

Global Chemicals Cracker

Mild Restocking But Underlying Demand Remains Sluggish. We like AXLL in the US; LG Chem in Asia and DSM in EU.

- **Stable crude supported restocking, but too early to call for recovery** — Crude oil stabilization encouraged downstream buyers to restock. Coupled with supply disruption in the US (fire at Williams Geismar cracker), EU (planned/unplanned outages) and Asia (Middle East feedstock constraint), major petrochemical prices edged up. Chemical margins have also improved slightly as raw material costs stayed flat, enabling crackers to operate at higher rates. However excluding restocking activities, demand was still weak and buyers remained in 'wait-and-see' mode. New supply in Asia and cracker restarts will cap margin upside and we expect slow recovery into 2H13.
- **Demand hurt by macro weakness in China and Europe** — The macro environment remains harsh given ongoing drag in Europe and slowing growth in emerging economies. In particular, Citi's China economists downgraded China's growth forecasts in 2013 and 2014 on the back of tighter credit condition and lackluster manufacturing activities. The pace of demand and spread recovery could be slow in 2H13, leading to our series of estimates downgrades in US, Europe and Korea in June.
- **PE/PP gained momentum** — China's PE/PP imports were strong in 2Q13, which was a result of lower imports of recycling materials. China implemented the 'Green Fence' action to regulate imports of solid waste, indirectly boosting demand for virgin products. Asian PE/PP margins have tracked ahead of expectation but some pullback in 3Q is likely on the back of to new cracker startups. Current low PE port inventory in China may serve as buffer. This is supportive for LG Chem and PTTGC. In the US, the latest PE converter survey suggests that demand growth is steady and PE inventory is low, which bodes well for US crackers. This is supportive for DOW. However, the European region remains under pressure.
- **Butadiene plunged led by excess supply in Asia** — Global butadiene price continued to drop in June (-20% MoM in EU; -11% in US) on ample supply and weak demand. BD production in Asia increased in May and June as crackers operated at higher run rate under favorable naphtha cracking economics. Furthermore, the market is expecting numerous BD plants to come on stream in July in Asia (c. 470kt). In China, some BD producers indicated that coastal inventory is high due to surge in BD imports in 4Q12-1Q13. This is negative for LXS which might also face an inventory write-down in 2Q13 given the sharp drop in pricing in July. Downstream synthetic rubber players were also facing similar inventory pressure and underlying demand from the tyre sector remains sluggish. Recovery hinges on global improvement in tyre demand but is not likely in the near term in our view.
- **Top Picks** — AXLL, DOW, EMN, HUN and LYB in the US; LG Chem, PTTGC, Lotte Chem and Asahi Kasei in Asia; DSM, CLN, and SYNN in EU; SOLBB and LXS least favored in EU.

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

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The month ahead

Figure 1. The month ahead (11 July – 13 August 2013)

July	Europe	USA	Asia
11-Jul-13	Clariant CMD	July WASDE and Citi's Farm to Fork call	
16-Jul-13		MOS 4Q13	
17-Jul-13		ALB 2Q13	
18-Jul-13	Akzo Nobel 2Q13	CE, CYT, PPG, SHW - 2Q13	
19-Jul-13	Yara 2Q13		
23-Jul-13	Croda IMS	APD - 3Q13, DD - 2Q13	
24-Jul-13	Syngenta 2Q13	PX 2Q13	
25-Jul-13	BASF, Givaudan, Lonza 2Q13	DOW, POT - 2Q13	Shin-Etsu Q1FY13
26-Jul-13		LYB 2Q13	
29-Jul-13		EMN 2Q13	JSR Q1FY13
30-Jul-13	Clariant, Air Liquide, Linde, Umicore, Wacker - 2Q13	ECL 2Q13	
31-Jul-13	Solvay 2Q13		
August			
01-Aug-13	Arkema, Evonik 2Q13		Mitsui Chemicals, Mitsubishi Chemicals Q1FY13
02-Aug-13			Asahi Kasei Q1FY13
05-Aug-13		DOW NDR	Sumitomo Chemical Q1FY13
06-Aug-13	DSM, Lanxess 2Q13	DOW NDR	
07-Aug-13	Symrise 2Q13		
08-Aug-13		AGU 2Q13	
09-Aug-13	Novozymes 1H13		
12-Aug-13		August WASDE and Citi's Farm to Fork call	
13-Aug-13	K+S 2Q13		

Source: Company reports and Citi Research

Global view – Mild Restocking but Demand Still Lacks Visibility

Crude oil stabilization encouraged downstream buyers to restock. Coupled with supply disruption in the US (fire at Williams Geismar cracker), EU (planned/unplanned outages) and Asia (Middle East feedstock constraint), major petrochemical prices edged up. Chemical margins have also improved slightly as raw material costs stayed flat, enabling crackers to operate at higher rates. However excluding restocking activities, demand was still weak and buyers remained in 'wait-and-see' mode. New supply in Asia and cracker restarts will cap margin upside and we expect slow recovery into 2H13. Macro environment remains harsh given ongoing drag in Europe and slowing growth in emerging economies. In particular, Citi's China economists downgraded China's growth forecasts in 2013 and 2014 on the back of tighter credit condition and lackluster manufacturing activities. The pace of demand/price recovery could be slow in 2H13, leading to our series of estimates downgrade in US, Europe and Korea in June.

Share price performance

- Chemical shares were up in Japan last month. Our coverage in Japan was up 11.5%. Tosoh was the top performer (+24%) and Showa Denko was the laggard and was unchanged.
- Our US coverage was down 3%. Mosaic was the laggard (-11%) and Cytec was the leader (+4%).
- Chemical share prices in Europe were down 4%. Lanxess was the laggard (-23%) and Givaudan was the leader (+5%).
- In Asia ex-Japan our coverage was also down 3%. Sinofert was the laggard (-24%) and PTT Global Chemical was the leader (+3%).

Product Price Highlights

- **Crude oil prices rise** — After a relatively stable May, crude oil prices have risen in June. Prices are up 3% MoM, but are still down YTD (-5%). Naptha prices have also crept higher around the world in June, likely influenced by some restocking.
- **US natural gas prices fall further** — US natural gas prices have fallen a further 8% following their sharp drop last month. Gas has improved its advantage as a feedstock versus oil this month, favoring the US producers.
- **Ethylene prices mostly up this month** — Ethylene prices in Europe and Asia stabilized in May on the back of restocking activity and since then prices have remained unchanged in Europe, but are up 1% in the US and 3% in Asia.
- **Propylene recovering in US and Asia, flat in Europe** — Propylene prices have fallen in recent months, but indications now point to recovery. Prices seem to have stabilized in Europe, where they are flat MoM, but they have risen 3% in both Asia and the US.
- **PVC prices mixed** — PVC prices are mixed this month. Europe and Asia have seen rising prices, by 6% and 2% respectively, but prices have dropped slightly in the US (-1%).
- **TiO2 prices stable, but demand weak in Asia** — The titanium dioxide market in Europe and the US has remained stable in June, with prices unchanged versus last month. However, prices have dropped further (-1%) in Asia, where lack of demand from the paint and coatings industry is weighing on the price.

What does it mean for key companies?

Asia/Japan

- **LG Chem:** Solid strategy with differentiated product mix for chemicals and expansion into Kazakhstan to secure cheap feedstock. Captive customer base and cost savings. Solid I&E margin backed by 3D FPR, polarizer and new business (e.g. ITO film).
- **PTT Global Chemical:** Benefits from low gas feedstock cost compared to naphtha crackers. Beneficiary of tight PX supply, but PX will likely enter downturn in 2014. Asset injection of PTT phenol and expect divestment of HMC Polymers and PTT Asahi into PTTGC.
- **Lotte Chem:** Leveraged to gradual margin recovery. Better product mix (MEG) and volume growth (first full-year contribution from cracker expansion) in 2013. Weak associate income from KP (PTA oversupply). Valuation capped by near term BD weakness and slower demand pickup in China.
- **PETRONAS Chemicals:** Limited EPS growth in 2013-14E given its lower leverage to ethylene upcycle. Low gas feedstock player leveraged to rising oil prices. Methane gas supply concern is eased as utilization improved in recent quarters.
- **Formosa Plastics:** Strong US gas-based operations (beneficiary of shale gas). 2013E EPS recovery lagging behind peers on weaker product mix (AN, AE).
- **Nan Ya Plastics:** Strongest earning recovery among Formosa sisters in 2013. Indirect DRAM recovery play. Beneficiary of our positive MEG outlook. Electronics (CCL, PCB) margin under pressure.
- **Formosa Chemical & Fibers:** Strong earning recovery. Near-term aromatics strength likely to support earnings, but we expect PX cycle to enter to cyclical downturn in 2014-15. Difficult ABS, phenol and PTA outlook.
- **OUCC:** Leveraged to tighter MEG supply into 2013 with healthy dividend yield. Partly offset by persistent loss for PTA.
- **Siam Cement:** Margin remains under huge pressure due to limited exposure to BD. Associate income hurt by weak PTA-PX; however long term exposure to ethylene upcycle.
- **Indorama Ventures:** High gearing post OWI acquisition could delay expansions. Exposure to PTA negative, but partly offset by recent acquisition of MEG asset in the US
- **Asahi Kasei:** Acrylonitrile margin declined. The company is expected to cut production to support price. Styrene monomer margin, however, is better than expected and underpin the earnings. Other divisions including home and pharmaceutical are firm.
- **Mitsubishi Chemical Holdings:** PTA spread stays at low level but it is gradually bottoming out as a result of production cut by Chinese producers. MMA, on the other hand, weakened unexpectedly due to stagnant demand.
- **Mitsui Chemicals:** Phenol and its derivative remain sluggish. TDI price is softening again. Though PP compound and elastomer are firm for auto parts, earnings are still tough.

- **Sumitomo Chemical:** Polyolefin margin in Asia have been moderately recovering. Singaporean subsidiary benefits. IT Chemical is strongly growing particularly in touch sensor panel for Samsung. Agrochemicals are firm.
- **Tosoh:** MDI margins are stable due to production cut by major suppliers. VCM price in Asia is a little improving. The company benefit somewhat from weak coal price for cogeneration.
- **Shin-Etsu Chemical:** US PVC is still quite strong. Earnings of Shintech in June quarter should be even better than that of March quarter. Although silicone in commodity grade is affected by overcapacity in China but specialty grade see recovery in demand.

Europe

Key products like TiO₂, acrylic acid and caustic soda are roughly flat this month

Acrylic acid profitability down YoY in 2Q13

Butadiene and SBR price collapsed on the back of weak demand and ample supply

Caustic soda down, PVC margins lower due to weaker demand pick up in June; soda ash prices edging up in the US

- **Akzo Nobel:** As we noted last month, conditions look better in 2Q13 than 1Q13 noting the pronounced seasonality which drives a stronger sequential performance. Titanium dioxide, acrylic acid, and caustic soda prices are roughly flat this month. While European demand is still weak at least cost pressures and their selling prices seem to be moving in helpful directions.
- **Arkema:** Acrylic prices are flat sequentially and 2Q13 margins in EU are down slightly YoY. Volumes should be better QoQ but seasonality looks somewhat subdued due to cold and wet weather at the start of 2Q13.
- **BASF:** MDI/TDI prices are slightly down this month mainly on the back of falling polyol prices. Polyamide is up in EU. Cracker cash costs are up MoM in EU due to rising naphtha prices. Ethylene margins are expected to be down as ethylene prices do not reflect the increase in input costs. With raw material costs up and downstream prices mainly flat to down the weakening trends seen during the quarter continued towards the end of it. So all in all margins somewhat weaker in 2Q13 noting that 2Q13 should however benefit from seasonally stronger demand.
- **Lanxess:** SBR prices are down 5% in EU, 14% in the US, and 25% in Asia. This comes on the back of ongoing weak demand and ample Butadiene supply. Butadiene prices collapsed in July: -20% MoM in EU, -11% in the US. This could potentially trigger an inventory write down for Lanxess. Customers continue to hold back orders in anticipation of further BD price drops. In Asia, BD prices are about to fall below \$1000/t with buyers pushing prices down to \$800-850/t. This provides further downside risk for EU and US prices. We expect a tough 2H13 for Lanxess.
- **Solvay:** Caustic soda prices are down 5% in EU with most of the market looking fairly balanced. PVC margins have started to trend lower again as June demand was below market expectations following a solid May. Soda ash margins started to improve somewhat given better seasonal demand. In the US producers started to increase prices by c. \$30/t which seems to have been successful. Nylon 6,6 should have been seasonally better but still down YoY.

US

- **LyondellBasell:** LYB should benefit from robust US ethylene margins in 2Q, with fairly steady profitability in Europe thanks to lower naphtha costs. Overall we like LYB's strong FCF profile, which is driven by high US ethylene margins and the company's focus on quick-payback, high-return brownfield projects. This cash generation should bridge the gap between now and the demand recovery, in our view, with share buybacks the likely focus. LYB also has an under-levered balance sheet that offers future optionality. For more detail please see: [Ringing the Global Register](#).

- **Dow Chemical:** 2013 is a critical year for Dow to deliver, after disappointing in 2012. There are plenty of value-creation opportunities, including: 1) Harnessing the US shale supremacy; 2) Balance sheet strengthening through lower interest and preferred payments, augmented by ~\$1.5B of pretax divestiture proceeds, a reduction in capex and the \$2.2B Kuwait legal settlement; 3) Cost cutting aimed at underperforming specialty businesses.
- **Axiall:** Near-term we expect AXLL to be impacted by the slow start to the US construction season (cool, wet weather), partially offset by the impact of PVC price increases. PVC producers have announced another 2c price increase for July implementation, and several producers have also announced an increase for August (2-3c/lb). Longer-term drivers remain in place: a recovering US housing market that is supporting PVC demand and cost-advantaged US natural gas that has kept US chlor-alkali producers at the low end of the global cost curve.
- **DuPont:** DD negatively preannounced 2Q13 results and reduced 1H13 operating EPS guidance to down ~10% Y/Y (vs. prior guidance of down 7-9%). The primary factor was cool, wet weather in North America and Europe, which impacted the company's Agriculture and Nutrition & Health businesses. In Ag, some acres switched from corn to soy, which is less profitable, due to the cool, wet spring in the US. The company also lowered FY13 guidance to the low end of its prior range (\$3.85/share).
- **Celanese:** We see limited catalysts until later this year when management expects to complete its ethanol MOU with Pertamina. Although these greenfield ethanol projects are exciting, the impact will not come into play until 2017 or later. We estimate a new ~1mmt greenfield ethanol plant could add ~\$0.50-\$1.00 to EPS in the future. Further, acetyls earnings remain in a trough as average acetic acid operating rates in China remain subdued near 50%.
- **Huntsman:** We expect a more gradual ramp-up in Pigments (TiO₂) segment earnings in 2H13 as volumes recover followed by pricing in 2014; pricing is necessary to reach management's normalized segment EBITDA run rate of \$200mm. A stock catalyst could include the sales of the Pigments business with proceeds prioritized for deleveraging. Moreover, the shale supremacy in the US and low-cost butane has been a boon to HUN's MTBE business.
- **Eastman:** EMN remains one of the few companies that have successfully transformed their portfolios, in our view. Focus now turns to realizing synergies following the acquisition of Solutia and deleveraging. Management is looking into starting its last shuttered cracker at Longview, TX and possible strategic options that could include its two smaller crackers with similar capacities. We expect sequential headwinds in 2Q from the decline in the propylene-to-propane spread and Asia plasticizer competition.
- **PPG, SHW, VAL:** Paint producers continue to benefit from the ongoing US housing recovery and the raw material environment (propylene, TiO₂) remains supportive of margin expansion. However, we have become incrementally more cautious on the group given a cool, wet spring in the US (which could delay some sales to 3Q13) and sluggish emerging market growth and recently downgraded VAL to Neutral from Buy. We prefer exposure to the industry through buy-rated PPG which will start to benefit from its recent Akzo Nobel US paint stores transaction over the coming years.

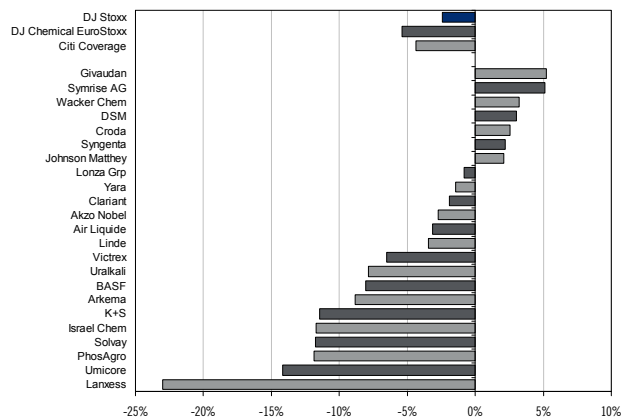
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Share Price Performance

Share Price Performance

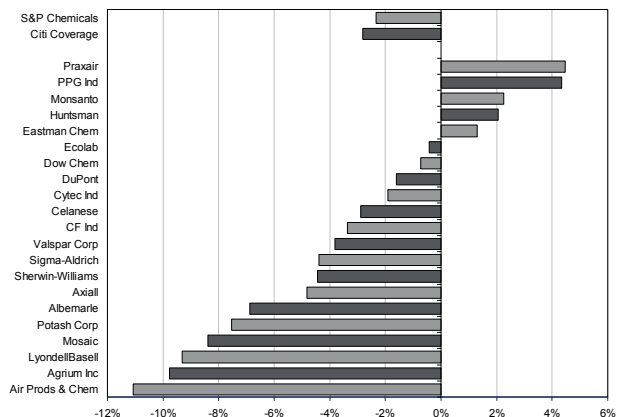
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Figure 2. European Chemicals 30 day share price performance



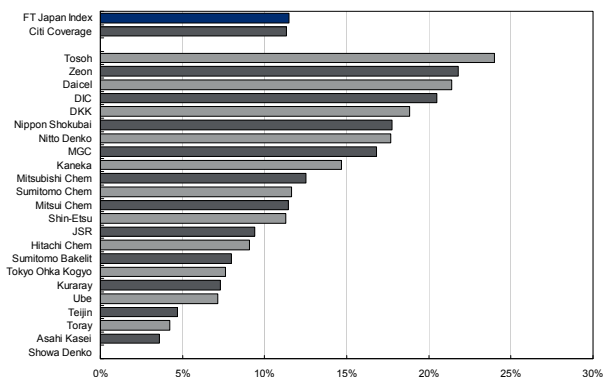
Source: dataCentral, Citi Research

Figure 3. US Chemicals 30 day share price performance



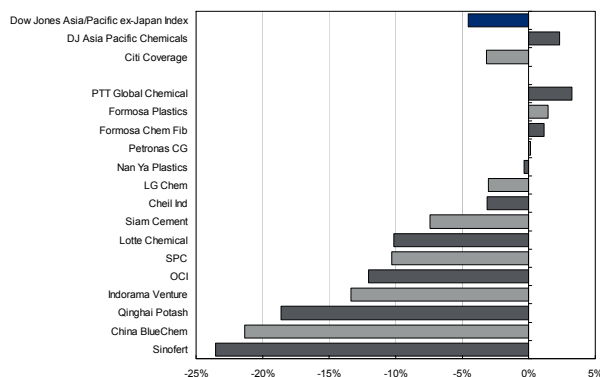
Source: dataCentral, Citi Research

Figure 4. Japanese Chemicals 30 day share price performance



Source: dataCentral, Citi Research

Figure 5. Asian Chemicals 30 day share price performance



Source: dataCentral, Citi Research

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Prices and Margins

Product Exposure

Figure 6. Building Blocks and Company Exposure

	Asia		USA		Europe	
Building Blocks	Producer	Consumer	Producer	Consumer	Producer	Consumer
Ethylene	FPCC, LG Chem, YNCC, Honam, SCC, PTCH, Mitsubishi Chem, Mitsui Chem	FPC, NYP, Hanwha, Shin-Etsu, Tosoh	Dow Chemical, Eastman		BASF	Clariant
Propylene	FPCC, LG Chem, YNCC, Honam, SCC, Mitsubishi Chem, Mitsui Chem	FPC, FCFC, NYP	Dow Chemical	Cytec, Dow Chemical	BASF	Arkema, Bayer
Benzene	FPCC, LG Chem, YNCC, Honam	TSRC, Kumho Petrochem		Huntsman		BASF, Lanxess
Butadiene	FPCC,				BASF	Lanxess
PX	FCFC, PTTAR, GS Caltex, S-Oil, SK, JX	FENC, IVL, Yizheng				

