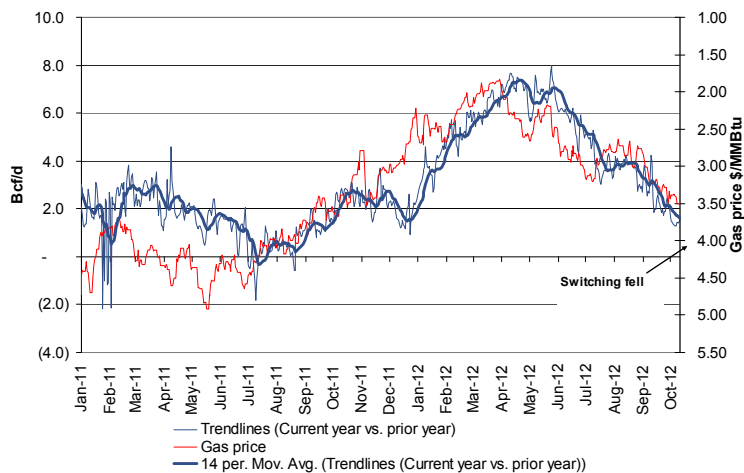


Source: Bentek, Citi Research

**US Natural Gas Demand: Coal-to-gas switching appears to have weakened since summer**

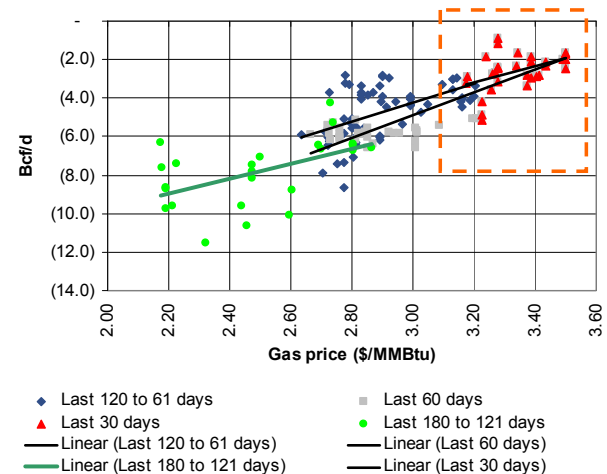
- The effectiveness of coal-to-gas switching seemed to have weakened over the last 2 months as gas prices climbed above \$3/MMBtu. If this weakness persists, then switching may not be as effective as observed during the past injection season from Apr'12 to Oct'12. This may suggest that gas prices would have to fall further in 2013 to induce more switching, as switching is still needed to absorb some amount of excess gas in 2013.
- Coal-to-gas switching is the key mechanism in absorbing excess gas supply and inventory in the market after a mild winter. Lower gas prices made gas-fired power generation more economic than coal-fired generation, so that gas plants run more and use more gas. While the expectation is always that switching should fall as gas prices rise, there is also a parallel shift toward a reduction in switching.
- To illustrate, the bottom left figure below showing switching vs. gas prices derives switching based on changes in coal demand for power generation. Starting in May, weather normalized coal demand seemed to have fallen much more (bottom left quadrant of the graph), where at \$2.4 gas, the YoY increase in weather-normalized gas demand as implied by lower coal consumption reached 8-Bcf/d. Extending this line to \$3.4 gas points to a nearly 4-Bcf/d YoY increase in weather-normalized gas demand for power generation. However, plotting recent coal burn data against gas prices indicates that at \$3.4 gas (top right quadrant), switching only rose by about 2-Bcf/d YoY. Extending this other trendline back to \$3 gas would imply 4-Bcf/d of switching.
- If this weakening of switching results from coal plants having to run for reasons of electric grid reliability, then the current ineffectiveness of switching could be ignored as normal demand returns. But if this weakness persists, then gas prices may have to be lower in 2013 to induce the same amount of switching as 2012.
- In fact, coal plants could be more competitive in 2013 vs 2012. Contracted coal prices in 2013 should be lower than 2012, as forward coal prices fell this year as utilities locked up prices a year ahead. Lower coal prices and higher gas prices should reduce the competitiveness of gas plants.

Figure 77. YoY switching in the East and Producing regions vs. Henry Hub cash gas prices



Source: EIA, Bentek, Platts, Citi Research

Figure 78. Switching implied by coal demand vs. gas prices



Source: EIA, Genscape, Citi Research

**US Natural Gas Demand: The extra gas demand from the West region should disappear**

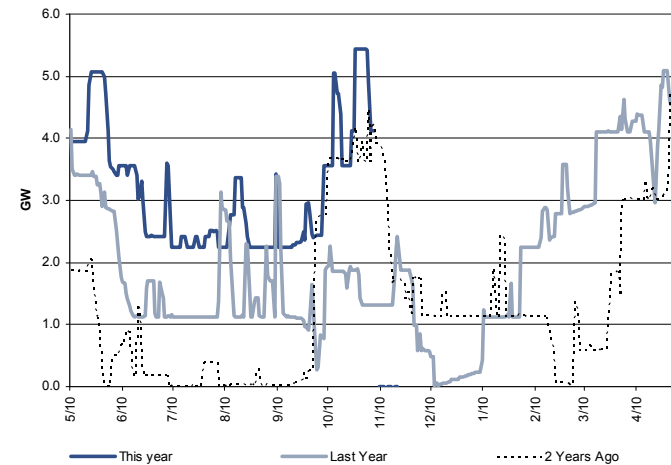
- Demand in the West region, up by about 1.5-Bcf/d YoY (bottom left graph), tightened the market beyond what switching in the East and Producing regions would have done. Gas demand in the West region had been stronger than 2011, particularly as a result of weaker hydro generation. The effect from hydro should fade going into 2013 if normal hydro is assumed or improved over 2012. Hydro generation in California was weak throughout the year. Hydro generation in the Pacific Northwest also faltered YoY since September by as much as 1-Bcf/d equivalent, both in the midstream portion of the Columbia River in Washington state, and the Snake River. Although snowpack on the US side was lower YoY earlier this year, as shown in lower Snake River stream flow, high snowpack in British Columbia, which translated into snowmelt and stream flow down the Columbia River from Canada to US, helped to keep hydro generation flat to 2011. 2011 had turbine outages reducing capacity, too.
- Nuclear outages in the West were larger than 2011, driven primarily by two reactors going offline, for a total of 2.2-GW, at the San Onofre nuclear generating station. This outage is equivalent to about 0.4-Bcf/d in gas demand. The plant operator applied for approval to restart unit 2 in the near future, but unit 3, which sustained substantial damage due to a pipe rupture, should remain shut. While a restart of unit 2 might not happen this year, it could in 2013.
- Actual power demand was also higher in California YoY, for an average of 2.1% YTD. But YoY demand in a weather-norm scenario should be lower in '13.
- All of the above combined to make gas demand stronger than what switching would have indicated, thereby tightening the gas balance much more rapidly than gas prices would have suggested. As long as the current situation in the West region (same hydro, same nuclear and same weather) persists through to 2013, the net balance would not tighten further YoY and so the YoY impact should diminish. In other words, demand would likely weaken as hydro and nuclear return.

**Figure 79. YoY change in weather-normalized demand in the West region**



Source: EIA, Bentek, Citi Research

**Figure 80. Nuclear outages in the West region**

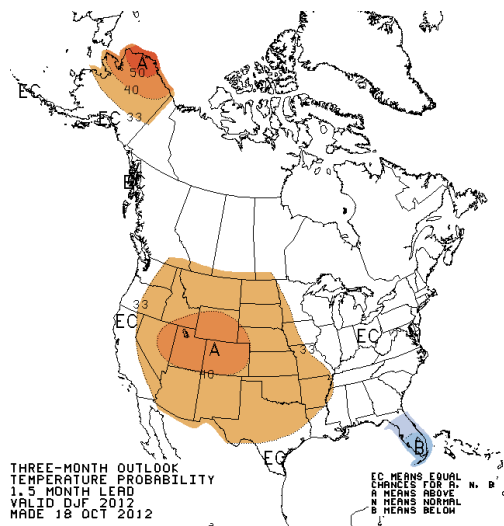


Source: NRC, Citi Research

**US Natural Gas Demand: The demand decline from the US Fiscal Cliff far outstrips the impact of a 5% warmer winter**

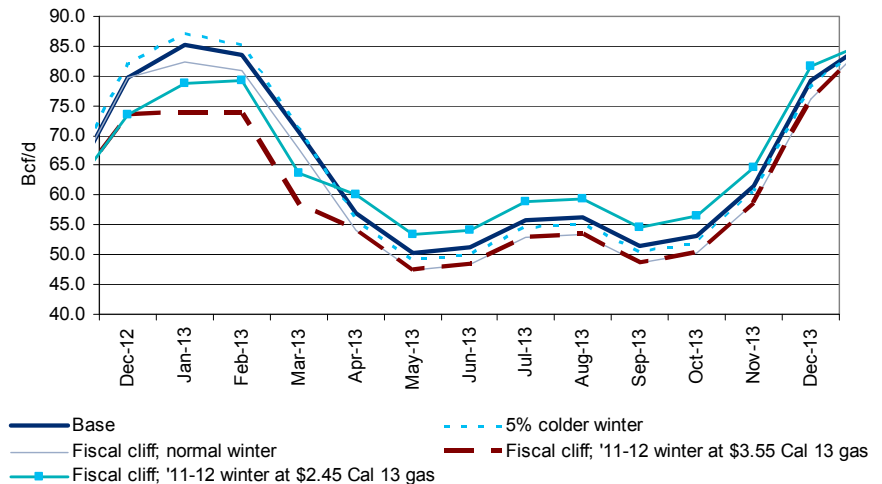
- **End-of-Oct'13 storage will likely be 3.89-Tcf based on normal weather. But a mild winter at 5% warmer than the 30-year normal, as indicated by Citi's Meteorologist, could push Mar'13 storage to 2.15-Tcf and Oct'13 storage to 4.06-Tcf. Prices would have to fall by 20¢ to get to the same storage levels in a normal weather scenario.** Conversely, a 5% colder winter could cause prices to rise to \$4 for 2013. Although the average of the ensemble forecast by NOAA does not expect a mild El Nino to take place, which historically coincides with milder weather in the northern part of the country, including the Northeast, milder weather is still expected elsewhere in the country. Furthermore, heavy reliance on El Nino/La Nina over the past three years turned out to give erroneous seasonal forecasts.
- Industrial demand should rise by 0.4-Bcf/d, as the economy gradually improves. More industrial facilities would be making small scale conversion to gas from oil or coal based fuel or feedstock. But the strong demand increase will likely not come until 2016, when major petrochemical, fertilizer, and other facilities are expected to come online. Gas liquefaction facilities should begin to come online in late 2015 to early 2016, as the Sabine Pass terminal begins operation.
- **The US Fiscal Cliff could lower demand by 2.9-Bcf/d.** Industrial demand could fall by 0.7-Bcf/d, putting it back to the 2010 level. Residential and commercial demand, as a result of the recessionary impacts and unemployment, could fall by 0.4-Bcf/d.
- **The most significant decline would come from the power generation sector. Power demand could fall by 3.3% in 2013, an unthinkable decline in the modern era.** The Great Recession three years ago only led to a 2.6% decline in power demand. Historically, power demand rose or remained flat even in mild recessions. Gas demand for power generation would take the brunt of the overall electricity demand drop, falling by 1.7-Bcf/d.
- **Cumulatively, the economy-wide demand decline could push the Oct'13 inventory to an incredible 4.7-Tcf if 2013 prices remain at around \$3.55. Prices would have to fall to \$2.9 in normal weather to keep Oct'13 storage from breaching 4-Tcf.** In the worst case scenario with a repeat of the 2011-12 winter, prices would have to average \$2.45 to keep storage from going over 4-Tcf.

Figure 81. Dec-Jan-Feb weather anomaly from normal weather



Source: NOAA, Citi Research

Figure 82. Gas demand scenarios

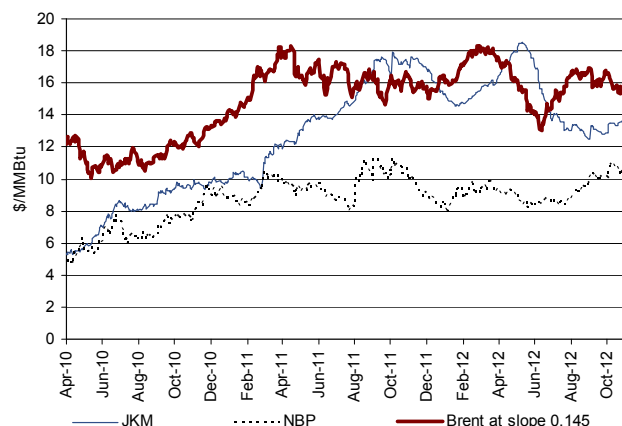


Source: EIA, Citi Research

## Global Gas – Supply-demand balance to moderately tighten in 2013

- The global gas market could moderately tighten in 2013, thereby pushing NBP and Asia’s Japan Korea Marker (JKM) higher in 2013, though weather and nuclear issues in Japan and Korea could change the market. Lower expected oil prices in 2013 should keep prices from going higher, with oil-indexed gas prices and the price ceiling on spot prices falling in tandem.
- On the demand side, nuclear generation in Japan can only stay flat or increase, especially with a more pro-nuclear government likely inaugurated after the election. With the on-going recession, Japanese LNG demand might fall. This should reduce the already moderate growth of global LNG demand. But the status of Korea’s nuclear fleet could prove to be a wildcard. If cracks found at unit 3 of its Yonggwang nuclear plant are serious and affect other plants as well, Korea would have to procure more LNG for power generation. A modest recovery in seaborne coal prices, due in part to lower US coal exports on higher US gas prices, could make some European coal plants less competitive vs. gas. Along with coal plant retirements in the UK due to LCPD (Large Combustion Plant Directive), gas demand could see a slight recovery. On the supply side, Gazprom will likely sell less gas in the home market, as competition inside Russia intensifies just as gas production is rising. Hence, Gazprom would have to stem its market share losses in Europe. However, geopolitical disruptions (eg. Yemen), the delayed start-up of new liquefaction facilities in Angola and the expansion at Algeria could limit supply.
- Thus, Citi expects Cal 13 NBP to average 63.4-p/th (\$9.80/MMBtu), up from 60-p/th (\$9.30/MMBtu), and Cal 14 should average 65-p/th (\$10.10/MMBtu). The likely decline in LNG shipments to the UK, hence a tighter market, is the key reason why Q1 and Q4’13 NBP prices are high.
- Citi forecasts Cal 13 JKM prices to average \$15/MMBtu. Although the new price forecast puts the cal 13 price similar to the expected Cal 12 average of \$14.80/MMBtu, the quarterly price path would be very different. The lack of sizeable storage facilities in Asia requires importers to procure gas during peak demand season, thereby pushing prices higher seasonally. Cal 14 is expected to average \$15.30/MMBtu. The market is expected to remain tight due to a lack of new major liquefaction facilities coming online until at least 2015/16 and global demand gradually rising.

Figure 83. UK (NBP) and Asian (JKM) gas prices



Source: Platts, Citi Research

Figure 84. Global gas price forecasts for 2013 vs 2012 for NBP and JKM

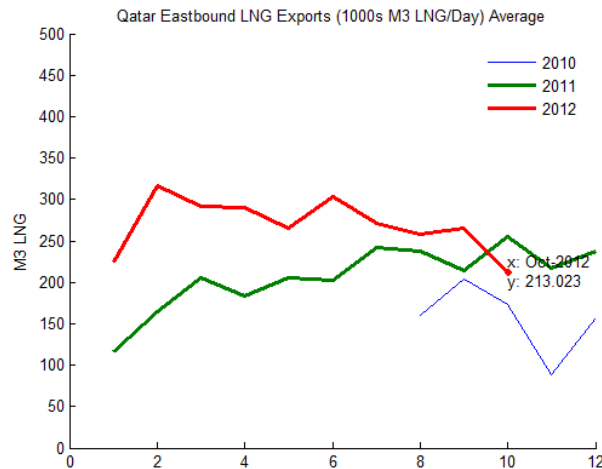
	1Q'13	2Q'13	3Q'13	4Q'13	Cal 12	Cal 13	Cal 14
NBP (p/th)	<b>66.5</b>	<b>60.0</b>	<b>58.5</b>	<b>68.5</b>	<b>60.5</b>	<b>63.4</b>	<b>65.0</b>
vs 2012	8.1	2.8	-0.4	1.0		2.9	
NBP (\$/MMBtu)	<b>10.3</b>	<b>9.3</b>	<b>9.1</b>	<b>10.6</b>	<b>9.4</b>	<b>9.8</b>	<b>10.1</b>
vs 2012	1.3	0.4	-0.1	0.2		0.4	
JKM	<b>15.0</b>	<b>14.5</b>	<b>14.5</b>	<b>16.0</b>	<b>14.8</b>	<b>15.0</b>	<b>15.3</b>
vs 2012	-0.2	-2.7	1.1	2.5		0.2	

Source: Bloomberg, Platts, Citi Research

**Global gas prices could be constructive, from supply disruption/restart-up delays, to stronger demand/Qatari shipping strategy**

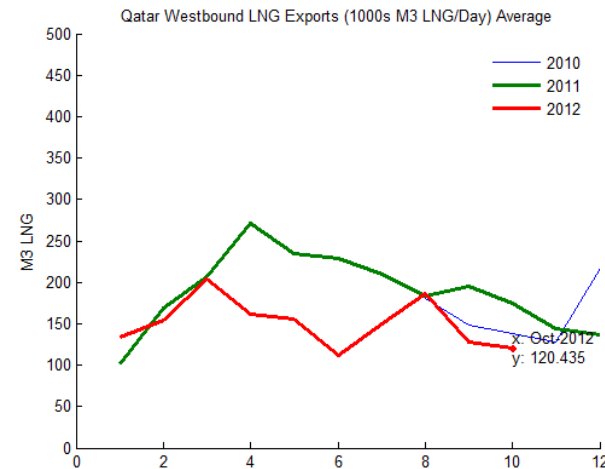
- On the supply side, LNG flow to Europe, particularly UK, is rather intermittent now. Globally, without new LNG supply coming online until 2016, prices tighten as demand rises. Nearer term supply opportunities, including Angola LNG, may be delayed. Whether LNG supply from Angola can come online on time, after slipping several times, is questionable. This part of the market is similar to what happened in oil in 2005-6, when delays plagued Angola, Nigeria and Algeria production then. In addition, geopolitical disruption is present in the LNG market, such as the Yemeni pipeline attack earlier in 2012, though not as prominent as the oil market. Nigeria has been producing below its capacity this year.
- On the demand side, underlying Asian demand should gradually move higher and demand elsewhere is also climbing. Even though nuclear might restart in Japan, only a very small portion of the 48-GW of capacity could come back online. The impact on gas could be small: A 1-GW increase in nuclear generation generally implies a decrease of 0.2-Bcf/d of gas demand. Using a standard LNG tanker, this implies about one fewer LNG tanker needed in every 14 days.
- Further, Kuwait has indicated that its LNG needs far exceeds its own previous estimates. Brazil and Turkey are also taking in record amounts, where Brazil is being affected by low hydro and Turkey is not getting as much pipeline gas from Iran.
- Amid these supply problems and rising demand, Qatar is also shipping more LNG cargoes to Asia and less to Europe, especially the UK. Qatar remains the largest LNG supplier to the UK. Lower LNG flow to UK boosts NBP prices because of the very limited supply options available – The UK continental shelf production continues to fall. But higher NBP prices do not necessarily reflect stronger demand on the Continent. The situation is akin to the physical Brent oil supply dynamics. UK demand should also increase next year on the UK carbon policy and LCPD (Large Combustion Plant Directive) that forces coal plants to retire.

Figure 85. Qatari LNG exports (Eastbound)



Source: Citi Research

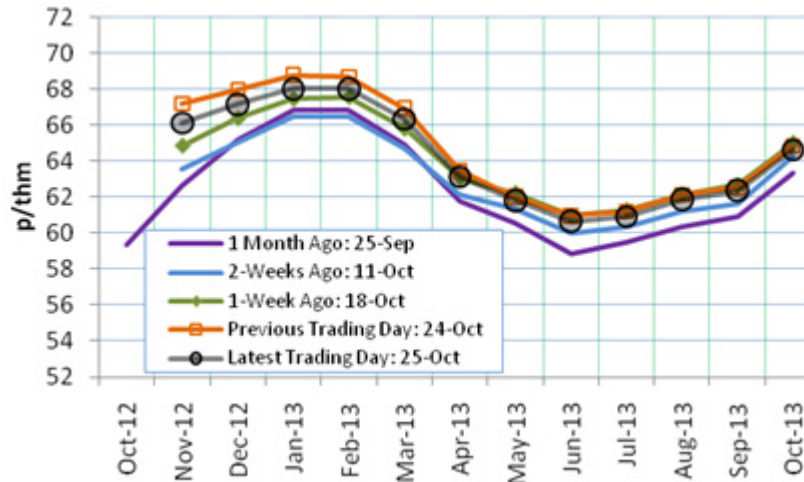
Figure 86. Qatari LNG exports (Westbound to Europe)



Source: Citi Research

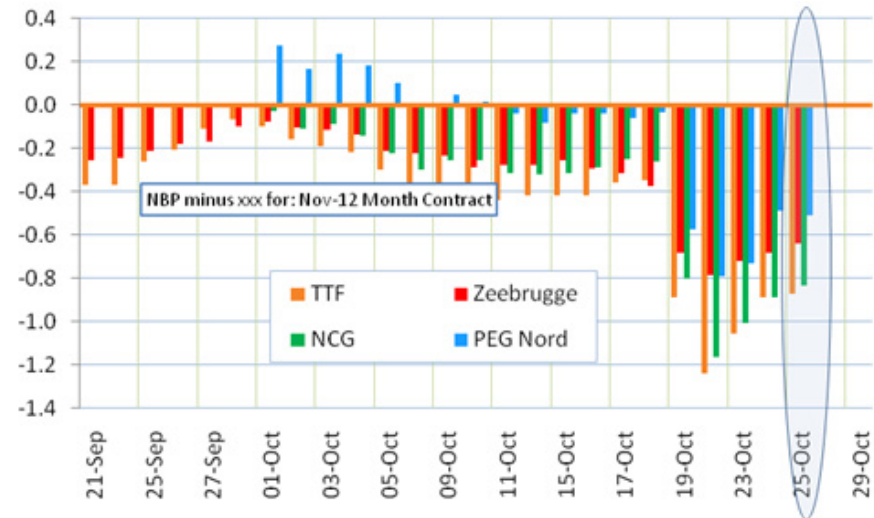


Figure 87. Short term cold weather has boosted NBP prices, lifting the rest of cal 13



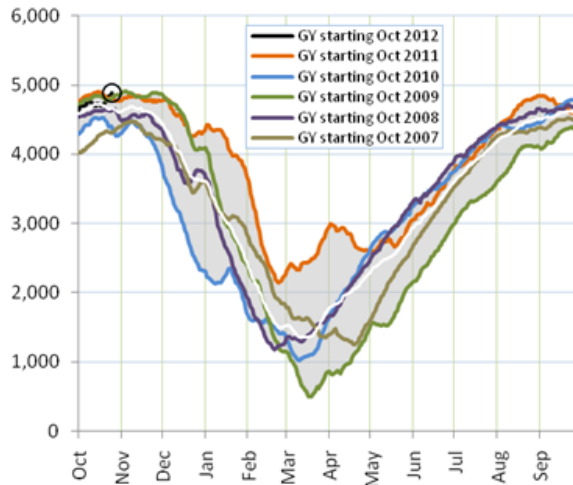
Source: Citi Research

Figure 88. With the lack of LNG coming, NBP prices moved above continental prices



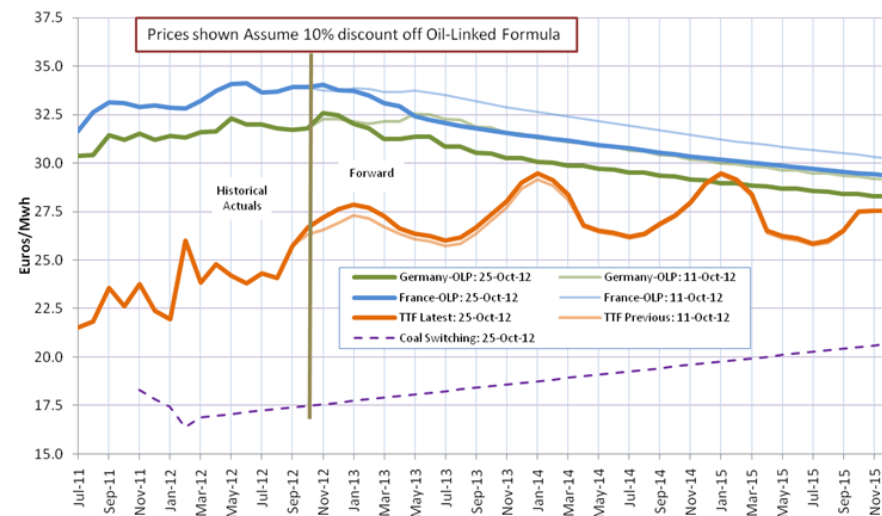
Source: Citi Research

Figure 89. UK gas storage remains very high by historical standards



Source: GSE, Citi Research

Figure 90. As long-dated oil falls, TTF forwards are nearly oil parity ceiling out the curve

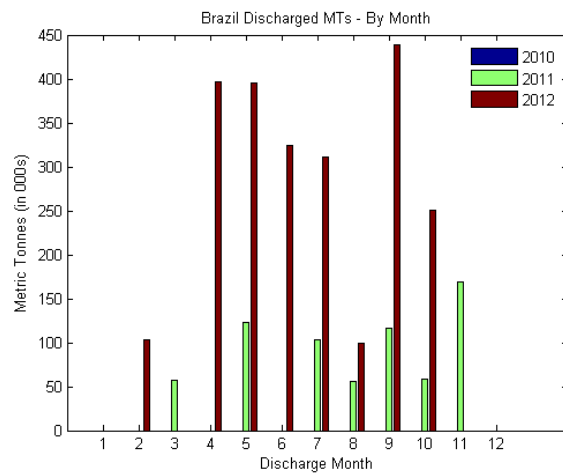


Source: Citi Research

**But potential bearish factors abound: a look at the demand side for global gas**

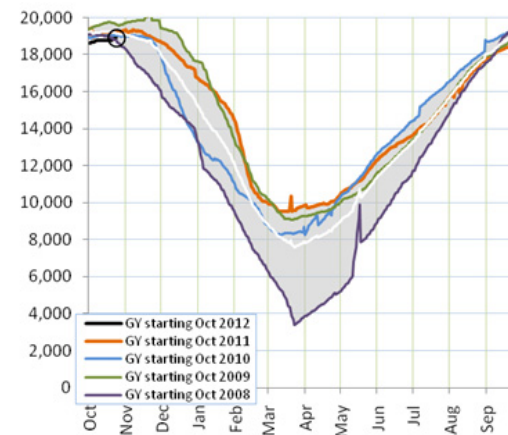
- Weather has the biggest impact in the short term. A mild winter in Europe would leave gas inventories higher than normal. Winter prices could remain elevated on supply concerns. A mild winter in the US could also put downward pressure on European gas prices.
- US coal exports could fall YoY but remain above the level seen in recent years. A mild US winter would depress US gas prices, with gas power plants displacing coal power plants. Lower coal demand without a corresponding fall in coal production should pressure coal prices, thereby opening up the export arbitrage to Europe and possibly Asia. Hence, low US Henry Hub gas prices can be transmitted to Europe. In addition, a stronger hydro year in Brazil should reduce the amount of fossil generation and LNG imports.
- Macro and policies can also affect the level of demand. If the global economy continues to muddle along, European gas demand could fall on a weather-normalized basis, as gas demand for power generation remains squeezed by low electricity demand, rising renewables and strong coal-fired generation.
- Low carbon prices helped to keep coal power plants competitive. The European Commission is proposing to boost carbon prices through the process of “backloading” – withholding 400, 900 or 1200-mt of allowances in the nearby years and release them in the out years. The vote is set to happen sometime in December. While carbon prices did rise to € 9/ton from a low of € 6 earlier in 2012, but they have now fallen back to near € 7. Carbon prices would have to be in the € 20 range to have more of an impact on coal-fired generation. If this “backloading” does not happen, carbon prices could stay in the \$6 to \$8 range.

**Figure 91. Brazilian LNG sendout – much stronger in 2012 than in 2011**



Source: Bloomberg, Citi Research

**Figure 92. Germany gas storage within recent years' range, but gas demand for power generation has fallen sharply**

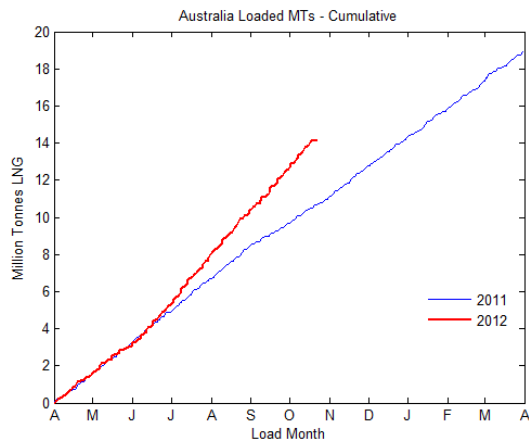


Source: GSE, Citi Research

**Potential bearish factors: a look at the supply side for global gas**

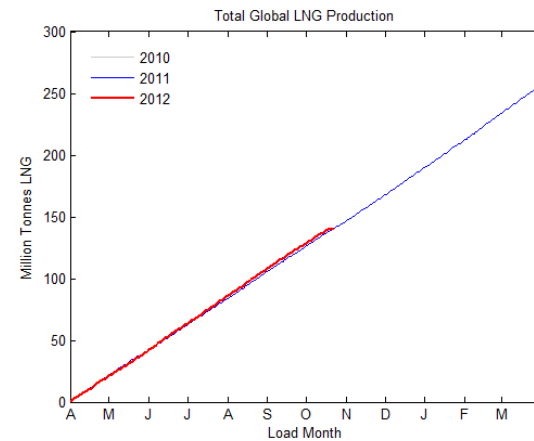
- On the supply side, Gazprom’s supply may not decline as much as previously thought. Russian producers are increasing output, with Novatek and Rosneft both boosting their supply to domestic users and intensifying the domestic competition within Russia. Gazprom, by far the largest producer, sought to raise its domestic prices to compensate for lower sales volume but the request was denied. In addition, with more gas in Europe being priced and procured outside of oil-indexed contracts, Gazprom has lost significant market share and should be looking to stem further losses. The tradeoff between losing market share is a reduction in current oil-indexed prices. It had to renegotiate contracts with a number of major European utilities. In addition, the supposed gas shortage in Feb’12 amid a severe cold snap raised questions on Gazprom’s ability to deliver gas. As such, Gazprom may look to ship more gas to Europe, as it loses shares in the domestic market. It is also likely looking to improve its gas deliverability by shipping more gas to continental Europe or Ukraine for storage during the injection season, so that Gazprom can supply gas to customers faster. This should reduce the scarcity pricing during high demand periods. The price premium should fall.
- With lower oil prices expected in 2013, the price of oil-indexed gas should decline, lowering the ceiling on spot gas prices.
- The Q2’12 scramble for LNG may not happen in 2013 as the market becomes more comfortable with Japan’s LNG requirements. Prices were pushed higher in Q2’12 amid Qatari maintenance and Yemeni pipeline explosions. The scramble could happen again if Korea shuts some of its nuclear units. Korea recently discovered cracks at its Yonggwang nuclear unit and elsewhere.
- The on-time start-up of Angola and Algerian LNG would provide new sources of LNG supply.
- Australian LNG liquefaction facilities appear to have been producing above nameplate capacity. While this run rate could continue, lower prices may reduce the incentives of overproduction.
- The resumption of Iranian gas exports to Turkey should reduce the demand for LNG.

Figure 93. Australian LNG production



Source: Citi Research

Figure 94. Global LNG production



Source: Citi Research

### Global Gas – 2013 looks to be an eventful year

- On the demand side, any potential resolution on the Iranian standoff could increase pipeline gas supply to Turkey. Turkish LNG demand soared in 2012 on Iranian disruption.
- With more physical regas and storage facilities coming online, the flexibility in tanker routing should increase. Besides a Malaysian import terminal likely coming online in 2013, a number of Chinese terminals will also begin operation, as domestic Chinese demand for gas continues to grow according to the 12<sup>th</sup> Five-Year Plan. Although local industries and power plants have agreed to procure 2.7-mtpa of gas from Singapore's new 3.5-mtpa regas terminal, further expansions in regas and storage capacity clearly put Singapore into becoming a regional LNG trading hub. Korea also has similar aspiration.
- On the supply side, supply projects have been plagued by delays and cost overruns. Woodside's Pluto facility in Western Australia was delayed and over budget. Angola's LNG liquefaction terminal should finally come online after a full year of delay due to technical problems. Algeria's Skikda expansion is being pushed back to 2013, while the Arzew project has been delayed from early to late 2013.
- On the transport side, after a period of tightness in the tanker market when day rates soared, the first of a number of new tankers should be entering the market. With a greater number of tankers, day rates should be pressured. As transport costs fall, the JKM-NBP spread should narrow as well, in addition to supply-demand reasons discussed above.
- The US should be issuing permits to export gas to FTA and non-FTA (Free Trade Agreement) countries, paving the way for an expected 5- to 6-Bcf/d of gas exports from the continental US starting in late 2015 or 2016. The export of US LNG is significant because prices would be tied to a gas price benchmark – Henry Hub – rather than linked to oil.
- LNG production fell in Trinidad in September, but the decline was also related to the extensive maintenance being performed to the country's liquefaction facilities and gas supply infrastructure. However, a longer term reduction in Trinidad production, combined with delays in bringing online liquefaction facilities in Angola and others could tighten the Atlantic Basin and global gas balance.

