

# Chemical Catalysts

## Coal-to-Chemicals: A Game Changer?

- **Looming over-investment, but impact delayed on execution risks** — We see strong incentives for Chinese coal companies to expand into chemicals due to a rising import dependency on crude oil and local government support. We expect ethylene capacity additions of up to ~5-6mt from CTO/MTO by 2016-17 (20% of domestic supply), mostly focusing on commodity PE/PP. However, we see limited impact on Asian petrochemical players at least until 2015 on start-up delays.
- **Competitive cash costs, but uncertainty in returns** — We forecast ethylene cash costs at ~US\$700/t for CTO vs. US\$1,200/t for naphtha crackers and US\$300/t for US ethane crackers. The economics would depend highly on utilization, given its low variable costs (coal) but high fixed costs. We derive a pre-tax ROI of 9% for CTO projects, but it could decline to 5% based on a 70% run rate. A minimum oil price of US\$100/bbl would be needed to generate a ~10% IRR. On methanol, the global ex China supply could tighten due to rising imports from non-integrated MTO projects in coastal China. However, the PRC supply glut should persist on slower development of derivatives (DME, methanol blending with gasoline).
- **Local technology in favor** — We believe the Chinese government favors the local development of key technologies to reduce reliance on overseas licensors. The CTL demonstration plants took 2-3 years for test-runs but achieved stable production (80-90%) in 2011. DMTO is also operating well. The only exception is CTMEG, as it could only meet anti-freeze grade but has yet to qualify for polyester feedstock.
- **Prefer commodity over specialty into the next upturn** — We change FY12-14E EPS by +1% to -51% to reflect our updated products demand-supply and Citi's latest global GDP forecasts. After rolling forward to FY13E, our TP's are cut 0-9%. We believe margins are unlikely to see a strong rebound in the next six months on new cracker startups and weak near-term order visibility, but still see an ethylene up-cycle into 2014-15. The recovery for specialty chemicals (phenol, acrylate, CPL, AN) could be more muted due to rising self-sufficiency in China. We stay cautious on the Formosa sisters and our regional top picks are LG Chem and PTTGC.

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Company	Ticker	Rating		Target Price		2012E EPS		2013E EPS	
		Old	New	Old	New	Old	New	Old	New
LG Chem	051910.KS	1	1	W390,000	W390,000	W23,792	W23,792	W29,491	W29,491
Honam	011170.KS	2H	2H	W285,000	W280,000	W17,469	W13,983	W31,367	W23,121
FPC	1301.TW	2	2	NT\$78.50	NT\$77.00	NT\$3.86	NT\$2.90	NT\$5.86	NT\$4.55
FCFC	1326.TW	3	3	NT\$66.00	NT\$63.00	NT\$2.66	NT\$1.60	NT\$5.24	NT\$3.65
NYP	1303.TW	3	3	NT\$53.00	NT\$48.00	NT\$1.60	NT\$0.78	NT\$4.21	NT\$2.30
FPCC	6505.TW	3	3	NT\$75.00	NT\$75.00	NT\$1.59	NT\$1.13	NT\$4.40	NT\$3.37
OUC	1710.TW	1	1	NT\$38.00	NT\$38.00	NT\$1.80	NT\$1.38	NT\$2.92	NT\$2.41
PCHEM	PCGB.KL	2	2	RM6.50	RM6.50	RM0.44	RM0.44	RM0.45	RM0.43

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

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## Executive Summary

We see looming over-investments in coal-to-chemicals projects in China, reflecting the rising dependency on imported crude oil and strong prospects for coal as an alternative energy source. A few structural changes could emerge: 1) Increased fragmentation for commodity PE/PP market (current capacity is dominated by Sinopec and PetroChina); 2) Coal companies may be less focused on returns given the priority for securing future resource allocation; and 3) PRC government favoring local development of key technologies (MTO, CTMEG, CTL). We believe start-up delays would be common due to execution risks (lack of expertise, quality issues in CTMEG, etc.) and concern about the environmental impact. Overall, we do not see significant impact on Asian chemicals exporters until at least 2015/2016.

Among all products, we believe coal-to-olefins (CTO) would attract the strongest interest due to import substitution. China's self-sufficiency for PE and PP was 56% and 67% in 2011. We forecast total ethylene capacity additions up to ~5-6mt from CTO and MTO by 2016-17 (20% of domestic supply), but the bulk would be back-loaded. Ethylene cash costs would be competitive at ~US\$700/t vs. US\$1,200/t for Asian naphtha crackers. However, we think the economics would depend highly on utilization rate, given its low variable costs (coal accounts for <30% of total) but high fixed costs (depreciation and interest on large capex). For example, Datang's MTP plant has yet to stabilize after two years of test-runs and it had cost-overruns of over 40%. Shenhua MTO is operating far better (1H12: 95%). Based on a coal cost of Rmb300/t, we estimate a sustainable oil price of US\$100/bbl would be required to generate a ~10% IRR for CTO / CTL. We also highlight the exposure of major coal companies in this area.

The global ex PRC methanol market could also tighten into 2014-15 on start-ups of non-integrated MTO projects in coastal China. We estimate incremental demand of ~4-5mt pa, which is significant vs. 2011 PRC imports of 5.7mt. However, we think the supply glut in China (high end of global cost curve) would persist due to slower development of derivatives (DME: lack of 'clear' policy support; methanol blending with gasoline: opposition from oil companies).

On petrochemicals, the earnings have significantly disappointed this year due to weak demand and ramp-ups of Middle East supply. This drove the 11% YTD under-performance vs MSCI. We think the big consensus downgrade is mostly behind us, but expect a slow pick-up in the next six months due to new cracker start-ups and weak order visibility. We still see an ethylene cyclical upturn from 2H13, reflecting a manageable supply growth (3.2% pa over 2013-15) and a potential pick-up in buying sentiment on stabilizing macros. MEG supply would also tighten in 2013. The recovery for specialty chemicals (phenol, acrylate, AN, CPL) could be more muted due to rising self-sufficiency in China.

Analyzing the PRC retail sales suggests a pronounced slowdown of durable goods this year, but daily-use goods and clothing were more resilient. We believe this reflects better underlying demand for MEG and PE vs. SM/ABS. China's plastics film output rose 8% YTD vs. 2% growth for apparent PE consumption (i.e. de-stocking), but our channel checks suggest the current inventory is already low.

Our regional top picks are LG Chem and PTTGC. We favour LG Chem for its diversified product mix, while our Thai analyst Amornrat Cheevavichawalkul recently upgraded PTTGC on its attractive valuations and stronger earnings visibility (see [Upgrade to Buy: Resilient Earnings at Bargain Valuation](#), 25 October 2012). We remain cautious on the Formosa sisters on rising DRAM exposure and lack of long-term strategy. We consider Honam a 'high-beta' play on potential re-stocking in China, but the weaker 4Q12 EPS momentum and drag from KP Chem would cap near-term upside. China Blue is also a beneficiary of the improving fundamentals for methanol.

# Coal-to-Chemicals: A Game Changer?

## Looming over-investments, but impact delayed on execution risks

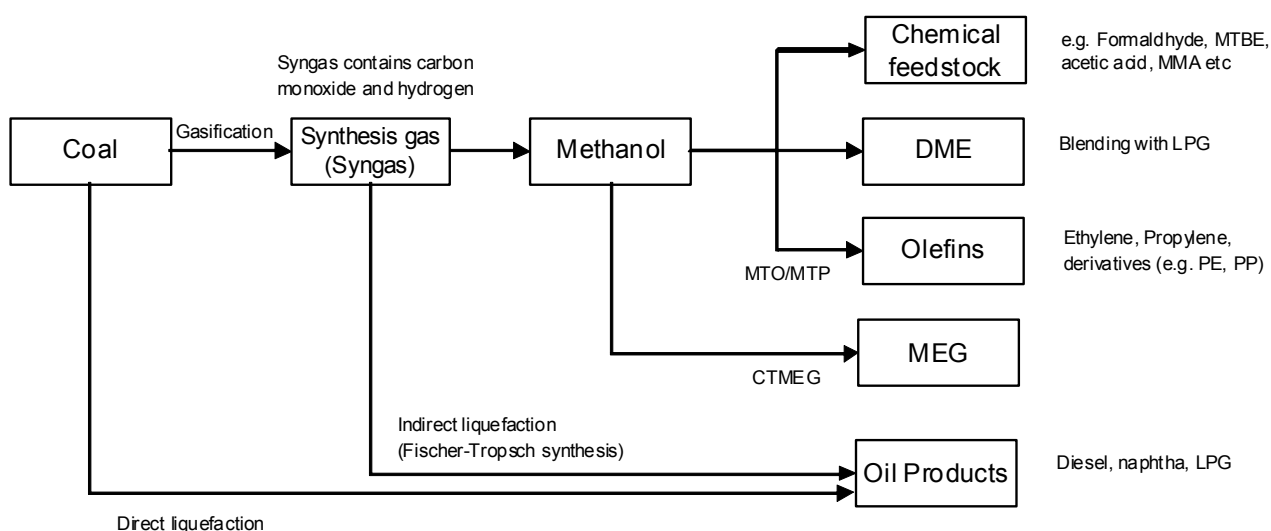
We see strong incentives for coal companies to develop coal-to-chemicals (e.g. methanol, DME, methanol-to-olefins (MTO), coal-to-liquid (CTL), coal-to-MEG (CTMEG)) given the country's abundant coal reserves and concerns about energy security pertaining to the rising dependency on imported crude oil. We believe it would be easier to secure future coal resource allocation from local governments due to higher value-added of chemical output (rather than selling coal directly). Hence, most projects would be vertically integrated and built in coal-rich provinces like Inner Mongolia, Shaanxi, Shanxi, Xinjiang etc.

Coal companies lack expertise to run chemical plants, hence delays are likely

However, we expect limited impact on Asian petrochemical producers until 2015 / 2016 due to start-up delays and longer ramp-up time for coal-to-chemical projects. These reflect: 1) lack of experience for coal companies in running large-scale chemical plants (we estimate it takes at least 6-12 months to stabilize production); 2) certain key technologies (e.g. CTMEG) are relatively new and not proven on a commercial scale outside China; 3) construction delays (stoppages in winter). The environmental impact could also be a constraint for future development, as most projects have large water consumption and carbon dioxide emissions.

Among all products, we believe coal-to-olefins (CTO) would attract the strongest interest due to potential import substitution. In 2011, China imported 8mt PE and 4.8mt PP with self-sufficiencies of 56% and 67% respectively. We expect China to remain a major net importer by 2020. However, the capital and technology entry barriers are high. CTO involves three major steps: 1) coal gasification - converting coal into synthesis gas (syngas) and then to methanol; 2) methanol-to-olefins (MTO) or methanol-to-propylene (MTP) to make ethylene / propylene; 3) polymerization into olefins derivatives like PE / PP.

Figure 1. Simple Flow Chart for Major Coal-to-Chemicals Products



Source: Citi Research

## MTO: Stable operation is the key

There are four MTO/MTP plants operating in China, with a combined ethylene and propylene capacity of 0.4mt and 1.4mt respectively. Three plants are integrated into methanol – Shenhua Baotou, Shenhua Ningxia Coal (both owned by parent of China Shenhua Energy), and Datang International Power. Sinopec operates a non-integrated MTO plant in Zhongyuan using third-party methanol.

Figure 2. Comparison of Completed CTO Projects in China

	Shenhua Baotou	Shenhua Ningxia Coal	Datang International Power
Capex (Rmb bn)	~17	~18	~23-24 (original budget: 16.2)
Coal gasification technology, scale	Texaco (7 x 1500 t/d coal feed), 5 operating, 2 spare	Siemens (5 x 2000t/d coal feed) 4 operating, 1 spare	Shell (3 x 4000t/d coal feed) 3 operating, no spare
MTO technology	DMTO (Dalian Institute)	MTP (Lurgi)	MTP (Lurgi)
PE/PP technology	Dow / Unipol	Lummus / CB&I	Dow / Unipol
Air separation unit capacity	4 x 60,000Nm <sup>3</sup> /hr (local)	2 x 90,000Nm <sup>3</sup> /hr (Air Liquide)	3 x 58,000Nm <sup>3</sup> /hr (local)
Methanol capacity ('000 tonnes)	1,800	1,670	1,680
PE capacity	300	-	-
PP capacity	300	500	460
EPC contractors	LPEC, SSEC, SNEC (Sinopec affiliates)	Huanqiu (CNPC)	CNCEC
Startup status	On-spec methanol / MTO in 3Q10, commercial operation from Jan-11	On-spec PP in May-11	On-spec methanol / PP in Jun / Sep-11 shutdown in 2Q12 for repairs
Utilisation	80-85% in 2011, 95% in 1H12	~170kt PP output in 2011; ~400kt target for 2012 (80% utilization)	Test-run (33kt output up to 15 Aug-12) Target 160kt in 2012 (70% run in Sep-Dec)

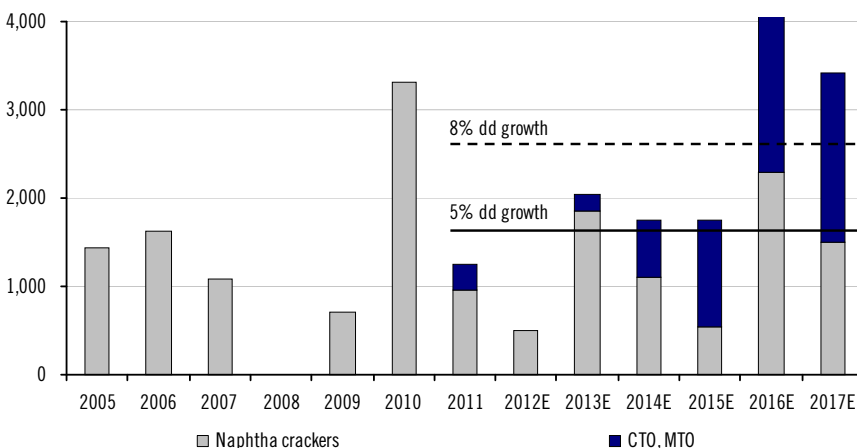
Source: Company Reports, Citi Research

## Limited impact on Asian producers until late-2015/2016

We forecast total ethylene supply additions of up to ~5-6mt from new CTO/MTO projects by 2016-17, but the bulk of capacity increase would be back-loaded. We expect two non-integrated MTO plants to start in 2013 and another two CTO plants (Yulin Coal Chem, Pucheng Clean Energy) to start in 2014. The combined ethylene capacity is 1.4mt. We also see a slowdown of naphtha cracker investments into 2014-15, after the completion of four ethylene projects in 4Q12-2H13 (total: 3mt). We would closely track the timing of the EPC contract award to determine the earliest start-up time, as construction takes ~3 years.

Limited naphtha crackers additions in 2014-15; impact from CTO projects likely to be back-loaded on execution risks

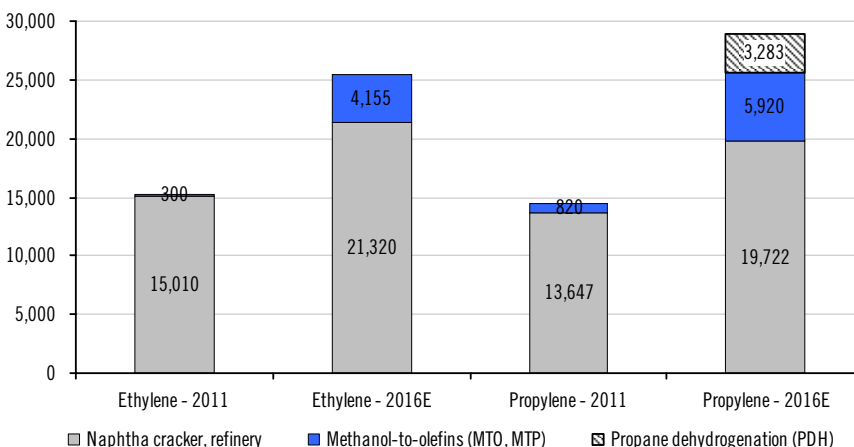
Figure 3. China's Ethylene Capacity Additions ('000 tonnes)



Source: IHS, Citi Research estimates

CTO / MTO likely to account for ~20% of olefins feedstock by 2016-17

Figure 4. China's Ethylene and Propylene Capacity By Feedstock ('000 tonnes)



Source: IHS, Citi Research estimates

## Economics: 'Threshold' oil price not that low

The capacity of a typical CTO plant is 1.8mt methanol and 600kt olefins (300kt ethylene, 300kt propylene). We expect olefins yield could be further improved by cracking by-products like C4, C5. This would lower conversion ratio of methanol to olefins from 3.0 to 2.6-2.7 and boost propylene output to 390kt. We also expect a 600kt CTO project would consume ~5mt of coal feedstock for gasification and fuel. The unit coal consumption of 1t of PE/PP would be ~7-10t, which varies depending on the quality / calorific value of coal.

We estimate the capex of an integrated 600kt CTO project at ~Rmb18-20bn. The capex per tonne of PE / PP output is ~US\$5,000/t, which is double that of naphtha crackers (~US\$2,500/t). The capex for a non-integrated MTO and downstream project (dependent on third-party methanol) would be ~Rmb7-8bn. This reflects larger capex for methanol (including coal gasification, air separation unit etc).

Figure 5. Estimated Capex Breakdown of CTO Project (Rmb bn)

	Capacity ('000t)	Unit capex (US/t)	Total capex (Rmb bn)
Methanol (incl. gasification, ASU)	1,800	700-800	~8-9
DMTO	600	-	~2.5-3.0
Downstream (PE, PP)	600	600-700	~2.0-2.5
Others (offsite, infrastructure etc)			~5-6
<b>Total (integrated CTO)</b>			<b>~18-20</b>
<b>Total (non-integrated MTO, PE/PP)</b>			<b>~7-8</b>

Source: Citi Research estimates

## Base case assumptions for CTO

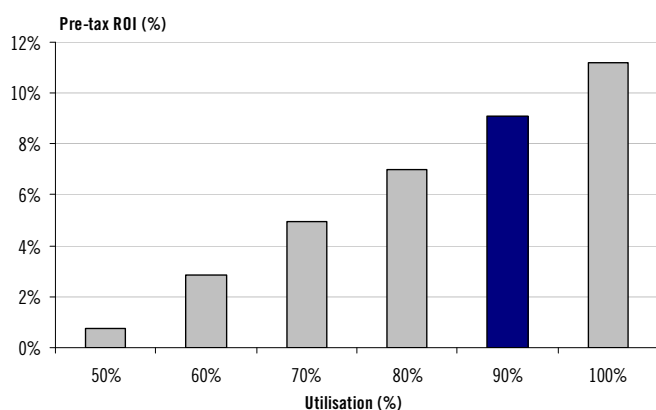
We analyze the economics of a hypothetical CTO project based on the assumptions below: coal cost of Rmb300/t, US\$110/bbl oil price, current HDPE / PP spreads of US\$400/t and US\$500/t, 15-years depreciation, Rmb18bn capex, debt-equity split of 60-40, 6% interest costs. Overall, we estimate the pre-tax return on investment ROI (EBIT / capex) at 9% based on 90% utilization, but it could drop to 5% if the operating rate falls to 70%. We estimate the current ROI for naphtha crackers is weak at ~4% due to trough cycle ethylene margin. We also factor in tax benefits (zero tax for first two years, 50% discount for next three years, 15% afterwards).

Figure 6. Sensitivity of Return of Investment (ROI) to Oil / Coal Price (%)

Oil price (US\$/bbl)	Coal Cost (Rmb/t)					
	150	200	300	350	400	500
70	3.6%	2.6%	0.7%	-0.3%	-1.2%	-3.2%
80	5.7%	4.7%	2.8%	1.8%	0.9%	-1.1%
90	7.8%	6.8%	4.9%	3.9%	3.0%	1.0%
100	9.9%	8.9%	7.0%	6.0%	5.1%	3.2%
110	12.0%	11.0%	9.1%	8.1%	7.2%	5.3%
120	14.1%	13.1%	11.2%	10.2%	9.3%	7.4%

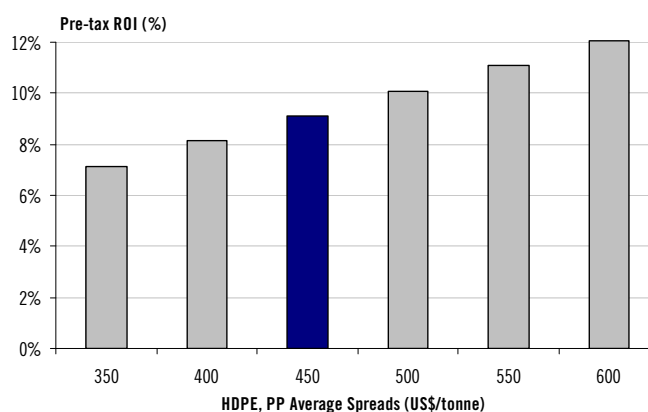
Source: Citi Research estimates

Figure 7. Sensitivity of ROI to Utilization Rate (%)



Source: Citi Research estimates

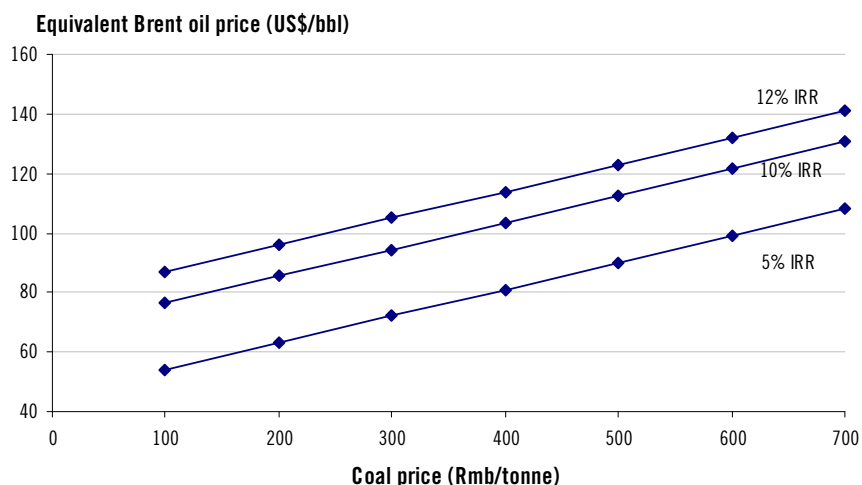
Figure 8. Sensitivity of ROI to HDPE / PP Spreads (US\$/tonne)



Source: Citi Research estimates

On an IRR basis, we believe the project would generate 10% IRR with a sustainable oil price of about US\$95-100/bbl (could be even higher if initial start-up is not smooth, leading to cost overruns). However, the investment decision for CTO is not purely driven by returns, but more on the need to secure new coal mine allocations.

Figure 9. Sensitivity of Integrated Coal-to-Olefins Project Returns\*



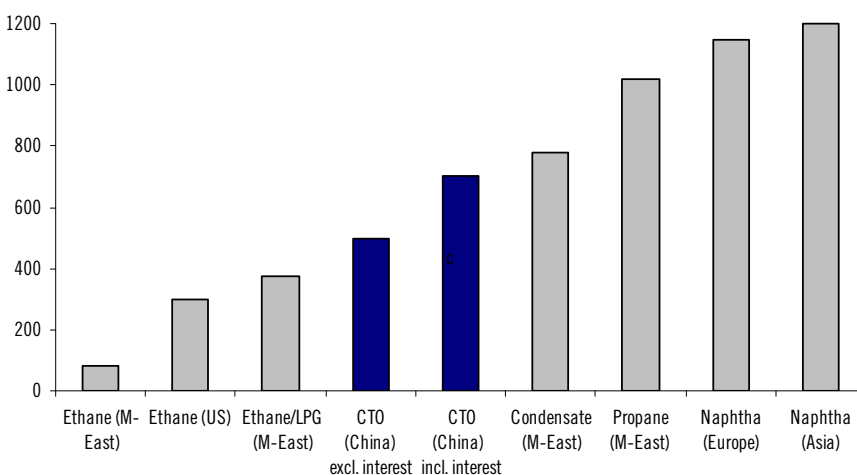
Source: Citi Research estimates

As most CTO projects have access to mine-mouth coal (low variable costs), we expect coal would only account for ~20-30% of total costs. This is significantly lower than >80% feedstock costs for naphtha crackers. Hence, the profitability for CTO would depend largely on utilization rates, given the high fixed costs like depreciation and interest expense (combined ~50% of total costs).

Based on a Rmb300/t coal price, we estimate CTO methanol cash cost at US\$165/t. Assuming a US\$200/t conversion cost for MTO (1 tonne of olefins needs 3 tonnes of methanol feedstock), olefins cost would be ~US\$500/t after netting off co-product C4/C5 credits (0.2t per 1t of olefin output). This is significantly below ~US\$1,200/t for Asian naphtha crackers. We forecast interest costs at US\$190/t. However, we expect CTO's all-in PE/PP production costs could reach ~US\$1,150/t due to high depreciation costs. Overall, we expect the CTO breakeven utilization at ~70% at current oil price, which explains the loss for Datang MTP (unable to start booking revenue despite its mechanical completion in 2010).

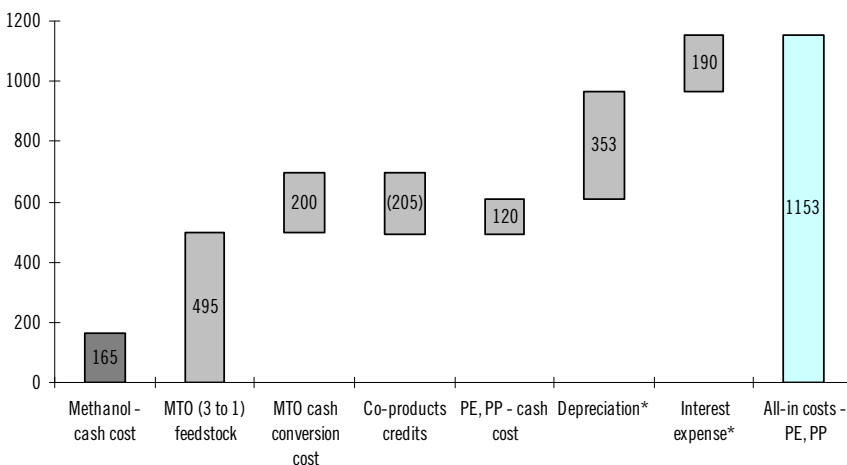
**CTO cash cost competitive vs naphtha crackers, but all-in costs dependent on the ability to operate smoothly and at high utilization**

Figure 10. Ethylene Cash Production Costs (US\$/tonne)



Source: IHS, Citi Research estimates

Figure 11. Estimated Cost Breakdown of CTO Projects (US\$/tonne)

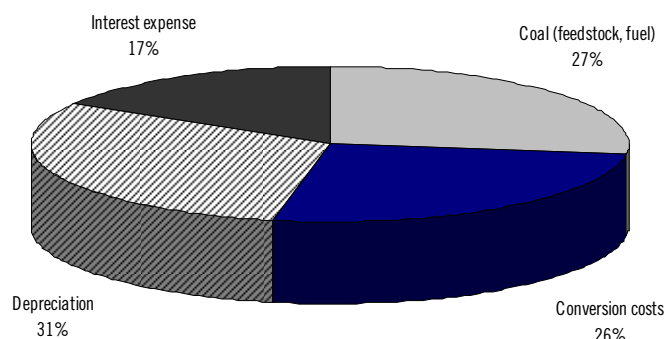


Source: Citi Research estimates



CTO has low variable costs but high fixed costs

Figure 12. Estimated Cost Breakdown of MTO Project in China



\* Assuming 15-years depreciation and Rmb300/t coal cost. Source: Citi Research estimates

A tale of two operators... Datang vs. Shenhua

### Local technology in favour

The execution of Shenhua Baotou CTO project was good and average utilisation reached 83% and 95% in 2011-1H12. However, Datang MTP had various start-up problems (e.g. the coal gasification plant, which is the largest in the world, is difficult to operate smoothly using low-grade coal feed). According to our power analyst, Pierre Lau, Datang stepped into trial production on 16 March 2012 and produced 32.6kt PP by 15 August. Datang targets to produce over 160kt PP by end-2012E (implying over 70% utilisation over Sep-Dec) and we expect commercial operation once this target is made. It also suffered significant cost over-runs - CIP was Rmb22.7bn in June 2012 vs. original capex budget of Rmb16.2bn.

Local DMT0 technology is proven by high utilization of Shenhua Baotou

Shenhua Baotou uses DMT0 technology from Dalian Institute of Chemical Physics, Chinese Academy of Sciences. The plant started commercial production in early 2011. Given the successful track record (profitable in 2011), we expect the bulk of new PRC projects would likely adopt similar technology. The downstream products would be focused on polymers – PE/PP is more commoditized, easy to transport and handle (solid) and has largest volume of demand.

Shenhua Ningxia Coal (unlisted) and Datang International Power both use Lurgi MTP technology. Sinopec developed an in-house technology (SMT0) and started its first commercial plant (Zhongyuan) in 4Q11. UOP/Hydro also has a similar MTO technology, but no commercial-scale plant is running it yet.

Based on a Rmb150/t lignite coal input costs, 22-years straight-line depreciation (normal: 15 years for other PRC chemical plants) and 80% utilisation, we estimate Datang MTP's pre-tax profit at ~Rmb0.4bn. However, this is likely to be lower than Shenhua CTO (~Rmb1bn) due to higher costs on a later start-up.

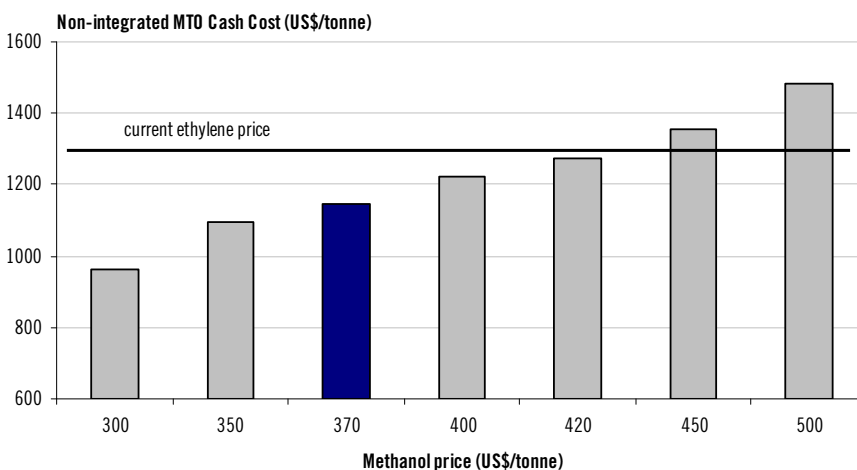
### Non-integrated MTO: Highly sensitive to methanol costs

We see a few non-integrated MTO projects in coastal China, which are owned by private companies like Ningbo Heyuan, Sanjiang etc. We expect the majority of feedstock would be imported rather than sourced domestically. This reflects the high transportation costs of methanol from inland areas (~Rmb600-700/t) despite the oversupply. The incremental methanol demand for one MTO project is significant at 1.8mt or 31% of 2011 total PRC imports.

We expect these coastal MTO projects will find it relatively easy to secure government approval due to fewer environmental issues. The downstream product mix would also be more diversified (e.g. MEG, EO, EVA) rather than commodity PE for most CTO projects. However, the profitability is highly sensitive to methanol (~80% of all-in costs vs. ~20-25% for CTO). Our sensitivity suggests the maximum affordable methanol price (i.e. breakeven) at ~US\$400-420/t vs. current price of US\$365/t. Even assuming a peak cycle ethylene/propylene-naphtha spread of US\$500/t, we estimate the 'threshold' for methanol would only be slightly higher at US\$450/t.

**Non-integrated MTO plants could not accept methanol cost of US\$420/t or above at current olefins price**

Figure 13. Non-Integrated MTO Cash Production Cost (US\$/tonne)



Source: Citi Research estimates

Another group of MTO projects mostly have in-house methanol plants (i.e. partial integration) like Shenhua Ningmei #2, Yankuang, Jiutai etc. The methanol capacity is 0.6-1mt each and the remaining feedstock (40-60% of total) would be sourced locally. We believe MTO integration could improve utilization for existing methanol plants due to insufficient domestic demand currently. For example, Yanzhou started commercial run of a 600kt plant in Yulin, Shannxi in September 2009, but the contribution was limited in 2011 (77% utilisation, 9% gross margin). However, the inland MTO projects should have limited impact on international merchant methanol market.

Figure 14. Comparison of MTO Projects in China

	Coal-to-methanol-to-olefins (CTO)	MTO in inland area	MTO in coastal area
Capex (Rmb bn)	~18-20	~7-8	~7-8
Methanol feedstock	Self-sufficient (integrated)	3 <sup>rd</sup> party (either has existing methanol plant or sourced from plants nearby)	3 <sup>rd</sup> party (mainly by imports, some sourced from domestic market)
Key success factors	Availability of cheap mine-mouth coal, water resources	Abundant supply of methanol locally	Long-term offtake for methanol supply, good port and logistics conditions
Key risk factors	Emission quotas (CO <sub>2</sub> ), water constraint, logistics (end market far away)	Methanol feedstock supply and price logistics (end market far away)	Methanol feedstock supply and price
Key driver for profitability	Oil price, utilization	Methanol price, utilization	Methanol price, utilization
Execution risk	High	Medium	Medium
Downstream products	PE, PP mostly	PE, PP mostly	More diversified (EO/EG, EVA, PP and other olefins derivatives)
Major participants	State-owned coal companies	Coal / chemical companies	Mainly private chemical companies

Source: Citi Research

Figure 15. Capacity of Major MTO/MTP Projects In China ('000 tonnes)

Companies	Location	Startup	Methanol	Ethylene	Propylene	Downstream
<b>Under construction</b>						
Ningbo Heyuan	Zhenhai, Ningbo	2H13	*	300	390	MEG, PP
Yanchang Petroleum / China Coal JV	Yulin, Shaanxi	2014	1,800	600	650	PE, PP
Pucheng Clean Energy	Weinan, Shaanxi	2014	1,800	300	380	PE, PP
China Coal Yulin Coal Chem	Yulin, Shaanxi	2015	1,800	300	300	PE, PP
Shenhua Ningmei #2	Ningdong, Ningxia	2H14/2015	#	-	500	PP
Ningxia Baofeng Energy	Ningdong, Ningxia	2015	1,500	300	300	PE, PP
Shenda Chemical	Tengzhou, Shandong	2015	*	170	200	PP, EO
Qinghai Saltlake	Germud, Qinghai	2015-16	1,000	160	160	PVC, PP
<b>Sub-total</b>			<b>8,200</b>	<b>2,130</b>	<b>2,880</b>	
<b>Under planning stage</b>						
Jiutai Energy	Erdos, Inner Mongolia	2015	#	300	300	PE, PP
Sanjiang Chemical	Zhapu, Zhejiang	2015	*	300	400	EO, EG
Sinopec JV in Anhui	Wainan, Anhui	2015-16?	1,700	300	300	PE, PP
Sinopec JV in Guizhou	Zhijin, Guizhou	2015-16?	1,800	300	300	PE, PP
Shenhua Shaanxi	Yulin, Shaanxi	2015-16	1,800	300	300	PE, PP
Shenhua Xinjiang	Xinjiang	2016-17?	1,800	300	300	PE, PP
China Power / Total JV	Erdos, Inner Mongolia	2016-17?	1,800	400	400	??
Yanchang Petroleum	Yan'an, Shaanxi	2016-17?	1,800	450	450	PE, PP, NBA
Yankuang Guohong	Zoucheng, Shandong	2016-17?	#	300	300	PE, PP
Shenghong Group	Linyunguang, Jiangsu	2015-16	*	300	300	PE, AN, MMA
<b>Sub-total</b>			<b>10,700</b>	<b>3,270</b>	<b>3,410</b>	
<b>Possible projects</b>						
Sinopec JV in Henan	Hebi, Henan	2016-17?	1,800	300	300	
Sinopec / China Coal JV	Erdos, Inner Mongolia		n/a	n/a	n/a	
China Coal Yili	Yili, Xinjiang		1,800	300	300	
Shanxi Coking	Hongtong, Shanxi		1,800	300	300	
Dow / Shenhua	Yulin, Shaanxi		3,320	600	600	

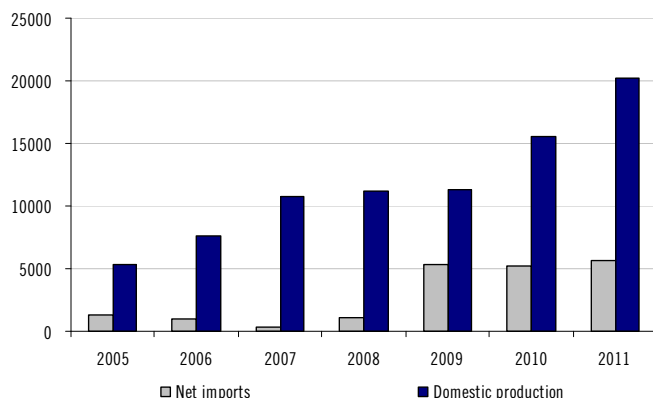
Note \*: Based on third-party methanol (mostly imports). # Partly or fully integrated into existing in-house methanol. Source: IHS, Citi Research estimates

## Methanol: A Two-Tier Market

We believe the huge methanol oversupply in China should persist over the next few years but the global ex PRC market is relatively balanced (modest demand growth, but only few capacity additions). IHS forecasts global methanol demand growth of 8.6% CAGR over 2012-16 and China would account for ~80% of incremental demand.