Source: Citi Research, Company Reports

Note: see the price and margin analysis at P. 17-27

Figure 7. Downstream Products and Company Exposure

	Asia		USA		Europe	
Downstream Products	Producer	Consumer	Producer	Consumer	Producer	Consumer
Polyethylene	Honam, FPC, LG, Hanwha, SCC, PTCH, Mitsubishi Chemical, Mitsui Chemicals, Sumitomo Chemical		Dow Chemical			
Polypropylene	Honam, LG, FPC, FCFC, SCC, Mitsubishi Chemical, Mitsui Chemicals, Sumitomo Chemical		Dow Chemical			
PVC	FPC, LG Chem, Hanwha, Shin-Etsu, Tosoh				Arkema, Solvay	
Styrenics	LG Chem, FCFC, Cheil, Taiwan SM, Asahi Kasei				BASF	
MDI/TDI/Polyols	Mitsui Chemicals, Tosoh, Sumitomo Chemical		Dow Chemical, Huntsman		BASF, Bayer	
PET	IVL, FENC, Yizheng		Eastman			
PTA	FCFC, FENC, Mitsubishi Chemical, Mitsui Chemicals	NYP, Yizheng, IVL, Toray				
Polycarbonate	FCFC, LG-Dow, Honam, Cheil, Teijin, Mitsubishi Chemical				Bayer	
Caprolactam/Polyamide	China Petrochemical Development, Ube Industries, Sumitomo Chemical				BASF, DSM, Lanxess	
Caustic Soda	FPC, Hanwha, LG Chem, Tosoh		Dow Chemical, PPG		Akzo Nobel, Arkema, BASF, Bayer, Solvay	
Soda Ash				PPG	Solvay	
Titanium Dioxide	Ishihara Sangyo		DuPont, Huntsman	PPG, Sherwin-Williams, Valspar		AkzoNobel
Acrylic Acid	FPC, LG Chem, Nippon Shokubai		Dow Chemical	PPG, Sherwin-Williams,	Arkema, BASF	AkzoNobel, DSM
Sytrene Butadiene Rubber	Kumho Petrochemical, JSR, Zeon, Asahi Kasei				Lanxess	

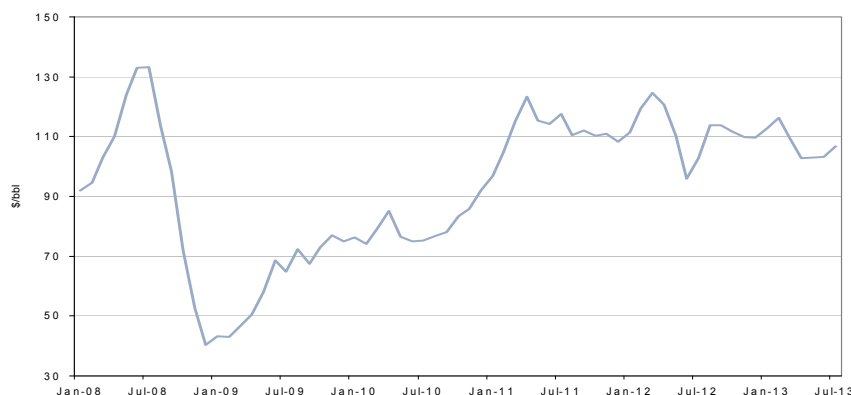
Source: Citi Research, Company Reports

Note: see the price and margin analysis at P. 21-27

Raw Material Price Moves

Oil prices are up 3% this month, but are down 5% YTD.

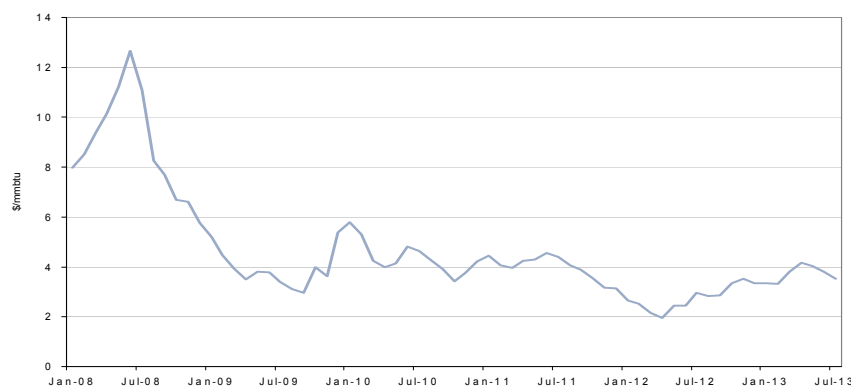
Figure 8. Brent Crude Oil (\$/bbl)



Source: dataCentral, Citi Research

US natural gas prices are down 8% MoM, but up 5% YTD. The competitive advantage of gas has improved versus oil this month.

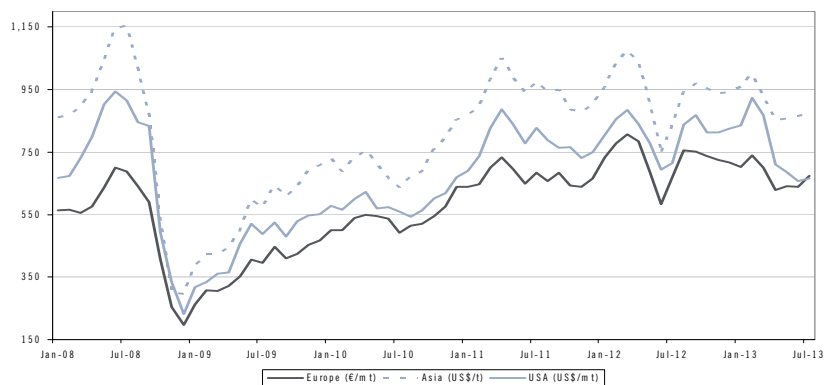
Figure 9. US Natural Gas price (\$/mmbtu)



Source: dataCentral, Citi Research

Naphtha prices are up this month. Prices are up 5.3% in Europe, 1% in Asia and they are up 1.4% in the US.

Figure 10. Global Naphtha prices



Source: CMAI, dataCentral, Citi Research

Building Blocks

Global ethylene prices were mostly up this month. Prices in Europe stayed flat, but prices were up in Asia (3%) and the US (1%). The average spot price decreased by one quarter of a cent while the weighted average cash cost declined 1.6 cents per pound from May, but the market has picked up recently following price strengthening post the Williams outage in the US.

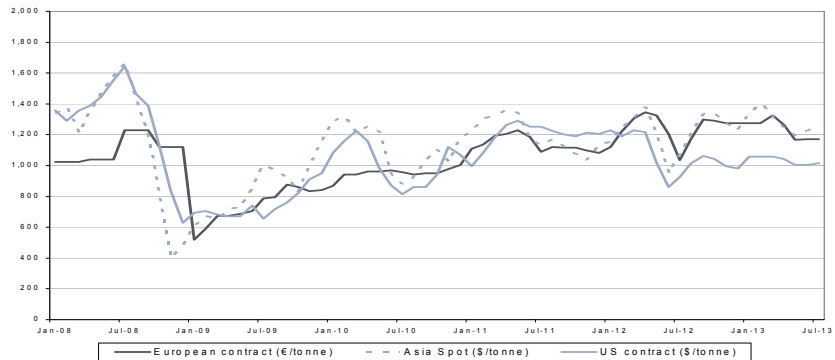
Ethylene margins remain mixed. US and European margins are expected to be down 5%, but Asia is expected to be up 11%.

The World Ethylene Cash Cost Comparison graph compares cash costs for each region of the world for May 2013 and June 2013. Cash costs decreased in the U.S. while rising slightly in most other regions shown from May to June.

Naphtha cash costs increased \$45 per ton in Southeast Asia and \$16 per ton in Northeast Asia. Both remained the highest ethylene costs in the world. Integrated naphtha cash costs in the U.S. fell \$47 per ton while in West Europe naphtha cash costs were \$11 per ton higher.

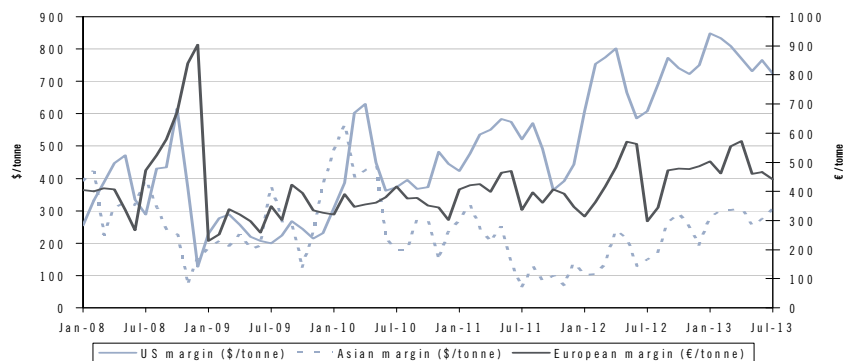
U.S. ethane cracking costs fell \$32 per ton to \$238 per ton, continuing to be among the lowest costs in the world. The spread between U.S. ethane cash costs and Asian naphtha cash costs widened in June to over \$800 per metric ton..

Figure 11. Global Ethylene prices



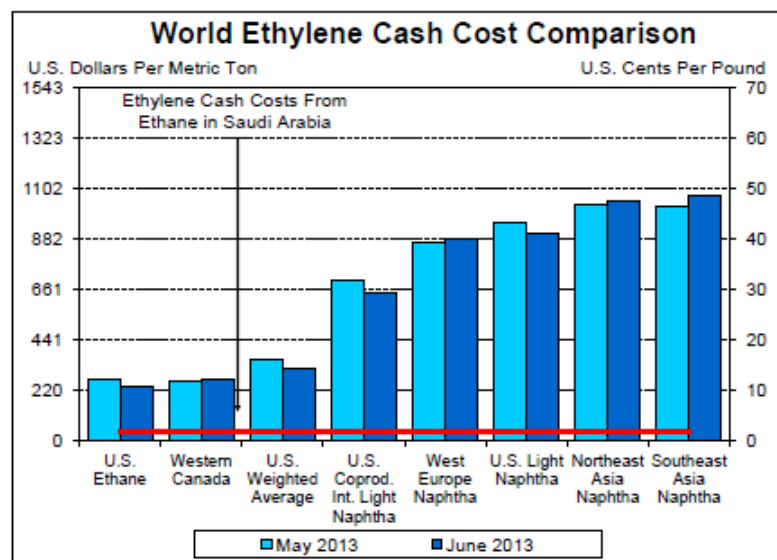
Source: CMAI, dataCentral, Citi Research

Figure 12. Global Ethylene Margins



Source: dataCentral, Citi Research

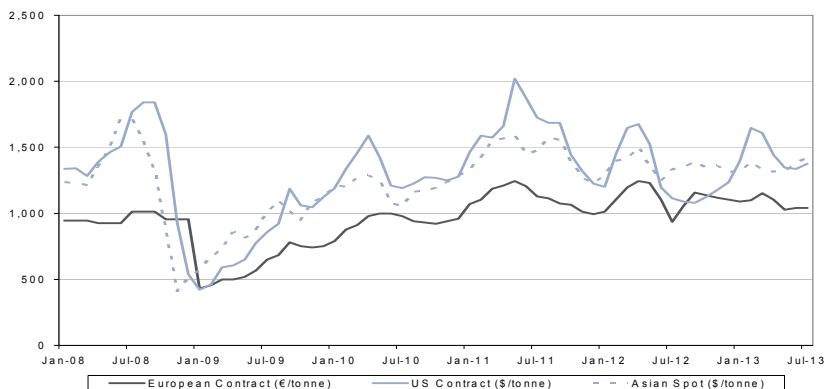
Figure 13. Global cracker cash cost curve



Source: CMAI / IHS Chemical

Global propylene prices are mostly up this month. European prices are flat, despite naphtha prices rising in Europe and raising expectations for ethylene and propylene prices in July. US and Asia prices are both up 3% versus last month.

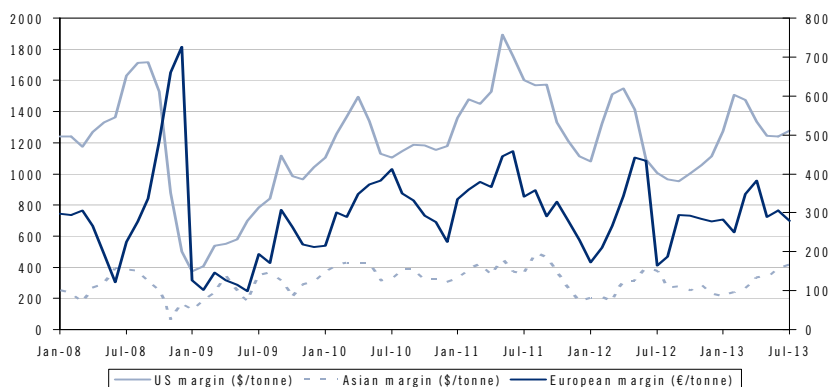
Figure 14. Global Propylene prices



Source: CMAI, dataCentral, Citi Research

Propylene margins are mixed, on the other hand. They are up in the US and Asia by 3% and 8% respectively, but are down 9% in Europe owing to higher naphtha costs.

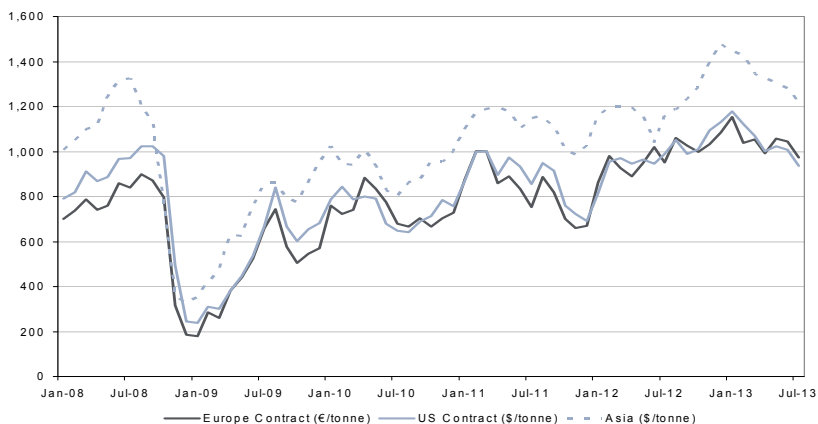
Figure 15. Global Propylene margins



Source: CMAI, dataCentral and Citi Research estimates

Benzene prices are down around the world. Prices are down 6.7% in Europe, 7.3% in the US and 4.5% in Asia. Demand in July continues to be weak owing to high benzene inventory.

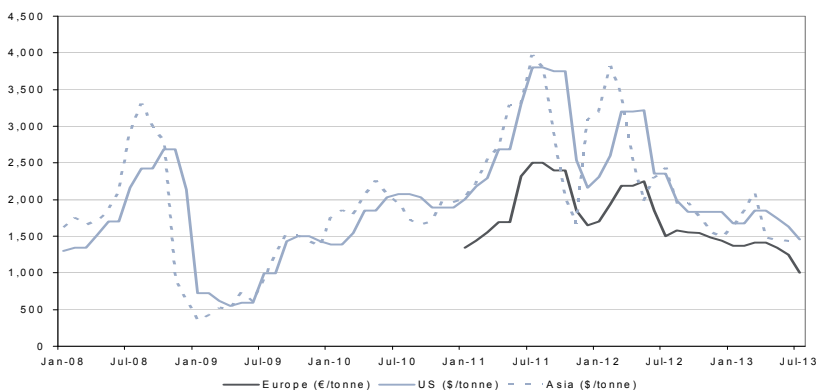
Figure 16. Global Benzene prices (\$/tonne)



Source: CMAI, dataCentral, Citi Research

Butadiene prices are down sharply in Europe (-20%) and the US (-11%) this month, reflecting additional supply and weaker demand. They were flat in the Asia, however.

Figure 17. Global Butadiene prices (\$/tonne)



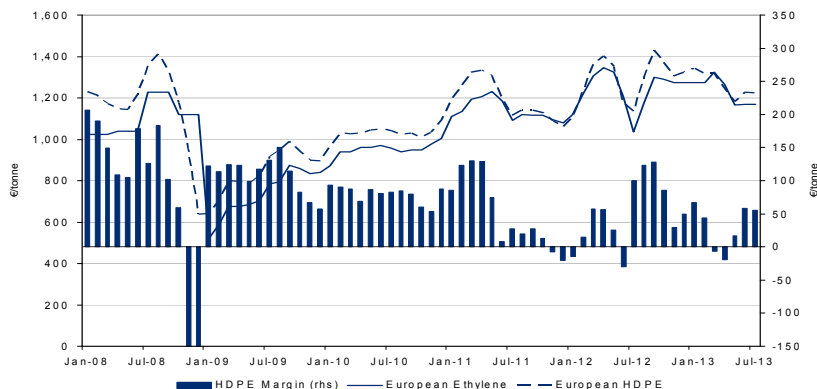
Source: ICIS, dataCentral, Citi Research

Downstream Products

Polyethylene

European Polyethylene margins are expected to be down 6%. Prices are down only slightly (-0.3%), while costs remain flat

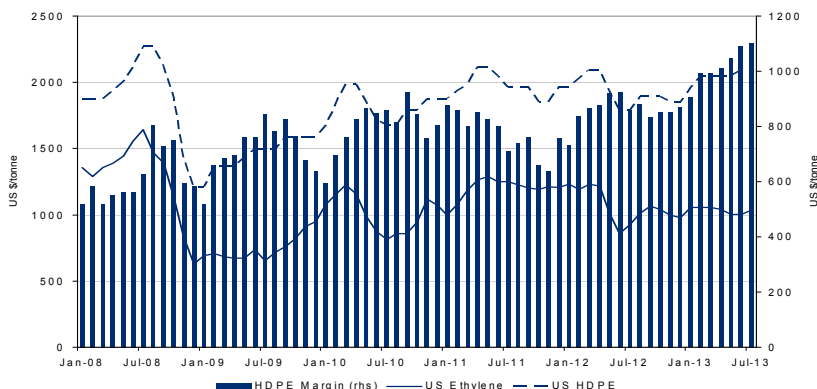
Figure 18. European Polyethylene margins (€/tonne)



Source: dataCentral and Citi Research estimates

US Polyethylene margins are expected to rise slightly (+1%), despite Ethylene costs (+3%) rising more than prices (+2%). Supply is still tight, however, largely because of two unplanned outages, forcing the two major producers in question to continue to act under force majeure conditions.

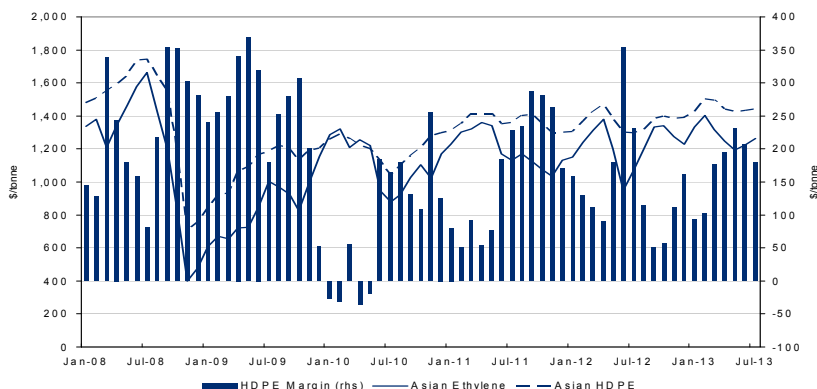
Figure 19. US Polyethylene margins (US \$/tonne)



Source: dataCentral and Citi Research estimates

Asian Polyethylene margins are expected to be down sharply, as Ethylene costs are up (3%) while prices are up only slightly (1%). Market sentiment turned bearish at the end of June on the back of the start up of a new PE plant and concerns about the monetary policies of China's central bank.

