



## Lesson learned from prior peaks

- **Consensus peak EPS estimates consistently conservative in prior cycles**
- **Steepness of cost curve coupled with large and evolving supply/demand growth disconnect points to a super-cycle, in our view**
- **Most positive for Overweight rated, ethylene exposed names: IQ, SABIC, and Yansab**

**Analyzing consensus EPS forecasts from the past 3 commodity chemical cycle peaks reveals that the sell side consistently underestimated the peak earnings power of companies by an average of 186% in the 2 years prior to a peak and an average of 60% 1 year prior.** This, to us, suggests that from current levels there may still be substantial room for positive earnings revisions and, in turn, for a share price rally for MENA petrochemical names.

**Based on our conservative forecasts, we see the spread between demand and supply growth CAGRs in the 2011–15 time period averaging 210 bps, suggesting a long, drawn-out peak on the way, similar to the 1988/89 peak.** The spread between the 4 year global ethylene demand and supply growth CAGRs in the run-up the 1995 peak was a meager 23 bps in 1995 and 42 bps in 2005, versus a healthy 350 bps in 1988. Additionally, the cost curve today is far steeper than those of prior peaks, with MENA petrochemical companies sitting at the bottom left end of the cost curve; to us, this implies a peak of higher amplitude than has been seen previously or, dare we say, a super-cycle.

**In terms of valuations, in each of the previous peaks commodity chemical shares experienced expansions in their peak P/E multiples.** Assigning prior peak P/E multiples to our peak earnings estimates points to an upside range of 5%–119% (depending on the peak multiple used) for the 3 ethylene exposed MENA names under our coverage – IQ, SABIC, and Yansab – all 3 of which we rate Overweight.

Industries Qatar	OW
Target price (QAR)	165
Current price (QAR)	137
SABIC	OW
Target price (SAR)	120
Current price (SAR)	106
Yansab	OW
Target price (SAR)	55
Current price (SAR)	50
Sidi Kerir	OW
Target price (EGP)	16.2
Current price (EGP)	14.6
SAFCO	OW
Target price (SAR)	225
Current price (SAR)	190
APC	N
Target price (SAR)	25
Current price (SAR)	32
Saudi Kayan	N
Target price (SAR)	20.0
Current price (SAR)	18.8

Note: All prices as of 2 April 2011

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**Disclaimer: See page 10**

## Revisions never positive enough in up cycles

It seems that the whole community of sell sides, myself included, consistently underestimates how extreme the swings of commodity chemical cycles tend to be. When an up cycle is upon us, we underestimate companies' peak earnings power, and, conversely, as we march towards a trough, we tend to be too optimistic about floor earnings levels. In the analysis shown in the table below, we look at consensus peak year EPS expectations 1 and 2 years prior to the last 3 peaks (1988, 1995, and 2005) for the main US commodity chemical companies of the time. As seen below, 2 years prior to a peak consensus underestimated peak EPS by 186% on average and by 60% 1 year prior to a peak.