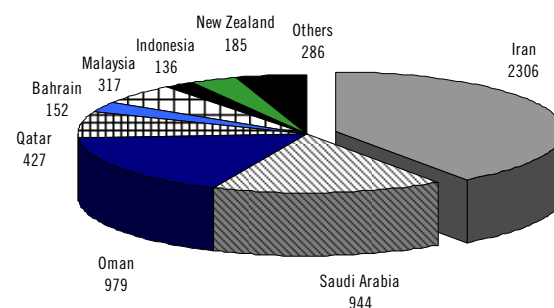
China has ~40mt methanol capacity but the nameplate utilisation is only 50-55% currently. Despite this, China is still a net importer of methanol and 2011 imports rose 10% YoY to 5.7mt (accounting for 20% of total domestic demand). This reflects: 1) high cost of coal-based methanol in China vs competitive gas-based methanol imports; 2) difficulty in transporting large volumes of methanol from inland (supply) to coastal areas (demand).

Figure 16. China's Methanol Production and Imports ('000 tonnes)



Source: CEIC, Citi Research

Figure 17. China's 2011 Methanol Imports ('000 tonnes)



Source: CEIC, Citi Research

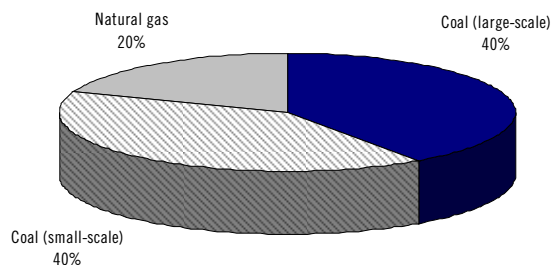
## China: Huge oversupply likely to persist

In China, the large capacity builds (from 15mt in 2007 to 40mt in 2012) were driven by: 1) expectations of strong non-traditional methanol demand as a fuel substitute and olefin feedstock; 2) abundant coal reserves; and 3) increasing value-added for the coal-mining industry.

With the rising trend of domestic natural gas prices, we believe coal is preferred over gas as a feedstock for methanol in China. The government already restricts construction of new gas-based methanol projects and charges a higher gas price for existing plants (~30% premium over fertilizer usage) due to strong residential gas demand. The majority of methanol capacity is built in coal-rich provinces, which is likely to have a competitive cost structure due to low coal costs.

We estimate China has ~4mt of sub-scale (<200kt) coal-based methanol capacity and future rationalisation is likely. We also expect most gas-based methanol in southwest China to run at lower rate due to feedstock shortage (particularly in winter). The only exception is China Blue, given the long-term offtake contracts with parent CNOOC. China has ~6-7mt of coke oven gas-based methanol capacity. While the scale is usually small (e.g. 100kt methanol ties in with 1mt coke plant), these projects are supported by government as they could reduce pollution (as the coke gas is flared before).

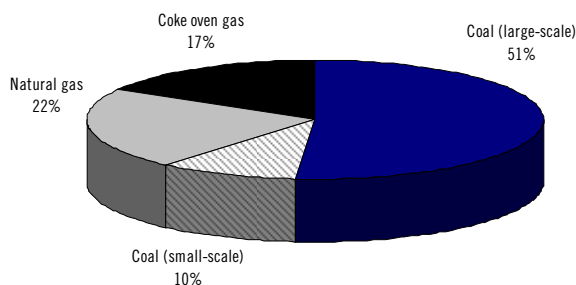
Figure 18. China's Methanol Feedstock – 2005



2005 PRC methanol capacity: 8.5mt

Source: Citi Research

Figure 19. China's Methanol Feedstock – 2011



2011 PRC methanol capacity: 40mt

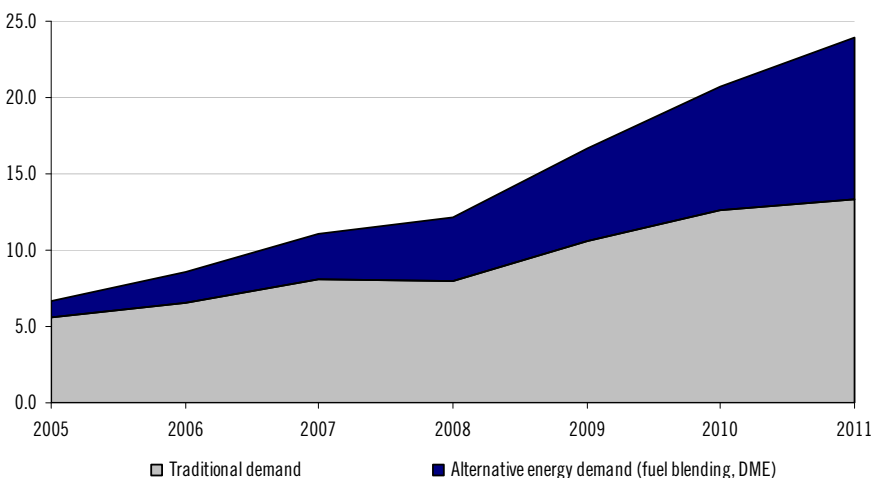
Source: Citi Research

China is the largest methanol market in the world, accounting for ~50% of total demand. The PRC demand growth was robust at 25% CAGR (from 11mt in 2007 to 26mt in 2011), but the industry remains in a huge glut due to slower development of derivatives market for fuel (methanol blending with gasoline, DME). This reflects the high entry barriers (e.g. logistics, technology) and lack of 'clear and favourable' government policies. We also expect the bulk of MTO projects would be backwardly integrated (i.e. no need for third-party purchases of methanol), which could not absorb the surplus.

Methanol is a primary feedstock for various chemicals, including formaldehyde, MTBE, acetic acid, MMA etc. Formaldehyde is the largest driver (one-third of global demand) and is used to make adhesives (e.g. plywood) and other plastics resins. Acetic acid is used as feedstock for PTA. MTBE is used for gasoline blending to boost octane value. We estimate the 'traditional' applications accounted for about half of China's methanol demand in 2011 (2007: 70%). While there are no 'official' statistics available, we estimate ~4-5mt of methanol demand was used for fuel blending (~15% of total) in 2011 vs. ~1-2mt in 2007.

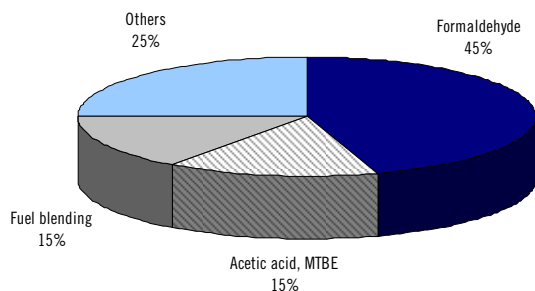
#### Robust demand for alternative energy usage

Figure 20. China's Methanol Demand – Traditional vs. Alternative Energy\* (mt)



\* Excludes 2mt methanol demand for integrated MTO/MTP plants. Source: Citi Research

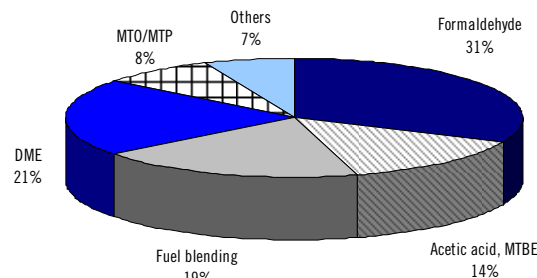
Figure 21. China's Methanol Demand Breakdown – 2005



2005 PRC methanol demand: 6.7mt

Source: Citi Research

Figure 22. China's Methanol Demand Breakdown – 2011



2011 PRC methanol demand: 26.5mt

Source: Citi Research

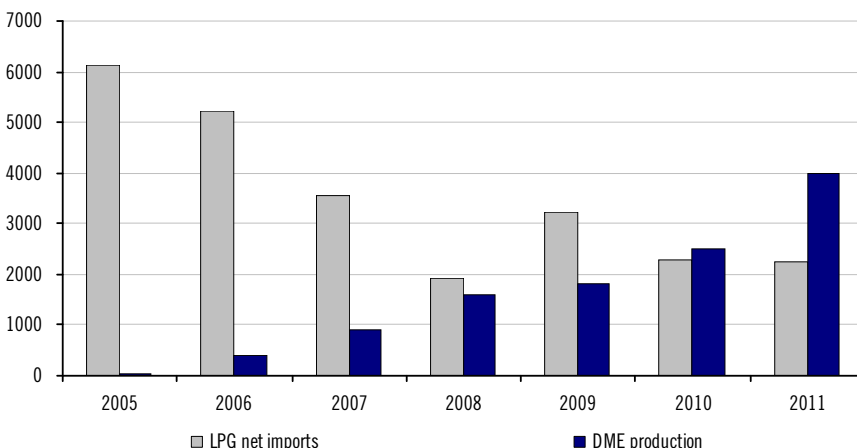
## DME: Lack of 'clear' policy hinders development

Dimethyl ether (DME) is a clean-burning fuel and could be blended into liquefied petroleum gas (LPG) for sales with limited modifications for existing infrastructure. China is a net LPG importer, which has driven rapid DME capacity build-ups since 2006. We believe the major constraint for DME is the difficulty in transportation over long distances (maximum: 500km), as it needs to be compressed into liquid.

China has >10mt DME capacity in 2011 but the industry utilisation is only 35-40% due to the lack of government support. The Ministry of Housing and Urban-Rural Development approves the usage for DME as city gas from January 2008, but it only applies to direct DME burning. However, the General Administration of Quality Supervision, Inspection and Quarantine issued a circular prohibiting the blending of DME into household LPG storage tanks in March 2008 (needs to use specialized tanks). Shandong and Guizhou announced provincial standards for DME blending in 2007 and 2009 respectively, but other provinces are not as supportive. Some local authorities in Guangdong even clamped down DME usage in 2010 due to complaints on leakage (DME corrosion on rubber plug) and efficiency (sold at the same price despite DME's lower energy content).

## LPG import substitution with DME

Figure 23. China's LPG Net Imports vs. DME Production ('000 tonnes)



Source: CEIC, Citi Research

Figure 24. Comparison Between Various Fuels

	Methanol	Ethanol	DME	MTBE	Butane (LPG)	Gasoline	Diesel
State at room temp and pressure	Liquid	Liquid	Gas	Liquid	Gas	Liquid	Liquid
Octane number (gasoline)	108	107	n/a	118	94	90-98	n/a
Cetane number (diesel)	n/a	n/a	55-60	n/a	n/a	n/a	40-55
Net energy (MJ/kg)	20	27	28	35	45	42-44	43

Source: US DOE

Hence, this has resulted in suspension of a mega coal-based DME project in Inner Mongolia (20mt coal mine, 4.2mt methanol, 3mt DME, DME pipeline to Beijing). The project was approved by NDRC in July 2006 and led by Sinopec, China Coal and other partners. However, limited progress was made and we think the scope may be changed to an integrated CTO instead.

The current DME price is ~Rmb4,500/t vs LPG price of Rmb6,600/t. DME tracks methanol pricing closely (1t of DME consumes 1.4t of methanol feedstock, plus ~Rmb500/t conversion cost), but upside is also capped by crude oil price. As DME is more cost competitive vs LPG under the current high oil price, LPG sellers have an incentive to blend DME (e.g. 20% DME with 80% LPG) to improve profitability. We think this partly explains the decline of LPG net imports (from 5-6mt pa in 2001-06 to 3.2mt in 2009 and 2.3mt in 2011).

DME also has the potential to be used for diesel blending given its high cetane value, but we believe it is still in very early stage to be used for transportation fuel. Outside of China, DME is mainly used as spray propellant but global demand is very small (below 1mt). We estimate China's methanol demand for DME at 5.6mt in 2011 (21% of total), but do not see strong growth ahead unless there is further government support.

## Methanol gasoline: Opposition from oil companies

We are not too optimistic about the country-wide adoption of methanol gasoline in China. We think this reflects: 1) opposition from the state-owned oil companies, as the low-cost methanol could challenge their existing market share on refined oil products; 2) health concerns about methanol given its high toxicity and corrosive effect on car engines.

**M85 standard has limited applications, but national standard of M15 yet to be announced**

The national standard for M85 (85% methanol, 15% gasoline) was issued in 2009, but the application is so far limited as car engines need modifications before using M85. However, at least ten provinces announced provincial standards for blending with low-content methanol (e.g. M15 – 15% methanol, 85% gasoline). This has resulted in robust growth for methanol fuel blending in China. As the methanol price (Rmb2,700/t) is less than half that of gasoline (Rmb8,840/t), we think some non state-owned gas stations may 'secretly' blend methanol into gasoline, but the product is not sold by Sinopec or PetroChina.

China's gasoline demand was 77mt in 2011, which implies ~6% overall blending ratio with methanol. Assuming M15 is implemented across China, we estimate this would result in incremental methanol demand of up to ~7-8mt and absorb the bulk of current surplus. However, we consider this is a highly unlikely scenario.

Only provincial standards available;  
opposition from oil companies due to  
potential loss of gasoline market share

Figure 25. Provincial Standards on Methanol Gasoline Blending



Source: Citi Research

## Ex-China: Potential upside dependent on MTO ramp-ups

The global ex China market is likely to see a structural shift in the competitive landscape. We see limited new supply additions going forward from the existing players in Middle East and Latin America on feedstock constraints. For example, Methanex's Chile operations had severe gas supply curtailment from Argentina (priority for residential heating demand) and could only run one of its four plants at ~30-40% utilization this year. However, the US is likely revive as a key producer given the shale gas advantage.

The large capacity growth over 2009-10 (9mt total) is over and we only expect one new greenfield project in Azerbaijan (0.7mt). Despite this, we expect various plant restarts in North America and New Zealand would add up to 4mt supply in 2011-15 (including the relocation of Methanex's one Chile plant to the US).

Figure 26. World ex China Methanol Capacity Additions ('000 tonnes)

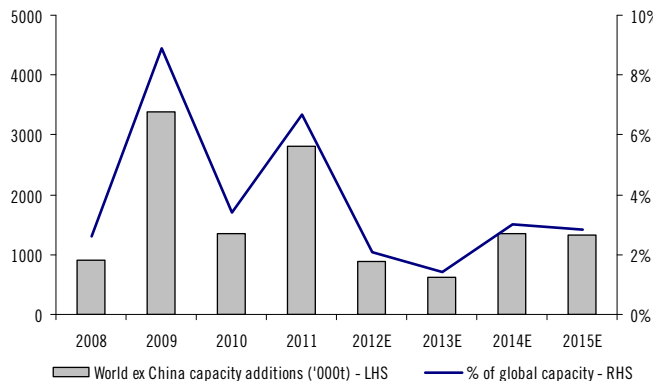
	Capacity ('000t)	Start-up time	Details
<b>Restarts / relocation</b>			
Methanex - Canada	470	Apr-2011	restart cost at US\$40m cost
OCI Nitrogen (Beaumont - Texas)	850	mid-2012	plant purchased at US\$65m
Methanex - New Zealand	650	Jul-2012	may add ~900kt by end-13 by restart of another line / expansion
LyondellBasell - Channelview	750	late-2013	
Methanex - Geismar	1,000	end-2014	relocation of 1 idled line from Chile to US
<b>Sub-total</b>	<b>3,720</b>		
<b>New plants</b>			
Azerbaijan Methanol	700	2014	
Celanese - Clear Lake, Texas	1,300	after July 2015	
JSC Urals Methanol	600	2016?	

Source: Company Reports, Citi Research estimates



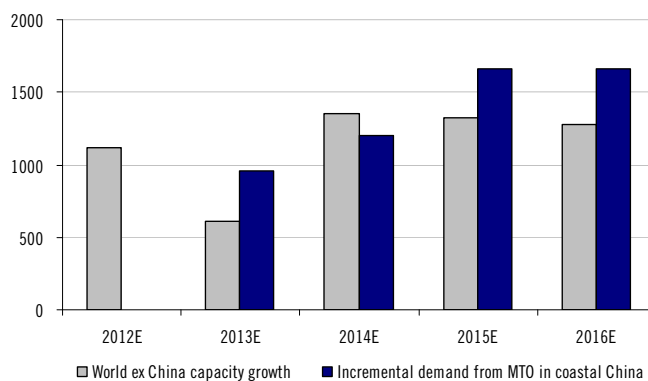
We expect global ex China methanol demand growth at ~1-2% pa, but the start-ups of non-integrated MTO projects should become a new demand driver. We see at least four MTO projects in coastal areas of China dependent on third-party methanol (currently under construction or planning stage). Assuming 90% MTO utilization, we estimate 4-5mt pa methanol demand by 2015-16. This is significant vs 2011 PRC imports of 5.7mt. We think the bulk of feedstock is likely to be imported given the logistics advantage.

Figure 27. Global Ex China Methanol Capacity Additions ('000 tonnes)



Source: Citi Research estimates

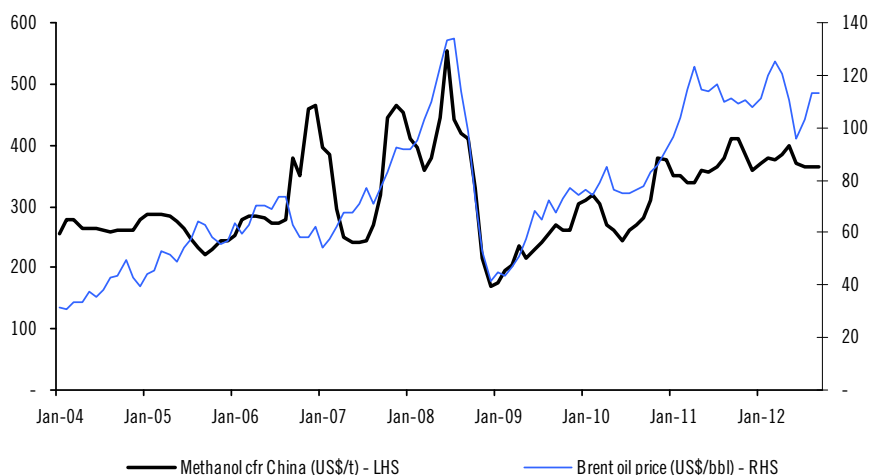
Figure 28. Incremental Methanol Demand from MTO in China ('000t)



\* Based on 90% utilization of non-integrated MTO in coastal China. Yet to factor in demand growth for 'traditional' usage (~1-2%). Source: Citi Research estimates

We forecast methanol prices to be relatively stable at US\$360-370/t in 4Q12-1H13 due to stable demand-supply and firm energy prices. We expect global demand-supply could tighten and see potential upside from 2H13 depending on the ramp-ups of new MTO projects. However, we believe the price is unlikely to surge sharply (say, to mid or high-US\$400/t), reflecting the deteriorating economics for MTO. Overall, we forecast Asian methanol prices at US\$370/t, US\$385/t and US\$400/t and US\$420/t in 2012-15 respectively.

Figure 29. Methanol Price (US\$/tonne) vs. Brent Crude Oil Price (US\$/bbl)



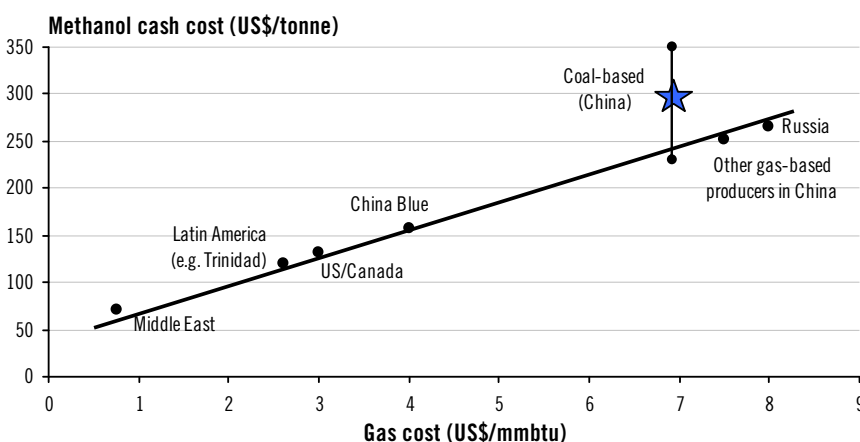
Source: Bloomberg, CEIC, Citi Research

## Methanol economics: China at the high end of cost curve

Traditionally, methanol is considered a way to monetize gas resources, particularly for remote locations which lack the infrastructure (pipeline) to sell gas. Based on a gas price of US\$0.75-1/mmbtu, we estimate methanol cash cost is the lowest in Middle East at US\$70-80/t. This will be followed by methanol producers in Latin America (e.g. Trinidad, Venezuela) and Southeast Asia (e.g. Malaysia, Brunei) and we estimate gas cost of ~US\$3-4/mmbtu. We believe Europe / Russia (gas-based) and China (coal-based) are at the high end of cost curve (cash cost of ~US\$300/t or higher).

**China remains a major net importer of low-cost methanol supply despite its huge domestic glut**

Figure 30. Estimated Methanol Cash Production Costs Excluding Freight (US\$/tonne)



Source: Company Reports, Citi Research estimates

**Most coal-based methanol projects have poor returns, including Yanzhou**

In China, we believe most sub-scale methanol plants (based on anthracite coal) are not operating due to high costs. The larger thermal coal-based capacity is more cost competitive, but it still significantly lags major producers outside China. For example, the production cost of Yanzhou Coal's Shaanxi Yuiln methanol plant (600kt capacity) was Rmb1,812/t and Rmb1,684/t in 2011 and 1H12 respectively, implying cash costs of US\$250-270/t. The profitability (gross margin: 9% and 15% in 2011 and 1H12) was further hurt by lower realized prices. We note Yanzhou's ASP was at 10-15% discount to China Blue, a gas-based methanol producer in Hainan. We believe the price gap reflects the transportation costs to end markets.

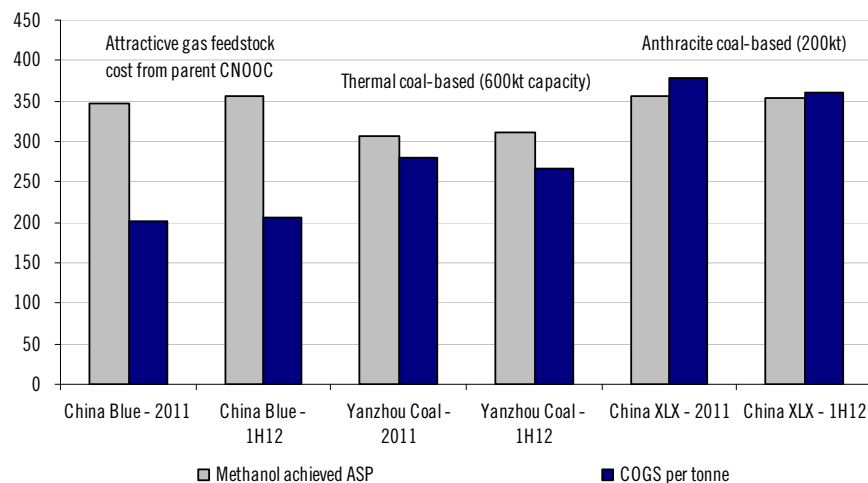
**China Blue is the only competitive PRC gas-based methanol producer on a long-term gas off-take contract with CNOOC**

We forecast gas cost for China Blue is competitive at ~US\$3-4/mmbtu, which implies methanol cash cost of US\$160-180/t. This reflects the long-term (15-20 years) off-take gas contracts with parent CNOOC, which is not subject to regulation (unlike onshore gas fields). The Chinese government raised ex-wellhead onshore gas prices by Rmb0.23/m<sup>3</sup> in June 2010 and no adjustment was made afterwards. Despite this, we expect the gas cost for other PRC producers is much higher at ~US\$7-8/mmbtu (methanol cash cost: US\$250-300/t) and these plants also suffer feedstock shortage.

We expect the recent drop in coal price would reduce marginal players' costs and hurt the cost advantage of gas-based producers in China. As 1 tonne of methanol consumes ~2-2.5t of coal (gasification and fuel, depending on coal quality), we estimate the YTD coal price decline of ~Rmb200/t could reduce methanol input costs by ~Rmb400-500/t (US\$50-70/t).

**Anthracite coal-based methanol likely to see future rationalisation**

**Figure 31. Methanol ASP and COGS for Selected Chinese Producers (US\$/tonne)**



Source: Company Reports, Citi Research

The freight cost is another factor in analyzing the competitiveness of methanol given its relatively low ASP vs other chemicals. For example, it costs ~US\$40-50/t to ship from Middle East into China, but the inland transportation costs (by rail) from coal-rich regions to coastal areas in China is more expensive at Rmb600-700/t (US\$100/t). Hence, there are limited export opportunities for PRC producers despite the domestic glut.

We estimate the capex for coal-based methanol in China at ~US\$700-900/t vs US\$400-500/t for gas-based methanol (China Blue). The capex for non-PRC gas-based projects is ~US\$700/t due to higher EPC costs (engineering, procurement, construction).

**Biodiesel accounts for 4% of global methanol demand**

While the US's MTBE ban (used for gasoline blending) resulted in a decline of methanol demand (~3mt over 2000-07), we expect this would be partly offset by another application – biodiesel. Biodiesel is produced from the esterification of fat (e.g. palm oil), which requires ~10% of methanol feedstock. We expect biodiesel accounted for 4% of global demand in 2011. The EU maintained a mandate of 10% biofuel content for transportation fuel in 2020, which should support demand. IEA forecasts global bio-diesel output to rise from 0.35m b/d in 2011 to 0.47m b/d in 2015, implying ~0.6mt of incremental methanol demand.

## CTMEG: Pending Technology Breakthrough

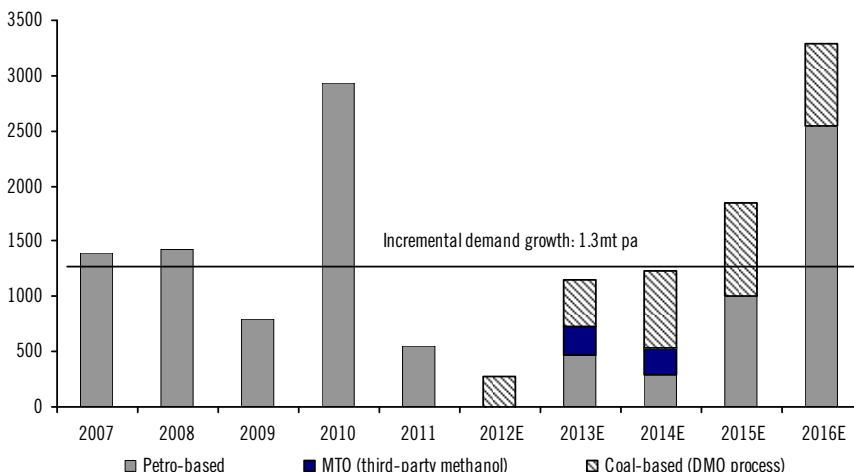
**Catalysts instability and product quality issues hinder CTMEG development**

China developed a new coal-to-MEG (CTMEG) technology, which is different from the traditional process (ethylene combines with oxygen to make ethylene oxide and then MEG). However, we see limited impact from CTMEG at least for the next 1-2 years, as the first commercial plant (Tongliao GEM Chemical, 150kt MEG, 100kt co-product oxalic acid capacity) has yet to achieve stable operations.

Our channel checks suggest the technology was not fully mature due to: 1) catalysts instability and 2) impurities in the CO feedstock stream and MEG. For example, the CTMEG output only meets anti-freeze grade currently but not polyester yet (80-90% of total demand). Management said it would focus on improving UV penetration in 2H12 to meet the standard for polyester grade MEG.

**We see limited petro-based MEG additions in the next two years, which should support healthy spread**

**Figure 32. Global MEG Capacity Additions ('000 tonnes)**



Source: IHS, Citi Research estimates

**First commercial CTMEG plant has yet to reach full run despite start-up in 4Q09**

Tongliao started test-runs in 4Q09 but only recognized sales from 2H11 (Rmb3bn capex vs. original budget of Rmb2.1bn). The average utilization stayed low at 37% and 54% in 2H11 and 1H12 respectively (could reach up to ~80%, but not on a sustainable basis). This reflects shutdowns for technical improvement and operating issues. Tongliao's net loss was Rmb139m and Rmb98m in 2H11 and 1H12 due to high fixed costs (depreciation, catalysts).

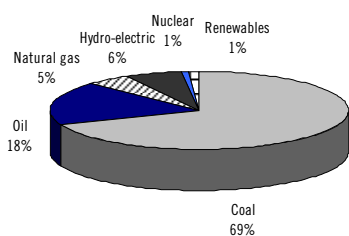
We estimate coal input cost would be ~Rmb1,000/t (1t of CTMEG consumes ~5.5-6t of lignite coal at ~Rmb150-200/t). However, Tongliao's MEG production cost (excluding SG&A) was much higher at Rmb6,800/t (US\$1,080/t) based on 1H12 reported gross margin of -14%. Stripping out depreciation, we forecast MEG cash cost of ~US\$580/t. It achieved breakeven level in 3Q12.

Given the low self-sufficiency of MEG in China (2011: 29%, the lowest among major chemicals), we see strong interests to build CTMEG for import substitution. Danhua Technology (600844.CH, N/R) licensed its CTMEG technology to form a JV with Henan Coal to build 1mt MEG capacity (five plants, 200kt each). Two plants (Xinxiang, Puyang) produced on-spec product in March and August 2012, and another two plants (Anyang, Yongcheng) would likely finish construction within the next 12 months. However, we believe it would take some time for these plants to achieve long and stable cycles of production.

Sinopec also developed a similar technology and completed a 1,000t pilot plant in Yangzi in end-2011. It also started building a 200kt demonstration plant in Hubei (conversion from an existing urea facility to utilize an idled coal gasification plant). The capex is ~Rmb2bn and expected start-up is end-2013. Overall, we forecast total nameplate CTMEG capacity of 2.3mt capacity vs. 5.8mt petro-based MEG in 2015 but see much lower utilisation for CTMEG. We would monitor the financial performance of Danhua (owns 54% of Tongliao) to assess potential impact on MEG market.

Under the CTMEG technology (also called DMO process), coal is gasified to form synthesis gas. Carbon monoxide (CO) reacts with methyl nitrate to form dimethyl oxalate (DMO), which further combines with hydrogen to yield MEG.

Figure 33. China's Energy Mix – 2011



Source: BP Stat Review

China is less likely to license CTL technology from Sasol, as the local demonstration plants (both direct and indirect) achieved stable production in 2011

## CTL: Strategic Solution to Energy Security?

We consider coal-to-liquid (CTL) or coal liquefaction to be the most strategic project in China. This could convert coal into fuel for transportation use (which has the strongest demand growth). However, the high technology entry barrier, capital and environmental costs have led to NDRC's conservative stance for the approval of new projects. We believe the government is concerned about potential over-investment, which may even result in capacity build-ups of sub-scale plants (e.g. similar to tea-pot oil refiners).

Currently, China has four CTL demonstration plants with a total capacity of 1.6mt, representing 0.3% of 2011 PRC oil demand. Shenhua operates the world's first commercial-scale direct coal liquefaction (DCL) plant using in-house technology. The construction was completed in 2008 but it took 2-3 years for trial production. It achieved stable runs in 2011 with an average utilization of ~80% (2011 output: 0.8mt, 1H12: 0.43mt).

There are three plants utilizing indirect coal liquefaction (ICL) technology developed by Synfuels China (originated from Shanxi Coal Chemical Research Institute, Chinese Academy of Science). These include Shenhua, Yitai Coal and Lu'an Group. Yitai started test-run in March 2009 and declared commercial operation in July 2011 after the technical upgrade. It could run up to 180-200kt capacity and the utilization was ~90-95% (0.15mt and 0.08mt oil products output in 2011 and 1H12 respectively).

Outside of China, South Africa developed the ICL technology since 1950s and established South African Coal, Oil and Gas Corp (Sasol). Sasol is now the world's largest ICL producer and operates three plants with a total capacity of 7.5mt.

Figure 34. China's Coal-to-Liquid Capacity ('000 tonnes)

Company	Location	Capacity ('000t)	Liquefaction process
<b>Under operation</b>			
Shenhua (DCL phase 1)	Erdos, Inner Mongolia	1,080	Direct
Shenhua	Erdos, Inner Mongolia	180	Indirect
Yitai Coal	Erdos, Inner Mongolia	180	Indirect
Lu'an Group	Changzhi, Shanxi	210	Indirect
<b>Sub-total</b>		<b>1,650</b>	
<b>Under planning stage</b>			
Shenhua (DCL phase 2)	Erdos, Inner Mongolia	2,100	Direct
Yankuang, Yanchang JV	Yulin, Shaanxi	1,000	Indirect
Shenhua Ningxia Coal	Ningxia	1,000 (total: 4mt)	Indirect
Lu'an Group	Shanxi	1,000 (total: 5.4mt)	Indirect
Yitai Coal	Erdos, Inner Mongolia	1,000	Indirect
Yitai Coal	Yili, Xinjiang	1,000	Indirect
<b>Sub-total</b>		<b>7,300</b>	

Source: Citi Research estimates

We estimate the capex for 1mt CTL project at ~Rmb15bn, more than ten times the unit cost of a greenfield oil refinery. Our channel checks suggest 1t of oil product would need ~5-6t of coal feedstock (for gasification and fuel) and ~12t of water under indirect liquefaction process. The output mix is 60-65% diesel, 35% naphtha and 5-10% LPG. Our channel checks suggest the CTL diesel has excellent quality with high cetane value and minimal sulphur content. The DCL technology has better conversion efficiency and we expect it would consume less coal feedstock (~3-4t) and water, but may require a higher coal quality.

Figure 35. Yitai CTL Key Metrics

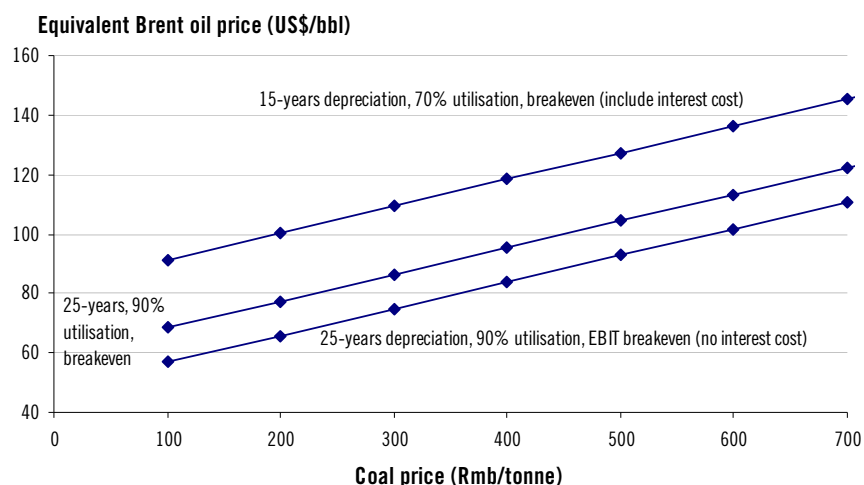
	2011*	1H12
Oil products output (kt)	152	80
<b>Sales (Rmb m)</b>	<b>648</b>	<b>659</b>
Consumption tax	(50)	(35)
COGS	(411)	(357)
Gross profit	187	266
<b>Net profit</b>	<b>27</b>	<b>81</b>
EBITDA per t (Rmb)	n/a	2,878
Net profit per t (Rmb)	n/a	1,009

\* P&L data refers to 2H11 operations. Source: Company Reports

Yitai's Coal-to-oil business reported 1H12 net profit of Rmb1,000/t (US\$160/t). We believe the weaker profitability reflects higher depreciation and interest costs on delays and cost overruns (Rmb3.3bn vs. capex budget of Rmb2.2bn). Despite this, Yitai's EBITDA is comparable to Sasol (US\$450/t in FY12 ended June 2012). We estimate Sasol's cash operating cost at ~US\$260/t in FY12 after netting off inter-segmental coal price of US\$27/t (Rmb200/t). No financial details were available for Shenhua DCL plant yet.

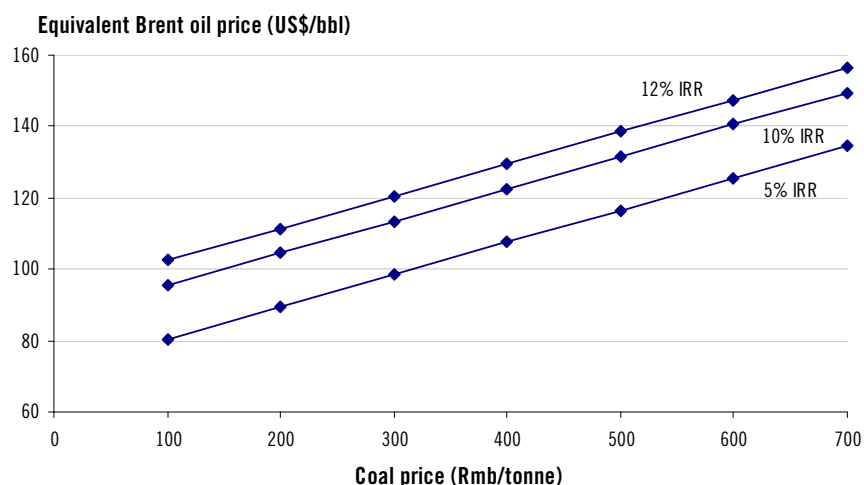
Assuming a coal price of Rmb200/tonne, 25 years of depreciation and some cost savings vs demonstration plants, we estimate the EBIT breakeven oil price at ~US\$75-80/bbl (for P&L). On a return basis, we forecast US\$105/bbl oil price would generate an IRR of 10%.