Figure 20. Asian Polyethylene margins (\$/tonne)

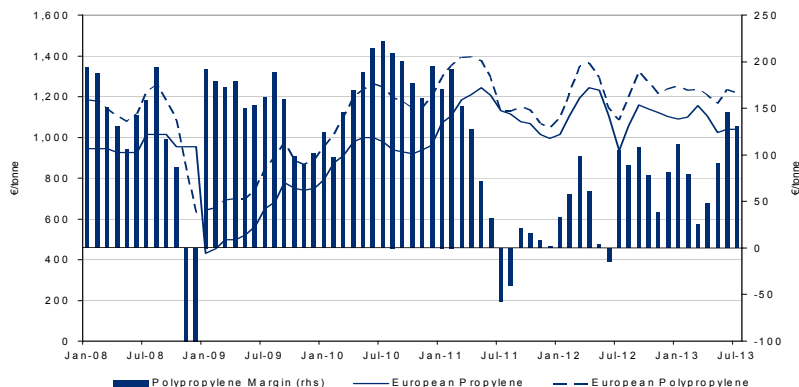


Source: dataCentral and Citi Research estimates

Polypropylene

European PP margins are expected to be down sharply, as propylene costs remain flat while prices are down 1%. European polypropylene demand is forecast to decline slightly this quarter.

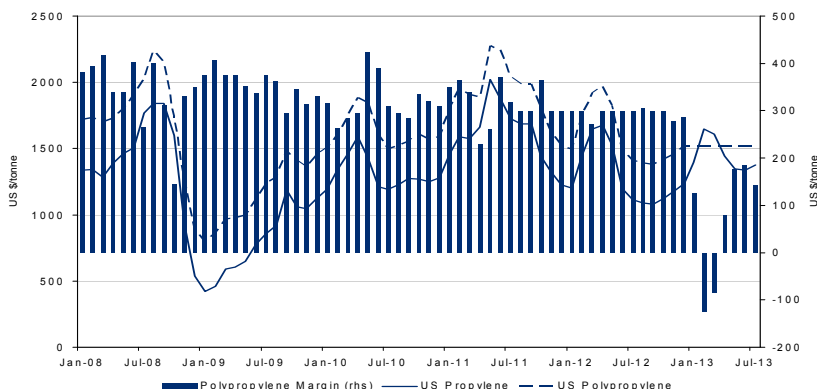
Figure 21. European Polypropylene margin (€/tonne)



Source: dataCentral and Citi Research

US PP margins are also expected to be down sharply (-20%) This is due to Propylene costs rising (3%), while PP prices are unchanged. June was a difficult month for PP producers with several force majeure events and various scheduled and unscheduled plant outages. The market was basically sold out and spot sales were extremely limited.

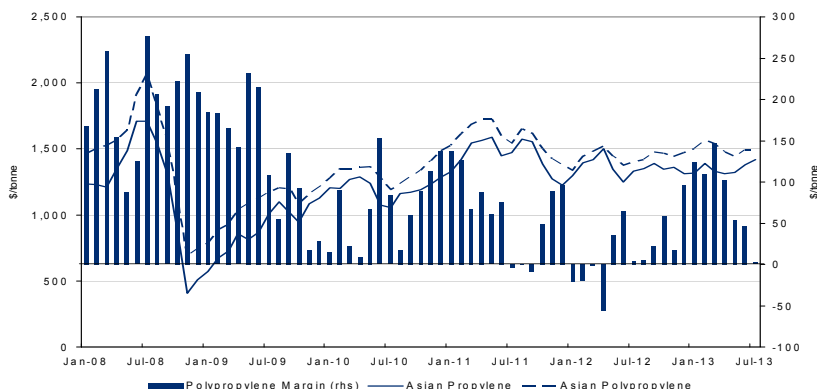
Figure 22. US Polypropylene margin (\$/tonne)



Source: dataCentral and Citi Research

Asian PP margins are also expected to be down sharply due to rising propylene costs (3%) versus unchanged polypropylene prices. Market sentiment remains weak, owing to concerns about upcoming supply from new start-ups.

Figure 23. Asian Polypropylene margin



Source: dataCentral and Citi Research

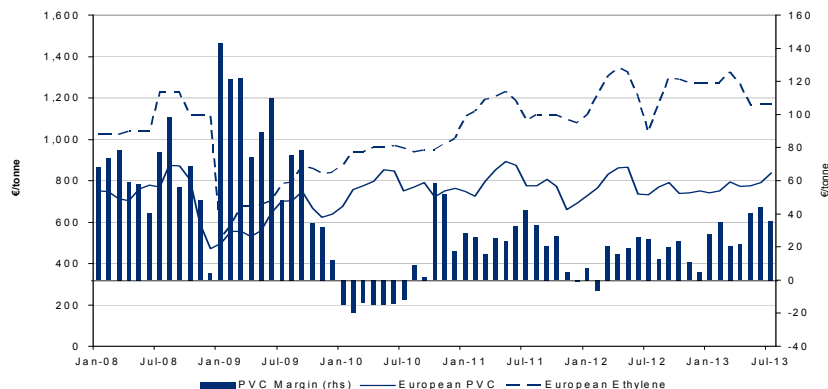
CMAI expects Europe's PVC margins to be down 19%, despite Ethylene costs being unchanged this month and PVC prices being up 6%. Demand was solid in May, resulting in higher operating rates and lower stocks and laying the foundations for June, but offtake in June was not as high due to reduced pre-buying.

CMAI expect US PVC margins to be up 7%, despite PVC being down 1% and Ethylene costs rising 3%. June contract prices were expected to rollover from May. Export prices are firm while domestic demand also seems to be holding up.

CMAI expects Asian PVC margins to fall again this month, albeit less so than in June. PVC prices are up 2% while ethylene costs are up 3%. The upward momentum in prices has boosted optimism that PVC prices are set for further gains in the near term. Regional demand has seen little change over the past few weeks, but some improvement has been seen in China, largely due to temporary supply tightness resulting from transportation holdups rather than a recovery in demand.

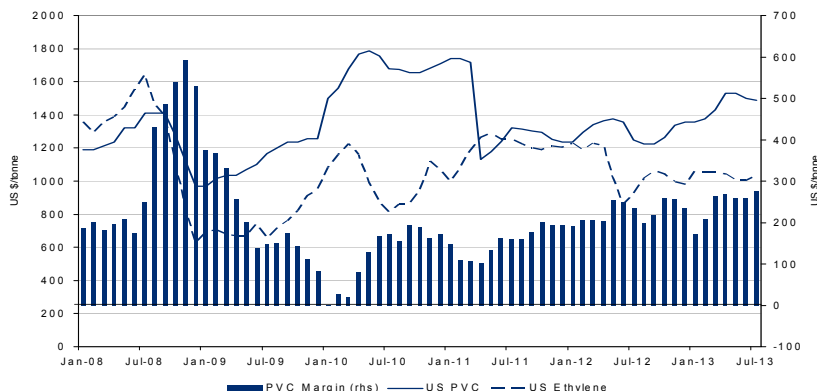
PVC

Figure 24. European PVC margin (€/tonne)



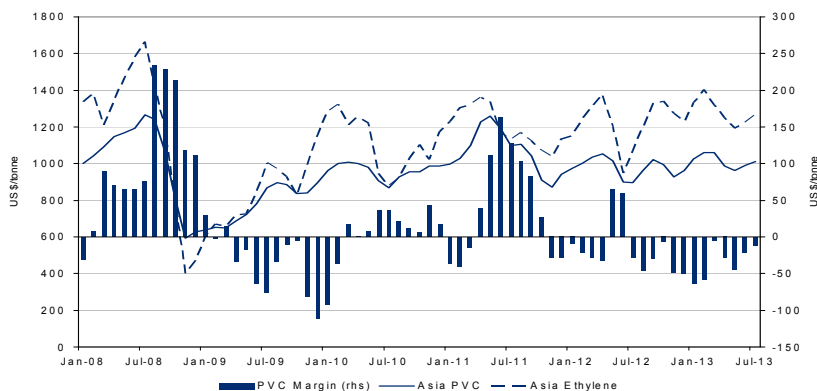
Source: CMAI, dataCentral and Citi Research

Figure 25. US PVC margin (\$/tonne)



Source: CMAI, dataCentral and Citi Research

Figure 26. Asian PVC margin



Source: CMAI, dataCentral and Citi Research

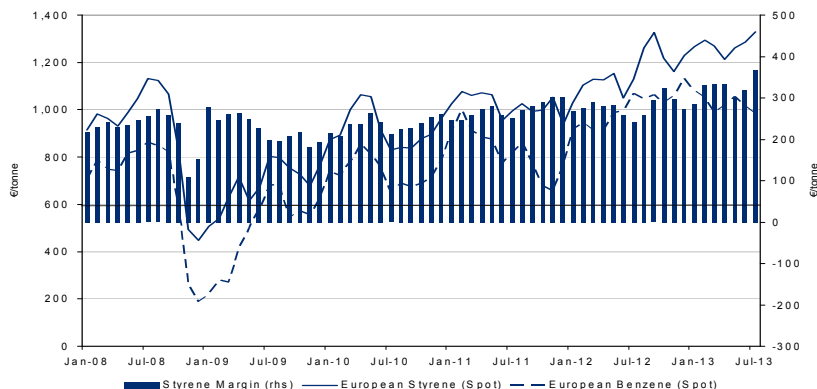
Styrenics

European Styrene margins are expected to be up 15%, as Styrene prices are flat and benzene contract costs are down 7%. The benzene-styrene spread has started July at \$439/t, this is higher than at the end of June, and reflects an uncertain supply picture.

US Styrene margins are expected to be down 3%. This is despite styrene prices being up 1%, while Benzene costs are down 4%. Ethylene costs are up 3%. Supply/demand balance now appears stable, but production has become more constrained in June owing to two plants going offline for unplanned outages.

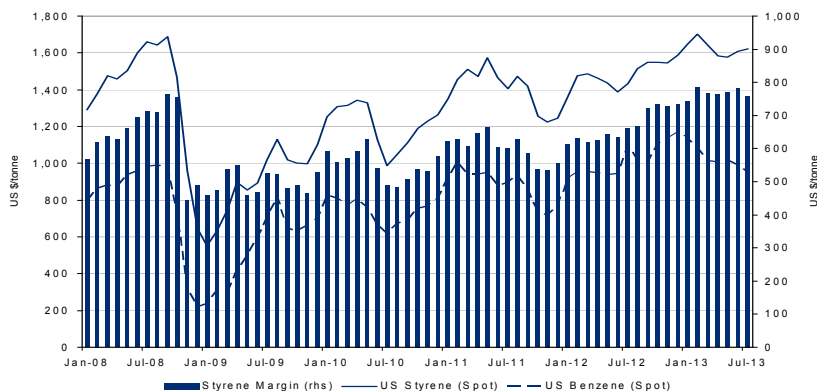
Asian Styrene margins are expected to improve (4%) thanks to Benzene costs falling faster (-5%) and Styrene prices (-1%). Asian styrene prices rose towards the end of June, but then activity fell again. Styrene profitability remains high, however, thanks to lower benzene costs.

Figure 27. European Styrenics margin (€/tonne)



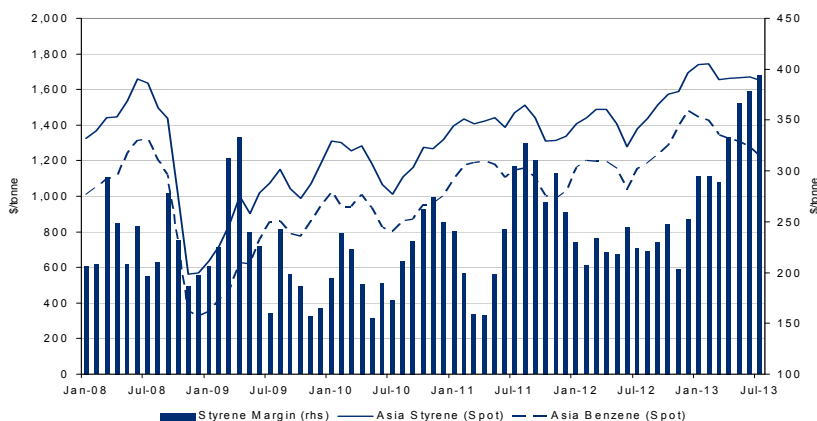
Source: dataCentral and Citi Research

Figure 28. US Styrenics margin (\$/tonne)



Source: dataCentral and Citi Research

Figure 29. Asian Styrenics margin, \$/tonne

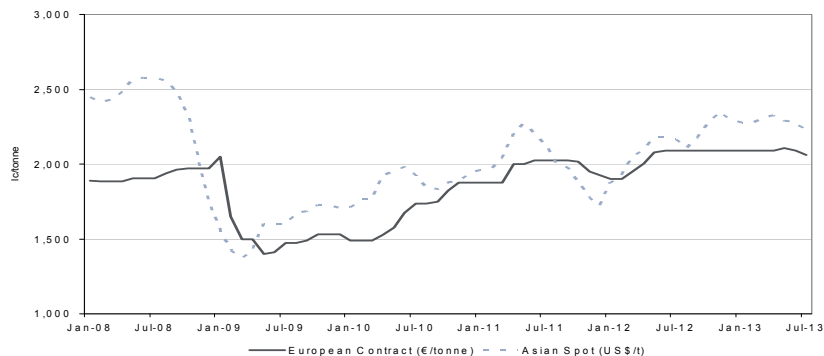


Source: dataCentral and Citi Research

Polyurethanes

MDI prices down. Prices are slightly down in Europe (-1.4%). Crude MDI consumption is slightly improved in the downstream building sector thanks to the end of the extended winter, but ongoing economic constraints still weigh on prices. MDI prices are also down in Asia (-2.2%).

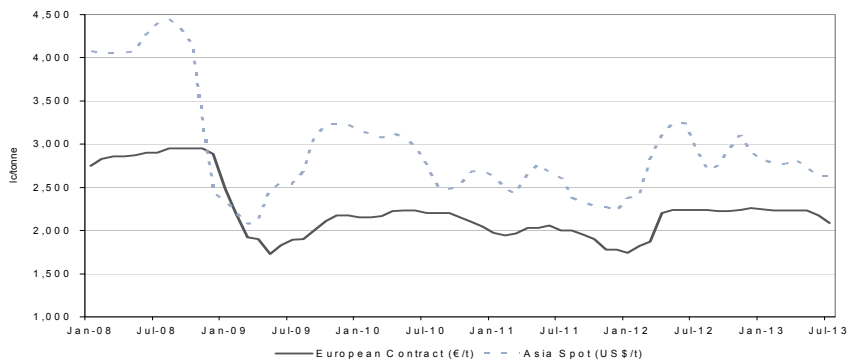
Figure 30. MDI Prices



Source: ICIS, dataCentral and Citi Research

TDI prices are down as well in Europe (-4%), but Asian prices are flat.

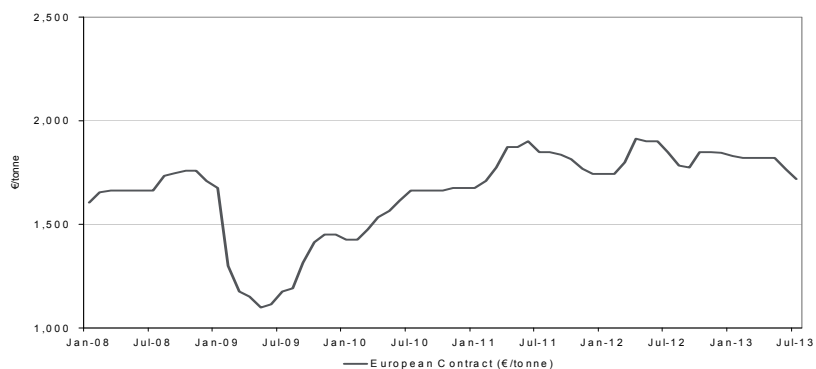
Figure 31. TDI Prices



Source: dataCentral, Citi Research

Polyol prices are down 2.5%. Flexible polyols demand in the downstream bedding and furniture sectors remain subdued for economic reasons.

Figure 32. Polyol Prices (€/tonne)

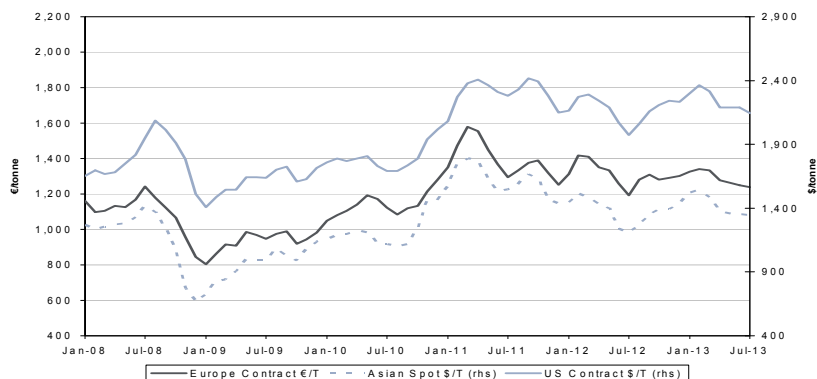


Source: ICIS and Citi Research

PET, Polycarbonates, and the Nylon Chain

PET prices are down 0.9% in Europe as domestic demand in June was on disappointingly low level. Prices are also down 2% in the US and 0.5% Asia.

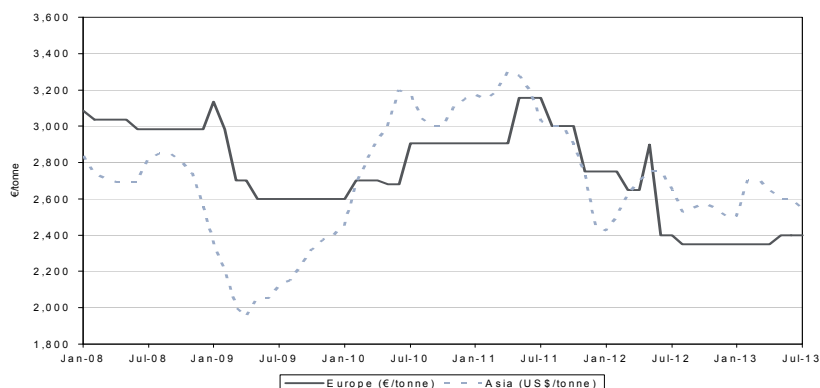
Figure 33. PET Prices: Europe, Asia and US



Source: CMAI, dataCentral and Citi Research

Polycarbonate prices are flat in Europe, but down 2% in Asia. Expectations are for a stable but subdued market.

Figure 34. Global Polycarbonate Prices

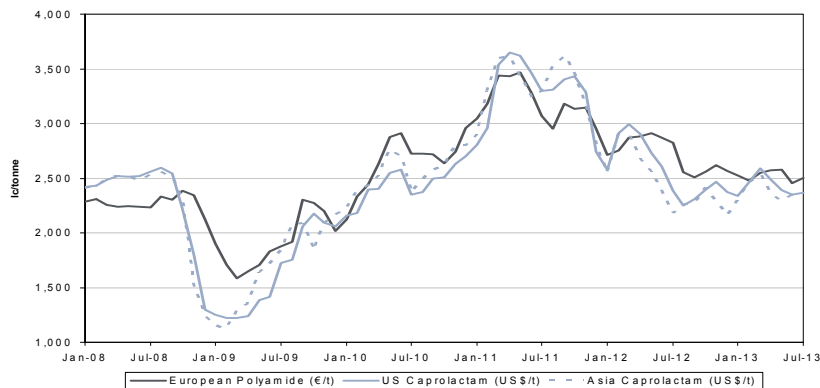


Source: ICIS, dataCentral and Citi Research

European Polyamide prices are up 2%. Overall nylon industrial demand continues to run flat but is expected to ease as we move into a weaker Q3. Formula prices will fall quite sharply in July on the back of lower costs in Q2.