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## Industrial Metals

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## 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 beginning 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 97. Copper supply / demand balance

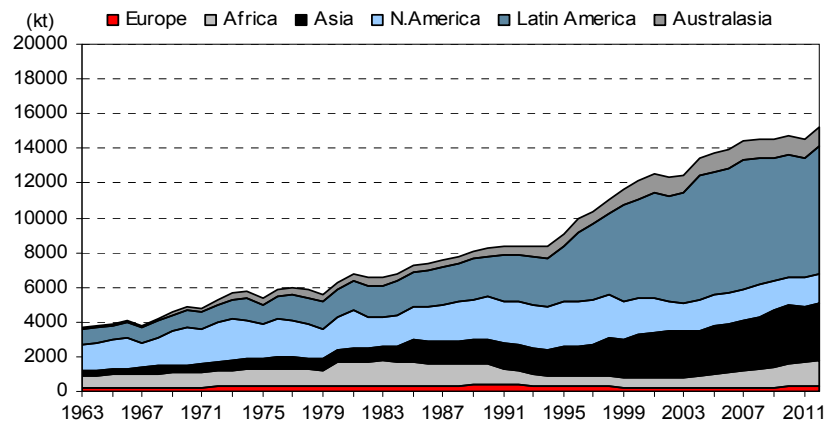
kt	2010	2011	2012	2013f	2014f	2015f	2016f
Mine Production (Concentrates)	12,822	12,734	13,243	14,211	15,276	15,577	16,401
Scrap/Resmelted blister etc. (incl losses)	1,913	2,678	2,663	1,981	2,075	2,165	2,426
Smelter Capacity	17,554	19,986	18,861	19,775	20,971	21,796	22,103
Smelter Production	14,786	15,421	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

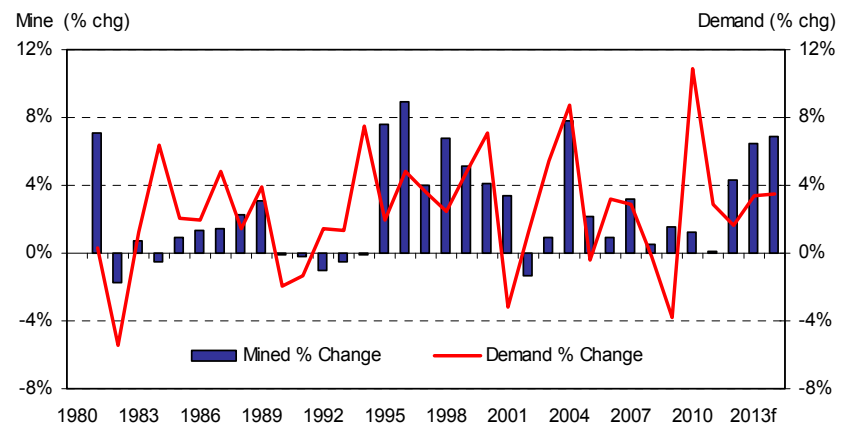
- Copper bulls continue to contend that copper supply will fail to deliver in 2013, pointing to losses due to strike activity, ore depletion and project slippage as the reasons. Obviously these have been the reasons for poor performance in recent years. However, we believe that these factors will be 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 98. Mine supply – clear recovery starting in 2012



Source: Citi Research

Figure 99. 2013/2014 mine supply growth – above recent trends

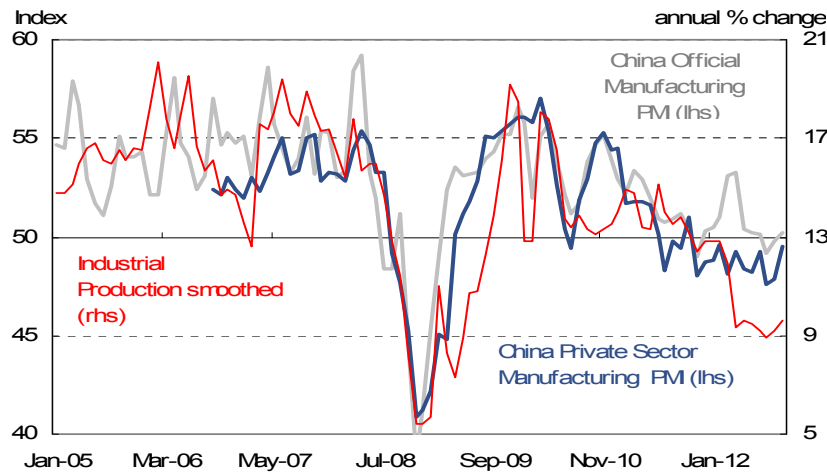


Source: Citi Research

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

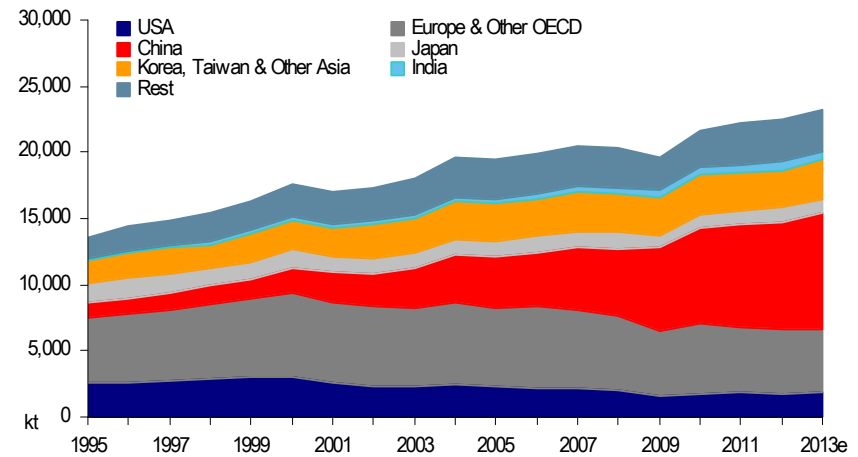
- Projections of ‘continued’ copper market tightness in 2013 continue to be made somewhat predictably, driven particularly by an expectation of renewed China stimulus to be implemented by the incoming Chinese leadership. The apparently more conservative tinge to the new leadership, suggests a more hawkish 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 100. Chinese manufacturing activity – showing signs up upturn**



Source: Citi Research

**Figure 101. China is the key source of consumption growth in a sluggish macro environment**



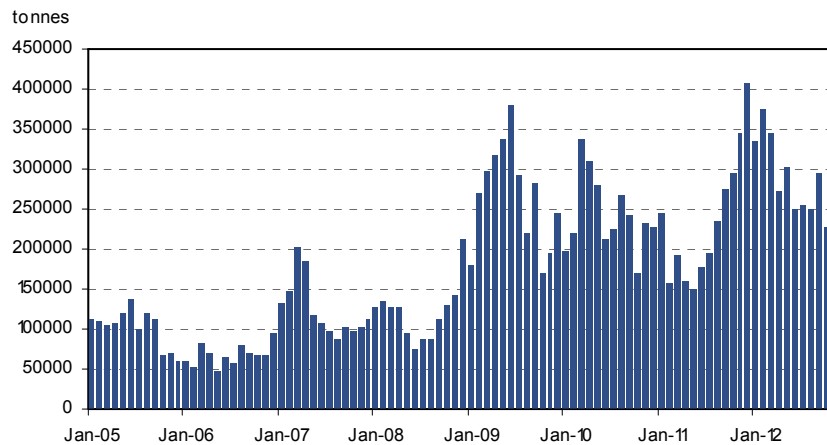
Source: Citi Research



**Copper outlook – a modestly widening surplus in 2013**

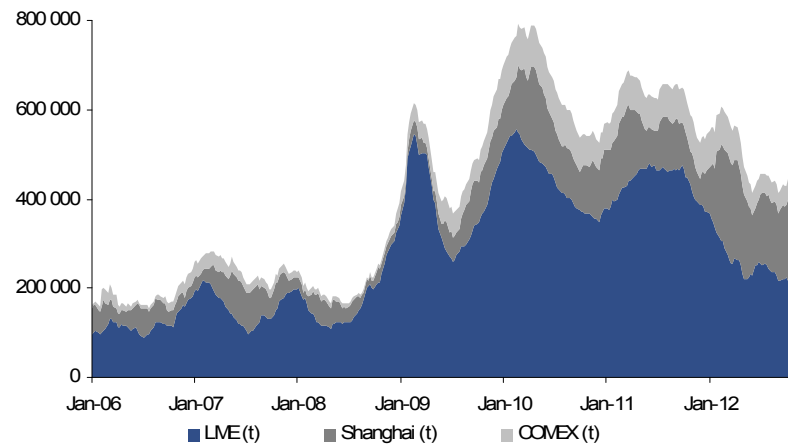
- Whilst a modest improvement in copper consumption growth rates is expected in 2013, largely driven by an end to Chinese final product destocking, this is expected to have only a moderately bullish impact on copper prices during the first half of next year. The primary reason is that primary copper 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 102. Chinese copper imports, a declining trend expected in 2013**



Source: Citi Research

**Figure 103. 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 104. Aluminum supply / demand balance

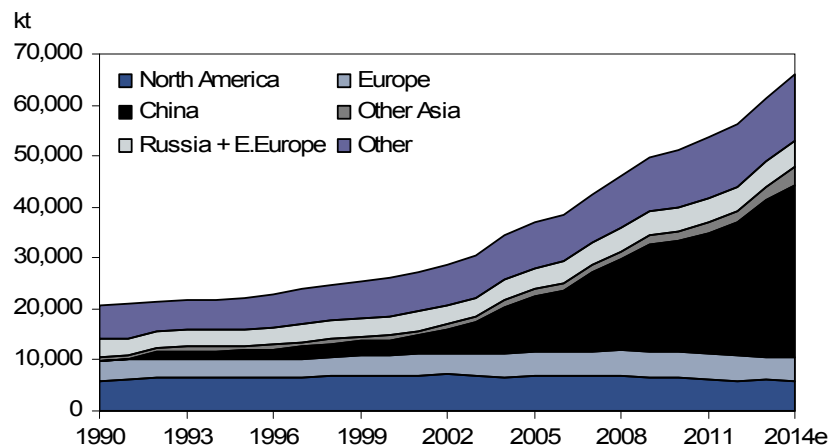
	2010	2011	2012e	2013f	2014f	2015f	2016f
Smelter Capacity ktpy	51,221	53,559	56,066	61,435	66,184	69,824	72,518
Refined Production	42,047	45,319	47,070	50,041	53,290	56,627	59,241
Capacity Utilization (%)	82%	85%	84%	81%	81%	81%	82%
Supply Incr (%)	12.6%	7.8%	3.9%	6.3%	6.5%	6.3%	4.6%
Consumption/Demand	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%
<b>MARKET BALANCE</b>	<b>1,224</b>	<b>681</b>	<b>555</b>	<b>660</b>	<b>747</b>	<b>924</b>	<b>826</b>
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

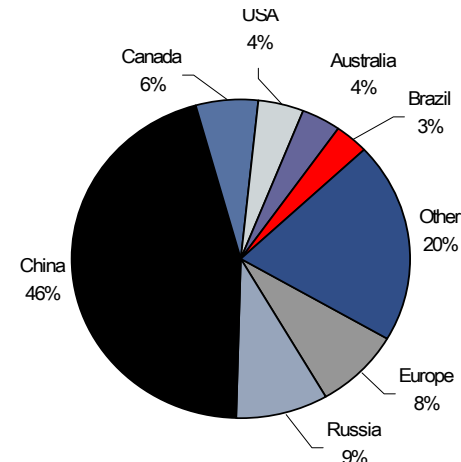
- The combined impact of the operation of LME warehousing and investor demand for physical metal for contango financing has effectively removed the laws of demand from driving production decisions. In 2012, only 3 smelters (Vlissingen, Kurri Kurri, and Porte Vesme) accounting for 1.8% of non-Chinese 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 105. No slowdown in supply growth going forward



Source: Wood Mackenzie, IAI, Citi Research

Figure 106. Aluminum production by region, 2012

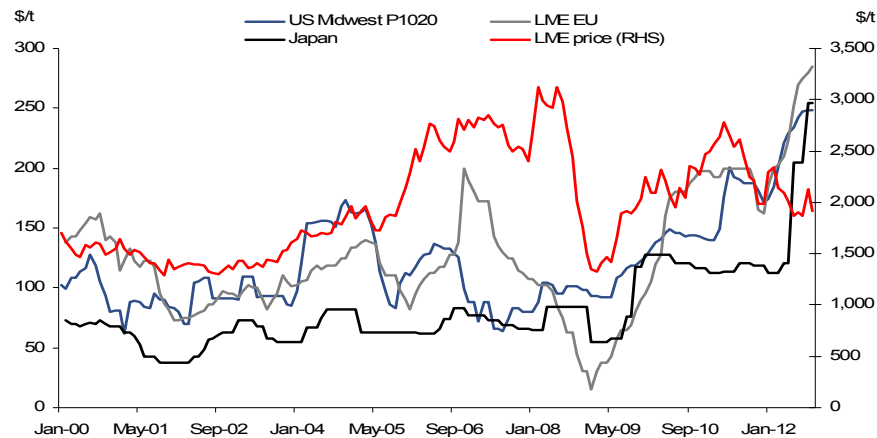


Source: Wood Mackenzie, IAI, Citi Research

**Aluminum – Focus on China for demand cues**

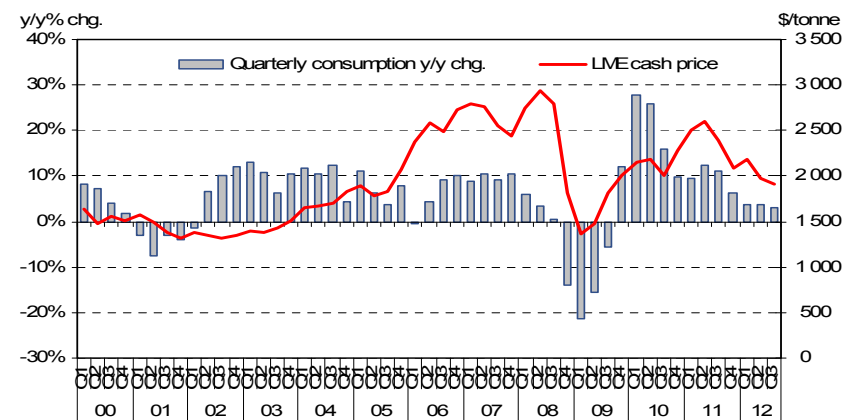
- Recent macro economic data does indicate that the Chinese economy has bottomed out in September. Data indicates that industrial production picked up modestly to 9.6% yoy in October, up 0.81% on September levels. Part of this boost has indeed come from the Government fast tracking some infrastructure 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 107. Spot physical premiums, set to rise further in 2013**



Source: LME, Citi Research

**Figure 108. Consumption growth trend slowing, expect modest pick up in H1 2013**

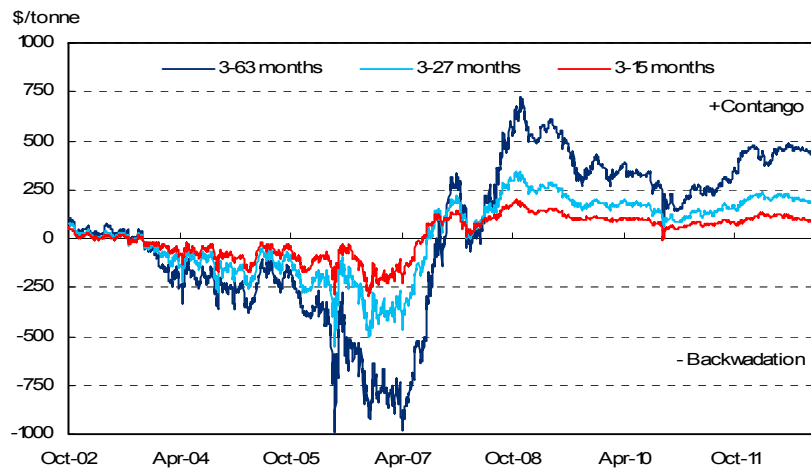


Source: Wood Mackenzie, WBMS, Citi Research

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

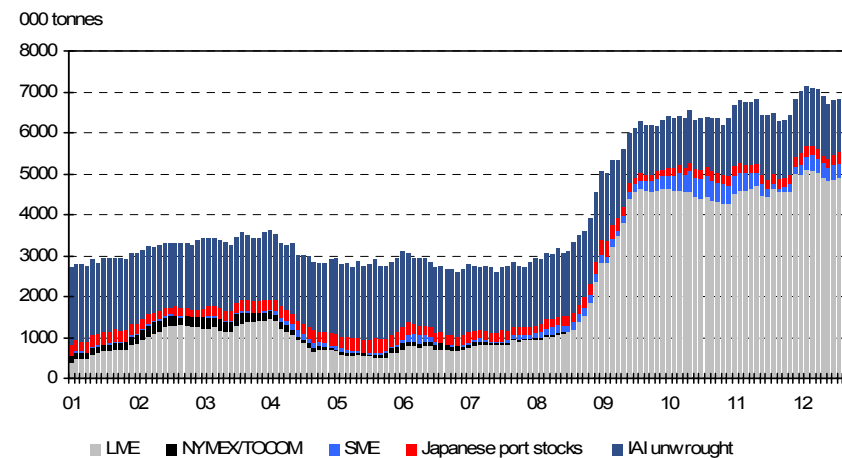
- It appears somewhat of a paradox that the 2012 Aluminum market surplus of 555,000 tons is expected to rise to 660,000 tons in 2013, yet little change in prices, in terms of annual averages, is expected. The key reason for this view is the impact of both physical and paper investors.
- Currently it 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 109. Forward spreads continue to make contango financing attractive



Source: LME, Citi Research

Figure 110. 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 111. Nickel demand / supply balance

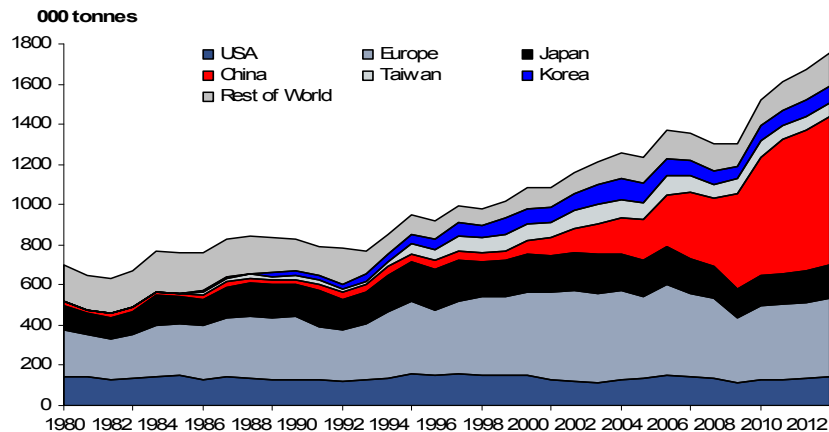
kt	2010	2011	2012e	2013f	2014f	2015f	2016f
Mine production	1,673	1,963	1,972	2,017	2,159	2,236	2,257
Refined capacity	2,113	2,310	2,467	2,492	2,563	2,579	2,532
Refinery utilization	69%	71%	70%	70%	72%	74%	78%
Nickel in Pig iron	174	282	252	260	244	256	269
Metal production	1,451	1,636	1,715	1,755	1,843	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

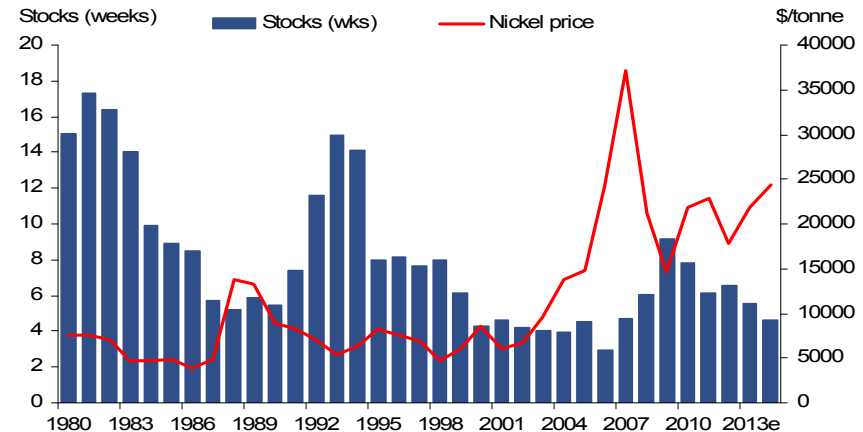
- For much of the last year, stainless steel consumers have been heavily destocking, while stainless steel mills following suit, destocking nickel as the price has steadily fallen. This trend partly explains the rise in exchange inventory that has occurred though 2012. Indeed, the pricing of stainless 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 112. Chinese stainless production



Source: Wood Mackenzie, INSG, Citi Research

Figure 113. Nickel inventory expected to return to a draw trend in 2013

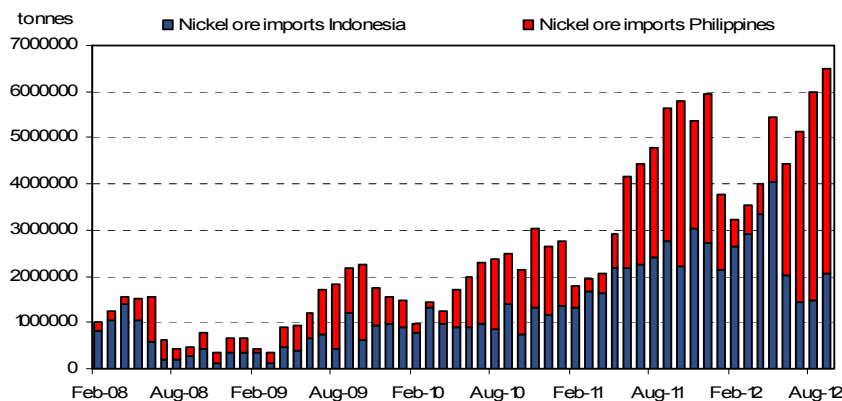


Source: Wood Mackenzie, INSG, Citi Research

**Nickel – supply failure a continuing theme**

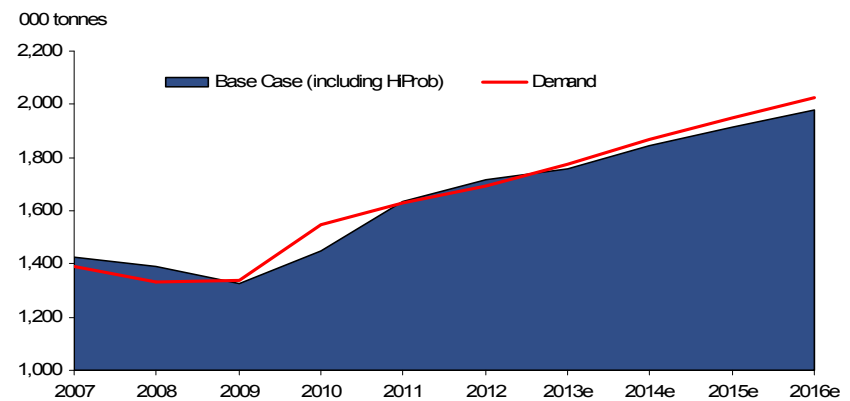
- Given the list of underperforming nickel production assets in 2012, it is clear the continued bearish sentiment towards nickel is not really born out by fundamentals. Vale’s 53,000 tpy Onca Puma ferronickel operations requires a complete furnace rebuild, with production not likely to restart until 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 114. Chinese nickel ore imports, Filipino material no substitute for Indonesian ore**



Source: NBS, Citi Research

**Figure 115. Nickel supply is beginning to underperform**



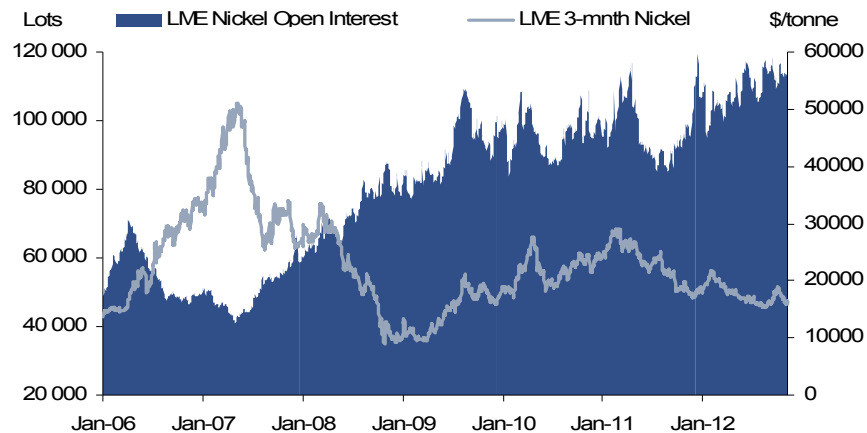
Source: Wood Mackenzie, Citi Research



**Nickel – Market deficits on the horizon**

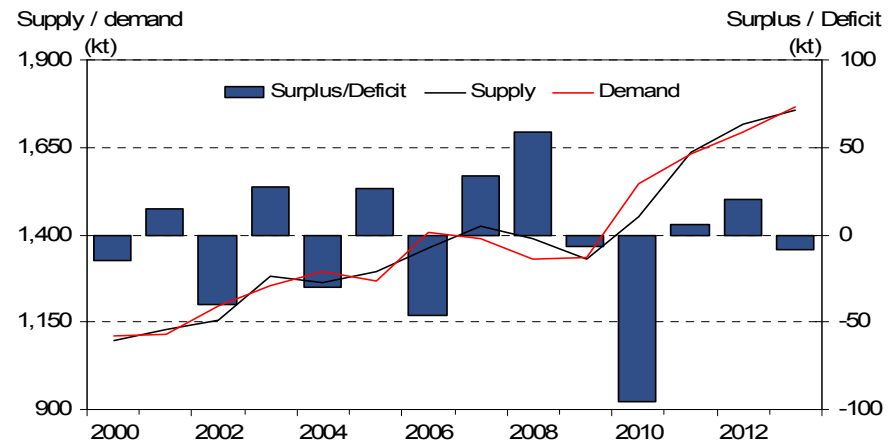
- Nickel has and continues to be one of the favored metals to short this year, with shorts building again into November due in part to the continuing negative narrative on the supply side. The story not helped by the extreme draw down in refined nickel inventory in China over the year, as evidenced by 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 116. Nickel has been one of funds favorite shorts



Source: LME, Citi Research

Figure 117. 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 118. Zinc supply / demand outlook

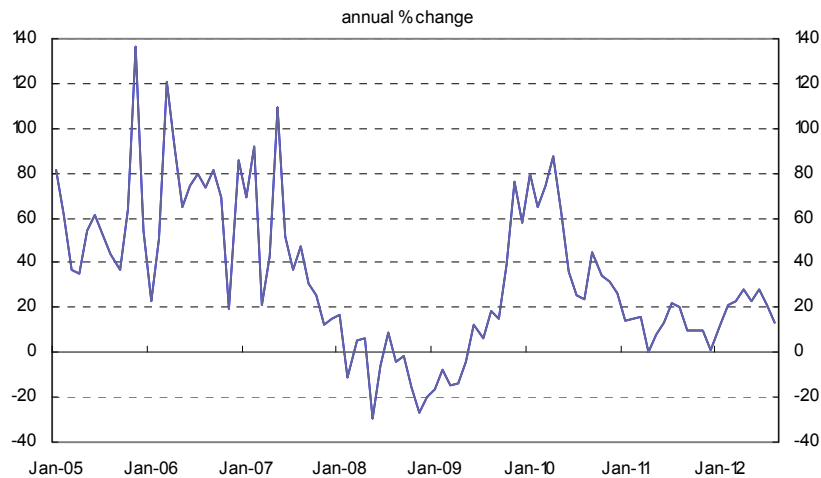
kt	2010	2011	2012f	2013e	2014e	2015e	2016e
Mine production	12,109	12,700	13,078	14,011	14,504	15,100	15,387
Concentrate required	12,366	12,754	12,994	13,327	13,854	14,620	15,032
Smelter Capacity	15,271	15,475	15,883	16,587	17,182	18,531	18,381
Primary prodn	11,795	12,165	12,394	12,711	13,206	13,944	14,338
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%
<b>MARKET BALANCE</b>	<b>1,039</b>	<b>500</b>	<b>357</b>	<b>193</b>	<b>270</b>	<b>320</b>	<b>42</b>
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

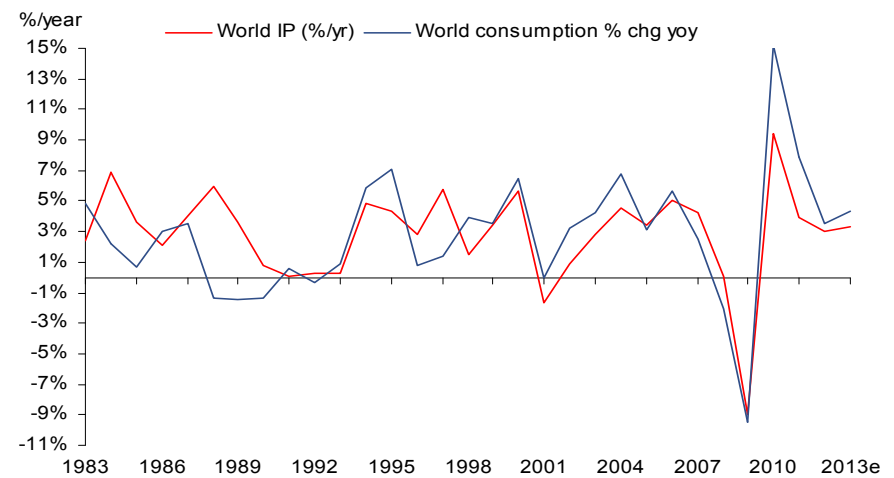
- In China, there are signs that manufacturing is showing signs of improvement. Although the official Chinese purchasing managers' index rose to 50.2 in October, up from 49.8 in September, the first monthly print above the crucial 50 mark since October last year. However, in contrast the official numbers, 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 119. Chinese galvanized sheet production continues to slow



Source: Bloomberg, Citi Research

Figure 120. Zinc demand stalls in 2012, but modest improvement set for 2013

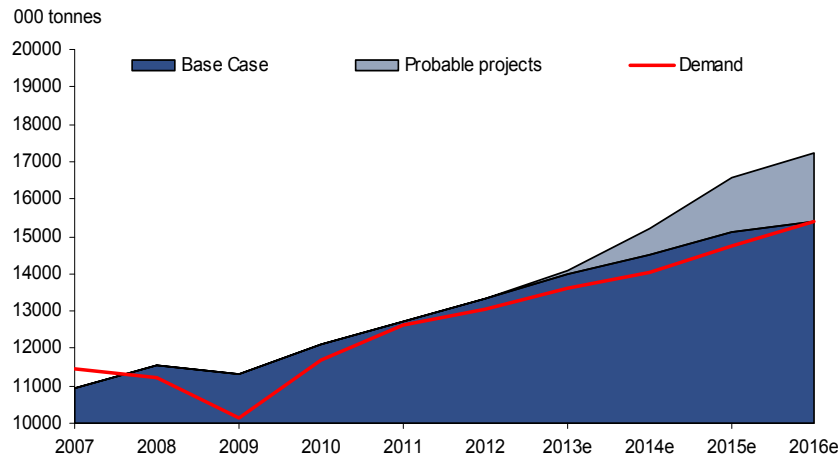


Source: Bloomberg, Wood Mackenzie, Citi Research

### Zinc – No shortage of mine supply

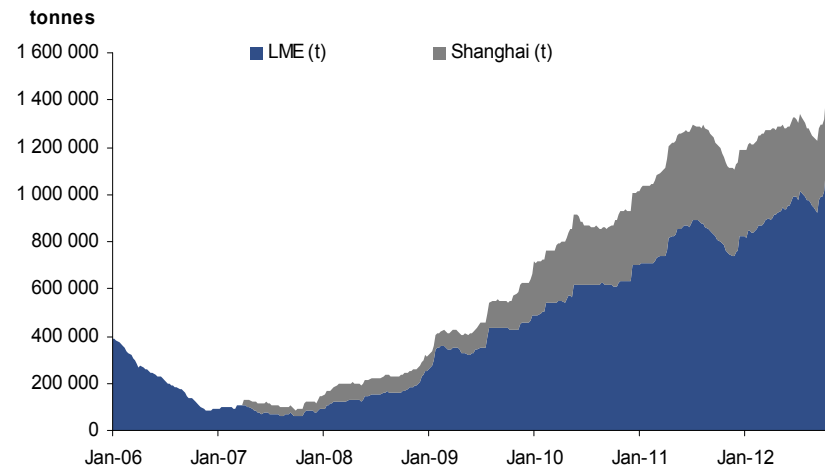
- The above mentioned contraction in Chinese refined zinc supply clear pitched the Chinese zinc market into a deficit for the year, as evidence by the 56% increase in refined imports this year. For the market as a whole to be pitched into deficit by the Chinese fall off in refined production would still 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 121. No apparent shortage in Zinc mine supply