### Consensus peak year EPS expectations 1 and 2 years prior to the peaks (USD/share)

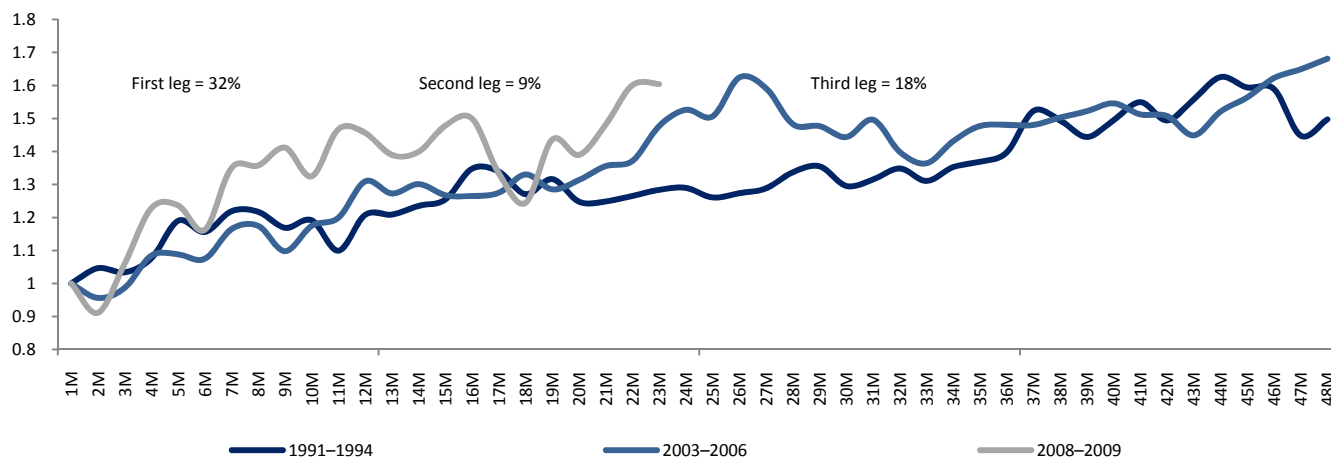
	Estimates in Jan '87	Estimates in Jan '88	Actual '88	Surprise from '87	Surprise from '88
Dow Chemical	1.03	1.42	2.85	177%	101%
Union Carbide	2.22	2.19	4.66	110%	113%
Average				143%	107%
	Estimates in Jan '94	Estimates in Jan '95	Actual '95	Surprise from '94	Surprise from '95
Dow Chemical	1.27	2.03	2.76	117%	36%
Eastman Chemical	3.25	4.75	6.93	113%	46%
Lyondell Chemical	1.03	4.83	4.86	372%	1%
Union Carbide	1.75	3.20	5.10	191%	59%
Average				198%	35%
	Estimates in Jan '04	Estimates in Jan '05	Actual '05	Surprise from '04	Surprise from '05
Dow Chemical	1.91	4.02	4.62	142%	15%
Eastman Chemical	1.70	3.52	6.61	289%	88%
Lyondell Chemical	-0.24	2.41	2.70	N/A	12%
Average				215%	38%

Source: Reuters, AlembicHC

## Chemical shares rally over a multiyear period

As we look to 2011 and beyond, we expect the chemical sector's outperformance to continue. In the chart on the following page, we present what we consider to be the 3 legs of a typical petrochemical share price rally after a crash. Petrochemical shares experienced precipitous declines in 1991, 2003, and 2008. In the first 12 months following those declines, the S&P Chemical Index appreciated strongly by 32% on average on the back of early signs of economic recovery, which is not very dissimilar from what we saw in 2009/10. Months 12–24 can generally be categorized as direction finding periods as market participants attempt to evaluate the robustness and sustainability of the economic recovery, with the S&P Chemical Index appreciating by around 9% on average during this period. Finally, beyond 24 months there tends to be another strong rally in chemical shares, with the S&P Chemical Index appreciating by 18% during this period. This analysis suggests that as we march towards a peak in the chemical cycle, there may still be a substantial amount of room left for chemical shares to run.

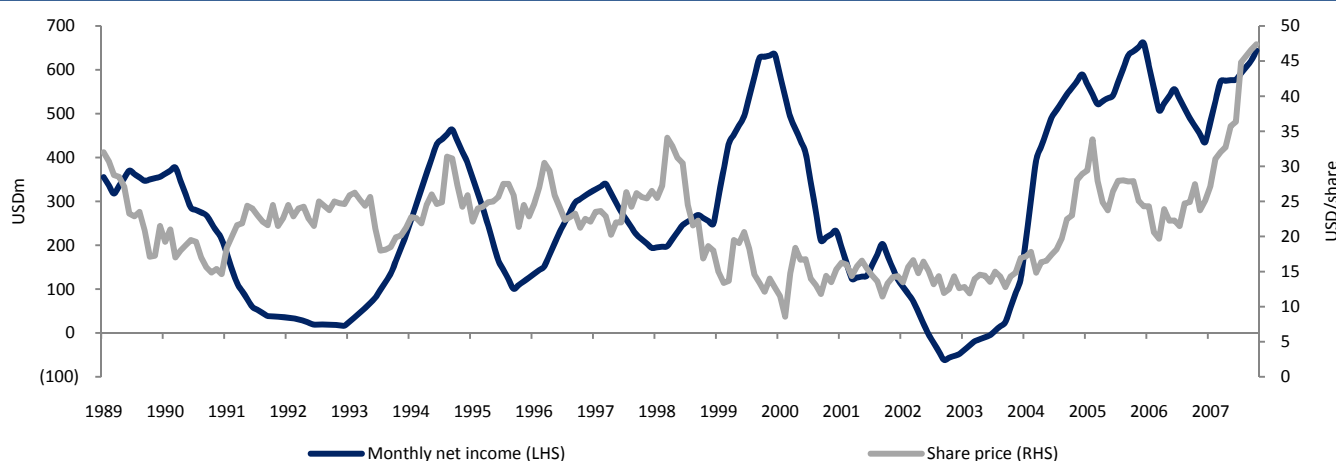
## S&P Chemical Index performance following crashes