Figure 36. CTL Projects P&L Breakeven Analysis\*



\* Assuming Rmb15bn capex for 1mt CTL plant, US\$300/t cash conversion cost, unit coal feedstock usage of 5.5t under indirect liquefaction. Source: Citi Research estimates

Figure 37. Sensitivity of CTL Project Returns\*



\* Assuming Rmb15bn capex for 1mt CTL plant, US\$300/t cash conversion cost, unit coal feedstock usage of 5.5t under indirect liquefaction. Source: Citi Research estimates

The NDRC has suspended the approvals for all CTL projects since 2009 pending the successful trial-runs of demonstration plants. We think the government would only allow construction of a limited number of new projects in coal-rich regions. We forecast an incremental CTL capacity of ~5-6mt by 2015-16 (e.g. phase #2 of Shenhua DCTL, Shenhua Ningxia Coal, Yankuang / Yanchang Petroleum JV, Yitai Coal, Lu'an Group). We also think the cost structure would likely improve due to better optimization and larger scale.

Under the indirect liquefaction, coal is first gasified to produce synthesis gas. After removing contaminants such as sulphur, the catalysts convert the CO and H<sub>2</sub> stream to form hydrocarbon liquids via Fischer-Tropsch (FT) synthesis under a slurry bed reactor. Under the direct liquefaction, coal reacts to form hydrocarbon under high pressure and temperature, in the presence of the catalyst and hydrogen.

## Government Policy on Coal-to-Chemicals

The coal-to-chemicals industry is well established in China, but the primary focus has been the production of coke, calcium carbide and nitrogen fertilizers in the early 2000s. This was driven by robust feedstock demand for the steel and carbide-PVC industries. However, the lower entry barriers have resulted in intense oversupply and industry utilization was low at 50% for calcium carbide and 75% for urea. The state-owned and private companies are expanding rapidly into methanol / DME in the past few years on robust demand growth. We expect the 'traditional' coal chemicals could see capacity rationalization given the PRC government's target to reduce unit GDP energy consumption by 16% under the 12<sup>th</sup> 5-year plan (2005-10: 19%).

### Minimum scale for coal-to-chemicals projects

In March 2011, the NDRC sets minimum standards on the scale of new projects – coal-to-olefins (500kt), coal-to-methanol (1mt), coal-to-DME (1mt), coal-to-liquid (1mt), coal-to-MEG (200kt), coal-to-gas (2bcm) and all future projects need to secure NDRC approval. As coal-to-chemicals consume large amount of water, the NDRC expresses concerns about the water resources imbalance (large number of projects being planned in coal-rich regions that may have insufficient water).

We expect the government to announce the revised policy on coal-to-chemicals in the near future. The key focus could be the promotion of new demonstration plants in coal-rich regions like Xinjiang (coal-to-gas), Inner Mongolia (CTO, coal-to-gas), Shaanxi (CTL), Ningxia (CTL), Guizhou (CTO) etc under the 12<sup>th</sup> 5-year plan. It is likely to strictly control new investments in provinces which are net buyers of coal. We also think the thermal efficiency, technology improvement, emissions, resource consumption would be the metrics in evaluating new projects. We estimate the combined incremental coal demand from all coal-to-chemicals projects (excluding coal-to-gas) would be ~100mt by 2016E (3% of 2011 demand).

The Ministry of Industry and Information Technology (MIIT) released the 12<sup>th</sup> 5-year plan for olefins industry, which stipulates that alternative feedstock ratio would be ~20%. These include coal (MTO, CTO, CTMEG) and imported condensate / LPG (propane dehydrogenation). We believe this reflects domestic shortage of cracking feedstock (naphtha). Diesel and hydrocrack tail oil accounted for 16% of ethylene cracking feedstock in China, which could be better used as transportation fuel. For example, Sinopec tends to cut cracker utilization when China faces a 'temporary' diesel shortage.



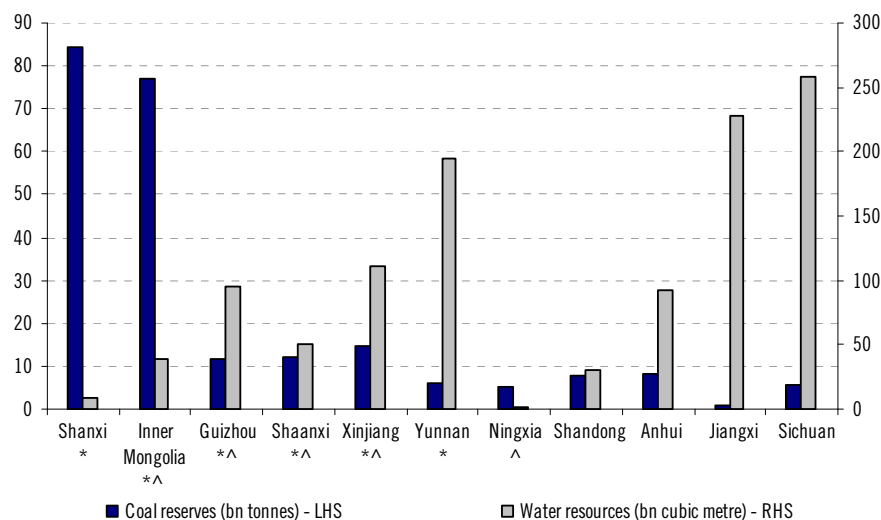
Figure 38. Selected Chinese National Policies on the Coal Chemicals Industry

Policies	Date	Details
NDRC policy on coal chemical industry	Jul-06	<ul style="list-style-type: none"> <li>Support demonstration work of DME as domestic and motor fuel</li> <li>Develop CTO, CTM, CTDME, CTL at a moderate pace to ease dependency on crude oil import</li> <li>New coal-based projects <b>must</b> meet capacity requirement – CTO (600kt), methanol (1000kt), DME (1000kt), CTL (3000kt)</li> </ul>
DME standard as city gas fuel	Jan-08	<ul style="list-style-type: none"> <li>Issue national standard for DME as urban domestic fuel (direct burning)</li> </ul>
MIIT Chemical industry stimulus package	May-09	<ul style="list-style-type: none"> <li>Stop approving new coke and calcium carbide projects for the next 3 years. Focus on achieving stable operation for existing demonstration plants (CTO, DME, CTMEG, CTL, CTG)</li> </ul>
Methanol gasoline (M85) standard on motor fuels	Jul-09	<ul style="list-style-type: none"> <li>Issue national standard on methanol-gasoline blending (M85)</li> </ul>
NDRC policy on coal chemical industry	Apr-11	<ul style="list-style-type: none"> <li>New coal-based projects <b>must</b> meet capacity requirement – CTO (500kt), methanol (1000kt), DME (1000kt), CTL (1000kt), CTMEG (200kt) and coal-to-gas (2bn bcm)</li> <li>NDRC's approval is needed for the above projects</li> <li>Restrict the development of coal chemical projects in net-coal-importing regions</li> <li>Evaluate thermal efficiency and carbon emission on demonstration projects</li> </ul>
MIIT 12th 5-year plan for olefin industry	Feb-12	<ul style="list-style-type: none"> <li>Increase alternative olefin feedstock to &gt;20% in 2015</li> <li>Set target for ethylene and propylene capacity in 2015 (27mt, 24mt)</li> <li>Support MTO projects in area with abundant water and coal resources (Inner Mongolia, Shaanxi, Xinjiang, Ningxia, Guizhou)</li> <li>Restrict the development of MTO projects in net-coal-importing regions</li> </ul>
MIIT 12th 5-year plan for coal industry	Mar-12	<ul style="list-style-type: none"> <li>Support the development of CTL, Coal-to-gas, CTO, CTMEG demonstration projects in Inner Mongolia, Shaanxi, Shanxi, Xinjiang, Guizhou and Yunnan</li> <li>Enhance technology, with focuses on energy efficiency, production cost, water and coal consumption</li> </ul>

Source: MIIT, NDRC, Citi Research

#### Water resources constraint could hinder development of coal-to-chemicals

Figure 39. Water and Coal Resources of Selected Provinces in China



\* Designated provinces to develop modern coal chemical projects (12<sup>th</sup> 5-year plan for the coal industry)

^ Designated provinces to develop CTO projects (12<sup>th</sup> 5-year plan for the olefin industry)

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



## Company Exposure in Coal-to-Chemicals

Figure 40. 2011 Methanol and Derivatives Capacity of Selected Companies ('000 tonnes)

	Feedstock	Methanol*	MTO/MTP Methanol#	Ethylene PE	Propylene PP	Oil Products CTL	DME	Acetic acid
Shenhua Coal Liquefaction & Chem	Coal	1,200	1,800	300	300	1,260		
Shenhua Ningxia Coal	Coal	850	1,670		500		210	
Yanzhou Coal - listed	Coal	700						200
Yanzhou Coal - parent	Coal	1,140						600
Datang Power - listed	Coal		1,680		460			
China Coal - listed	Coal	390						
Yitai Coal - listed	Coal					180		
China Bluechem	Gas	1,600^						
Kingboard Chemical	Gas, coke oven gas	800						500

\* For external sales. # For internal feedstock for MTO/MTP. ^ Includes a 60/40 JV with Kingboard (600kt methanol capacity). Source: Company Reports, Citi Research

- **China Shenhua Energy** – The company announced its plan to acquire China Shenhua Coal Liquefaction & Chemical from its parent in May 2012, but no details are available. The operations include coal liquefaction (1.08mt direct, 0.18mt indirect), CTO (1.8mt methanol, 300kt PE, 300kt PP) in Inner Mongolia and methanol plants (1.2mt) in Shaanxi. Shenhua Ningxia Coal (owned by Shenhua parent) also has an integrated MTP plant (500kt PP) and stand-alone methanol/DME plants. Shenhua Ningxia Coal has awarded EPC contracts for another 500kt MTP/PP plant (late-2014 startup) and may expand into CTL (indirect) as well.
- **Yanzhou Coal** – Yanzhou Coal started a 600kt methanol plant in Yulin, Shannxi in 2009, but the profitability was weak (2010: loss making, 2011-1H12 gross margin: 9% and 15%). Its parent Yankuang Group also has various coal-to-chemical plants including methanol (1.1mt), acetic acid (0.6mt) and urea fertilizer in Shandong etc. Yankuang plans to expand into MTO and form a CTL JV with Yanchang Petroleum.
- **China Coal** – China Coal started construction of a new greenfield CTO project (100%-owned) in Yulin in 1H12. Total capex is Rmb21bn with startup in 2015. China Coal also has a 30% equity stake in CTO / DCC JV project with Yanchang Petroleum (600kt PE, 600kt PP). The capex is Rmb26bn and we expect 2014 startup. It is also building a 600kt methanol plant in Inner Mongolia (75% stake).
- **Yitai Coal** – Yitai runs a 180kt indirect CTL plant in Inner Mongolia. It plans to expand CTL capacity further.
- **Datang Power** – Datang's 60%-owned MTP plant had significant delays and it has yet to declare commercial production currently despite 1.5-2 years of test-runs.
- **Sinopec** – Sinopec parent set up a new wholly-owned subsidiary Great Wall Energy & Chemical to develop coal-to-chemicals projects in September 2012. It plans to form JV with coal companies to build integrated MTO projects using its in-house technology advantage (e.g. SMTO, syngas-to-MEG). It plans to build coal-chemicals production bases in Guizhou, Anhui, Henan, Xinjiang and Inner Mongolia.

# Petrochemicals: Favoring Commodity Over Specialty Into The Next Cyclical Upturn

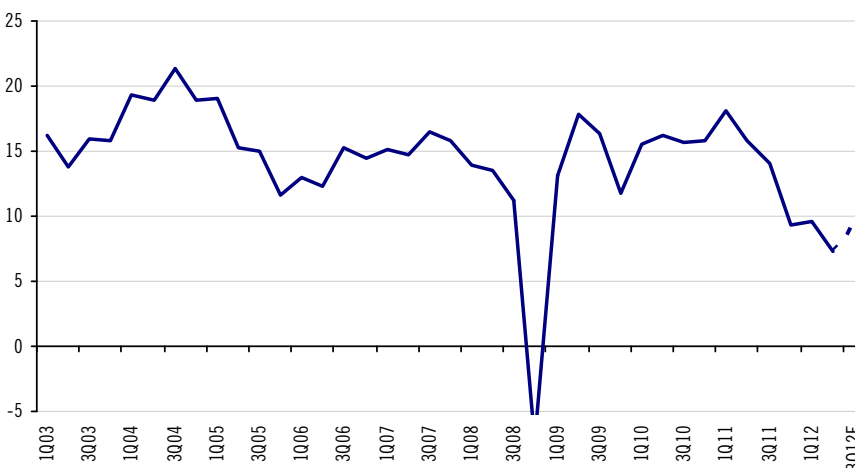
## Bottoming, But Slow Recovery In 1H13

Chemicals margins have significantly disappointed this year (except PX) due to weaker-than-expected demand in China, industry de-stocking and ramp-ups of Middle East capacity.

Asian chemical sector EBITDA margin dropped from 15-16% in 2010-3Q11 to 9.5% in 4Q11-1Q12 and 7.3% in 2Q12. While we expect margin has bottomed in 2Q12 on stabilizing oil price and macro indicators, we do not see strong recovery in the near-term. This reflects limited orders visibility (uncertainty of demand pick-up in China) and increased supply from crackers start-ups (Saudi Polymers - 3Q12, Petrochina Daqing, Fushun - 4Q12, Sinopec Wuhan, Exxon Singapore - 1Q13).

Margin has bottomed in 2Q12, but we do not see strong recovery into 1H13

Figure 41. Asian Chemical Sector EBITDA Margin (%)



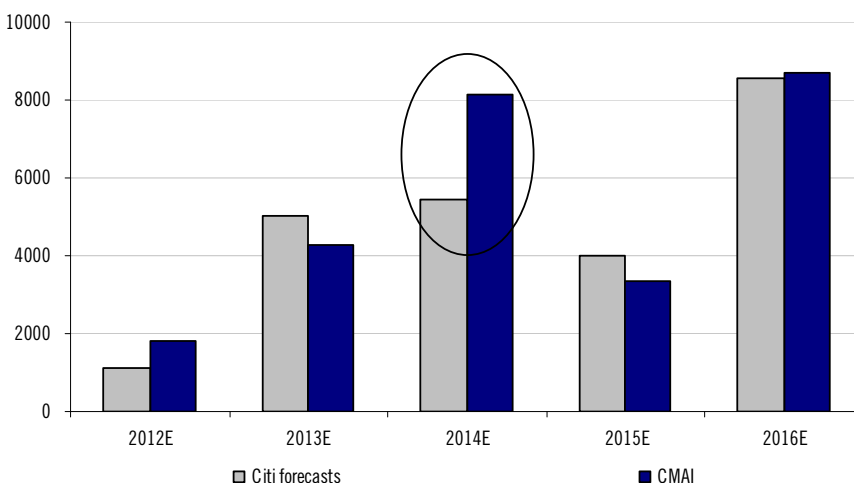
Source: Company Reports, Citi Research

We have updated the demand-supply balance for various products and factored in a more conservative demand projection (reflecting Citi's latest global GDP forecasts of 2.5%, 2.6% and 3.2% in 2012-14E). We still see a cyclical upturn for commodity chemicals (ethylene chain) with peak margins in 2015. However, the recovery for specialty chemicals (e.g. phenol, acrylate, CPL, AN) could be more muted due to rising self-sufficiency in China.

IHS's global ethylene capacity growth of 8.1mt (5.3%) in 2014 suggests a more muted upcycle, but we think the forecast is too high. We forecast supply growth of 5.4mt in 2014 (3.6%). The major variance was due to start-up delays in Iran (1mt - economic sanctions), China (1mt - execution risks of coal-to-olefins projects) and Indonesia (0.4mt - Chandra Asri expansion is likely to start in 2015 instead of 2014, as it has yet to award EPC contractors). Overall, we forecast supply growth of 3.4%, 3.6% and 2.5% in 2013-15. We believe the next downturn would start in 2016-17 following the start-ups of greenfield gas crackers in North America / central Asia and ramp-up of Chinese projects.

We have assumed startup delays for 2014 projects including Iran Kavyan (1mt), various CTO / MTO projects in China (~1mt) and Chandra Asri (likely 2015, instead of 2014)

Figure 42. Global Ethylene Capacity Additions – Citi vs. Industry Forecasts ('000 tonnes)



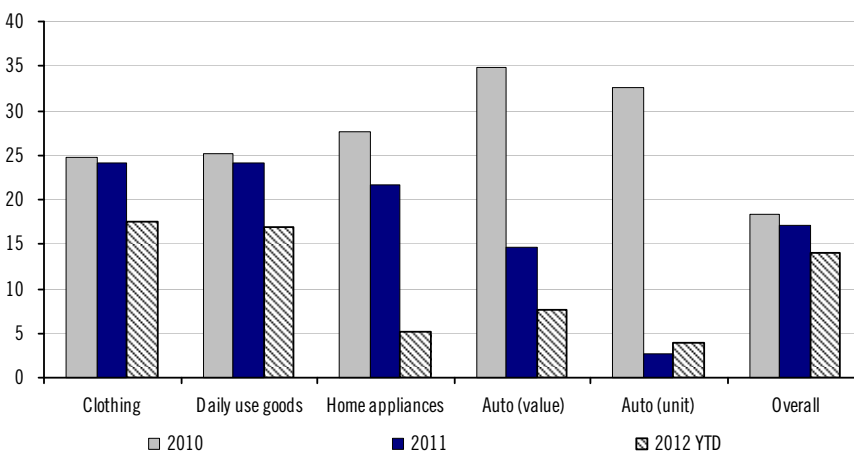
Source: IHS, Citi Research estimates

## Assessing demand: Diverging trend

Analyzing the China domestic retail sales data suggests a more pronounced slowdown for durable goods (e.g. auto, electrical appliances) this year, but consumer staples (e.g. daily-use goods) and clothing were more resilient. We believe this would hurt demand for SM, PS, ABS, phenol/BPA, polycarbonate etc. The underlying demand of PE should hold up better, as its end application is mostly consumption-related (e.g. packaging, plastics articles, agricultural film).

Resilient retail sales of plastics goods and clothing bodes well for commodity chemicals (PE, PP, MEG), but durable goods weakness drags SM & ABS

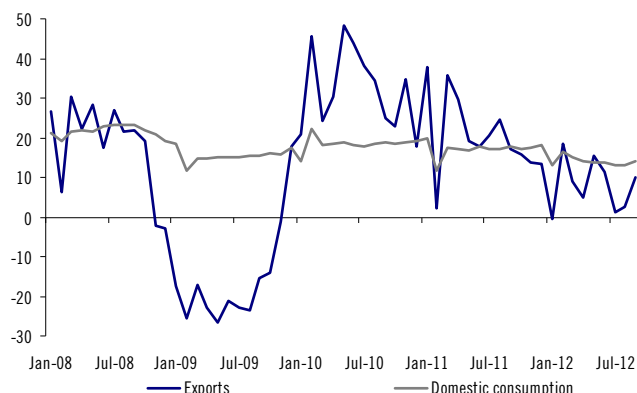
Figure 43. Domestic Sales Growth of Major Consumer Goods (%)



Source: CEIC, Citi Research

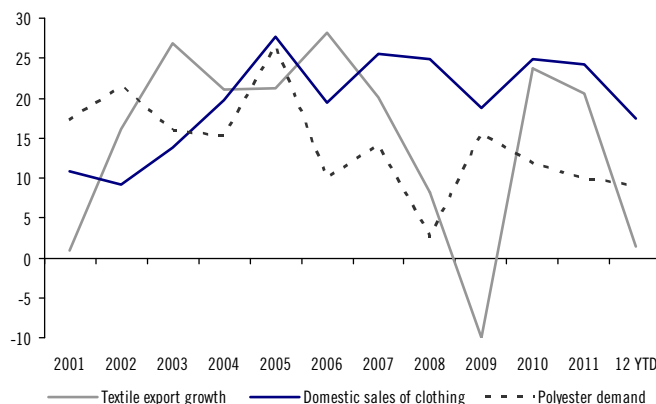
China's September export growth was better than expected at 9.9% (August: 2.7%) due to improved sentiment (QE3 in US, ECB bond purchase). Textile export growth was weak at 1% in 8M12 (2011: 21%) but China's overall polyester demand remained healthy (1H12: +9% vs. +10% in 2011). Hence, we expect the robust domestic consumption growth (September: +14.2%) would partly offset the negative impact from weak exports and be a key driver of chemical demand ahead.

Figure 44. China's Export and Domestic Consumption Growth (%)



Source: CEIC, IHS, Citi Research

Figure 45. Textile Exports, Domestic Sales and Polyester Demand (%)

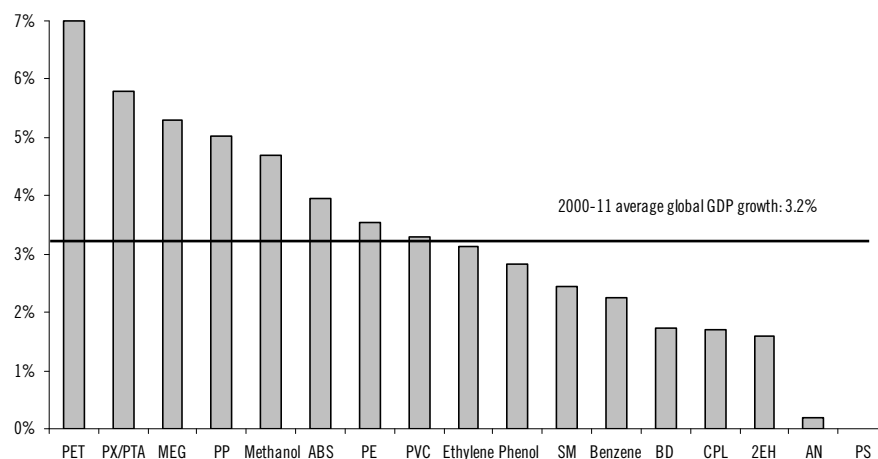


Source: CEIC, IHS, Citi Research

Among products, AN was the weakest link and global demand saw a mere 0.2% CAGR over 2000-11. This was due to structural decline of acrylic fibre consumption (substitution into polyester fibre) and its share of AN demand dropped from 48% in 2004 to 38% in 2011. Falling PS usage (substitution into ABS for home appliances and PP for packaging) dragged SM demand (+2.4%). Polyester and its feedstock (PX, PTA, MEG), PP, ABS, methanol saw stronger growth (above global GDP). We expect the historical trend would provide a good indicator for future demand outlook. The only exception is BD and we forecast global demand growth would accelerate to 3-4% in 2012-16E (2000-11: 1.7%). This reflects increased market share of synthetic rubber (particularly for eco-friendly tires).

#### AN and PS are the weakest links

Figure 46. 2000-11 Demand CAGR For Major Chemical Products (%)



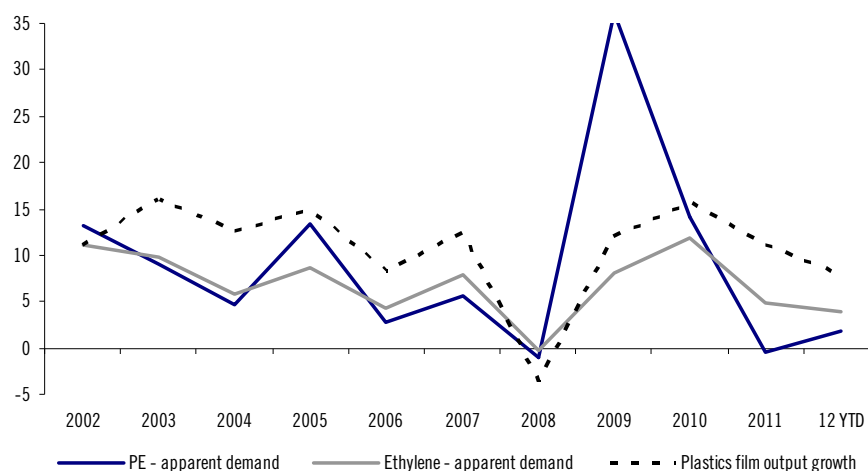
Source: IHS, Citi Research

#### Assessing demand: Will the muted growth persist?

China's apparent consumption of PE was sluggish (flat in 2011, 2% growth in 8M12), which was a sharp slowdown vs. 25% pa growth in 2009-10. On an ethylene equivalent basis (including all derivatives like PE, MEG, SM), the growth was slightly better at 5% and 4% in 2011 and 1H12. However, the data do not capture inventory change (re-stocking, de-stocking, speculation) and we believe it is not appropriate to extrapolate the 2011-12 weakness for assessing long-term demand.

Using plastics film output as a 'proxy' for underlying demand, the growth was more stable at 12% in 2009, 16% in 2010, 11% in 2011 and 8% in 8M12 respectively. Our channel checks suggest the inventory level was already low for both producers and converters. We also see some early signs of a pick-up in buying interest from China - PE/PP imports rose 13-17% YoY in 3Q12.

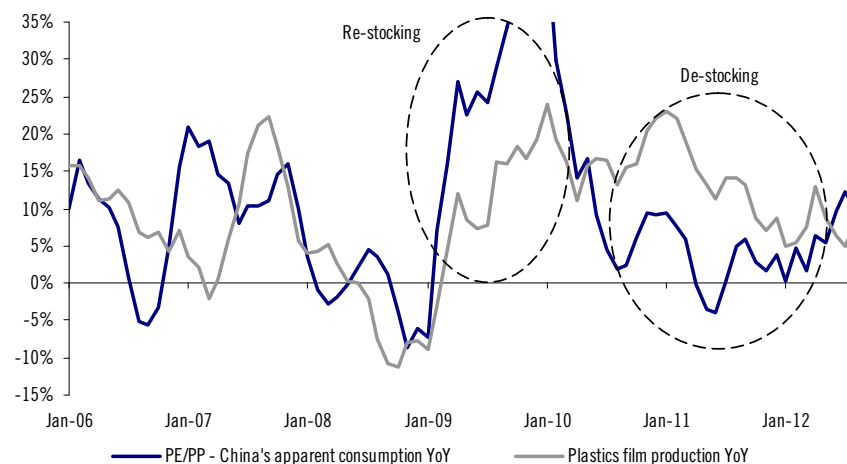
**Figure 47. China's PE, Ethylene Apparent Demand vs. Plastics Film Production Growth (%)**



Source: CEIC, IHS, Citi Research

**We believe de-stocking is over and the industry inventory is already low**

**Figure 48. China's Plastics Film Output vs. PE/PP Apparent Demand YoY Growth (%)**

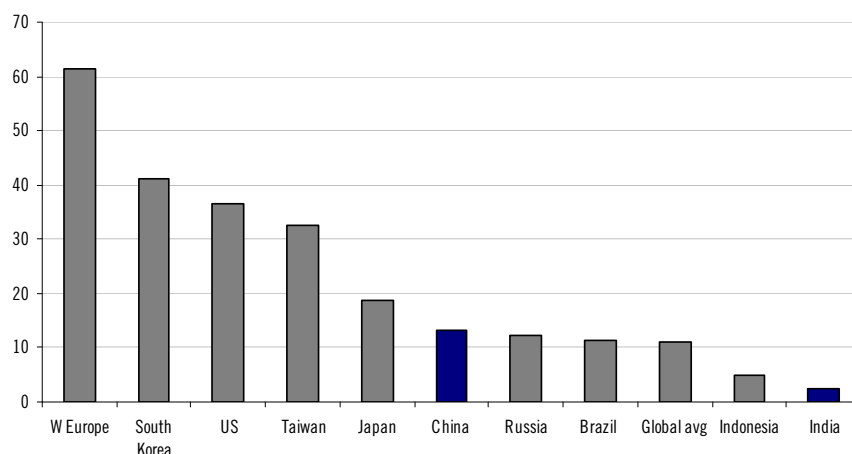


Source: CEIC, IHS, Citi Research

We forecast PE demand using a bottom-up approach. In China, the per capita PE consumption more than doubled from 5kg in 2000 to 13kg in 2011, similar to the global average of 11kg. However, it remained below 37kg, 61kg and 30-40kg for US, Western Europe and Korea/Taiwan respectively. We factor in a 6% long-term growth in China (2000-11 CAGR: 9%) given its relatively high base but demand is likely to improve gradually into 2013-14 on potential re-stocking. India's per capita consumption was low (2011: 2kg) and we forecast stronger growth of 8-10% pa going forward.

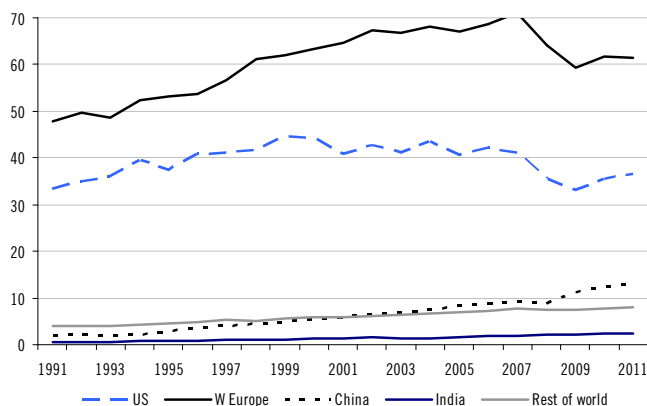
The US's domestic PE sales rose 1.7% YoY in 8M12. We see a slight pick-up into 2013-14 (~2-3% pa) before normalizing to 1% growth due to a recent pick-up in consumer sentiment. Overall, emerging markets should continue to be the key driver and we forecast global demand growth to improve from 2% in 2012 to 3.5% and 4.6% in 2013-14 respectively.

Figure 49. PE – 2011 Per Capita Consumption (kg)



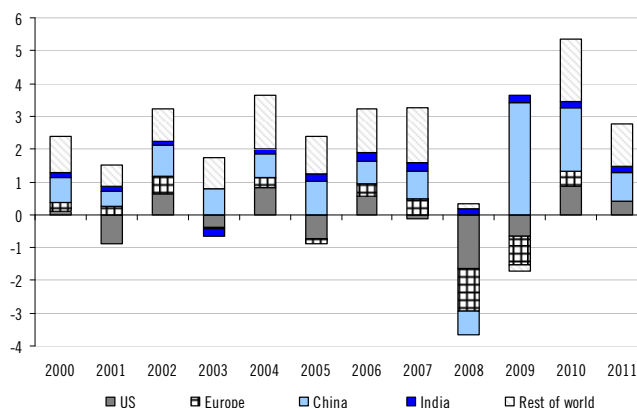
Source: CEIC, IHS, Citi Research

Figure 50. Per Capita Consumption (kg)



Source: CEIC, IHS, Citi Research

Figure 51. Regional Breakdown of PE Demand Growth (mt)



Source: CEIC, IHS, Citi Research

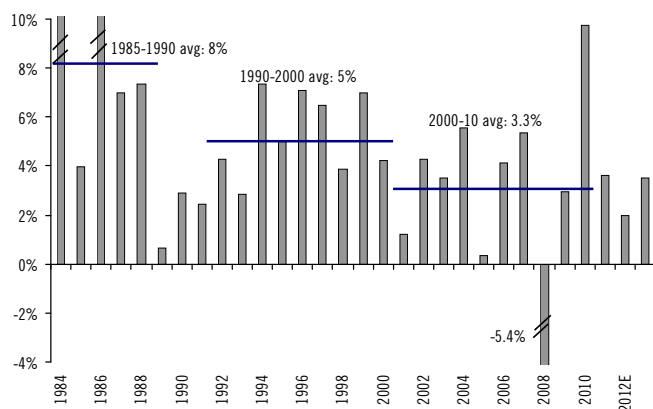
Figure 52. PE Demand Growth Projections (%)

	2000-11 CAGR	2012E	2013E	2014E	2015-16E
Global – Citi	3.5	2.0	3.5	4.6	3.9
US	(0.8)	1.5	2.0	3.0	1.0
W Europe	-	(3.0)	(1.0)	0.5	0.5
China	9.1	2.0	6.0	8.0	6.0
India	7.9	8.0	9.0	10.0	10.0
Rest	4.5	3.5	3.5	4.0	4.0
Global – IHS	3.4	4.8	5.2	5.1	4.8

Source: IHS, Citi Research estimates

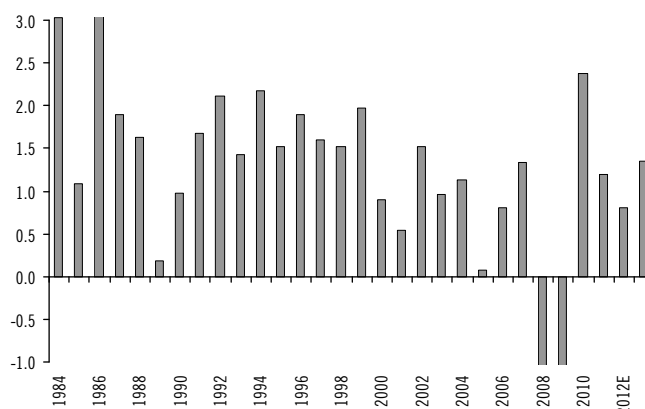
In 1985-2000, world ethylene consumption rose at an average 1.2-1.3x GDP, but fell to an average of 1x over 2000-11. This reflects anemic growth in US & Europe (2000-11 CAGR: -0.8% and 0% respectively). Possible reasons include increased recycling and substitution into other environmental friendly materials (e.g. bio-degradable plastics). However, we note the GDP multiplier was highly volatile (1.8x in 2010-11) and forecast 1.0-1.1x average in 2012-16E.

Figure 53. Long-Term Global Ethylene Demand Growth (%)



Source: IHS, Citi Research estimates

Figure 54. Global Ethylene Demand GDP Coefficient (x)

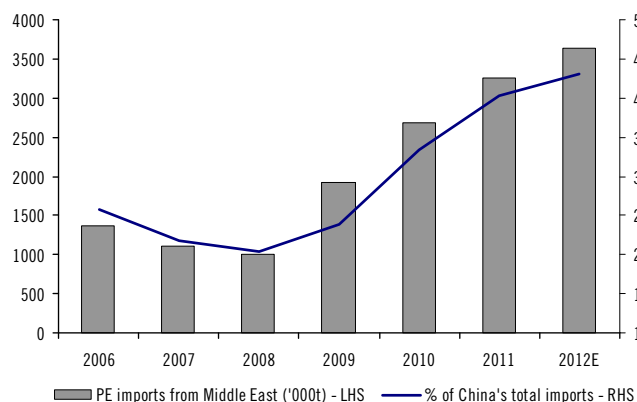


Source: IHS, Citi Research estimates

## Assessing supply: Middle East overhang diminishing

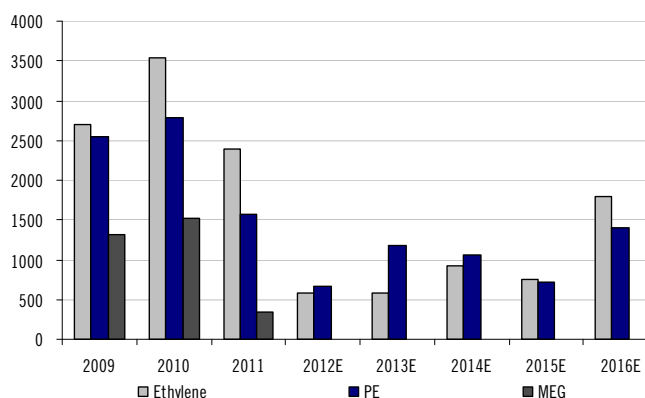
Despite limited Middle East ethylene capacity additions (0.6mt in 2012 vs. 2.9mt pa in 2009-11), we believe the ramp-ups of new supply continue to depress Asian margins this year. China's total PE imports increased 11% in 8M12 compared to a 19% rise in Middle East shipments. The market share of the Middle East reached 44% in 1H12 (2011: 40%, 2010: 34%).

Figure 55. China's PE Imports from Middle East\* ('000 tonnes)



\* 2012E based on 8M12 annualized. Source: IHS, Citi Research

Figure 56. Middle East Capacity Additions – PE and MEG ('000 tonnes)

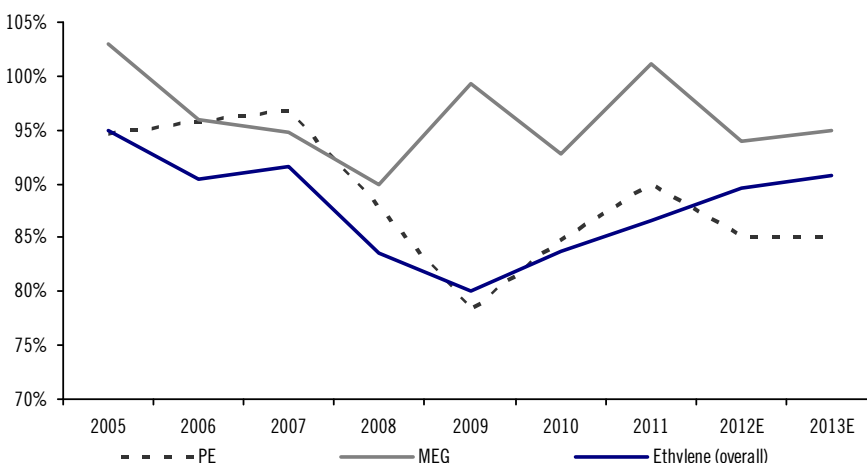


Source: IHS, Citi Research estimates

Ramp-ups of Middle East capacity in 2011-12 hurt Asian exporters, but we expect diminishing impact ahead

However, we expect the incremental impact from Middle East supply would gradually diminish from 2013. We forecast Saudi Arabia ethylene utilization would improve to ~90% in 2012 vs 85% in 2010-11 and 80% in 2009. We do not see a significant further hike for Saudi Arabia's crude oil production, suggesting limited room to boost associated gas feedstock availability. Hence, we expect a sharp slowdown of capacity build-ups (below 1mt pa in 2013-15). In Iran, we also see a possibility that utilization and exports may drop in the long term if the economic sanctions persist (catalyst change during scheduled maintenance is dependent on US/European suppliers).