Caprolactam prices are up 1% in the US and they are also up 1% in Asia. The near-term outlook, however, is not positive owing to supply-side issues developing in China and weak export volumes in the US and Europe.

Figure 35. Global Caprolactam and Polyamide Prices

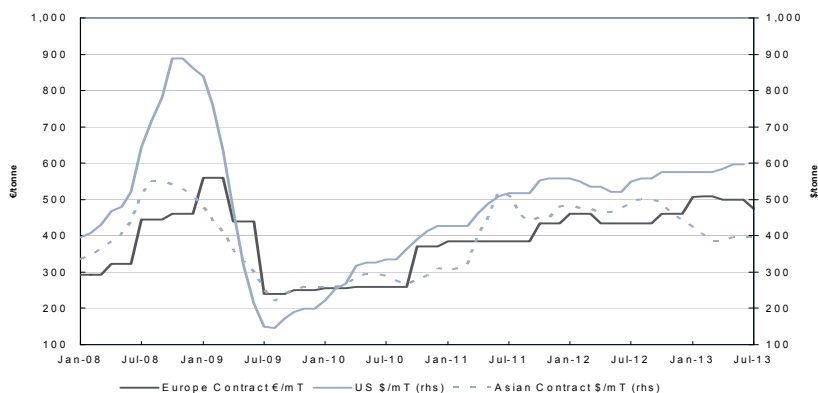


Source: dataCentral and Citi Research

Caustic Soda, Soda Ash, Titanium Dioxide

Caustic Soda prices are mixed. They are down 5% in Europe, but they are flat in Asia. The balance in Northwest Europe remains largely unchanged despite forces majeure in France, Germany and the Czech Republic in recent weeks; other production has picked up and demand remains moderate. Conditions in Southern Europe remain weak amid falling prices.

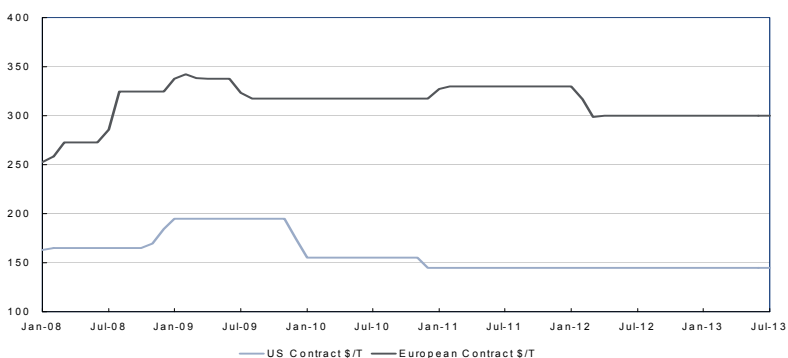
Figure 36. Caustic Soda Prices



Source: CMAI and Citi Research

Soda Ash prices are unchanged in Europe. Prices are also stable in the US.

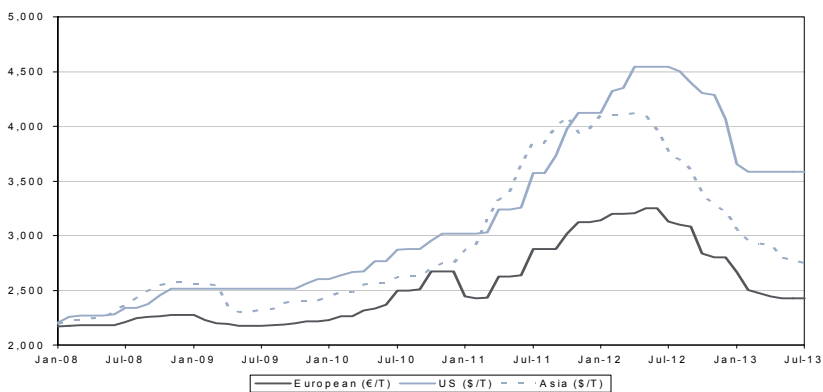
Figure 37. Soda Ash Prices



Source: ICIS, dataCentral and Citi Research

Titanium dioxide prices are unchanged in Europe and in the US, but are down in Asia (-1%). The Asian market is suffering from slow downstream demand from the paints and coatings industry.

Figure 38. Titanium dioxide prices



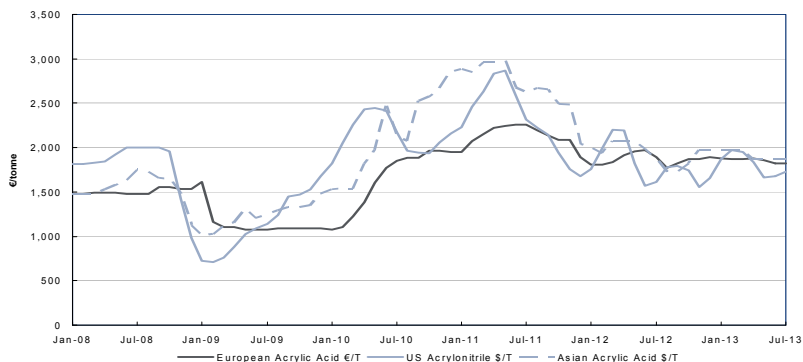
Source: dataCentral and Citi Research

Acrylic Acid and Styrene Butadiene Rubber Prices

Acrylic Acid prices are mostly up this month. They are up very slightly in Europe (0.3%), but flat in Asia.

Acrylonitrile prices are up 3% in the US.

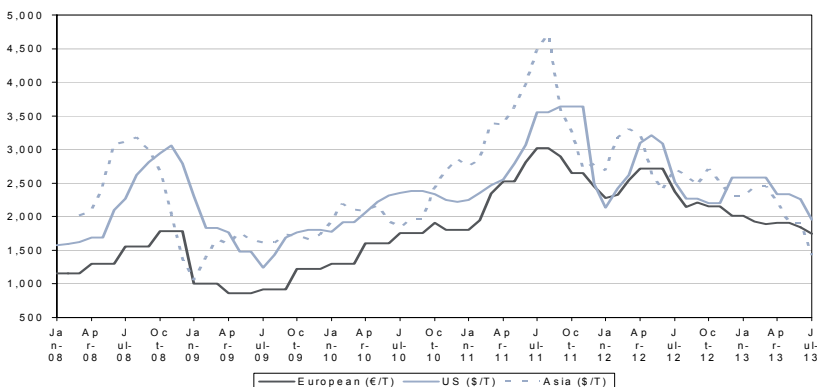
Figure 39. Acrylic Acid and Acrylonitrile Prices



Source: ICIS, CMAI, dataCentral and Citi Research

SBR prices are down around the world, by 5% in Europe, 14% in the US and 25% in Asia. SBR demand in Europe is poor with no improvement expected in the near term, as a result of overcapacity in the downstream automotive and tyre industries and lower input costs as butadiene prices have fallen further.

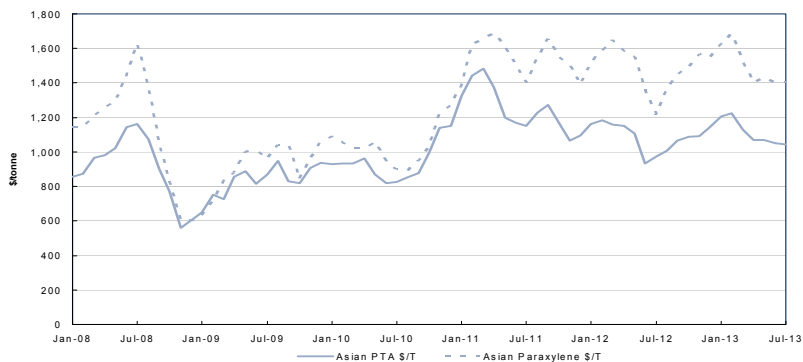
Figure 40. Styrene Butadiene Rubber



Source: ICIS and Citi Research

Paraxylene prices are flat this month as demand failed to pick up through June. PTA prices are slightly down (-0.5%) this month. Demand had picked up in June on the back of good downstream market, but has fallen off somewhat so far this month.

Figure 41. Asian PTA and Paraxylene prices



Source: CMAI, dataCentral and Citi Research

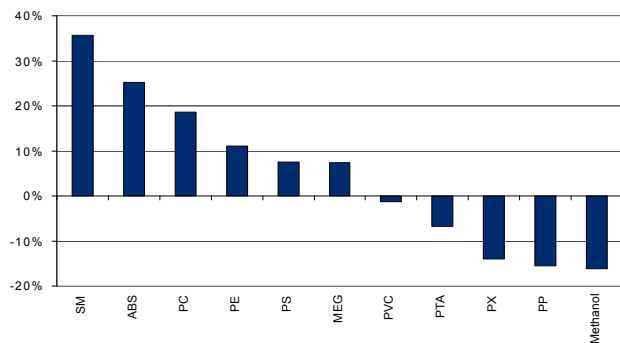
Chinese Import Trends

Chinese Import Trends

China's May Trade: PE/PP Imports Gained Momentum

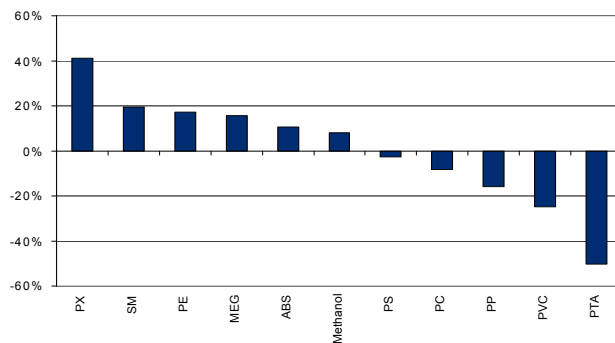
- **Tighter control of recycling materials boosted PE/PP imports** — Despite rising domestic PE output, China's PE/PP imports remained solid (May: +11%/+12% MoM; 5M13: +7%/+3% YoY). This reflects lower imports of recycling materials and pickup in buying interests on stabilizing oil price. The PRC Customs implemented a 'Green Fence' action since Feb to regulate imports of solid waste. 5M13 PE scrap materials imports fell 14% vs. +19% pa over 2010-12, but overall (virgin + scrap) volume was flat. In 2012, imports of virgin and scrap PE were 8.5mt and 3.7mt respectively. 5M13 apparent PE demand growth was 5% (8% excluding the impact of recycling) vs. 4% in 2012 (see figure 1-2). We think the underlying demand for packaging usage was firm. Coupled with limited further market share gains from Middle East supply (peaked at 45-47% in 2012-5M13), PE/PP margins have tracked ahead of our expectations. We expect some pullback in 3Q due to new supply (Exxon: June, Wuhan: July) but current port inventory was low (see figure 7).
- **MEG: Coastal inventory still high** — MEG imports rebounded 7% MoM as Middle East shipment increased after plant restarts. Taiwan export was affected by NYP's #4 shutdown. China's shore tank MEG inventory has retreated slightly in June but still lingers at high level. We believe the destocking for MEG takes a longer time due to weaker polyester production growth (YTD: +6%, 2012: +9%) and retail clothing sales (YTD: +11%, 2012: +18%).
- **Imports rebounded on stabilizing oil price** — Most products saw MoM pickup in May imports except PVC (-2%, weak demand), PX (-14%, maintenance), PTA (-6%, supply glut), phenol (-49%, high base effect). Domestic PVC demand was sluggish (zero growth) but May PVC exports dropped 14% MoM on weaker regional pricing. SM and ABS imports rose 36%/25% MoM but YTD total fell 1%/5% YoY. Auto and electrical appliances output increased 12% and 2% YoY in May.
- **Fertilizers: Ample supply led to price decline** — Urea and phosphate production dropped 6%/7% MoM in May (YTD: +10%/+6%) as producers cut utilization due to softer demand and rising inventory. We expect domestic urea price to remain weak on high port inventory (up to ~2.5-3mt) and plunge in global prices (reduced export opportunity during off-peak season). However, we see limited downside as current price (Rmb1,750/t) is already below costs of anthracite coal-based urea producers (~Rmb1,800-1,850/t). On potash, imports declined 37% MoM to 0.6mt (YTD: +14%) and China may postpone the 2H contract settlement on softer demand.
- **Key stock takeaways** — Stronger PE/PP imports should benefit LG Chem, FPC, Lotte Chem, PTTGC and SCC etc. High MEG inventory may cap near-term margin upside for Lotte Chem and NYP. Weak fertilizer market is negative for China Blue and Sinofert.

Figure 42. China's May Imports – MoM Change (%)



Source: China Customs and Citi Research

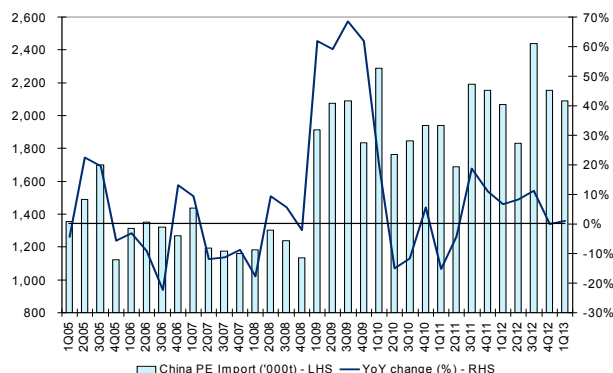
Figure 43. China's May Imports – YoY Change (%)



Source: China Customs and Citi Research

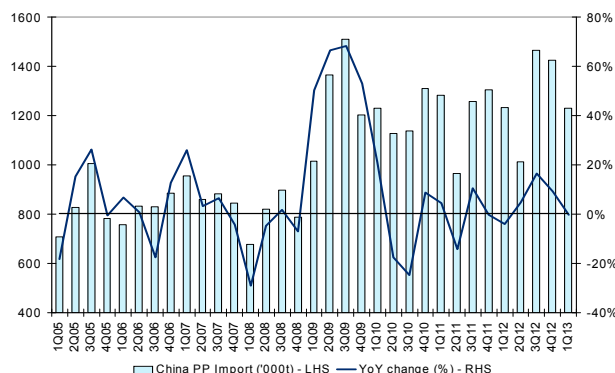
Longer-term Chinese Import/Export Trends

Figure 44. China's PE Import ('000 tonnes) and YoY Change (%)



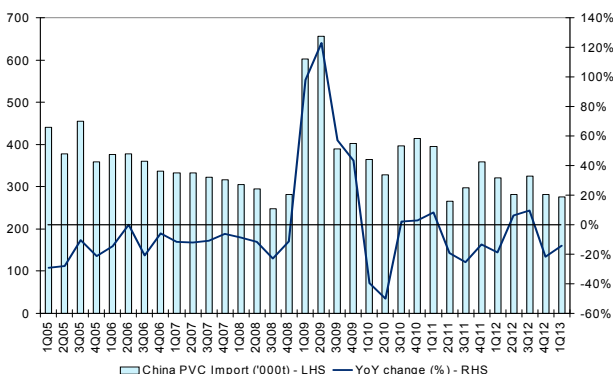
Source: China Customs and Citi Research

Figure 45. China's PP Import ('000 tonnes) and YoY Change (%)



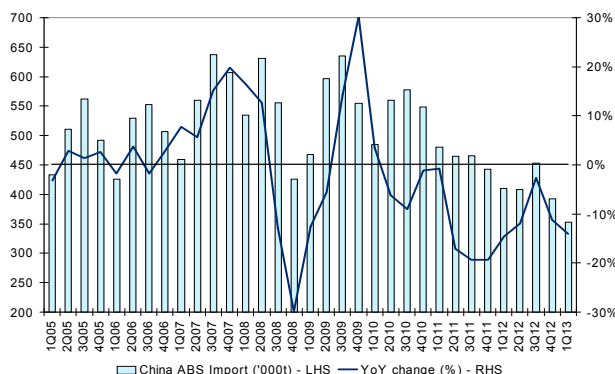
Source: China Customs and Citi Research

Figure 46. China's PVC Import ('000 tonnes) and YoY Change (%)



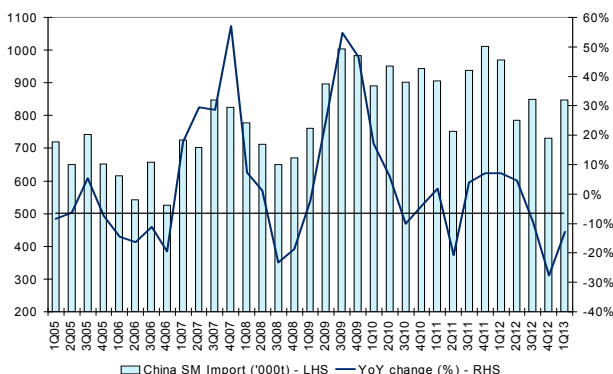
Source: China Customs and Citi Research

Figure 47. China's ABS Import ('000 tonnes) and YoY Change (%)



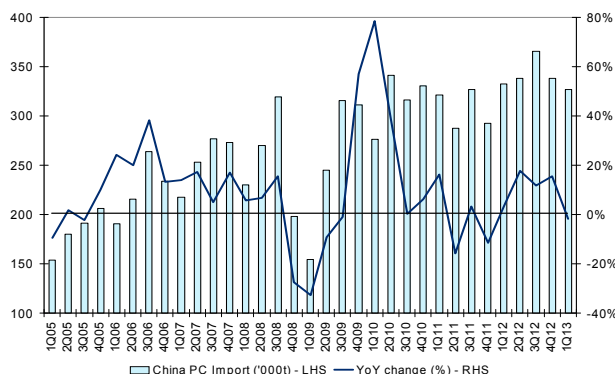
Source: China Customs and Citi Research

Figure 48. China's SM Import ('000 tonnes) and YoY Change (%)



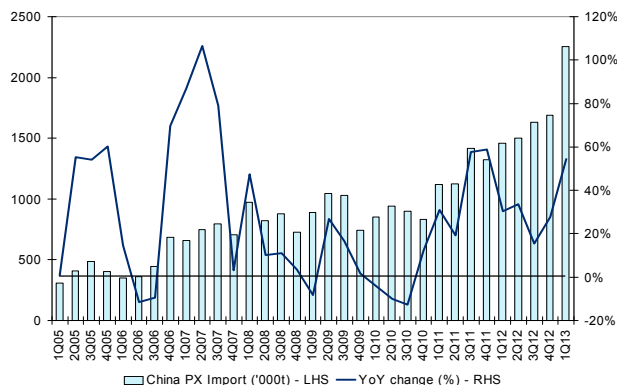
Source: China Customs and Citi Research

Figure 49. China's PC Import ('000 tonnes) and YoY Change (%)



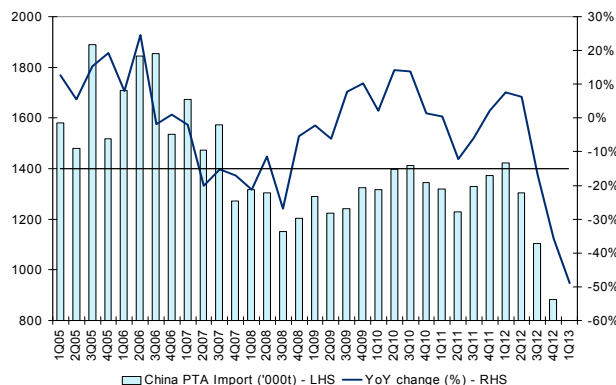
Source: China Customs and Citi Research

Figure 50. China's PX Import ('000 tonnes) and YoY Change (%)



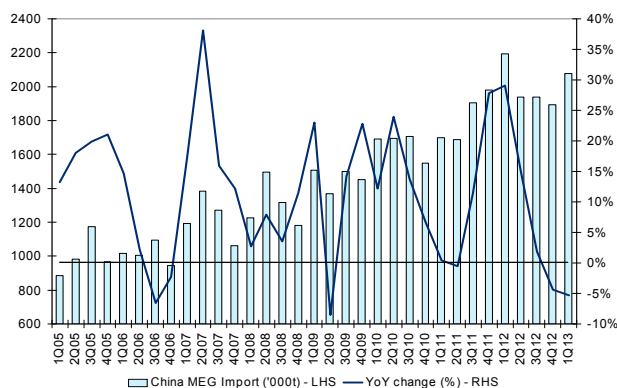
Source: China Customs and Citi Research

Figure 51. China's PTA Import ('000 tonnes) and YoY Change (%)