Source: Wood Mackenzie, ILZSG, Citi Research

Figure 122. Inventory continues to rise despite talk of market deficits

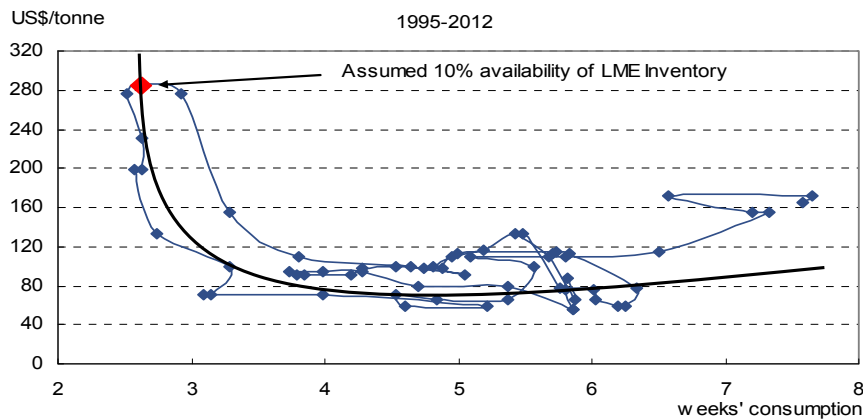


Source: LME, Citi Research

**Zinc – dislocation between consumer and LME prices a growing possibility**

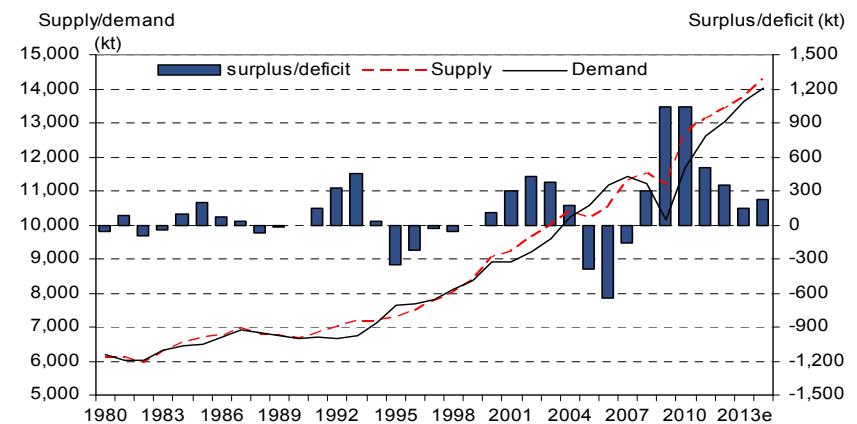
- Cancellations of LME inventory have again surged in the last week, and now account for over 48% of total inventory. As mentioned above, analysis suggests that actually metal availability is significantly lower than cancellation suggest due to financing, and load out queues. Indeed, we estimate that 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 123. Zinc premiums, significant upside potential in 2013**



Source: LME, Citi Research

**Figure 124. Market projected to remain in surplus in 2013**



Source: Wood Mackenzie, ILZSG, Citi Research

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## Precious Metals

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## 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 13<sup>th</sup> 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 5<sup>th</sup> to \$1739/oz on November 9<sup>th</sup> 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 125. Gold supply / gold balance

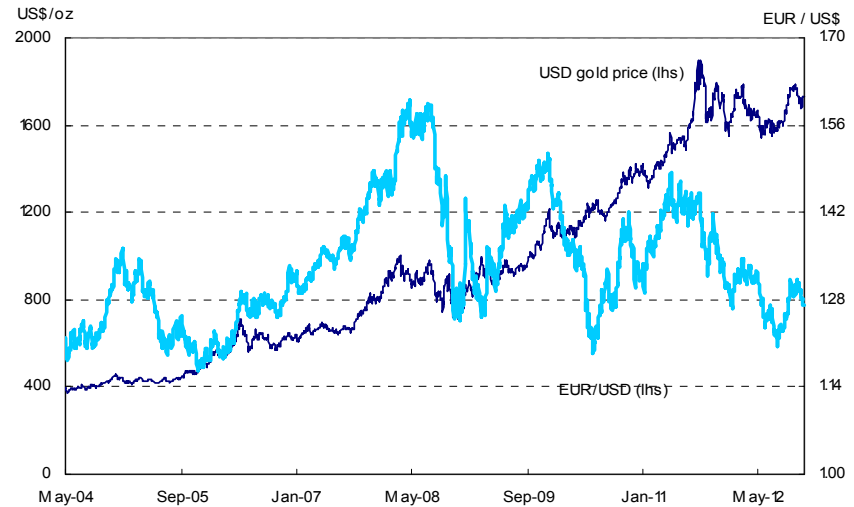
kt	2010	2011	2012e	2013e	2014e	2015e	2016e
Mine Supply	2,689	2,819	2,834	2,889	2,964	2,818	2,800
Scrap Supply	1,645	1,661	1,636	1,837	1,518	1,300	1,300
Net Producer Hedging	0	12	20	82	114	122	100
<b>Total Supply</b>	<b>4,334</b>	<b>4,486</b>	<b>4,470</b>	<b>4,808</b>	<b>4,596</b>	<b>4,208</b>	<b>4,150</b>
Jewelry	2,017	1,973	1,863	1,775	1,926	2,273	2,300
Other fabrication and Industrial use	767	786	751	730	732	682	670
<b>Total Fabrication Demand</b>	<b>2,779</b>	<b>2,759</b>	<b>2,614</b>	<b>2,505</b>	<b>2,658</b>	<b>2,955</b>	<b>2,970</b>
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
<b>Total Demand</b>	<b>4,334</b>	<b>4,486</b>	<b>4,470</b>	<b>4,808</b>	<b>4,596</b>	<b>4,208</b>	<b>4,150</b>
(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**

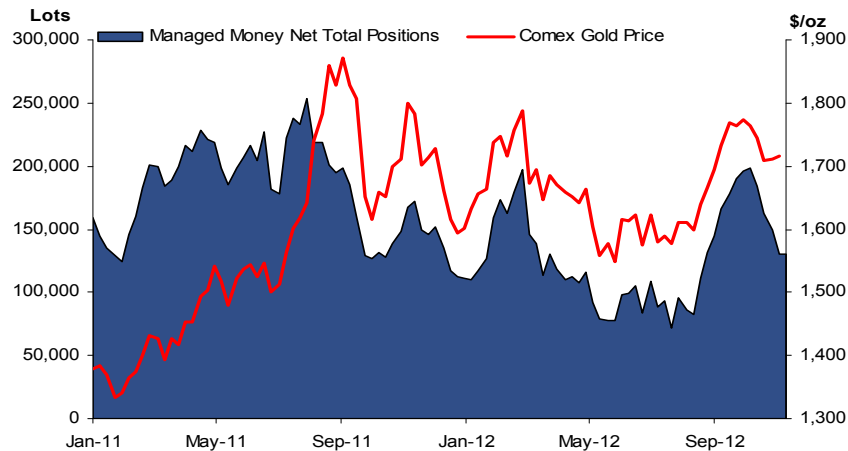
- Investors appear to be losing faith in the bull story for gold, if net managed money positions on Comex provide a reasonable guide. Indeed, net long managed money positions on Comex have fallen by 33% since October 2 2012, not exactly a vote of confidence for further significant gold upside. Perhaps 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 of 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 126. Dollar has been strengthening vs. Euro despite open ended QE3, not helping gold**



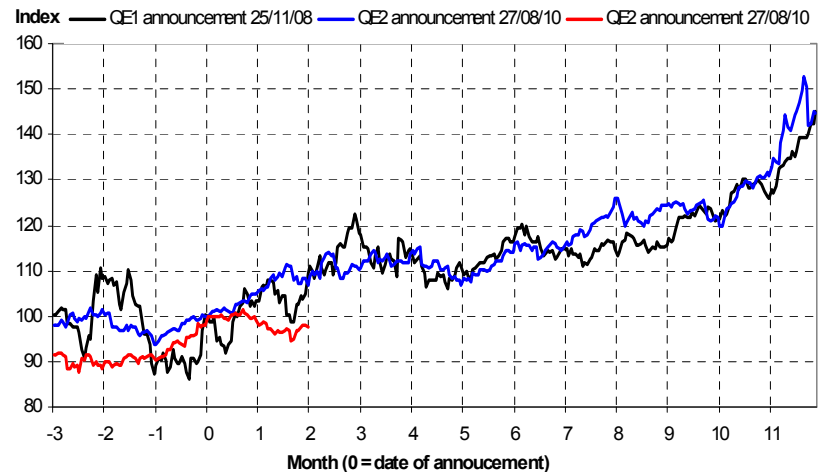
Source: Bloomberg, Citi Research

**Figure 127. Fund managers have been rapidly reducing positions since the QE3 announcement**



Source: COMEX, Citi Research

**Figure 128. QE3 has had a significantly less positive impact on prices than previous easing**



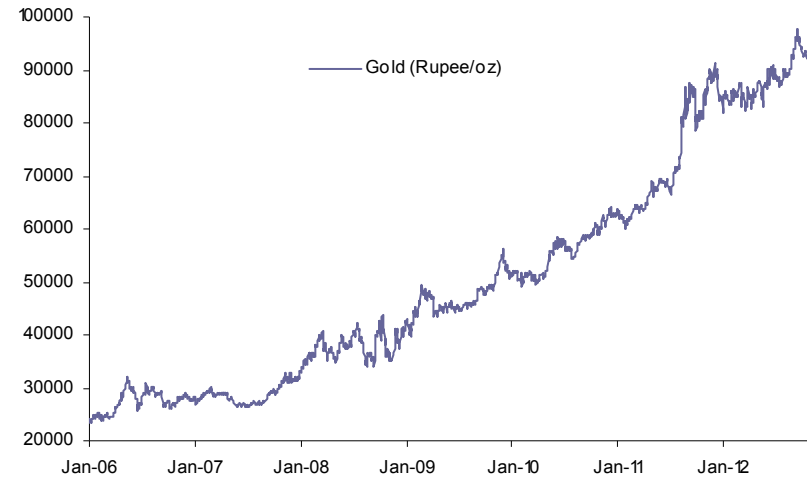
Source: Bloomberg, Citi Research



### Gold - Indian market shows some signs of life

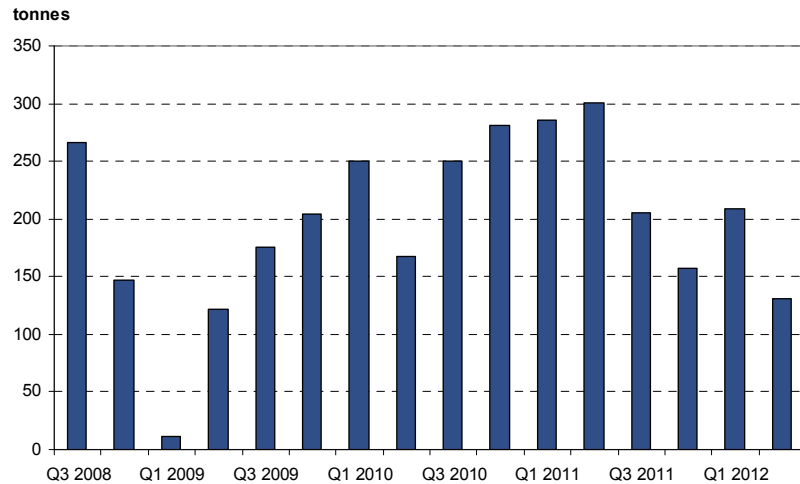
- Indian gold demand has been in the doldrums through 2012, struggling under the impact of weak Rupee and a temporary import duty rate hike in H1, and thus gold prices consistent new record highs in Rupee terms through the year. In H1, gold imports declined by 42% y/y (or 247 tons). The trend has continued 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 129. Rupee gold prices remain close to record highs



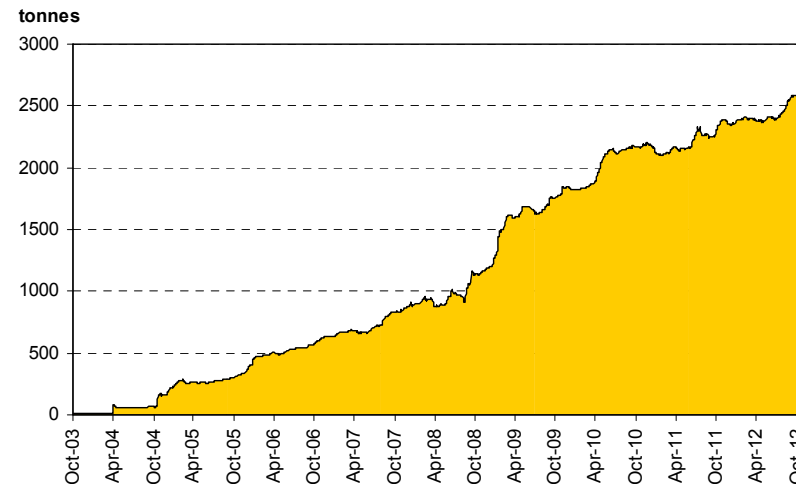
Source: Citi Research

Figure 130. India gold imports, struggled on weakening Rupee



Source: Citi Research

Figure 131. ETF uptake no match for weak fabrication demand in the year to date

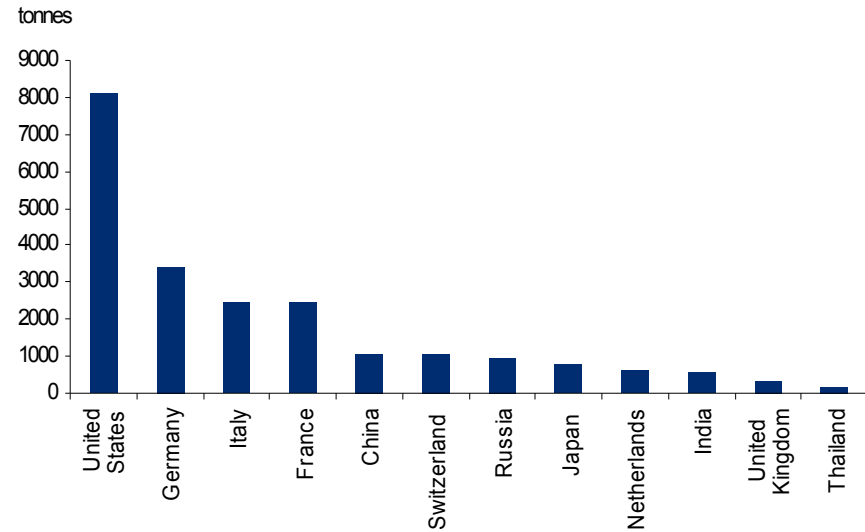


Source: Citi Research

### Gold – Modest Q1 2013 upside expected

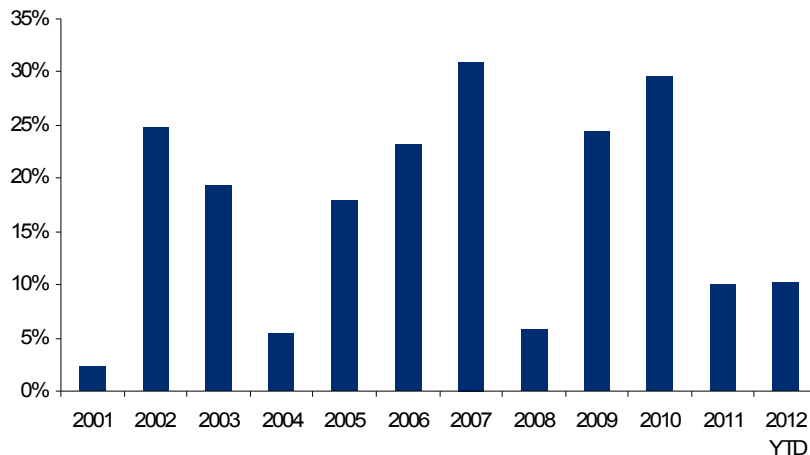
- On the supply side, tensions in the South African mining sector, and particularly in the gold sector, appear to have eased. Reported losses Anglo Gold Ashanti were down around 2 tons in Q3 compared to guidance, while Gold Fields losses were around 0.5 tons in the same quarter.
- The outlook in 2013 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 132. Official sector gold holdings, November 2012



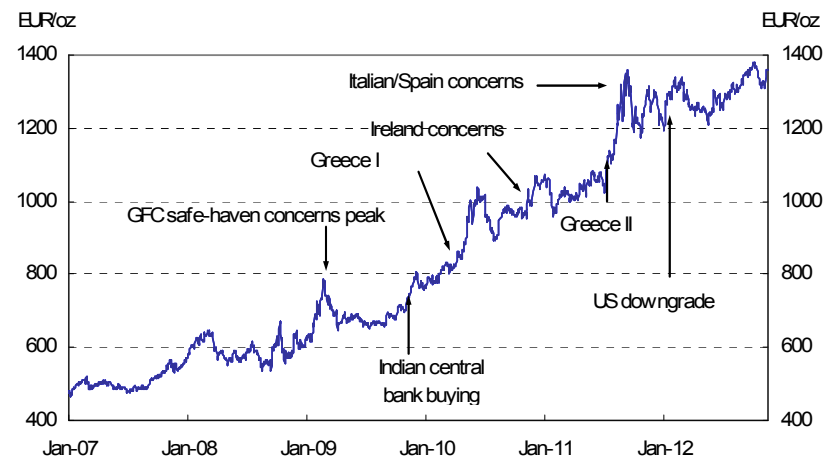
Source: GFMS, Citi Research

Figure 133. Gold Annual returns, 2000 - 2012



Source: Bloomberg, Citi Research

Figure 134. 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

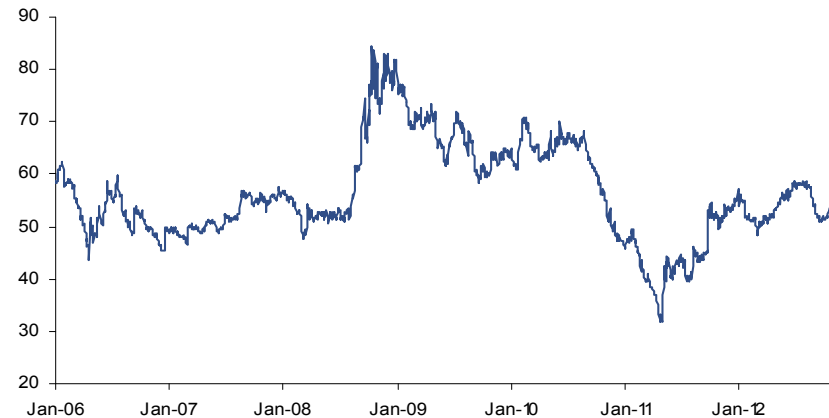
- As with the wider industrial and precious metals complex, silver prices saw a sharp rally prior to September on the expectation of QE3, eventually reaching an H2 2012 high of \$35.36/oz on October 1<sup>st</sup> before the rally ran out of steam, with prices settling back into a \$31-33/oz trading 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 135. Silver Price (US\$/oz) : Resistance at \$35/oz



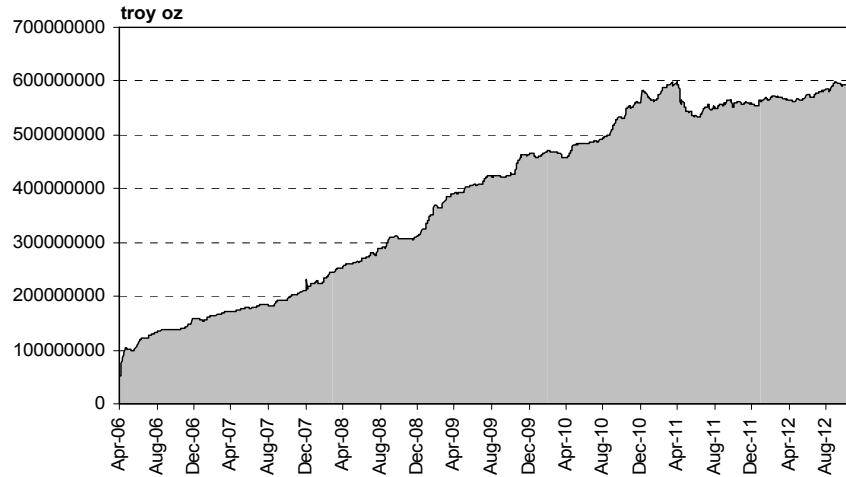
Source: GFMS, Citi Research

Figure 136. Gold / Silver Ratio : Neutral Territory



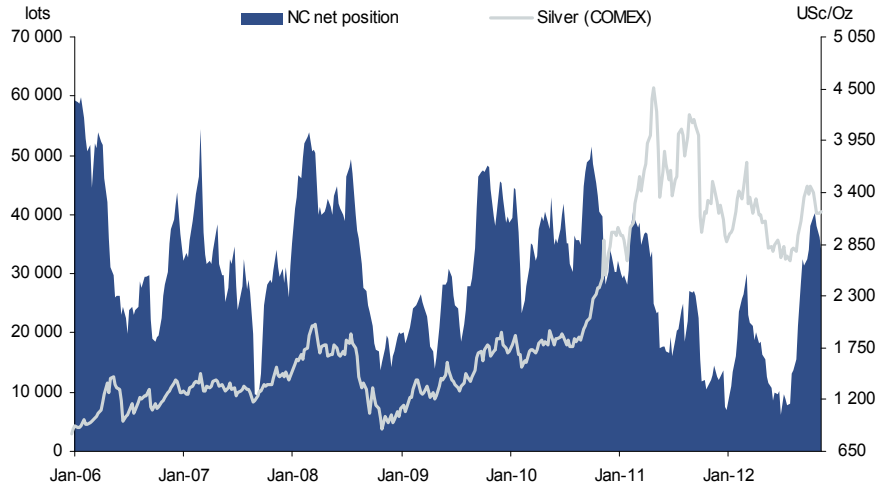
Source: GFMS, Citi Research

Figure 137. Silver ETF holdings – slowing upward momentum



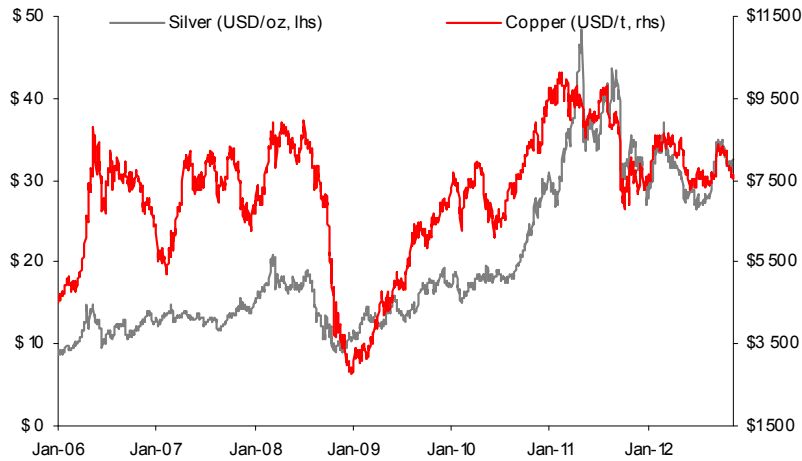
Source: Bloomberg, Citi Research

Figure 138. Non commercial net longs appear to have peaked in mid October



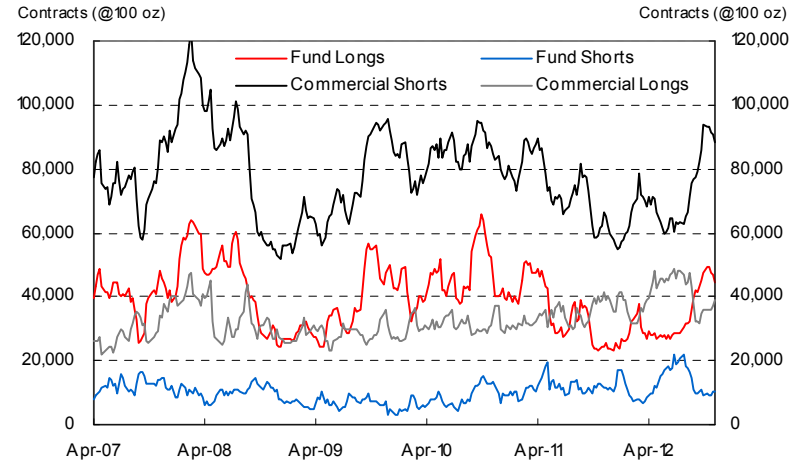
Source: Bloomberg, Citi Research

Figure 139. Silver again back to tracking industrial metals



Source: Bloomberg, Citi Research

Figure 140. 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 141. Silver Demand and Supply**

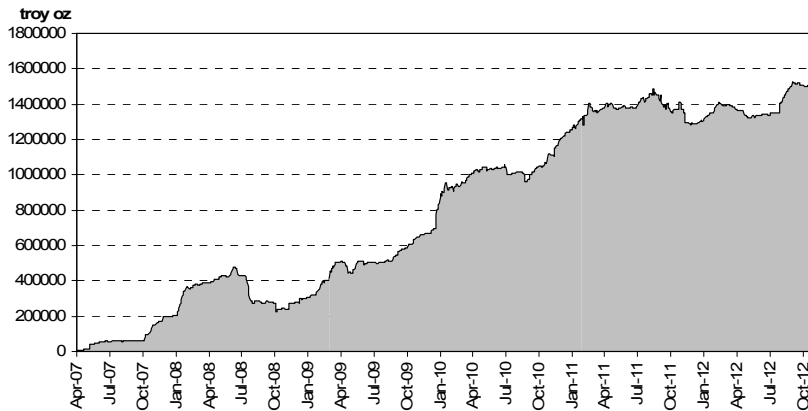
(m ounces)	2009	2010	2011	2012e	2013e	2014e
<b>Supply</b>						
Mine Production	716.1	751.4	761.6	782.3	807.3	816.5
Scrap	199.9	228.7	256.7	285.0	285.0	285.0
<b>Total Supply</b>	<b>931.6</b>	<b>1074.7</b>	<b>1040.5</b>	<b>1107.3</b>	<b>1129.3</b>	<b>1140.5</b>
<b>Demand</b>						
Industrial	405.1	500.0	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
<b>Total Fabrication</b>	<b>782.1</b>	<b>890.1</b>	<b>876.6</b>	<b>862.0</b>	<b>878.2</b>	<b>919.8</b>
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
<b>Total Demand</b>	<b>931.6</b>	<b>1074.7</b>	<b>1040.5</b>	<b>1107.3</b>	<b>1129.3</b>	<b>1140.5</b>
<b>Price</b>	<b>14.48</b>	<b>20.24</b>	<b>35.26</b>	<b>31.30</b>	<b>31.00</b>	<b>26.50</b>

Source: GFMS ,Citi Research

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

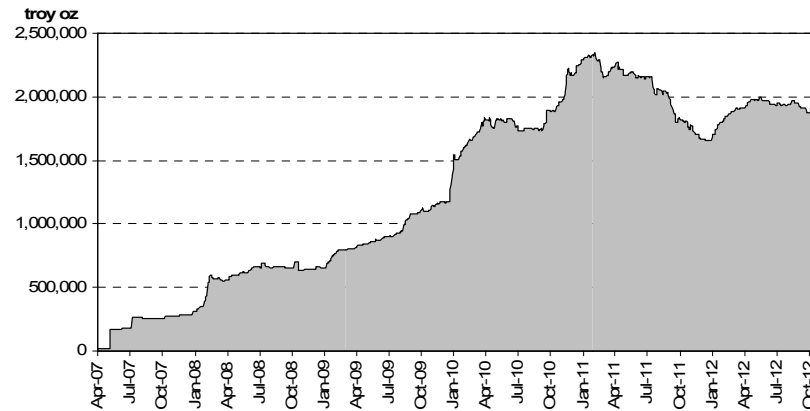
- Recent price moves in both platinum and palladium have been dominated by the strike disruption in South Africa, effectively counteracting a weaker demand picture most notably from the European auto sector. While SA events have had a significant impact most notably on pgm prices in the short term, pushing platinum prices to 2012 to-date highs of \$1,726/oz on October 5<sup>th</sup>. 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 142. Platinum ETF holdings - Lift from South African strike beginning to ebb



Source: Bloomberg, Citi Research

Figure 143. Palladium ETF holdings – On the decline since May



Source: Bloomberg, Citi Research

Figure 144. 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 145. Palladium demand / supply

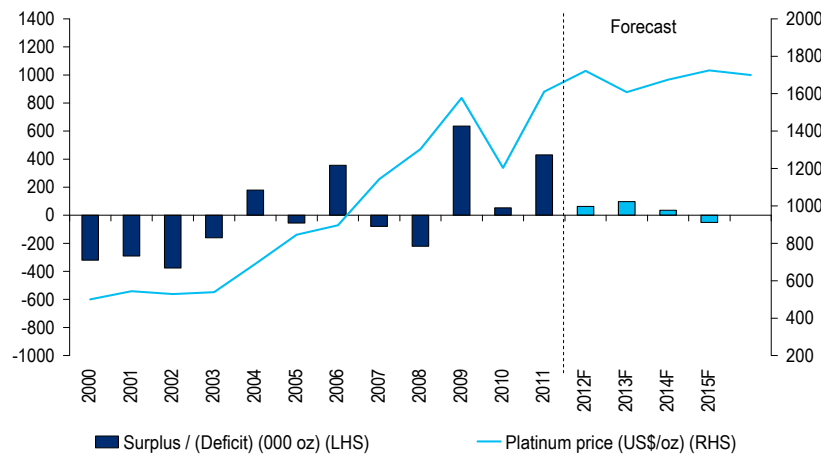
000 ounces	2010	2011	2012e	2013f	2014f	2015f	2016f
Mine production:							
South Africa	2,860	2,825	2,675	2,785	2,853	2,922	2,970
Russia	2,720	2,705	2,700	2,650	2,650	2,650	2,650
North America	590	900	795	870	980	1,050	1,050
Rest of World	185	155	180	180	180	180	180
Total Mine Supply	6,355	6,585	6,350	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

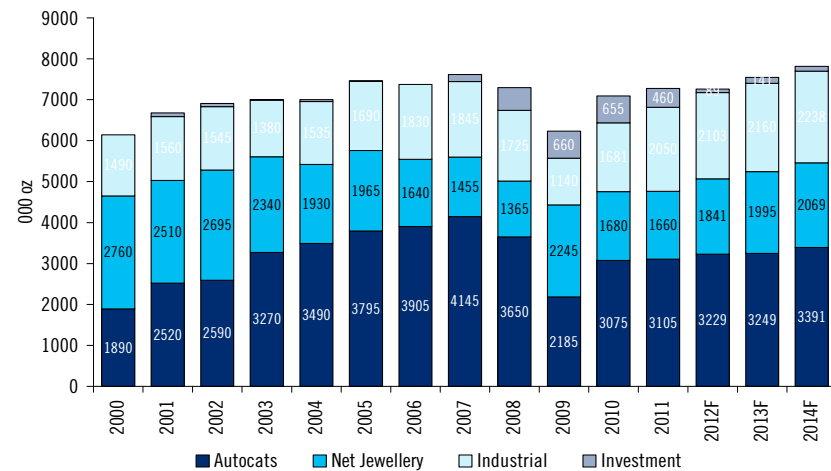
- September saw a clear strike premium price into platinum. Production losses have indeed been substantial losses at major South African miners, with some key producers hard hit and showing Q3 2012 mine production down 45.7% y/y, prompting a 20.8% fall in Q3 refined output. However, the strike premium in the platinum prices was somewhat short lived, retreating from 2013 highs of \$1,726/oz on October 5<sup>th</sup>, 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 146. Citi Platinum Surplus (deficit) forecasts