Source: Bloomberg, AlembicHC

Speaking more specifically about commodity chemicals, if we look, for example, at Lyondell Chemical Company's share price performance (before the Basell merger) over its 18 year history (shown in the chart below) we discover that the company's shares rallied for almost 5 years before the company was taken private. The chart clearly shows that as earnings at Lyondell Chemical Company marched towards a peak in the 2003–07 time period, so did the share price. If an investor had exited his/her position in the name after a 160% appreciation similar to what we have seen recently, he/she would have missed out on around 140% further upside in the name. In short, we believe most US commodity chemical share prices could easily double from current levels as we move towards the chemical cycle's peak.

## Lyondell Chemical Company's share price and earnings performance



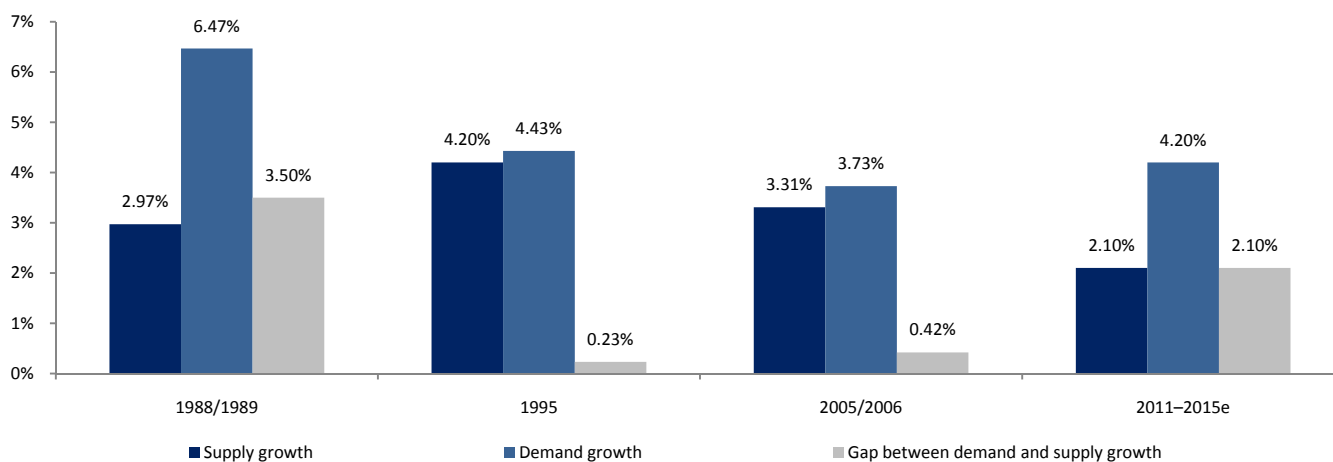
Source: Bloomberg, AlembicHC

## What to expect from next peak?

### The next peak could be long and drawn out...

As stated in several of our previous notes, we expect a peak in the commodity chemical cycle as early as 2013. Our view that a peak in the commodity chemical cycle is imminent is predicated primarily on a capacity addition vacuum arising between 2012 and 2015 as Middle Eastern producers exit the capacity addition game. In the chart below, we compare the disconnect between global ethylene supply and demand growth CAGRs in the 4 years prior to previous peaks. As seen in the chart, the disconnect between demand and supply growth averaged only 0.2% in 1995 and 0.4% in 2005, while averaging 3.5% in 1988. Using what we consider to be conservative demand growth assumptions, we see the demand growth CAGR in the 2011–15 time period outstripping the supply growth CAGR by 2.1%, suggesting a smooth, drawn-out peak similar to that of 1988/89. It is also worth highlighting that the 4 year supply growth CAGR prior to the 1988/89 peak stood at 3.0%, which compares well with our expectation of a 2011–15 supply growth CAGR of 2.1%. We are also conservatively modeling a 2011–15 demand growth CAGR of 4.2%, which pales in comparison to the 6.5% demand growth CAGR witnessed in the 4 years prior to the 1988/89 peak.