Figure 57. Estimated Utilization of Saudi Arabia (%)



Source: IHS, Citi Research estimates

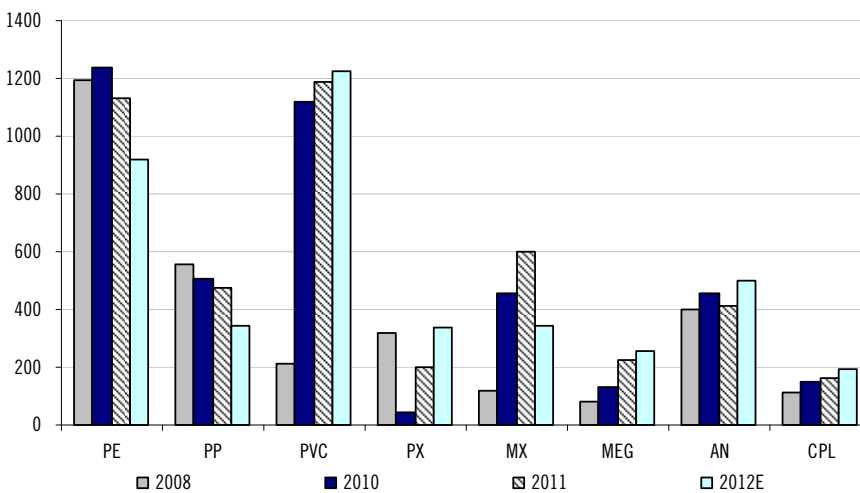
## Assessing supply: US impact

According to our US chemical analyst, PJ Juvekar, only two greenfield ethylene projects (CPChem, Exxon) have filed for the necessary permits but they have yet to secure final approvals. Coupled with the concern of a potential shortage of skilled labor, he expects most new plants would only start in 2017 or later instead of 2016. We forecast the restart of idled crackers and modification of existing plants to handle lighter feeds would add 2mt of total ethylene capacity over 2013-15 or 0.4-0.5% pa of global supply growth. The US's effective cracker utilization was already high at ~95% in 1H12 so we see limited room to boost runs further.

While the feedstock advantage of US crackers has widened further vs Asia, we have yet to see a significant impact on the Asian market. For example, US's PE and PP exports fell modestly in 2012. We believe this was due to better netbacks for selling into Latin America on robust demand and slow industry development. US PVC exports were competitive, but we believe rising imports from India, Middle East and other EM countries would partly offset this.



Figure 58. US Exports into Asia For Selected Chemical Products\* ('000 tonnes)



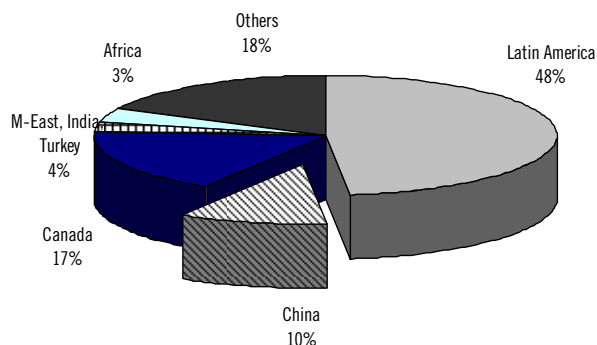
\* 2012E based on 8M12 annualised data. Source: IHS, Citi Research estimates

Figure 59. North America Ethylene Capacity Expansion ('000 tonnes)

	Ethylene capacity	Startup
<b>2013</b>		
Dow - Taft #2	386	restarting in early-2013 (shut in Jul-09)
Westlake - Lake Charles	110	1Q13 (delayed from late-12)
Ineos - Chocolate Bayou	211	debottlenecking in 2013
Williams	270	debottlenecking in 3Q13
Sub-total	<b>977</b>	
<b>2014</b>		
Westlake - Calvert City	80	2Q14
LYB - LaPorte	386	
Sub-total	<b>466</b>	
<b>2015</b>		
Westlake	110	2nd phase debottlenecking in end-2014
Nova	280	
Sub-total	<b>390</b>	
<b>2016</b>		
Braskem / Idesa JV (Mexico)	1,000	EPC awarded in Oct-12, end-15 startup
Formosa USA	800	2H16
Sub-total	<b>1,800</b>	
<b>2017</b>		
CPChem (Cedar Bayou)	1,500	
Exxon (Texas)	1,500	
Dow (Freeport)	1,500	
Shell (northeast US)	1,000	
Oxychem	544	
Sub-total	<b>6,054</b>	

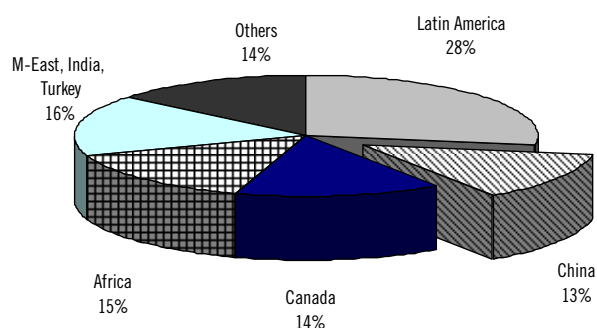
Source: IHS, Company Reports, Citi Research estimates

Figure 60. PE — 2011 US Export Market Share (%)



Source: CMAI, Citi Investment Research and Analysis

Figure 61. PVC — 2011 US Export Market Share (%)



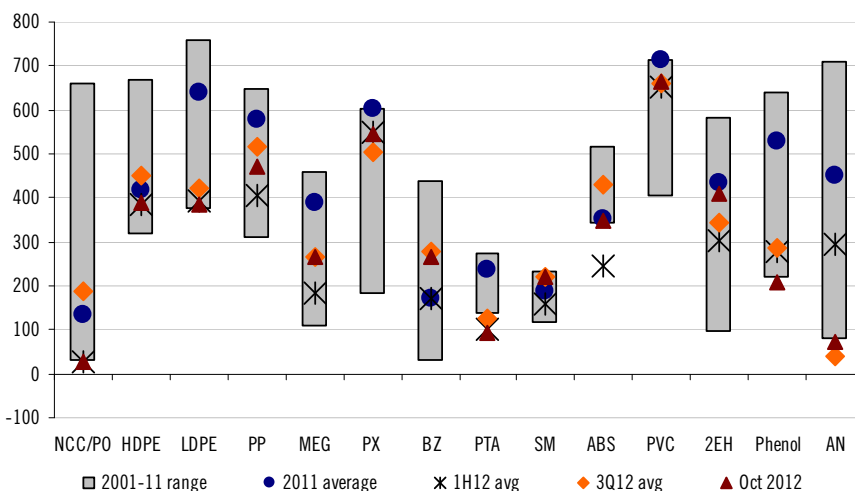
Source: CMAI, Citi Investment Research and Analysis

## Products outlook into 2013 and beyond

While we still see an ethylene cyclical upturn from 2H13, the margin is likely to remain weak over the next 6 months due to new cracker start-ups. Most Asian crackers are still operating below full utilization (China: ~95%, Japan: 80-85%), which suggests ample supply. Hence, we think any pick-up in PRC demand or restocking (although timing is uncertain) would not result in a near-term spike in margins. We remain constructive for the long-term ethylene outlook until the next peak in 2015.

The recovery for specialty chemicals (phenol, acrylate, CPL, AN) could be more muted due to rising self-sufficiency in China. Given the lower capital requirement (unlike naphtha crackers or CTO projects) and availability of local technology, we see an increasing proportion of new capacity build-ups by private enterprises. This would result in rising market fragmentation.

Figure 62. Chemical Product Spreads vs. Historical Range (US\$/tonne)



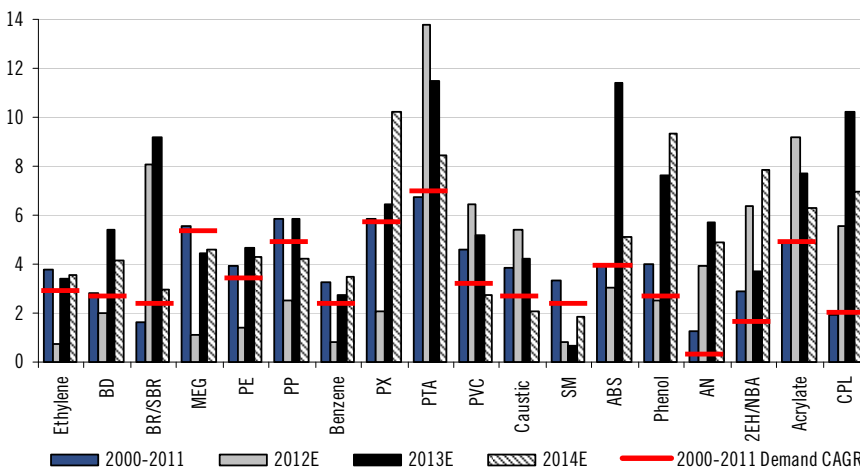
Source: IHS, Citi Research

Figure 63. Chemical Product Margin Peak and Trough Cycles

	2004	2005	2006	2007	2008	2009	2010	2011	2012E	2013E	2014E	2015E
<b>Olefins chain</b>												
Naphtha cracker	PEAK	PEAK	PEAK					TROUGH	TROUGH			PEAK
Butadiene				TROUGH	PEAK			PEAK	PEAK	PEAK	PEAK	PEAK
PE	PEAK	PEAK	PEAK	PEAK				TROUGH	TROUGH			PEAK
PP	PEAK	PEAK	PEAK	PEAK					TROUGH			PEAK
MEG	PEAK		TROUGH			TROUGH		PEAK		PEAK	PEAK	
PVC	PEAK		TROUGH			TROUGH					PEAK	PEAK
<b>Aromatics chain</b>												
PX		PEAK	PEAK		TROUGH		TROUGH	PEAK	PEAK		TROUGH	TROUGH
Benzene	PEAK	PEAK			TROUGH	TROUGH						
PTA	PEAK		TROUGH	TROUGH	TROUGH		PEAK	PEAK	TROUGH	TROUGH	TROUGH	
SM	PEAK				TROUGH						PEAK	PEAK
ABS	TROUGH	TROUGH	TROUGH				PEAK		TROUGH	TROUGH		
<b>Specialty chems</b>												
AN	TROUGH	TROUGH	TROUGH				PEAK	PEAK	TROUGH	TROUGH	TROUGH	
Acrylate	PEAK	PEAK	TROUGH	TROUGH			PEAK	PEAK	TROUGH	TROUGH	TROUGH	
Phenol/BPA	PEAK	TROUGH	TROUGH	PEAK		TROUGH	PEAK	PEAK	TROUGH	TROUGH	TROUGH	
Oxo-alcohols	TROUGH	TROUGH		PEAK		TROUGH	PEAK				TROUGH	TROUGH
<b>Fibre chain</b>												
CPL	TROUGH						PEAK	PEAK		TROUGH	TROUGH	TROUGH
Polyester	TROUGH (NO CYCLE EXCEPT DURING COTTON PRICE SPIKE IN 2H10/1H11)											

Source: Citi Research estimates

Figure 64. Global Net Supply Additions vs. 2000-11 CAGR Demand (%)



Source: IHS, Citi Research estimates

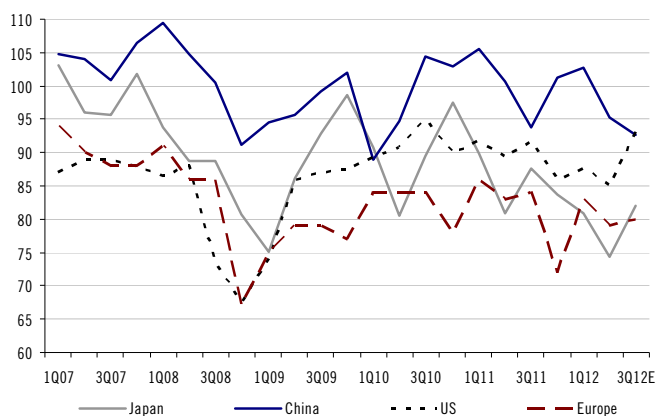
- **Ethylene, PE & PP: bottoming, but slow near-term recovery** – We forecast global ethylene supply additions at 3.2% pa average in 2013-15. The start-up of various greenfield gas crackers in the US and improving utilization for China's CTO projects would drive the next downturn into 2016-17. While the nameplate capacity growth was limited (0.8%) in 2012, we believe the effective capacity increase was higher due to further ramp-ups of Middle East capacity. Coupled with weak PRC demand, this has resulted in earnings disappointment.

Figure 65. Global Ethylene Demand/Supply Balance – Nameplate ('000 tonnes)

	2004	2005	2006	2007	2008	2009	2010	2011	2012E	2013E	2014E	2015E	2016E	2017E
Total capacity	111,202	115,903	120,445	125,594	129,345	131,563	141,383	146,799	147,938	152,979	158,419	162,433	170,993	180,788
Change	535	4,702	4,542	5,148	3,752	2,218	9,820	5,416	1,139	5,041	5,441	4,014	8,560	9,795
Change yoy (%)	0.5	4.2	3.9	4.3	3.0	1.7	7.5	3.8	0.8	3.4	3.6	2.5	5.3	5.7
Total demand	104,327	104,666	108,971	114,778	108,557	111,746	122,637	127,056	129,597	134,133	140,169	145,776	151,607	157,671
Change	5,494	339	4,305	5,807	(6,221)	3,189	10,891	4,419	2,541	4,536	6,036	5,607	5,831	6,064
Change yoy (%)	5.6	0.3	4.1	5.3	(5.4)	2.9	9.7	3.6	2.0	3.5	4.5	4.0	4.0	4.0
Utilisation (%)	93.8	90.3	90.5	91.4	83.9	84.9	86.7	86.6	87.6	87.7	88.5	89.7	88.7	87.2
Demand-supply delta	4,960	(4,363)	(237)	659	(9,973)	971	1,071	(997)	1,402	(505)	595	1,593	(2,729)	(3,731)
<b>Change by region</b>														
North America	(514)	723	378	208	(275)	(1,662)	(450)	379	114	896	667	430	1,250	4,600
South America	69	66	678	-	137	113	50	150	-	-	-	-	-	-
Europe (incl. Russia)	295	331	650	155	562	(763)	101	(159)	(150)	40	490	30	620	620
Middle East ex Iran	350	1,170	580	548	604	2,702	3,542	2,400	610	610	930	750	1,800	650
Iran	-	290	330	855	1,685	1,020	250	250	-	-	-	-	-	-
Africa	-	-	40	160	100	-	-	-	-	-	24	254	230	-
Indian sub-continent	-	75	110	135	-	-	778	283	-	-	1,320	450	1,365	-
NE Asia (excl China)	177	219	148	1,666	862	(10)	49	418	55	445	20	-	-	-
China only	128	1,438	1,628	1,077	-	704	3,392	1,104	510	2,050	1,750	1,760	3,295	3,425
Southeast Asia	30	390	-	345	78	113	2,108	592	-	1,000	240	340	-	500

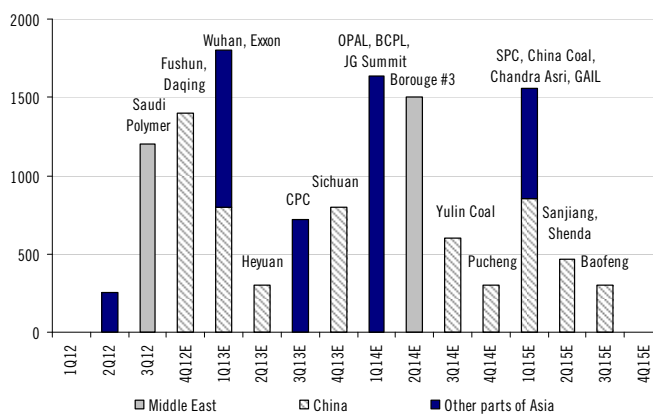
Source: IHS, Company Reports, Citi Research estimates

Figure 66. Cracker Utilization For Key Regions (%)



Source: IHS, Citi Research estimates

Figure 67. Asia & Middle East Ethylene Capacity Additions ('000t)



Source: IHS, Citi Research estimates

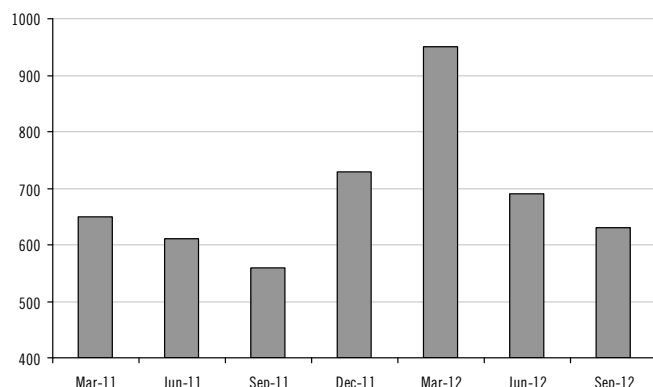
Figure 68. Breakdown of Major Ethylene Capacity Additions\* ('000 tonnes)

	Capacity ('000t)	Latest startup time	Details
<b>2012</b>			
Saudi Polymer (NCP)	1,200	started (Oct-12)	started commercial production in Oct-12
China - Daqing	600	test-run (Oct-12)	on-spec ethylene on 5 Oct
China - Fushun	800	4Q12	intermediate handover achieved in Jul-12
<b>Total (un-weighted)</b>	<b>2,600</b>		
<b>2013</b>			
Singapore - Exxon	1,000	end-2012/1Q13	98% mech completed in Mar-12, PE, PP, elastomers ready, cracker delay
China - Wuhan	800	1Q13	construction started in early-2010
China - Sichuan	800	2H13	construction started in Sep-2009
CPC #3 (scrap-and-rebuild)	720	2H13	EPC awarded to CTCI in 2H09, assume some delay
Ningbo Heyuan	300	2H13	MTO using imported methanol
<b>Total (un-weighted)</b>	<b>3,620</b>		
<b>2014</b>			
India - ONGC	1,100	end-2013	cracker EPC to Linde/Samsung E&C (Dec-08), HDPE EPC to Samsung (May-11)
JG Summit (Philippines)	320	1H14	ground breaking in Mar-11
UAE - Borouge #3	1,500	2Q/mid-2014	cracker EPC to Linde in Jul-09
Russia - Novy Urengoy	420	2014	awarded engineering contract to Linde in Dec-09
China - Yulin Coal Chems	600	2014	intermediate handover target in Dec-2013, DMT0 / DCC technology
China - Pucheng Clean Energy	300	2014	DMT0 technology
<b>Total (un-weighted)</b>	<b>4,240</b>		
<b>2015</b>			
China - Sinopec Shanghai	700	early-2015	scrap-and-rebuild of cracker #1, placed order for long-lead items (Aug-12)
India - GAIL	450	early-2015	EPC awarded to Shaw (Dec-10)
Egypt - SIDPEC	460	mid-2015	EPC awarded to Toyo (Mar-12)
China - various MTO projects	1,200	2015	China Coal Yulin, Sanjiang, Baofeng, Shenda etc
<b>Total (un-weighted)</b>	<b>2,810</b>		
<b>2016</b>			
Braskem-Idesa (Mexico)	1,050	end-2015/2016	EPC awarded to Technip consortium (Oct-12)
Sadara (Saudi Aramco/Dow)	1,500	2H15/2016	cracker EPC awarded to Daelim (Aug-11)
China - Sinopec/KPC JV	1,000	end-2015	ground breaking in Nov-11, refinery to start end-14, cracker in end-15
India - RIL	1,400	2016	selected Technip as tech/engineering contractor (Jul-12)
Uzbekistan - Ustyurt	400	1H16	JV with Honam, KOGAS, STX, EPC awarded to Samsung E&C (Aug-11)
Kazakhstan - JV with LG Chem	840	2016	JV contract signed in Aug-11, EPC contract award likely in 4Q12
Formosa USA	800	2H16	revised up from 450kt to 800kt (Jul-11), approval expected in 2012
China - CNOOC	1,000	2016?	yet to secure NDRC approval
China - Qingdao Refining	800	2016?	LPG-feed, under study
China - various MTO projects	1,800	2016	Shenhua Shaanxi, Baofeng, Yankuang, Yanchang, Sinopec JV, CPI JV etc
<b>Total (un-weighted)</b>	<b>10,590</b>		

\* Excludes debottlenecking and cracker restarts. Source: IHS, Company Reports, Citi Research estimates

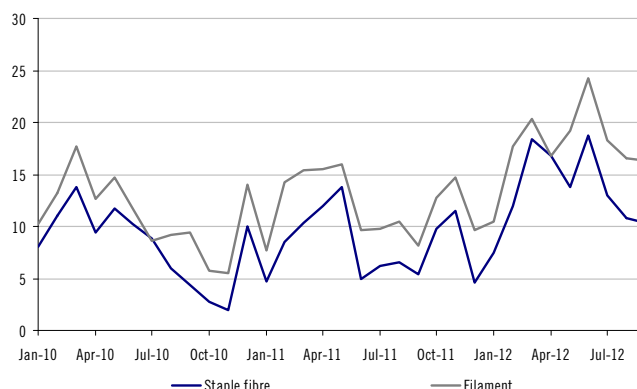
- **Butadiene: some pullback in 2013, but structural tightness persists** – We expect the BD supply from naphtha crackers start-ups in China would result in a modest spread decline into 2013. We note the announcement of a few new BD extraction projects for late-2014/2015 start-up, but think the incremental volume would be rather limited, as most of existing crude-C4 stream is already sold to other third-parties for extraction. CTO also has minimal BD yield.
- **MEG: normalized inventory; a better 2013** – China's shore tank MEG inventory dropped from 950kt peak in March to 620kt in October. This reflects reduced supply from the Middle East due to extended shutdowns (8-10 weeks) of JUPC #1 & 2 (700kt capacity each) in April-July. Sharq #4 (similar design as JUPC) is also currently shut for ~10 weeks since September. Coupled with the fire-related shutdowns of Kuwait Equate #1 in late-July (restart likely in November) and Nan Ya #4 (~1 month in October), the MEG supply has tightened. Our channel checks suggest there may be some design problem for certain reactors and we see a risk that some plants may need to run at slightly lower utilization. With a steady polyester demand (albeit not particularly robust) and limited new MEG capacity into 2013-14, we expect MEG spread would gradually improve.

Figure 69. Estimated Shore Tank MEG Inventory in China ('000t)



Source: IHS

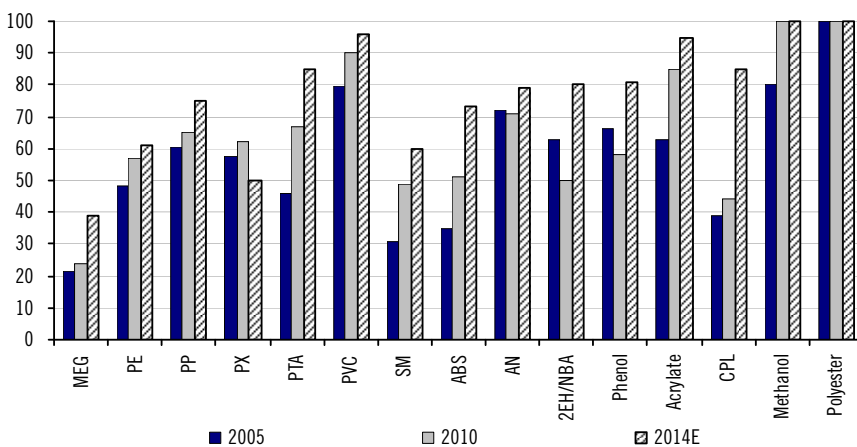
Figure 70. China's Polyester Fibre Inventory (Days of Production)



Source: HIS

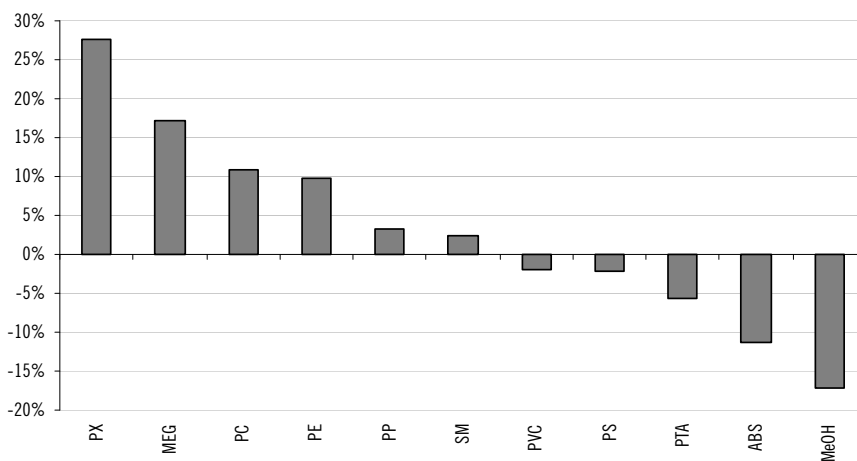
- **PX: Solid margin in 2013; oversupply into 2014-15** – IHS indicates the start-up of Xianglu Teonglong and OMPL (India) would be delayed to March 2013 and 4Q13 respectively (instead of 4Q12 and end-2012). We also expect no merchant PX volume from Tenglong given its integration into new PTA expansion. The PX supply tightness would gradually ease from 2H13 and we forecast the spread to fall from US\$520/t in 2013 to US\$300-350/t in 2014-15.
- **PTA: no relief in sight** – We estimate cash costs for new PTA plants (over 1mt capacity) could be as low as ~US\$80-90/t vs. US\$150/t for smaller plants (400kt or below) and the spread would be structurally lower. The tough outlook is likely to persist in the next 2-3 years due to large capacity build-ups in China and we see potential capacity rationalization ahead.
- **Benzene: healthy demand from start-ups of derivatives capacity** – Benzene spread improved from US\$180/t in 1H12 to US\$250/t in 3Q12 due to widening price premium of US vs. Asia (increased arbitrage). The start-up of new phenol, CPL capacity in China should result in higher benzene imports and we expect the spread to remain firm into 2013.
- **SM: Limited new supply, but unexciting demand** – We forecast global SM capacity additions of <2% pa in 2013-15. However, PS demand was stagnant and ABS was hurt by slowdown of durable goods sales. Despite this, we still expect the SM spread to rebound modestly from US\$190/t in 2012 to US\$220-250/t in 2013-15.
- **PVC: Steady ship** – We expect US PVC exports to remain cost competitive on a global basis, but the rising imports from Latin America, India, Middle East, Africa could mostly absorb this. The potential rebound of US housing starts could also support domestic demand. We also do not see a sharp pick-up of PRC exports at current pricing and hence PVC profitability is likely to hold up well.
- **Propylene derivatives (phenol, acrylate, AN): limited recovery** – We expect the specialty chemicals chain to remain difficult due to rising self-sufficiency in China. However, the recent fire at Nippon Shokubai's plant could tighten global acrylic acid/SAP supply and support margin in the near-term.

Figure 71. China's Self-Sufficiency For Chemicals (%)



Source: IHS, Citi Research estimates

Figure 72. China's 8M12 Imports – YoY Change (%)

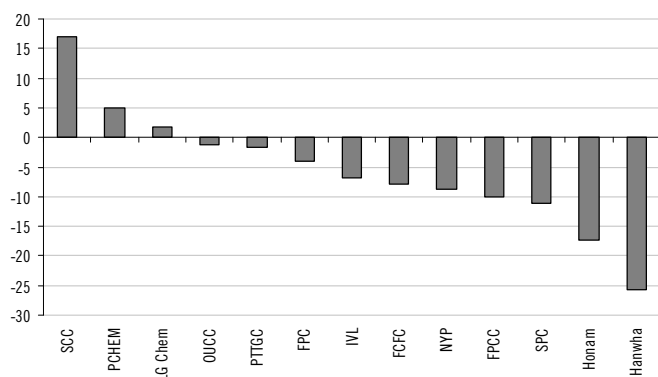


Source: IHS, CEIC, Citi Research

## Valuation: Expectations Reset

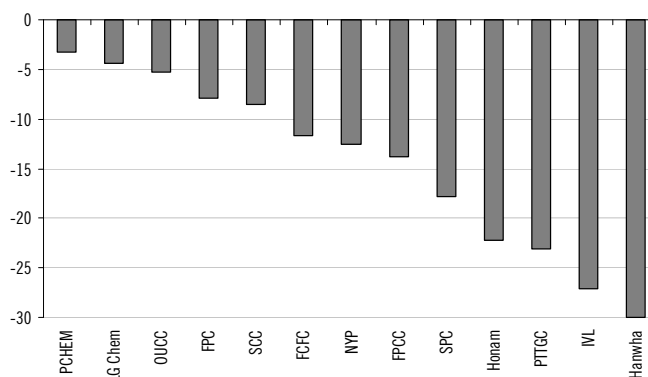
The Asian chemical sector rose 2% YTD and under-performed MSCI by 11% due to large earnings disappointment. Only three companies had positive absolute returns – SCC (robust performance for cement / building materials), PCHEM (gas cracker) and LG Chem (diversified mix, solid IT materials margin). We think the consensus downgrade over the past 6-12 months has mostly priced in the trough outlook this year. For 2013, the expectations may still be slightly on the high side depending on the timing and magnitude of demand recovery in China. Overall, we see stronger margin recovery from 2H13 and would look to re-visit the sector in 1Q13 as share price tends to price in the fundamentals 3-6 months in advance.

Figure 73. Absolute performance – 2012 YTD (%)



\*Price as of 22 Oct. Source: Datastream, Citi Research

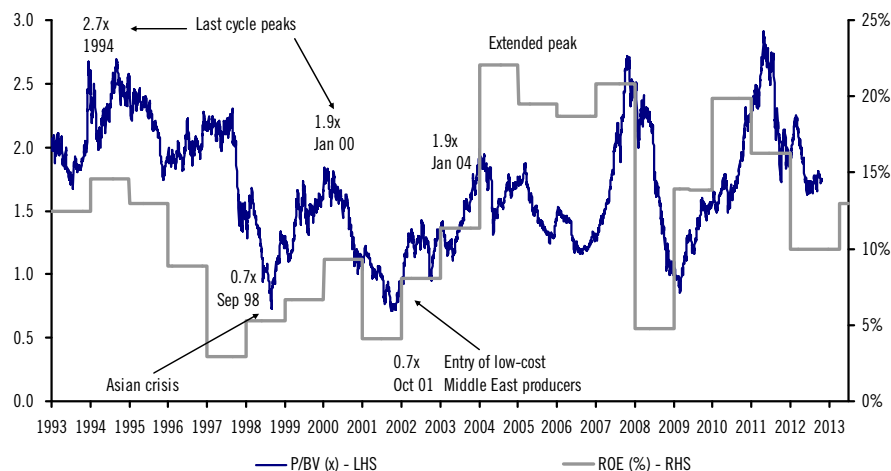
Figure 74. Relative Performance vs. Home Country Index (%)



\*Price as of 22 Oct. Source: Datastream, Citi Research

The current sector valuation of 1.6-1.7x P/B is at mid-cycle, but this would be partly distorted by high multiples of SCC (lack of cement plays in Thailand) and Formosa Group (outperformance of non-tech 'benchmark' stocks due to a lack of choice in 'tech-heavy' Taiwan market). Despite our positive long-term view of an ethylene upturn in 2014-15, we do not think it should return to peak P/BV soon.

Figure 75. Asian Chemicals Sector P/BV (x) vs. ROE Trend (%)



Source: Datastream, Citi Research estimates



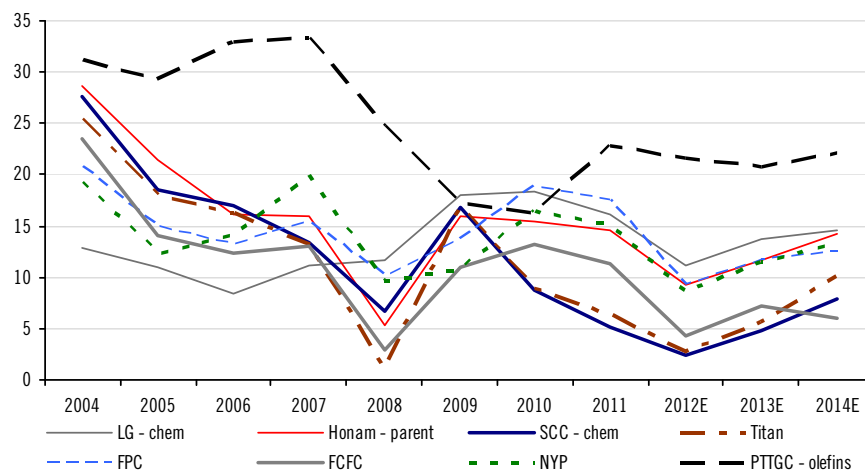
Our regional top picks are LG Chem and PTTGC. PTTGC's EBITDA margin (~20% for olefins division) would fare better than naphtha crackers and the concern of feedstock formula adjustment should be mostly priced in. We remain cautious on the Formosa sisters (one Neutral/three Sells) on rising DRAM exposure and lack of long-term growth strategy. On Honam, we consider the stock a 'high-beta' play on potential re-stocking. However, the weak 4Q EPS momentum and poor PTA outlook for KP Chem would cap near-term share price upside.