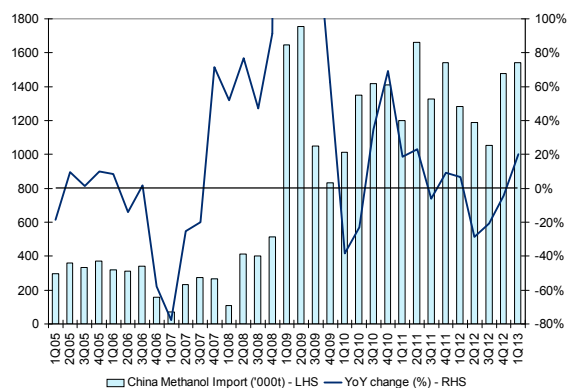
Source: China Customs and Citi Research

Figure 52. China's MEG Import ('000 tonnes) and YoY Change (%)



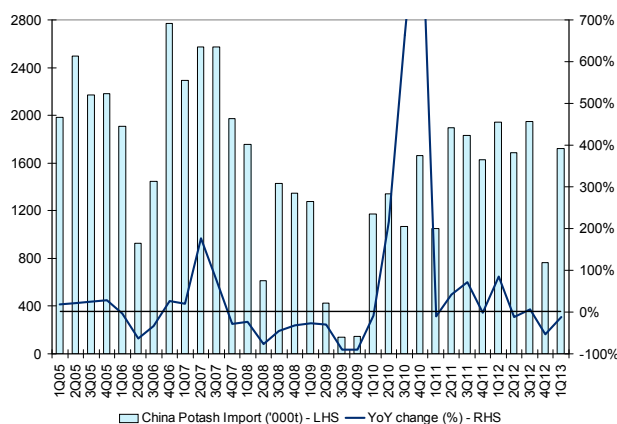
Source: China Customs and Citi Research

Figure 53. China's Methanol Import ('000 tonnes) and YoY Change (%)



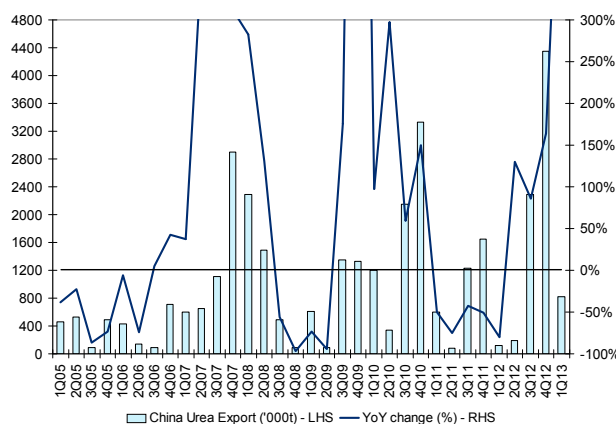
Source: China Customs and Citi Research

Figure 54. China's Potash Import ('000 tonnes) and YoY Change (%)



Source: China Customs and Citi Research

Figure 55. China's Urea Export ('000 tonnes) and YoY Change (%)



Source: China Customs and Citi Research

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Capacity Update

Capacity News in June/July

(Source: ICIS)

- US polymers producer Formosa Plastics has lifted force majeure declarations for both polypropylene (PP) and high molecular weight (HMW) high density polyethylene (HDPE), a company spokesman said on 8th July. The company declared force majeure on HMW HDPE in May, following a flash fire at its Point Comfort complex in Texas on 2 May. The complex has an HDPE capacity of 650,000 tonnes/year, but it was not clear how much of that was dedicated to HMW HDPE production.
- Japan's Mitsubishi Chemical has restarted its 493,000 tonne/year naphtha cracker in Mizushima as scheduled following the completion of a turnaround which began in mid-May, a company official said on 8th July. "We fed in naphtha [to the cracker] this morning and hopefully by midnight today the ethylene [produced] will be on-spec," the source added. "We can't comment on the [cracker's] July operating rates, but theoretically we will try to operate at 100% capacity if market prices are attractive," the source said. The naphtha cracker was operating at 80-85% capacity before it was taken off line in mid-May for maintenance.
- South Korea's LG Chem is operating its two acetone-based isopropanol (IPA) plants in Yeosu at reduced rates of 60-70% capacity this month as a result of persistently weak margins, a source close to the company said on 5th July. The company is likely to maintain the reduced rates at the plants with a combined nameplate capacity of 105,000 tonnes/year in August, if the costs of feedstock acetone were to remain at high levels, the source said.
- South Korea's LG Chem cut the operating rate at its phenol/acetone plant in Daesan on 1 July to 70% because of prevailing weak market conditions, a company source said on 5th July. The plant, which has a phenol nameplate capacity of 300,000 tonnes/year and an acetone nameplate capacity of 180,000 tonnes/year, was running at full capacity prior to the production cut, the source said. The plant will be running at the reduced operating rates until the end of July, the source added.
- Japan's Mitsui Chemicals on 4 July shut its phenol/acetone plant in Osaka for a scheduled annual maintenance, a company source said on Friday. The plant, which can produce 200,000 tonnes/year of phenol and 120,000 tonnes/year of acetone, was initially scheduled to restart on 1 August, the source said. However, the restart was postponed to 12 August because of prevailing weak market conditions, the source added.
- China's Sinopec Mitsubishi Chemical Polycarbonate (Beijing) is running its 150,000 tonne/year bisphenol A (BPA) unit at Yanshan in Beijing at 70% capacity because of prevailing weak market conditions, a source close to the company said on 5th July. The BPA unit was running at full capacity prior to the run rate cut on 2 July, the source said. The company is a joint venture between Chinese major Sinopec, and Japan's Mitsubishi Chemical and Mitsubishi Engineering Plastics.
- Malaysia's PETRONAS Chemicals Group (PCG) has lowered the operating rate of its 1.7m tonne/year No 2 methanol plant in Labuan to below 50% capacity, a company source said on 1 July. The No 2 plant, along with its 660,000 tonne/year No 1 methanol unit at the same site, was restarted in the week of 24 June, the source added. The two plants were shut in the week of 17 June because of technical issues. PCG is running its No 1 methanol plant at 50% capacity, according to the source.

- China's Liaoyang Petrochemical, a subsidiary of state-owned oil giant PetroChina, shut down its second adipic acid (ADA) line in Liaoning province this week for scheduled maintenance, a company source said on 26 June. The company's adipic acid plant with a total capacity of 140,000 tonnes/year is located in northeast China. The full capacity is expected to be restarted in September, the source said.
- South Korea's Lotte Chemical has reduced its butyl glycol (BG) plant operating rate to about 70% capacity from 95-100% capacity because of mechanical problems, a company source said on 26 June. Mechanical issues prompted the producer to cut the operating rate at its 50,000 tonne/year BG plant in Daesan over the weekend of 22-23 June, the company source said.
- Germany-based chemicals major BASF has lifted force majeure on butyl acrylate (butyl-A) production from its Ludwigshafen facility, and sales control will remain in place until further notice, market sources said on 25 June. There was no official confirmation from the supplier at the time of writing. Market sources said the force majeure was lifted on 21 June. The company had announced force majeure on 13 June because of unplanned production problems. BASF has the capacity to produce 110,000 tonnes/year of butyl-A from its Ludwigshafen facility in Germany.
- US Shell Chemical began the restart process at its Norco cracker in Louisiana, sources said on 21 June. Market sources said the cracker had been shut down in early May for planned maintenance but was expected to be back on line sometime next week. The company has two crackers at the site with a combined ethylene capacity of 1.420m tonnes/year, according to ICIS plants and projects.

Ethylene

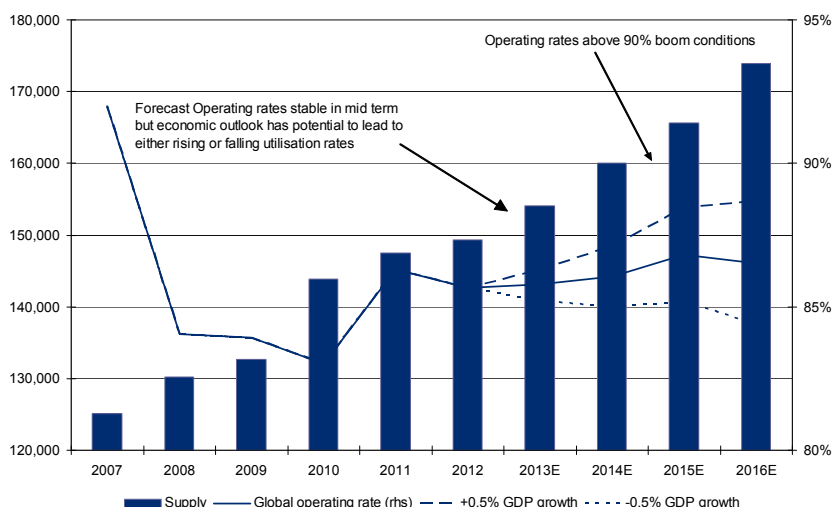
- **North America:** The June offline capacity figure of 7.7 percent was down from the 10.5 percent offline figure from May as several crackers restarted from planned turnarounds. With no planned outages in July, this figure is expected to drop below 6 percent next month. The spot price outlook for the next few months was increased slightly this month as prices have strengthened following the Williams outage. Prior to the Williams outage, the market was well balanced.
- **West Europe:** The European supply of ethylene has continued to be heavily impacted by steam cracker turnarounds and a number of minor operational issues that have resulted in constraints for several crackers. Besides planned outages in France, Germany and Belgium, a number of other units have seen minor operational issues with several crackers. For the majority of crackers in Europe, feedstock preference has shifted away from propane during June. Demand in June has carried over from the improved levels seen in May with the main derivative of polyethylene continuing to see an inventory rebuild downstream.
- **Asia:** Ethylene prices in Northeast Asia were stable to firm through June, rising by about one percent over the previous month. Spot prices had fallen towards end May on the back of availability of cargoes from Taiwan and flattened out thereafter as the key Chinese market went away on a long holiday in the second week of June. Spot prices picked up slightly towards late June as feedstock naphtha prices strengthened and Chinese buyers returned to the market.

Figure 56. Ethylene Supply, Demand and Utilisation Rate, 2007-2014E

	2007	2008	2009	2010	2011	2012	2013E	2014E
(In '000 Metric Tons)								
Global Capacity	125,121	130,218	132,603	143,870	147,476	149,290	154,131	160,013
Capacity Percent Change	4.0%	4.1%	1.8%	8.5%	2.5%	1.2%	3.2%	3.8%
Global Production	115,084	109,453	111,299	119,414	127,253	127,873	132,195	137,694
Production % Change	5.6%	-4.9%	1.7%	7.3%	6.6%	0.5%	3.4%	4.2%
Global Operating Rate	92.0%	84.1%	83.9%	83.0%	86.3%	85.7%	85.8%	86.1%
US Margin (\$/tonne)	273	375	238	431	494			
European Margin (€/tonne)	757	518	319	360	403			
Asian margin (\$/tonne)	944	942	233	906	987			

Source: CMAI and Citi Research Estimates

Figure 57. Ethylene Supply, Demand and Utilisation Rate History and Outlook, 2007-2016E (kT)



Source: CMAI and Citi Research estimates

Demand Outlook – world growth forecast unchanged

Citi economists have kept their **2013E** world **GDP growth** forecast flat at 2.6%. They have also kept their expectations for the US economy unchanged at 1.9%, but have lowered the growth outlook for the Eurozone to -0.8% from -0.7%. Forecasts for Japan have been raised to 2.2% from 2.0% previously, but expectations for growth in China have been lowered to 7.6% from 7.7%.

Figure 58. Annual GDP Growth by Region, 2007-2016E

Annual Growth	2007	2008	2009	2010	2011	2012	2013E	2014E	2015E	2016E
World	4.0%	1.5%	-2.2%	4.1%	3.0%	2.5%	2.6%	3.2%	3.4%	3.7%
US	1.9%	-0.3%	-3.1%	2.4%	1.8%	2.2%	1.9%	2.9%	3.2%	3.2%
Euro Area	3.0%	0.4%	-4.4%	2.0%	1.5%	-0.5%	-0.8%	0.0%	0.7%	1.1%
Emerging Asia	8.9%	6.2%	5.3%	9.2%	7.3%	6.2%	6.5%	6.5%		
Japan	2.2%	-1.0%	-5.5%	4.5%	-0.8%	1.9%	2.2%	1.9%	1.0%	1.2%
China	14.2%	9.6%	9.2%	10.4%	9.3%	7.8%	7.6%	7.3%	7.0%	7.5%
Germany	3.4%	0.8%	-5.1%	4.0%	3.1%	0.9%	0.3%	1.5%	2.0%	1.9%
UK	3.6%	-1.0%	-4.0%	1.8%	0.9%	0.3%	1.0%	1.2%	1.8%	1.7%

Source: Government Statistics and Citi Research Estimates

Supply Estimates – raised expectations for 2013 capacity additions

- CMAI has revised up its expected 2013 Ethylene capacity additions. It now expects 4.83 million tonnes more during this period. That's 5% more than the 4.60 million tonnes expected last month.
- CMAI has also raised its expected 2014-2016 Ethylene capacity additions. It now expects 19.8 million tonnes more during this period. That's 4% more than the 19.0 million tonnes expected last month.

Figure 59. Geographic Summary of Expected Capacity Additions, 2013-2016E (MT '000)

Capacity additions	2013E	2014E	2015E	2016E	2014-2016
North America	672	777	599	1605	2981
South America					0
W. Europe	-74	-221			-221
C. Europe					0
CIS & Baltics	40	280	240	400	920
Middle East	1205	750	1250	2458	4458
Africa		24	254	230	508
India		1433	337	675	2445
NE Asia	2241	2152	2699	2584	7435
SE Asia	747	687	213	400	1300
Total - Global	4831	5882	5592	8352	19826
% Increase	3%	4%	3%	5%	

Source: Company Reports and Citi Research Estimates

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Company Margin Monitor

Explaining the model

In 2005 we introduced our European model for the global sector, which attempts to link the movement in commodity chemical and raw material prices to the earnings performance of the key commodity producers across the globe. For some of the other companies under coverage, we have customized the price data by company, i.e. price charts for each of the product/raw materials produced/used by each company.

For each of the key global commodity producers, we have analysed:

- The estimated sales of each commodity product as a proportion of group sales;
- The capacity growth expectations by product;
- The estimated annual gross margin (capacity x (price – raw material cost)) and its movement on the prior year – this analysis assumes: (1) 100% utilization rates; (2) current product and raw material prices persist for the remainder of the year; and (3) the gross margin for a product sold internally is assigned to that product specifically rather than the end product that leaves the company; note that gross contribution totals may not match company reported numbers due to intra-company sales;

Monthly progression of overall gross margin of analysed products and the cumulative

Contents and Summary

Margin pressure remains significant this month. On a fixed price basis, this year's margin decline of Caprolactam has caused margin decline for DSM, whereas Caustic margin improvements has led to an overall margin improvement for Solvay.

Note, however, that these company analyses assess only the relative movements between selling and raw material prices. The analyses assume capacity utilization rates remain stable.

Arkema: Margins down a bit

BASF: Margins now slightly up

Bayer: Margins down in 2Q13

DSM: Margins still declining

Lanxess: Margin decline goes on

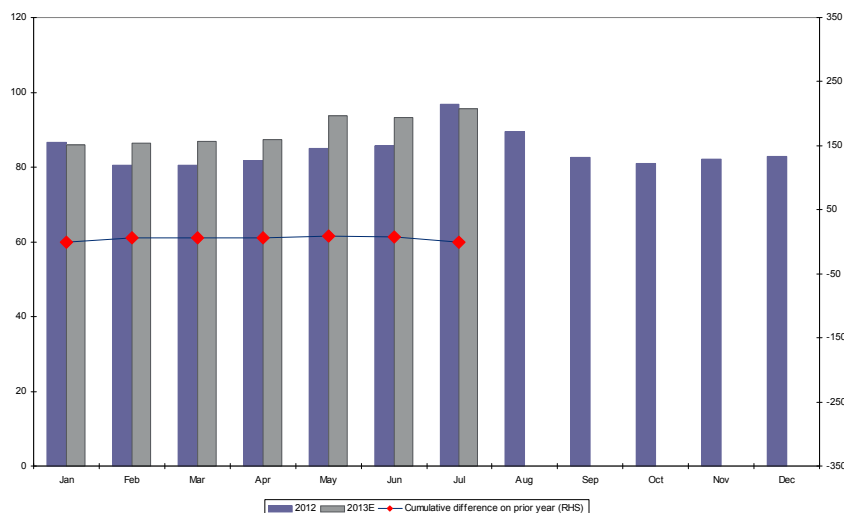
Solvay: Margin growth continues

Dow: Margins fall sharply

Arkema: Margins down a bit

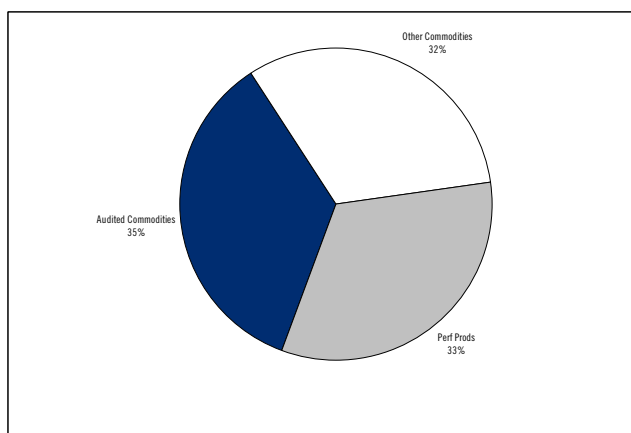
July's margins would be slightly down YoY. On a fixed-price basis, Caustic activities would see the biggest margin increase.

Figure 60. Progression of Gross Margin for Major Commodity Products, 2012-13E (€m)



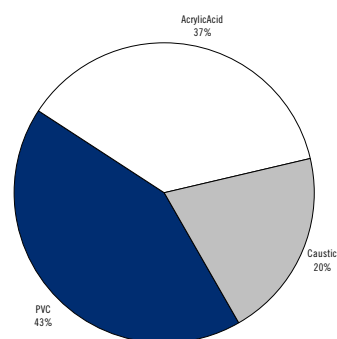
Source: Company Reports and Citi Research Estimates

Figure 61. Proportion of Major Commodities Sales, 2012



Source: Company reports and Citi Research

Figure 62. Breakdown of Major Commodities Sales, 2012



Source: Company reports and Citi Research

Figure 63. Estimated Gross Contribution – Product Sales Over Raw Materials Consumed (€m)

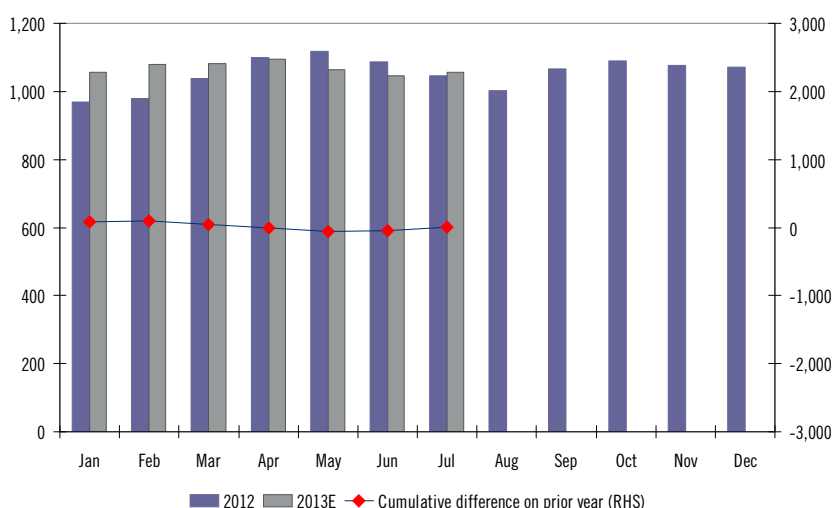
	VCM	PVC	Acrylic Acid	Caustic	Total
2012	303	74	225	412	1014
Implied 2013 margin	305	92	234	463	1093
Difference	2	18	8	50	78

Source: Company Reports and Citi Research Estimates

BASF: Margins now slightly up

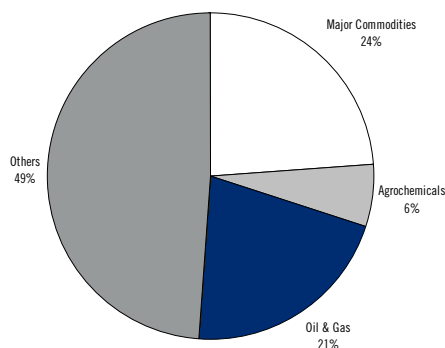
Margins are slightly up vs last month and also on YoY basis. On a fixed price basis, Ethylene activities' margin losses would be the biggest challenge.