### 4 year global ethylene supply and demand growth CAGRs prior to peaks



Source: AlembicHC

### ...with a high amplitude

In order to hypothesize about the amplitude of a future commodity chemical cycle peak, we believe one has to compare current product pricing and raw material costs with those of previous peaks. In the table below, we compare the current costs of ethane and naphtha, the primary ethylene raw materials, with those of prior peaks. What is strikingly clear from this table is that the crude oil to natural gas ratio and, in turn, the naphtha to ethane price differential are currently at all time highs compared with those of prior peaks, while product pricing is comparable to 2005 levels, particularly for ethylene. To us, this product pricing and raw material cost dynamic suggests further upward product pricing momentum as we march towards a peak and as naphtha based marginal producers gain pricing power and start making positive returns.

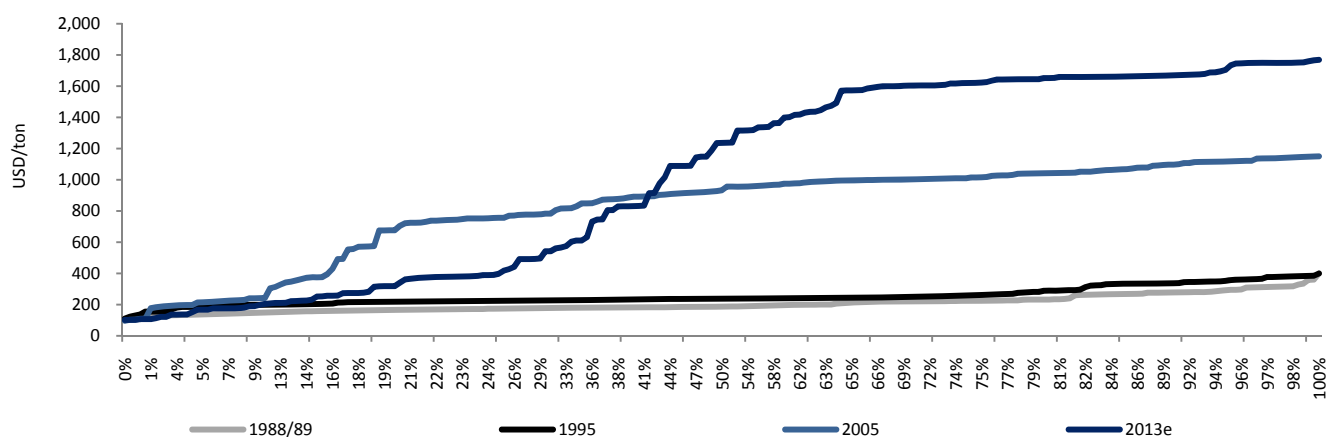
#### Current product and raw material prices compared to those of prior peaks

	1988	1995	2005	Present
<b>Raw materials</b>				
Crude oil (USD/bbl)	14.98	18.43	56.37	99.79
Natural gas (USD/mmBtu)	1.60	1.69	8.28	4.09
Crude/gas ratio	9.4	10.9	6.8	24.4
Ethane (cents/gal)	17.0	14.4	61.2	61.6
Naphtha (cents/gal)	36.1	40.8	126.0	235.2
Naphtha-ethane differential (cents/gal)	19.1	26.5	64.7	173.6
<b>Products</b>				
Ethylene (cents/lb)	27.0	25.1	44.2	50.2
LDPE (cents/lb)	48.3	45.9	70.3	97.8

Source: CMAI, AlembicHC

Said differently, today's ethylene cost curve is far steeper than those we have seen in prior peaks, as shown in the chart below. As global utilization rates tighten and marginal producers push through further price hikes, we would expect lower-cost US producers to benefit disproportionately from a pricing umbrella that is higher than ever before, which, in our view, should result in a peak with an amplitude higher than in past cycles.

#### Global ethylene cost curve (USD/ton)



Source: AlembicHC

## What it all means for the companies

During each prior peak, we witnessed P/E multiples expand from the levels seen in the peak before, as is clear from the table below. It is quite evident from our proprietary ethylene cost curves, shown earlier in this report, that at current ethylene pricing levels the marginal naphtha based ethylene producers are making break-even cash margins at best. This is not inconsistent with what one would expect in the current phase of the cycle – global ethylene capacity utilization remains at around 86% according to our estimates, which would imply trough or break-even margins. That said, as we march towards mid cycle (88%–90%) and eventually peak (over 90%) capacity utilization rates, we would expect to see a pickup in the marginal producers' cash margins.