Figure 76. Analysis of Historical Trough and Peak P/BV (x) vs. ROE(%)

	Price 22-Oct	FY13E Current	Mid-cycle	P/BV* Trough	08 trough	Peak	Price @ Mid-cycle	Variance	ROE 2001	ROE 2013E*
FPC	77.6	2.32	2.36	1.19	1.32	3.40	79	2	7.6	11.7
FCFC	73.6	2.23	2.10	0.75	1.05	3.15	69	(6)	5.2	8.7
NYP	54.8	1.81	2.22	0.78	1.06	3.38	67	22	6.2	7.0
FPCC	84.3	3.38	3.56	2.00	2.20	4.92	89	5	3.7	14.2
OUCC	34.1	1.74	2.49	0.69	0.69	4.28	49	43	7.2	12.7
LG Chem	323,000	1.70	2.11	0.49	0.67	3.55	399,840	24	13.0	16.7
Honam	246,500	1.28	1.40	0.20	0.30	2.50	269,787	9	0.9	12.7
SCC	366	2.68	2.49	0.68	1.03	3.96	341	(7)	12.9	18.2
PTTGC#	60.0	1.16	1.26	0.35	0.35	2.17	65	9	n/a	14.4
IVL	27.3	1.77	3.06	1.55	n/a	4.57	47	73	n/a	16.4
PCG	6.51	2.38	2.46	1.96	n/a	2.96	7	3	n/a	16.4
SPC	2.30	0.94	1.79	0.24	0.48	3.10	4.4	91	0.9	5.7
China Blue	5.29	1.73	1.89	0.96	0.97	2.81	5.8	9	n/a	16.5
Sinofert	1.70	0.81	2.57	0.78	1.24	3.90	5.4	217	n/a	7.5

\*Based on restated book value (excluding mark-to-market gains for cross holdings) Source: Citi Research estimates

Figure 77. EBITDA Margin for Selected Asian Chemical Companies\* (%)



\* Excludes refinery / aromatics division for PTTGC. Source: IHS, Citi Research estimates

## Forecast & Spread Changes

Figure 78. EPS Forecast Changes

	EPS - New			EPS - Old			% Change		
	FY12E	FY13E	FY14E	FY12E	FY13E	FY14E	FY12E	FY13E	FY14E
LG Chem	23,792	29,491	35,209	23,792	29,491	35,209	-	-	-
Honam	13,983	23,121	33,372	17,469	31,367	41,895	(20)	(26)	(20)
FPC	2.90	4.55	5.63	3.86	5.86	7.12	(25)	(22)	(21)
FCFC	1.60	3.65	3.89	2.66	5.24	5.11	(40)	(30)	(24)
NYP	0.78	2.30	3.80	1.60	4.21	5.55	(51)	(45)	(32)
FPCC	1.13	3.37	4.03	1.59	4.40	5.00	(29)	(23)	(19)
OUCG	1.38	2.41	2.88	1.80	2.92	3.44	(23)	(18)	(16)
PCHEM	0.44	0.43	0.41	0.44	0.45	0.42	1	(4)	(3)

\*Prices in local currency Source: Citi Research estimates

Figure 79. Asian Chemicals Spreads Assumptions (US\$/tonne)

	2010	2011	12E New	12E Old	Change	13E New	13E Old	Change	14E New	14E Old	Change
Naphtha price	724	938	940	900	40	850	850	-	850	850	-
<b>Olefins Chain</b>											
Integrated NCC, PE/PP	493	303	184	263	(79)	298	424	(127)	493	613	(121)
Ethylene-naphtha	395	264	280	250	30	320	350	(30)	400	450	(50)
Propylene-naph	474	516	420	430	(10)	450	500	(50)	480	500	(20)
Butadiene-naph	1,176	1,989	1,580	1,850	(270)	1,250	1,650	(400)	1,650	2,150	(500)
HDPE-naphtha	483	416	410	430	(20)	460	520	(60)	550	580	(30)
LDPE-naphtha	740	633	410	450	(40)	480	540	(60)	570	600	(30)
PP-naphtha	585	578	450	450	-	500	520	(20)	550	580	(30)
MEG-ethylene	200	439	274	287	(13)	395	406	(11)	425	444	(19)
<b>Aromatics Chain</b>											
PX-naphtha	319	607	540	580	(40)	520	550	(30)	350	350	-
Benzene-naphtha	208	169	210	200	10	250	240	10	250	250	-
SM-benzene/C2	157	188	190	169	21	223	222	1	260	266	(6)
PTA-PX	273	239	98	108	(10)	102	122	(19)	126	136	(10)
PTA-naphtha	488	652	470	506	(36)	459	499	(40)	369	379	(10)
<b>Plastics, Rubber Chain</b>											
PVC-EDC/ethylene	321	400	446	435	11	452	421	31	469	453	16
PVC (integrated)	624	715	674	691	(17)	695	702	(7)	722	738	(16)
ABS	518	354	328	276	52	353	297	56	372	364	8
ABS (non-integrated)	429	258	233	192	41	239	186	53	238	227	11
Synthetic rubber (BR)	1,009	1,270	806	743	63	697	675	22	775	710	65
<b>Propylene Derivatives</b>											
AN	708	450	178	277	(99)	258	381	(123)	227	239	(12)
2EH	582	433	324	302	22	361	334	27	302	284	18
Acrylic ester (AE)	1,330	1,436	793	883	(90)	793	741	52	648	641	7
Phenol	640	527	264	315	(51)	299	386	(87)	227	239	(12)
BPA	344	440	180	188	(8)	210	202	8	193	254	(61)
<b>Synthetic Fibre</b>											
Caprolactam	1,611	2,143	1,400	1,500	(100)	1,200	1,410	(210)	1,150	1,300	(150)
Polyester staple fibre	306	291	207	199	8	207	192	15	208	202	6
Polyester filament DTY	691	632	607	609	(2)	587	572	15	588	582	6
PET chip	169	175	157	159	(2)	167	172	(5)	168	182	(14)

Source: IHS, Citi Research estimates

Figure 80. Asian Chemical Spreads Assumptions (US\$/tonne)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012E	2013E	2014E	2015E
Oil price (US\$/bbl)	24.4	25.0	28.8	38.0	54.5	65.5	72.6	97.7	61.8	79.6	110.6	110.0	99.0	100.0	100.0
Naphtha price	237	237	285	389	486	582	696	825	555	724	938	940	850	850	850
<b>Olefins Chain</b>															
Integrated PE/PP	353	402	462	768	707	730	597	453	556	493	303	184	298	493	631
Ethylene-naphtha	223	189	215	519	415	556	469	325	310	395	264	280	320	400	500
Propylene-naphtha	164	231	289	430	458	516	410	339	350	474	516	420	450	480	480
BD-naphtha	190	318	441	578	766	761	360	1,164	443	1,176	1,989	1,580	1,250	1,650	1,750
HDPE-naphtha	376	321	344	554	553	652	668	626	599	483	416	410	460	550	650
LDPE-naphtha	398	375	420	751	658	693	792	721	684	762	661	410	480	570	670
PP-naphtha	313	360	420	567	588	649	638	577	512	585	578	450	500	550	620
MEG-ethylene	201	199	365	371	362	172	345	242	118	200	439	274	395	425	363
<b>Aromatics Chain</b>															
PX-naphtha	186	187	287	386	407	497	416	274	374	319	605	540	520	350	300
Benzene-naphtha	36	114	172	437	348	282	340	134	146	208	169	210	250	250	220
SM-benzene/C2	153	232	213	185	152	182	186	118	206	157	188	190	223	260	255
PTA-PX	205	242	205	245	209	177	154	137	232	273	240	98	102	126	150
PTA-naphtha	332	367	396	497	489	511	438	344	475	488	652	470	459	369	359
<b>Plastics Chain</b>															
PVC-EDC/C2	224	211	267	314	283	281	323	430	329	321	400	446	452	469	458
PVC (integrated)	405	419	480	658	523	506	597	702	585	624	715	674	695	722	727
ABS	378	371	360	362	344	364	446	357	463	518	354	328	353	372	439
Sync rubber (BR)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,114	708	1,009	1,270	806	697	775	782
<b>C3 Derivatives</b>															
AN	123	185	91	83	147	150	399	205	167	708	450	178	258	227	303
2EH	n/a	n/a	n/a	126	99	228	583	518	272	582	433	324	361	302	302
Phenol	326	299	402	479	295	242	587	422	222	640	527	793	793	227	325
BPA	n/a	216	190	313	482	257	328	256	242	344	440	264	299	193	221
Acrylate (AE)	n/a	n/a	n/a	1,244	1,003	534	590	753	576	1,284	1,463	180	210	648	648
<b>Synthetic Fibre</b>															
Caprolactam	719	690	734	951	1,276	1,206	1,288	1,216	1,076	1,611	2,143	1,400	1,200	1,150	1,180
Staple fibre	111	136	147	131	111	123	183	144	176	306	291	207	207	208	216
Polyester filament	451	412	410	445	378	426	553	491	472	691	632	607	587	588	596
PET chip	220	149	122	131	139	148	189	150	156	169	175	157	167	168	176

Source: IHS, Citi Research estimates

## Regional and Global Valuation Summary

Figure 81. Regional Chemicals Valuation

	FPC	FCFC	NYP	FPCC	OUCC	LG Chem	Honam	SCC	PTTGC	IVL	PCG*	CBC	Sinofert
Price on 22 Oct 12	77.6	73.6	54.8	84.3	34.1	323,000	246,500	366.0	60.0	27.3	6.51	5.29	1.70
12-month target price	77.0	63.0	48.0	75.0	38.0	390,000	280,000	412.0	72.0	31.5	6.50	6.60	2.30
Market Cap (US\$M)	16,225	14,306	14,699	27,431	1,032	19,379	7,110	14,295	8,803	4,270	17,064	3,147	1,541
The call	Neutral /	Sell /	Sell /	Sell /	Buy /	Buy /	Neutral / High Risk	Buy /	Buy /	Neutral / High Risk	Neutral /	Buy /	Buy /
Reuters	1301.TW	1326.TW	1303.TW	6505.TW	1710.TW	051910.KS	011170.KS	SCC.BK	PTTGC.BK	IVL.BK	PCGB.KL	3983.HK	0297.HK
Bloomberg	1301 TT	1326 TT	1303 TT	6505 TT	1710 TT	051910 KS	011170 KS	SCC/F TB	PTTGC TB	IVL TB	PCHEM MK	3983 HK	297 HK
<b>Absolute Performance</b>													
1-mth	(7.3)	(6.8)	(6.6)	(4.5)	0.3	(2.0)	(6.1)	2.8	(6.6)	(7.6)	(0.5)	17.8	13.3
3-mth	(3.5)	(5.4)	(1.1)	1.0	(1.5)	2.5	(3.5)	13.0	(1.2)	(12.1)	(0.2)	11.6	16.4
12-mth	(9.2)	(12.7)	(19.8)	(2.0)	(2.3)	(5.8)	(14.7)	26.6	11.1	(15.5)	8.3	0.2	(14.6)
ytd	(4.0)	(7.9)	(8.8)	(10.1)	(1.3)	1.7	(17.3)	16.9	(1.6)	(6.8)	5.0	(10.0)	(22.0)
<b>Relative Performance</b>													
1-mth	(2.5)	(2.0)	(1.8)	0.4	5.5	1.1	(3.2)	0.9	(8.3)	(9.3)	(2.7)	7.5	3.4
3-mth	(6.2)	(8.1)	(3.9)	(1.9)	(4.3)	(3.7)	(9.4)	4.2	(8.9)	(18.9)	(1.3)	(0.6)	3.7
12-mth	(10.7)	(14.1)	(21.1)	(3.6)	(3.9)	(10.8)	(19.2)	(11.4)	(22.3)	(40.9)	(6.2)	(14.0)	(26.7)
ytd	(7.9)	(11.6)	(12.5)	(13.8)	(5.3)	(4.3)	(22.2)	(8.5)	(23.0)	(27.1)	(3.3)	(16.8)	(27.9)
Book value - 2012E	37.5	40.7	32.1	22.6	18.2	163,949	183,689	125.8	47.6	13.6	2.5	2.7	2.0
P/BV (x) [FY12E]	2.07	1.81	1.71	3.74	1.87	1.97	1.34	2.91	1.26	2.01	2.58	1.93	0.86
Book value - 2013E	40.1	43.3	33.8	24.9	19.6	189,498	192,705	136.6	51.9	15.4	2.7	3.1	2.1
P/BV (x) [FY13E]	1.94	1.70	1.62	3.38	1.74	1.70	1.28	2.68	1.16	1.77	2.38	1.73	0.81
<b>EV/EBITDA (x)</b>													
2010	8.4	7.4	7.6	12.8	12.2	6.3	4.6	12.2	11.4	13.3	n/a	7.4	15.2
2011	9.3	8.5	9.1	18.3	6.5	6.1	3.9	12.2	7.3	10.2	n/a	5.0	4.0
2012E	19.9	24.2	18.7	25.8	8.6	7.6	7.2	12.2	8.2	10.7	7.8	4.8	1.8
2013E	14.7	14.4	13.1	14.7	5.7	6.2	4.8	10.2	6.6	8.8	7.9	4.4	1.6
2014E	12.3	16.1	9.8	13.1	5.0	5.3	3.3	8.0	6.6	7.1	8.8	4.4	1.4
<b>PE (x)</b>													
2010	10.4	8.8	10.5	19.6	17.0	10.1	9.9	16.0	16.6	11.7	n/a	16.7	18.0
2011	13.3	12.7	18.6	35.7	11.5	10.2	8.0	17.3	9.0	13.7	14.4	9.9	14.2
2012E	26.7	46.0	70.3	74.8	24.7	13.6	17.6	19.3	10.2	18.8	14.6	9.8	10.6
2013E	17.1	20.2	23.8	25.0	14.2	11.0	10.7	15.4	8.4	11.5	15.1	8.9	8.9
2014E	13.8	18.9	14.4	20.9	11.8	9.2	7.4	11.1	8.8	8.4	16.0	8.7	7.7
<b>Dividend Yield (%)</b>													
2010	8.8	10.2	8.6	4.6	6.4	1.2	0.7	3.4	n/a	2.4	n/a	2.1	0.8
2011	5.2	5.4	3.8	2.4	5.3	1.2	0.7	3.1	n/a	3.7	2.5	3.7	1.2
2012E	2.6	1.5	1.1	1.2	2.9	1.2	0.5	2.7	3.9	2.2	3.4	4.0	1.8
2013E	4.1	3.5	2.9	3.6	4.4	1.4	0.6	3.6	4.8	2.9	3.5	4.7	2.2
2014E	5.2	3.8	5.1	4.3	5.9	1.5	0.7	4.9	4.6	3.6	3.4	4.9	2.9
<b>ROE (%)</b>													
2010	18.7	18.8	15.4	17.2	12.4	31.5	19.2	31.5	9.7	42.4	16.3	11.6	4.3
2011	14.2	12.7	8.5	9.6	16.8	24.4	19.6	20.0	16.0	38.0	n/a	17.5	5.3
2012E	7.5	3.8	2.4	4.9	7.5	15.4	7.9	15.6	12.9	12.4	18.6	16.2	6.8
2013E	11.7	8.7	7.0	14.2	12.7	16.7	12.7	18.2	14.4	16.4	16.4	16.5	7.5
2014E	13.6	8.9	10.9	15.9	14.2	17.2	16.0	22.9	12.7	19.6	14.4	15.4	8.2

\*Estimates corresponding to calendar year. Note: All prices in local currency

Source: Company Reports, Datastream, Citi Research estimates

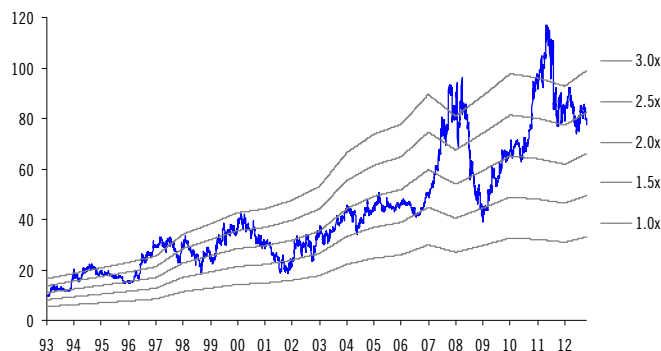
Figure 82. Global Chemicals Valuation

Name	RIC	Rating	Price (LC)	P/E (x)			P/BV (x)			EV/EBITDA (x)			ROE (%)	Debt/Eq (%)	Div Yield
				23-Oct-12	FY12E	FY13E	FY14E	FY12E	FY13E	FY14E	FY12E	FY13E			
US Chemicals															
Air Prods & Chem	APD.N	2	79.0	14.6	13.7	12.5	2.6	2.4	2.2	8.6	8.2	7.8	15.7	75.5	3.2
Albemarle	ALB.N	1	56.2	12.3	11.0	10.0	2.6	2.2	1.8	8.1	7.3	6.6	22.8	41.4	1.4
Celanese	CE.N	1	37.4	9.8	7.9	6.9	2.7	2.0	2.0	9.0	7.1	6.1	38.9	138.1	0.8
DuPont	DD.N	2	49.8	12.9	11.2	9.9	4.4	3.9	3.1	7.0	6.4	5.5	38.1	113.4	3.4
Dow Chem	DOW.N	1	29.7	16.3	10.8	8.2	1.1	1.1	1.0	7.4	6.2	5.1	9.0	84.2	4.1
Ecolab	ECL.N	2	69.7	23.6	19.9	17.8	3.9	3.1	3.1	11.9	10.8	9.9	15.8	124.4	1.1
Eastman Chem	EMN.N	1	56.2	10.7	8.9	8.0	3.5	2.9	2.4	5.0	4.0	3.5	36.3	158.1	1.9
Huntsman	HUN.N	2H	15.7	7.1	7.4	6.2	1.8	1.5	1.3	5.0	4.9	4.2	27.0	167.3	2.6
Monsanto	MON.N	1	88.9	24.0	20.0	18.2	4.0	3.6	3.2	12.3	11.1	10.3	17.3	17.2	1.4
PPG Ind	PPG.N	1	117.7	14.9	13.5	12.8	5.2	4.3	3.7	7.4	7.0	6.7	35.6	86.2	2.0
Praxair	PX.N	1	105.3	18.7	16.4	14.8	5.5	5.1	4.3	10.9	10.0	9.3	30.3	121.4	2.1
Valspar Corp	VAL.N	1	57.7	17.5	15.0	13.5	4.2	3.6	3.1	10.2	9.2	8.3	25.4	93.5	1.4
	Mkt wtd average			17.3	14.5	12.8	3.7	3.3	2.8	9.2	8.3	7.5	24.4	88.7	2.4
	Simple average			15.2	13.0	11.6	3.5	3.0	2.6	8.6	7.7	6.9	26.0	101.7	2.1
European Chemicals															
Air Liquide	AIRP.PA	2	91.7	18.2	16.7	15.2	2.7	2.6	2.4	9.3	8.7	8.0	15.5	64.8	2.6
Akzo Nobel	AKZO.AS	2	42.4	14.0	12.3	10.8	1.3	1.3	1.3	6.2	5.9	5.5	(24.8)	43.1	3.4
Arkema	AKE.PA	1	72.3	9.3	9.0	8.1	1.5	1.3	1.2	5.8	5.7	5.1	16.7	28.2	2.0
BASF	BASFn.DE	2	64.6	11.4	11.2	10.2	2.3	2.2	2.0	6.3	6.4	6.0	18.1	46.0	3.9
Bayer	BAYGn.DE	1	67	12.3	10.6	9.5	2.7	2.4	2.1	9.3	7.7	6.8	13.8	46.9	2.8
Clariant	CLN.VX	1	11.0	9.7	7.1	5.9	1.0	0.9	0.8	5.0	4.3	3.6	8.2	95.0	2.6
Croda	CRDA.L	3	23.1	18.3	19.2	18.9	8.8	7.5	6.5	11.8	11.9	11.6	55.0	68.2	2.6
DSM	DSMN.AS	1	39.7	13.1	10.5	9.1	1.1	1.0	1.0	7.3	6.6	6.0	7.1	38.5	3.7
Givaudan	GIVN.VX	3	927	18.8	16.3	14.9	2.3	2.2	2.0	12.3	10.8	10.0	10.0	54.5	2.5
Johnson Matthey	JMAT.L	1	22.6	14.0	15.3	13.0	3.0	2.7	2.4	9.2	9.3	8.0	21.5	40.6	2.5
Lanxess	LXSG.DE	2	61.4	9.1	7.6	6.7	1.7	1.5	1.3	5.8	4.9	4.3	22.4	62.2	1.5
Linde	LING.DE	1	129.8	15.5	14.2	12.7	1.8	1.9	1.8	8.9	8.0	7.3	10.6	81.5	2.1
Lonza Grp	LONN.VX	1	46.7	12.5	10.7	9.0	0.9	0.8	0.8	7.3	6.6	5.9	7.7	99.5	2.8
Solvay	SOLB.BR	3	94.1	12.9	12.1	10.7	1.2	1.2	1.1	6.2	5.9	5.4	5.9	58.3	2.6
Symrise AG	SY1G.DE	3	27.4	16.8	16.4	15.6	3.3	3.0	2.7	10.2	9.9	9.5	16.9	57.6	2.4
Syngenta	SYNN.VX	1	348	17.7	15.9	13.8	5.0	4.4	3.8	11.7	10.6	9.4	25.4	61.2	2.3
Umicore	UMI.BR	2	39.1	15.5	14.3	13.1	2.4	2.2	2.0	9.8	8.4	7.7	15.0	13.9	2.4
Victrex	VCTX.L	2	14	16.7	15.6	14.0	4.2	3.3	2.7	10.9	10.0	8.6	28.3	0.0	2.4
Yara	YAR.OL	1	276	7.5	7.3	7.1	1.5	1.3	1.1	5.3	5.3	4.9	22.6	9.0	2.9
	Mkt wtd average			13.8	12.6	11.3	2.6	2.4	2.1	8.4	7.7	7.0	15.1	52.1	2.9
	Simple average			13.9	12.8	11.5	2.6	2.3	2.1	8.3	7.7	7.0	15.6	51.0	2.6
Asian Chemicals															
	Mkt wtd average			21.8	13.0	11.8	2.1	1.9	1.7	12.2	8.7	8.1	11.2	47.7	2.0
	Simple average			20.4	12.2	10.7	1.9	1.7	1.6	13.3	7.7	7.1	10.2	38.5	2.4
	Overall Mkt wtd average				13.3	11.9	2.8	2.5	2.3	9.6	8.1	7.4	17.0	62.3	2.5
	Overall simple average				12.7	11.3	2.6	2.3	2.1	9.9	7.7	7.0	16.8	61.2	2.4

Note: All prices in local currency  
Source: Datastream, Citi Research estimates

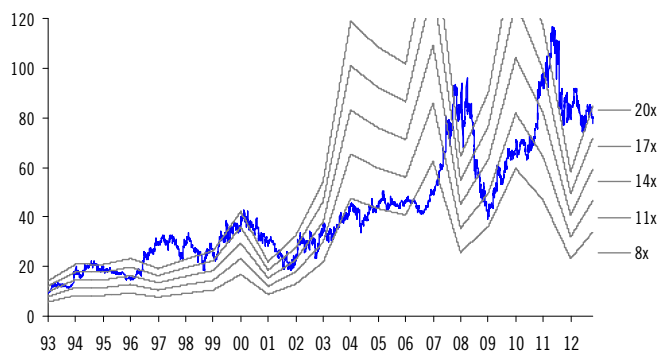
## Asian Chemicals Valuation Trends

Figure 83. FPC – Price to Book\*



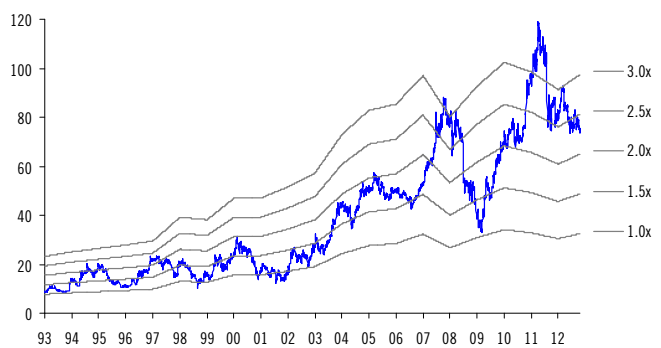
\* Based on restated book value. Source: Datastream, Citi Research

Figure 84. FPC – PER



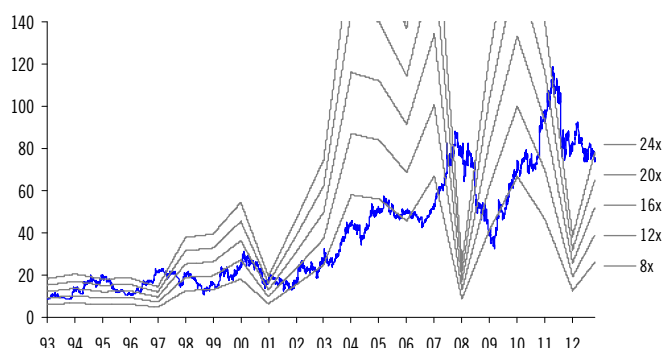
Source: Datastream, Citi Research

Figure 85. FCFC – Price to Book\*



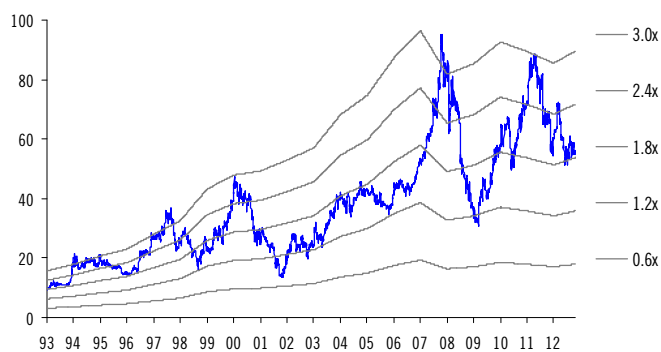
\* Based on restated book value. Source: Datastream, Citi Research

Figure 86. FCFC – PER



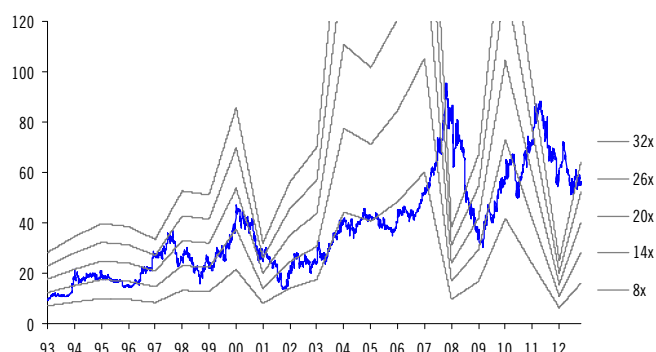
Source: Datastream, Citi Research

Figure 87. NYP – Price to Book\*



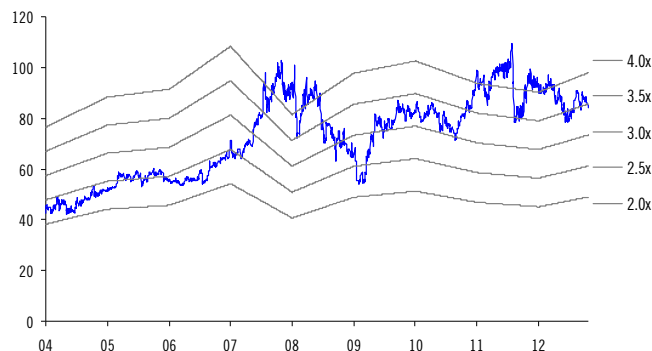
\* Based on restated book value. Source: Datastream, Citi Research

Figure 88. NYP – PER



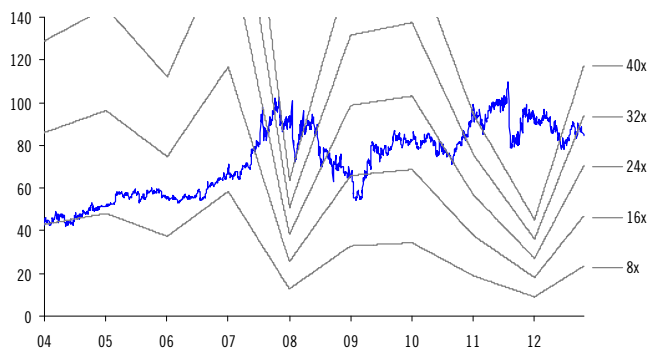
Source: Datastream, Citi Research

Figure 89. FPCC – Price to Book



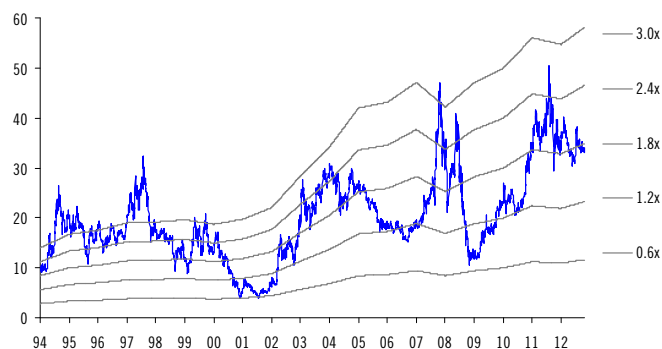
Source: Datastream, Citi Research

Figure 90. FPCC – PER



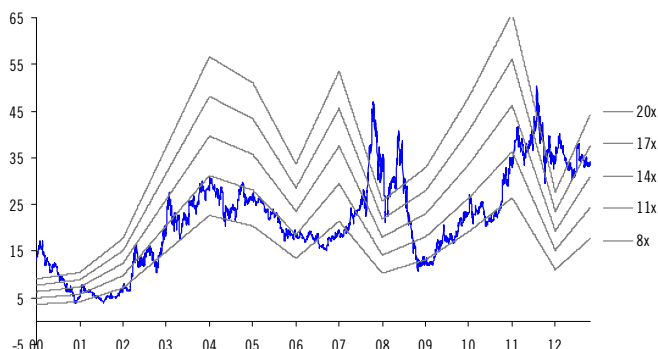
Source: Datastream, Citi Research

Figure 91. OUCC – Price to Book



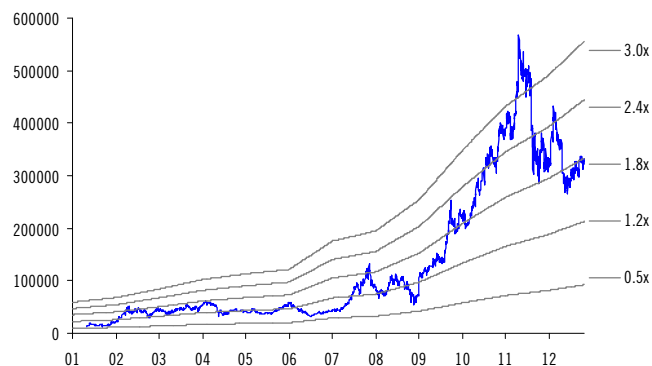
Source: Datastream, Citi Research

Figure 92. OUCC – PER



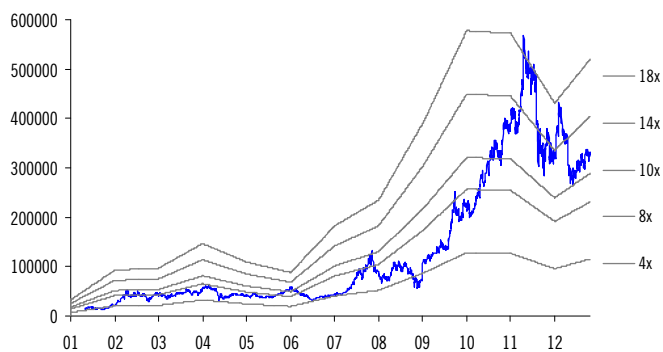
Source: Datastream, Citi Research

Figure 93. LG Chem – Price to Book



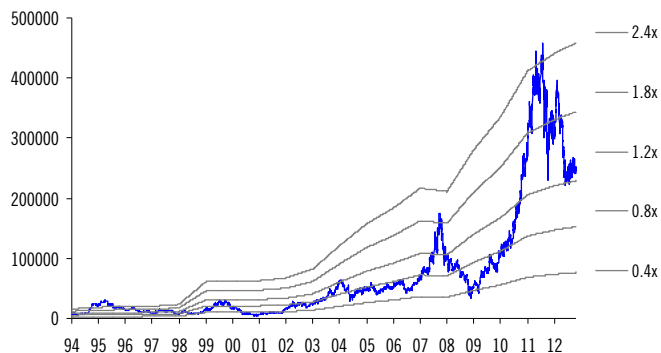
Source: Datastream, Citi Research

Figure 94. LG Chem – PER



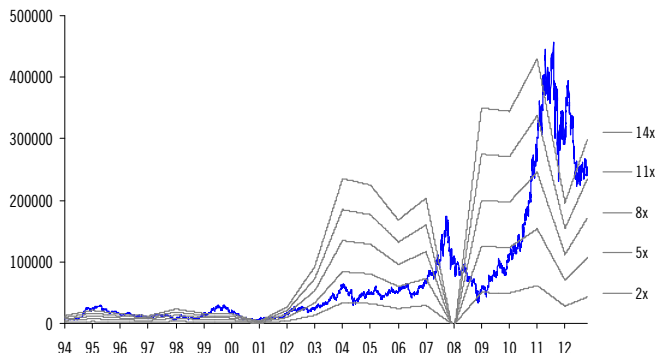
Source: Datastream, Citi Research

Figure 95. Honam – Price to Book



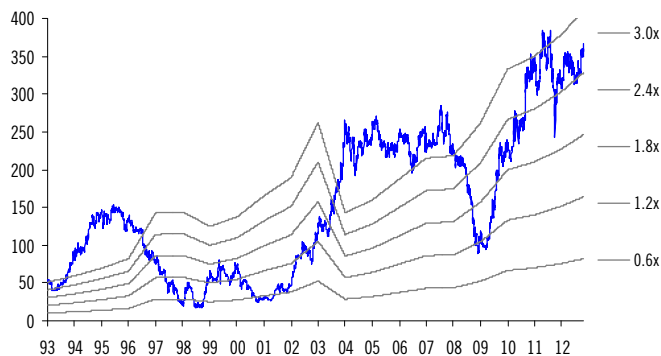
Source: Datastream, Citi Research

Figure 96. Honam – PER



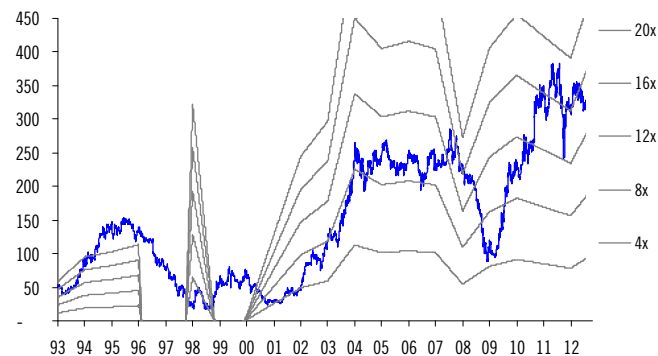
Source: Datastream, Citi Research

Figure 97. SCC – Price to Book



Source: Datastream, Citi Research

Figure 98. SCC – PER



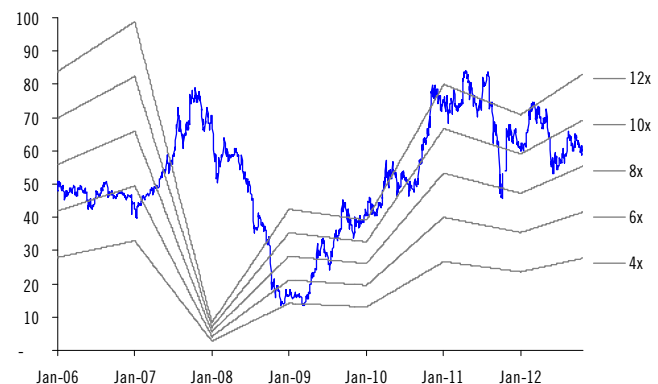
Source: Datastream, Citi Research

Figure 99. PTTGC – Price to Book



Source: Datastream, Citi Research

Figure 100. PTTGC – PER



Source: Datastream, Citi Research

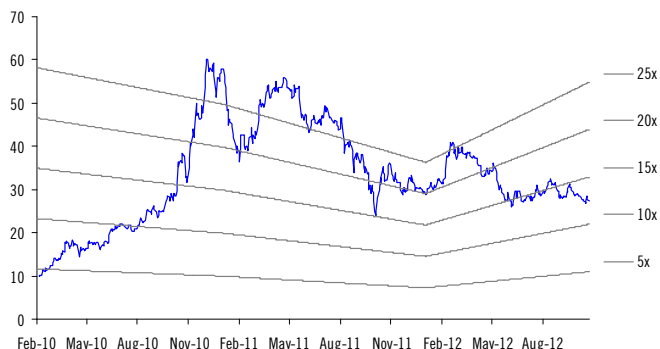


Figure 101. IVL – Price to Book



Source: Datastream, Citi Research

Figure 102. IVL - PER



Source: Datastream, Citi Research

Figure 103. PCG – Price to Book



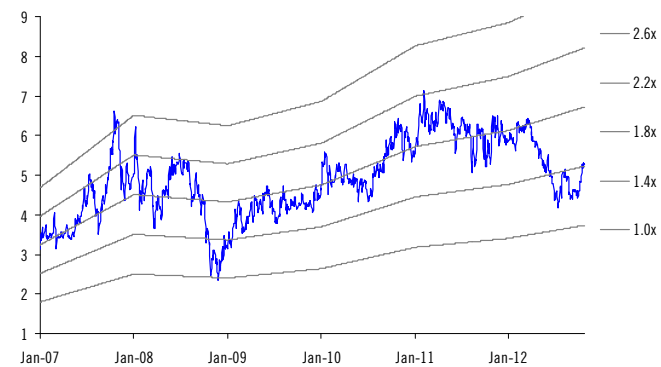
Source: Datastream, Citi Research

Figure 104. PCG - PER



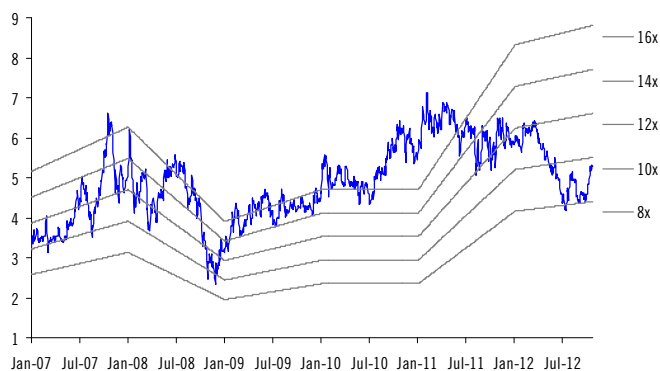
Source: Datastream, Citi Research

Figure 105. China BlueChemical – Price to Book



Source: Datastream, Citi Research

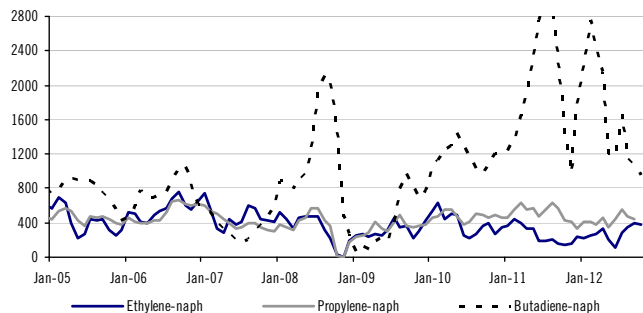
Figure 106. China BlueChemical – PER



Source: Datastream, Citi Research

## Asian Chemical Spreads

Figure 107. Ethylene, Propylene, Butadiene Spreads



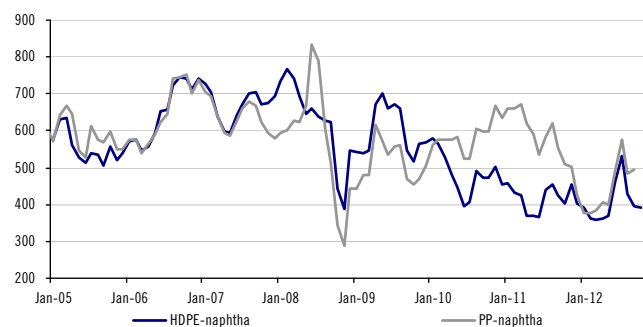
Source: IHS, Citi Research

Figure 108. Integrated Naphtha Spread



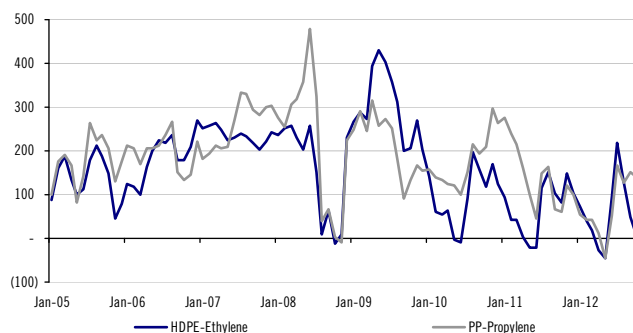
Source: IHS, Citi Research

Figure 109. HDPE-Naphtha and PP-Naphtha Spreads



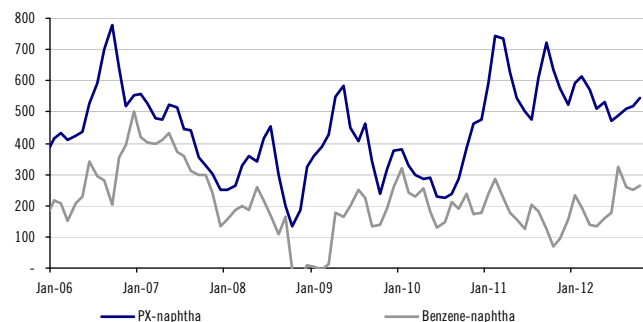
Source: IHS, Citi Research

Figure 110. Non-integrated HDPE/PP Spreads



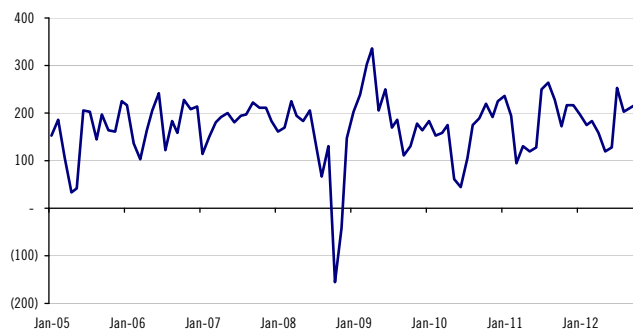
Source: IHS, Citi Research

Figure 111. Benzene-Naphtha and PX-Naphtha Spreads



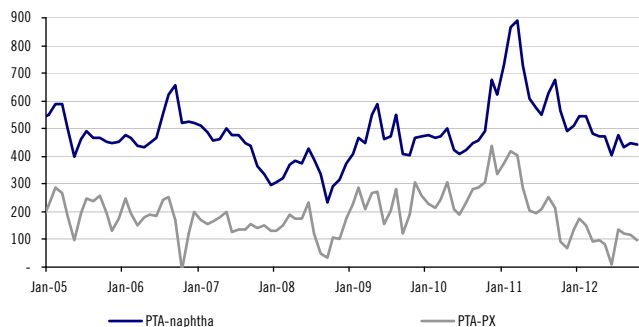
Source: IHS, Citi Research

Figure 112. SM-Benzene/Ethylene Spread



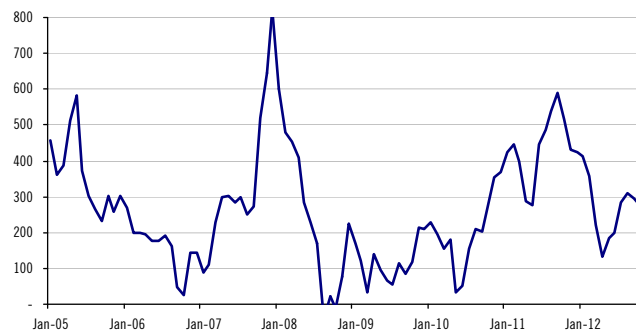
Source: IHS, Citi Research

Figure 113. PTA-PX and PTA-Naphtha Spreads



Source: IHS, Citi Research

Figure 114. MEG-Ethylene Spreads



Source: IHS, Citi Research

Figure 115. Phenol and AN Spreads



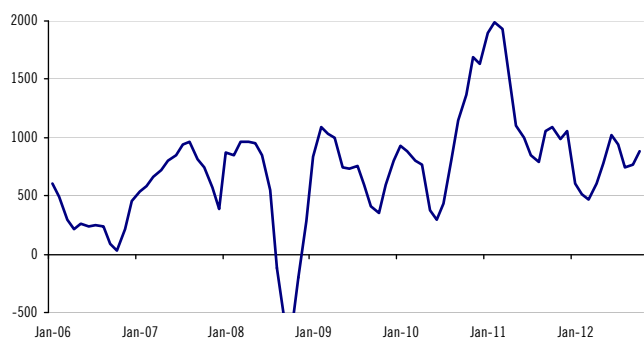
Source: IHS, Citi Research

Figure 116. AE and 2EH Spreads



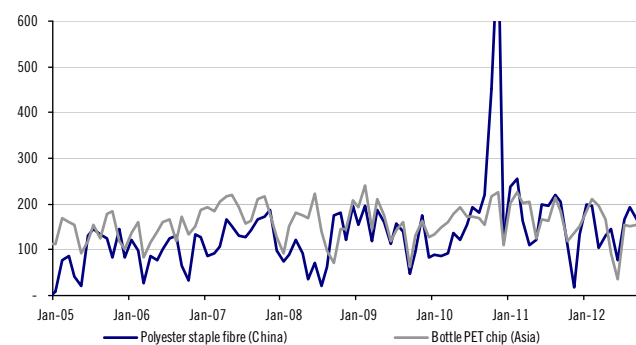
Source: IHS, Citi Research

Figure 117. Synthetic Rubber (BR-BD) Spread



Source: IHS, Citi Research

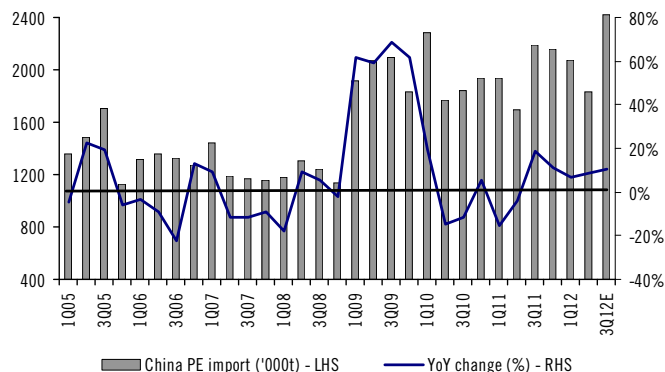
Figure 118. PET (Asia) and Polyester Staple Fibre (China) Spreads