Figure 64. Progression of Gross Margin for Major Commodity Products, 2010-11E (€m)



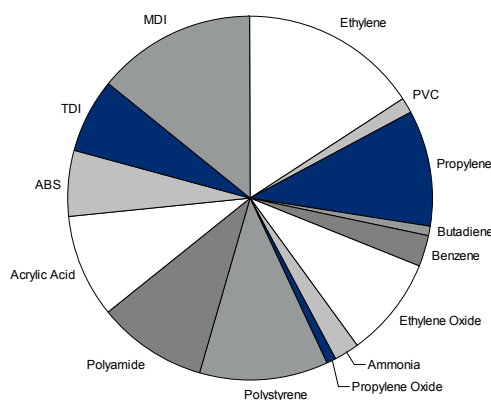
Source: Company Reports and Citi Research Estimates

Figure 65. Proportion of Major Commodities Sales, 2012



Source: Company Reports and Citi Research Estimates

Figure 66. Breakdown of Major Commodities Sales, 2012



Source: Company Reports and Citi Research Estimates

Figure 67. Estimated Gross Contribution – Product Sales Over Raw Materials Consumed (€m)

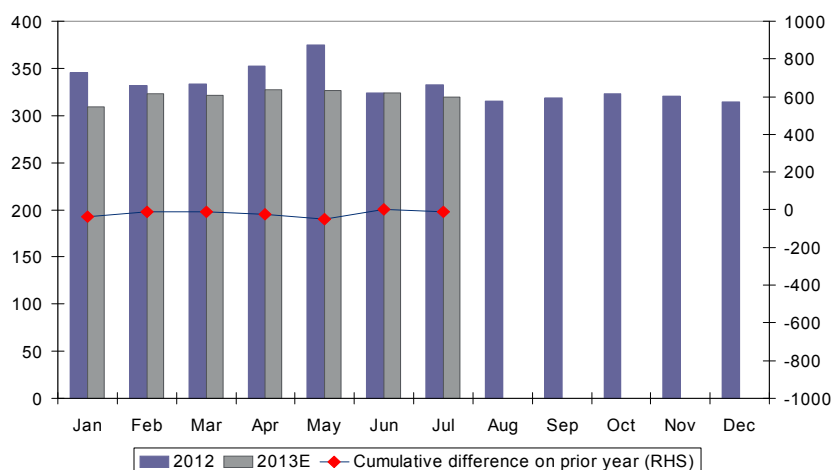
	Ethylene	PVC	Propylene	Butadiene	Benzene	Styrene	Ethylene Oxide	Ammonia	PO	PS	Polyamide	Acrylic Acid	ABS	TDI	MDI	Total
2012	3,579	29	1,767	324	619	143	194	597	58	1,043	1,150	775	517	945	1,830	13,569
Implied 2013 margin	2,626	36	1,690	190	666	204	256	507	59	1,240	932	803	668	967	1,843	12,688
Difference	-952	7	-77	-134	47	60	62	-89	1	197	-217	28	151	22	12	-881

Source: Citi Research and company reports

Bayer: Margins down in 2Q13

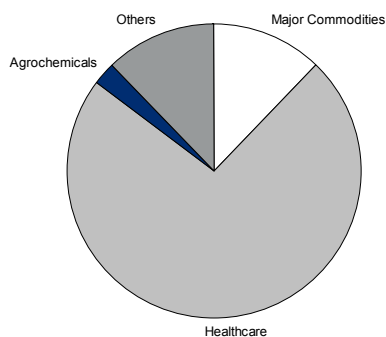
This month's margins would still be down YoY. On a fixed price basis, polycarbonate activities' margin losses would be the biggest challenge.

Figure 68. Progression of Gross Margin for Major Commodity Products, 2010-11E (€m)



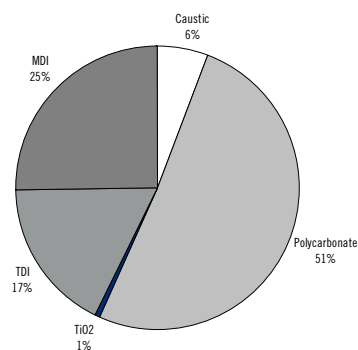
Source: Company Reports and Citi Research Estimates

Figure 69. Proportion of Major Commodities Sales, 2012



Source: Company Reports and Citi Research Estimates

Figure 70. Breakdown of Major Commodities Sales, 2012



Source: Company Reports and Citi Research Estimates

Figure 71. Estimated Gross Contribution – Product Sales Over Raw Materials Consumed (€m)

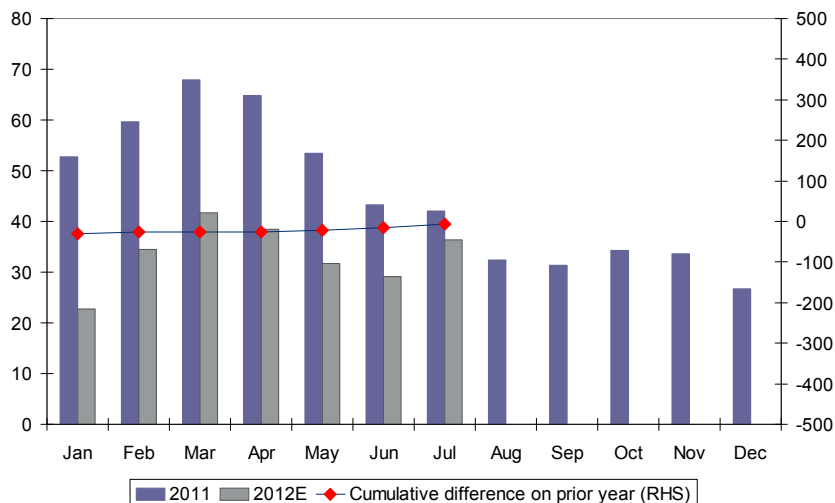
	Caustic	Polycarbonate	TiO2	TDI	MDI	Total
2012	591	1251	62	884	1200	3987
Implied 2013 margin	663	1054	49	905	1208	3878
Difference	72	-197	-13	21	8	-109

Source: Company Reports and Citi Research Estimates

DSM: Margins still declining

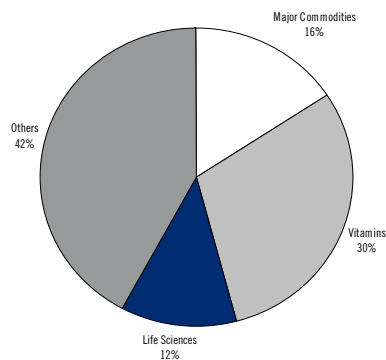
The margin decline would still be sizeable in July, albeit not as bad as June. On a fixed price basis, caprolactam activities' margin losses would be the biggest challenge.

Figure 72. Progression of Gross Margin for Major Commodity Products, 2010-11E (€m)



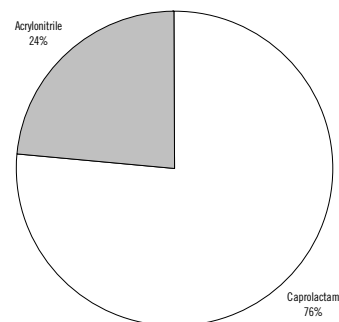
Source: Company Reports and Citi Research Estimates

Figure 73. Proportion of Major Commodities Sales, 2012



Source: Company Reports and Citi Research Estimates

Figure 74. Breakdown of Major Commodities Sales, 2012



Source: Company Reports and Citi Research Estimates

Figure 75. Estimated Gross Contribution – Product Sales Over Raw Materials Consumed (€m)

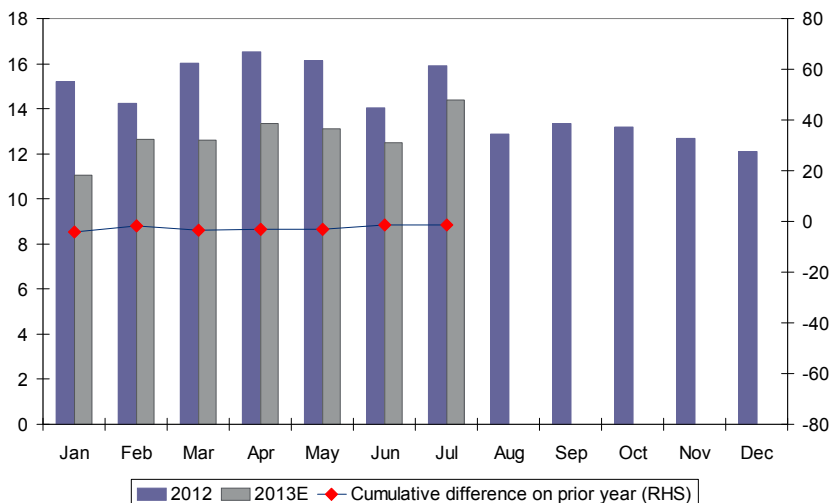
	Caprolactam	Acrylonitrile	Total
2012	440	102	543
Implied 2013 margin	287	85	373
Difference	-153	-17	-170

Source: Company Reports and Citi Research Estimates

Lanxess: Margin decline goes on

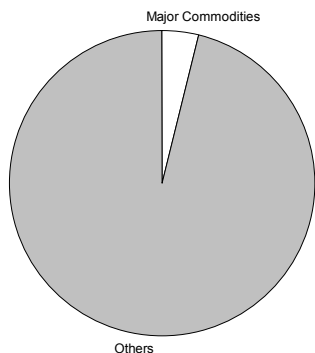
Margins would still be down YoY in June. On a fixed price basis, the margin losses of Polyamide activities would be the biggest challenge to growth.

Figure 76. Progression of Gross Margin for Major Commodity Products, 2010-11E (€m)



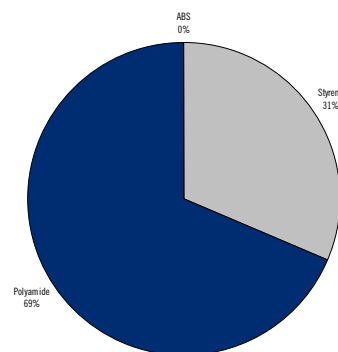
Source: Company Reports and Citi Research Estimates

Figure 77. Proportion of Major Commodities Sales, 2012



Source: Company Reports and Citi Research Estimates

Figure 78. Breakdown of Major Commodities Sales, 2012



Source: Company Reports and Citi Research Estimates

Figure 79. Estimated Gross Contribution – Product Sales Over Raw Materials Consumed (€m)

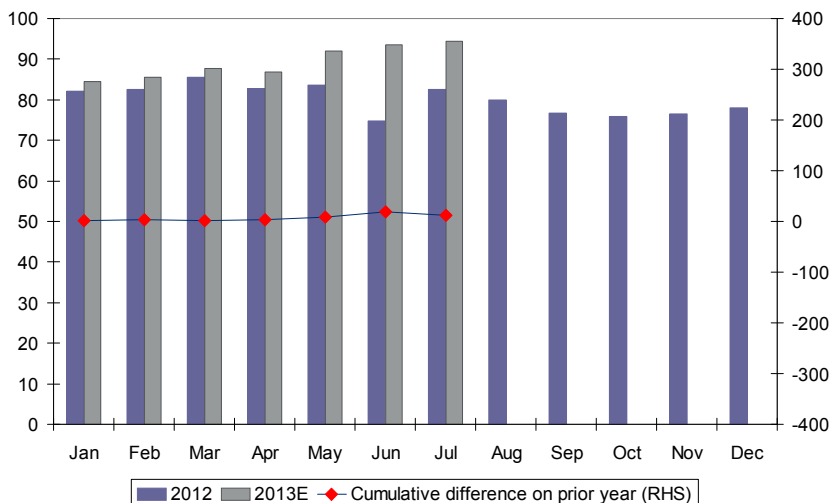
	Styrene	Polyamide	Total
2012	13	160	172
Implied 2013 margin	21	130	150
Difference	8	-30	-22

Source: Company Reports and Citi Research Estimates

Solvay: Margin growth continues

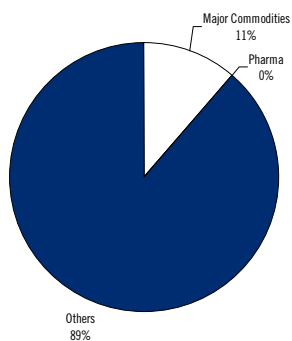
Margins would be up YoY in July. On a fixed price basis, Caustic activities would be contributing the most to margin growth.

Figure 80. Progression of Gross Margin for Major Commodity Products, 2010-11E (€m)



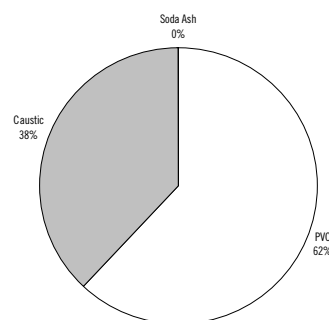
Source: Company Reports and Citi Research Estimates

Figure 81. Proportion of Major Commodities Sales, 2012



Source: Company Reports and Citi Research Estimates

Figure 82. Breakdown of Major Commodities Sales, 2012



Source: Company Reports and Citi Research Estimates

Figure 83. Estimated Gross Contribution – Product Sales Over Raw Materials Consumed (€m)

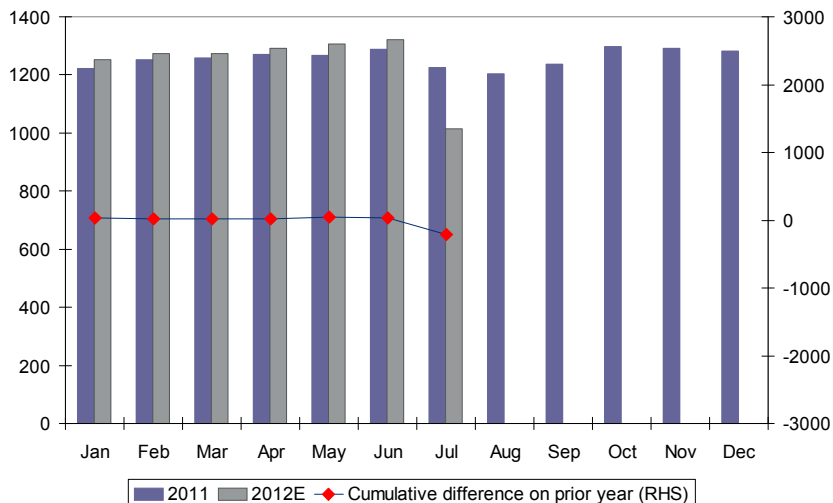
	PVC	Caustic	Total
2012	118	844	961
Implied 2013 margin	146	946	1,092
Difference	28	103	131

Source: Company Reports and Citi Research Estimates

Dow: Margins fall sharply

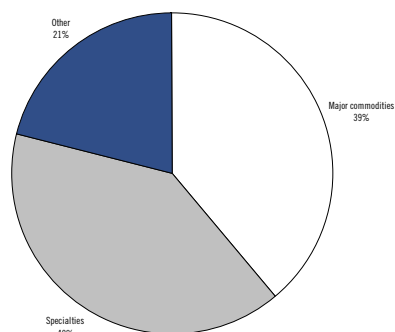
Margins are expected to fall sharply YoY in July. On a fixed price basis, margin losses of Polypropylene activities would be the biggest drag on growth.

Figure 84. Progression of Gross Margin for Major Commodity Products, 2010-11E (\$m)



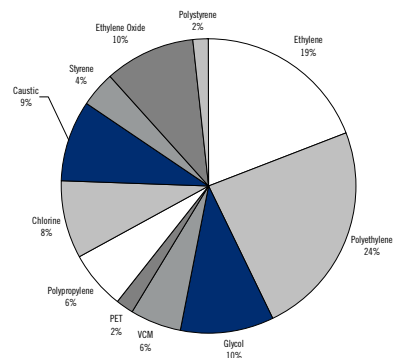
Source: Company Reports and Citi Research Estimates

Figure 85. Proportion of Major Commodities Sales, 2012



Source: Company Reports and Citi Research Estimates

Figure 86. Breakdown of Major Commodities Sales, 2012



Source: Company Reports and Citi Research Estimates

Figure 87. Estimated Gross Contribution – Product Sales Over Raw Materials Consumed (\$m)

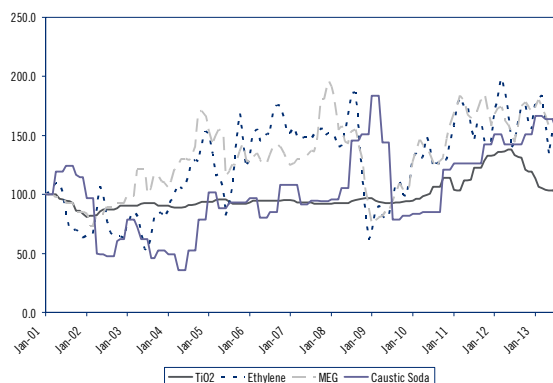
	Ethylene	Polyethylene	Glycol	VCM	PET	Polypropylene	Chlorine	Caustic	Styrene	Ethylene Oxide	Polystyrene	Total
2012	3397	2951	325	1045	348	282	1745	3406	364	1036	201	15098
Implied 2013 margin	3251	3575	524	933	363	116	1720	3510	449	924	235	15600
Difference	-146	624	199	-112	16	-165	-25	104	85	-112	34	501

Source: Company Reports and Citi Research Estimates

Company Products / Raw Material Trends

Akzo Nobel

Figure 88. Raw Material Price Progression, Rebased Jan01-date



Source: DataStream, CMAI and ICIS

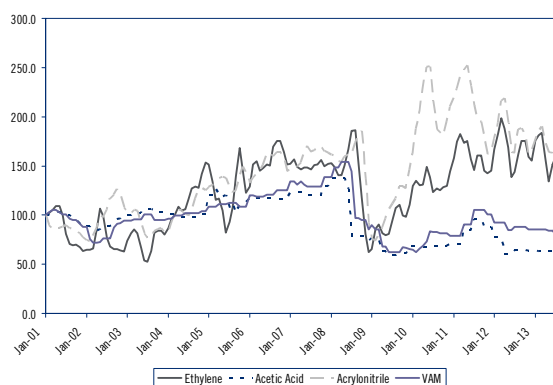
Figure 89. Price Movements

materials/products	Raw	Current vs prior	July'13 vs	YTD vs prior
TiO2	rm	0%	-25%	-22%
Ethylene	rm	5%	9%	-6%
MEG	rm	-1%	2%	2%
Caustic	p	-5%	15%	13%