### Peak P/E ratios (USD)

1988 peak	Peak share price	Peak EPS	P/E
Dow Chemical	24.36	2.85	8.5x
Union Carbide	32.50	4.66	7.0x
Average			7.8x
1995 peak	Peak share price	Peak EPS	P/E
Dow Chemical	26.42	2.76	9.6x
Eastman Chemical	56.00	6.93	8.1x
Lyondell Chemical	31.38	4.86	6.5x
Union Carbide	42.75	5.10	8.4x
Average			8.1x
2005 peak	Peak share price	Peak EPS	P/E
Dow Chemical	55.15	4.62	11.9x
Eastman Chemical	65.75	6.61	9.9x
Lyondell Chemical	33.85	2.70	12.5x
Average			11.5x

Source: Bloomberg, AlembicHC

In the table on the next page, we provide historic mid cycle and peak cash margins by product, looking at monthly product margin history going back 30 years. In order to come up with normal and peak pricing estimates, we are simply tacking on historic mid cycle and peak margins respectively to current pricing levels. The underlying theory is that if our cost curve suggests that a marginal producer is making break-even economics at current ethylene prices of say USD1,222/ton, for example, then pricing needs to rise to USD1,448/ton (current price of USD1,222/ton plus a historic mid cycle margin of USD226/ton) for that producer to make normal mid cycle margins. Similarly, to attain peak margins, prices would need to rise to USD1,594/ton. This implies that in an energy price environment like today's, ethylene prices could rise c18% from current levels under mid cycle conditions and 30% under peak conditions, and correspondingly cash margins could rise USD225/ton–USD375/ton depending on the phase of the cycle, all else being equal.

### Marginal producers' chemical pricing and margins in different phases of the cycle (cents/lb)

	High-cost producer margins			Current price	Price		
	Trough	Normal	Peak		Trough	Normal	Peak
Ammonia	0	115	220	460	460	575	680
EO/EG	0	125	393	1,200	1,200	1,325	1,593
Ethylene	0	226	372	1,222	1,222	1,448	1,594
Methanol	0	100	200	420	420	520	620
PE	0	430	586	1,725	1,725	2,155	2,311
PP	0	134	259	1,565	1,565	1,699	1,824
PVC	0	145	230	1,040	1,040	1,185	1,270
Urea	0	115	220	350	350	465	570

Source: Corporate reports, AlembicHC

Taking our mid cycle and peak pricing and margin analysis to the next level, in the table on the following page we provide product capacities and EBITDA generation potentials for the MENA petrochemical names under our coverage. In the same analysis, we evaluate what the peak EPS potential for these companies could be using product margin sensitivities, 2010 EPS and EBITDA, and the earlier established peak margins, and we determine what the peak valuation would be using each of the prior peak P/E multiples shown in the table on the previous page. According to this analysis, every name under our coverage except SAFCO could experience 50%–100% upside from current levels in a peak scenario.