Source: Johnson Matthey, Citi Research

Figure 147. Citi Platinum demand by application forecasts



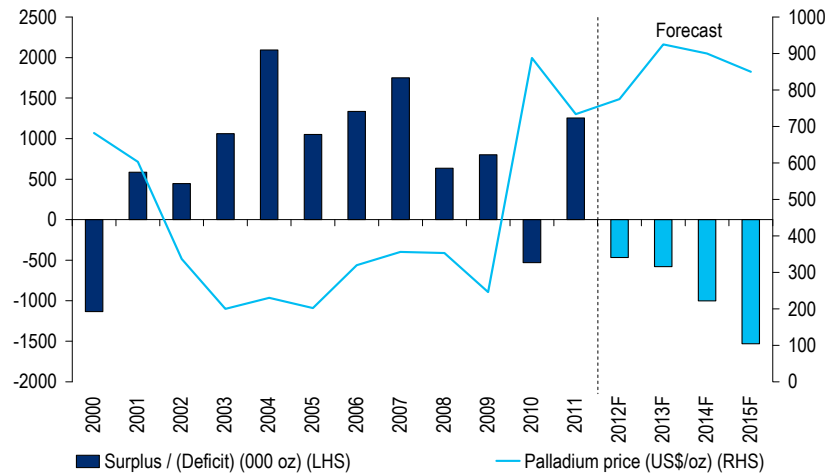
Source: Johnson Matthey, Citi Research



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

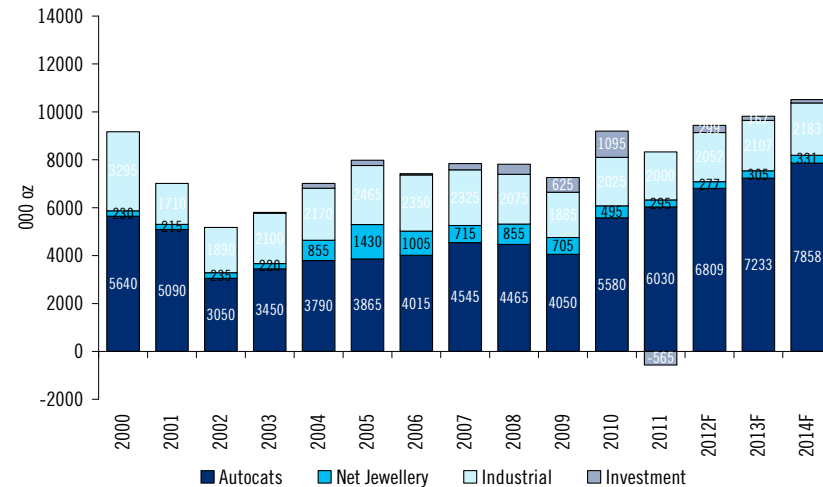
- South Africa accounts for roughly 42% of palladium mine supply (in typical non-strike years), but around 80% of global platinum mine supply. Thus it is easier to understand why palladium received less of lift from South Mine disruption. Indeed, unlike platinum, when palladium rallied during early October 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 148. Citi Palladium Surplus (deficit) forecasts



Source: Johnson Matthey, Citi Research

Figure 149. Citi Palladium demand by application forecasts

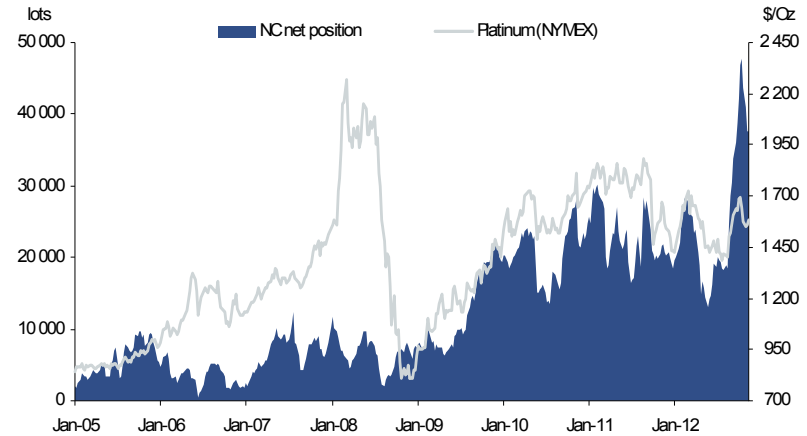


Source: Johnson Matthey, Citi Research

### SA political issues in platinum mining

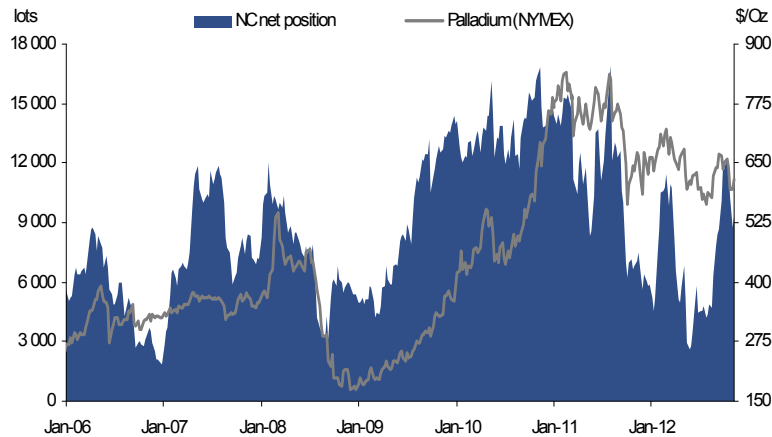
- There have been a number of supply side disruptions in the SA platinum sector during 2012. These include illegal strikes at IMP's Lease area and LON's Marikana mine. To date we estimate that the sector has lost ~360,000 ounces of platinum production from illegal strikes. Refer to our note "[Recap of 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 create 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 150. Net non-commercial NYMEX platinum positions vs. Price...



Source: NYMEX, Citi Research

Figure 151. Net non-commercial NYMEX palladium positions vs. price



Source: NYMEX, Citi Research

Figure 152. Expect platinum/palladium spread squeezed in 2013, as palladium outperforms



Source: Bloomberg, Citi Research

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# Bulks

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## 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.

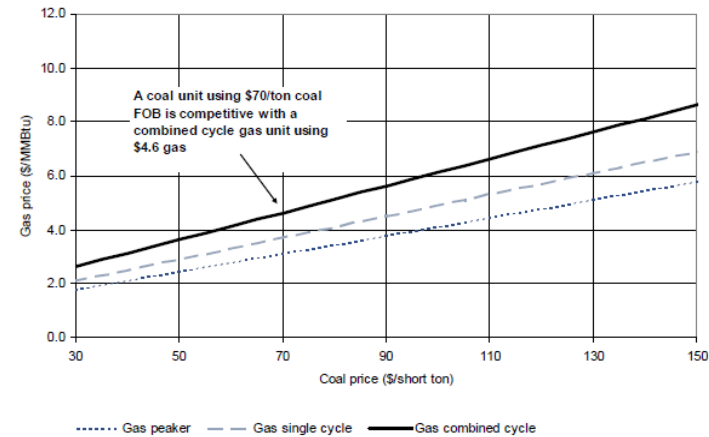
Figure 153. Seaborne Thermal Coal market balance

	2012e	2013e	2014e	2015e	2016e
<b>Demand</b>					
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
<b>Total</b>	<b>837</b>	<b>851</b>	<b>850</b>	<b>897</b>	<b>977</b>
<b>Supply</b>					
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
<b>Total</b>	<b>853</b>	<b>882</b>	<b>907</b>	<b>965</b>	<b>1031</b>
Implied Balance	16	31	57	68	53

Source: Citi Research, Tex Reports, Wood Mackenzie

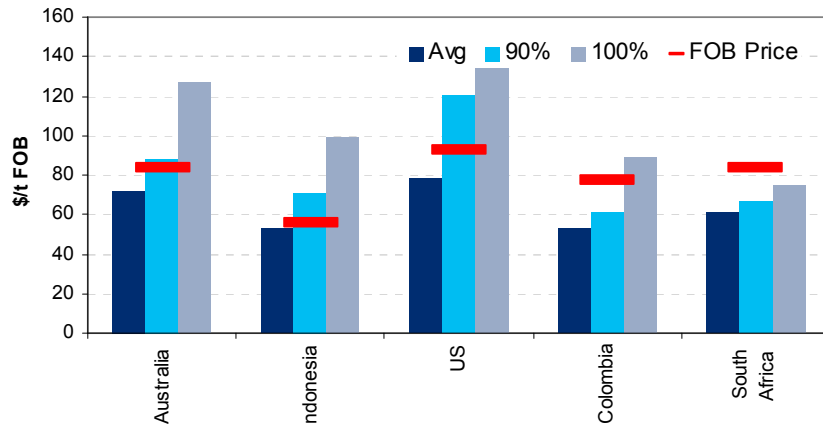
- The improvement in US gas prices is switching the arbitrage back in favor of coal. However, a mild winter should produce a gas glut again, albeit smaller than the one in 2012 (thereby pushing down gas prices, boosting coal-gas switching and lowering coal demand). Citi's meteorologist is expecting a 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 154. US coal to gas pricing arbitrage



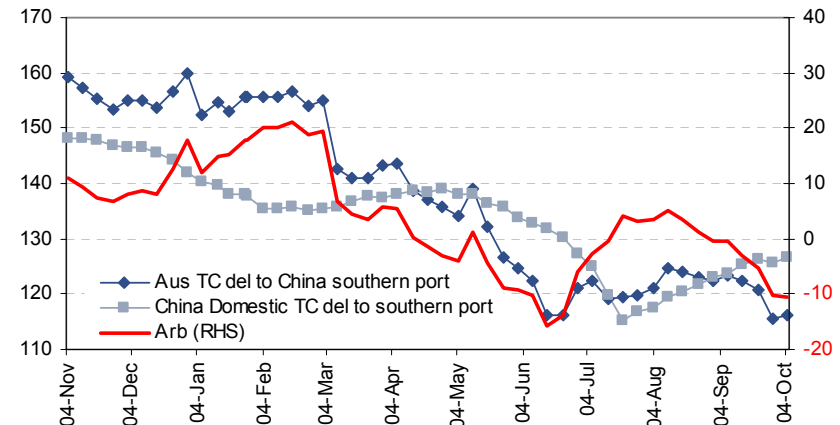
Source: Citi Research

Figure 155. Profitability and cost position – thermal coal producers



Source: Wood Mackenzie, Citi Research

Figure 156. Coal price arbitrage Australia To China

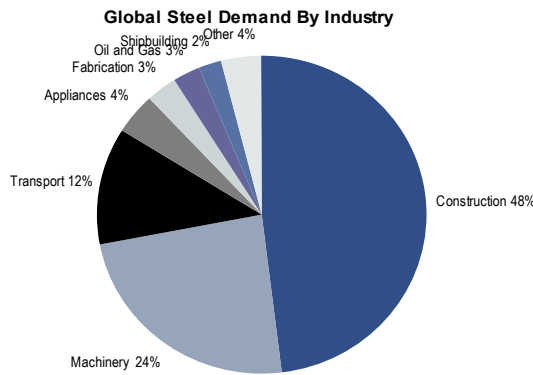


Source: Platts, Citi Research

## The new norm for Industrial commodity consumption

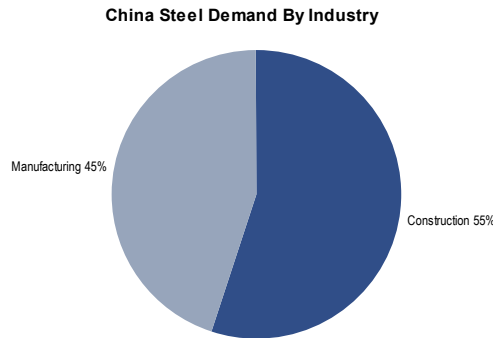
Arguably the biggest impact on industrial commodity consumption over the next decade is likely to occur from a shift in the intensity of use as China embarks on a transition towards a consumer based economy and away from construction. This is likely to impact industrial commodities differently with the 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 157. Steel demand is heavily weighted towards construction.



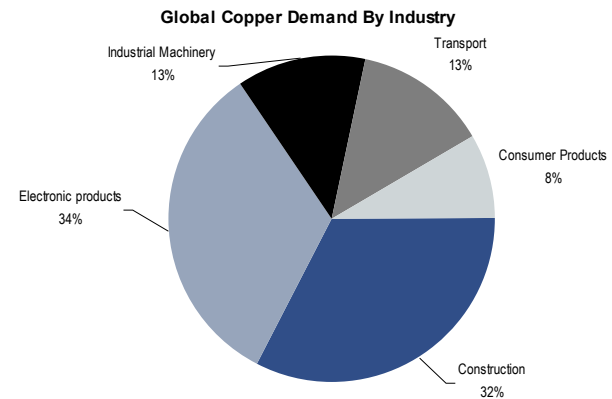
Source: Citi Research

Figure 159. In China the rapid growth of FAI has led to a steel construction above global averages.



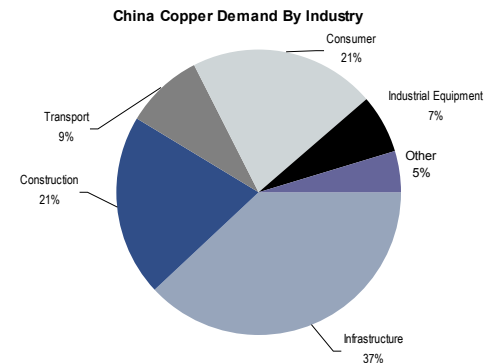
Source: Citi Research

Figure 158. While copper consumption is more balanced towards the consumer



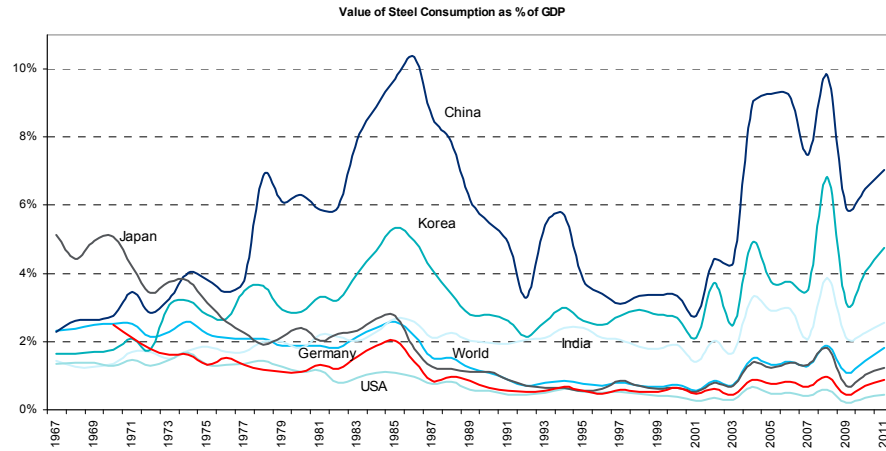
Source: Citi Research

Figure 160. China copper demand by Industry is more in line with global averages.



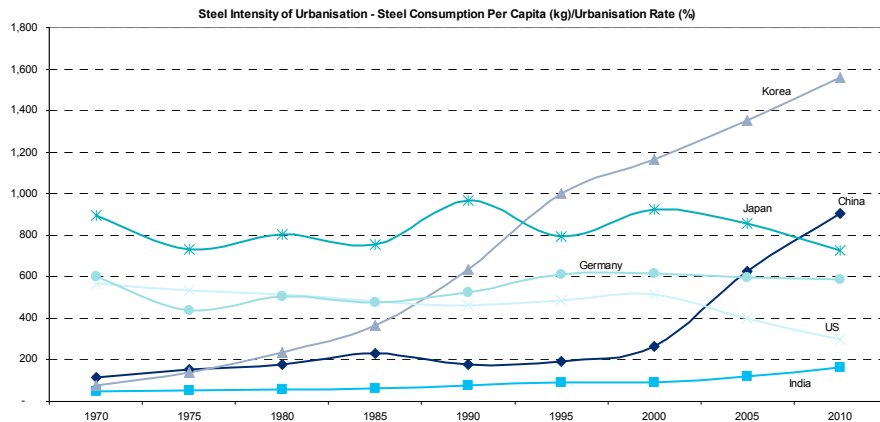
Source: Citi Research

Figure 161. Surprisingly since 2004, China has spent on average 8% of its GDP on steel



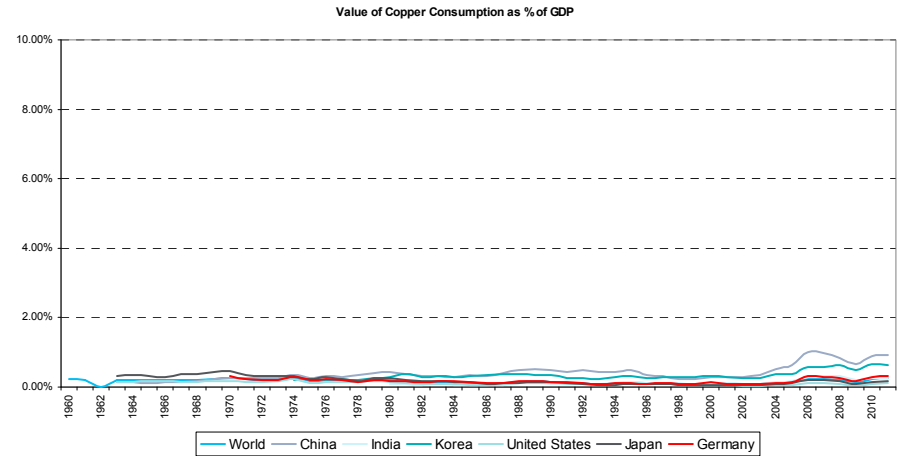
Source: Citi Research

Figure 163. 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



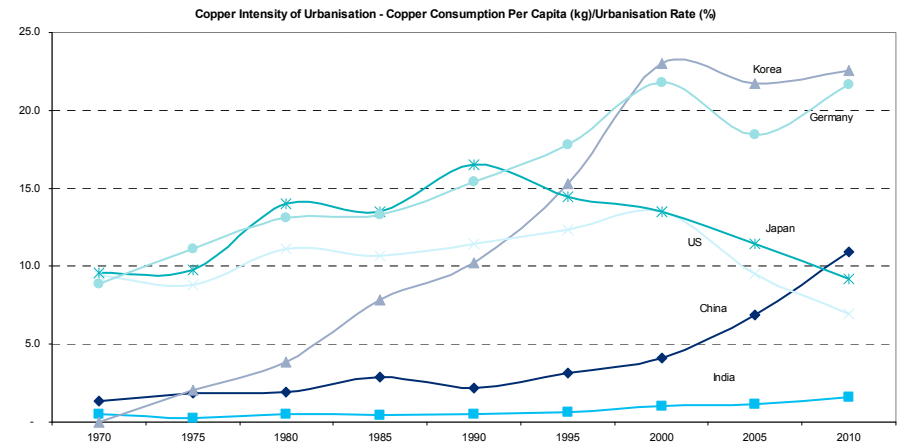
Source: Citi Research

Figure 162. While China has spend just 1% of its GDP on copper



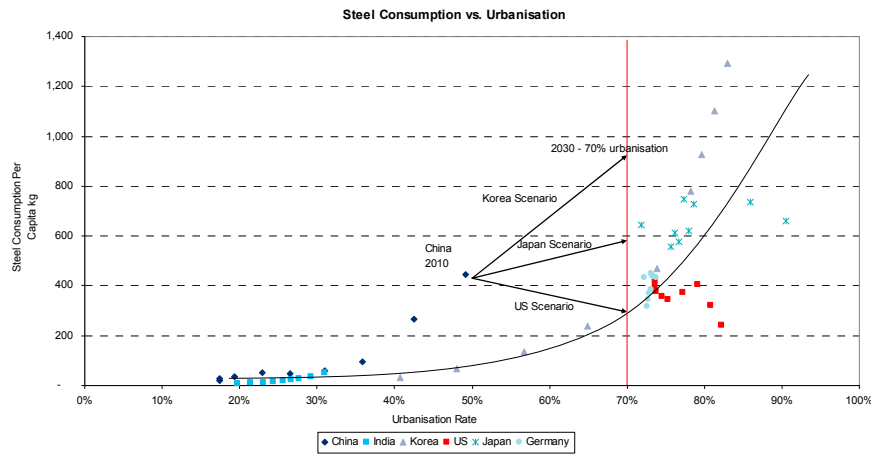
Source: Citi Research

Figure 164. 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.



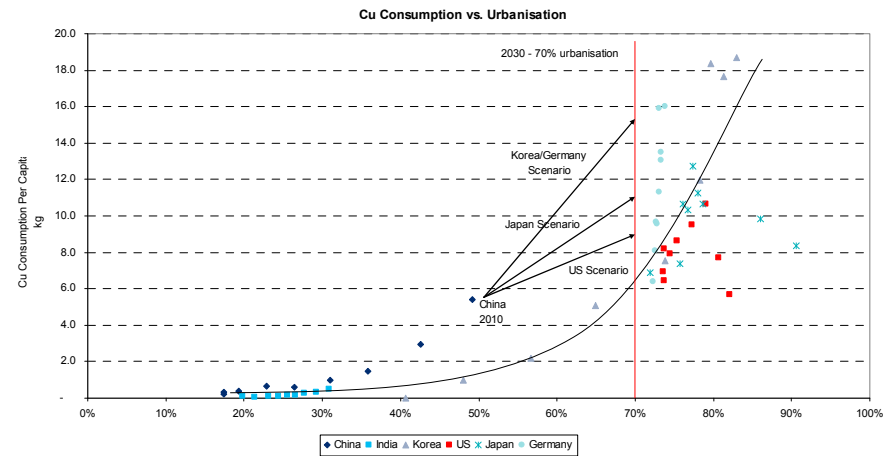
Source: Citi Research

Figure 165. 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 166. 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 0.85<sup>1</sup>.
- 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)

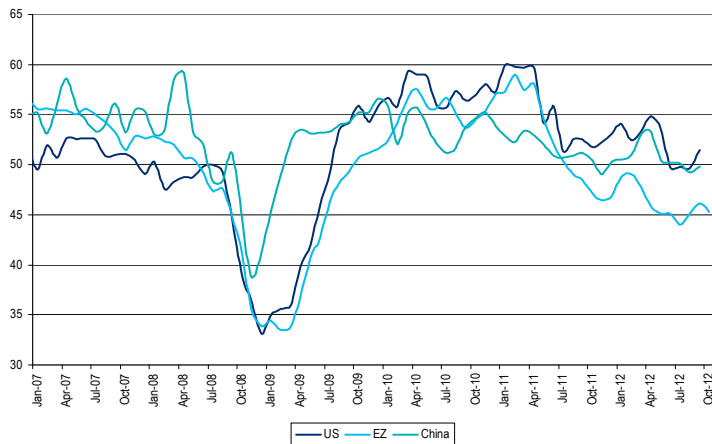


## Steel

### Demand – Significant improvement on 2012 unlikely

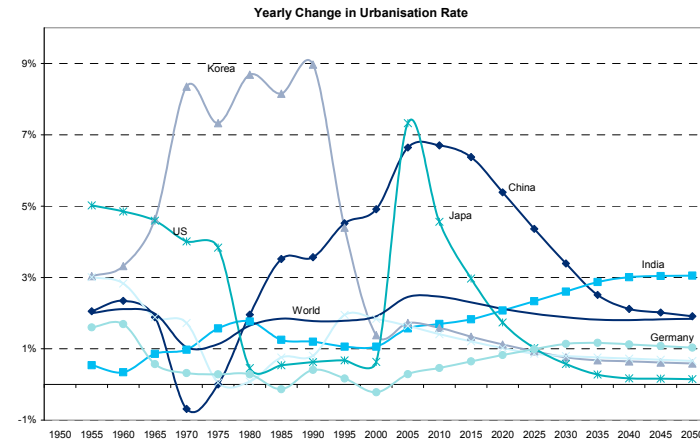
- Demand for steel in key regions is unlikely to materially improve in 2013. We see little potential in Europe, where Eurozone pressures will rumble on and constrain growth; our house view is for negative Euro Area IP growth of 0.4% and negative GDP growth of 0.7%. Europe will remain one of the most 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 167. 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 168. China will continue to urbanize but at a slower rate than seen previously

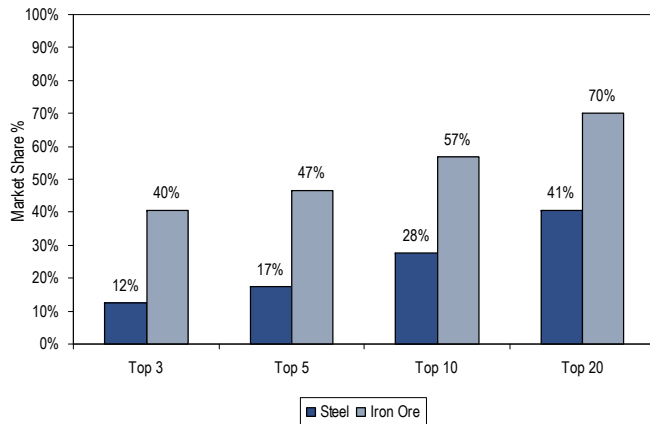


Source: Citi Research

**Supply – Another year of excess looming**

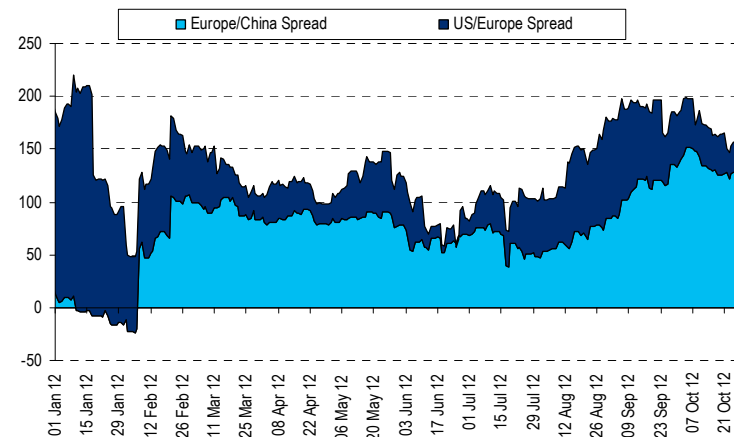
- Oversupply is the major hindrance to the steel industry; the market globally is lacking discipline. Capacity cuts in Europe and the US are offset by new approvals in China. In May 2012 the Chinese government approved a further 19mt of capacity, comprising Baosteel’s Zhanjiang project (10mt capacity) 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 169. 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 170. 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 171. 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	
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	
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	
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	
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	
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	
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	
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	
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	
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	
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	
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	

Source: Citi Research

Figure 172. 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
<b>Global Production</b>	<b>1,203</b>	<b>1,405</b>	<b>1,502</b>	<b>1,555</b>	<b>1,610</b>	<b>1,669</b>	<b>1,722</b>
Estimate Production Excess/(Deficit)	4	46	63	96	107	125	109
<b>Finished Steel Production</b>	<b>1143</b>	<b>1335</b>	<b>1427</b>	<b>1478</b>	<b>1529</b>	<b>1585</b>	<b>1636</b>

Source: Citi Research

Figure 173. 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
<b>Global Demand</b>	<b>1,139</b>	<b>1,289</b>	<b>1,363</b>	<b>1,382</b>	<b>1,422</b>	<b>1,460</b>	<b>1,527</b>
<b>Global Finished Steel Production</b>	<b>1,143</b>	<b>1,335</b>	<b>1,427</b>	<b>1,478</b>	<b>1,529</b>	<b>1,585</b>	<b>1,636</b>
Estimate Production Excess/(Deficit)	4	46	63	96	107	125	109

Source: Citi Research

## Iron Ore

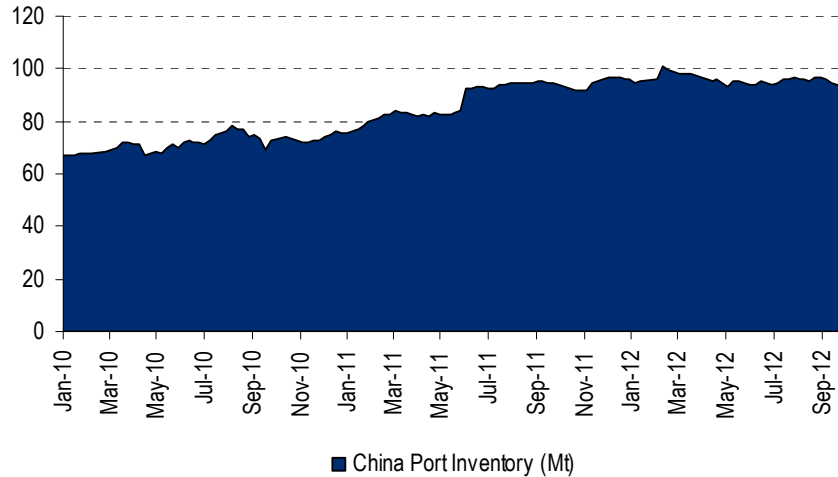
- Citi expects the closure of Chinese high-cost production to be the key defining price setting mechanism for iron ore in 2013. We maintain our 2013 forecast at \$120/t based on our calculation that it will take 2-3 years to knock out high cost capacity in China. However we expect increased volatility 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 174. Iron Ore Supply Demand Balance

Mt	2008	2009	2010	2011	2012e	2013e	2014e	2015e	2016e	2017e	2018e	2019e	2020e
<b>Supply: Seaborne Exports</b>													
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
<b>Total Seaborne Exports</b>	<b>800</b>	<b>871</b>	<b>966</b>	<b>1,030</b>	<b>1,055</b>	<b>1,094</b>	<b>1,172</b>	<b>1,302</b>	<b>1,381</b>	<b>1,441</b>	<b>1,537</b>	<b>1,617</b>	<b>1,657</b>
<b>Demand: Seaborne Imports</b>													
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
<b>Total Seaborne Imports</b>	<b>340</b>	<b>274</b>	<b>356</b>	<b>354</b>	<b>360</b>	<b>374</b>	<b>388</b>	<b>402</b>	<b>459</b>	<b>502</b>	<b>521</b>	<b>536</b>	<b>555</b>
<b>Market balance ex-china</b>	<b>460</b>	<b>597</b>	<b>611</b>	<b>676</b>	<b>694</b>	<b>720</b>	<b>784</b>	<b>899</b>	<b>922</b>	<b>939</b>	<b>1016</b>	<b>1081</b>	<b>1102</b>
<b>China Adjustment</b>													
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
<b>Implied Total Surplus/(Deficit)</b>	<b>29</b>	<b>-24</b>	<b>1</b>	<b>14</b>	<b>-1</b>	<b>-28</b>	<b>-1</b>	<b>40</b>	<b>28</b>	<b>18</b>	<b>102</b>	<b>159</b>	<b>181</b>

Source: Tex Report, Citi Research

Figure 175. China Port Inventory Mt



Source: Bloomberg, Citi Research

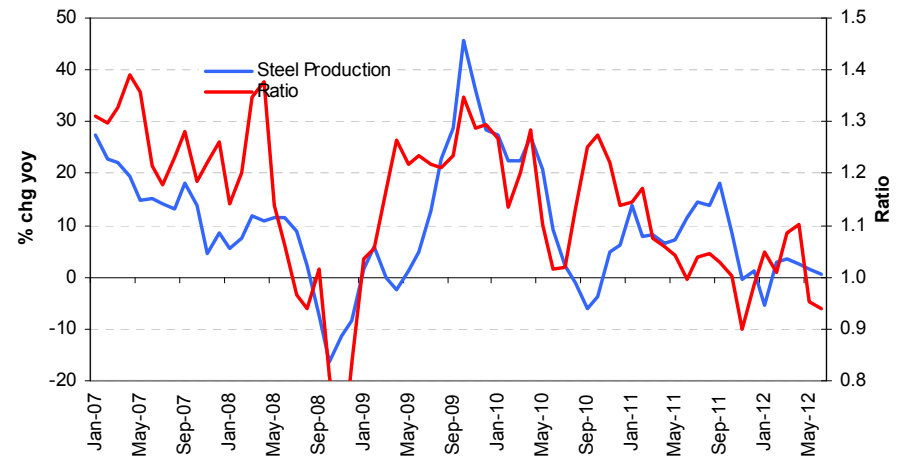
- How Chinese steel production holds up will be the key to how the iron ore market will perform for 2013. Recent China steel production numbers from the China Iron and Steel Association (CISA) shows that production levels have increased back to the levels seen in the period from April to May. Citi base case forecasts call for an average crude steel production number of 718Mt for 2013.
- The relationship between the new orders/inventory ratio (Figure 177) suggests the current production rate has moved ahead of underlying demand and suggests a pull back in steel production.