Source: IHS, Citi Research

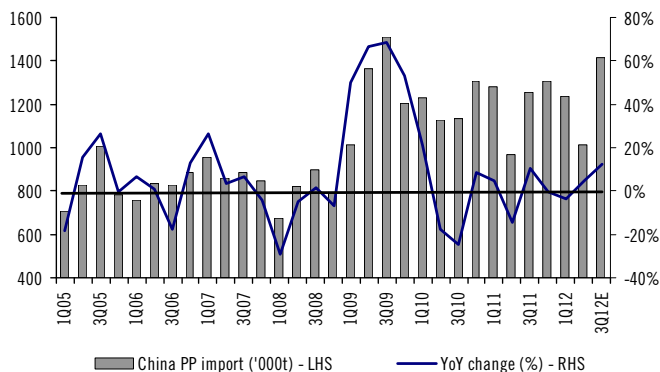
## China's Quarterly Import Trends

Figure 119. China's PE Imports ('000 tonnes) and YoY Change (%)



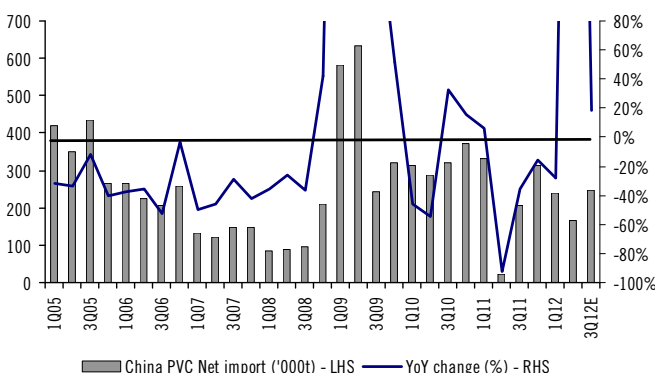
Source: China Customs, Citi Research

Figure 120. China's PP Imports ('000 tonnes) and YoY Change (%)



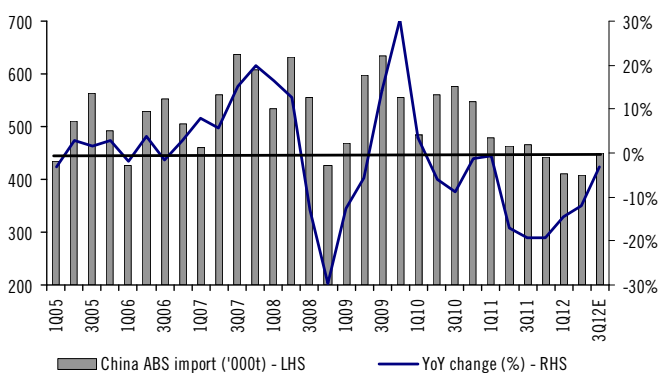
Source: China Customs, Citi Research

Figure 121. China's PVC Imports ('000 tonnes) and YoY Change (%)



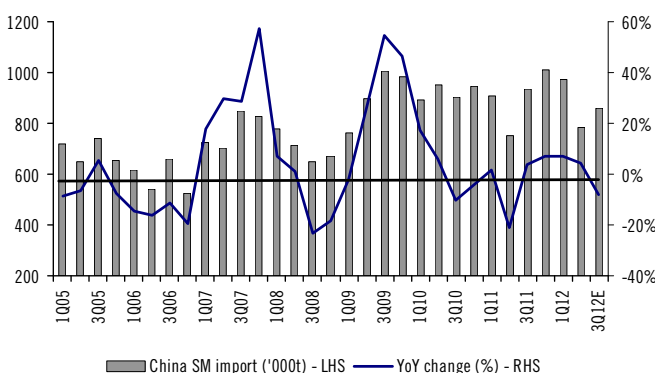
Source: China Customs, Citi Research

Figure 122. China's ABS Imports ('000 tonnes) and YoY Change (%)



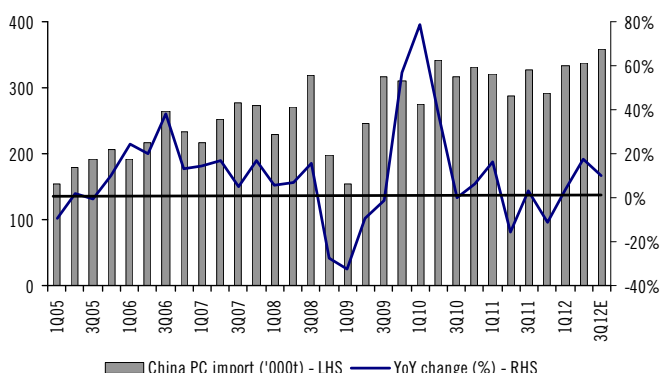
Source: China Customs, Citi Research

Figure 123. China's SM Imports ('000 tonnes) and YoY Change (%)



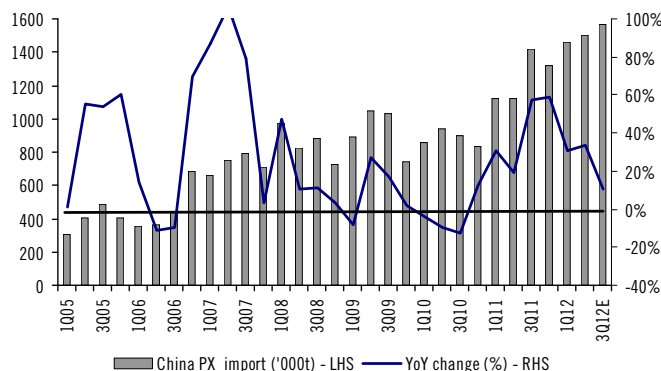
Source: China Customs, Citi Research

Figure 124. China's PC Imports ('000 tonnes) and YoY Change (%)



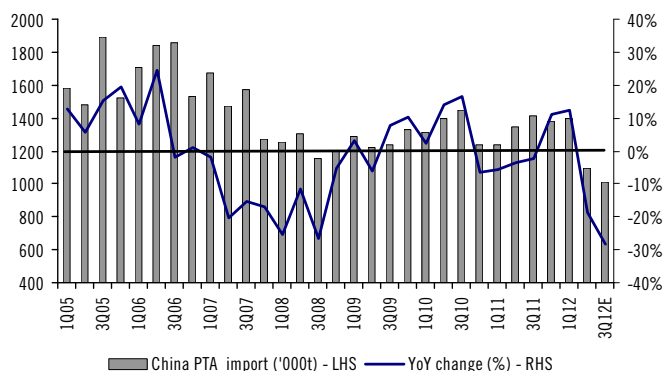
Source: China Customs, Citi Research

Figure 125. China's PX Imports ('000 tonnes) and YoY Change (%)



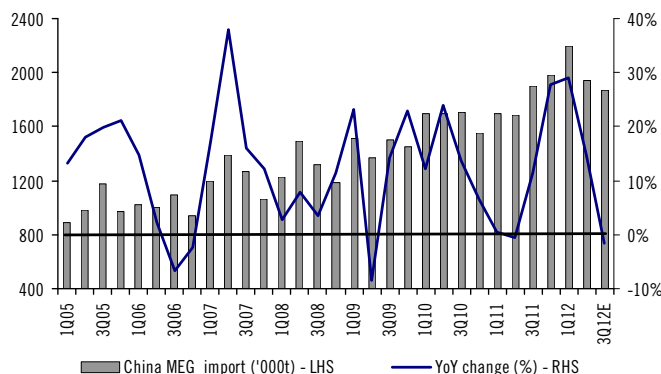
Source: China Customs, Citi Research

Figure 126. China's PTA Imports ('000 tonnes) and YoY Change (%)



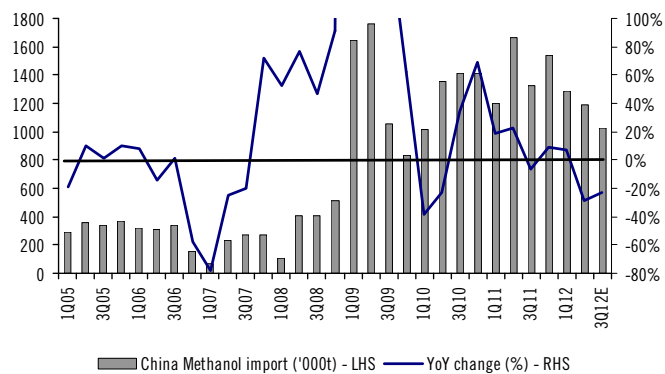
Source: China Customs, Citi Research

Figure 127. China's MEG Imports ('000 tonnes) and YoY Change (%)



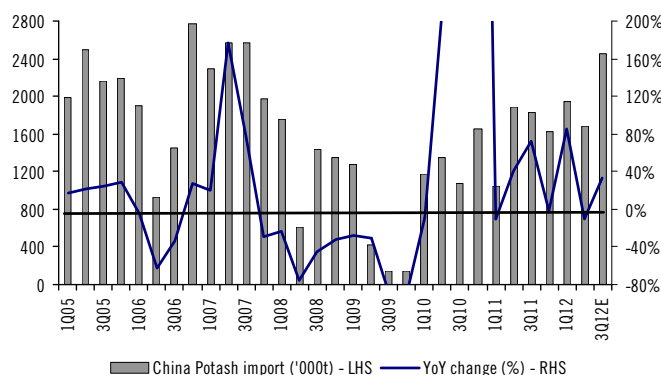
Source: China Customs, Citi Research

Figure 128. China's Methanol Imports ('000 tonnes) and YoY Change (%)



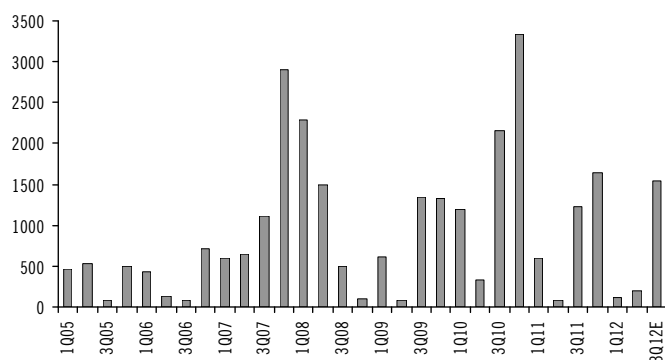
Source: China Customs, Citi Research

Figure 129. China's Potash Imports ('000 tonnes) and YoY Change (%)



Source: China Customs, Citi Research

Figure 130. China's Urea Exports ('000 tonnes)



Source: China Customs, Citi Research



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# Companies

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## Company Focus

### ■ Company Update

<b>Buy</b>	<b>1</b>
Price (23 Oct 12)	W311,000
Target price	W390,000
Expected share price return	25.4%
Expected dividend yield	1.3%
<b>Expected total return</b>	<b>26.7%</b>
Market Cap	W20,610,312M US\$18,659M

### Price Performance

(RIC: 051910.KS, BB: 051910 KS)



## LG Chem (051910.KS)

### 3Q Results In-Line; Battery Still Disappointing

- **Solid 3Q** — LG Chem reported 3Q EBIT of W601bn (+20% QoQ, -17% YoY), which was in line with our and market estimates. Chemicals margin improved to 10% (2Q: 7.6%) on lower naphtha feedstock costs despite weak demand. I&E materials sales rose 7% QoQ and margin reached 16% (+1ppt QoQ) thanks to rising LCD polarizer utilization and strong 3D FPR sales. Battery remained the drag – margin fell 2ppts QoQ to 2.6% on weaker sales (-10% QoQ, +6% YoY). This was due to shutdown of GM plant (one month) and weak NB demand.
- **Chemical: Bottoming, but slow recovery** — LG Chem's CEO expects 2013 EBIT to rebound, but it is unlikely to return to 2010-11 peak level (W2.8tr EBIT). Despite low inventory in China, the near-term outlook remains conservative. The tight supply of AA/SAP would benefit LG, but we still expect lower seasonality and new crackers startups (Daqing, Fushun) would drive a modest QoQ EBIT decline in 4Q.
- **I&E materials: Robust performance** — LG Chem said 3D FPR contributed 16% of I&E EBIT (implying ~20% margin). It targets 2013 sales at ~W600bn (2012: W400-450bn). However, 9M12 I&E total sales only rose 2% YoY (guidance: 12%), which suggests softer sales for other materials and delay for LCD glass ramp-up.
- **Battery: Remains the weakest link** — 3Q GM Volt sales rose to 7.5k (2Q: 4.9k). Assuming similar sales in 4Q, the 2012 total sales would only be ~24-25k vs. GM's target of 45k. The sluggish orders from GM/Renault could not offset slightly better-than-expected orders from Hyundai/Kia due to the latter's much lower ASP (battery energy content) for hybrid cars vs plug-in hybrid or EV.
- **Pending clarity on new business** — We cut FY12-14E EPS by 3%, 14% and 15% respectively on lower chemical spreads (after re-assessing the demand-supply) and slower growth of auto battery/LCD glass. LG Chem would hold up better than peers due to diversified product mix, but we believe further re-rating would depend on the execution of new business and chemical demand outlook.

### Statistical Abstract

Year to	Net Profit	Diluted EPS	EPS growth	P/E	P/B	ROE	Yield
31 Dec	(WB)	(W)	(%)	(x)	(x)	(%)	(%)
2010A	2,127	32,101	48.5	9.7	2.7	31.5	1.3
2011A	2,107	31,794	-1.0	9.8	2.2	24.4	1.3
2012E	1,577	23,792	-25.2	13.1	1.9	15.4	1.3
2013E	1,954	29,491	24.0	10.5	1.6	16.7	1.4
2014E	2,333	35,209	19.4	8.8	1.4	17.2	1.6

Source: Powered by dataCentral



051910.KS: Fiscal year end 31-Dec						Price: W311,000; TP: W390,000; Market Cap: W20,610,312m; Recomm: Buy					
Profit & Loss (Wb)	2010	2011	2012E	2013E	2014E	Valuation ratios	2010	2011	2012E	2013E	2014E
Sales revenue	19,471	22,676	23,382	24,459	26,200	PE (x)	9.7	9.8	13.1	10.5	8.8
Cost of sales	-15,473	-18,595	-19,933	-20,438	-21,619	PB (x)	2.7	2.2	1.9	1.6	1.4
Gross profit	3,999	4,081	3,450	4,021	4,581	EV/EBITDA (x)	6.1	5.9	7.3	6.0	5.1
Gross Margin (%)	20.5	18.0	14.8	16.4	17.5	FCF yield (%)	4.3	0.2	-0.7	3.6	3.0
<b>EBITDA (Adj)</b>	<b>3,493</b>	<b>3,592</b>	<b>2,941</b>	<b>3,604</b>	<b>4,149</b>	Dividend yield (%)	1.3	1.3	1.3	1.4	1.6
EBITDA Margin (Adj) (%)	17.9	15.8	12.6	14.7	15.8	Payout ratio (%)	12	13	17	15	14
Depreciation	-672	-757	-855	-1,008	-1,092	ROE (%)	31.5	24.4	15.4	16.7	17.2
Amortisation	0	0	0	0	0	<b>Cashflow (Wb)</b>	<b>2010</b>	<b>2011</b>	<b>2012E</b>	<b>2013E</b>	<b>2014E</b>
<b>EBIT (Adj)</b>	<b>2,821</b>	<b>2,835</b>	<b>2,087</b>	<b>2,597</b>	<b>3,057</b>	EBITDA	3,493	3,592	2,941	3,604	4,149
EBIT Margin (Adj) (%)	14.5	12.5	8.9	10.6	11.7	Working capital	-170	-724	-276	-150	-387
Net interest	-35	-40	-42	-41	-17	Other	-816	-628	-487	-617	-695
Associates	55	15	10	15	20	<b>Operating cashflow</b>	<b>2,507</b>	<b>2,240</b>	<b>2,178</b>	<b>2,837</b>	<b>3,067</b>
Non-op/Except	-24	-14	-45	-50	-50	Capex	-1,617	-2,195	-2,320	-2,100	-2,450
<b>Pre-tax profit</b>	<b>2,818</b>	<b>2,797</b>	<b>2,009</b>	<b>2,520</b>	<b>3,010</b>	Net acq/disposals	-14	-41	0	0	0
Tax	-619	-627	-400	-526	-628	Other	0	0	0	0	0
Extraord./Min.Int./Pref.div.	-72	-63	-33	-40	-49	<b>Investing cashflow</b>	<b>-1,631</b>	<b>-2,237</b>	<b>-2,320</b>	<b>-2,100</b>	<b>-2,450</b>
<b>Reported net profit</b>	<b>2,127</b>	<b>2,107</b>	<b>1,577</b>	<b>1,954</b>	<b>2,333</b>	Dividends paid	-280	-319	-296	-296	-333
Net Margin (%)	10.9	9.3	6.7	8.0	8.9	<b>Financing cashflow</b>	<b>-342</b>	<b>-420</b>	<b>-296</b>	<b>-296</b>	<b>-333</b>
Core NPAT	2,127	2,107	1,577	1,954	2,333	<b>Net change in cash</b>	<b>571</b>	<b>-416</b>	<b>-438</b>	<b>441</b>	<b>284</b>
<b>Per share data</b>	<b>2010</b>	<b>2011</b>	<b>2012E</b>	<b>2013E</b>	<b>2014E</b>	<b>Free cashflow to s/holders</b>	<b>890</b>	<b>45</b>	<b>-142</b>	<b>737</b>	<b>617</b>
Reported EPS (W)	32,101	31,794	23,792	29,491	35,209						
Core EPS (W)	32,101	31,794	23,792	29,491	35,209						
DPS (W)	4,000	4,000	4,000	4,500	5,000						
CFPS (W)	37,832	33,806	32,869	42,802	46,284						
FCFPS (W)	13,429	678	-2,139	11,114	9,315						
BVPS (W)	116,242	144,158	163,949	189,498	220,264						
Wtd avg ord shares (m)	66.3	66.3	66.3	66.3	66.3						
Wtd avg diluted shares (m)	66.3	66.3	66.3	66.3	66.3						
<b>Growth rates</b>	<b>2010</b>	<b>2011</b>	<b>2012E</b>	<b>2013E</b>	<b>2014E</b>						
Sales revenue (%)	25.5	16.5	3.1	4.6	7.1						
EBIT (Adj) (%)	34.5	0.5	-26.4	24.4	17.7						
Core NPAT (%)	43.6	-1.0	-25.2	24.0	19.4						
Core EPS (%)	48.5	-1.0	-25.2	24.0	19.4						
<b>Balance Sheet (Wb)</b>	<b>2010</b>	<b>2011</b>	<b>2012E</b>	<b>2013E</b>	<b>2014E</b>						
Cash & cash equiv.	1,368	1,379	1,219	1,459	1,544						
Accounts receivables	2,602	3,251	3,331	3,485	3,733						
Inventory	2,182	2,475	2,755	2,881	3,230						
Net fixed & other tangibles	5,872	7,376	8,841	9,933	11,291						
Goodwill & intangibles	0	0	0	0	0						
Financial & other assets	649	804	810	833	865						
<b>Total assets</b>	<b>12,673</b>	<b>15,286</b>	<b>16,956</b>	<b>18,592</b>	<b>20,663</b>						
Accounts payable	2,571	2,743	2,883	3,016	3,230						
Short-term debt	1,621	1,838	2,000	2,000	1,800						
Long-term debt	473	684	799	599	599						
Provisions & other liab	165	314	253	258	266						
<b>Total liabilities</b>	<b>4,830</b>	<b>5,578</b>	<b>5,935</b>	<b>5,872</b>	<b>5,894</b>						
Shareholders' equity	7,703	9,553	10,865	12,558	14,597						
Minority interests	140	154	156	161	171						
<b>Total equity</b>	<b>7,844</b>	<b>9,708</b>	<b>11,021</b>	<b>12,719</b>	<b>14,768</b>						
<b>Net debt</b>	<b>726</b>	<b>1,142</b>	<b>1,580</b>	<b>1,139</b>	<b>855</b>						
Net debt to equity (%)	9.3	11.8	14.3	9.0	5.8						

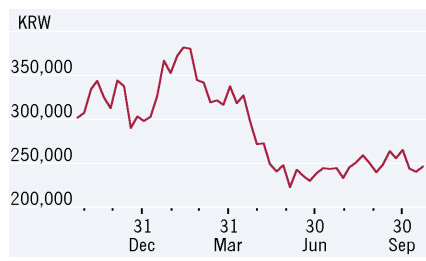
For further data queries on Citi's full coverage universe please contact Citi Research Data Services at CitiRsch.DataServices.Global@citi.com  
For definitions of the items in this table, please click [here](#).

## Company Focus

- Company Update
- Target Price Change
- Estimate Change

<b>Neutral/High Risk</b>	<b>2H</b>
Price (23 Oct 12)	W241,500
Target price	W280,000
from W285,000	
Expected share price return	15.9%
Expected dividend yield	0.5%
<b>Expected total return</b>	<b>16.5%</b>
Market Cap	W7,694,190M
	US\$6,966M

### Price Performance (RIC: 011170.KS, BB: 011170 KS)



## Honam Petrochemical (011170.KS) Continuous Drag from KP and Titan

- **3Q12 results in-line with market estimates** — Honam reported 3Q K-IFRS EBIT of W198bn (2Q: W28bn loss) due to seasonality, bottoming of oil / product pricing and stronger MEG spread. Parent-only sales rose 13% QoQ thanks to rising volume after Yeosu cracker expansion and margin improved to 7% in 3Q (2Q: 1.9%). However, the results (3Q overall EBIT margin: 4.7%) fared much worse than LG Chem (10%) on persistent drag from affiliate KP Chemical (-1% margin, no QoQ improvement). On Titan, EBIT was also breakeven in 3Q after stripping out the reversal of inventory loss (W35bn) in 2Q. On a YoY basis, net profit plunged 50% to W163bn.
- **Some pullback likely in 4Q12** — We expect 4Q earnings would see a modest QoQ decline due to new crackers startups in China (Daqing, Fushun), lower seasonality and limited recovery for KP and Titan. We expect the MEG spread to improve gradually ahead on tightening supply (shutdowns of Sharq #4, Kuwait Equate #1, Nan Ya #4). However, the near-term outlook for PE/PP is likely to remain lackluster.
- **Potential merger with KP likely to be mildly EPS dilutive** — We expect the tough PTA outlook is likely to persist in the next 2-3 years due to industry glut in China and sharply lower cash costs for new entrants (~US\$80-90/t vs. ~US\$150/t for smaller-scale plants). We believe KP's PX profitability would also be hurt by tighter supply of MX feedstock. PX-MX spread declined to US\$200/t in 3Q vs. US\$250/t in 2Q and US\$330/t in 2011. Hence, we expect the merger with KP could result in EPS dilution of ~3% for Honam given weak profitability of KP ahead.
- **EPS cut** — We lower FY12-14E EPS by 20-26% to reflect our revised spreads. Our target price is cut slightly to W280k (from W285k) to reflect mild EPS dilution from new share issuance (2.4m) for potential merger with KP and an unchanged 6x EV/EBITDA for core business (but rolling forward to FY13E).

### Statistical Abstract

Year to	Net Profit	Diluted EPS	EPS growth	P/E	P/B	ROE	Yield
31 Dec	(WB)	(W)	(%)	(x)	(x)	(%)	(%)
2010A	791	24,817	-0.8	9.7	1.7	19.2	0.7
2011A	978	30,701	23.7	7.9	1.4	19.6	0.7
2012E	446	13,983	-54.5	17.3	1.3	7.9	0.5
2013E	792	23,121	65.3	10.4	1.3	12.7	0.6
2014E	1,144	33,372	44.3	7.2	1.1	16.0	0.7

Source: Powered by dataCentral

011170.KS: Fiscal year end 31-Dec						Price: W241,500; TP: W280,000; Market Cap: W7,694,190m; Recomm: Neutral/High Risk					
Profit & Loss (Wb)	2010	2011	2012E	2013E	2014E	Valuation ratios	2010	2011	2012E	2013E	2014E
Sales revenue	10,635	15,700	16,067	16,608	16,880	PE (x)	9.7	7.9	17.3	10.4	7.2
Cost of sales	-9,108	-13,807	-15,049	-15,179	-14,980	PB (x)	1.7	1.4	1.3	1.3	1.1
Gross profit	1,526	1,893	1,018	1,430	1,899	EV/EBITDA (x)	4.5	3.8	7.0	4.7	3.2
Gross Margin (%)	14.4	12.1	6.3	8.6	11.3	FCF yield (%)	8.3	8.9	0.0	7.1	11.5
<b>EBITDA (Adj)</b>	<b>1,485</b>	<b>1,870</b>	<b>988</b>	<b>1,406</b>	<b>1,835</b>	Dividend yield (%)	0.7	0.7	0.5	0.6	0.7
EBITDA Margin (Adj) (%)	14.0	11.9	6.2	8.5	10.9	Payout ratio (%)	7	6	9	6	5
Depreciation	-308	-379	-432	-482	-483	ROE (%)	19.2	19.6	7.9	12.7	16.0
Amortisation	0	0	0	0	0	<b>Cashflow (Wb)</b>	<b>2010</b>	<b>2011</b>	<b>2012E</b>	<b>2013E</b>	<b>2014E</b>
<b>EBIT (Adj)</b>	<b>1,178</b>	<b>1,491</b>	<b>556</b>	<b>924</b>	<b>1,352</b>	EBITDA	1,485	1,870	988	1,406	1,835
EBIT Margin (Adj) (%)	11.1	9.5	3.5	5.6	8.0	Working capital	-488	117	-146	-27	-13
Net interest	-3	-31	-42	-9	38	Other	57	-368	-139	-192	-273
Associates	6	55	35	60	75	<b>Operating cashflow</b>	<b>1,054</b>	<b>1,618</b>	<b>704</b>	<b>1,188</b>	<b>1,548</b>
Non-op/Except	10	11	25	15	15	Capex	-416	-933	-700	-600	-600
<b>Pre-tax profit</b>	<b>1,190</b>	<b>1,526</b>	<b>574</b>	<b>991</b>	<b>1,479</b>	Net acq/disposals	-1,507	-206	-325	-140	-50
Tax	-290	-394	-112	-198	-325	Other	0	0	0	0	0
Extraord./Min.Int./Pref.div.	-109	-154	-16	0	-10	<b>Investing cashflow</b>	<b>-1,923</b>	<b>-1,139</b>	<b>-1,025</b>	<b>-740</b>	<b>-650</b>
<b>Reported net profit</b>	<b>791</b>	<b>978</b>	<b>446</b>	<b>792</b>	<b>1,144</b>	Dividends paid	-57	-65	-56	-40	-51
Net Margin (%)	7.4	6.2	2.8	4.8	6.8	<b>Financing cashflow</b>	<b>813</b>	<b>215</b>	<b>-611</b>	<b>-390</b>	<b>-351</b>
Core NPAT	791	978	446	792	1,144	<b>Net change in cash</b>	<b>-109</b>	<b>690</b>	<b>-922</b>	<b>58</b>	<b>547</b>
<b>Per share data</b>	<b>2010</b>	<b>2011</b>	<b>2012E</b>	<b>2013E</b>	<b>2014E</b>	<b>Free cashflow to s/holders</b>	<b>638</b>	<b>685</b>	<b>4</b>	<b>588</b>	<b>948</b>
Reported EPS (W)	24,817	30,701	13,983	23,121	33,372						
Core EPS (W)	24,817	30,701	13,983	23,121	33,372						
DPS (W)	1,750	1,750	1,250	1,500	1,750						
CFPS (W)	33,077	50,795	22,084	34,648	45,177						
FCFPS (W)	20,020	21,511	113	17,143	27,672						
BVPS (W)	141,840	171,456	183,689	192,705	224,577						
Wtd avg ord shares (m)	31.9	31.9	31.9	34.3	34.3						
Wtd avg diluted shares (m)	31.9	31.9	31.9	34.3	34.3						
<b>Growth rates</b>	<b>2010</b>	<b>2011</b>	<b>2012E</b>	<b>2013E</b>	<b>2014E</b>						
Sales revenue (%)	78.1	47.6	2.3	3.4	1.6						
EBIT (Adj) (%)	64.1	26.6	-62.7	66.3	46.2						
Core NPAT (%)	-0.8	23.7	-54.5	77.9	44.3						
Core EPS (%)	-0.8	23.7	-54.5	65.3	44.3						
<b>Balance Sheet (Wb)</b>	<b>2010</b>	<b>2011</b>	<b>2012E</b>	<b>2013E</b>	<b>2014E</b>						
Cash & cash equiv.	1,173	1,810	929	987	1,534						
Accounts receivables	1,365	1,746	1,832	1,894	1,925						
Inventory	1,104	1,267	1,321	1,365	1,387						
Net fixed & other tangibles	3,733	4,308	4,575	4,693	4,810						
Goodwill & intangibles	0	0	0	0	0						
Financial & other assets	1,418	1,617	1,956	2,158	2,284						
<b>Total assets</b>	<b>8,793</b>	<b>10,747</b>	<b>10,613</b>	<b>11,097</b>	<b>11,941</b>						
Accounts payable	1,550	2,152	1,761	1,820	1,850						
Short-term debt	522	303	300	150	150						
Long-term debt	1,108	1,560	1,050	850	550						
Provisions & other liab	545	573	939	961	972						
<b>Total liabilities</b>	<b>3,725</b>	<b>4,589</b>	<b>4,049</b>	<b>3,781</b>	<b>3,522</b>						
Shareholders' equity	4,519	5,463	5,852	6,605	7,697						
Minority interests	548	695	711	711	721						
<b>Total equity</b>	<b>5,067</b>	<b>6,158</b>	<b>6,564</b>	<b>7,316</b>	<b>8,419</b>						
<b>Net debt</b>	<b>458</b>	<b>54</b>	<b>421</b>	<b>13</b>	<b>-834</b>						
Net debt to equity (%)	9.0	0.9	6.4	0.2	-9.9						

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## Company Focus

- Company Update
- Target Price Change
- Estimate Change

<b>Neutral</b>	<b>2</b>
Price (23 Oct 12)	NT\$78.40
Target price	NT\$77.00
	from NT\$78.50
Expected share price return	-1.8%
Expected dividend yield	2.6%
<b>Expected total return</b>	<b>0.8%</b>
Market Cap	NT\$479,879M
	US\$16,392M

### Price Performance (RIC: 1301.TW, BB: 1301 TT)



## Formosa Plastics (1301.TW) Earnings Support from Solid US Operations

- **EPS cut, lower dividend** — We expect FPC would be hurt by weaker margins for AE, AN and EVA, but the profitability for PVC / caustic soda should hold up relatively well. We trim FY12-14E EPS by 21-25% on weaker chemical spreads, lower dividend and associate income. FPC remains our preferred pick in the Formosa Group due to strong earnings from US operation (beneficiary of shale gas advantage). We also forecast the 2012E dividend yield would be slightly higher than FCFC/NYP/FPCC, but it remains unattractive at 2.6%. We lower our target price slightly from NT\$78.5 to NT\$77 reflecting an unchanged mid-cycle 6x EV/EBITDA for core business but adjust for our EBIT downgrade.