Source: DataStream, CMAI and ICIS

Clariant

Figure 90. Raw Material Price Progression, Rebased Jan01-date



Source: DataStream, CMAI and ICIS

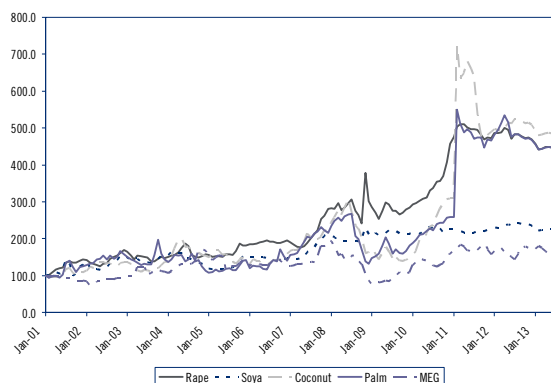
Figure 91. Price Movements

materials/products	Raw	Current vs prior	July'13 vs	YTD vs prior
Ethylene	rm	5%	9%	-6%
Acetic Acid	rm	3%	5%	-8%
Acrylonitrile	rm	7%	-1%	-10%
VAM	rm	-5%	-1%	-6%

Source: DataStream, CMAI and ICIS

Croda

Figure 92. Raw Material Price Progression, Rebased Jan01-date



Source: DataStream, CMAI and ICIS

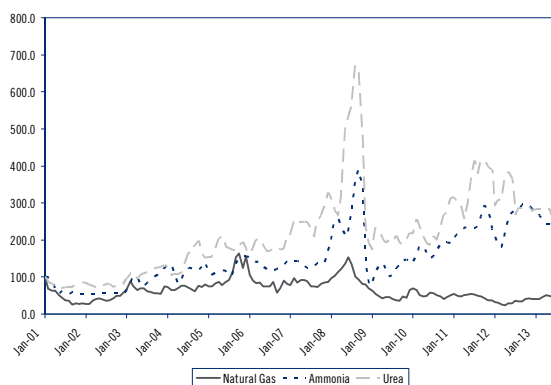
Figure 93. Price Movements

	Raw materials/products	Current vs prior month	July'13 vs Jun'13	YTD vs prior year
Rape	rm	-1%	-5%	-8%
Soya	rm	-1%	-5%	-3%
Coconut	rm	-1%	-5%	-3%
Palm	rm	-1%	-6%	-11%
MEG	rm	-1%	2%	2%

Source: DataStream, CMAI and ICIS

Yara

Figure 94. Raw Material Price Progression, Rebased Jan01-date



Source: DataStream, CMAI and ICIS

Figure 95. Price Movements

	Raw materials/products	Current vs prior month	July'13 vs Jun'13	YTD vs prior year
Natural Gas	rm	-7%	56%	59%
Ammonia	rm/p	-8%	-15%	15%
Urea	p	-6%	-31%	-18%

Source: DataStream, CMAI and ICIS

Valuation Tables

Figure 96. Global Chemicals – Valuation Summary by Region, 2013E-2014E

Company	Rating	Target Price	Current Price	P/E		EV* / EBITDA		ROCE	
				2013E	2014E	2013E	2014E	2013E	2014E
Europe									
Air Liquide (AIRP.PA)	Neutral (2)	EUR 91	EUR 97.74	18.5x	17.3x	9.8x	9.3x	13.4%	13.3%
Akzo Nobel (AKZO.AS)	Neutral (2)	EUR 48	EUR 47.29	18.4x	14.2x	8.5x	7.5x	10.1%	11.7%
Arkema (AKE.PA)	Neutral (2)	EUR 80	EUR 75.85	10.8x	9.3x	6.2x	5.4x	12.1%	13.3%
BASF (BASFn.DE)	Neutral (2)	EUR 72	EUR 71.2	13.4x	12.4x	8.6x	8.1x	12.5%	12.8%
Croda (CRDA.L)	Sell (3)	GBP 15	GBP 26	21.3x	21.4x	13.3x	13.0x	29.2%	28.1%
Clariant (CLN.VX)	Buy (1)	CHF 16	CHF 14.3	13.9x	11.6x	7.2x	6.4x	15.8%	17.1%
DSM (DSMN.AS)	Buy (1)	EUR 55	EUR 53.91	15.8x	13.6x	8.9x	7.8x	10.1%	11.3%
Evonik (EVKn.DE)	Sell (3)	EUR 24	EUR 26	13.0x	12.4x	7.4x	7.6x	10.7%	9.3%
Givaudan (GIVN.VX)	Neutral (2)	CHF 1250	CHF 1299	25.5x	23.5x	14.4x	13.4x	18.3%	20.1%
Israel Chem (ICL.TA)	Buy (1)	ILS 48	ILS 35.42	9.8x	8.8x	7.5x	6.7x	23.9%	26.1%
Johnson Matthey (JMAT.L)	Neutral (2)	GBP 27	GBP 28.07	17.7x	16.1x	11.6x	10.6x	15.0%	14.9%
K+S (SDFGn.DE)	Buy (1)	EUR 40	EUR 27.425	9.1x	8.7x	5.0x	5.4x	15.1%	12.9%
Lanxess (LXSG.DE)	Sell (3)	EUR 40	EUR 46.59	17.3x	11.4x	7.7x	6.5x	6.3%	8.1%
Linde (LING.DE)	Neutral (2)	EUR 160	EUR 145.75	17.1x	16.1x	9.6x	9.0x	12.8%	13.2%
Lonza Grp (LONN.VX)	Neutral (2)	CHF 55	CHF 74.25	19.4x	17.2x	9.8x	9.0x	7.2%	8.1%
PhosAgro (PHORq.L)	Buy (1)	USD 19	USD 12.1	6.8x	7.3x	5.1x	5.1x	32.8%	29.1%
Sirius Minerals (SXX.L)	Buy (1H)	GBP 0.8	GBP 0.2775	nm	nm	-69.5x	-45.8x		
Solvay (SOLB.BR)	Sell (3)	EUR 80	EUR 102.45	15.5x	13.1x	7.4x	7.0x	9.1%	9.5%
Symrise AG (SY1G.DE)	Sell (3)	EUR 22	EUR 33.36	18.5x	17.8x	12.3x	11.6x	21.0%	21.4%
Syngenta (SYNN.VX)	Buy (1)	CHF 440	CHF 393.6	18.1x	15.4x	11.9x	10.4x	26.3%	28.1%
Umicore (UM.BR)	Neutral (2)	EUR 35	EUR 33.26	16.8x	14.5x	8.2x	7.4x	11.8%	12.7%
Uralkali (URKAq.L)	Buy (1)	USD 45.5	USD 33.25	11.0x	10.5x	7.8x	7.2x	19.6%	20.9%
Victrex (VCTX.L)	Neutral (2)	GBP 15.5	GBP 16.44	19.5x	18.5x	12.2x	11.1x	27.3%	24.6%
Wacker Chem (WCHG.DE)	Neutral (2)	EUR 60	EUR 64.1	90.0x	27.1x	7.0x	6.2x	3.1%	4.5%
Yara (YAR.OL)	Buy (1)	NOK 350	NOK 259	10.3x	8.8x	6.6x	5.7x	12.7%	13.6%
Europe Sector Weighted Ave (USD)				14.7x	13.3x	9.0x	8.4x	15.6%	16.2%
USA									
Dow Chem (DOW.N)	Buy (1)	USD 39	USD 34.2	15.2x	12.0x	6.0x	5.2x	8.8%	10.3%
DuPont (DD.N)	Neutral (2)	USD 55	USD 54.54	14.4x	12.5x	7.2x	6.4x	16.6%	17.7%
PPG Ind (PPG.N)	Buy (1)	USD 170	USD 158.03	20.2x	17.3x	10.9x	10.0x	19.6%	20.7%
Agrium Inc (AGU.N)	Buy (1)	USD 102	USD 93.34	11.2x	9.6x	7.9x	7.1x	13.8%	14.0%
CF Ind (CF.N)	Neutral (2)	USD 204	USD 187.55	8.0x	8.3x	4.5x	4.9x	29.0%	20.9%
Monsanto (MON.N)	Buy (1)	USD 122	USD 103.34	21.4x	18.5x	12.3x	10.9x	23.6%	24.2%
Mosaic (MOS.N)	Neutral (2)	USD 57	USD 56.85	13.2x	11.5x	7.7x	6.9x	21.6%	15.6%
Potash Saskatchewan (POT.N)	Neutral (2)	USD 43	USD 39.86	14.5x	13.0x	10.1x	8.9x	15.3%	16.7%
Air Prods & Chem (APD.N)	Neutral (2)	USD 98	USD 97.01	17.2x	15.8x	10.3x	9.7x	8.8%	9.0%
Praxair (PX.N)	Neutral (2)	USD 125	USD 117.39	19.8x	17.6x	11.8x	10.6x	10.9%	11.5%
Albemarle (ALB.N)	Neutral (2)	USD 63	USD 65.06	14.5x	12.6x	9.7x	8.3x	18.5%	19.3%
Celanese (CE.N)	Neutral (2)	USD 49	USD 47.51	10.5x	9.2x	6.7x	5.9x	12.4%	12.8%
Cytec Ind (CYT.N)	Neutral (2)	USD 84	USD 78.39	16.5x	13.3x	11.0x	9.9x	9.8%	9.9%
Ecolab (ECL.N)	Neutral (2)	USD 85	USD 89.9	25.6x	21.3x	11.9x	10.6x	14.3%	16.7%
Sherwin-Williams (SHW.N)	Neutral (2)	USD 179	USD 186.88	23.9x	19.7x	15.0x	12.3x	20.1%	23.6%
Sigma-Aldrich (SIAL.O)	Neutral (2)	USD 79	USD 84.08	20.3x	19.1x	11.1x	9.8x	26.0%	26.9%
Valspar Corp (VAL.N)	Neutral (2)	USD 73	USD 67.83	18.0x	15.2x	11.1x	9.3x	24.0%	27.1%
Axial (AXLL.N)	Buy (1)	USD 52	USD 42.76	9.8x	8.4x	4.8x	4.0x	17.1%	19.6%
Eastman Chem (EMN.N)	Buy (1)	USD 77	USD 73.97	11.8x	10.6x	7.8x	6.9x	14.3%	15.0%
Huntsman (HUN.N)	Buy (1H)	USD 21	USD 17.52	11.7x	7.6x	6.3x	5.2x	7.4%	10.9%
LyondellBasell (LYB.N)	Buy (1)	USD 76	USD 69.39	11.5x	9.5x	6.4x	5.8x	25.8%	27.9%
PetroLogistics (PDH.N)	Neutral (2H)	USD 14.5	USD 13.01	9.4x	9.0x	8.2x	7.8x	34.5%	34.3%
North America Sector Weighted Ave (USD)				15.5x	13.3x	9.3x	8.3x	17.4%	18.1%

Source: dataCentral, Citi Research. Prices as at 11 July 2013.

Figure 97. Global Chemicals – Valuation Summary by Region, 2013E-2014E, cont'd

Company	EV* / CE		EV* / Sales		Dividend Yield		FCF Yield		Price / Book	
	2013E	2014E	2013E	2014E	2013E	2014E	2013E	2014E	2013E	2014E
Europe										
Air Liquide (AIRP.PA)	2.7x	2.5x	2.5x	2.3x	2.7%	2.9%	2.7%	2.5%	3.0x	2.8x
Akzo Nobel (AKZO.AS)	1.6x	1.6x	1.0x	0.9x	3.1%	3.3%	3.9%	5.3%	1.9x	1.8x
Arkema (AKE.PA)	1.6x	1.5x	1.0x	0.9x	2.8%	3.2%	5.4%	8.1%	2.0x	1.7x
BASF (BASFn.DE)	2.1x	2.0x	1.2x	1.3x	3.8%	3.9%	5.0%	7.2%	2.5x	2.3x
Croda (CRDA.L)	6.6x	6.3x	3.6x	3.4x	2.3%	2.3%	3.6%	4.2%	7.8x	6.6x
Clariant (CLN.VX)	2.1x	2.0x	1.0x	0.9x	2.4%	2.6%	4.1%	7.0%	1.5x	1.4x
DSM (DSMN.AS)	1.8x	1.7x	1.2x	1.1x	2.8%	3.1%	2.2%	4.3%	1.5x	1.4x
Evonik (EVKn.DE)	1.5x	1.4x	1.1x	1.1x	3.2%	3.4%	-1.7%	0.6%	1.8x	1.6x
Givaudan (GIVN.VX)	4.4x	4.5x	3.0x	2.8x	3.2%	3.5%	3.6%	3.6%	3.5x	3.4x
Israel Chem (ICL.TA)	2.6x	2.4x	2.1x	2.0x	7.2%	7.4%	5.5%	8.3%	3.3x	2.9x
Johnson Matthey (JMAT.L)	3.3x	3.0x	0.6x	0.5x	2.1%	2.3%	2.0%	3.1%	3.7x	3.2x
K+S (SDFGn.DE)	1.3x	1.2x	1.3x	1.4x	4.6%	4.8%	2.3%	-5.0%	1.3x	1.2x
Lanxess (LXSG.DE)	1.2x	1.2x	0.8x	0.8x	2.1%	2.3%	1.9%	2.2%	1.6x	1.5x
Linde (LING.DE)	2.6x	2.5x	2.2x	2.0x	2.0%	2.1%	3.2%	3.1%	3.1x	2.9x
Lonza Grp (LONN.VX)	1.6x	1.5x	1.7x	1.6x	2.8%	3.2%	6.0%	5.7%	1.4x	1.3x
PhosAgro (PHORq.L)	2.6x	2.3x	1.8x	1.8x	7.4%	6.8%	12.4%	11.8%	3.1x	2.5x
Sirius Minerals (SXX.L)	4.8x	2.5x			0.0%	0.0%	-12.0%	-26.0%	2.3x	2.4x
Solvay (SOLB.BR)	1.5x	1.5x	1.1x	1.1x	3.4%	3.6%	3.6%	4.4%	1.3x	1.3x
Symrise AG (SY1G.DE)	3.8x	3.7x	2.5x	2.4x	2.0%	2.1%	4.9%	5.2%	4.1x	3.8x
Syngenta (SYNN.VX)	4.9x	4.5x	2.6x	2.3x	2.3%	2.7%	4.4%	5.2%	4.0x	3.5x
Umicore (UMI.BR)	2.0x	1.9x	0.3x	0.3x	3.0%	3.2%	5.5%	3.9%	2.0x	1.9x
Uralkali (URKAq.L)	2.4x	2.4x	4.8x	4.4x	4.5%	4.7%	9.0%	9.6%	2.3x	2.2x
Vicorex (VCTX.L)	4.8x	4.1x	5.6x	5.2x	2.4%	2.5%	1.7%	2.5%	4.0x	3.3x
Wacker Chem (WCHG.DE)	1.1x	1.1x	1.1x	1.1x	0.0%	0.9%	-1.4%	1.2%	1.2x	1.2x
Yara (YAR.OL)	1.5x	1.4x	1.0x	0.8x	5.0%	5.0%	9.1%	10.0%	1.4x	1.3x
Europe Sector Weighted Ave (USD)	2.6x	2.5x	1.9x	1.8x	3.3%	3.5%	4.2%	5.1%	2.7x	2.5x
USA										
Dow Chem (DOW.N)	1.1x	1.1x	0.9x	0.8x	3.7%	3.7%	9.2%	10.8%	1.4x	1.3x
DuPont (DD.N)	2.1x	1.9x	1.5x	1.4x	3.3%	3.4%	4.2%	5.5%	3.9x	3.3x
PPG Ind (PPG.N)	3.8x	3.6x	1.8x	1.7x	1.5%	1.6%	4.3%	4.7%	5.3x	4.9x
Agrium Inc (AGU.N)	1.9x	1.7x	1.2x	1.1x	2.1%	2.1%	2.6%	4.8%	2.0x	1.7x
CF Ind (CF.N)	2.2x	1.8x	2.3x	2.3x	0.9%	0.9%	7.4%	-2.1%	1.9x	1.6x
Monsanto (MON.N)	5.3x	4.7x	3.5x	3.4x	1.5%	1.6%	4.6%	4.7%	4.0x	3.7x
Mosaic (MOS.N)	2.1x	1.8x	2.3x	2.2x	1.8%	1.8%	1.2%	3.4%	1.8x	1.7x
Potash Saskatche (POT.N)	2.7x	2.5x	4.4x	4.1x	3.0%	3.5%	4.3%	6.6%	3.0x	2.6x
Air Prods & Chem (APD.N)	2.0x	1.9x	2.5x	2.4x	2.9%	3.2%	2.2%	1.8%	2.9x	2.7x
Praxair (PX.N)	2.4x	2.3x	3.7x	3.4x	2.0%	2.2%	2.6%	3.6%	5.2x	4.6x
Albemarle (ALB.N)	2.8x	2.5x	2.2x	2.0x	1.4%	1.6%	5.6%	6.1%	3.2x	2.7x
Celanese (CE.N)	1.9x	1.7x	1.4x	1.3x	0.7%	0.8%	8.0%	7.7%	3.1x	2.4x
Cytec Ind (CYT.N)	2.0x	1.8x	2.0x	1.8x	0.6%	0.6%	-2.8%	-0.9%	2.5x	2.2x
Ecolab (ECL.N)	3.5x	3.5x	2.3x	2.1x	1.0%	1.1%	3.2%	4.0%	3.6x	3.6x
Sherwin-Williams (SHW.N)	5.2x	4.9x	2.0x	1.7x	1.1%	1.1%	4.2%	3.7%	7.2x	6.1x
Sigma-Aldrich (SIAL.O)	4.8x	4.4x	3.4x	3.1x	0.0%	0.0%	4.1%	4.9%	3.3x	2.8x
Valspar Corp (VAL.N)	4.5x	4.2x	1.7x	1.5x	1.4%	1.4%	3.1%	6.8%	4.8x	4.1x
Axiall (AXLL.N)	1.7x	1.6x	0.7x	0.7x	0.7%	1.1%	10.2%	9.5%	1.1x	1.0x
Eastman Chem (EMN.N)	2.1x	2.0x	1.7x	1.6x	1.6%	1.6%	7.3%	7.6%	3.1x	2.5x
Huntsman (HUN.N)	1.2x	1.1x	0.7x	0.6x	2.9%	2.9%	6.0%	7.2%	2.2x	1.8x
LyondellBasell (LYB.N)	2.8x	2.7x	0.9x	0.9x	2.7%	3.2%	7.1%	8.4%	3.3x	3.3x
PetroLogistics (PDH.N)	3.1x	3.2x	2.9x	2.7x	12.5%	11.1%	8.3%	12.8%	4.9x	4.9x
North America Sector Weighted Ave (USD)	2.9x	2.7x	2.3x	2.1x	2.2%	2.4%	4.7%	5.5%	3.5x	3.1x

Source: dataCentral, Citi Research. Prices as at 11 July 2013.