Figure 176. China weekly iron ore prices and forward curve against Citi forecasts



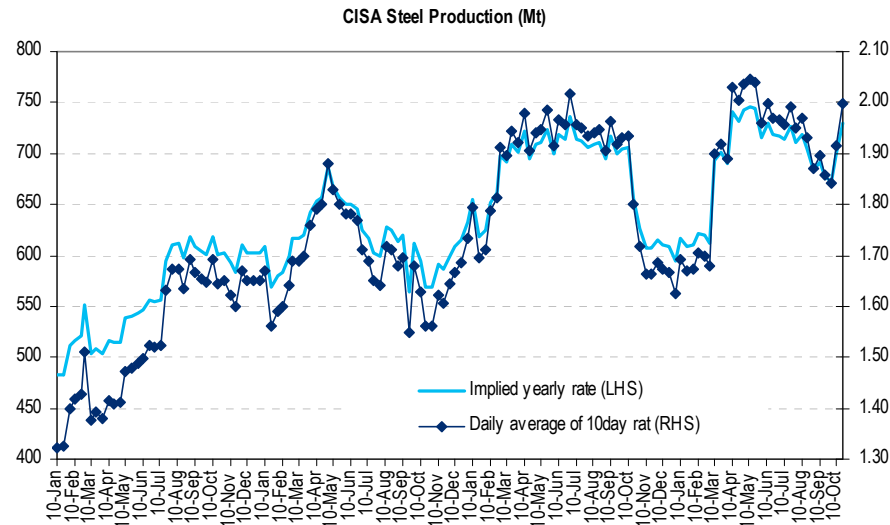
Source: Bloomberg, Citi Research

Figure 177. New Orders/Inventory Ratio vs. Steel Production



Source: Bloomberg, Citi Research

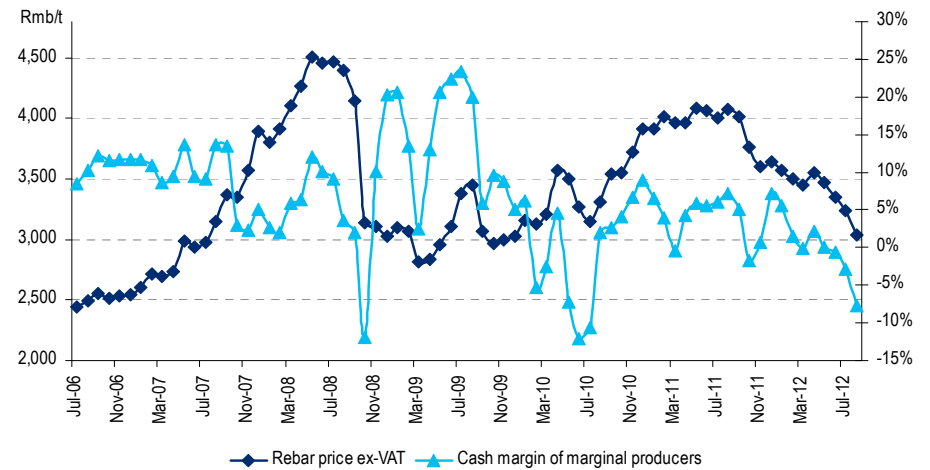
Figure 178. China Steel Production remains high



Source: CISA, Citi Research

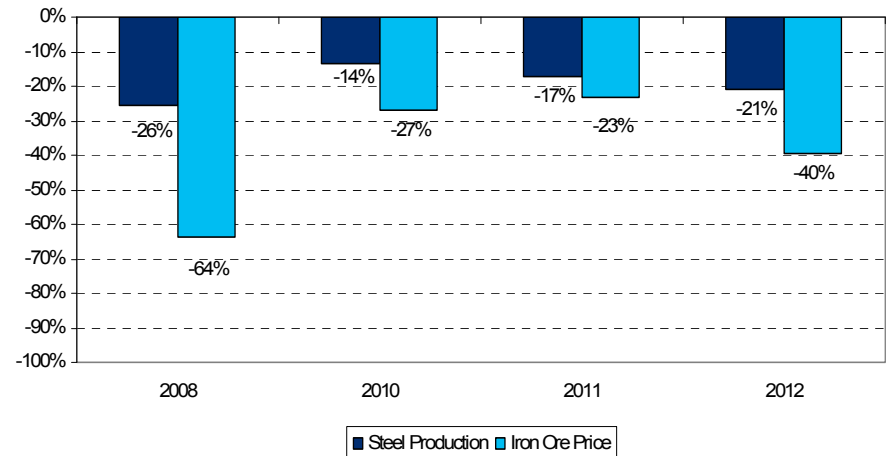
- Cash margins at Chinese steel producers have improved due to lower coking coal and iron ore prices but the profitability of the industry is effectively being subsidized by the state via cheap debt. The wildcard for next year is financing costs both for inventories and steel mills.
- We expect that 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 179. Chinese Steel Spot Cash Margins vs. Rebar Price (Rmb/t)



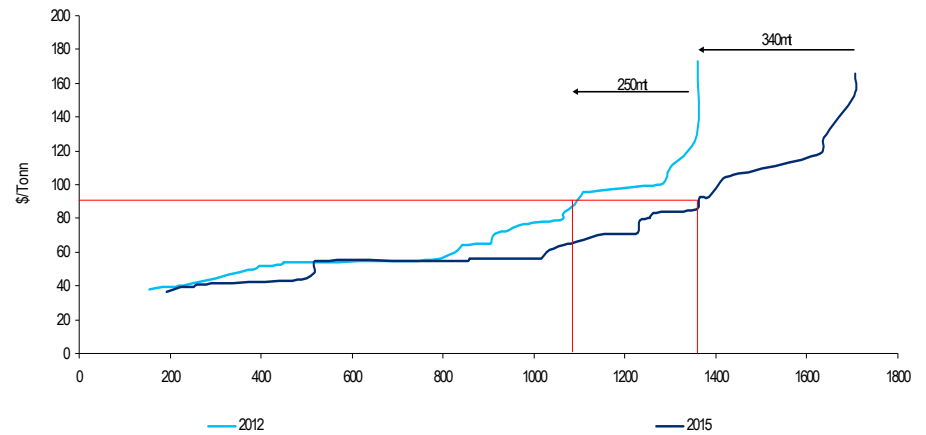
Source: CRU, Citi Research

Figure 180. Peak to Trough % Change in Chinese Steel Production and Iron Ore



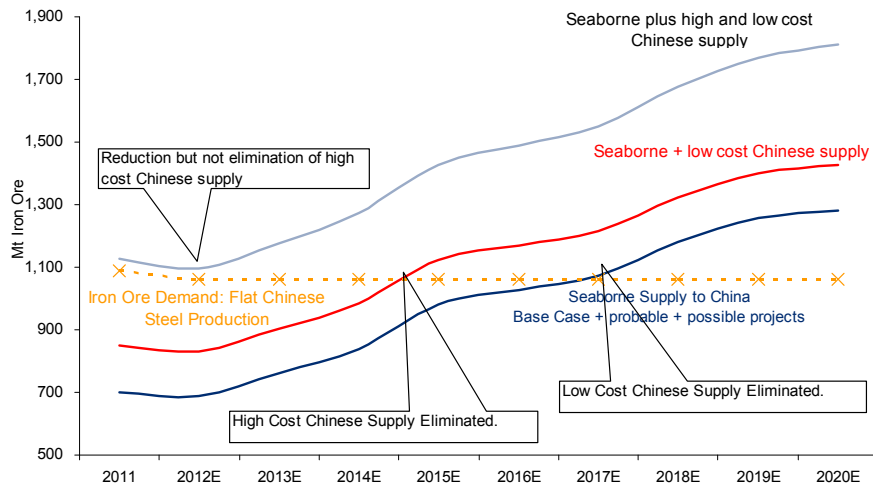
- Our base case Chinese steel production in 2013 increases 3% on 2012, rising from 697mt to 718mt. This in turn is likely to lead to an increase in Chinese domestic iron ore production from 229mt (contained Fe) to 251mt even as average prices fall YoY from \$135/t to \$120/t. We expect low cost capacity 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 181. Global Iron Ore Cost Curve (CIF China, \$/t)



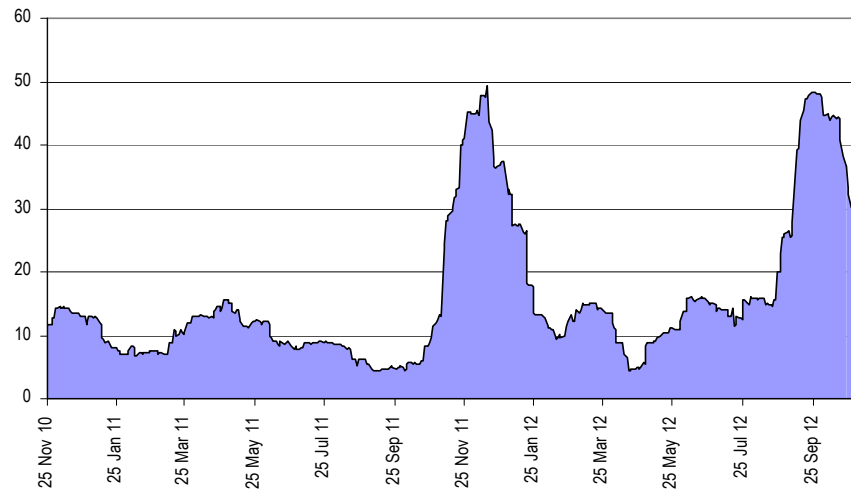
Source: Citi Research

Figure 182. Global iron ore supply all possible sources.



Source: Tex Report, Citi Research

Figure 183. Volatility in the iron ore price – 30 day historical vol

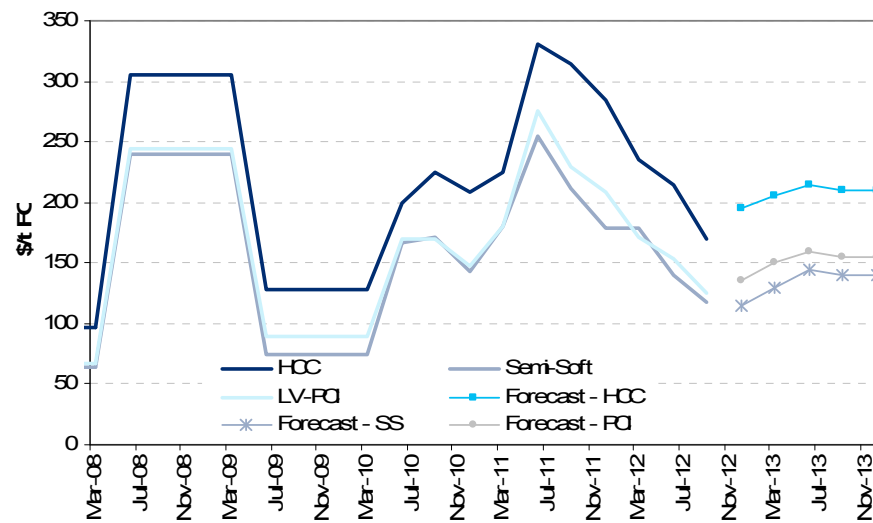


Source: Tex Report, Citi Research

## 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 184. Metallurgical Coal Prices and Forecasts



Source: Platts, Bloomberg, Citi Research

Figure 185. Metallurgical Coal Market Balance

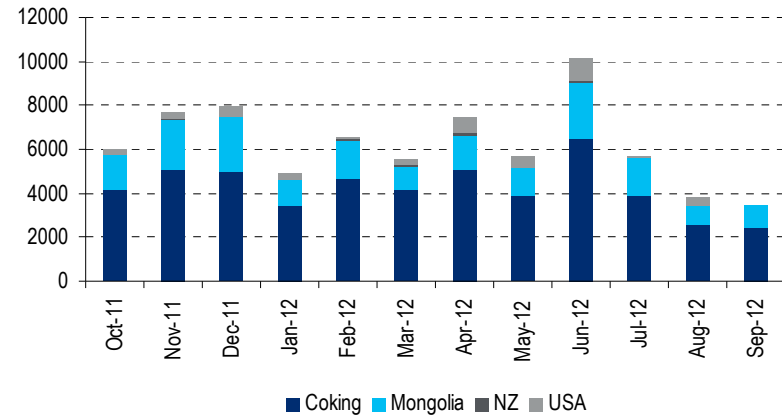
IMPORTS (Mt)	2010	2011	2012e	2013e	2014e	2015e	2016e
Japan	64.8	53.6	59.8	59.9	61.6	59.9	61.1
South Korea	31.9	30.3	28.3	28.3	28.8	29.3	31.4
India	35.5	32.1	10.1	10.1	10.3	10.5	9.0
Europe	56.8	36.3	41.3	56.7	85.4	91.8	99.0
China (excl Mongolia)	38.2	23.1	35.0	35.2	35.2	35.2	35.1
Brazil	12.9	18.0	30.0	9.4	12.6	23.7	19.8
Other	26.1	31.7	18.8	19.7	20.5	21.5	23.2
<b>Total</b>	<b>266.1</b>	<b>225.1</b>	<b>26.4</b>	<b>33.1</b>	<b>29.1</b>	<b>33.4</b>	<b>35.4</b>
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
<b>Total</b>	<b>258.6</b>	<b>242.2</b>	<b>3.0</b>	<b>3.0</b>	<b>3.0</b>	<b>3.0</b>	<b>3.0</b>
<b>IMPLIED MARKET BALANCE</b>			<b>-21</b>	<b>16</b>	<b>6</b>	<b>-10</b>	<b>5</b>

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



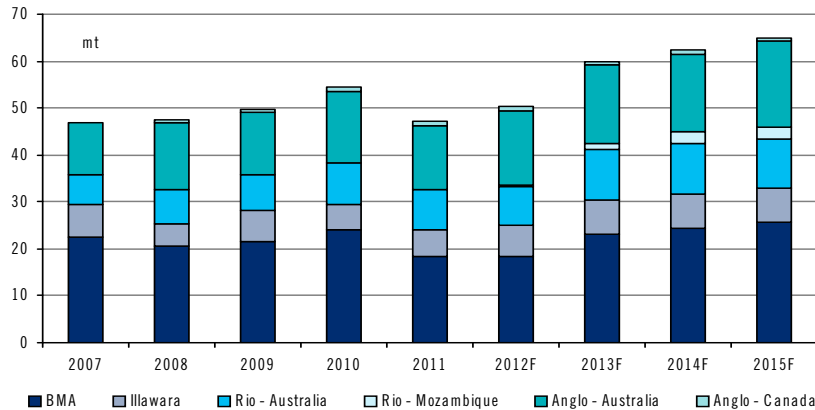
- Citi are forecasting anemic steel volume growth outside of China in 2013 and around 3% growth within China. Chinese stimulus measures are likely take effect in 2013, however Citi analysis suggests the demand pull through is likely to be minimal. With abundant Chinese capacity this leaves the market 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 186. Chinese imports have come down aggressively in the destock



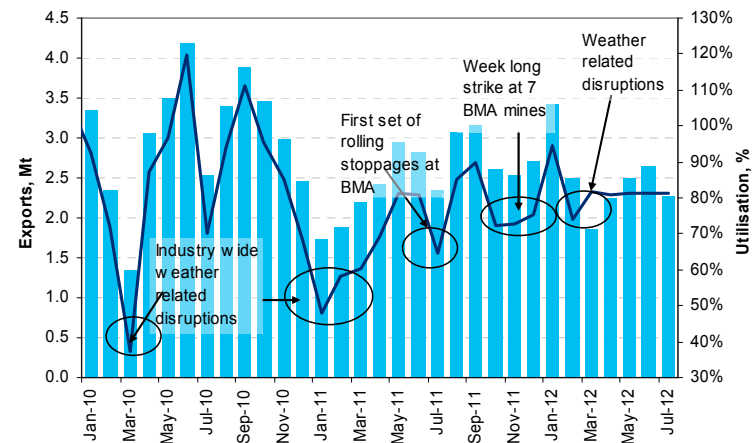
Source: China Customs, Tex Report, Citi Research

Figure 187. Met coal production UK Big 3 operations



Source: Company Reports, Citi Research

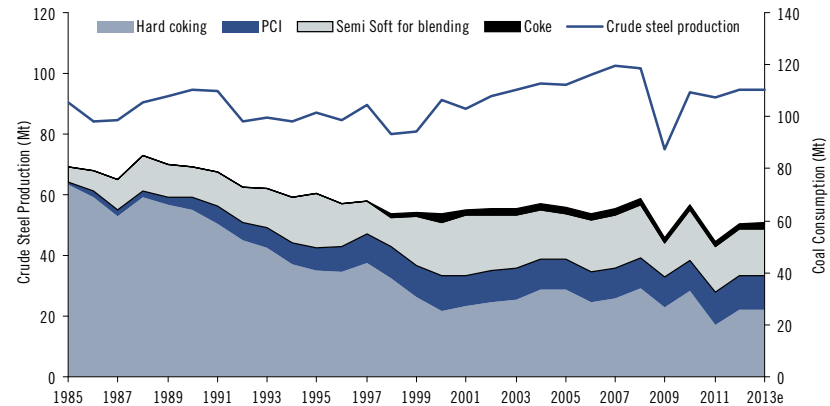
Figure 188. Australia exports are set to increase



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

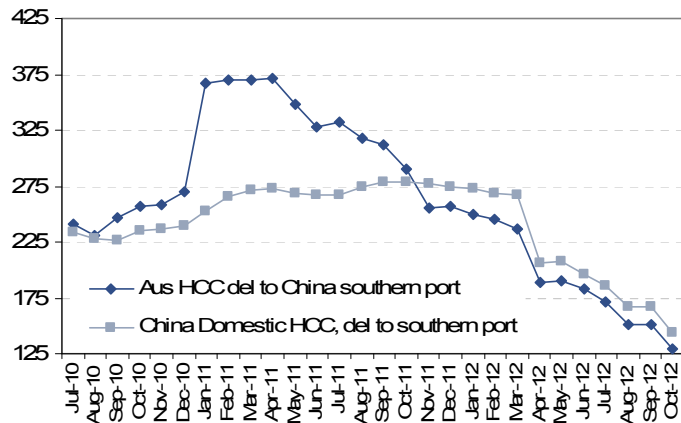
- The hard coking coal prices ex Australia have fallen at a faster rate than domestic prices in China, and this has resulted in the arbitrage reopening. This is resulting in a clear pick up of purchasing in China and is helping stabilize the market in the short term.
- On supply, spot coking coal prices 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 189. Japanese Met coal consumption vs. Crude Steel production



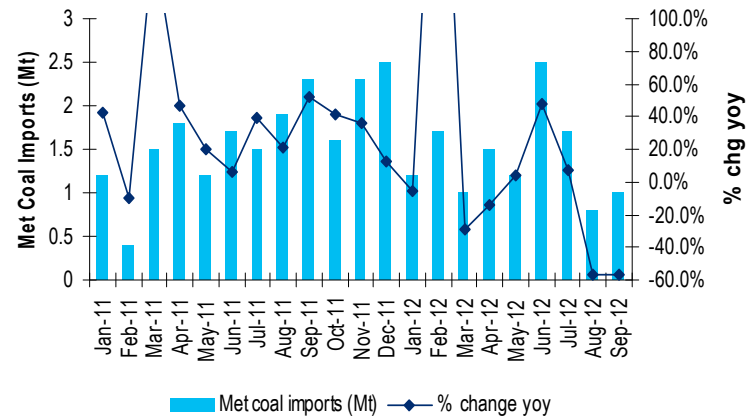
Source: The Tex Report, IISI, Citi Research

Figure 190. The arb between China and Australia is still conducive for Chinese imports



Source: Platts, Citi Research

Figure 191. Mongolian exports have the potential to curb Chinese import demand



Source: Platts, Citi Research

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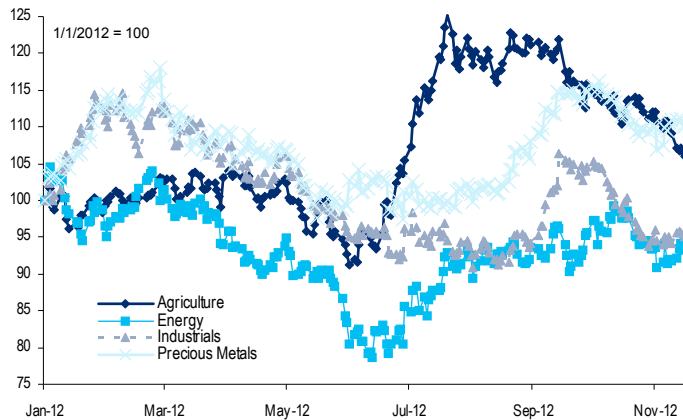
# Agriculture

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**In Perspective...**

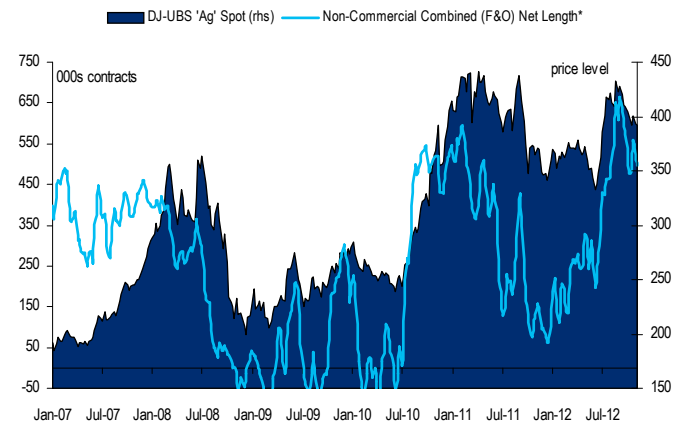
- 2012 has been a unique and idiosyncratic year for major agriculture crops versus other commodity sectors and within the complex itself. 2013 is less likely to be as thrilling but still offers a dichotomy. Grain and oilseed prices rallied to record levels this summer on the back of the most devastating US drought in a half-century, which curtailed 12/13 US production prospects. To be sure, CBOT corn, wheat and soybeans remain amongst the strongest performing commodity underliers in 2012 and prices are not expected to ease until 2H'13. Meanwhile other soft commodities lagged the move higher—in a fillip of their strength during the first half of 2011—and stand among the weakest performing commodities this year. The absence of geopolitical catalysts and relatively looser supply/demand fundamentals have left ICE coffee and ICE cotton contract returns, for example, stubbornly negative; keeping any short-covering rallies at bay and short-lived (in line with the Citi view).
- There has been a meaningful consolidation across all commodity markets and in particular the 'ag' complex since mid-September. While spec positioning remains quite healthy on a y/y seasonal basis (+105%), the retrenchment in category net length has been palpable; sliding from an all-time peak of over 690,000 contracts at the beginning of September to 511,000 lots at the beginning of November. Expectations are for aggregate net non-commercial length in the sector to remain less supportive in 2013 when compared to the highs of 3Q'12 although weekly positioning and flows will likely be prone to choppiness prior to the 13/14 US harvest; the tug-of-war between tight balances for grains and physical market pressure ensure demand rationing persists. Index rebalancing for the complex in January is likely to be negative for CBOT wheat (~3.5Bn net outflow) and CBOT soybeans (~3.1Bn net outflow) primarily via DJ-UBS with the addition of Kansas wheat and soy meal.
- Going forward there is still a strong likelihood of grain and bean prices spiking in 1Q'13 before bumper Latin American output, record US plantings and back-to-trend yields possibly ease balances into 2H'13 harvest season. Delayed LatAm harvests may pressure US markets for higher row crop prices in late 1Q/early 2Q 2013. Soft commodities are likely to remain subdued and unlikely to hit either 2011 or 2012 price peaks, although within the complex cocoa beans may have more upside.

**Figure 192. Commodity Sector Performance, YTD**



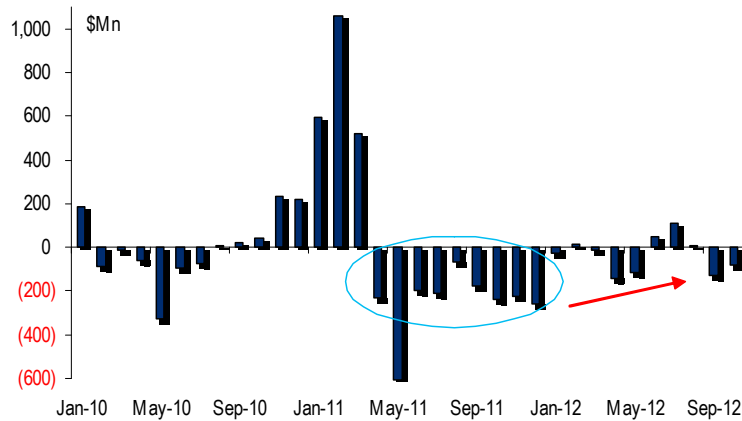
Source: Bloomberg, Citi Research

**Figure 193. Aggregate Non-Commercial Net Positioning\***



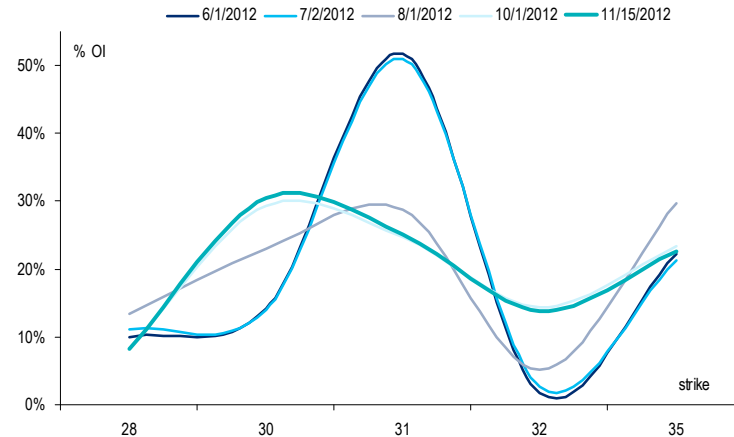
Source: CFTC, Citi Research, \*CBOT corn, wheat, soybeans, rough rice, ICE cocoa, coffee, cotton, sugar

Figure 194. Listed Ag Sector Exchange Traded Fund Net Flows



Source: Citi Research

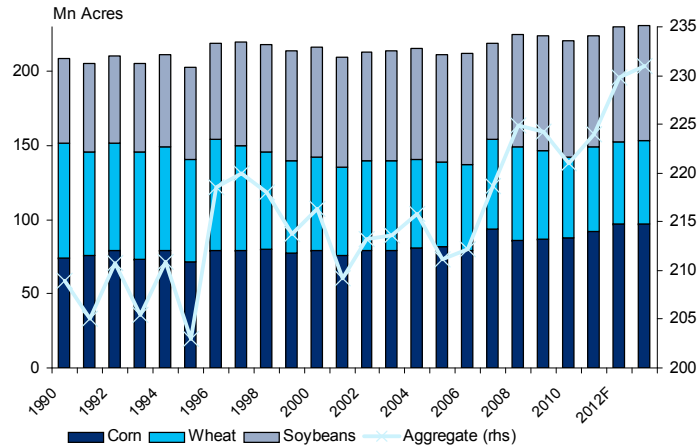
Figure 195. DBA\* January 2013 Call Option Open Interest Distribution



Source: Bloomberg, Citi Research, \*DB Agriculture ETF; price: ~\$28.5/sh, AUM: ~\$1.75Bn) week of 12<sup>th</sup> Nov 2012

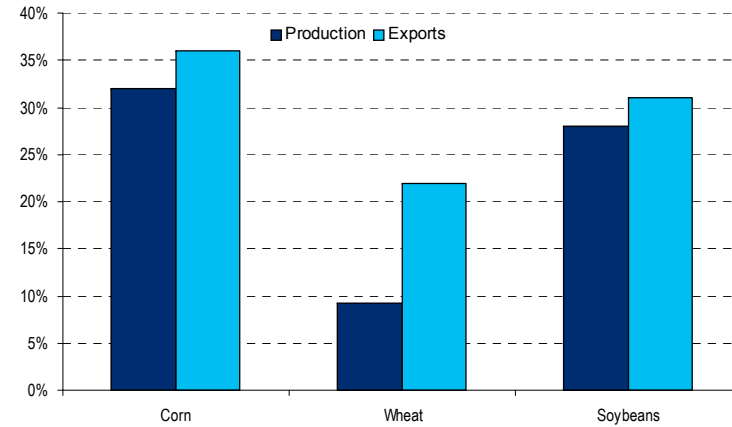
- Exchange traded fund flows for the grain-and-bean-dominated agriculture sector served to buttress markets in a positive feedback loop during last summer’s rally but have done an about-face as the US harvest season nears completion. Nearly +\$170Mn of net inflows June-August of this year compares to -\$475Mn in net redemptions during the same period in 2011. But the more recent -\$130Mn and -\$84Mn net withdrawals in September and October are more in line with the nearly -\$200Mn average monthly net outflow during 2H’11. The shift in bullish call option open interest distribution for January 2013 expiry calls for DB Agriculture ETF—the largest such exchange traded product globally—shows positioning has measurably faded for out-of-the-money strikes in contrast to its summer peaks. Assets under management for the fund plunged from \$2.2Bn in August to \$1.75Bn as of mid-November. However much of the ‘extremity’ in managed money net length and investor longs in the complex has now been flushed out. Thus a more range-bound market in the near term might be in order; the likelihood of fundamentally driven short-term price spikes in 1H’13 as physical balances for corn, beans and wheat tighten on LatAm harvest uncertainty could be supported with a fresh wave of buying. Physical prices already remain elevated—particularly in Europe—and exchange prices may again rally given low US carryout expectations, global supply issues and healthy Chinese demand.
- As such, points of seasonal tightness in 1H’13 and tail-risk factors should keep grain and oilseed markets bid to curb demand (already seen in weekly US export data). Brazil has been pushing corn out at a record pace although this is likely to abate later in 1Q’13 as the country switches to soybean exports; notably the South American giant should just about match the US in soybean production with a record 69.5-m acres planted and a potential 80-mt harvest. Corn and grains market focus might then shift to Argentina as the 13/14 US corn crop starts planting in early 2Q. To be certain, the US still remains the primary bread and grain basket of the world producing more than 1/3 of the key row crops and the preeminent exporter of wheat. 13/14 is likely to see another record American planting of 231-m acres driven by coarse grains and beans. Reduced global plantings for less economic crops such as cotton are likely to provide for higher deferred prices in the years ahead but overall none of the softs are expected to achieve 2011 or 2010 peaks in prices for the balance of 2012 or during 2013. If anything, the bias remains for soft commodity prices to remain pressured as balances look loose for these less-essential crops such as sugar and coffee.

Figure 196. US Planted Acres



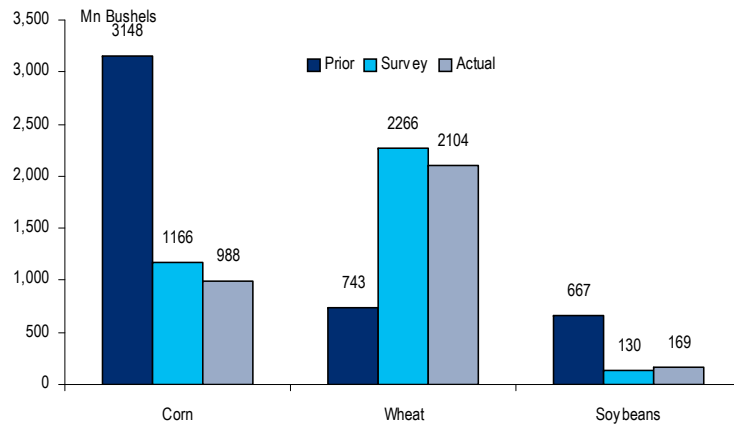
Source: USDA, Citi Research

Figure 197. US Crop Output and Trade (% of World)



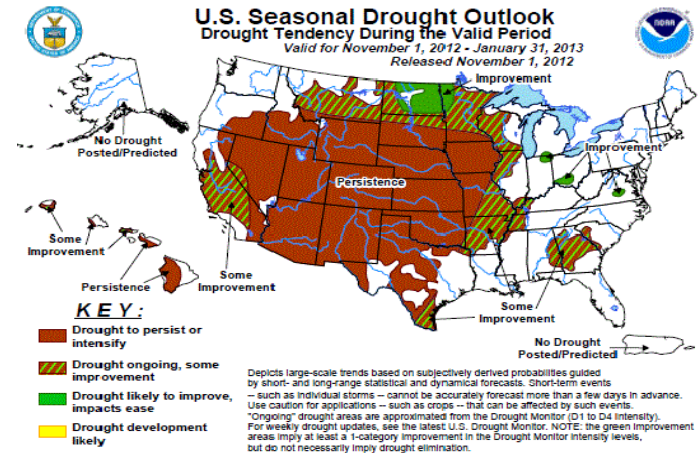
Source: Citi Research

Figure 198. US Quarterly Stocks (Sept. 1)



Source: USDA, Citi Research

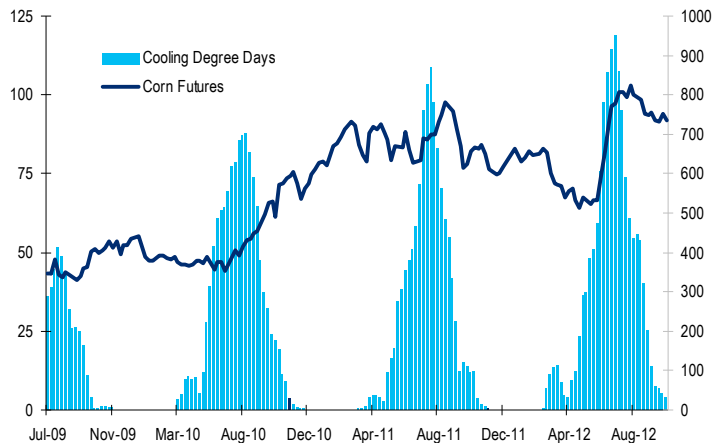
Figure 199. Drought conditions across the US likely to persist through much of 1Q'13...