### Statistical Abstract

Year to	Net Profit	Diluted EPS	EPS growth	P/E	P/B	ROE	Yield
31 Dec	(NT\$M)	(NT\$)	(%)	(x)	(x)	(%)	(%)
2010A	45,546	7.44	65.4	10.5	1.8	18.7	8.7
2011A	35,724	5.84	-21.6	13.4	2.0	14.2	5.1
2012E	17,761	2.90	-50.3	27.0	2.1	7.5	2.6
2013E	27,854	4.55	56.8	17.2	2.0	11.7	4.1
2014E	34,438	5.63	23.6	13.9	1.8	13.6	5.1

Source: Powered by dataCentral

1301.TW: Fiscal year end 31-Dec						Price: NT\$78.40; TP: NT\$77.00; Market Cap: NT\$479,879m; Recomm: Neutral					
Profit & Loss (NT\$m)	2010	2011	2012E	2013E	2014E	Valuation ratios	2010	2011	2012E	2013E	2014E
Sales revenue	194,446	187,603	176,694	183,413	192,817	PE (x)	10.5	13.4	27.0	17.2	13.9
Cost of sales	-158,815	-155,828	-159,752	-160,355	-166,281	PB (x)	1.8	2.0	2.1	2.0	1.8
Gross profit	35,631	31,775	16,942	23,058	26,536	EV/EBITDA (x)	8.5	9.4	20.2	15.0	12.5
Gross Margin (%)	18.3	16.9	9.6	12.6	13.8	FCF yield (%)	9.8	7.8	4.0	4.8	6.1
<b>EBITDA (Adj)</b>	<b>36,835</b>	<b>32,858</b>	<b>16,245</b>	<b>21,524</b>	<b>24,161</b>	Dividend yield (%)	8.7	5.1	2.6	4.1	5.1
EBITDA Margin (Adj) (%)	18.9	17.5	9.2	11.7	12.5	Payout ratio (%)	91	69	69	70	71
Depreciation	-10,182	-10,309	-8,991	-8,444	-7,903	ROE (%)	18.7	14.2	7.5	11.7	13.6
Amortisation	0	0	0	0	0	Cashflow (NT\$m)					
<b>EBIT (Adj)</b>	<b>26,653</b>	<b>22,549</b>	<b>7,254</b>	<b>13,080</b>	<b>16,258</b>	EBITDA	36,835	32,858	16,245	21,524	24,161
EBIT Margin (Adj) (%)	13.7	12.0	4.1	7.1	8.4	Working capital	-8,735	-14,577	-1,153	3,416	646
Net interest	-888	-610	-802	-902	-880	Other	21,212	22,592	8,900	3,251	9,314
Associates	25,534	17,379	11,990	18,415	22,342	<b>Operating cashflow</b>	<b>49,312</b>	<b>40,873</b>	<b>23,992</b>	<b>28,191</b>	<b>34,121</b>
Non-op/Except	-85	1,244	1,500	400	400	Capex	-2,491	-3,313	-5,000	-5,000	-5,000
<b>Pre-tax profit</b>	<b>51,214</b>	<b>40,562</b>	<b>19,943</b>	<b>30,992</b>	<b>38,120</b>	Net acq/disposals	-2,180	-10,834	-7,200	-10,028	-6,172
Tax	-5,668	-4,838	-2,182	-3,138	-3,682	Other	0	0	0	0	0
Extraord./Min.Int./Pref.div.	0	0	0	0	0	<b>Investing cashflow</b>	<b>-4,671</b>	<b>-14,147</b>	<b>-12,200</b>	<b>-15,028</b>	<b>-11,172</b>
<b>Reported net profit</b>	<b>45,546</b>	<b>35,724</b>	<b>17,761</b>	<b>27,854</b>	<b>34,438</b>	Dividends paid	-24,764	-41,574	-24,484	-12,242	-19,587
Net Margin (%)	23.4	19.0	10.1	15.2	17.9	<b>Financing cashflow</b>	<b>-24,656</b>	<b>-44,846</b>	<b>-16,074</b>	<b>-12,242</b>	<b>-22,587</b>
Core NPAT	45,546	35,724	17,761	27,854	34,438	<b>Net change in cash</b>	<b>19,986</b>	<b>-18,120</b>	<b>-4,283</b>	<b>921</b>	<b>361</b>
Per share data						<b>Free cashflow to s/holders</b>	<b>46,821</b>	<b>37,560</b>	<b>18,992</b>	<b>23,191</b>	<b>29,121</b>
Reported EPS (\$)	7.44	5.84	2.90	4.55	5.63						
Core EPS (\$)	7.44	5.84	2.90	4.55	5.63						
DPS (\$)	6.80	4.00	2.00	3.20	4.00						
CFPS (\$)	8.06	6.68	3.92	4.61	5.57						
FCFPS (\$)	7.65	6.14	3.10	3.79	4.76						
BVPS (\$)	42.62	39.41	37.50	40.05	42.48						
Wtd avg ord shares (m)	6,121	6,121	6,121	6,121	6,121						
Wtd avg diluted shares (m)	6,121	6,121	6,121	6,121	6,121						
Growth rates											
Sales revenue (%)	23.9	-3.5	-5.8	3.8	5.1						
EBIT (Adj) (%)	152.9	-15.4	-67.8	80.3	24.3						
Core NPAT (%)	65.4	-21.6	-50.3	56.8	23.6						
Core EPS (%)	65.4	-21.6	-50.3	56.8	23.6						
Balance Sheet (NT\$m)											
Cash & cash equiv.	81,329	63,209	58,926	59,847	60,208						
Accounts receivables	32,392	39,372	40,630	37,150	36,413						
Inventory	13,546	18,549	17,470	18,134	19,064						
Net fixed & other tangibles	60,490	53,964	49,973	46,529	43,626						
Goodwill & intangibles	0	0	0	0	0						
Financial & other assets	153,717	163,449	169,990	192,037	207,610						
<b>Total assets</b>	<b>341,473</b>	<b>338,543</b>	<b>336,990</b>	<b>353,698</b>	<b>366,922</b>						
Accounts payable	21,177	18,089	17,037	17,685	18,591						
Short-term debt	7,772	9,591	11,000	9,000	9,000						
Long-term debt	40,444	57,159	69,159	71,159	68,159						
Provisions & other liab	11,237	12,449	10,261	10,708	11,175						
<b>Total liabilities</b>	<b>80,629</b>	<b>97,288</b>	<b>107,457</b>	<b>108,553</b>	<b>106,926</b>						
Shareholders' equity	260,844	241,255	229,533	245,145	259,996						
Minority interests	0	0	0	0	0						
<b>Total equity</b>	<b>260,844</b>	<b>241,255</b>	<b>229,533</b>	<b>245,145</b>	<b>259,996</b>						
<b>Net debt</b>	<b>-33,113</b>	<b>3,541</b>	<b>21,233</b>	<b>20,312</b>	<b>16,951</b>						
Net debt to equity (%)	-12.7	1.5	9.3	8.3	6.5						

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## Company Focus

- Company Update
- Target Price Change
- Estimate Change

<b>Sell</b>	<b>3</b>
Price (23 Oct 12)	NT\$73.50
Target price	NT\$63.00
<i>from NT\$66.00</i>	
Expected share price return	-14.3%
Expected dividend yield	1.5%
<b>Expected total return</b>	<b>-12.8%</b>
Market Cap	NT\$418,250M
	US\$14,287M

### Price Performance (RIC: 1326.TW, BB: 1326 TT)



## Formosa Chemicals & Fiber (1326.TW) Better SM Margin Unlikely to Offset PTA / Phenol Weakness

- **Maintain Sell** — We lower FY12-14E EPS by 40%, 30% and 24% respectively to reflect our revised spreads, weaker-than-expected YTD results and lower income from associates. Despite its vertical integration into PX, FCFC's PTA operations continue to suffer from dismal margin (loss-making). We expect benzene and SM spreads to improve into 2013, but this is unlikely to fully offset the weakness for PTA and phenol. We cut TP from NT\$66 to NT\$63 to reflect our EPS cut.

### Statistical Abstract

Year to	Net Profit	Diluted EPS	EPS growth	P/E	P/B	ROE	Yield
31 Dec	(NT\$M)	(NT\$)	(%)	(x)	(x)	(%)	(%)
2010A	47,275	8.33	60.6	8.8	1.5	18.8	10.2
2011A	32,971	5.81	-30.3	12.6	1.7	12.7	5.4
2012E	9,070	1.60	-72.5	46.0	1.8	3.8	1.5
2013E	20,692	3.65	128.1	20.2	1.7	8.7	3.5
2014E	22,092	3.89	6.8	18.9	1.6	8.9	3.8

Source: Powered by dataCentral

1326.TW: Fiscal year end 31-Dec						Price: NT\$73.50; TP: NT\$63.00; Market Cap: NT\$418,250m; Recomm: Sell					
Profit & Loss (NT\$m)	2010	2011	2012E	2013E	2014E	Valuation ratios	2010	2011	2012E	2013E	2014E
Sales revenue	283,121	280,814	280,194	274,722	270,887	PE (x)	8.8	12.6	46.0	20.2	18.9
Cost of sales	-250,286	-253,211	-272,368	-258,787	-258,086	PB (x)	1.5	1.7	1.8	1.7	1.6
Gross profit	32,836	27,603	7,826	15,935	12,802	EV/EBITDA (x)	7.4	8.4	24.2	14.4	16.1
Gross Margin (%)	11.6	9.8	2.8	5.8	4.7	FCF yield (%)	12.0	9.7	4.5	5.8	5.6
EBITDA (Adj)	37,204	31,920	12,007	19,709	16,358	Dividend yield (%)	10.2	5.4	1.5	3.5	3.8
EBITDA Margin (Adj) (%)	13.1	11.4	4.3	7.2	6.0	Payout ratio (%)	90	69	69	71	72
Depreciation	-11,726	-11,172	-11,104	-10,766	-10,618	ROE (%)	18.8	12.7	3.8	8.7	8.9
Amortisation	0	0	0	0	0	Cashflow (NT\$m)	2010	2011	2012E	2013E	2014E
EBIT (Adj)	25,478	20,748	903	8,943	5,740	EBITDA	37,204	31,920	12,007	19,709	16,358
EBIT Margin (Adj) (%)	9.0	7.4	0.3	3.3	2.1	Working capital	-10,083	-14,007	1,385	4,724	621
Net interest	-1,140	-1,050	-1,257	-1,296	-1,445	Other	23,552	24,346	10,420	4,809	11,189
Associates	25,778	15,402	8,865	13,847	18,029	Operating cashflow	50,673	42,259	23,812	29,242	28,167
Non-op/Except	248	1,416	600	600	600	Capex	-601	-1,908	-5,000	-5,000	-5,000
Pre-tax profit	50,365	36,517	9,111	22,094	22,924	Net acq/disposals	-3,288	-9,729	-7,200	-10,300	-8,945
Tax	-3,090	-3,546	-42	-1,402	-832	Other	0	0	0	0	0
Extraord./Min.Int./Pref.div.	0	0	0	0	0	Investing cashflow	-3,889	-11,637	-12,200	-15,300	-13,945
Reported net profit	47,275	32,971	9,070	20,692	22,092	Dividends paid	-25,972	-42,638	-22,694	-6,241	-14,751
Net Margin (%)	16.7	11.7	3.2	7.5	8.2	Financing cashflow	-40,866	-36,543	-10,739	-13,241	-12,751
Core NPAT	47,275	32,971	9,070	20,692	22,092	Net change in cash	5,434	-5,321	873	701	1,472
Per share data	2010	2011	2012E	2013E	2014E	Free cashflow to s/holders	50,072	40,351	18,812	24,242	23,167
Reported EPS (\$)	8.33	5.81	1.60	3.65	3.89						
Core EPS (\$)	8.33	5.81	1.60	3.65	3.89						
DPS (\$)	7.50	4.00	1.10	2.60	2.80						
CFPS (\$)	8.93	7.45	4.20	5.15	4.96						
FCFPS (\$)	8.83	7.11	3.32	4.27	4.08						
BVPS (\$)	47.81	43.66	40.73	43.28	44.57						
Wtd avg ord shares (m)	5,673	5,673	5,673	5,673	5,673						
Wtd avg diluted shares (m)	5,673	5,673	5,673	5,673	5,673						
Growth rates	2010	2011	2012E	2013E	2014E						
Sales revenue (%)	28.8	-0.8	-0.2	-2.0	-1.4						
EBIT (Adj) (%)	148.0	-18.6	-95.6	890.1	-35.8						
Core NPAT (%)	60.6	-30.3	-72.5	128.1	6.8						
Core EPS (%)	60.6	-30.3	-72.5	128.1	6.8						
Balance Sheet (NT\$m)	2010	2011	2012E	2013E	2014E						
Cash & cash equiv.	81,860	62,815	60,689	61,390	62,861						
Accounts receivables	34,390	37,296	45,250	40,602	40,036						
Inventory	25,346	28,265	26,868	26,343	25,975						
Net fixed & other tangibles	79,348	72,350	66,246	60,480	54,862						
Goodwill & intangibles	0	0	0	0	0						
Financial & other assets	156,837	164,535	167,033	184,548	198,959						
Total assets	377,780	365,261	366,085	373,363	382,693						
Accounts payable	26,553	18,792	26,279	25,765	25,406						
Short-term debt	9,535	13,045	10,000	8,000	5,000						
Long-term debt	60,203	75,148	90,148	85,148	90,148						
Provisions & other liab	10,241	10,582	8,588	8,928	9,277						
Total liabilities	106,532	117,567	135,015	127,841	129,831						
Shareholders' equity	271,247	247,695	231,070	245,521	252,862						
Minority interests	0	0	0	0	0						
Total equity	271,247	247,695	231,070	245,521	252,862						
Net debt	-12,121	25,378	39,460	31,759	32,287						
Net debt to equity (%)	-4.5	10.2	17.1	12.9	12.8						

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## Company Focus

- Company Update
- Target Price Change
- Estimate Change

<b>Sell</b>	<b>3</b>
Price (23 Oct 12)	NT\$53.80
Target price	NT\$48.00
from NT\$53.00	
Expected share price return	-10.8%
Expected dividend yield	1.1%
<b>Expected total return</b>	<b>-9.7%</b>
Market Cap	NT\$422,454M
	US\$14,431M

### Price Performance (RIC: 1303.TW, BB: 1303 TT)



## Nan Ya Plastics (1303.TW) DRAM Concern Unlikely to End Soon

- **Maintain Sell, TP cut to NT\$48** — We see further financing needs from Nan Ya Tech, as the amount raised from the private placement in 3Q could only cover about 1-2 quarters of losses. While NYP would benefit from better MEG spreads ahead, we remain concerned about the operational track record of Formosa Group (e.g. fire-related shutdown of MEG #4 for ~3-4 weeks in October). We lower FY12-14E EPS by 51%, 45% and 32% respectively to reflect larger losses at tech affiliates (Nan Ya Tech, Nan Ya PCB, PRC operations) and our revised product spreads. Our TP was revised from NT\$53 to NT\$48 to reflect the EPS downgrade.

### Statistical Abstract

Year to	Net Profit	Diluted EPS	EPS growth	P/E	P/B	ROE	Yield
31 Dec	(NT\$M)	(NT\$)	(%)	(x)	(x)	(%)	(%)
2010A	40,974	5.22	149.8	10.3	1.5	15.4	8.7
2011A	23,143	2.95	-43.5	18.3	1.6	8.5	3.9
2012E	6,118	0.78	-73.6	69.1	1.7	2.4	1.1
2013E	18,055	2.30	195.1	23.4	1.6	7.0	3.0
2014E	29,862	3.80	65.4	14.1	1.5	10.9	5.2

Source: Powered by dataCentral



1303.TW: Fiscal year end 31-Dec						Price: NT\$53.80; TP: NT\$48.00; Market Cap: NT\$422,454m; Recomm: Sell					
Profit & Loss (NT\$m)	2010	2011	2012E	2013E	2014E	Valuation ratios	2010	2011	2012E	2013E	2014E
Sales revenue	212,249	194,022	183,495	194,476	207,769	PE (x)	10.3	18.3	69.1	23.4	14.1
Cost of sales	-173,432	-160,119	-163,755	-167,916	-176,085	PB (x)	1.5	1.6	1.7	1.6	1.5
Gross profit	38,817	33,903	19,740	26,560	31,684	EV/EBITDA (x)	7.4	8.8	18.2	12.8	9.5
Gross Margin (%)	18.3	17.5	10.8	13.7	15.2	FCF yield (%)	10.4	10.0	0.9	6.3	7.4
<b>EBITDA (Adj)</b>	<b>35,055</b>	<b>29,311</b>	<b>15,742</b>	<b>22,445</b>	<b>27,821</b>	Dividend yield (%)	8.7	3.9	1.1	3.0	5.2
EBITDA Margin (Adj) (%)	16.5	15.1	8.6	11.5	13.4	Payout ratio (%)	90	71	77	70	74
Depreciation	-8,539	-7,698	-7,676	-7,676	-8,046	ROE (%)	15.4	8.5	2.4	7.0	10.9
Amortisation	0	0	0	0	0	Cashflow (NT\$m)					
<b>EBIT (Adj)</b>	<b>26,516</b>	<b>21,614</b>	<b>8,065</b>	<b>14,769</b>	<b>19,774</b>	EBITDA	35,055	29,311	15,742	22,445	27,821
EBIT Margin (Adj) (%)	12.5	11.1	4.4	7.6	9.5	Working capital	-4,722	-17,915	-14,742	5,683	400
Net interest	-1,246	-1,001	-1,146	-1,260	-1,082	Other	18,132	34,120	8,981	3,654	8,218
Associates	21,527	6,123	-407	6,214	13,789	<b>Operating cashflow</b>	<b>48,464</b>	<b>45,516</b>	<b>9,981</b>	<b>31,782</b>	<b>36,439</b>
Non-op/Except	-333	1,462	1,131	998	914	Capex	-4,627	-3,402	-6,000	-5,000	-5,000
<b>Pre-tax profit</b>	<b>46,463</b>	<b>28,197</b>	<b>7,644</b>	<b>20,721</b>	<b>33,395</b>	Net acq/disposals	-7,100	-16,316	-10,530	-13,460	-6,731
Tax	-5,489	-5,054	-1,526	-2,666	-3,533	Other	0	0	0	0	0
Extraord./Min.Int./Pref.div.	0	0	0	0	0	<b>Investing cashflow</b>	<b>-11,727</b>	<b>-19,717</b>	<b>-16,530</b>	<b>-18,460</b>	<b>-11,731</b>
<b>Reported net profit</b>	<b>40,974</b>	<b>23,143</b>	<b>6,118</b>	<b>18,055</b>	<b>29,862</b>	Dividends paid	-15,274	-36,820	-16,490	-4,711	-12,564
Net Margin (%)	19.3	11.9	3.3	9.3	14.4	<b>Financing cashflow</b>	<b>-24,078</b>	<b>-34,043</b>	<b>6,517</b>	<b>-14,205</b>	<b>-24,057</b>
Core NPAT	40,974	23,143	6,118	18,055	29,862	<b>Net change in cash</b>	<b>12,659</b>	<b>-8,244</b>	<b>-32</b>	<b>-883</b>	<b>651</b>
Per share data						Free cashflow to s/holders					
Reported EPS (\$)	5.22	2.95	0.78	2.30	3.80		43,838	42,115	3,981	26,782	31,439
Core EPS (\$)	5.22	2.95	0.78	2.30	3.80						
DPS (\$)	4.70	2.10	0.60	1.60	2.80						
CFPS (\$)	6.17	5.80	1.27	4.05	4.64						
FCFPS (\$)	5.58	5.36	0.51	3.41	4.00						
BVPS (\$)	36.05	33.70	32.12	33.82	36.03						
Wtd avg ord shares (m)	7,852	7,852	7,852	7,852	7,852						
Wtd avg diluted shares (m)	7,852	7,852	7,852	7,852	7,852						
Growth rates											
Sales revenue (%)	31.9	-8.6	-5.4	6.0	6.8						
EBIT (Adj) (%)	204.4	-18.5	-62.7	83.1	33.9						
Core NPAT (%)	149.8	-43.5	-73.6	195.1	65.4						
Core EPS (%)	149.8	-43.5	-73.6	195.1	65.4						
Balance Sheet (NT\$m)											
Cash & cash equiv.	54,354	38,870	36,838	35,955	36,606						
Accounts receivables	52,943	67,151	80,805	74,984	74,417						
Inventory	21,246	23,256	20,109	21,312	22,769						
Net fixed & other tangibles	69,831	66,448	64,772	62,096	59,049						
Goodwill & intangibles	507	1,143	500	500	500						
Financial & other assets	208,279	212,251	216,534	230,807	240,628						
<b>Total assets</b>	<b>407,160</b>	<b>409,119</b>	<b>419,557</b>	<b>425,655</b>	<b>433,969</b>						
Accounts payable	16,313	13,410	10,992	11,649	12,446						
Short-term debt	5,518	16,994	29,494	24,494	24,494						
Long-term debt	77,168	85,948	96,455	91,961	80,468						
Provisions & other liab	25,082	28,148	30,370	31,960	33,674						
<b>Total liabilities</b>	<b>124,081</b>	<b>144,500</b>	<b>167,310</b>	<b>160,065</b>	<b>151,081</b>						
Shareholders' equity	283,078	264,619	252,247	265,590	282,888						
Minority interests	0	0	0	0	0						
<b>Total equity</b>	<b>283,078</b>	<b>264,619</b>	<b>252,247</b>	<b>265,590</b>	<b>282,888</b>						
<b>Net debt</b>	<b>28,332</b>	<b>64,072</b>	<b>89,111</b>	<b>80,500</b>	<b>68,355</b>						
Net debt to equity (%)	10.0	24.2	35.3	30.3	24.2						

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## Company Focus

- Company Update
- Estimate Change

## Formosa Petrochemical (6505.TW) Expensive Valuation, Lack of Catalysts

- **Maintain Sell** — We lower FY12-14E EPS by 19-29% to reflect weaker olefins spreads, slightly lower achieved refining margin premium (naphtha weakness) and utilization rates. We maintain Sell on FPCC due to expensive valuation, but the stock price could remain supported given its lower free float and low foreign holdings.

<b>Sell</b>	<b>3</b>
Price (23 Oct 12)	NT\$82.90
Target price	NT\$75.00
Expected share price return	-9.5%
Expected dividend yield	1.2%
<b>Expected total return</b>	<b>-8.3%</b>
Market Cap	NT\$789,702M
	US\$26,975M

### Price Performance (RIC: 6505.TW, BB: 6505 TT)



### Statistical Abstract

Year to	Net Profit	Diluted EPS	EPS growth	P/E	P/B	ROE	Yield
31 Dec	(NT\$M)	(NT\$)	(%)	(x)	(x)	(%)	(%)
2010A	40,923	4.30	4.4	19.3	3.2	17.2	4.7
2011A	22,499	2.36	-45.0	35.1	3.5	9.6	2.4
2012E	10,729	1.13	-52.3	73.6	3.7	4.9	1.2
2013E	32,089	3.37	199.1	24.6	3.3	14.2	3.6
2014E	38,435	4.03	19.8	20.5	3.2	15.9	4.3

Source: Powered by dataCentral

6505.TW: Fiscal year end 31-Dec						Price: NT\$82.90; TP: NT\$75.00; Market Cap: NT\$789,702m; Recomm: Sell					
Profit & Loss (NT\$m)	2010	2011	2012E	2013E	2014E	Valuation ratios	2010	2011	2012E	2013E	2014E
Sales revenue	747,307	798,534	901,030	853,068	880,827	PE (x)	19.3	35.1	73.6	24.6	20.5
Cost of sales	-700,111	-768,557	-882,517	-808,028	-828,629	PB (x)	3.2	3.5	3.7	3.3	3.2
Gross profit	47,196	29,976	18,514	45,040	52,198	EV/EBITDA (x)	12.6	18.0	25.4	14.5	12.8
Gross Margin (%)	6.3	3.8	2.1	5.3	5.9	FCF yield (%)	7.0	4.6	2.6	5.7	5.3
<b>EBITDA (Adj)</b>	<b>71,214</b>	<b>49,433</b>	<b>34,976</b>	<b>60,026</b>	<b>65,553</b>	Dividend yield (%)	4.7	2.4	1.2	3.6	4.3
EBITDA Margin (Adj) (%)	9.5	6.2	3.9	7.0	7.4	Payout ratio (%)	91	85	89	89	89
Depreciation	-32,089	-28,562	-25,910	-24,159	-22,690	ROE (%)	17.2	9.6	4.9	14.2	15.9
Amortisation	0	0	0	0	0	Cashflow (NT\$m)					
<b>EBIT (Adj)</b>	<b>39,125</b>	<b>20,871</b>	<b>9,066</b>	<b>35,867</b>	<b>42,863</b>	EBITDA	71,214	49,433	34,976	60,026	65,553
EBIT Margin (Adj) (%)	5.2	2.6	1.0	4.2	4.9	Working capital	-12,172	-5,350	174	7,641	-9,249
Net interest	-2,823	-2,637	-2,674	-2,256	-2,017	Other	813	-3,924	-337	-5,683	-6,373
Associates	3,366	3,014	3,221	2,904	3,245	<b>Operating cashflow</b>	<b>59,855</b>	<b>40,158</b>	<b>34,813</b>	<b>61,984</b>	<b>49,931</b>
Non-op/Except	4,773	3,423	2,000	1,500	1,500	Capex	-4,439	-3,632	-14,000	-17,000	-8,000
<b>Pre-tax profit</b>	<b>44,441</b>	<b>24,671</b>	<b>11,613</b>	<b>38,015</b>	<b>45,591</b>	Net acq/disposals	-619	-9,374	-5,100	-7,375	-5,800
Tax	-3,517	-2,172	-885	-5,926	-7,156	Other	0	0	0	0	0
Extraord./Min.Int./Pref.div.	0	0	0	0	0	<b>Investing cashflow</b>	<b>-5,058</b>	<b>-13,007</b>	<b>-19,100</b>	<b>-24,375</b>	<b>-13,800</b>
<b>Reported net profit</b>	<b>40,923</b>	<b>22,499</b>	<b>10,729</b>	<b>32,089</b>	<b>38,435</b>	Dividends paid	-36,200	-37,150	-19,052	-9,526	-28,578
Net Margin (%)	5.5	2.8	1.2	3.8	4.4	<b>Financing cashflow</b>	<b>-46,860</b>	<b>-7,984</b>	<b>-40,117</b>	<b>-34,526</b>	<b>-33,578</b>
Core NPAT	40,923	22,499	10,729	32,089	38,435	<b>Net change in cash</b>	<b>7,937</b>	<b>19,167</b>	<b>-24,403</b>	<b>3,083</b>	<b>2,553</b>
Per share data						Free cashflow to s/holders					
Reported EPS (\$)	4.30	2.36	1.13	3.37	4.03		55,416	36,526	20,813	44,984	41,931
Core EPS (\$)	4.30	2.36	1.13	3.37	4.03						
DPS (\$)	3.90	2.00	1.00	3.00	3.60						
CFPS (\$)	6.28	4.22	3.65	6.51	5.24						
FCFPS (\$)	5.82	3.83	2.18	4.72	4.40						
BVPS (\$)	25.64	23.43	22.56	24.93	25.96						
Wtd avg ord shares (m)	9,526	9,526	9,526	9,526	9,526						
Wtd avg diluted shares (m)	9,526	9,526	9,526	9,526	9,526						
Growth rates											
Sales revenue (%)	17.8	6.9	12.8	-5.3	3.3						
EBIT (Adj) (%)	-14.9	-46.7	-56.6	295.6	19.5						
Core NPAT (%)	4.4	-45.0	-52.3	199.1	19.8						
Core EPS (%)	4.4	-45.0	-52.3	199.1	19.8						
Balance Sheet (NT\$m)											
Cash & cash equiv.	37,836	51,717	27,313	30,397	32,950						
Accounts receivables	83,733	78,233	82,941	78,526	85,908						
Inventory	81,553	96,129	98,743	93,487	96,529						
Net fixed & other tangibles	207,310	185,350	173,440	166,281	151,592						
Goodwill & intangibles	0	0	0	0	0						
Financial & other assets	40,819	50,349	59,522	68,297	76,808						
<b>Total assets</b>	<b>451,251</b>	<b>461,777</b>	<b>441,960</b>	<b>436,988</b>	<b>443,786</b>						
Accounts payable	24,993	33,813	24,686	23,372	24,132						
Short-term debt	74,187	51,065	50,000	30,000	30,000						
Long-term debt	91,959	139,639	119,639	114,639	109,639						
Provisions & other liab	15,889	14,072	32,715	31,495	32,675						
<b>Total liabilities</b>	<b>207,028</b>	<b>238,590</b>	<b>227,040</b>	<b>199,506</b>	<b>196,446</b>						
Shareholders' equity	244,223	223,188	214,920	237,483	247,340						
Minority interests	0	0	0	0	0						
<b>Total equity</b>	<b>244,223</b>	<b>223,188</b>	<b>214,920</b>	<b>237,483</b>	<b>247,340</b>						
<b>Net debt</b>	<b>128,310</b>	<b>138,987</b>	<b>142,326</b>	<b>114,243</b>	<b>106,689</b>						
Net debt to equity (%)	52.5	62.3	66.2	48.1	43.1						

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## Company Focus

- Company Update
- Estimate Change

<b>Buy</b>	<b>1</b>
Price (23 Oct 12)	NT\$34.00
Target price	NT\$38.00
Expected share price return	11.8%
Expected dividend yield	2.9%
<b>Expected total return</b>	<b>14.7%</b>
Market Cap	NT\$30,114M
	US\$1,029M

### Price Performance (RIC: 1710.TW, BB: 1710 TT)



## Oriental Union Chemical (1710.TW) Positive MEG Outlook, but PRC operations loss-making

- **Improving MEG spread, but tough outlook for PTA and EA** — We believe OUCC's China PTA contribution would remain in the red due to oversupply. While the PTA-PX spread recovered slightly in 3Q (2Q12: US\$64/t; 3Q12: US\$127/t) on bottoming of oil prices in 2Q, the spread is likely to stay low at US\$100/t or below. The China EA/EOD plants would also be loss-making due to expensive EO feedstock sourced from Sinopec Yangzi (oligopoly market). MEG remains the bright spot – the spread recovered to US\$250-300/t in 3Q12 (2Q12: US\$172/t) due to various outages and a decline in China's shore tank inventory. We expect MEG supply would tighten into 2013.
- **Still our preferred pick in Taiwan** — We lower FY12-14E EPS by 23%, 18% and 16% respectively to reflect higher losses at China PTA and EA/EOD plants. However, we expect the company to maintain a high dividend payout ratio on strong balance sheet (net cash).

### Statistical Abstract

Year to	Net Profit	Diluted EPS	EPS growth	P/E	P/B	ROE	Yield
31 Dec	(NT\$M)	(NT\$)	(%)	(x)	(x)	(%)	(%)
2010A	1,749	2.00	21.9	17.0	2.0	12.4	6.4
2011A	2,594	2.97	48.3	11.4	1.8	16.8	5.3
2012E	1,205	1.38	-53.5	24.6	1.9	7.5	2.9
2013E	2,104	2.41	74.6	14.1	1.7	12.7	4.4
2014E	2,517	2.88	19.6	11.8	1.6	14.2	5.9

Source: Powered by dataCentral

1710.TW: Fiscal year end 31-Dec						Price: NT\$34.00; TP: NT\$38.00; Market Cap: NT\$30,114m; Recomm: Buy					
Profit & Loss (NT\$m)	2010	2011	2012E	2013E	2014E	Valuation ratios	2010	2011	2012E	2013E	2014E
Sales revenue	12,410	13,875	12,702	13,350	13,825	PE (x)	17.0	11.4	24.6	14.1	11.8
Cost of sales	-10,137	-10,310	-10,273	-9,844	-10,066	PB (x)	2.0	1.8	1.9	1.7	1.6
Gross profit	2,273	3,565	2,429	3,506	3,759	EV/EBITDA (x)	12.2	6.4	8.6	5.7	4.9
Gross Margin (%)	18.3	25.7	19.1	26.3	27.2	FCF yield (%)	3.1	7.1	6.4	9.0	9.5
<b>EBITDA (Adj)</b>	<b>1,751</b>	<b>3,169</b>	<b>2,331</b>	<b>3,378</b>	<b>3,600</b>	Dividend yield (%)	6.4	5.3	2.9	4.4	5.9
EBITDA Margin (Adj) (%)	14.1	22.8	18.3	25.3	26.0	Payout ratio (%)	109	61	72	62	69
Depreciation	-478	-474	-494	-494	-494	ROE (%)	12.4	16.8	7.5	12.7	14.2
Amortisation	0	0	0	0	0	<b>Cashflow (NT\$m)</b>	<b>2010</b>	<b>2011</b>	<b>2012E</b>	<b>2013E</b>	<b>2014E</b>
<b>EBIT (Adj)</b>	<b>1,273</b>	<b>2,695</b>	<b>1,837</b>	<b>2,885</b>	<b>3,106</b>	EBITDA	1,751	3,169	2,331	3,378	3,600
EBIT Margin (Adj) (%)	10.3	19.4	14.5	21.6	22.5	Working capital	-386	292	46	-8	-6
Net interest	-1	1	5	5	5	Other	-19	-408	-176	-386	-470
Associates	915	466	-456	-394	-119	<b>Operating cashflow</b>	<b>1,345</b>	<b>3,053</b>	<b>2,201</b>	<b>2,985</b>	<b>3,123</b>
Non-op/Except	21	9	40	40	40	Capex	-413	-939	-300	-300	-300
<b>Pre-tax profit</b>	<b>2,208</b>	<b>3,171</b>	<b>1,426</b>	<b>2,535</b>	<b>3,032</b>	Net acq/disposals	-718	2	-276	-1,200	-1,200
Tax	-459	-577	-221	-431	-515	Other	0	0	0	0	0
Extraord./Min.Int./Pref.div.	0	0	0	0	0	<b>Investing cashflow</b>	<b>-1,131</b>	<b>-937</b>	<b>-576</b>	<b>-1,500</b>	<b>-1,500</b>
<b>Reported net profit</b>	<b>1,749</b>	<b>2,594</b>	<b>1,205</b>	<b>2,104</b>	<b>2,517</b>	Dividends paid	-1,369	-1,932	-1,588	-874	-1,310
Net Margin (%)	14.1	18.7	9.5	15.8	18.2	<b>Financing cashflow</b>	<b>-1,453</b>	<b>-2,180</b>	<b>-1,580</b>	<b>-874</b>	<b>-1,310</b>
Core NPAT	1,749	2,594	1,205	2,104	2,517	<b>Net change in cash</b>	<b>-1,239</b>	<b>-64</b>	<b>46</b>	<b>611</b>	<b>313</b>
<b>Per share data</b>	<b>2010</b>	<b>2011</b>	<b>2012E</b>	<b>2013E</b>	<b>2014E</b>	<b>Free cashflow to s/holders</b>	<b>932</b>	<b>2,115</b>	<b>1,901</b>	<b>2,685</b>	<b>2,823</b>
Reported EPS (\$)	2.00	2.97	1.38	2.41	2.88						
Core EPS (\$)	2.00	2.97	1.38	2.41	2.88						
DPS (\$)	2.18	1.82	1.00	1.50	2.00						
CFPS (\$)	1.54	3.50	2.52	3.42	3.58						
FCFPS (\$)	1.07	2.42	2.18	3.07	3.23						
BVPS (\$)	16.64	18.67	18.24	19.65	21.03						
Wtd avg ord shares (m)	874	874	874	874	874						
Wtd avg diluted shares (m)	874	874	874	874	874						
<b>Growth rates</b>	<b>2010</b>	<b>2011</b>	<b>2012E</b>	<b>2013E</b>	<b>2014E</b>						
Sales revenue (%)	28.4	11.8	-8.5	5.1	3.6						
EBIT (Adj) (%)	58.4	111.7	-31.8	57.0	7.7						
Core NPAT (%)	21.9	48.3	-53.5	74.6	19.6						
Core EPS (%)	21.9	48.3	-53.5	74.6	19.6						
<b>Balance Sheet (NT\$m)</b>	<b>2010</b>	<b>2011</b>	<b>2012E</b>	<b>2013E</b>	<b>2014E</b>						
Cash & cash equiv.	183	408	454	1,065	1,378						
Accounts receivables	673	959	878	923	956						
Inventory	395	592	542	569	590						
Net fixed & other tangibles	5,109	6,667	6,494	6,321	6,148						
Goodwill & intangibles	0	0	0	0	0						
Financial & other assets	9,621	10,034	10,129	10,911	11,966						
<b>Total assets</b>	<b>15,981</b>	<b>18,660</b>	<b>18,496</b>	<b>19,788</b>	<b>21,037</b>						
Accounts payable	328	680	623	654	678						
Short-term debt	0	0	0	0	0						
Long-term debt	0	0	0	0	0						
Provisions & other liab	1,119	1,667	1,944	1,974	1,993						
<b>Total liabilities</b>	<b>1,447</b>	<b>2,347</b>	<b>2,567</b>	<b>2,628</b>	<b>2,671</b>						
Shareholders' equity	14,534	16,313	15,929	17,160	18,367						
Minority interests	0	0	0	0	0						
<b>Total equity</b>	<b>14,534</b>	<b>16,313</b>	<b>15,929</b>	<b>17,160</b>	<b>18,367</b>						
<b>Net debt</b>	<b>-183</b>	<b>-408</b>	<b>-454</b>	<b>-1,065</b>	<b>-1,378</b>						
Net debt to equity (%)	-1.3	-2.5	-2.8	-6.2	-7.5						

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## Company Focus

- Company Update
- Estimate Change

## PETRONAS Chemicals Group (PCGB.KL) Steady Sailing Despite Macro Headwinds

- **Minor EPS changes** — We raise FY12E EPS slightly by 1% and cut FY13-14E EPS by 3-4% to reflect our revised spreads. As a gas cracker, PCHEM would continue to enjoy better earnings visibility vs naphtha crackers in a strong oil price environment. We maintain Neutral given its lower leverage to the ethylene upturn into 2014-15.