## MENA petrochemical companies' peak earnings power and valuations

	Units	APC	IQ	SABIC	SAFCO	Yansab
<b>Annual external sales volumes</b>						
Ammonia	m tons	0.00	0.30	0.35	0.77	0.00
EO/EG	m tons	0.00	0.00	2.99	0.00	0.77
Ethylene	m tons	0.00	0.10	0.92	0.00	0.00
Methanol	m tons	0.00	0.50	2.27	0.38	0.00
PE	m tons	0.00	0.79	5.19	0.00	0.80
PP	m tons	0.55	0.00	1.92	0.00	0.40
PVC	m tons	0.00	0.00	0.42	0.00	0.00
Urea	m tons	0.00	4.09	1.77	2.27	0.00
<b>2010 EBITDA</b>	<b>QARm/SARm</b>	<b>572</b>	<b>5,806</b>	<b>47,083</b>	<b>2,869</b>	<b>3,546</b>
<b>2010 EPS</b>	<b>QAR/SAR</b>	<b>2.32</b>	<b>10.14</b>	<b>7.20</b>	<b>12.73</b>	<b>2.97</b>
<b>Peak swing</b>						
Ammonia	QARm/SARm	0	236	289	635	0
EO/EG	QARm/SARm	0	0	4,407	0	1,135
Ethylene	QARm/SARm	0	139	1,283	0	0
Methanol	QARm/SARm	0	364	1,703	282	0
PE	QARm/SARm	0	1,681	11,405	0	1,758
PP	QARm/SARm	534	0	1,865	0	389
PVC	QARm/SARm	0	0	358	0	0
Urea	QARm/SARm	0	3,278	1,460	1,873	0
<b>Implied EBITDA</b>	<b>QARm/SARm</b>	<b>1,106</b>	<b>11,505</b>	<b>69,852</b>	<b>5,659</b>	<b>6,827</b>
D&A	QARm/SARm	211	1,182	11,635	248	1,020
EBIT	QARm/SARm	895	10,323	58,217	5,411	5,807
Interest expense	QARm/SARm	-48	-210	-2,760	88	-425
Other income	QARm/SARm	0	380	3,500	650	0
Taxes	QARm/SARm	-34	-262	-2,358	-246	-215
Net income	QARm/SARm	813	10,230	56,599	5,903	5,167
<b>Peak EPS</b>	<b>QAR/SAR</b>	<b>5.75</b>	<b>18.60</b>	<b>18.87</b>	<b>23.61</b>	<b>9.19</b>
<b>Peak valuation</b>						
Valuation at '88 multiple	QAR/SAR	45	144	146	183	71
Valuation at '95 multiple	QAR/SAR	47	151	153	192	75
Valuation at '05 multiple	QAR/SAR	66	213	216	271	105
<b>Upside to peak valuation</b>						
Valuation at '88 multiple		44%	5%	39%	-2%	48%
Valuation at '95 multiple		51%	10%	46%	2%	55%
Valuation at '05 multiple		114%	56%	106%	44%	119%

Source: Corporate analysis, AlembicHC

## Valuation

Our preferred methodology for valuing commodity chemical companies is the normalized valuation framework. In our normalized valuation approach, we determine a mid cycle, or 'normalized,' earnings estimate for each company under our coverage based on a historical trend line through 1 full commodity cycle. The implied growth rate of this earnings trend is the average return on capital for that company through the cycle.

However, this methodology is not applicable to companies for which we do not have a long enough earnings history or historical figures relating to individual product margins in the region, as is the case with Saudi Kayan and Yansab. This makes it virtually impossible to do a bottom-up analysis of a company's normal earnings power. For both such companies we either use a multiple based valuation approach, assigning these companies average multiples in line with their global peer groups, or base valuation on a replacement value analysis.



## Risks

The macro risks to our bullish view of the commodity chemical cycle can be lumped into four main categories: (1) demand, (2) the Middle East, (3) China, and (4) energy prices.

### Demand

Capacity is physical and easy to understand. Demand tends to be much harder to forecast and hence remains among the main risks. Almost every positive and negative surprise in the industry over the last 25 years has come from demand. The 2 prior up cycles were, for the most part, initiated by surges in demand associated with inventory builds in periods of strong economic and consumer spending growth, and the 2 subsequent downturns were initiated by inventory reductions, resulting in much weaker than expected demand.

Today, we are seeing some inventory build, but with energy prices relatively high we could see energy prices come down, resulting in a decrease in inventories in the near to medium term. A weak GDP driven reduction in demand could also drive prices lower and result in lower than forecasted profitability.

### Middle East

Improved political ties between Iran and the Western world could very well lead to the removal of sanctions and accelerated capacity builds in the country. This would slacken supply/demand relative to our base case assumptions.

### China

Any GDP driven deceleration in China would have a dire impact on global ethylene demand, resulting in lower than expected global capacity utilization.

### Energy prices

Our positive view on North American commodity chemical producers is predicated in part on a continuation of the disconnect between crude oil and natural gas prices. Under the current energy price regime, MENA chemical producers are benefiting from the pricing umbrella provided by the higher-cost Asian and European naphtha based producers. Any 'normalization' in the crude oil/natural gas ratio could result in declining profitability and, in turn, negative earnings revisions and poor stock price performance for MENA petrochemical company shares.

## Rating scale

Recommendation	Potential return
Overweight	Greater than 20%
Neutral	0% to 20%
Underweight	Less than 0%

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