Source: NOAA

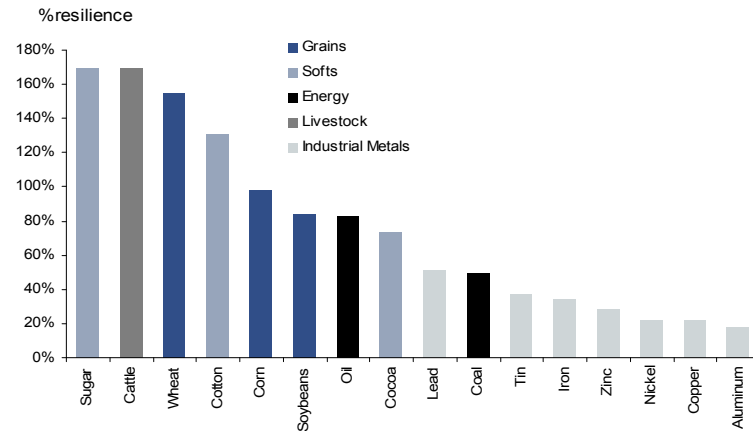
- Adverse and drought-like conditions are forecast to persist across the American Midwest in the short-term but 13/14 baseline planting and pollination conditions are expected to be normal. Thus back-to-trend yields and record planted acres are likely to cap prices in late 2H'13 and into 2014 and stands in sharp contrast to 2012. Dry soil moisture has thus far not impacted the sowing of US winter-wheat with crop conditions and progress on par on an actual and y/y basis. 2013 sources of new supply should be both US and globally driven which can allow for stronger 13/14 carryout and significantly looser balance sheets. Absent a weather or geopolitically induced tail-risk (i.e. Russian wheat export ban a la 2010), prices are expected to moderate in the latter part of next year for the grains. Notable areas of export origin are the US, Black Sea and Brazil/Argentina. In the US a 2bn-bu carryout of US corn in 13/14 would compare to an intolerably tight domestic 12/13 ending stocks-to-use below 6%. Argentinean corn output and exports are expected to rebound as well after a disappointing 2012. Brazil—which is already providing record corn exports this year—will shift to a soybean export program at the end of 1Q'12 and is nearly on pace to overtake the US as the world's largest producer of the oilseed. Meanwhile, global wheat output should rebound after a disappointing Black Sea crop whereby Russian export capacity fell more than 50% y/y to below 10-mt and the Ukraine effectively looked to impose an export ban. To be sure, poor seeding and growing weather or an extremely hot and dry summer across the US farm belt like that of 2012 could significantly derail the robust expectations of row crop balance sheets following a 2012 summer during which more than 2/3 of the nearly 97-m planted corn acres reported persistent severe/extreme regional drought conditions. Abnormally warm days have been rising in recent crop cycles—and seasonal price responses during the third-quarters have been responding in kind—but the extreme nature of the 2012 drought is unlikely to repeat in kind.
- Estimates of the sensitivity of commodity demand to world economic growth show that livestock and soft commodities alongside grains typically show the most resilience to an economic downturn. Chinese slowdown or rebalancing would likely have a *de minimis* impact on consumption patterns since agricultural commodities are less linked to industrial activity and more so to demographic shifts and population growth. In fact—given the increasing amount of weather tail-risks, concentrated crop dependence and lack of diversified rotation, global population growth and a relative 'ceiling' on yields, longer-term cyclical agriculture prices are likely to experience higher highs and higher lows in nominal terms during the new 'abnormal'.

Figure 200. Hot Hot Heat – High High Prices... Iowa CDDs\* and 3m fwd corn prices



Source: Bloomberg, Weather Underground, Citi Research, \*4wk moving average of temp. above 65F

Figure 201. Agriculture Commodities are Resilient\* to Economic Slowdown



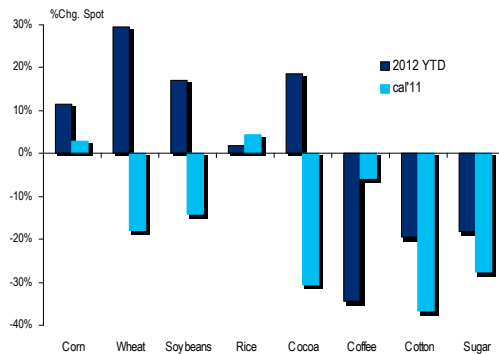
Source: Citi Research, \*inverse of demand elasticity to global growth

Figure 202. Agriculture Commodity Price Forecast\*

Nov-12	2010	2011	0-3m	6-12m	1Q12	2Q12	3Q12	4Q12f	2012f	1Q13f	2Q13f	3Q13f	4Q13f	2013f	2014f	11 vs. 10	12 vs. 11	13 vs. 12	14 vs. 13
Corn (USD/bu)	428	680	800	675	641	618	783	770	700	770	750	655	620	700	625	252	20	0	(75)
Wheat (USD/bu)	582	709	925	850	643	641	870	885	760	900	900	825	825	860	775	127	51	100	(85)
Soybeans (USD/bu)	1049	1317	1700	1460	1272	1426	1675	1575	1490	1625	1550	1430	1400	1500	1335	268	173	10	(165)
Rice (USD/cwt)	12.5	15.1	15.2	15.3	14.3	14.8	15.3	15.1	14.9	15.2	15.2	15.3	15.5	15.3		2.6	-0.2	0.4	
Cocoa (USD/mt)	2942	2921	2600	2510	2308	2221	2440	2500	2370	2540	2500	2500	2520	2515		(21)	(551)	145	
Coffee (USD/lb)	164	253	160	167	205	170	172	160	177	160	165	165	170	165		89	(76)	(12)	
Cotton (USD/lb)	94	137	67	68	93	81	73	67	78	65	65	70	70	68		43	(59)	(11)	
Sugar (USD/lb)	22	27	20	21	24.5	21.2	21.0	20.5	21.8	21.0	21.0	21.0	21.0	21.0		5	(5)	(1)	

Source: Citi Research, \*subject to revisions, rounded, CBOT or ICE benchmark contracts unless noted

Figure 203. Agriculture Commodity Price Performance\*



Source: Bloomberg, Citi Research, \*through 15<sup>th</sup> November 2012

- Grains/Beans:** levels are likely to remain elevated although the bullish tinge that has colored row crops could be more muted and a price spike pushed beyond this quarter given currently strong non-US origin availabilities and demand destruction across the complex. On the whole, 12/13 prices should remain historically high and stay as such until balance sheets start to ease. US corn prices are expected to average USd770/bu in the short-term with the potential upside for prices to push USd800/bu again in 1Q'13 before easing by the end of 2013 (where the curve might be rich given the possibility of a 14bn-bu harvest). CBOT wheat prices are expected to remain elevated and US export programs likely to ramp up given lost availabilities in the Black Sea and Oceania producing blocs and 13/14 US acres remaining biased to corn and beans. Chinese consumption for soybeans has been robust and on pace for 60-mt this year and even more in 2013. But the short-term upside for beans traded in Chicago has been reduced to USd1700/bu on healthier US supply and although a late South American harvest should see prices rise in 1H'13.
- Softs:** the key conviction calls for softs remain largely intact with cotton prices likely to fall further still (although the curve should remain in steep contango given reduced global planted acres and potential for more robust global economic growth in 2014). ICE coffee prices have come in sharply since the summer and are likely to stay muted in 2013. Sugar prices are expected to be flat and cocoa prices wrapped around USD2500/mt although geopolitical risks given the delicious bean's producing region could show upside.



## CBOT Corn

- Prices are expected to stay elevated for the balance of 2012 and through 1H'13 with a cal'13 price target of USd700/bu—unchanged from 2012f—but in a mirror image with higher prices in 1H'13 followed by easing prices in 2H'13. US corn balances remain very tight with 12/13 projected carryout below 650-m bu (the lowest since 95/96) and stocks-to-use at sub-6%. To be clear, 12/13 US output has stabilized and the risk of a sub-10bn bu harvest (a market concern during 3Q'12) all but an afterthought with expectations for the final US harvest to fall just north of 10.8-bn bu or down 12% y/y. Looking into the subsequent cycle, the forecast calls for 13/14 to show a record planted area in the US for coarse grains with corn allocated 97.5-m total acres. Normal weather and back-to-trend yields of 160-bu/acre would be a 45-point jump y/y and imply an annualized jump of 31% for 13/14 production at a record 14.3-bn bu whereby the US would go from just under 1/3 of global corn production in 12/13 back to its more recent historical levels shy of 40%. As such, prices in late-2013 and for a cal 2014 context are forecast to compress to the low USd600s/bu as US ending stocks would be 2-bn bushels and carryout as a percent of total domestic use triples to over 16%. Corn stock rebuilding should be aided by reduced animal feed demand resulting from smaller populations of cattle and hogs. Slaughter rates during the summer of 2012 spiked along with feed costs due to the US drought, and rebuilding the cattle and hog populations is likely to take several years.
- US ethanol consumption remains a key caveat for US balance sheet tightness. 12/13 production has so far averaged ~812-k b/d implying corn-use-for-ethanol just above 4.45-bn bu (50-m below the USDA estimate) or more than 150-m below the Citi view. Shut-in US production, healthy inventory and negative processing margins are a headwind albeit economics still positive for blenders (nearly all federal subsidies for output have disappeared including tariff barrier, blender tax credits and are unlikely to return although the mandated RFS production level still remains from the 2007 EISA law). Having hit a 10% blend wall—going to a 15% waiver nationally seems unlikely nor will any excessive use of RINs given the needs for deferred years but 800-k b/d seems a likely floor on output which is expected ~830-k b/d. Citi estimates of 12/13 US corn exports are 50-m bu above the USDAe of 1.15-bn bu. US exports are likely to ramp-up in 1Q'13 as Brazil flips to its soybean program. Brazilian exports Jul-Oct of this year of more than 11.2-mt are up 127% y/y as the giant has posted four straight months of record trade—benefitting from a discounted basis of about \$30-\$40/t. But already this has led to some signs of port congestion (i.e. Japan) and US farmers that store now should trade in 1H'13.

Figure 204. US Corn Balances

Mn bushels/Mn acres	09/10	10/11	11/12	12/13 USDA	12/13E Citi	12/14E Citi
Planted Area	86.4	88.2	91.9	96.9	96.9	97.5
Harvest	79.5	81.4	84	87.7	87	89.2
% Harvested	92%	92%	91%	91%	90%	92%
Yield (bu/acre)	165	153	147	122.3	125	160
Beginning Stocks	1,673	1,707	1,127	989	989	639
Output	13,092	12,447	12,358	10,726	10,875	14,274
Imports	8	28	29	100	125	10
<b>Total Supply</b>	<b>14,773</b>	<b>14,182</b>	<b>13,514</b>	<b>11,815</b>	<b>11,989</b>	<b>14,923</b>
Feed/Resid	5,125	4,793	4,550	4,150	4,175	5,050
Food/Industrial	1,370	1,406	1,410	1,367	1,375	1,300
Fuel Ethanol	4,591	5,021	5,025	4,500	4,600	5,000
Exports	1,980	1,835	1,540	1,150	1,200	1,500
<b>Total Demand</b>	<b>13,066</b>	<b>13,055</b>	<b>12,525</b>	<b>11,167</b>	<b>11,350</b>	<b>12,850</b>
Ending Stocks	1,707	1,127	989	648	639	2,073
% use	13.1%	8.6%	7.9%	5.8%	5.6%	16.1%

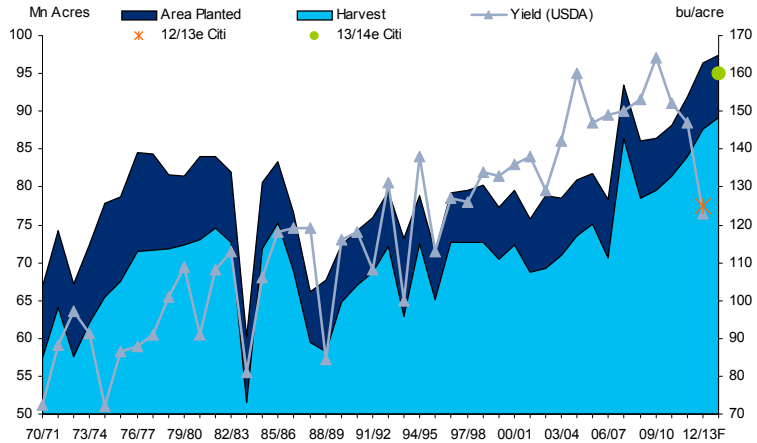
Source: USDA, Citi Research

Figure 205. World Corn Balances

(000 MT)	08/09	09/10	10/11	11/12	12/13E*
Beginning Stocks	131,320	144,893	128,720	114,607	130,607
<b>Total Production</b>	<b>799,300</b>	<b>813,400</b>	<b>828,000</b>	<b>880,000</b>	<b>838,000</b>
y-o-y change	0.60%	1.76%	1.79%	6.28%	-4.77%
US Production	307,100	332,500	315,000	313,893	276,225
% of world	38.4%	40.9%	38.0%	35.7%	33.0%
Imports	82,450	89,750	91,338	96,000	93,000
<b>Total Supply</b>	<b>1,013,070</b>	<b>1,048,043</b>	<b>1,048,058</b>	<b>1,090,607</b>	<b>1,061,607</b>
Exports	84,477	96,823	90,451	100,000	91,000
Consumption	783,700	822,500	843,000	860,000	858,000
<b>Total Demand</b>	<b>868,177</b>	<b>919,323</b>	<b>933,451</b>	<b>960,000</b>	<b>949,000</b>
Stock Bal Change	13,573	-16,173	-14,113	16,000	-18,000
Ending Stocks	144,893	128,720	114,607	130,607	112,607
% Use	17%	14%	12%	14%	12%

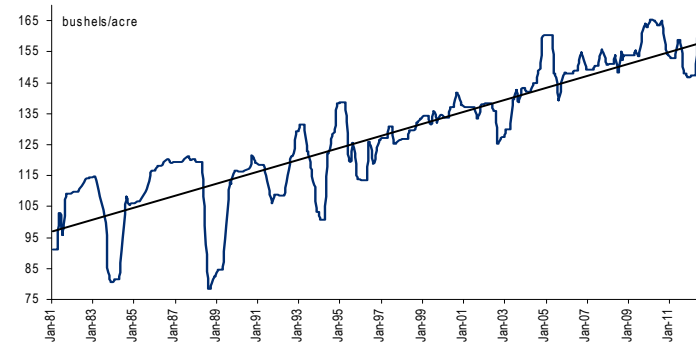
Source: USDA, Citi Research

Figure 206. US Corn Market Production Profile



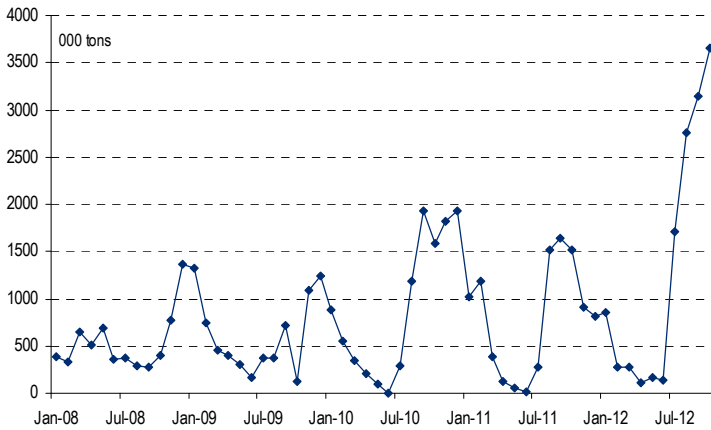
Source: USDA, Citi Research

Figure 207. US Corn Yields Expected to Move Back to Trend\*...



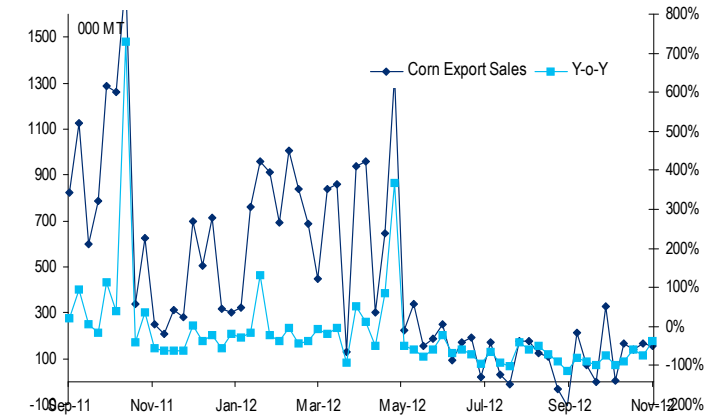
Source: USDA, Citi Research, \*A yield of 160 bushels, which represents a "return-to-trend", would be consistent with the second highest corn yield ever in the US (2010 yield of ~165 bushels was the record high), with the average yield since 2004 of about 152 bushels / acre. Keeping all other assumptions constant, if the 2013/14 yield was only 152 (average since 2004), ending stock-s to use would drop to high single digits and likely result in another year of high corn prices, plantings and receipts.

Figure 208. Record Corn exports from Brazil...



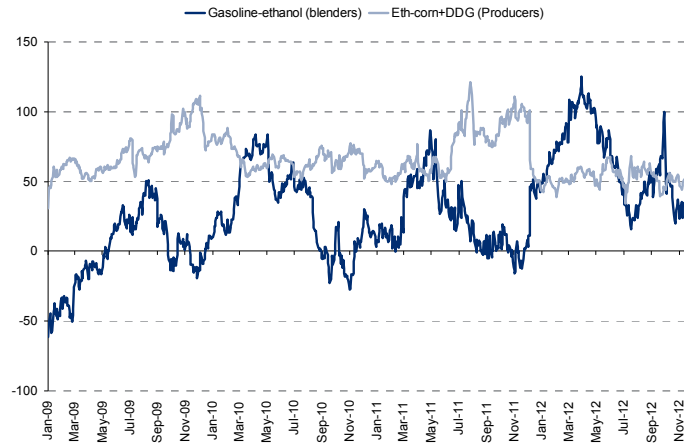
Source: Brazil Ministry of Commerce, Citi Research

Figure 209. ... are pushing out US corn trade...which is expected to rebound in 13/14



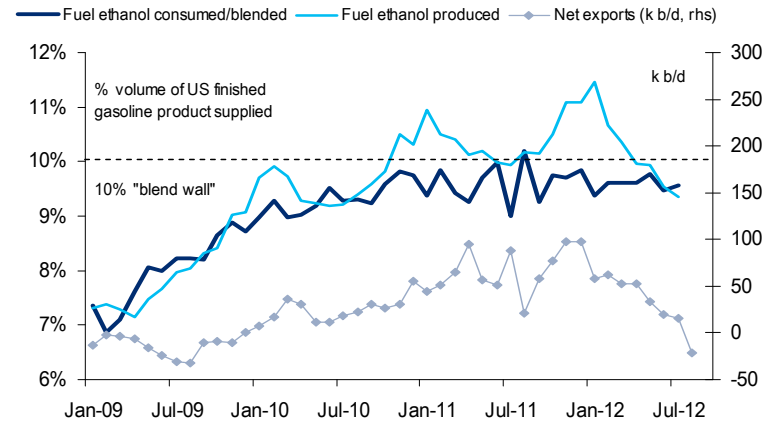
Source: USDA, Citi Research

Figure 210. US Corn Crush Spreads\* compressing...



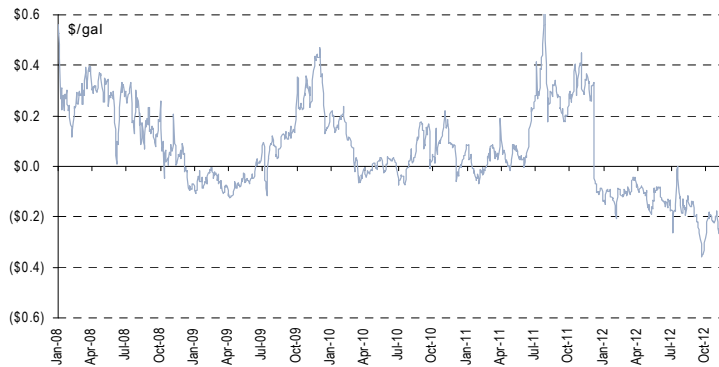
Source: CME, Citi Research, \*difference between market value of ethanol and DDGs less corn price

Figure 211. Ethanol Blending Wall



Source: EIA, Citi Research

Figure 212. Dry Mill Ethanol Plant Profit\* (ex-DDG)



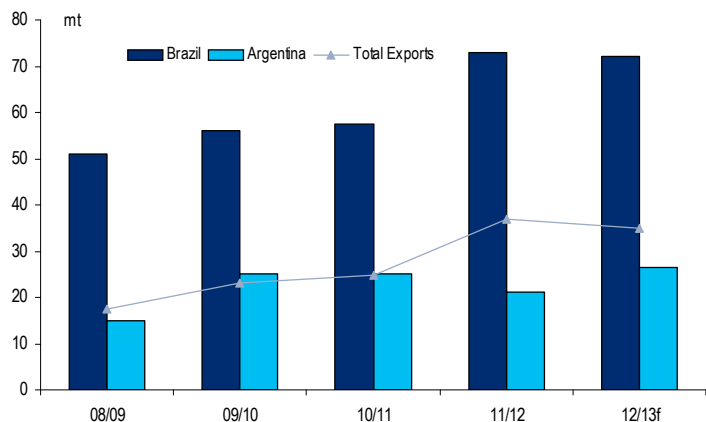
Source: Citi Research, \*Spot ethanol output margins are weak and below break-even levels of ~\$0.05/gal with the forward curve also looking to pressure producers until 13/14 crop comes online. Citi equity research colleagues note utilization rates dipped below 90% to 88% in August, for the first time in nearly three years as weak margins are reducing output. Moreover, recent industry data suggests that the situation has continued into November, despite the harvesting of the new corn crop, as 1.4 billion gallons of ethanol are currently idled, representing 9% of total installed capacity.

Figure 213. US Fuel Ethanol Production\*



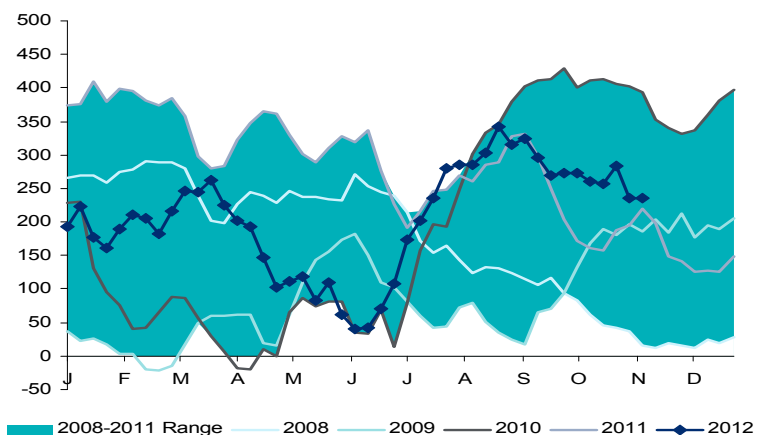
Source: EIA, Citi Research, \*on 16<sup>th</sup> November the EPA refused state requests to waive the ethanol blending mandate, in line with Citi's prior views (that markets and economics would on their own ration use) and leaving intact the 13.2bn gallon blending requirement for US refiners of mogas per the RFS legislation. Official agency analysis concluded a waiver would very modestly reduce corn prices.

Figure 214. Latin American supply surge expected to be healthy with Argentinean rebound...



Source: IE, Citi Research

Figure 215. CBOT Corn Managed Money (F&O) Net Positioning



Source: CFTC, Citi Research

- Global supply looks to remain tight in 12/13 with a negative stock balance change and total supply declining just under 3% y/y to 1,062-mt. This compares to flat consumption growth y/y to 858-mt. Latin American supply including a strong Brazilian crop of 72-mt and a rebound in Argentinean output to a record 26.5-mt is a major reason global markets are looking to loosen in 2013 although already delayed regional plantings can push back the harvest of early maize in Argentina and safra in Brazil from mid-February to mid-March. Deterioration of South American weather could also compromise yields and hinder the record 98.5-mt local output sending prices higher in 1H'13—especially if acres go to beans over corn in later stage plantings. This is crucial because should the USDA in its final plug (11<sup>th</sup> January 2012) increase abandoned acres in the US (from an area harvested of 87.7-m acres down to below 87-m acres without a consequential move in yields) then current markets do not appear to be rationing demand at an adequate level and futures prices should spike given the agency's overly optimistic take on net balances.
- Chinese bidding of corn during the earlier part of 2012 has subsided and a large-scale purchase program is less likely given its own 4% output growth to 200-mt in 12/13. This production could imply Middle Kingdom carryout above 60-mt or more than half of global ending stocks. Although Chinese imports of corn matter much less in the grand scheme compared to soybeans and agency forecasts for imports remain subdued—any stockpiling should be price supportive—especially should it look to further subsidize its livestock industry with feed grains as it has done with soy meal this year.
- Money manager net positioning for CBOT corn has 'fallen back to Earth' and in line on a seasonal and historic basis although in reality—unlike for Chicago wheat or beans—category net length in the benchmark coarse grain never really hit record-level length the way it did for those other crops. Speculative liquidation has been a major headwind for prices that have fallen from USd850/bu in August to below USd750/bu in mid-November. But the flushing out of this length could be a positive sign going forward given expectations of increasing tightness in early 2013. Supply uncertainty for the crop remains high, rationing of demand will need to persist and much of the recent bearishness hinges on the outlook of a bumper LatAm harvest. While markets should ease—especially with the onset of another record planting in the US for 13/14—the risk likely remains to the some upside and 1H'13 curve looks to be trading cheap.

### CBOT Wheat

- After rallying in sympathy with the row crops wheat has come out on its own, outperforming in 4Q (-3.75% versus -4.5% for corn and -8.5% for beans) and prices for the primary food grain are likely to remain strong through 2013; its historical premium to coarse grains of about USd100-125/bu likely intact after the longest period in history (during much of 11/12) when Chicago wheat traded at parity or even at a discount to US corn. While the issues for the major row crops have been local and centered about the US farm-belt, the buoyancy of wheat is a global phenomenon driven by disappointing production outlook and export availabilities in the Black Sea, Australia and Argentina. Wheat prices are forecast to average USd880/bu next year driven by higher 1H'13 levels before prices start fading in 2H'13 during the Northern hemisphere harvest. Expectations are for US all-wheat production in 13/14 to be flat at around 2.25-bn bu and for stocks-to-use jumping 1.5-points to 27%.
- To be sure, 12/13 global wheat production of 649.5-mt is 2-mt below agency estimates and colors the bullish view given bias to the downside. In its recent WASDE, the USDA reduced global wheat output 1.6-mt and noted a sharp 1.5-mt cut in Australian shipments after a 2-mt cut in production—falling in line with Citi's original view of Oz output closer to 21-mt with risk to the downside. But the agency is also much more supportive of Black Sea and Indian wheat trade. Although for India (production growth to a record 94-mt) this makes good sense—exports from Ukraine, Russia and other origins appear front-loaded and optimistic; prone to further geopolitical risks and effective bans—especially if US winter wheat came up short. Also on the November WASDE, US wheat carryout printed 50-m bu higher m/m and 7.6% above the survey back above 700-m bu, in part driven by lower expectations of domestic exports which were cut 4% m/m to 1.1-bn bu which added modest short-term bearish pressure. Stocks-to-use thus came in higher just shy of 29% a jump of more than 2.5% m/m. But this stands in contrast to Citi projections for a tighter domestic wheat market and 12/13 US wheat exports of more than 1.2-bn bu (which are projected to ramp up after a sluggish few months) given the tightness in foreign producing blocs.

Figure 216. US Wheat Balances

Mn bushels/Mn acres	09/10	10/11	11/12	12/13 USDA	12/13E Citi	13/14E Citi
Planted Area	59.2	53.6	54.4	55.7	55.7	55.5
Harvest	49.9	47.6	45.7	49	49	48.75
% Harvested	84.3%	88.8%	84.0%	88.0%	88.0%	87.8%
Yield (bu/acre)	44.5	46.3	43.7	46.3	46.3	46
Beginning Stocks	657	977	863	744	744	638
Output	2,218	2,207	2,000	2,269	2,269	2,243
Imports	119	97	115	130	120	120
<b>Total Supply</b>	<b>2,994</b>	<b>3,281</b>	<b>2,978</b>	<b>3,143</b>	<b>3,133</b>	<b>3,000</b>
Food Consumption	919	926	940	950	950	950
Seed	69	71	77	73	75	75
Feed/Resid	150	132	169	315	260	210
Exports	879	1,289	1,048	1,100	1,210	1,140
<b>Total Demand</b>	<b>2,017</b>	<b>2,418</b>	<b>2,234</b>	<b>2,438</b>	<b>2,495</b>	<b>2,375</b>
Ending Stocks	977	863	744	705	638	625
% use	48.4%	35.7%	33.3%	28.9%	25.6%	26.3%

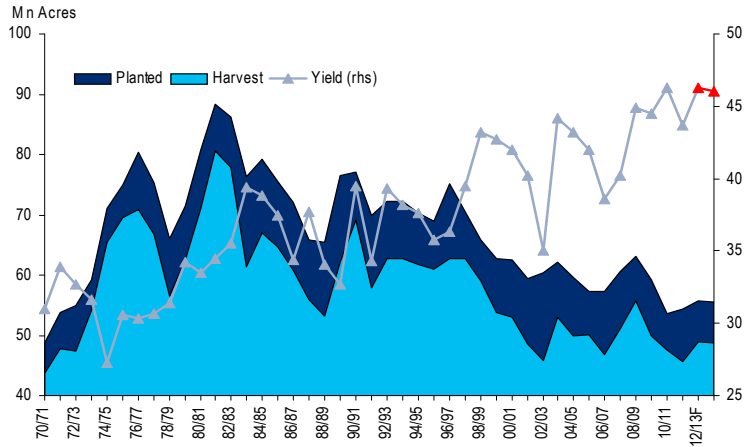
Source: IE, USDA, Citi Research

Figure 217. World Wheat Balances

(000 MT)	08/09	09/10	10/11	11/12	12/13E
Beginning Stocks	126,903	167,050	200,110	195,510	196,460
<b>Total Production</b>	<b>682,815</b>	<b>685,590</b>	<b>651,510</b>	<b>696,000</b>	<b>649,500</b>
y-o-y change	12%	0.4%	-5.0%	6.8%	-6.7%
US Production	68,020	60,370	60,060	54,410	61,709
Euro Area	151,122	138,816	135,674	137,500	130,000
Russia	63,700	61,770	41,510	56,230	37,500
India	78,570	80,680	80,800	86,800	94,000
Other	321,403	343,954	333,466	361,060	326,291
Imports	136,949	133,580	130,070	147,950	137,600
<b>Total Supply</b>	<b>946,667</b>	<b>986,220</b>	<b>981,690</b>	<b>1,039,460</b>	<b>983,560</b>
Exports	143,520	135,800	131,820	156,000	133,000
Consumption	636,097	650,310	654,360	687,000	681,000
<b>Total Demand</b>	<b>779,617</b>	<b>786,110</b>	<b>786,180</b>	<b>843,000</b>	<b>814,000</b>
Stock Bal Change	40,147	33,060	-4,600	950	-26,900
Ending Stocks	167,050	200,110	195,510	196,460	169,560
% Use	21%	25%	25%	23%	21%

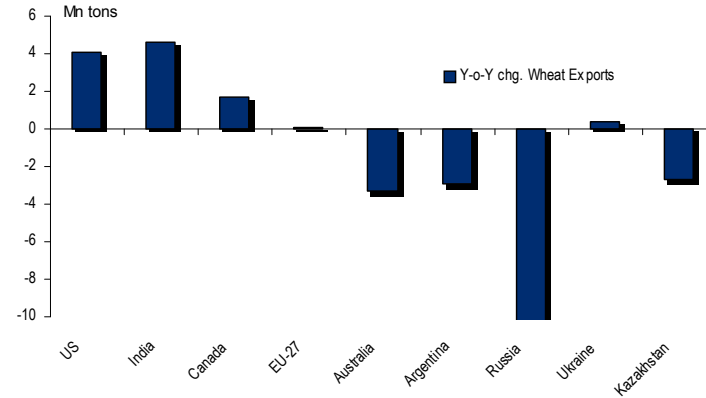
Source: USDA, Citi Research

Figure 218. US Wheat Market Production Profile...