<b>Neutral</b>	<b>2</b>
Price (23 Oct 12)	RM6.45
Target price	RM6.50
Expected share price return	0.8%
Expected dividend yield	3.4%
<b>Expected total return</b>	<b>4.2%</b>
Market Cap	RM51,600M
	US\$16,907M

### Price Performance (RIC: PCGB.KL, BB: PCHEM MK)



### Statistical Abstract

Year to	Net Profit	Diluted EPS	EPS growth	P/E	P/B	ROE	Yield
31 Dec	(RMM)	(RM)	(%)	(x)	(x)	(%)	(%)
2010A	na	na	na	na	na	na	na
2011A	3,607	0.45	na	14.3	2.9	na	2.5
2012E	3,557	0.44	-1.4	14.5	2.6	18.6	3.4
2013E	3,451	0.43	-3.0	15.0	2.4	16.4	3.6
2014E	3,256	0.41	-5.7	15.9	2.2	14.4	3.4

Source: Powered by dataCentral

PCGB.KL: Fiscal year end 31-Dec						Price: RM6.45; TP: RM6.50; Market Cap: RM51,600m; Recomm: Neutral					
Profit & Loss (RMm)	2010	2011	2012E	2013E	2014E	Valuation ratios	2010	2011	2012E	2013E	2014E
Sales revenue	na	16,237	16,594	15,960	15,848	PE (x)	na	14.3	14.5	15.0	15.9
Cost of sales	na	-10,493	-10,824	-10,318	-10,481	PB (x)	na	2.9	2.6	2.4	2.2
Gross profit	na	5,744	5,770	5,642	5,367	EV/EBITDA (x)	na	na	7.7	7.8	8.7
Gross Margin (%)	na	35.4	34.8	35.3	33.9	FCF yield (%)	na	7.6	6.2	1.7	-3.7
<b>EBITDA (Adj)</b>	<b>na</b>	<b>5,996</b>	<b>5,714</b>	<b>5,556</b>	<b>5,289</b>	Dividend yield (%)	na	2.5	3.4	3.6	3.4
EBITDA Margin (Adj) (%)	na	36.9	34.4	34.8	33.4	Payout ratio (%)	na	35	49	53	54
Depreciation	na	-1,032	-1,133	-1,161	-1,195	ROE (%)	na	na	18.6	16.4	14.4
Amortisation	na	-300	0	0	0	<b>Cashflow (RMm)</b>	<b>2010</b>	<b>2011</b>	<b>2012E</b>	<b>2013E</b>	<b>2014E</b>
<b>EBIT (Adj)</b>	<b>na</b>	<b>4,664</b>	<b>4,582</b>	<b>4,394</b>	<b>4,094</b>	EBITDA	na	5,996	5,714	5,556	5,289
EBIT Margin (Adj) (%)	na	28.7	27.6	27.5	25.8	Working capital	na	270	-226	38	7
Net interest	na	127	201	220	220	Other	na	-1,916	-869	-837	-754
Associates	na	437	297	313	283	<b>Operating cashflow</b>	<b>na</b>	<b>4,350</b>	<b>4,619</b>	<b>4,757</b>	<b>4,542</b>
Non-op/Except	na	39	100	100	100	Capex	na	-424	-1,402	-3,854	-6,428
<b>Pre-tax profit</b>	<b>na</b>	<b>5,267</b>	<b>5,179</b>	<b>5,027</b>	<b>4,698</b>	Net acq/disposals	na	10	0	0	0
Tax	na	-1,141	-1,269	-1,257	-1,174	Other	na	0	0	0	0
Extraord./Min.Int./Pref.div.	na	-519	-353	-319	-268	<b>Investing cashflow</b>	<b>na</b>	<b>-414</b>	<b>-1,402</b>	<b>-3,854</b>	<b>-6,428</b>
<b>Reported net profit</b>	<b>na</b>	<b>3,607</b>	<b>3,557</b>	<b>3,451</b>	<b>3,256</b>	Dividends paid	na	-2,506	-1,616	-1,919	-1,974
Net Margin (%)	na	22.2	21.4	21.6	20.5	<b>Financing cashflow</b>	<b>na</b>	<b>-4,002</b>	<b>-2,108</b>	<b>-2,019</b>	<b>-2,074</b>
Core NPAT	na	3,607	3,557	3,451	3,256	<b>Net change in cash</b>	<b>na</b>	<b>-66</b>	<b>1,109</b>	<b>-1,117</b>	<b>-3,960</b>
<b>Per share data</b>	<b>2010</b>	<b>2011</b>	<b>2012E</b>	<b>2013E</b>	<b>2014E</b>	<b>Free cashflow to s/holders</b>	<b>na</b>	<b>3,926</b>	<b>3,217</b>	<b>903</b>	<b>-1,886</b>
Reported EPS (RM)	na	0.45	0.44	0.43	0.41						
Core EPS (RM)	na	0.45	0.44	0.43	0.41						
DPS (RM)	na	0.16	0.22	0.23	0.22						
CFPS (RM)	na	0.54	0.58	0.59	0.57						
FCFPS (RM)	na	0.49	0.40	0.11	-0.24						
BVPS (RM)	na	2.26	2.53	2.74	2.91						
Wtd avg ord shares (m)	na	8,000	8,000	8,000	8,000						
Wtd avg diluted shares (m)	na	8,000	8,000	8,000	8,000						
<b>Growth rates</b>	<b>2010</b>	<b>2011</b>	<b>2012E</b>	<b>2013E</b>	<b>2014E</b>						
Sales revenue (%)	na	na	2.2	-3.8	-0.7						
EBIT (Adj) (%)	na	na	-1.8	-4.1	-6.8						
Core NPAT (%)	na	na	-1.4	-3.0	-5.7						
Core EPS (%)	na	na	-1.4	-3.0	-5.7						
<b>Balance Sheet (RMm)</b>	<b>2010</b>	<b>2011</b>	<b>2012E</b>	<b>2013E</b>	<b>2014E</b>						
Cash & cash equiv.	na	9,380	10,789	9,972	6,312						
Accounts receivables	na	1,671	1,708	1,642	1,631						
Inventory	na	1,341	1,370	1,318	1,309						
Net fixed & other tangibles	na	12,295	12,048	14,741	19,974						
Goodwill & intangibles	na	26	26	26	26						
Financial & other assets	na	1,382	1,638	1,646	1,629						
<b>Total assets</b>	<b>na</b>	<b>26,095</b>	<b>27,580</b>	<b>29,346</b>	<b>30,881</b>						
Accounts payable	na	2,371	2,214	2,129	2,114						
Short-term debt	na	2,152	2,000	2,000	2,000						
Long-term debt	na	241	0	0	0						
Provisions & other liab	na	1,689	1,430	1,430	1,430						
<b>Total liabilities</b>	<b>na</b>	<b>6,453</b>	<b>5,644</b>	<b>5,559</b>	<b>5,544</b>						
Shareholders' equity	na	18,092	20,209	21,901	23,316						
Minority interests	na	1,550	1,726	1,886	2,020						
<b>Total equity</b>	<b>na</b>	<b>19,642</b>	<b>21,936</b>	<b>23,787</b>	<b>25,336</b>						
<b>Net debt</b>	<b>na</b>	<b>-6,987</b>	<b>-8,789</b>	<b>-7,972</b>	<b>-4,312</b>						
Net debt to equity (%)	na	-35.6	-40.1	-33.5	-17.0						

For further data queries on Citi's full coverage universe please contact Citi Research Data Services at CitiRsch.DataServices.Global@citi.com  
For definitions of the items in this table, please click [here](#).

## LG Chem

### Company description

LG Chem is a major producer of chemicals in Korea and ranks as one of the top producers globally for PVC (1.3m tonnes capacity) and ABS (1.3m tonnes). It is backwardly integrated into two naphtha crackers (ethylene capacity: 1.9m tonnes). It completed a spin-off of the industrial materials division into LG Hausys on 1 April 2009 and diversified into LCD polarizer film and lithium-ion rechargeable batteries in 1999. On polarizer, LG is the largest producer globally with ~30% market share. It was the third largest producer of small-sized battery and also holds a strong position in HEV battery (exclusive battery supplier for GM's new plug-in hybrid vehicle Chevy Volt).

### Investment strategy

We rate LG Chem Buy (1) with a W390k target price. We believe the recent correction has mostly priced in the concern of weaker chemical demand and near-term earnings disappointment. We favour its two-pronged strategy in chemicals by securing cheap feedstock (ethane cracker JV) and improving competitiveness for existing plants. On electronics, we believe the company should continue to fare better than its peers, thanks to its cost advantage and solid long-term prospects.

### Valuation

Our W390,000 target price is based on a mid-cycle 2x FY12E P/BV for the core business. We also assess the value of its new growth drivers like HEV batteries and LCD glass based on DCF valuation. We value the HEV business at W3tr (from W4.4tr) to reflect weaker sales pickup of GM Chevy Volt. On LCD glass, our valuation was lowered to W0.7tr (from W1.4tr) given the tougher market outlook and lower normalised EBIT margin (from 30% to 20%). We value chemical stocks using P/BV methodology due to the asset-heavy nature of the business.

### Risks

Key downside risks to our target price include: 1) Weaker-than-expected China chemical demand and/or globally; 2) Further ASP pressure on polarizer/battery on industry oversupply and softer demand; 3) Unscheduled plant shutdown for rechargeable battery; and 4) Uncertainty of various assumptions in DCF valuation of new business, which is highly subjective. Key upside risks to our target price include: 1) Stronger-than-expected electronics recovery; 2) Delays for new Middle East capacity startups; and 3) Sharp weakening of the Won:US\$ exchange rate.

## Honam Petrochemical

### Company description

Honam Petrochemical is part of the Lotte group, and has a total ethylene capacity of 1.75m tonnes following its merger with Lotte Daesan (100%-owned) at end-2008. It is the leading producer in Korea for MEG (1.04m tonnes), PE (0.78mt) and PP (0.88mt). It also owns a 52% stake in KP Chemical (1m tonnes PTA, 200,000 tonnes PIA, 400,000 tonnes PET). Honam diversified into specialty chemicals products including PC, MMA, EOA etc. It also acquired 100% stake of a Malaysian cracker operator Titan Chemical for W1.5tr in end-2010.



## Investment strategy

We rate Honam Neutral/High Risk (2H) with a target price of W280,000. Honam is a beneficiary of our positive MEG and BD outlook, but we expect PE/PP margin to remain poor in 2H12 due to weak demand pickup in China and new crackers startups. The contribution from KP would stay sluggish on PTA oversupply and tighter MX feedstock. While we expect the ethylene cyclical upturn to start from 2H13, the near-term earnings momentum is likely to be weak.

## Valuation

Our target price of W280,000 is based on sum-of-the-parts, which values the chemicals businesses (Honam, KP, Titan) at mid-cycle 6x EV/EBITDA (rolling forward to FY13E, but adjusts for our EBIT downgrade). We also factor in a mild EPS dilution of 3% and new shares issuance (2.4m) following the potential merger with KP Chem. We think EV/EBITDA better reflects Honam's underlying value compared to P/B, as book value and earnings could be distorted by its shorter depreciation policy. We value the other unlisted equity investments at book.

## Risks

We assign a High Risk (H) rating based on our quantitative model, which is linked to the stock's volatility over the past year. Key downside risks to our investment case and target price are: 1) weaker-than-expected chemical demand in China; 2) a sharp plunge in oil prices could hurt buying sentiment of downstream converters in China; and 3) faster-than-expected ramp-up of Middle East supply. Key upside risks are: 1) stronger-than-expected recovery in global demand; and 2) delays in new cracker capacity in the Middle East and Asia over 2009-10.

## Formosa Plastics

### Company description

Formosa Plastics (FPC) is the flagship of the Formosa Group in Taiwan. It is one of the world's largest polyvinyl chloride (PVC) producers, with 1.7m tonnes capacity (1.3m in Taiwan, 0.4m in China) and is vertically integrated into VCM/EDC feedstock, boasting economies of scale and cost competitiveness. FPC has significant exposure to PE and PP, although it generates lower returns given its non-integrated business model. The company has expanded into specialty chemicals including AN, ECH, MMA and carbon fibre. It also has a 30% stake in Formosa Sumco (a silicon wafer producer) listed on the Taiwan main board at end-2007.

### Investment strategy

We rate Formosa Plastics shares Neutral with a target price of NT\$77. We believe its diversified product mix (PVC, caustic soda) should partly buffer the negative impact of the peaking of specialty chemicals (AE, AN) margins in 2011. However, we are concerned about the poor operating track record of Formosa Group given the large number of fire incidents. We see a possibility of dividend cut given its DRAM exposure (inter-group loan to Nan Ya Tech) and rising maintenance capex.

### Valuation

Our sum-of-the-parts target price of NT\$77 for FPC is based on mid-cycle 6x average EV/EBITDA for the core business but adjusts for our EBIT downgrade. We use SOTP as our valuation methodology given the company's large equity-

investment holdings. We value its stake in Formosa Petrochemical at our target price of NT\$75 and Formosa Sumco at the current market price. We value its unlisted US and PRC operations at 2.5x (from 2x to reflect widening gas feedstock cost advantage) and 1.5x P/BV respectively. However, we conservatively assume zero value for its stake in Nan Ya Tech and the write-off of its inter-group loan exposure for Nan Ya Tech given the poor DRAM outlook.

## Risks

Key downside risks to our investment case and target price include: 1) weaker-than-expected chemical demand in China; 2) a slowdown in export orders from plastics converters resulting in lower buying interest; and 3) continuous financial support to Nan Ya Tech, which could tie up more working capital and reduce dividend payout. Key upside risks to our target price include: 1) capacity rationalization for carbide-PVC in China due to government concerns over high energy consumption and pollution; and 2) delay in new ethylene/PE capacity from the Middle East.

## Formosa Chemicals & Fiber

### Company description

Formosa Chemical & Fibre (FCFC) is part of the Formosa Group. Originally, it produced textiles and nylon, but in 1999 it diversified into major chemicals with a focus on aromatics and styrenics. The company has total aromatics capacity of 3.4mt (PX - 1.75mt, benzene - 1.2mt, OX - 0.5mt), PTA and SM capacity of 3mt (2.2mt in Taiwan, 0.8mt in China) and 1.2mt respectively. The plastics capacities are as follows: 0.7mt ABS (0.4mt in Taiwan, 0.3mt in China), 0.5mt PP, 0.5mt PS and 0.2mt PC. It enjoys strong vertical integration with 90% of its PX and benzene feedstock produced in-house and so it enjoys better margins than its peers.

### Investment strategy

We rate Formosa Chemical & Fibre shares Sell with a target price of NT\$63. We think earnings momentum peaked in 2011 and its key earnings drivers (PTA, ABS, phenol) would see weakening margins into 2012-13E on large new capacity additions in China. We are also concerned about the poor operating track record of the Formosa Group given the large number of fire incidents. We also see the possibility of a dividend cut given rising financial support for Nan Ya Tech and maintenance capex.

### Valuation

Our sum-of-the-parts target price of NT\$63 for FCFC is based on mid-cycle 6x average EV/EBITDA for the core business, but adjusts for our EBIT downgrade. We value the holding in Formosa Petrochemical at our target price of NT\$75. We value its stake in Formosa Taffeta at its market price and PRC operation at 1.5x book. We factor in zero value for its stake in Nan Ya Tech and also the write-off of inter-group loan to DRAM affiliates (Nan Ya Tech, Inotera) for conservative purposes. We use sum-of-the-parts (SOTP) as our valuation methodology given the large equity investment holdings of FCFC.

## Risks

Key upside risks to our target price are: 1) stronger-than-expected chemical demand in China and globally; 2) delays in new supply startups; and 3) unanticipated disruptions for aromatics/SM/PTA capacity in the Middle East and

Asia. Key downside risks are: 1) weaker-than-expected chemical demand in China; and 2) tighter credits resulting in lower buying interest from plastics converters.

## Nan Ya Plastics

### Company description

Nan Ya Plastics' (NYP) business is divided into four major divisions: chemicals, plastics, polyester and electronics materials. NYP has 1.8m tonnes MEG capacity (7% global market share). It is a major producer of high-end polyester filament, oxo-alcohols/DOP and BPA. It is also the world's largest integrated producer of copper-clad laminates (CCL) with a substantial presence in printed-circuit boards and DRAM. NYP holds a 38% stake in Nanya Tech and a 67% stake in Nan Ya PCB.

### Investment strategy

We rate Nan Ya Plastics shares Sell with a target price of NT\$48. We see lower earnings visibility vs. other Formosa sisters due to poor DRAM outlook. NYP provided additional inter-group lending to Nan Ya Tech and Inotera in 2012, which were used to replace part of the amount provided by FPC. We are also concerned about the poor operating track record of Formosa Group given the large number of fire incidents, which could result in structural de-rating. However, as the largest MEG producer in Asia (7% of global capacity), we expect NYP to benefit from the positive MEG outlook.

### Valuation

Our sum-of-the-parts (SOTP) target price of NT\$48 is based on mid-cycle 6x average EV/EBITDA for the core business, but adjusts for our EBIT downgrade. We use SOTP given the large equity investments, which accounted for 50% of FY11 total assets. Given the high gearing and poor DRAM outlook, we assign no value for its stake in Nan Ya Tech. We also conservatively exclude NYP's inter-group loan to DRAM affiliates (Nanya Tech, Inotera) in our SOTP valuation. We value the holding in Formosa Petrochemical at our target price of NT\$75 and the stake in Nan Ya PCB at current market prices. We value its operation in US and China at 1.5x book.

### Risks

Key downside risks to our investment case and valuation are: 1) weaker-than-expected chemical demand; 2) a potential capital injection into Nanya Tech if DRAM outlook worsens further; 3) lower associate income contribution from Nan Ya PCB and Nanya Tech; 4) soft demand for electronics materials and increasing margin pressure from new CCL capacity in China. The key upside risks are: 1) delay in capacity ramp-up of new MEG capacity from the Middle East; 2) major industry consolidation for China's polyester industry driving a sharp improvement in demand-supply balance. Any of these risk factors could cause the share price to deviate from our target price.

## Formosa Petrochemical

### Company description

Formosa Petrochemical (FPCC) is part of the Formosa Group in Taiwan. It owns a 540,000 b/d refinery, 2.9m tonnes of ethylene capacity from three naphtha crackers,

and a 2,800MW cogeneration power plant. It was set up when the Taiwan government approved expansion of the private sector into the oil refining and upstream chemical business.

### Investment strategy

We rate Formosa Petrochemical shares Sell with a target price of NT\$75. We are concerned about the poor operating track record of Formosa Group given the large number of fire incidents. We see limited upside for refining margin, but the chemical (ethylene) cyclical upswing remains intact from 2013. Among the Formosa sisters, the relatively low free-float of the stock (15%) and foreign ownership (6%) may reduce selling pressure vs. its peers if the market sees a sharp correction.

### Valuation

Our NT\$75 target price for Formosa Petrochemical is based on a mid-cycle valuation of 3x P/BV, reflecting our earnings downgrade and the chemical cyclical upturn from 2013. We use P/BV as our valuation methodology due to the asset-heavy nature of the business.

### Risks

Key upside risks that could cause the shares to continue to trade at or above our target price include: 1) stronger re-stocking from China; 2) a short-term spike in refining margins on any unscheduled shutdowns in US/Asia; and 3) continuous buyback support from related parties. Key downside risks include: 1) weaker-than-expected oil and/or chemical demand; and 2) Taiwan government intervention on CPC's new oil products pricing mechanism.

## Oriental Union Chemical

### Company description

Founded in 1975, Oriental Union Chemical (OUCC), a Far Eastern Group (FEG) company, is a producer of ethylene glycol (MEG) and ethylene oxide derivatives (EOD) in Taiwan. The company diversified into specialty chemicals (EOD) in 2001 by expanding into ethanolamine (EA) and ethylene carbonate (EC). OUCC has 250kt EO/MEG, 80kt EA and 60kt EC capacities respectively in Taiwan. It holds a 39% stake in FEG's China PTA plant (700kt capacity) and an 18% stake in Taiwan PTA plant (1mt capacity). OUCC started a 40kt EA plant in Yangzhou in March 2011 and a 60kt EOD plant in 1Q12.

### Investment strategy

We rate OUCC shares Buy with a target price of NT\$38. As a 'pure' MEG play (70% of EBIT), OUCC is a beneficiary of our long-term positive MEG outlook. Despite weaker polyester demand outlook, we expect gradual spread recovery into 2H12-2013 on limited new supply globally and eased short tank inventory pressure in China (reduced imports on various outages). The diversification into specialty chemicals should also reduce earnings volatility in the long term. However, we see minimal contribution from China's PTA plant on industry oversupply.

### Valuation

Our sum-of-the-parts target price of NT\$38 is based 6x EV/EBITDA for the core business but adjusts for our earnings downgrade and stock dividend (10%). We

value its holdings in China and Taiwan PTA plants at trough cycle 0.8x P/BV (from 1x) to reflect the loss-making business. We value other equity holdings and idle land at book value. We also expect the company to maintain a high dividend payout on a strong balance sheet.

## Risks

Key downside risks to our investment case and target price include: 1) disruption of ethylene supply from CPC would result in lower utilization; 2) weaker-than-expected polyester demand in China ; and 3) significant potential capacity build-ups for coal-based MEG projects in China . Key upside risks are: 1) robust textile exports driving strong polyester/MEG demand; and 2) unscheduled plant shutdowns driving tighter regional supply.

## PETRONAS Chemicals Group

### Company description

Founded in 1985, PETRONAS Chemicals Group Berhad (PCG) is the chemical arm of Malaysia's national oil & gas company, Petroliaam Nasional Berhad (PETRONAS). PCG is the largest producer of olefins and derivatives, aromatics, fertilizer, methanol and specialty chemicals in Malaysia. It has 1mt ethylene capacity (two gas crackers), 0.5mt PE, 0.4mt MEG, 0.3mt PVC, 0.5mt PX, 1.4mt urea and 2.4mt methanol capacities respectively. PCG also holds a 40% stake in a BASF PETRONAS JV, which produces acrylics, oxo-alcohols etc.

### Investment strategy

We rate PCG as Neutral with a target price of RM6.5. It is the most competitive ethylene producer in Asia ex Middle East thanks to the attractively priced gas feedstock from its parent PETRONAS. However, we expect limited EPS growth in the next 2-3 years given its high earnings base and low leverage to the cyclical upturn from 2013. In the near-term, we see stronger earnings visibility as PCG's earnings should hold up better than Asian naphtha crackers under a strong oil price environment. We see future growth opportunities (e.g. urea project) that may arise from upstream E&P development of PETRONAS. Any sharp surge in oil price would be the key upside risk for PCG.

### Valuation

Our target price of RM6.5 for PCG is based on 7x FY12-13E EV/EBITDA but adjusts for our EPS downgrade. This is broadly in line with the sector average of 6-7x. We value the equity investments (e.g. 40% stake in BASF-PETRONAS JV) at 2x P/BV, reflecting softening of demand-supply of acrylics/oxo-alcohols, and also factors in its large net cash holdings.

## Risks

Key downside risks to our target price include: 1) Softer chemical demand; 2) Credit tightening resulting in lower buying interests from plastics converters in China; and 3) A sharp plunge in oil prices. Key upside risk is the sharp surge in oil price leading to stronger chemical product pricing.

## Appendix A-1

### Analyst Certification

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

### IMPORTANT DISCLOSURES

#### LG Chem (051910.KS)

##### Ratings and Target Price History Fundamental Research

Analyst: Oscar Yee



	Date	Rating	Target Price	Closing Price
1	13-Jan-10	*1L	*275,000.00	225,000.00
2	16-Sep-10	*2L	*350,000.00	326,000.00
3	30-Jan-11	2L	*435,000.00	408,000.03

\* Indicates change

	Date	Rating	Target Price	Closing Price
4	20-Apr-11	2L	*550,000.00	567,000.00
5	25-Sep-11	*1L	*440,000.00	316,500.00
6	7-Oct-11	Stock rating system changed		

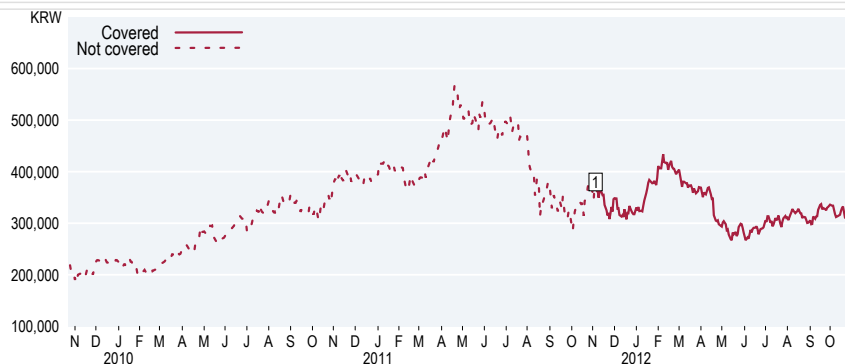
	Date	Rating	Target Price	Closing Price
7	7-Oct-11	*1	440,000.00	322,000.00
8	23-May-12	1	*390,000.00	279,000.00

Rating/target price changes above reflect Eastern Standard Time

#### LG Chem (051910.KS)

##### Ratings and Target Price History Best Ideas Research Relative Call (3 Month)

Analyst: Oscar Yee



	Date	Rating	Target Price	Closing Price
1	4-Nov-11	*ADD MP	-	372,500.00

\* Indicates change

Rating/target price changes above reflect Eastern Standard Time

## Honam Petrochemical (011170.KS)

### Ratings and Target Price History Fundamental Research

Analyst: Oscar Yee



	Date	Rating	Target Price	Closing Price
1	3-Dec-09	*1M	*126,000.00	101,000.00
2	21-Mar-10	*3M	126,000.00	120,000.00
3	2-Dec-10	3M	*244,000.00	263,000.00

	Date	Rating	Target Price	Closing Price
4	5-Apr-11	3M	*330,000.00	387,000.00
5	5-Oct-11	*2H	*285,000.00	243,000.00
6	7-Oct-11	Stock rating system changed		

	Date	Rating	Target Price	Closing Price
7	16-Feb-12	2H	*390,000.00	366,500.00
8	23-May-12	2H	*295,000.00	234,500.00
9	23-Jul-12	2H	*285,000.00	231,000.00

\* Indicates change

Rating/target price changes above reflect Eastern Standard Time

## Honam Petrochemical (011170.KS)

### Ratings and Target Price History Best Ideas Research Relative Call (3 Month)

Analyst: Oscar Yee



	Date	Rating	Target Price	Closing Price
1	11-Feb-11	*ADD LP	-	335,000.00

	Date	Rating	Target Price	Closing Price
2	5-Apr-11	*REM LP	-	387,000.00

\* Indicates change

Rating/target price changes above reflect Eastern Standard Time

## Formosa Plastics (1301.TW)

### Ratings and Target Price History Fundamental Research

Analyst: Oscar Yee



	Date	Rating	Target Price	Closing Price
1	24-Feb-10	2L	*72.00	68.60
2	3-Jun-10	*1L	*78.00	64.20
3	2-Dec-10	1L	*104.00	93.80
4	22-Mar-11	*2L	*107.00	101.50

	Date	Rating	Target Price	Closing Price
5	29-Jun-11	2L	*103.00	103.50
6	4-Aug-11	2L	*95.00	89.50
7	3-Oct-11	2L	*78.00	77.30
8	7-Oct-11	Stock rating system changed		

	Date	Rating	Target Price	Closing Price
9	7-Oct-11	*2	78.00	86.20
10	16-Feb-12	2	*85.00	89.60
11	23-May-12	2	*80.00	78.90
12	4-Jul-12	2	*78.50	80.40

\* Indicates change

Rating/target price changes above reflect Eastern Standard Time

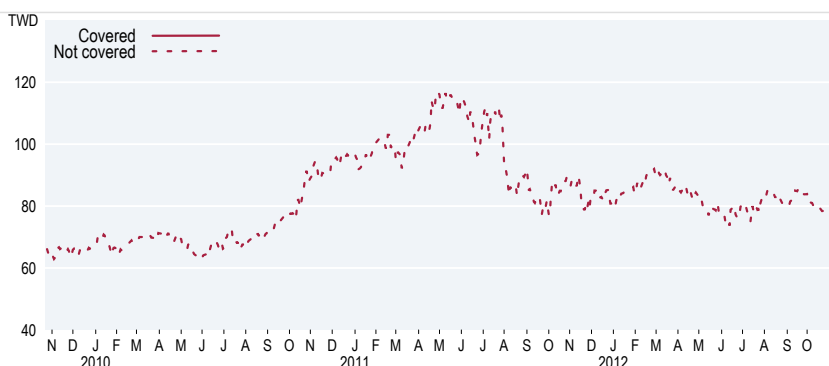
## Formosa Plastics (1301.TW)

### Ratings and Target Price History

#### Best Ideas Research

#### Relative Call (3 Month)

Analyst: Oscar Yee



\* Indicates change

Rating/target price changes above reflect Eastern Standard Time

## Nan Ya Plastics (1303.TW)

### Ratings and Target Price History

#### Fundamental Research

Analyst: Oscar Yee



\* Indicates change

Rating/target price changes above reflect Eastern Standard Time

	Date	Rating	Target Price	Closing Price
1	24-Feb-10	*2L	*65.00	63.60
2	13-Jul-10	*1L	*68.00	56.50
3	2-Dec-10	1L	*84.00	69.70
4	25-Mar-11	1L	*94.00	83.60

	Date	Rating	Target Price	Closing Price
5	29-Jun-11	1L	*84.00	76.60
6	5-Aug-11	*2L	*73.00	69.00
7	3-Oct-11	2L	*66.00	64.80
8	7-Oct-11	Stock rating system changed		

	Date	Rating	Target Price	Closing Price
9	7-Oct-11	*2	66.00	69.30
10	23-May-12	*3	*55.00	55.60
11	4-Jul-12	3	*53.00	55.50

## Nan Ya Plastics (1303.TW)

### Ratings and Target Price History

#### Best Ideas Research

#### Relative Call (3 Month)

Analyst: Oscar Yee



\* Indicates change

Rating/target price changes above reflect Eastern Standard Time

	Date	Rating	Target Price	Closing Price
1	5-Apr-11	*ADD MP	-	88.00

	Date	Rating	Target Price	Closing Price
2	10-Aug-11	*REM MP	-	66.00

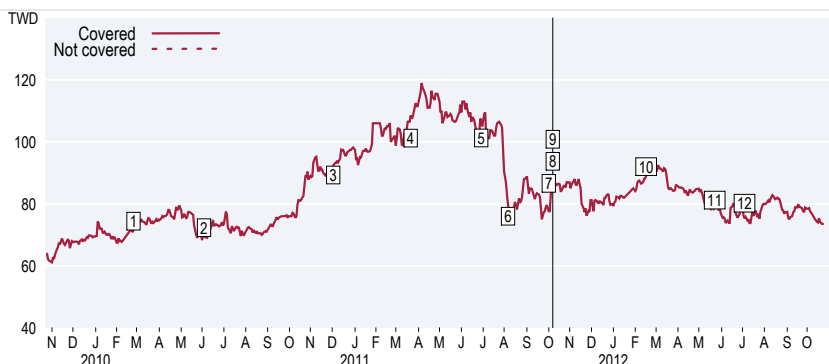
	Date	Rating	Target Price	Closing Price
3	4-Nov-11	*ADD LP	-	66.00



## Formosa Chemicals & Fiber (1326.TW)

### Ratings and Target Price History Fundamental Research

Analyst: Oscar Yee



	Date	Rating	Target Price	Closing Price
1	24-Feb-10	1L	*78.00	71.60
2	3-Jun-10	*2L	*73.00	69.50
3	2-Dec-10	2L	*96.00	92.30
4	22-Mar-11	2L	*113.00	108.50

\* Indicates change

	Date	Rating	Target Price	Closing Price
5	29-Jun-11	*3L	*92.00	107.00
6	5-Aug-11	3L	*85.00	82.60
7	3-Oct-11	3L	*72.00	77.60
8	7-Oct-11	Stock rating system changed		

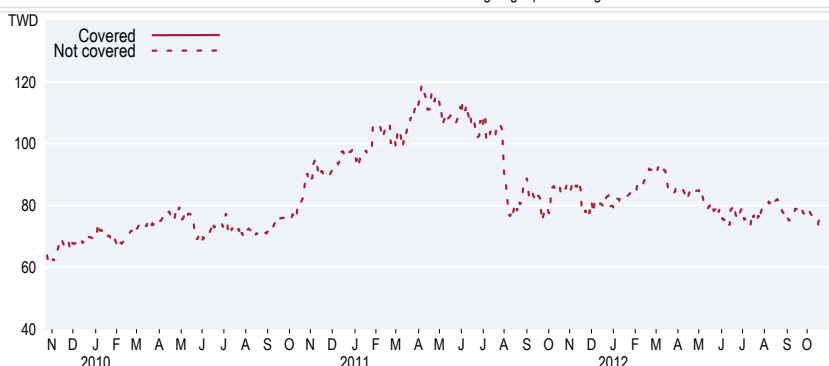
	Date	Rating	Target Price	Closing Price
9	7-Oct-11	*3	72.00	85.70
10	16-Feb-12	3	*74.00	89.00
11	23-May-12	3	*68.00	78.60
12	4-Jul-12	3	*66.00	75.30

Rating/target price changes above reflect Eastern Standard Time

## Formosa Chemicals & Fiber (1326.TW)

### Ratings and Target Price History Best Ideas Research Relative Call (3 Month)

Analyst: Oscar Yee



\* Indicates change

Rating/target price changes above reflect Eastern Standard Time

## Oriental Union Chemical (1710.TW)

### Ratings and Target Price History Fundamental Research

Analyst: Oscar Yee

Covered since July 21 2011



	Date	Rating	Target Price	Closing Price
1	15-Dec-09	Coverage terminated		
2	6-May-11	*1L	*49.09	36.36
3	7-Oct-11	Stock rating system changed		

\* Indicates change

	Date	Rating	Target Price	Closing Price
4	7-Oct-11	*1	49.09	32.82
5	16-Feb-12	1	*45.45	37.09
6	23-May-12	1	*37.27	30.32

	Date	Rating	Target Price	Closing Price
7	30-Aug-12	1	*38.00	33.55

Rating/target price changes above reflect Eastern Standard Time

## Oriental Union Chemical (1710.TW)

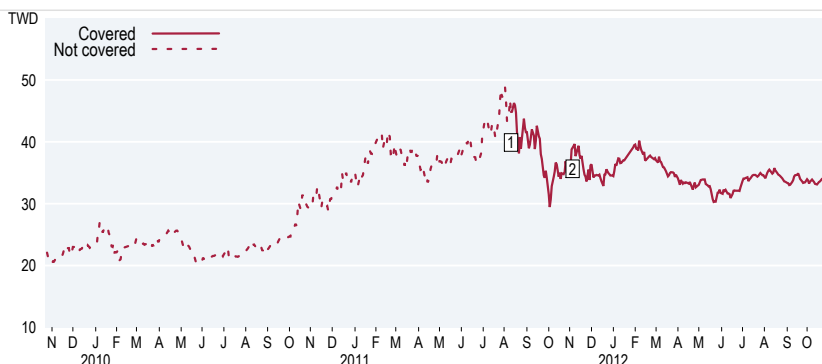
### Ratings and Target Price History

#### Best Ideas Research

#### Relative Call (3 Month)

Analyst: Oscar Yee

Covered since July 21 2011



	Date	Rating	Target Price	Closing Price
[1]	10-Aug-11	*ADD MP	-	44.82

	Date	Rating	Target Price	Closing Price
[2]	4-Nov-11	*REM MP	-	38.77

\* Indicates change

Rating/target price changes above reflect Eastern Standard Time

## Formosa Petrochemical (6505.TW)

### Ratings and Target Price History

#### Fundamental Research

Analyst: Oscar Yee



	Date	Rating	Target Price	Closing Price
[1]	24-Feb-10	3L	*70.00	80.00
[2]	2-Dec-10	3L	*80.00	87.00
[3]	3-Oct-11	3L	*70.00	82.60

	Date	Rating	Target Price	Closing Price
[4]	7-Oct-11	Stock rating system changed		
[5]	7-Oct-11	*3	70.00	90.00
[6]	16-Feb-12	3	*80.00	93.80

	Date	Rating	Target Price	Closing Price
[7]	4-Jul-12	3	*75.00	81.00

\* Indicates change

Rating/target price changes above reflect Eastern Standard Time

## Formosa Petrochemical (6505.TW)

### Ratings and Target Price History

#### Best Ideas Research

#### Relative Call (3 Month)

Analyst: Oscar Yee



	Date	Rating	Target Price	Closing Price
[1]	5-Apr-11	*ADD LP	-	97.90

\* Indicates change

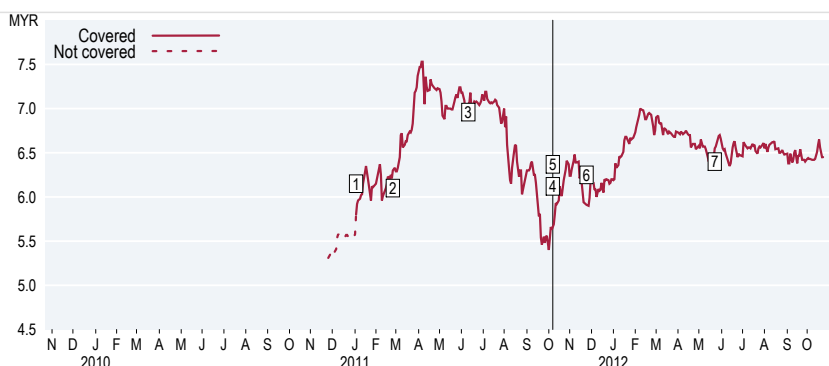
Rating/target price changes above reflect Eastern Standard Time

## PETRONAS Chemicals Group (PCGB.KL)

### Ratings and Target Price History Fundamental Research

Analyst: Oscar Yee

Covered since January 4 2011



	Date	Rating	Target Price	Closing Price
1	4-Jan-11	*1L	*6.40	5.80
2	24-Feb-11	1L	*7.20	6.30
3	10-Jun-11	1L	*8.00	7.05

\* Indicates change

	Date	Rating	Target Price	Closing Price
4	7-Oct-11	Stock rating system changed		
5	7-Oct-11	*1	8.00	5.63
6	24-Nov-11	1	*7.00	5.91

	Date	Rating	Target Price	Closing Price
7	23-May-12	*2	*6.50	6.55

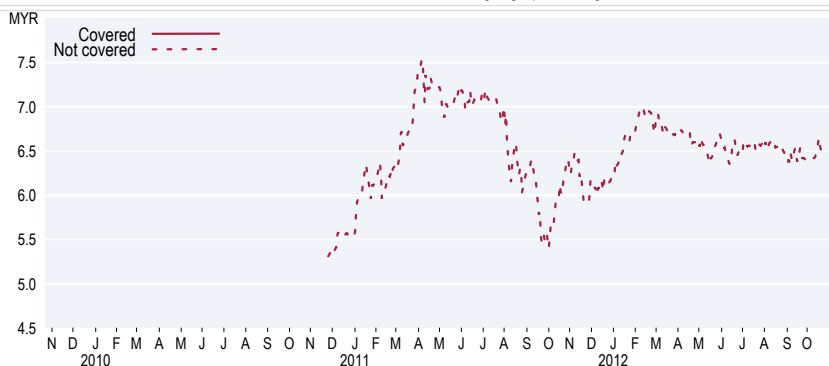
Rating/target price changes above reflect Eastern Standard Time

## PETRONAS Chemicals Group (PCGB.KL)

### Ratings and Target Price History Best Ideas Research Relative Call (3 Month)

Analyst: Oscar Yee

Covered since January 4 2011



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