Figure 98. Global Chemicals – Valuation Summary by Region, 2013E-2014E

Company	Rating	Target Price	Current Price	P/E		EV* / EBITDA		ROCE	
				2013E	2014E	2013E	2014E	2013E	2014E
Asia Pacific									
Asahi Kasei (3407.T)	Buy (1)	JPY 860	JPY 668	13.4x	11.1x			9.6%	10.6%
Asian Paints (ASPN.BO)	Sell (3)	INR 4210	INR 4877.15	36.5x	31.3x	23.3x	19.9x	38.8%	44.7%
China BlueChem (3983.HK)	Buy (1)	HKD 5.6	HKD 3.99	8.4x	8.5x	3.8x	3.8x	16.2%	14.7%
Daicel (4202.T)	Buy (1)	JPY 1050	JPY 883	14.7x	12.1x	5.0x	4.3x	9.4%	10.9%
DIC (4631.T)	Neutral (2)	JPY 260	JPY 248	12.6x	9.7x			6.8%	8.1%
DKK (4061.T)	Buy (1)	JPY 410	JPY 355	11.8x	10.2x	5.0x	4.4x	5.7%	6.4%
Formosa Chem Fib (1326.TW)	Sell (3)	TWD 69	TWD 75.7	14.2x	23.9x	10.1x	10.9x	6.9%	4.9%
Formosa Plastics (1301.TW)	Neutral (2)	TWD 75	TWD 74.4	16.0x	17.3x	24.7x	16.1x	3.3%	7.1%
Hitachi Chem (4217.T)	Buy (1)	JPY 1850	JPY 1647	16.9x	14.0x			6.8%	8.2%
Huabao Int (0336.HK)	Sell (3H)	HKD 3	HKD 3.28	5.7x	5.5x	3.9x	3.4x	26.5%	25.0%
Indorama Venture (IVL.BK)	Neutral (2H)	THB 23.5	THB 19.8	17.6x	11.1x	10.1x	8.5x	6.1%	7.6%
JSR (4185.T)	Buy (1)	JPY 2500	JPY 1953	14.5x	13.1x	5.0x	4.3x	15.2%	16.1%
Kaneka (4118.T)	Neutral (2)	JPY 670	JPY 692	18.1x	14.0x			5.3%	6.5%
Kansai Paint (4613.T)	Buy (1)	JPY 1490	JPY 1322	18.3x	17.3x			12.0%	13.9%
Kuraray (3405.T)	Neutral (2)	JPY 1400	JPY 1382	15.3x	13.8x	3.7x	3.4x	11.6%	12.1%
LG Chem (051910.KS)	Buy (1)	KRW 350000	KRW 264500	11.6x	9.1x	6.2x	5.0x	11.8%	13.7%
Lotte Chemical (011170.KS)	Buy (1)	KRW 195000	KRW 152000	13.4x	8.0x	4.5x	2.9x	6.2%	10.2%
MGC (4182.T)	Buy (1)	JPY 1040	JPY 759	15.9x	9.7x	7.7x	6.2x	3.8%	5.6%
Mitsubishi Chem (4188.T)	Neutral (2)	JPY 510	JPY 482	17.0x	11.9x	5.9x	5.1x	4.3%	5.5%
Mitsui Chem (4183.T)	Neutral (2)	JPY 290	JPY 237	75.1x	18.7x	8.8x	6.9x	0.8%	2.4%
Nan Ya Plastics (1303.TW)	Buy (1)	TWD 70	TWD 61.5	14.5x	14.8x	12.3x	9.4x	6.2%	9.1%
Nippon Paint (4612.T)	Buy (1)	JPY 1330	JPY 1238	14.5x	12.5x			20.2%	23.4%
Nippon Shokubai (4114.T)	Neutral (2)	JPY 1130	JPY 1038	25.8x	15.2x	8.3x	6.6x	4.1%	6.1%
Nitto Denko (6988.T)	Buy (1)	JPY 7600	JPY 6200	16.2x	13.3x	6.4x	5.1x	18.2%	20.1%
OCI (010060.KS)	Neutral (2H)	KRW 200000	KRW 140000	17.2x	12.3x	5.5x	4.8x	3.7%	4.7%
Oriental Union (1710.TW)	Buy (1)	TWD 35	TWD 28.3	18.7x	12.1x	7.2x	5.2x	17.3%	24.1%
PETRONAS CG (PCGB.KL)	Neutral (2)	MYR 6.5	MYR 6.62	15.4x	16.4x	8.6x	9.8x	21.7%	15.0%
PTT Global Chem (PTTGC.BK)	Buy (1)	THB 88	THB 74	8.9x	10.0x	6.4x	6.9x	15.4%	13.1%
SPC (0338.HK)	Buy (1)	HKD 3.3	HKD 2.44	13.9x	9.3x	6.5x	5.0x	4.3%	6.3%
Shin-Etsu (4063.T)	Buy (1)	JPY 7800	JPY 6880	23.0x	19.3x	8.2x	6.9x	11.4%	13.1%
Showa Denko (4004.T)	Neutral (2)	JPY 170	JPY 138	14.2x	9.8x			4.0%	5.2%
Siam Cement (SCC.BK)	Buy (1)	THB 555	THB 452	17.1x	14.0x	12.8x	11.1x	12.2%	13.6%
Sinofert (0297.HK)	Neutral (2)	HKD 2.15	HKD 1.3	7.7x	7.2x	-0.5x	-0.3x	12.5%	11.8%
SPC (0338.HK)	Buy (1)	HKD 3.3	HKD 2.44	13.9x	9.3x	6.5x	5.0x	4.3%	6.3%
Sumitomo Bakelit (4203.T)	Neutral (2)	JPY 410	JPY 383	16.7x	12.7x	3.1x	2.8x	5.8%	6.7%
Sumitomo Chem (4005.T)	Buy (1)	JPY 410	JPY 327	69.0x	12.2x			2.2%	4.6%
Teijin (3401.T)	Sell (3)	JPY 190	JPY 219	nm	219.0x	5.2x	5.3x	-118.8%	0.7%
Tokyo Ohka Kogyo (4186.T)	Neutral (2)	JPY 2200	JPY 2210	14.3x	14.9x	1.9x	1.7x	12.8%	11.3%
Toray (3402.T)	Buy (1)	JPY 860	JPY 657	16.6x	13.5x	6.8x	5.8x	6.6%	7.7%
Tosoh (4042.T)	Neutral (2)	JPY 390	JPY 368	11.0x	10.0x	6.3x	5.7x	4.9%	5.9%
Ube (4208.T)	Neutral (2)	JPY 210	JPY 189	14.2x	10.7x	5.5x	4.9x	4.8%	5.5%
United Phosphorus (UNPO.BO)	Buy (1)	INR 205	INR 143.5	6.7x	5.7x	4.7x	4.0x	14.0%	15.0%
Yingde Gases (2168.HK)	Sell (3)	HKD 8	HKD 7.14	12.4x	10.2x	7.8x	6.3x	9.8%	10.2%
Zeon (4205.T)	Buy (1)	JPY 1400	JPY 1145	13.9x	11.8x	5.6x	4.7x	9.9%	10.9%
Asia Pacific Sector Weighted Ave (USD)				15.1x	13.4x	9.3x	8.0x	0.1x	0.1x

Source: dataCentral, Citi Research. Prices as at 11 July 2013.

Figure 99. Global Chemicals – Valuation Summary by Region, 2013E-2014E, cont'd

Company	EV* / CE		EV* / Sales		Dividend Yield		FCF Yield		Price / Book	
	2013E	2014E	2013E	2014E	2013E	2014E	2013E	2014E	2013E	2014E
Asia Pacific										
Asahi Kasei (3407.T)					2.1%	2.2%	-3.1%	5.7%	1.1x	1.0x
Asian Paints (ASPN.BO)	14.2x	13.9x	3.8x	3.3x	1.1%	1.4%	2.5%	3.3%	12.0x	10.1x
China BlueChem (3983.HK)	1.1x	1.0x	1.0x	1.0x	4.8%	4.8%	4.8%	3.6%	1.1x	1.0x
Daicel (4202.T)	1.1x	1.0x	0.7x	0.7x	1.5%	1.8%	1.8%	4.5%	1.2x	1.1x
DIC (4631.T)					2.4%	2.4%	3.4%	-3.7%	1.3x	1.2x
DKK (4061.T)	0.9x	0.8x	0.6x	0.6x	2.8%	3.0%	4.8%	6.7%	0.9x	0.8x
Formosa Chem Fib (1326.TW)	1.7x	1.7x	1.0x	1.0x	2.9%	2.6%	8.4%	7.2%	1.7x	1.7x
Formosa Plastics (1301.TW)	2.6x	2.4x	1.6x	1.5x	2.7%	3.4%	5.9%	5.1%	1.8x	1.7x
Hitachi Chem (4217.T)					2.2%	2.2%	1.5%	4.5%	1.1x	1.0x
Huabao Int (0336.HK)	1.3x	1.1x	2.2x	1.9x	6.5%	6.6%	9.2%	11.8%	1.3x	1.1x
Indorama Venture (IVL.BK)	1.2x	1.1x	0.7x	0.7x	2.1%	2.7%	-9.7%	-4.0%	1.5x	1.3x
JSR (4185.T)	1.6x	1.5x	0.8x	0.7x	1.9%	2.0%	3.5%	3.9%	1.4x	1.3x
Kaneka (4118.T)					2.3%	2.3%	-2.6%	1.5%	0.9x	0.8x
Kansai Paint (4613.T)					1.0%	1.1%	2.3%	3.4%	1.7x	1.5x
Kuraray (3405.T)	1.1x	1.0x	0.8x	0.8x	2.6%	2.6%	2.4%	3.9%	1.2x	1.1x
LG Chem (051910.KS)	1.4x	1.3x	0.8x	0.7x	1.5%	1.5%	4.6%	5.0%	1.5x	1.3x
Lotte Chemical (011170.KS)	0.7x	0.6x	0.2x	0.2x	0.7%	1.0%	2.3%	11.1%	0.8x	0.7x
MGC (4182.T)	0.9x	0.9x	0.6x	0.6x	1.6%	1.8%	-1.3%	5.6%	1.1x	1.0x
Mitsubishi Chem (4188.T)	0.8x	0.8x	0.5x	0.4x	2.5%	2.5%	6.8%	9.1%	0.8x	0.8x
Mitsui Chem (4183.T)	0.7x	0.7x	0.4x	0.4x	2.5%	2.5%	-20.7%	-1.4%	0.6x	0.6x
Nan Ya Plastics (1303.TW)	1.7x	1.7x	1.4x	1.3x	3.3%	4.1%	5.6%	7.4%	1.7x	1.6x
Nippon Paint (4612.T)					1.3%	1.6%	7.2%	8.0%	1.9x	1.7x
Nippon Shokubai (4114.T)	1.2x	1.1x	0.8x	0.8x	1.5%	1.7%	-0.8%	0.6%	0.9x	0.9x
Nitto Denko (6988.T)	2.4x	2.1x	1.1x	1.0x	1.6%	1.7%	0.4%	4.4%	2.0x	1.8x
OCI (010060.KS)	0.7x	0.7x	1.1x	1.1x	1.4%	1.4%	-9.6%	-6.2%	0.9x	0.8x
Oriental Union (1710.TW)	1.9x	1.8x	1.2x	1.0x	4.2%	5.3%	5.4%	8.4%	1.5x	1.5x
PETRONAS CG (PCGB.KL)	3.1x	2.5x	2.8x	3.1x	3.3%	3.3%	3.3%	-3.2%	2.4x	2.3x
PTT Global Chem (PTTGC.BK)	1.3x	1.2x	0.8x	0.7x	4.7%	4.2%	14.2%	10.3%	1.4x	1.3x
SPC (0338.HK)	0.9x	0.8x	0.2x	0.2x	1.8%	2.7%	17.7%	12.1%	0.8x	0.8x
Shin-Etsu (4063.T)	2.1x	1.9x	2.0x	1.8x	1.5%	1.6%	2.8%	3.7%	1.7x	1.6x
Showa Denko (4004.T)					2.2%	2.2%	-8.5%	-4.7%	0.7x	0.7x
Siam Cement (SCC.BK)	2.6x	2.5x	1.4x	1.3x	3.1%	3.8%	4.6%	4.6%	3.4x	3.1x
Sinofert (0297.HK)	-0.1x	-0.1x	0.0x	0.0x	2.6%	2.9%	0.8%	0.3%	0.5x	0.5x
SPC (0338.HK)	0.9x	0.8x	0.2x	0.2x	1.8%	2.7%	17.7%	12.1%	0.8x	0.8x
Sumitomo Bakelit (4203.T)	0.6x	0.5x	0.3x	0.3x	2.6%	2.6%	-1.2%	3.9%	0.7x	0.7x
Sumitomo Chem (4005.T)					2.5%	2.8%	-9.3%	3.9%	1.0x	0.9x
Teijin (3401.T)	0.7x	0.8x	0.4x	0.4x	1.8%	1.8%	-2.6%	-2.5%	0.8x	0.8x
Tokyo Ohka Kogyo (4186.T)	0.5x	0.4x	0.3x	0.3x	2.1%	2.2%	-2.6%	1.7%	0.8x	0.8x
Toray (3402.T)	1.2x	1.1x	0.7x	0.7x	1.5%	1.8%	-2.7%	2.7%	1.3x	1.2x
Tosoh (4042.T)	1.0x	0.9x	0.6x	0.5x	1.6%	1.6%	10.3%	9.3%	1.1x	1.0x
Ube (4208.T)	0.8x	0.8x	0.5x	0.5x	2.6%	2.6%	1.4%	5.2%	0.9x	0.8x
United Phosphorus (UNPO.BO)	1.1x	1.0x	0.9x	0.8x	1.4%	1.4%	5.0%	7.0%	1.2x	1.0x
Yingde Gases (2168.HK)	1.3x	1.1x	2.1x	1.6x	2.8%	3.5%	-6.3%	-2.7%	1.5x	1.2x
Zeon (4205.T)	1.4x	1.3x	0.9x	0.8x	1.1%	1.2%	-2.8%	3.8%	1.5x	1.4x
Asia Pacific Sector Weighted Ave (USD)	2.2x	2.0x	1.3x	1.3x	2.3%	2.5%	2.9%	4.3%	1.9x	1.7x

Source: dataCentral, Citi Research. Prices as at 11 July 2013.

Figure 100. Recommendations

Company	Rating	Target Price	Current Price	Dividend Yield	ETR	YTD Return	12m Return	Analyst
Air Liquide (AIRP.PA)	Neutral (2)	EUR 91	97.7	2.7%	(4.2%)	2.8%	11.3%	Andrew Benson
Akzo Nobel (AKZO.AS)	Neutral (2)	EUR 48	47.3	3.1%	5.3%	(4.9%)	21.4%	Andrew Benson
Arkema (AKE.PA)	Neutral (2)	EUR 80	75.9	2.8%	8.2%	(4.2%)	31.0%	Dominik Frauendienst
BASF (BASFn.DE)	Neutral (2)	EUR 72	71.2	3.8%	4.9%	0.1%	29.5%	Andrew Benson
Clariant (CLN.VX)	Buy (1)	CHF 16	14.3	2.4%	14.3%	15.8%	41.4%	Dominik Frauendienst
Croda (CRDA.L)	Sell (3)	GBP 15	26.0	2.3%	(40.0%)	9.4%	15.4%	Andrew Benson
DSM (DSMN.AS)	Buy (1)	EUR 55	53.9	2.8%	4.8%	17.7%	40.0%	Andrew Benson
Evonik (EVKn.DE)	Sell (3)	EUR 24	26.0	3.2%	(4.0%)			Andrew Benson
Givaudan (GIVN.VX)	Neutral (2)	CHF 1250	1,299.0	3.2%	(0.6%)	34.9%	39.0%	Dominik Frauendienst
Israel Chem (ICL.TA)	Buy (1)	ILS 48	35.4	7.2%	43.1%	(23.3%)	(17.3%)	Andrew Benson
Johnson Matthey (JMAT.L)	Neutral (2)	GBP 27	28.1	2.1%	(1.6%)	18.1%	27.4%	Dominik Frauendienst
K+S (SDFGn.DE)	Buy (1)	EUR 40	27.4	4.6%	53.1%	(21.6%)	(26.7%)	Andrew Benson
Lanxess (LXSG.DE)	Sell (3)	EUR 40	46.6	2.1%	(12.2%)	(29.7%)	(12.7%)	Dominik Frauendienst
Linde (LING.DE)	Neutral (2)	EUR 160	145.8	2.0%	11.7%	10.4%	25.9%	Andrew Benson
Lonza Grp (LONN.VX)	Neutral (2)	CHF 55	74.3	2.8%	(23.1%)	50.4%	75.3%	Dominik Frauendienst
PhosAgro (PHORq.L)	Buy (1)	USD 19	12.1	7.4%	64.4%	(11.0%)	0.8%	Andrew Benson
Sirius Minerals (SXX.L)	Buy (1H)	GBP 0.8	0.3	0.0%	188.3%	3.7%	76.2%	Andrew Benson
Solvay (SOLB.BR)	Sell (3)	EUR 80	102.5	3.4%	(18.8%)	(6.3%)	34.5%	Dominik Frauendienst
Symrise AG (SY1G.DE)	Sell (3)	EUR 22	33.4	2.0%	(32.0%)	23.0%	34.4%	Dominik Frauendienst
Syngenta (SYNN.VX)	Buy (1)	CHF 440	393.6	2.3%	14.4%	7.4%	22.5%	Andrew Benson
Umicore (UMI.BR)	Neutral (2)	EUR 35	33.3	3.0%	8.2%	(20.2%)	(4.8%)	Dominik Frauendienst
Uralkali (URKAq.L)	Buy (1)	USD 45.5	33.3	4.5%	41.4%	(13.0%)	(17.5%)	Andrew Benson
Victrix (VCTX.L)	Neutral (2)	GBP 15.5	16.4	2.4%	(3.9%)	1.5%	33.1%	Andrew Benson
Wacker Chem (WCHG.DE)	Neutral (2)	EUR 60	64.1	0.0%	(4.8%)	29.1%	16.2%	Andrew Benson
Yara (YAR.OL)	Buy (1)	NOK 350	259.0	5.0%	40.2%	(5.4%)	(5.2%)	Andrew Benson
Agrium Inc (AGU.N)	Buy (1)	USD 102	93.3	2.1%	11.4%	(6.6%)	4.3%	P.J. Juvekar
Air Prods & Chem (APD.N)	Neutral (2)	USD 98	97.0	2.9%	3.9%	15.5%	23.4%	P.J. Juvekar
Albemarle (ALB.N)	Neutral (2)	USD 63	65.1	1.4%	(1.7%)	4.7%	13.5%	P.J. Juvekar
Axiall (AXLL.N)	Buy (1)	USD 52	42.8	0.7%		3.6%	57.0%	P.J. Juvekar
CF Ind (CF.N)	Neutral (2)	USD 204	187.6	0.9%		(7.7%)	(3.7%)	P.J. Juvekar
Celanese (CE.N)	Neutral (2)	USD 49	47.5	0.7%		6.7%	40.6%	P.J. Juvekar
Cytec Ind (CYT.N)	Neutral (2)	USD 84	78.4	0.6%		13.9%	32.8%	P.J. Juvekar
Dow Chem (DOW.N)	Buy (1)	USD 39	34.2	3.7%	17.8%	5.8%	12.9%	P.J. Juvekar
DuPont (DD.N)	Neutral (2)	USD 55	54.5	3.3%	4.1%	21.3%	15.7%	P.J. Juvekar
Eastman Chem (EMN.N)	Buy (1)	USD 77	74.0	1.6%		8.7%	55.8%	P.J. Juvekar
Ecolab (ECL.N)	Neutral (2)	USD 85	89.9	1.0%	(4.4%)	25.0%	33.9%	P.J. Juvekar
Huntsman (HUN.N)	Buy (1H)	USD 21	17.5	2.9%	22.7%	10.2%	51.2%	P.J. Juvekar
LyondellBasell (LYB.N)	Buy (1)	USD 76	69.4	2.7%		21.5%	74.9%	P.J. Juvekar
Monsanto (MON.N)	Buy (1)	USD 122	103.3	1.5%	19.2%	9.2%	24.9%	P.J. Juvekar
Mosaic (MOS.N)	Neutral (2)	USD 57	56.9	1.8%	2.0%	0.4%	2.5%	P.J. Juvekar
PetroLogistics (PDH.N)	Neutral (2H)	USD 14.5	13.0	12.5%		(3.9%)	20.8%	P.J. Juvekar
Potash Saskatchewan (POT.N)	Neutral (2)	USD 43	39.9	3.0%	9.3%	(2.0%)	(10.3%)	P.J. Juvekar
PPG Ind (PPG.N)	Buy (1)	USD 170	158.0	1.5%	9.1%	16.8%	56.7%	P.J. Juvekar
Praxair (PX.N)	Neutral (2)	USD 125	117.4	2.0%	8.5%	7.3%	9.3%	P.J. Juvekar
Sherwin-Williams (SHW.N)	Neutral (2)	USD 179	186.9	1.1%	(3.4%)	21.5%	45.9%	P.J. Juvekar
Sigma-Aldrich (SIAL.O)	Neutral (2)	USD 79	84.1	0.0%		14.3%	19.4%	Amit Bhalla
Valspar Corp (VAL.N)	Neutral (2)	USD 73	67.8	1.4%	8.8%	8.7%	32.6%	P.J. Juvekar

Source: dataCentral, Citi Research. Prices as at 11 July 2013.

Notes

Notes

Appendix A-1

Analyst Certification

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