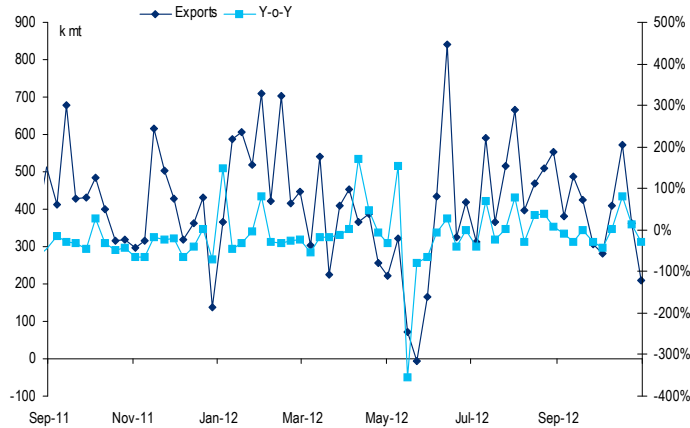
Source: USDA, Citi Research

Figure 219. ...needed to offset the weakness in global exports from Black Sea and Oz...



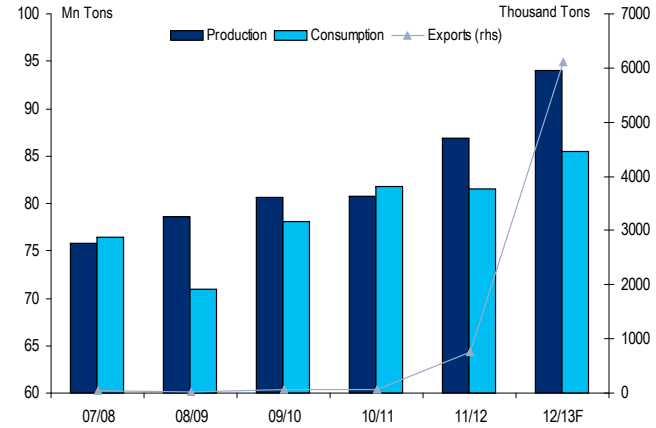
Source: IE, Citi Research

Figure 220. Sluggish US wheat export sales poised to rise...



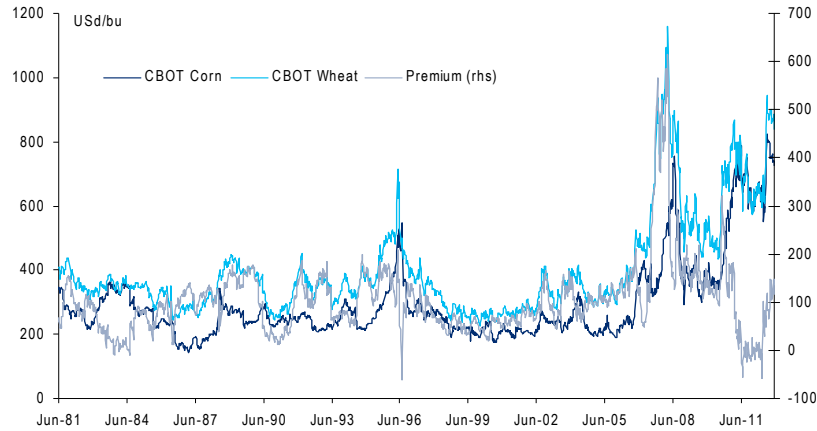
Source: USDA, Citi Research

Figure 221. India to lend support as well...



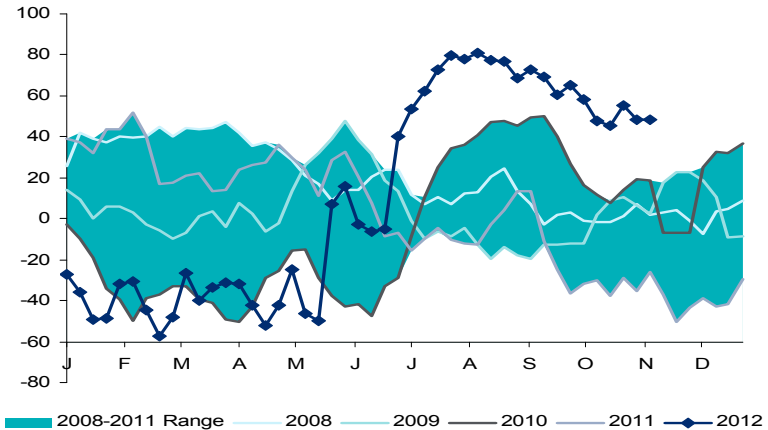
Source: USDA, Citi Research

Figure 222. Can US wheat prices diverge from US corn?



Source: Bloomberg, Citi Research

Figure 223. CBOT Wheat Managed Money (F&O) Net Positioning



Source: CFTC, Citi Research

- The 25-mt drop in world wheat ending stocks makes the market tight. Carryout of 169.5-mt is the lowest in five-years. Global wheat market physical prices and benchmarks already show extreme tightness (i.e. French Matif) and the situation is very tight, with Europe substituting corn given the troubled weather impacted and low quality crop out of UK and lack of regional availabilities. 12/13 global wheat exports have collapsed more than 20-mt y/y including 11.8-mt from Russia, 2.7-mt from Kazakhstan, 3-mt from Argentina and over 3-mt from Australia. As such sharp export availabilities from North America including 1.7-mt from Canada, 4.1-mt in the US and 4.6-mt in India are needed to minimize the tightness. To be sure, 12/13 US wheat export sales (Citi projects at just below 33-mt) are so far well below pace and imply 25-mt. But 1H'13 exports should lift dramatically as exhausted supply abroad pressures the largest wheat export market—which is the US. This should lift US prices since global consumption, already dropping 6-mt y/y, is unlikely to waiver further given the tightness elsewhere in the complex.
- Prices in late 2013 are expected to weaken but remain at a strong premium to corn. This spread could narrow, however, if the bias towards new crop acres (both in the US but also globally) are fully towards row crops vis-à-vis wheat. In that case, wheat prices in Chicago should shoot to the downside of the Citi forecast as the view towards a much larger carryout and potential surplus market comes in play.
- Net positioning by fast money specs is still at historic and seasonally strong levels this quarter despite a 40% curtailment of net length since the August peaks; commitment of traders data from early November show money manager net length of 49,000 contracts for CBOT wheat is well above the five-year range. CBOT corn and soybeans net long positioning have declined 23% and 29% respectively since this time but Chicago wheat prices have outperformed the harvesting row crops and traded sideways; wheat trading on its 'own' is likely to continue at least until the winter-wheat harvest completes. Net index rebalancing effects in January are a potential headwind for CBOT wheat (-\$3.5Bn) with the addition of KCBT wheat (+\$1.1Bn) linked to DJ-UBS, but more generally, expectations are for fund flows to remain accommodative give the global tightness and, record high European prices and looming pressure on US export markets.

## CBOT Soybeans

- US soybean prices are cut given measurable improvement to the domestic production outlook and expectations for record-level South American harvests. However upside risk remains in play because the Latin American picture while positive is uncertain and US carryout figure and stocks-to-use remains tight; the Citi forecast remains above the forward curve. 2012f prices are set to USD1490/bu and 2013f at USD1500/bu with traded levels potentially spiking in 1H'13 (0-3m upside point-price target at USD1700/bu) before subsiding towards the end of next year. In addition to strong supply out of Brazil and Argentina, US production is thought to have stabilized for 12/13 and post a very strong 13/14 harvest. To be sure, the 'big surprise' if any in the November WASDE was the large 1.5 point m/m jump in soybean yields in the US lifting production prospects more than 100-m bu to 2.97-bn bu. However ending stocks were lifted only 10-m bu with most of the increase flowing through to higher exports and use. Nevertheless the rosier outlook prompted the USDA to cut farmer prices for beans and associated products expecting the season-average at around USD1490/bu. Meanwhile 13/14 Citi estimates for the oilseed are for a record 78-m acres planted (more than 75-m outright with more than 2-m acres in double cropping) and for output to grow 12% y/y to 3.3-bn bu in the US. This will allow use to grow dramatically including US exports to just under 1.5-bn bu and lifting stocks-to-use more than 2% to 6.5%. Price risk for soybeans should thus shift from the mid-to-high teens in the short-term down to the low-teens.
- Indeed US exports are expected to be robust; Citi view at 1.365-bn bu which is 20-m bu above the USDA's own m/m adjustment of +20-m bu. The first two months of this season has seen US bean exports jump 27% y/y to just shy of 6-mt. Brazilian exports of beans are also likely to be on hold until the end of 1Q'13. Part of this is for its export program for corn but also as planting finishes this month for soybeans. Chinese imports in 2012 are likely to hit just under 60-mt and rise further still in 2013 to over 61-mt. Imports are also off to a strong start in 12/13 (nearly 5-mt in September and nearly ~5-mt monthly average forecast) as the country looks to ease its pork markets during a critical high consumption time of the year; China should remain a strategic buyer. US crush for beans is in line with the USDA at 1.555-bn bu before jumping to 1.65-bn bu in 13/14. US soybean crush was strong in September and October (+9% y/y); low prices and strong margins encouraging more use.

Figure 224. US Soybean Balances

Mn bushels/Mn acres	09/10	10/11	11/12	12/13 USDA	12/13E Citi	13/14 E Citi
Planted Area	77.5	77.4	75	77.2	77.2	78
Harvest	76.4	76.6	73.8	75.7	75.7	76.8
% Harvested	98.6%	99.0%	98.4%	98.1%	98.1%	98.5%
Yield (bu/acre)	44	43.5	41.9	39.3	39	43
Beginning Stocks	138	150	215	169	169	127
Output	3,359	3,329	3,092	2,975	2,952	3,304
Imports	15	14	16	20	35	15
<b>Total Supply</b>	<b>3,512</b>	<b>3,493</b>	<b>3,323</b>	<b>3,164</b>	<b>3,157</b>	<b>3,445</b>
Crush	1,752	1,648	1,702	1,560	1,555	1,650
Exports	1,500	1,500	1,360	1,345	1,365	1,475
Seed	90	87	90	89	90	90
Residual	20	43	2	30	20	20
<b>Total Demand</b>	<b>3,362</b>	<b>3,278</b>	<b>3,154</b>	<b>3,024</b>	<b>3,030</b>	<b>3,235</b>
Ending Stocks	150	215	169	140	127	210
% use	4.5%	6.6%	5.4%	4.6%	4.2%	6.5%

Source: IE, Oil World, USDA, Citi Research

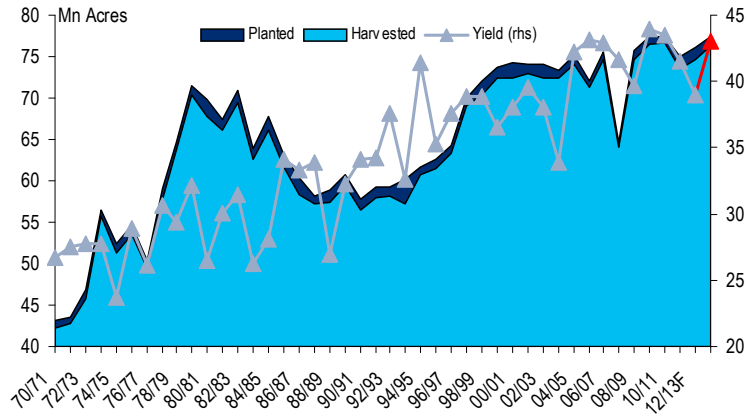
Figure 225. World Soybean Balances

(000 MT)	08/09	09/10	10/11	11/12	12/13E
Beginning Stocks	51,788	42,831	59,821	70,351	55,751
<b>Total Production</b>	<b>211,607</b>	<b>261,030</b>	<b>264,700</b>	<b>239,000</b>	<b>266,000</b>
y-o-y change	-4%	23.4%	1.4%	-9.7%	11.3%
US Production	80,750	91,420	90,610	84,158	80,350
Brazil	57,800	69,000	75,300	67,000	80,000
Argentina	32,000	54,500	49,000	42,000	54,000
Other	41,057	46,110	49,790	45,842	51,650
Imports	77,395	86,830	90,000	92,500	96,000
<b>Total Supply</b>	<b>340,790</b>	<b>390,691</b>	<b>414,521</b>	<b>401,851</b>	<b>417,751</b>
Exports	76,894	92,850	92,670	90,300	98,500
Consumption	221,065	238,020	251,500	255,800	261,000
<b>Total Demand</b>	<b>297,959</b>	<b>330,870</b>	<b>344,170</b>	<b>346,100</b>	<b>359,500</b>
Stock Bal Change	-8,957	16,990	10,530	-14,600	2,500
Ending Stocks	42,831	59,821	70,351	55,751	58,251
% Use	14%	18%	20%	16%	16%

Source: USDA, Citi Research

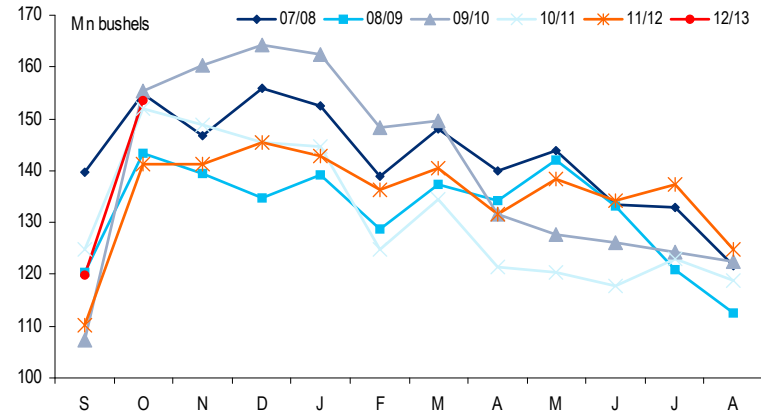


Figure 226. US Soybean Market Production Profile



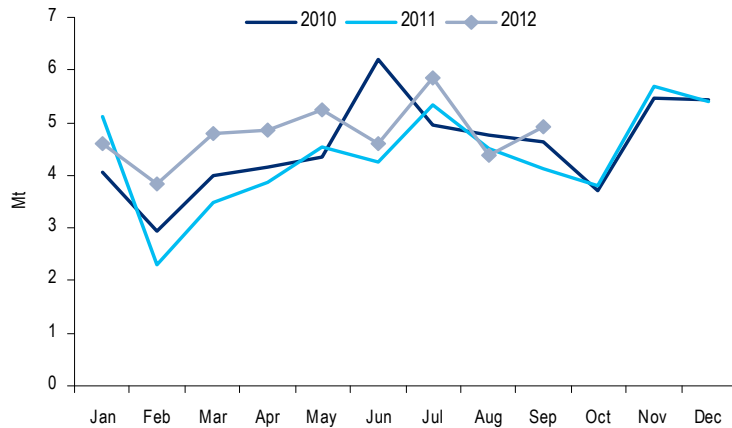
Source: USDA, Citi Research

Figure 227. US Soybean Crush jumped in October and should be aided by strong margins...



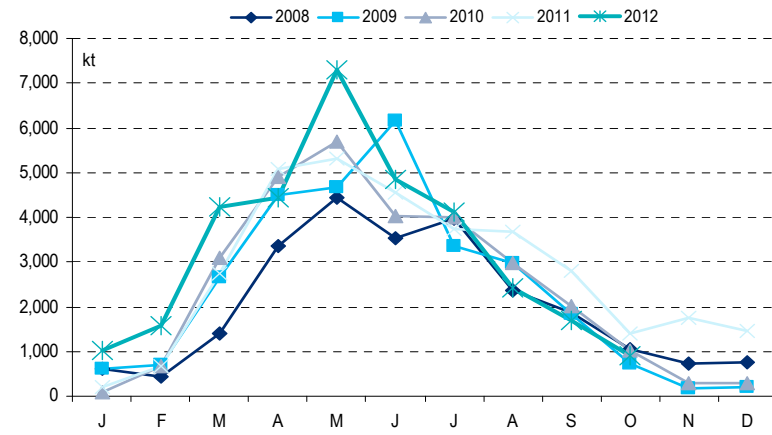
Source: IE, NOPA, Citi Research

Figure 228. China Soybean Net Imports\*



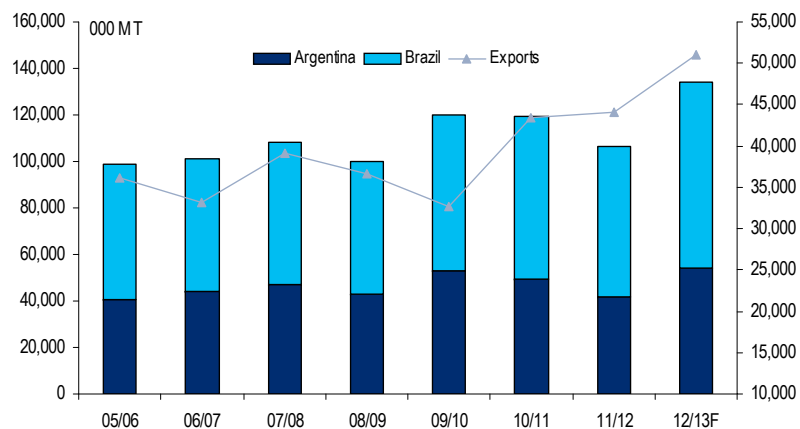
Source: China Customs, WIND, Citi Research, \*market concerns over recent Chinese cancellations of soybean cargoes can pressure markets in the short-term but it is unlikely consumption for the country will abate.

Figure 229. Brazil Soybean Exports should be tempered until 2Q'13...



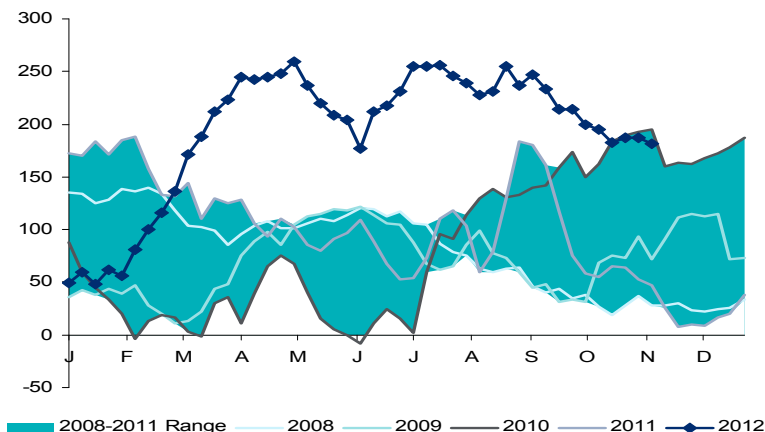
Source: Brazil Ministry of Commerce, Citi Research

Figure 230. Latin American output set to explode...Brazil overtakes US...but there are risks...



Source: SLC, USDA, Citi Research

Figure 231. CBOT Soybeans Managed Money (F&O) Net Length



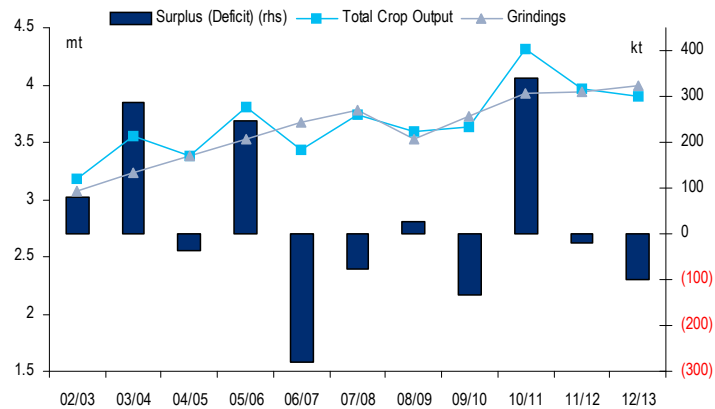
Source: CFTC, Citi Research

- Much of the 'perceived looseness' for 2013 hinges on the expectations of a record crop in Brazil and Argentina which Citi sees at 134-mt versus USDA estimates of 136-mt; noting risk to a production shortfall rather than a surprise to the upside. According to *Oil World*, the 12/13 harvest could drop by 3-6 million tons due to excess rain in Argentina from original expectations of about 56-mt. Weather conditions need to be followed closely, especially due to Argentina's external constraint (lack of US dollars). Meanwhile a late start to soybean plantings of ~69.5-m acres in Brazil would likely require very favorable weather to achieve yields above 2.9MT/ha and output of 80-mt or higher. Brazil Foods CEO noted in November the concerns about soybean replanting and other local reports suggest that the USDA might be too optimistic in its outlook. In any event, the assessment of a delayed Southern hemisphere harvest is likely to play out and substantially tighten markets in late 1Q'13.
- Overall global balances remain tight –just as they did during 11/12—and prices and the curve do not appear to be adequately pricing the risk to balances in 2013. While global oilseed production growth has edged higher with the better outlook in the US (consequently should support soy meal and soy oil output), given the drawdown of stocks and tight carryout even with bumper South American crops, the market is tight both in the US and globally. Worldwide soybean trade is expected to pick up substantially in the current marketing cycle which should also support US prices during 1Q'13 and 2Q'13 before foreign origins may hit the market in size.
- Money manager positioning for soybeans has been extremely net long on both an aggregate and seasonal basis most of this year but has faded substantially during 4Q albeit near the top of the 5Y range. Fund positioning as high as 250,000 contracts during April and August of this year has stabilized around the 165,000 lot mark. Index rebalancing is likely to impact another \$3.1Bn in net outflows from the crop with the addition of soy meal to the DJ-UBS benchmark at the expense of CBOT soybeans about \$2.85Bn of this figure and the balance via recalibration of GSCI. Combined with the more bearish fundamental supply headlines out of the US has flushed out fast money longs although the sell-off is probably excessive. Markets should tighten in the early part of 2013 and the January 11<sup>th</sup> WASDE / NASS reports where production and stocks are physically counted and finalized is likely to serve as bullish catalyst and possibly the delay, and potential short-fall of a robust South American crop. The confluence of these factors—and relatively healthy crush and Chinese imports—should serve to push prices higher before falling entering 2014.

## ICE Cocoa

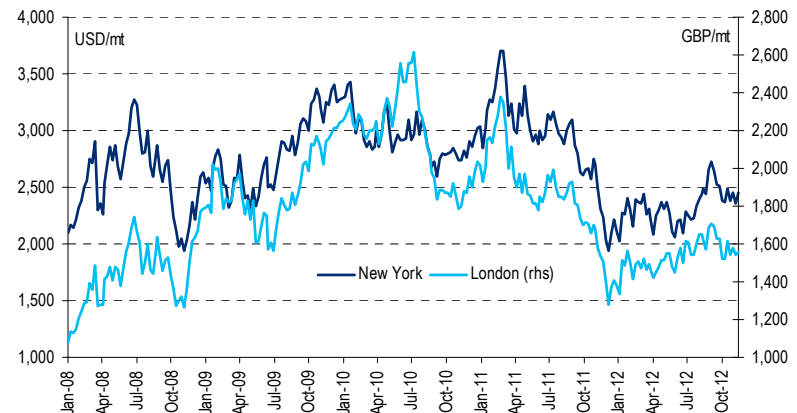
- Cocoa prices have underperformed this quarter compared to Citi's previously published bullish point-price target for ICE prices making the current curve look cheap although the recent rally has fallen more in line with Citi's original view of tighter markets and short-term prices that could scale USD2500/MT. New York prices for 2012 are now projected to average USD2370/MT this year, increasing a bit over USD2500/MT in cal'13 (unchanged from prior view). West African producing region supply risks, healthy cocoa butter ratios and fund positioning should be supportive for the delicious bean and support New York prices.
- European data do show tepid demand; recently declining 16% y/y in 3Q'12 to 317-kt although North American grindings were closer to flat and showing an uptick in recent trade reports. Relatively anemic global growth has been a headwind to luxury chocolate consumption in Europe albeit emerging market powder demand has and should be relatively stable; Citi conversations with downstream users indicate the potential upside to grindings just as markets begin to tighten. To be sure, any further increase in consumption on the back of what has already been weak processing environment in Europe and given more favorable cocoa butter ratios above 1.5x persisting in this sideways market for the bean is also constructive. Liffe stocks have dropped 15% y-t-d and more than 50% since the end of 2010 to 123-kt.
- Overall balances point to a 12/13 seasonal deficit of ~100-kt and a drop in global cocoa bean stocks-to-grinding ratio of 2-points y/y to 42.5—the tightest since 09/10. Total world crop of ~3.9-mt lags the 1.5% annual increase in global grindings to about 4-mt. To be sure, approximately 56% of global output—or 2.15-mt—has origins in Ivory Coast and Ghana which has been benefiting from moderate weather recently and a more stable geopolitical situation versus 2011. But local pre-sales of the new harvest leave a lack of natural sellers in the market and the risk could be on delayed physical delivery or farmer bids-to-cover on underperforming crops.
- After holding a persistent net short throughout 1H'12, money manager combined net length finished the summer with a record seasonal net long of about 30,000 lots. Fund positioning has faltered a bit since then but should remain supportive especially if looking to squeeze commercials and given more bullish fundamentals.

Figure 232. World Cocoa Balances



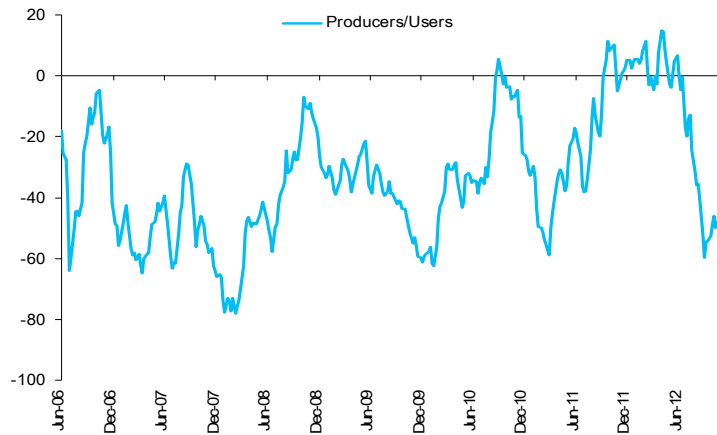
Source: ICCO, Citi Research

Figure 233. Benchmark Cocoa Prices



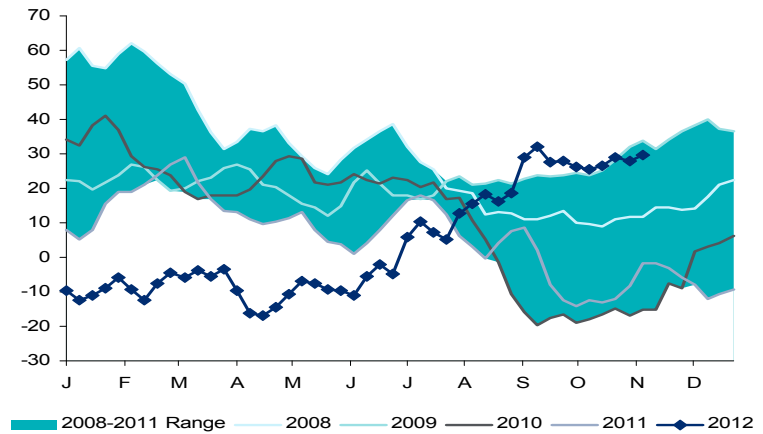
Source: Bloomberg, Citi Research

Figure 234. Producer / User Net Selling



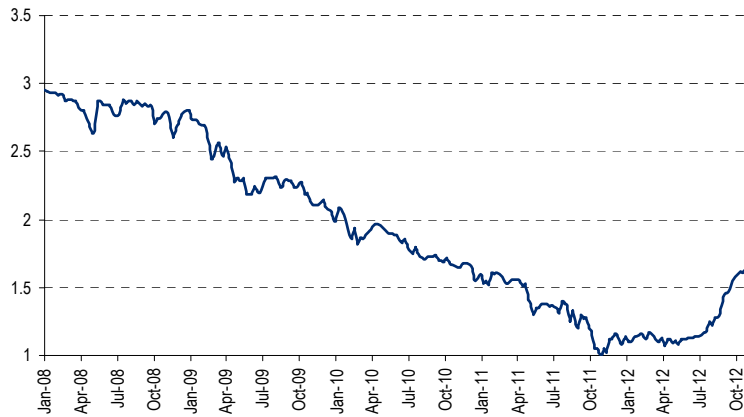
Source: CFTC, Citi Research

Figure 235. ICE Cocoa Managed Money (F&O) Net Length



Source: CFTC, Citi Research

Figure 236. Cocoa Butter Ratios



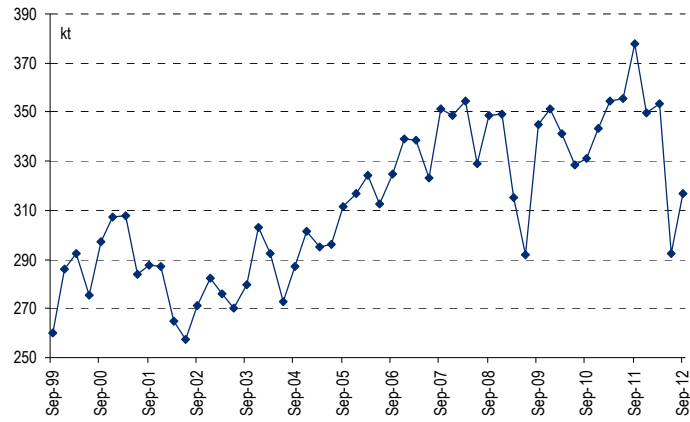
Source: Cocoa Merchant Association, Citi Research

Figure 237. London Cocoa Stocks Total



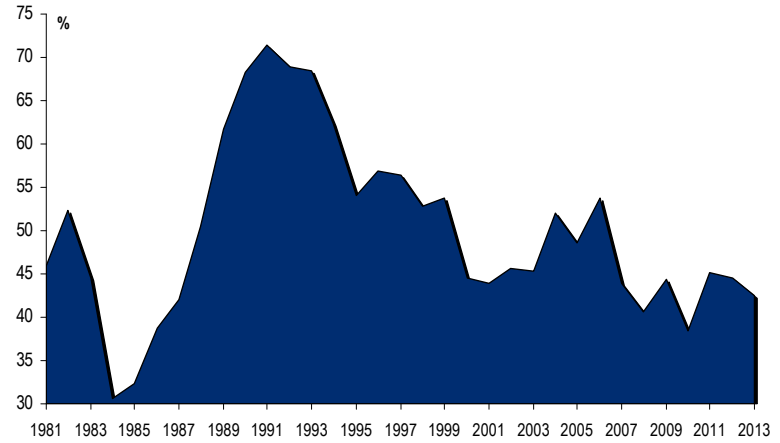
Source: Liffe, Citi Research

Figure 238. European Cocoa Bean Usage



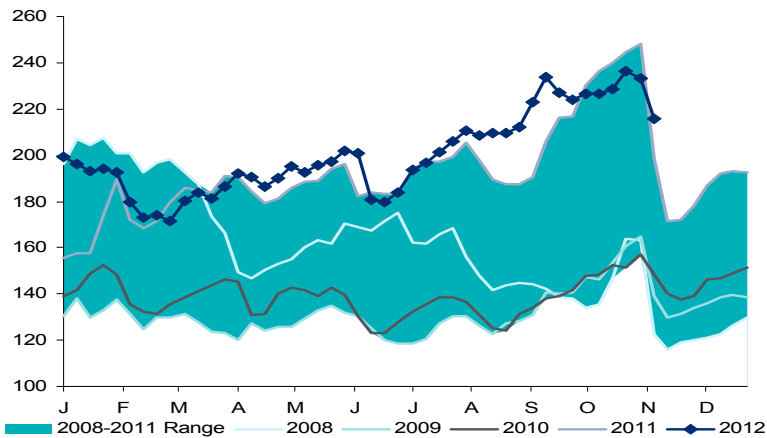
Source: ECA, Citi Research

Figure 239. World Cocoa Stocks-to-Grinding Ratio



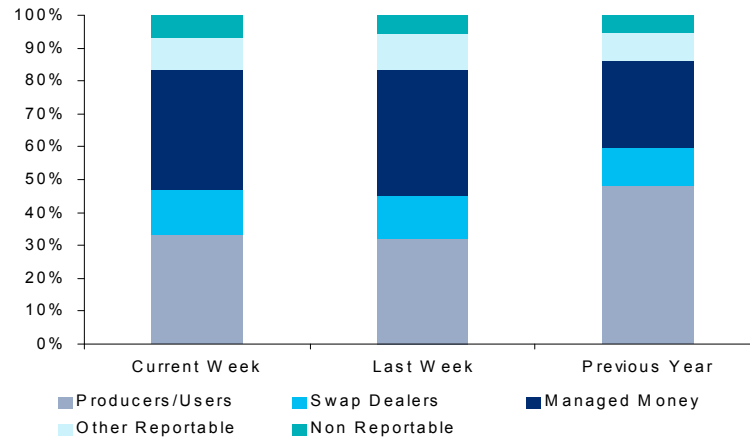
Source: ICCO, Citi Research

Figure 240. ICE Cocoa Combined Open Interest



Source: CFTC, Citi Research

Figure 241. Open Interest Split by Category\*



Source: CFTC, Citi Research, \*current week ended 9<sup>th</sup> November 2012

## ICE Coffee

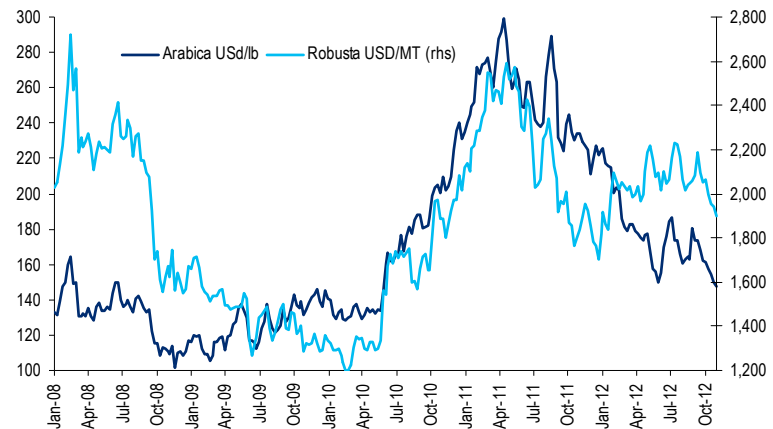
- Arabica coffee prices have fallen precipitously this year from well above USd200/lb during 1Q'12 to the USd150s/lb in 4Q. The outlook for 2013 prices remains subdued with only modest appreciation in flat price and term structure with spreads likely to be stable. ICE coffee markets face both fundamental and technical headwinds that are likely to keep a cap on prices below USd180/lb in the near term. Prices this quarter are expected to average ~USd160/lb with the cal'13 strip expected to be range-bound between USd160-175/lb. The backlog of Brazilian production yet to be sold, roaster-switching from Arabica to Robusta beans and a surge in ICE warehouse inventories to 30-month highs are the primary reasons that 2013 is unlikely to be a stellar year for the caffeinated commodity.
- Marketing of 12/13 crop has begun across all major producers this quarter and global supply/demand balances imply a 6% y/y increase in output to 146-m bags as driven by strong Arabica growing in Brazil which should have a record harvest of 53-m bags. Healthy supply is expected from other key regions as well which contrasts to flat consumption growth although 12/13 is still poised for another record year for the global coffee trade. The determining factor will be the patience of Brazilian producer selling of its completed harvest representing 1/3 of the new global crop and if roasters come in to buy at reduced prices into 1Q'13. Broker markets continue to indicate merchant forward sales maintaining a 6-10% discount to the ICE curve with local producers holding inventory for the time being. Forced selling would serve as a significant bearish headwind and given the growth in projected carryout 11% y/y to over 30-m bags.
- 11/12 world coffee exports were a record 108-m bags driven by a surge in Vietnamese Robusta production volumes of ~23-m bags which are expected to decrease marginally. New harvest Brazilian coffee exports (partially delayed due to wet weather in June) through October of this year have totaled 8.75-m bags—down about 12% y/y. Given expectations of healthier world exports and Asia and Central America coming off bumper years, total supply bias will be towards Brazilian sales. Exports from Brazil in October surged 0.7-m bags m/m to 2.7-m bags (over 30% of monthly global trade) although sequential jumps may be more tempered.

Figure 242. World Coffee Balances

(000 bags, 60kg)	08/09	09/10	10/11	11/12	12/13E
Beginning Stocks	29,800	35,940	31,740	31,240	27,040
<b>Total Production</b>	<b>136,640</b>	<b>127,300</b>	<b>134,600</b>	<b>137,800</b>	<b>146,000</b>
Arabica	82,400	73,900	83,500	79,000	87,000
Robusta	54,240	53,400	51,100	58,800	59,000
Imports	96,800	93,800	107,500	104,000	109,500
<b>Total Supply</b>	<b>263,240</b>	<b>257,040</b>	<b>273,840</b>	<b>273,040</b>	<b>282,540</b>
Exports	97,300	93,000	107,600	108,000	114,000
Consumption	130,000	132,300	135,000	138,000	138,500
<b>Total Demand</b>	<b>227,300</b>	<b>225,300</b>	<b>242,600</b>	<b>246,000</b>	<b>252,500</b>
Stock Bal Change	6,140	-4,200	-500	-4,200	3,000
Ending Stocks	35,940	31,740	31,240	27,040	30,040
% of consumption	28%	24%	23%	20%	22%

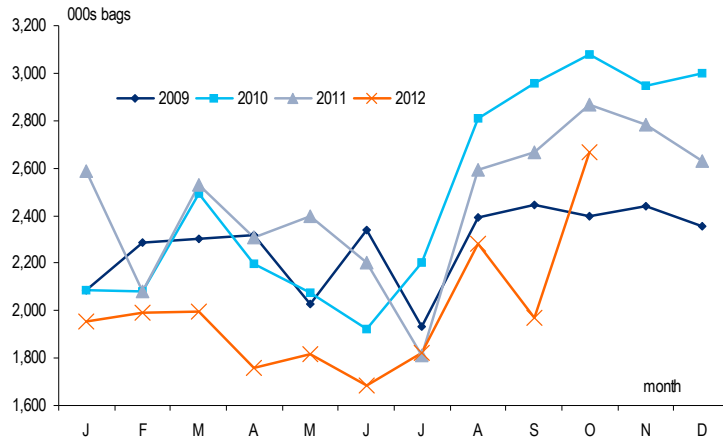
Source: Conab, ICO, USDA, Citi Research

Figure 243. Benchmark Coffee Prices



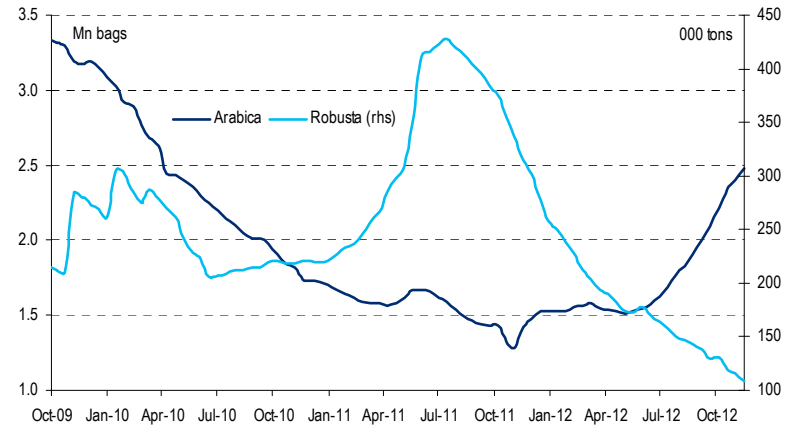
Source: Bloomberg, Citi Research

Figure 244. Brazil Coffee Exports



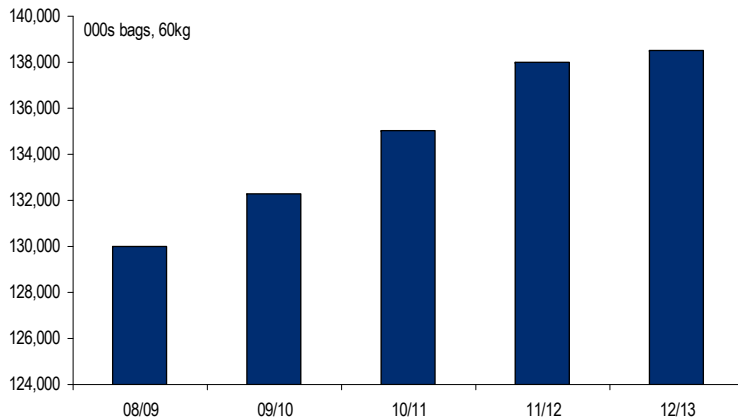
Source: Brazil Ministry of Development, Citi Research

Figure 245. Certified Coffee Stocks



Source: ICE, Liffe, Citi Research

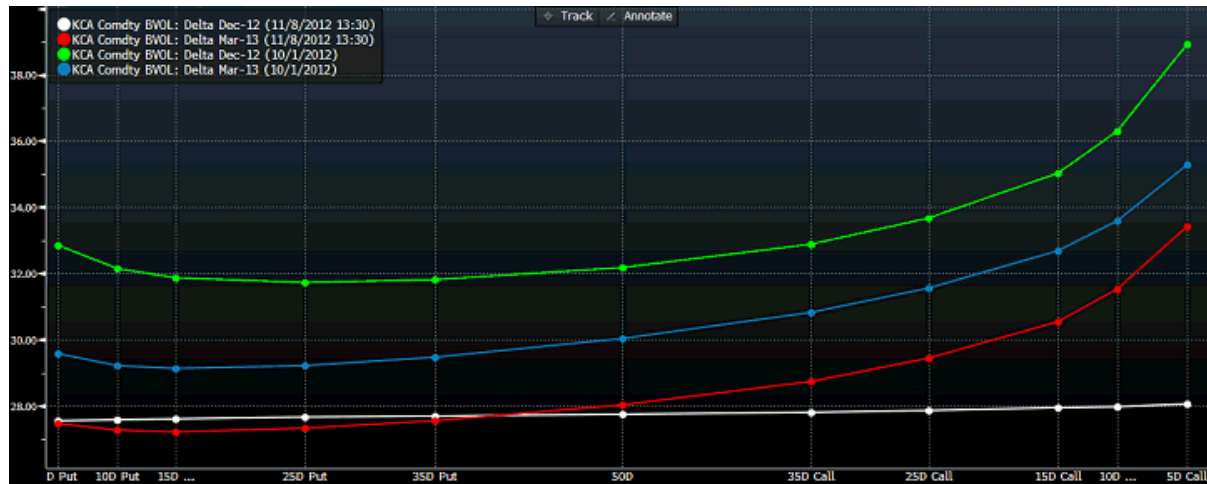
Figure 246. Coffee Consumption



Source: Citi Research

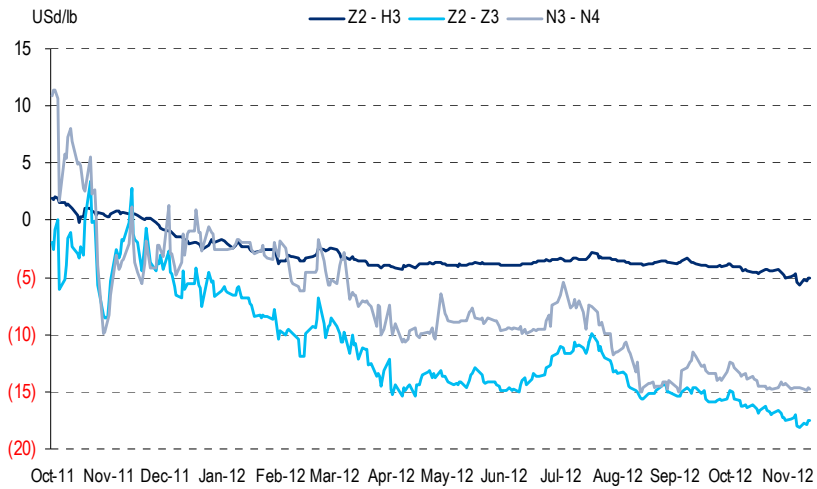
- Certified Arabica coffee stocks on ICE have jumped to their highest levels since 2Q'10—just shy of 2.5-m bags—which contrasts sharply to the steep and steady decline of Robusta stocks on Liffe since 3Q'11. Much of this has been driven by roaster-switching of perhaps as much of 3-m bags this year. Given the growth in 12/13 production is driven almost entirely on the Arabica side of the ledger, Liffe prices may remain more supported than ICE contracts, London continuing to trade at a much narrower discount.
- CFTC data show money manager positioning becoming increasingly unsupportive in recent weeks. The category held a net short of about 24,000 contracts at the beginning of November—the most bearish purview since reporting became public—which has led to ICE futures prices plunging and the calendar strip to shift down in parallel and slightly steepen its carry. It is unlikely that investor flows will be supportive for ICE prices given the somewhat bearish fundamentals although bouts of short-covering might persist if healthier Brazilian producers wait and see rather than sell and wait. The minimal impact of the <\$2-5Bn linked notional Rogers International Commodity Index replacing ICE coffee with Liffe traded contracts in 1Q'13 serves as a further headwind to ICE prices.

Figure 247. Still moderately constructive but Arabica option skews have become less constructive for prices near term...



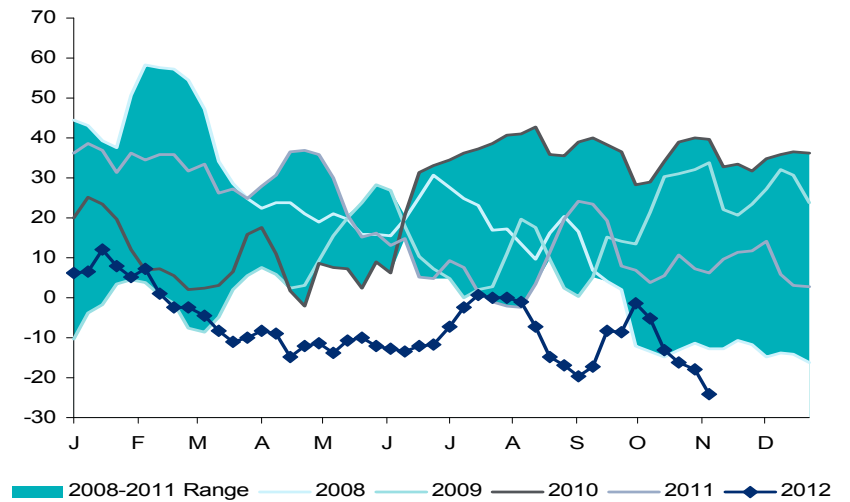
Source: Bloomberg

Figure 248. ICE Coffee Spreads



Source: Bloomberg, Citi Research

Figure 249. ICE Coffee Managed Money (F&O) Net Length



Source: CFTC, Citi Research



## ICE Cotton

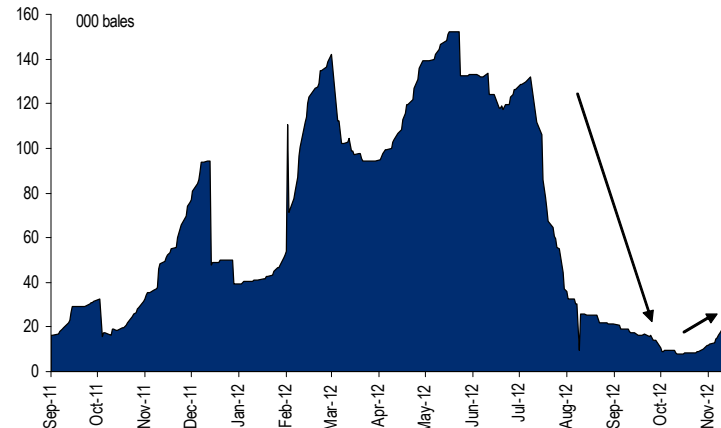
- The bearish outlook for cotton remains intact. Prices on ICE are forecast to average USd65/lb during 1H'13 before rising to the low USd70s in 2H'13. Despite the sharp retrenchment of prices this year—in line with Citi's persistently bearish view—the forward curve still looks rich in a 2013 context. Fundamental weakness in cotton prices—that scaled to USd200/lb in 2011—is driven by three key factors including: robust global output (despite the US summer drought and slow moving Indian monsoon); lack of a Chinese reserve purchase program and expectations of a record carryout; and lastly the expected build of historically low certified stocks.
- Tightness in ICE certified cotton stocks that dropped more than 50% y/y to below 8,000 bales in October only served to put a floor and support prices near USd70/lb. With US-grown deliverable inventory likely held by only a few large physical trading houses it was a risk for specs to position too aggressively for a further downside move given the potential for a short-squeeze that roiled markets during the July expiry. But with the US harvest coming online, certified stocks should build and have already edged upwards to about 27,000 bales. Over 3/4 of the American crop was harvested by the middle of November, in line on a seasonal basis and on-track to complete by month's end. This provides the ability for money managers to reestablish outright shorts given loose cotton fundamentals. CFTC data that show choppiness of fund positioning should soon continue the two-year trend of a downward trajectory. Despite the crowded nature of the trade—and the potential for reversals such as the optical rally in October driven by US crop quality concerns (which need be monitored)—the overall fundamentals still argue for lower prices.
- The 12/13 cotton supply/demand balance looks outright bearish under most scenarios. Even to model weaker US output and global supply and higher global consumption compared to USDA benchmarks—ending stocks globally would be close to a record 78-mt and up 35% from the five-year average. In the absence of a cotton stockpiling program, China alone would own almost half of this carryout and set its own domestic record able to cover its deficits for future cycles. Trade data for the Middle Kingdom show that it has sharply pushed out imports after its reserve purchase program ended in 1Q'12.

Figure 250. World Cotton Balances

(000 bales)	08/09	09/10	10/11	11/12	12/13E
Beginning Stocks	62,030	62,502	47,823	49,520	68,380
<b>Total Production</b>	<b>107,313</b>	<b>102,230</b>	<b>116,395</b>	<b>122,710</b>	<b>116,000</b>
y-o-y change	-10%	-5%	14%	5%	-5%
US Production	12,820	12,190	18,100	15,570	17,000
% of world output	12%	12%	16%	13%	15%
Imports	30,475	36,350	35,920	43,550	37,400
<b>Total Supply</b>	<b>199,818</b>	<b>201,082</b>	<b>200,138</b>	<b>215,780</b>	<b>221,780</b>
Exports	30,402	35,593	36,661	43,400	37,000
Consumption	106,914	117,666	113,957	104,000	107,600
China	41,750	50,000	46,000	41,000	39,000
% of world consump.	39%	42%	40%	39%	36%
<b>Total Demand</b>	<b>137,316</b>	<b>153,259</b>	<b>150,618</b>	<b>147,400</b>	<b>144,600</b>
Stock Bal Change	472	-14,679	1,697	18,860	8,800
Ending Stocks	62,502	47,823	49,520	68,380	77,180
% Use	46%	31%	33%	46%	53%

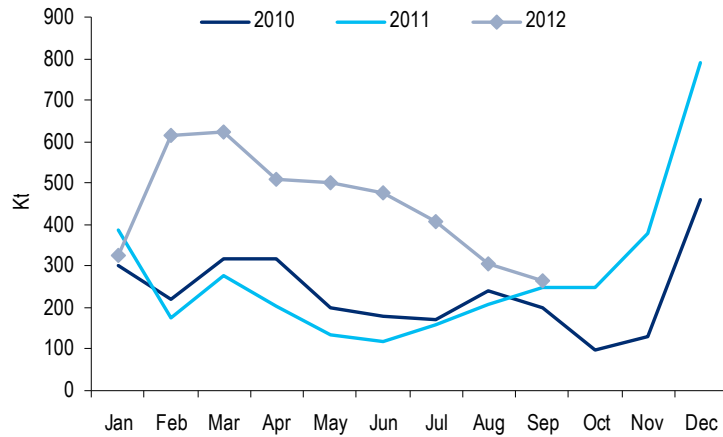
Source: USDA, Citi Research

Figure 251. Certified Cotton Stocks



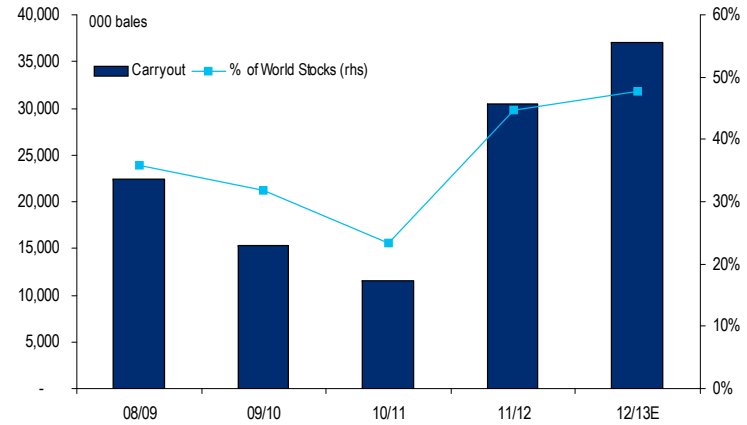
Source: ICE, Citi Research

Figure 252. China Net Imports of Cotton



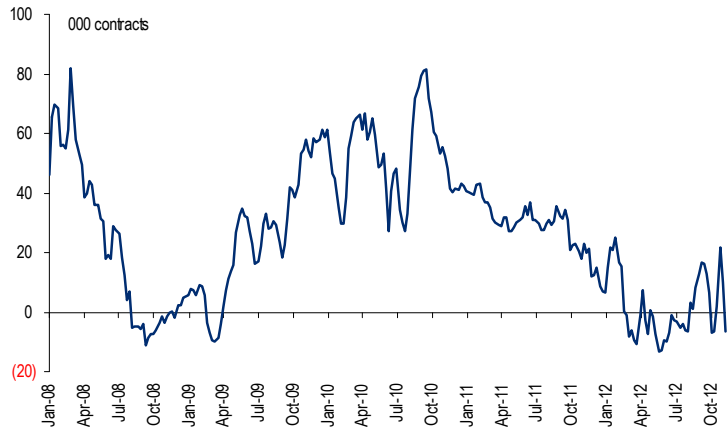
Source: China Customs, WIND, Citi Research

Figure 253. Record Chinese Ending Stocks of Cotton



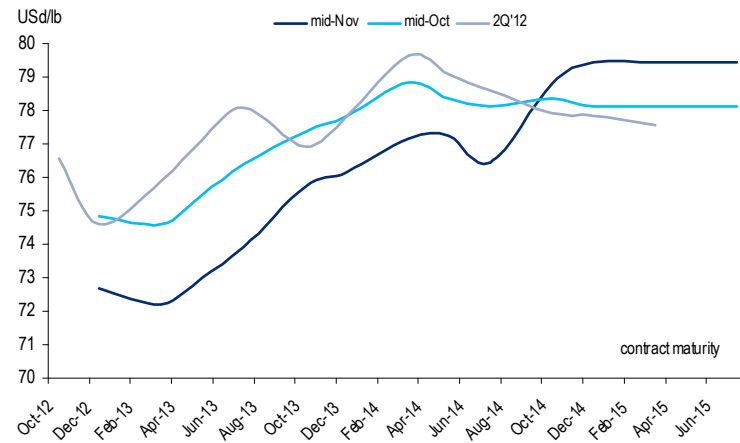
Source: USDA, Citi Research

Figure 254. ICE Cotton Managed Money (F&O) Net Length



Source: CFTC, Citi Research

Figure 255. ICE Cotton Forward Curves



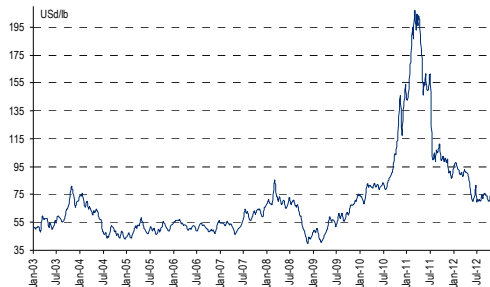
Source: Bloomberg, Citi Research

Figure 256. US Cotton Harvest Progress

State	Week ending			2007-2011 Average
	November 11, 2011	November 4, 2012	November 11, 2012	
	(percent)	(percent)	(percent)	(percent)
Alabama .....	69	59	74	74
Arizona .....	54	33	50	58
Arkansas .....	97	97	99	90
California .....	77	70	87	73
Georgia .....	68	53	62	60
Kansas .....	50	45	66	35
Louisiana .....	100	99	100	94
Mississippi .....	98	90	97	91
Missouri .....	93	83	89	88
North Carolina .....	78	48	61	76
Oklahoma .....	49	59	74	48
South Carolina .....	75	51	63	71
Tennessee .....	92	86	92	86
Texas .....	75	56	71	54
Virginia .....	84	49	72	80
15 States .....	78	64	75	68

Source: USDA, \*these 15 states harvest 98% of planted acreage

Figure 257. ICE Cotton Prices



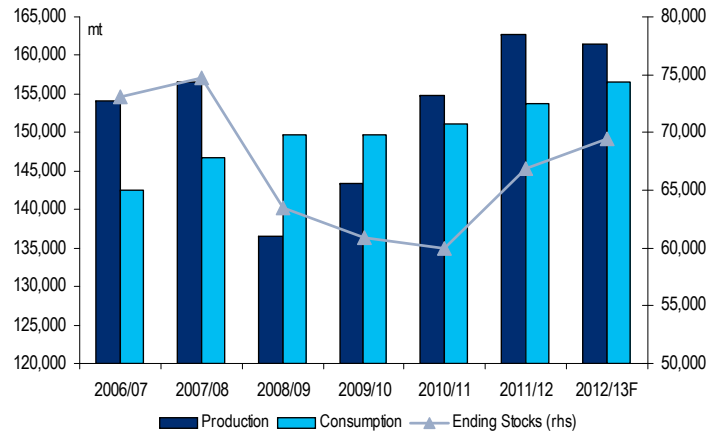
Source: Bloomberg, Citi Research

- To be certain, Chinese net imports of cotton this year have steadily declined on a sequential basis; recent data show 263-kt in September versus 305.5-kt in August (and flat y/y). Imports through 3Q'12 stand at over 4-mt but they were largely front-loaded and the risk remains that they are unlikely to tick-up in the coming year. Already the PRC government has been supporting farmer incomes and maintaining domestic production via building its reserves locally. The rise in China output stands as a headwind to global prices, especially as the Indian crop emerged after adverse weather conditions earlier this year.
- After high prices of 10/11 and 11/12, Asian mills started curbing demand switching to synthetic fibers with cotton further hindered by headwinds to global retail consumption. As such Chinese demand is set to decline for a third consecutive year in 12/13 and without the world's most significant cotton consumer looking to buy and already holding record carry-in—it is difficult to see ICE cotton markets supported at higher levels.
- Prices could gain traction in 2014—perhaps above the current curve—providing consumers an opportunity to hedge on a deferred basis. The forward curve is expected to remain steep but could come down in parallel. The potential for a 10%+ curtailment of global cotton plantings globally in 2013, economic rebound and the potential for Chinese stimulus in the latter part of the year—however unlikely (to focus on cotton)—provide more upside to future prices although 2013 looks likely to be another weak year for the comfortable fabric.

### ICE sugar

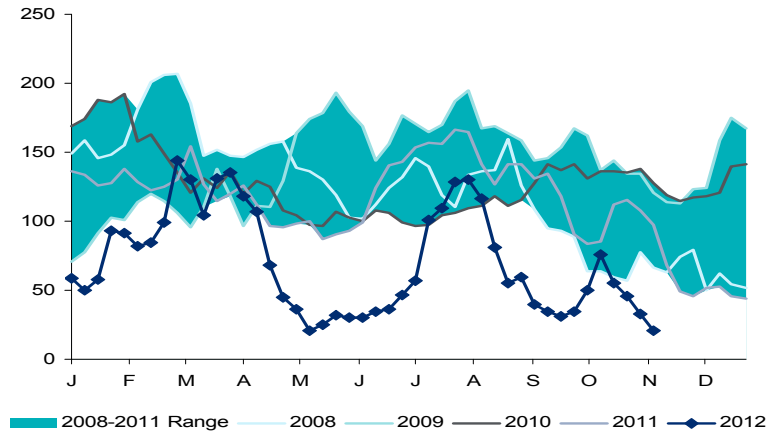
- ICE sugar prices have come crashing down since 2011 and are expected to remain very range-bound and tempered through 2013 at around USd20-21/lb with bias towards further downside to the high-teens given tepid demand growth and sufficient supply. Global balances for 12/13 are likely to finish with the third consecutive surplus season, at 4.9-mt, even as production declines marginally y/y to 161.5-mt and consumption grows 2% to 156.6-mt. Ending stocks are forecast to grow nearly 2.5-mt to 69.5-mt. Hedge funds have taken notice and curtailed positions massively to well below the historical five-year range. Category net length just shy of 20,800 contracts is down 80% y/y and more than 85% since the year-to-date peak from 1Q'12 as prices over the past cycle have come down from over USd30/lb to below USd20/lb this quarter. Money manager buying and levels are unlikely to find traction next year given the global story.
- In Brazil the Center South region continues to benefit from drier-than-normal weather conditions which has allowed for mills to make up for earlier delays this season and remain focused on sugar output. Final CS cane numbers are seen around 512-520-mt with sugar with ethanol production at around 32.5-mt (versus 31.3-mt in 11/12) and 21bn liters (versus 20.5bn liters in 11/12). The market is already looking at the 13/14 campaign which is expected to start earlier than normal to ensure enough ethanol supply ahead of the increase in the anhydrous blend with gasoline schedule to June'13 and also to ensure the industry has sufficient time to crush the majority of cane availability next year.
- In India there has been a somewhat turbulent pre-harvest season marked by farmer protests demanding higher cane prices. The State Advisory Cane Price (SAP) for Uttar Pradesh and around Mumbai is not yet decided. Therefore, further delays to the start the crushing season are in the cards. Production is assessed around 23-mt, off about 3.2-mt y/y; enough to the cover domestic needs but not much more. The South Asian tiger's port refinery system has been active buying raw sugar for tolling (domestic use/re-export) which is currently pegged at 1.2-mt.

Figure 258. World Sugar Balances



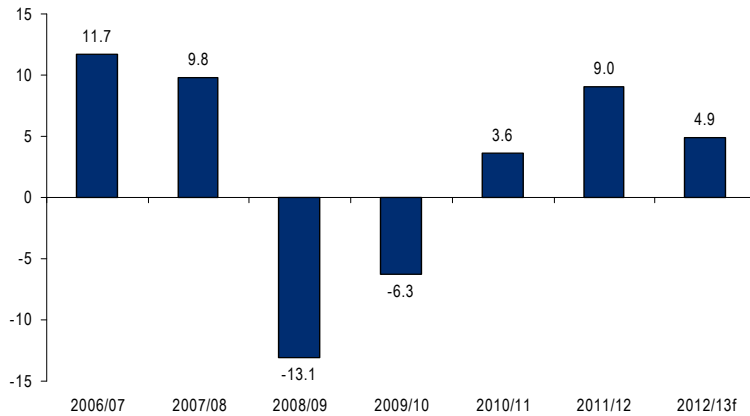
Source: FO Licht, UNICA, Citigroup Global Agricultural Commodities, Citi Research

Figure 259. ICE Sugar Managed Money (F&O) Net Length



Source: CFTC, Citi Research

Figure 260. World Sugar Surplus/Deficit



Source: FO Licht, Citigroup Global Agricultural Commodities, Citi Research

Figure 261. ICE Sugar Prices and Forecast – Range-bound with risk to the downside...



Source: Bloomberg, Citi Research

- In Thailand, initial projections for 9.75-mt sugar output in the new cycle came in as a 5% y/y drop. However, Thailand’s Office of Cane and Sugar Board has recently downgraded its 12/13 sugar production estimate to 9.4-mt from 10-mt. The key cane areas in Northeast and Central Thailand received below normal rainfall during most of 2012 which is causing cane yields to taper off.
- The European Commission (EC) kept its initial EU27 12/13 output estimate at 17.55-mt or roughly 1-mt lower than in the previous campaign. The EC formed a proposal to increase sugar supplies in the EU27 by 1.2-mt through imports at reduced duty and reclassification of out of quota sugar into quota sugar in order to tackle the rising gap between international and domestic prices in the region. Regarding Russia, the country beet sugar production at 4.75-mt is maintained but some local sources suggest this number could be as low as 4.4-mt amid adverse weather conditions in the last few months that has similarly roiled its grain market.
- The sugar conference held in Hangzhou, China, in late October gave several market participants the opportunity to share some optimism on the new Chinese sugar crop. The market consensus is for a record 14-mt crop which if confirmed would represent an increase in production of 2.5-mt on the previous marketing campaign and result in a significant reduction in the country’s import requirement in 2013.
- On balance, output looks promising and given sluggish demand growth ICE sugar prices should be tempered. While fund positioning and fundamentals point to this lower range-bound market, index net rebalancing in 1Q’13 is expected to provide about +\$1Bn of inflows (primarily from DJ-UBS).



## Notes

Citi Research

# Appendix A-1

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